MySQL 5.1

MySQLMySQL dev.mysql.com

This translation was done by MySQL partner GreatLinux, Beijing, People's Republic of China. GreatLinux Inc. MySQL
sales@greatlinux.com

2006-7-27HTML
hemon.ecjtu.net

MySQL MySQL 5.15.1.2-alpha

2005-11-15

1.
- 1.1.
- 1.2.
- 1.3. MySQL AB
- 1.4. MySQL
  - 1.4.1. MySQL
  - 1.4.2. MySQL
  - 1.4.3. MySQL
  - 1.4.4. MySQL
  - 1.4.5. 2000
- 1.5. MaxDB
  - 1.5.1. MaxDB
  - 1.5.2. MaxDB
  - 1.5.3. MaxDB
  - 1.5.4.
  - 1.5.5. MaxDBMySQL
  - 1.5.6. MaxDBMySQL
  - 1.5.7. MaxDB
- 1.6. MySQL
  - 1.6.1. MySQL 5.1
- 1.7. MySQL
  - 1.7.1. MySQL
  - 1.7.2. IRCMySQL
  - 1.7.3. MySQLMySQL
- 1.8. MySQL
  - 1.8.1. MySQL
  - 1.8.2. SQL
  - 1.8.3. ANSIMySQL
  - 1.8.4. MySQLSQL
  - 1.8.5. MySQLSQL
  - 1.8.6. MySQL

2. MySQL
2.1.
2.1.1. MySQL
2.1.2. MySQL
2.1.3. MySQL
2.1.4. MD5GnuPG
2.1.5.
2.2. MySQL
2.3. WindowsMySQL
2.3.1. Windows
2.3.2.
2.3.3. MySQL
2.3.4. MySQL
2.3.5.
2.3.6. ZipMySQL
2.3.7.
2.3.8.
2.3.9. MySQL
2.3.10.
2.3.11. WindowsMySQL
2.3.12. WindowsMySQL
2.3.13. MySQL
2.3.14. WindowsMySQL
2.3.15. WindowsMySQL
2.3.16. WindowsMySQLUnixMySQL
2.4. LinuxMySQL
2.5.Mac OS XMySQL
2.6. NetWareMySQL
2.7. UnixMySQL
2.8. MySQL
2.8.1.
2.8.2.
2.8.3.
2.8.4. MySQL
2.8.5. MIT-pthreads
2.8.6. WindowsMySQL
2.8.7. WindowsMySQL
2.9.

2.9.1. Windows
2.9.2. Unix
2.9.3. MySQL
2.10. MySQL
2.10.1. 5.0
2.10.2.
2.10.3. MySQL
2.11. MySQL
2.12.
2.12.1. Linux
2.12.2. Mac OS X
2.12.3. Solaris
2.12.4. BSD
2.12.5. Unix
2.12.6. OS/2
2.13. Perl
2.13.1. UnixPerl
2.13.2. WindowsActiveState Perl
2.13.3. Perl DBI/DBD

3.
3.1.
3.2.
3.3.
3.3.1.
3.3.2.
3.3.3.
3.3.4.
3.4.
3.5. **my**sql
3.6.
3.6.1.
3.6.2.
3.6.3.
3.6.4.
3.6.5.
3.6.6.
3.6.7.
3.6.8.
3.6.9. AUTO_INCREMENT
3.7.
3.7.1.
3.7.2.
3.8. ApacheMySQL

4. MySQL
    4.1. MySQL
    4.2. MySQL
    4.3.
        4.3.1.
        4.3.2.
        4.3.3.
        4.3.4.

5.
5.1. MySQL
5.1.1.
5.1.2. mysq**ld-maxMy**SQL
5.1.3. mysqld_safeMySQL
5.1.4. mysql.serverMySQL
5.1.5. mysqld_multiMySQL
5.2. mysqlmanagerMySQL
5.2.1. MySQLMySQL
5.2.2. MySQL
5.2.3. MySQL
5.2.4. MySQL
5.2.5. MySQL
5.3. mysqldMySQL
5.3.1. **mysqld**
5.3.2. SQL
5.3.3.
5.3.4.
5.4. mysql_fix_privilege_tablesMySQL
5.5. MySQL
5.6.
5.6.1.
5.6.2. MySQL
5.6.3. Mysqld
5.6.4. LOAD DATA LOCAL
5.7. MySQL
5.7.1.
5.7.2.
5.7.3. MySQL
5.7.4. MySQL
5.7.5. , 1
5.7.6. , 2
5.7.7.
5.7.8.
5.7.9. MySQL 4.1
5.8. MySQL
5.8.1. MySQL
5.8.2. MySQL

5.8.3. MySQL
5.8.4.
5.8.5.
5.8.6.
5.8.7.
5.9.
5.9.1.
5.9.2.
5.9.3.
5.9.4.
5.9.5. myisamchkMyISAM
5.9.6.
5.9.7.
5.10. MySQL
5.10.1.
5.10.2.
5.10.3.
5.10.4.
5.10.5.
5.10.6.
5.10.7.
5.10.8. MySQL
5.11. MySQL
5.11.1.
5.11.2.
5.11.3.
5.11.4.
5.11.5.
5.12. MySQL
5.12.1. Windows
5.12.2. Unix
5.12.3.
5.13. MySQL
5.13.1.
5.13.2. SELECT
5.13.3.
5.13.4.

6. MySQL
    6.1.
    6.2.
    6.3.
        6.3.1.
        6.3.2. I/O
        6.3.3. SQL
        6.3.4.
    6.4.
    6.5. MySQL
    6.6.
        6.6.1. 5.0
    6.7.
    6.8.
    6.9. FAQ
    6.10.
    6.11.
    6.12. Auto-Increment

7.
7.1.
7.1.1. MySQL
7.1.2.
7.1.3. MySQL
7.1.4. MySQL
7.1.5.
7.2. SELECT
7.2.1. EXPLAINSELECT
7.2.2.
7.2.3. SELECT
7.2.4. MySQLWHERE
7.2.5.
7.2.6.
7.2.7. MySQLIS NULL
7.2.8. MySQLDISTINCT
7.2.9. MySQLLEFT JOINRIGHT JOIN
7.2.10. MySQLJoin
7.2.11. MySQL
7.2.12. MySQLORDER BY
7.2.13. MySQLGROUP BY
7.2.14. MySQLLIMIT
7.2.15.
7.2.16. INSERT
7.2.17. UPDATE
7.2.18. DELETE
7.2.19.
7.3.
7.3.1.
7.3.2.
7.4.
7.4.1.
7.4.2.
7.4.3.
7.4.4.
7.4.5. MySQL
7.4.6. MyISAM
7.4.7. MyISAM

7.4.8. MySQL
7.4.9. MySQL
7.4.10.
7.5. MySQL
7.5.1.
7.5.2.
7.5.3.
7.5.4. MySQL
7.5.5. MySQL
7.5.6. MySQLDNS
7.6.
7.6.1.

8.
8.1.
8.2. myisampackMyISAM
8.3. mysqlMySQL
8.3.1.
8.3.2. **mysql**
8.3.3. SQL
8.3.4. **mysql**
8.4. mysqlaccess
8.5. mysqladminMySQL
8.6. mysqlbinlog
8.7. mysqlcheck
8.8. mysqldump
8.9. mysqlhotcopy
8.10. mysqlimport
8.11. mysqlshow
8.12. myisamlogMyISAM
8.13. perror
8.14. replace
8.15. mysql_zap

9.
9.1.
9.1.1.
9.1.2.
9.1.3.
9.1.4.
9.1.5.
9.1.6. NULL
9.2.
9.2.1.
9.2.2.
9.3.
9.4.
9.4.1.
9.5.
9.6. MySQL

10.
10.1.
10.2. MySQL
10.3.
10.3.1.
10.3.2.
10.3.3.
10.3.4.
10.3.5.
10.3.6.
10.3.7.
10.3.8. SQLCOLLATE
10.3.9. COLLATE
10.3.10. BINARY
10.3.11.
10.3.12.
10.3.13.
10.4.
10.4.1.
10.4.2. CONVERT()
10.4.3. CAST()
10.4.4. SHOW
10.5. Unicode
10.6. UTF8
10.7. DBMS
10.8.
10.9.
10.10. MySQL
10.10.1. Unicode
10.10.2.
10.10.3.
10.10.4.
10.10.5.
10.10.6.
10.10.7.

11.
11.1.
11.1.1.
11.1.2.
11.1.3.
11.2.
11.3.
11.3.1. DATETIMEDATETIMESTAMP
11.3.2. TIME
11.3.3. YEAR
11.3.4. Y2K
11.4. String
11.4.1. CHARVARCHAR
11.4.2. BINARYVARBINARY
11.4.3. BLOBTEXT
11.4.4. ENUM
11.4.5. SET
11.5.
11.6.
11.7.

12.
12.1.
12.1.1.
12.1.2.
12.1.3.
12.1.4.
12.2.
12.3.
12.3.1.
12.4.
12.4.1.
12.4.2.
12.5.
12.6. MySQL
12.7.
12.7.1.
12.7.2.
12.7.3.
12.7.4.
12.7.5. MySQL
12.8. Cast
12.9.
12.9.1.
12.9.2.
12.9.3.
12.9.4.
12.10. GROUP BY
12.10.1. GROUP BY
12.10.2. GROUP BY
12.10.3. GROUP BY

13. SQL
13.1.
13.1.1. ALTER DATABASE
13.1.2. ALTER TABLE
13.1.3. CREATE DATABASE
13.1.4. CREATE INDEX
13.1.5. CREATE TABLE
13.1.6. DROP DATABASE
13.1.7. DROP INDEX
13.1.8. DROP TABLE
13.1.9. RENAME TABLE
13.2.
13.2.1. DELETE
13.2.2. DO
13.2.3. HANDLER
13.2.4. INSERT
13.2.5. LOAD DATA INFILE
13.2.6. REPLACE
13.2.7. SELECT
13.2.8. Subquery
13.2.9. TRUNCATE
13.2.10. UPDATE
13.3. MySQL
13.3.1. DESCRIBE
13.3.2. USE
13.4. MySQL
13.4.1. START TRANSACTION, COMMITROLLBACK
13.4.2.
13.4.3.
13.4.4. SAVEPOINTROLLBACK TO SAVEPOINT
13.4.5. LOCK TABLESUNLOCK TABLES
13.4.6. SET TRANSACTION
13.4.7. XA
13.5.
13.5.1.
13.5.2.
13.5.3. SET
13.5.4. SHOW

13.5.5.
13.6.
13.6.1. SQL
13.6.2. SQL
13.7. SQL

14. _____
14.1. ____
14.2. ____
14.3. MySQL _____
14.4. _____
14.5. _____
14.6. _____
14.7. _____
14.8. _____
14.9. _____

15.
15.1. MyISAM
15.1.1. MyISAM
15.1.2.
15.1.3. MyISAM
15.1.4. MyISAM
15.2. InnoDB
15.2.1. InnoDB
15.2.2. InnoDB
15.2.3. InnoDB
15.2.4. InnoDB
15.2.5. InnoDB
15.2.6. InnoDB
15.2.7. InnoDB
15.2.8. InnoDB
15.2.9. InnoDB
15.2.10. InnoDB
15.2.11. InnoDB
15.2.12.
15.2.13.
15.2.14. I/O
15.2.15. InnoDB
15.2.16. InnoDB
15.2.17. InnoDB
15.3. MERGE
15.3.1. MERGE
15.4. MEMORY (HEAP)
15.5. BDB (BerkeleyDB)
15.5.1. BDB
15.5.2. BDB
15.5.3. BDB
15.5.4. BDB
15.5.5. BDB
15.5.6. BDB
15.5.7. BDB
15.6. EXAMPLE
15.7. FEDERATED
15.7.1. FEDERATED

15.7.2. FEDERATED
15.7.3. FEDERATED
15.7.4. FEDERATED
15.8. ARCHIVE
15.9. CSV
15.10. BLACKHOLE

16.
16.1.
16.2.
16.3.
16.4. handlerton
16.5.
16.6.
16.7.
16.8.
16.9.
16.9.1. store_lock()
16.9.2. external_lock()
16.9.3. rnd_init()
16.9.4. info()
16.9.5. extra()
16.9.6. rnd_next()
16.10.
16.11. INSERT
16.12. UPDATE
16.13. DELETE
16.14. API
16.14.1. bas_ext
16.14.2. close
16.14.3. create
16.14.4. delete_row
16.14.5. delete_table
16.14.6. external_lock
16.14.7. extra
16.14.8. info
16.14.9. open
16.14.10. rnd_init
16.14.11. rnd_next
16.14.12. store_lock
16.14.13. update_row
16.14.14. write_row

17. MySQL
17.1. MySQL
17.2. MySQL
17.3.
17.3.1.
17.3.2.
17.3.3.
17.3.4.
17.3.5.
17.3.6.
17.4. MySQL
17.4.1. MySQL
17.4.2.
17.4.3. MySQL
17.4.4.
17.5. MySQL
17.5.1. MySQLMySQL
17.5.2. **ndbd**
17.5.3. **ndb_mgmd**“”
17.5.4. **ndb_mgm**“”
17.5.5. MySQL
17.6. MySQL
17.6.1. MySQL
17.6.2. “”
17.6.3. MySQL
17.6.4.
17.6.5. MySQL
17.7. MySQL
17.7.1. MySQLSCI
17.7.2.
17.8. MySQL
17.9. MySQL
17.9.1. MySQL 5.0MySQL
17.9.2. MySQLMySQL 5.1
17.10. MySQL
17.11. MySQL

18.
18.1. MySQL
18.2.
18.2.1. RANGE
18.2.2. LIST
18.2.3. HASH
18.2.4. KEY
18.2.5.
18.2.6. MySQLNULL
18.3.
18.3.1. RANGELIST
18.3.2. HASHKEY
18.3.3.
18.3.4.

19. MySQL
19.1.
19.2. OpenGIS
19.2.1. Geometry
19.2.2. Geometry
19.2.3. Point
19.2.4. Curve
19.2.5. LineString
19.2.6. Surface
19.2.7. Polygon
19.2.8. GeometryCollection
19.2.9. MultiPoint
19.2.10. MultiCurve
19.2.11. MultiLineString
19.2.12. MultiSurface
19.2.13. MultiPolygon
19.3.
19.3.1. (WKT)
19.3.2. (WKB)
19.4. MySQL
19.4.1. MySQL
19.4.2.
19.4.3.
19.4.4.
19.4.5.
19.5.
19.5.1. Geometry
19.5.2. Geometry
19.5.3. GeometryGeometry
19.5.4.
19.5.5. MBR
19.5.6.
19.6.
19.6.1.
19.6.2.
19.7. MySQL
19.7.1. GIS

20.
20.1.
20.2.
20.2.1. CREATE PROCEDURECREATE FUNCTION
20.2.2. ALTER PROCEDUREALTER FUNCTION
20.2.3. DROP PROCEDUREDROP FUNCTION
20.2.4. SHOW CREATE PROCEDURESHOW CREATE FUNCTIO
20.2.5. SHOW PROCEDURE STATUSSHOW FUNCTION STATUS
20.2.6. CALL
20.2.7. BEGIN ... END
20.2.8. DECLARE
20.2.9.
20.2.10.
20.2.11.
20.2.12.
20.3.
20.4.

21. _____
21.1. CREATE TRIGGER ___
21.2. DROP TRIGGER ___
21.3. _____

22.
22.1. ALTER VIEW
22.2. CREATE VIEW
22.3. DROP VIEW
22.4. SHOW CREATE VIEW

23. INFORMATION_SCHEMA
23.1. INFORMATION_SCHEMA
23.1.1. INFORMATION_SCHEMA SCHEMATA
23.1.2. INFORMATION_SCHEMA TABLES
23.1.3. INFORMATION_SCHEMA COLUMNS
23.1.4. INFORMATION_SCHEMA STATISTICS
23.1.5. INFORMATION_SCHEMA USER_PRIVILEGES
23.1.6. INFORMATION_SCHEMA SCHEMA_PRIVILEGES
23.1.7. INFORMATION_SCHEMA TABLE_PRIVILEGES
23.1.8. INFORMATION_SCHEMA COLUMN_PRIVILEGES
23.1.9. INFORMATION_SCHEMA CHARACTER_SETS
23.1.10. INFORMATION_SCHEMA COLLATIONS
23.1.11. INFORMATION_SCHEMA COLLATION_CHARACTER_SET_APPLICABILITY
23.1.12. INFORMATION_SCHEMA TABLE_CONSTRAINTS
23.1.13. INFORMATION_SCHEMA KEY_COLUMN_USAGE
23.1.14. INFORMATION_SCHEMA ROUTINES
23.1.15. INFORMATION_SCHEMA VIEWS
23.1.16. INFORMATION_SCHEMA TRIGGERS
23.1.17. INFORMATION_SCHEMA
23.2. SHOW

24. _____
24.1. _____
24.2. DECIMAL _____
24.3. _____
24.4. _____
24.5. _____

25. API
25.1. libmysqldMySQL
25.1.1. MySQL
25.1.2. libmysqld
25.1.3. MySQL
25.1.4.
25.1.5. (TODO)
25.1.6.
25.1.7.
25.2. MySQL C API
25.2.1. C API
25.2.2. C API
25.2.3. C API
25.2.4. C API
25.2.5. C API
25.2.6. C API
25.2.7. C API
25.2.8. C API
25.2.9. C API
25.2.10. C API
25.2.11. C API
25.2.12. C API
25.2.13. C API
25.2.14.
25.2.15.
25.3. MySQL PHP API
25.3.1. MySQLPHP
25.4. MySQL Perl API
25.5. MySQL C++ API
25.5.1. Borland C++
25.6. MySQL Python API
25.7. MySQL Tcl API
25.8. MySQL Eiffel Wrapper
25.9. MySQL
25.9.1. msql2mysqlmSQLMySQL
25.9.2. mysql_config

26.
- 26.1. MySQL Connector/ODBC
  - 26.1.1. MyODBC
  - 26.1.2. ODBCMyODBC
  - 26.1.3. MyODBC
  - 26.1.4. WindowsMyODBC
  - 26.1.5. IUnixMyODBC
  - 26.1.6. WindowsMyODBC
  - 26.1.7. UnixMyODBC
  - 26.1.8. BitKeeperMyODBC
  - 26.1.9. MyODBC
  - 26.1.10. MyODBC
  - 26.1.11. MyODBCMicrosoft Access
  - 26.1.12. MyODBCMicrosoft VBAASP
  - 26.1.13. MyODBCODBC
  - 26.1.14. MyODBC
  - 26.1.15. MyODBC
  - 26.1.16. MyODBC API
  - 26.1.17. MyODBC
  - 26.1.18. MyODBC
  - 26.1.19. MyODBCVBADODAORDO
  - 26.1.20. MyODBCMicrosoft.NET
  - 26.1.21.
- 26.2. MySQL Connector/NET
  - 26.2.1.
  - 26.2.2. MySQL Connector/NET
  - 26.2.3. Connector/NET
  - 26.2.4. MySQL Connector/NET
  - 26.2.5. MySQL Connector/NET
- 26.3. MySQL Connector/J
  - 26.3.1. JDBC
  - 26.3.2. Connector/J
  - 26.3.3. JDBC
  - 26.3.4. J2EEJava Connector/J
  - 26.3.5. Connector/J
  - 26.3.6. Changelog
- 26.4. MySQL Connector/MXJ
  - 26.4.1.

26.4.2.
26.4.3. Junit
26.4.4. Junit
26.4.5. JDBC
26.4.6. Java
26.4.7. MysqldResource API
26.4.8. JMX(custom)
26.4.9. JMX (JBoss)
26.4.10.

27. MySQL
27.1. MySQL
27.1.1. MySQL
27.1.2. MySQL
27.2. MySQL
27.2.1.
27.2.2. CREATE FUNCTION/DROP FUNCTION
27.2.3.
27.2.4.
27.3. MySQL
27.3.1.
27.3.2.
A.
A.1.
A.2. MySQL
A.2.1.
A.2.2. [local] MySQL
A.2.3.
A.2.4.
A.2.5. hos *t_name*
A.2.6.
A.2.7.
A.2.8. MySQL
A.2.9.
A.2.10.
A.2.11.
A.2.12.
A.2.13.
A.2.14.
A.2.15. tbl_na *me*
A.2.16.
A.2.17.
A.3.
A.3.1. MySQL
A.3.2. MySQL
A.3.3.
A.4.
A.4.1.

A.4.2. MySQL
A.4.3. MySQL
A.4.4. MySQL
A.4.5. MySQL/tmp/mysql.sock
A.4.6.
A.5.
A.5.1.
A.5.2. DATE
A.5.3. NULL
A.5.4.
A.5.5.
A.5.6.
A.5.7.
A.5.8.
A.6.
A.7.
A.7.1. ALTER TABLE
A.7.2.
A.7.3. TEMPORARY TABLE
A.8. MySQL
A.8.1. MySQL
B.
B.1.
B.2.
C.
C.1. MySQL AB
C.2. MySQL
C.3.
C.4. MySQL
C.5. MySQL
C.6. MySQL
C.7. MySQL
D. MySQL
D.1. 5.1.x
D.1.1. 5.1.2
D.1.2. 5.1.1
D.2. MyODBC
D.2.1. MyODBC 3.51.12
D.2.2. MyODBC 3.51.11

E.
E.1. MySQL
E.1.1. MySQL
E.1.2.
E.1.3. gdbm **ysqld**
E.1.4.
E.1.5. mysqld
E.1.6.
E.2. MySQL
E.3. DBUG
E.4. RTS
E.5.
F.
G. MySQL
H. MySQL
H.1.
I.
I.1.
I.2.
I.3.
I.4.
I.5. XA
J. GNU
K. MySQL FLOSS

14.1. MySQL
14.2.
16.1. MySQL

26.1.
26.2.
26.3. ResultSet.getObject()MySQLJava
26.4. MySQLJava

26.1. DriverManager
26.2. java.sql.StatementSELECT
26.3.
26.4. Connection.prepareCall()
26.5.
26.6. CallableStatement
26.7.
26.8. Statement.getGeneratedKeys()AUTO_INCREMENT
26.9. SELECT LAST_INSERT_ID()AUTO_INCREMENT
26.10. ResultSetsAUTO_INCREMENT
26.11. UnixCLASSPATH
26.12. J2EE
26.13.

5.15.1.2-alphaMySQLMySQLMySQL 5.1MySQL *MySQL 5.0* MySQL 5.0 *MySQL 4.1*MySQL 4.1MySQL5.1.xMySQL 5.1

MySQLMySQL dev.mysql.com

1

1.1.
1.2.
1.3. MySQL AB
1.4. MySQL
    1.4.1. MySQL
    1.4.2. MySQL
    1.4.3. MySQL
    1.4.4. MySQL
    1.4.5. 2000
1.5. MaxDB
    1.5.1. MaxDB
    1.5.2. MaxDB
    1.5.3. MaxDB
    1.5.4.
    1.5.5. MaxDBMySQL
    1.5.6. MaxDBMySQL
    1.5.7. MaxDB
1.6. MySQL
    1.6.1. MySQL 5.1
1.7. MySQL
    1.7.1. MySQL
    1.7.2. IRCMySQL
    1.7.3. MySQLMySQL
1.8. MySQL
    1.8.1. MySQL
    1.8.2. SQL
    1.8.3. ANSIMySQL
    1.8.4. MySQLSQL
    1.8.5. MySQLSQL
    1.8.6. MySQL

MySQL®SQL

MySQLGNU http://www.fsf.org/licenses/MySQLMySQL

http://www.mysql.com/company/legal/licensing/

- MySQL 1.4.2 “MySQL”
- 2MySQL
- MySQL E
- 5.0 2.10.1“5.0”
- MySQL 3
- SQL sql-bench
- D *MySQL*
- A.8 “MySQL”
- 1.6 “MySQL”
- C

http://bugs.mysql.com1.7.1.3 “”

MySQL security@mysql.com

1.1.

5.15.1.2-alphaMySQLMySQLMySQL
MySQL 5.0 *MySQL 4.1* MySQL 3.223.234.04.15.1.x
5.1

SQL

MySQL http://dev.mysql.com/doc/HTMLPDFWindows
CHM

DocBook XMLHTML DocBook XSL sty

docs@mysql.com

David AxmarkMichael “ Monty” WideniusMySQLPaul
HinzMike HillyerJon Stephens C

MySQL ABMySQL ®MySQLMySQL AB

1.2.

· SQLCPerl FLUSH PRIVILEGES

· **mysql**MySQL **mysqld**MySQL

·

· “ my.cnf/etc”

· “%”

·

·

shell>mysql> **mysql**

```
shell> type a shell command hereshell
mysql> type a mysql statement heremysql
```

“shell” Unix **shcshbash**Windows **command.comcmd.exe**

db_nametbl_namecol_name

```
mysql> SELECT col_name FROM db_name.tbl_name;
```

```
mysql> SELECT author_name FROM biblio_db.author_list;
```

SQL

“[”“]” IF EXISTS

```
DROP TABLE [IF EXISTS] tbl_name
```

“|”“[”“]”

```
TRIM([[BOTH | LEADING | TRAILING] [remstr] FROM] str)
```

“ {”“ }”

```
{DESCRIBE | DESC} tbl_name [col_name | wild]
```

… INSERT ... SELECTSLECTINSERT

*reset_option*1

```
RESET reset_option [,reset_option] ...
```

shellBourne shellBourne

```
shell> VARNAME=value some_command
```

cshtcsh

```
shell> setenv VARNAME value
shell> some_command
```

1.3. MySQL AB

MySQL ABMySQLMySQL ABDavid AxmarkAllan Larsson
Michael“Monty”Widenius

MySQLMySQL ABMySQLMySC

1.4 “MySQL”

MySQLMySQL

MySQL ABMySQL

.

.

.

.

.

.

MySQL AB

.

.

.

.

. “”

.

MySQLhttp://www.mysql.com/MySQLMySQL

“AB”“ aktiebolag”“”“MySQL”MySQL MySQLGmbHMySQL AB

1.4. MySQL

1.4.1. MySQL
1.4.2. MySQL
1.4.3. MySQL
1.4.4. MySQL
1.4.5. 2000

MySQLSQLMySQL ABMySQL ABMySQL

MySQLhttp://www.mysql.com/MySQLMySQL

· MySQL

MySQL

- MySQL

  MySQLSQL“”SQLANSI/ISO
  “ SQL-92”1992“SQL:1999”1999“SQL:2003”
  “SQL”SQL

- MySQL

  “”InternetMySQLMySQLGPLGNU
  http://www.fsf.org/licenses/GPLMySQLMySQL
  http://www.mysql.com/company/legal/licensing/

- MySQL

  MySQLMySQL

  MySQLMySQLMySQLMySQLInternet

- MySQL/

  MySQL/1SQLAPI

MySQL

- MySQL

  MySQL

“MySQL”“ My Ess Que Ell”“ my sequel”,“ my sequel”

1.4.1. MySQL

mSQLISAMmSQLSQLAPImSQL APImSQLMySQL

MySQL10“my”Monty

MySQL Dolphin“ Sakila”MySQL AB“ TwebazeAmbroseSakilaSiSwatiSakilaArushaAmbrose

1.4.2. MySQL

MySQL 1.6“MySQL”

.

o CC++

o

o 2.1.1 “MySQL”

o GNU AutomakeAutoconfLibtool

o CC++EiffelJavaPerlPHPPythonRubyTclAPI 25API

o CPUCPU

o

o “B” MyISAM

- SQL
-
- “”
-
- SQL
- PurifyGPLValgrind http://developer.kde.org/~sewardj/MySQL
- /

  -
    - /12348 FLOATDOUBLECHARVARCHARTEXTBLOBDATETIMEDAT OpenGIS 11
    -
  -
    - SELECTWHERE

      ```
      mysql> SELECT CONCAT(first_name, ' ', last_name)
          -> FROM citizen
          -> WHERE income/dependents > 10000 AND age > 30;
      ```

    - SQL GROUP BYORDER BY(COUNT(), COUNT(DISTINCT ...)AVG()STD()SUM()MAX()MIN()GROUP_CONCAT())
    - LEFT OUTER JOINRIGHT OUTER JOIN SQLODBC
    - SQL
    - DELETEINSERT REPLACEUPDATE
    - MySQL SHOWEXPLAIN

- ABS“(”
- MySQL 3.22

-

-

- MySQL5MySQL6000050
- 64MySQL 4.1.2321161000MySQL CHARVARCHARBLOBTEXT

-

- TCP/IPMySQLWindowsNTNT2000XP2003 UnixUnix
- MySQL 4.1“ --shared-memory”Windows“ protocol=memory”
- Connector/ODBC (MyODBC)ODBCMySQLMS AccessMySQLWindowsUnixMyODBCODBC 26
- Connector/JJDBCJavaMySQLWindowsUnixConnector/J 26

-
- 5.10.2“”
- latin1 (cp1252) germanbig5ujis ‘ 4.1Unicode
-
- MySQLCzechMySQL

-
  - MySQLSQL
    MyISAM 5
  - MySQL“ -help”“-?”

1.4.3. MySQL

“MySQL”“MySQL”

2080ISAMMySQL

MySQL“”“”MySQL3.23
“” A.8“MySQL”

MySQL

· Replication

MySQL 5.x

· InnoDB

3.23.49 InnoDB InnoDB

· BDB

Berkeley DBMySQL BDB

·

MySQL 4.04.1

· MyODBC 3.51

MyODBC 3.51ODBC SDK 3.51ODBC

1.4.4. MySQL

MySQL 3.224GBMySQL 3.23 MyISAM 65536TB256 ^{7} – 1
MySQLMySQL

InnoDBInnoDB64TB

Linux 2.2-Intel 32-bit	2GB (LFS: 4GB)
Linux 2.4+	(using ext3 filesystem) 4TB
Solaris 9/10	16TB
NetWare w/NSS filesystem	8TB
win32 w/ FAT/FAT32	2GB/4GB
win32 w/ NTFS	2TB
MacOS X w/ HFS+	2TB

Linux 2.2ext2LFS2GB MyISAM Linux 2.4ReiserFS 2TBLinux2.4LFSJFSXFSpetabyteLinux
MySQL

LinuxLFSAndreas Jaeger“Linux”
http://www.suse.de/~aj/linux_lfs.html

Windows FATVFAT (FAT32)MySQLNTFS

MySQL MyISAM4GB SHOW TABLE STATUS**myisamchk -dv *tbl_name***
13.5.4“SHOW”

4GBMyISAMAVG_ROW_LENGTH MAX_ROWSCREATE TA
13.1.5“CREATE TABLE” ALTER TABLE 1
“ALTER TABLE”

MyISAM

· **myisampack** **myisampack**50 **myisampack**1
8.2“myisampackMyISAM”

· MySQLMyISAMMERGEMyISAM MERGE 15.3“MERGE”

1.4.5. 2000

MySQL2000Y2K

· MySQLUnix TIMESTAMP2037 DATEDATETIME9999

· MySQL1sql/time.cc2000

· MySQL 3.22 YEAR1019012155 19702069YEAR01
MySQL2001

MySQL9999 DATEDATETIME2030TIMESTAMP

```
mysql> DROP TABLE IF EXISTS y2k;
Query OK, 0 rows affected (0.01 sec)

mysql> CREATE TABLE y2k (date DATE,
    ->                   date_time DATETIME,
    ->                   time_stamp TIMESTAMP);
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> INSERT INTO y2k VALUES
    -> ('1998-12-31','1998-12-31 23:59:59',19981231235959),
    -> ('1999-01-01','1999-01-01 00:00:00',19990101000000),
    -> ('1999-09-09','1999-09-09 23:59:59',19990909235959),
    -> ('2000-01-01','2000-01-01 00:00:00',20000101000000),
    -> ('2000-02-28','2000-02-28 00:00:00',20000228000000),
    -> ('2000-02-29','2000-02-29 00:00:00',20000229000000),
    -> ('2000-03-01','2000-03-01 00:00:00',20000301000000),
    -> ('2000-12-31','2000-12-31 23:59:59',20001231235959),
    -> ('2001-01-01','2001-01-01 00:00:00',20010101000000),
    -> ('2004-12-31','2004-12-31 23:59:59',20041231235959),
    -> ('2005-01-01','2005-01-01 00:00:00',20050101000000),
    -> ('2030-01-01','2030-01-01 00:00:00',20300101000000),
    -> ('2040-01-01','2040-01-01 00:00:00',20400101000000),
    -> ('9999-12-31','9999-12-31 23:59:59',99991231235959);
Query OK, 14 rows affected (0.01 sec)
Records: 14  Duplicates: 0  Warnings: 2

mysql> SELECT * FROM y2k;
+------------+---------------------+----------------+
| date       | date_time           | time_stamp     |
+------------+---------------------+----------------+
| 1998-12-31 | 1998-12-31 23:59:59 | 19981231235959 |
| 1999-01-01 | 1999-01-01 00:00:00 | 19990101000000 |
| 1999-09-09 | 1999-09-09 23:59:59 | 19990909235959 |
```

```
| 2000-01-01 | 2000-01-01 00:00:00 | 20000101000000 |
| 2000-02-28 | 2000-02-28 00:00:00 | 20000228000000 |
| 2000-02-29 | 2000-02-29 00:00:00 | 20000229000000 |
| 2000-03-01 | 2000-03-01 00:00:00 | 20000301000000 |
| 2000-12-31 | 2000-12-31 23:59:59 | 20001231235959 |
| 2001-01-01 | 2001-01-01 00:00:00 | 20010101000000 |
| 2004-12-31 | 2004-12-31 23:59:59 | 20041231235959 |
| 2005-01-01 | 2005-01-01 00:00:00 | 20050101000000 |
| 2030-01-01 | 2030-01-01 00:00:00 | 20300101000000 |
| 2040-01-01 | 2040-01-01 00:00:00 | 00000000000000 |
| 9999-12-31 | 9999-12-31 23:59:59 | 00000000000000 |
+------------+---------------------+----------------+
14 rows in set (0.00 sec)
```

2TIMESTAMP020409999TIMESTAMP TIMESTAMP32
19700101000000203001010000064 TIMESTAMP2106

MySQL2000Y2K24“00”“99”“”

MySQLY2KMySQL2 11.3.4“Y2K”

1.5. MaxDB

1.5.1. MaxDB
1.5.2. MaxDB
1.5.3. MaxDB
1.5.4.
1.5.5. MaxDBMySQL
1.5.6. MaxDBMySQL
1.5.7. MaxDB

MaxDBSAP

MaxDBSAP DB2003SAP AGMySQL A
SAP

MySQL ABMaxDBSAPMaxDBMaxDB
MySQLMaxDBMaxDBMaxDBMySQL

MaxDBMySQLMaxDBMySQLMySQL

MySQL ABMaxDB

1.5.1. MaxDB

MaxDBANSI SQL-92SAP AGRDBMS)MySQL
24x7TB

19772080NixdorfSiemens
VDNReflexSupra 2DDB/4Entire SQL-DB-ServerADABAS
1997SAPAPSAP DB200010GNUSAP

2003SAP AGMySQL ABMaxDB

1.5.2. MaxDB

MaxDBSAP DBSAP AGDBMSMaxDBSAP DBM
DBMSSQL

OracleMicrosoft SQL ServerIBM DB2SAP DB2
GNU GPL JGNU SAP DB

MaxDB3500SAPSAPITUnixLinuxDBMSMaxDBMaxDB
OLTPGBTB

2003SAPMySQL7.5200311SAPSAP

MaxDB 7.5SAP DB 7.4MaxDB7.5SAP DB

SAP AGSAP DBMaxDBMySQL ABSAPMaxDBMaxDB 1.5
“MaxDB” SAP AGMySQL ABMaxDBMaxDBMySQL

SAPMySQLMaxDBSAP AG

1.5.3. MaxDB

MaxDBSAPOLTPOLAPmySAPMySQL

MaxDB/OLTP/OLAP/

· GUIDBMS

·

·

· **TB**

·

1.5.4.

MySQL ABMaxDBGNUMaxDB
http://www.mysql.com/company/legal/licensing/

MySQL ABSAPMaxDBMaxDB/Web

MaxDBSapSAP NetWeavermySAPMySQL

AB

MySQLMaxDB http://www.mysql.com/training/

1.5.5. MaxDBMySQL

MaxDBMySQL ABSAPMaxDBMySQL ABMaxDBMySQL

MaxDBMySQL

· MaxDB/MySQL/

· MaxDBMySQL

· MaxDBMySQLTCP/IPSSLUnixWindows

· MaxDBMySQL5.0MaxDBSQLMySQL

· MaxDBWebMySQLMySQLMySQLMySQL
Web

· MaxDBMySQLMaxDBMaxDB
JDBCPerlPythonMaxDB PHPPHPMySQL
DBADODAORDO.NETODBCMaxDBSQLC/C++

· MaxDBMySQL

1.5.6. MaxDBMySQL

MaxDBMySQLMaxDBMySQLMaxDB
MaxDB

MaxDBMaxDBCSVMaxDB
MaxDB **mysqldump**INSERTSELECT ... INTO OUTFILECSVMax
MySQL

MaxDBMySQL**mysqldump**SQL“”MaxDBMySQLSQL
Mysqldump“ --compatible-name = maxdb” MaxDB

MaxDB 7.6MaxDBMaxDBMySQLMySQL

MySQLMaxDBMySQL2005MySQLMySQLMaxDB

1.5.7. MaxDB

MaxDB http://www.mysql.com/products/maxdbMaxDB

MySQLMaxDBMaxDBMaxDBMaxDB
http://dev.mysql.com/doc/maxdb/index.html

MySQL ABMaxDB http://lists.mysql.com/maxdb

MaxDBWebhttp://forums.mysql.com/MaxDBSAP

1.6. MySQL

1.6.1. MySQL 5.1

MySQLMySQL

MySQL 5.02005105.0.15MySQL
4.1MySQL 4.03.23

MySQL 5.05.1MySQL

1 2.10“MySQL”

	MySQ
Foreign keys	3.23 InnoDB
Unions	4.0
Subqueries	4.1
R-trees	4.1 MyISAM
Stored procedures	5.0
Views	5.0
Cursors	5.0

XA transactions	5.0
Foreign keys	5.1 3.23 InnoDB
Triggers	5.05.1
Full outer joins	5.1
Constraints	5.1 3.23 InnoDB
Partitioning	5.1
Pluggable Storage Engine API	5.1
Row-Based Replication	5.1

1.6.1. MySQL 5.1

MySQL 5.1 [1.6“MySQL”](#) 5.1

[18](#)

1.7. MySQL

1.7.1. MySQL
1.7.2. IRCMySQL
1.7.3. MySQLMySQL

1.7.1. MySQL

1.7.1.1. MySQL
1.7.1.2.
1.7.1.3.
1.7.1.4.

MySQL

1.7.1.1. MySQL

http://lists.mysql.com/

MySQL lists.mysql.com MySQL

ID

MySQL

.

MySQL1MySQL

· mysql

MySQL

.

MySQL 1.7.1.3“”

.

MySQLMySQL

· mysqldoc

MySQL MySQL AB

.

MySQL

· packagers

MySQLMySQLMySQL

· java

MySQLJavaJDBCMySQL

· win32

MicrosoftWindows 9x, Me, NT, 2000, XP2003My

· myodbc

ODBCMySQL

· gui-tools

MySQL GUI MySQLMySQL

· cluster

MySQL

· dotnet

MySQL.NETMySQL Connector/Net

· plusplus

C++ APIMySQL

· perl

PerlMySQL DBD::mysql

MySQLMySQL ABMySQL

MySQLMySQL AB

· <mysql-france-subscribe@yahoogroups.com>

· <list@tinc.net>

mysql your@email.address

· <mysql-de-request@lists.4t2.com>

mysql-de your@email.addresshttp://www.4t2.com/mysql/

· <mysql-br-request@listas.linkway.com.br>

mysql-br your@email.address

· <mysql-alta@elistas.net>

mysql your@email.address

1.7.1.2.

· MySQL http://dev.mysql.com/doc/ http://dev.mysql.com/doc/mysql/en/News.html

· http://bugs.mysql.com/

· MySQL http://lists.mysql.com/

· http://www.mysql.com/search/MySQL AB

MySQLMySQL

1.7.1.3.

http://bugs.mysql.com/1

1

mysqlbug **Mysqlbug**MySQLbin **mysqlbug** WindowsMySQL

mysqlbug

MySQL“ mysql test < script_file”ShellPerl

http://bugs.mysql.com/MySQL

MySQL security@mysql.com

1 http://bugs.mysql.com/ **mysqlbug**MySQL

MySQL

aMySQLbMySQL99“”
MySQLMySQL

MySQLMySQL

Connector/ODBC (MyODBC)1 26.1.1.9“MyODBC”

80 **mysql**“ --vertical”“ \G” EXPLAIN SELECT

· MySQLMySQL 4.0.12 **mysqladmin version** **Mysqladmin** MySQLbin

·

· Windows“”“ /Windows ”Unix uname –a

·

· MySQL

·

· **mysqld** **mysqld** **mysqld** **mysqld** E.1.5“mysqld ”

· **mysqldump --no-data *db_name tbl_name***

· SELECT“EXPLAIN SELECT ...”SELE
SHOW CREATE TABLE *tbl_name*

mysqlbug **mysql**80“ \G”

```
mysql> SHOW VARIABLES;
mysql> SHOW COLUMNS FROM ...\G
       <output from SHOW COLUMNS>
mysql> EXPLAIN SELECT ...\G
       <output from EXPLAIN>
mysql> FLUSH STATUS;
mysql> SELECT ...;
       <A short version of the output from SELECT,
       including the time taken to run the query>
mysql> SHOW STATUS;
       <output from SHOW STATUS>
```

· **mysqld** http://bugs.mysql.com/

mysqladmin variables extended-status processlist

· 10 **mysqldump**README

targzipzipFTP ftp://ftp.mysql.com/pub/mysql/upload/
http://bugs.mysql.com/

· MySQL

· FTP
ftp://ftp.mysql.com/pub/mysql/upload/

· **mysqld**MySQL **mysqldmysqlconfigure**
PerlPHP

· **mysqlaccess** **mysqladmin reload** **mysqlaccess**
mysqladmin reload version **mysqlaccess**MySQLbin

·

· MySQL

·

· MySQL http://dev.mysql.com/doc/MySQL
<licensing@mysql.com>

MySQLMySQLMySQL DMySQL

· CHECK TABLEREPAIR TABLE**myisamchk** 5

Windows SHOW VARIABLES LIKE 'lower_case_table_names'
“ lower_case_table_names”

· MySQL
mysqld **mysqld** A.1“”

· MySQLMySQLMySQL 2.1.2“MySQL ”

mysql-support@mysql.com

MyODBC 26.1.1.9“MyODBC”

A

1.7.1.4.

HTML

1.7.2. IRCMySQL

MySQLIRC

· **Freenode** http://www.freenode.net/

o #mysqlMySQLSQLMySQLPHPPerlC

URCIRC xChathttp://www.xchat.org/X-ChatGPLUnix WindowsWindowsX-Chat http://www.silverex.org/down

1.7.3. MySQLMySQL

http://forums.mysql.com

·

· MySQL

- MySQL
-
-
-
-
- MySQL
- SQL
-

1.8. MySQL

1.8.1. MySQL
1.8.2. SQL
1.8.3. ANSIMySQL
1.8.4. MySQLSQL
1.8.5. MySQLSQL
1.8.6. MySQL

MySQLANSI/ISO SQLMySQLSQLMySQL

SQL1986“ SQL-92”1992“SQL:1999”1999“SQL:2003” “SQL”SQL

MySQLMySQL

SQLMySQLSQLSQLMySQL4.0 HANDLER 13.2.3“HANDLER”

Web

MySQL100-1100MBMySQLTBMySQL

MySQL

4.1.2NDB 17 *MySQL*

XML

1.8.1. MySQL

ANSI/ISO SQL

ODBC0-3.51

1.8.2. SQL

MySQLSQL

MySQLSQLMySQL

“ --sql-mode="modes"” **mysqld**SQLMySQL 4.1 [SESSION|GLOBAL] sql_mode='modes' sql_mode

5.3.2“SQL”

1.8.3. ANSIMySQL

“ --ansi” **mysqld**ANSI 5.3.1“ **mysqld**”

ANSI“ --sql_mode”

```
--transaction-isolation=SERIALIZABLE
--sql-mode=REAL_AS_FLOAT,PIPES_AS_CONCAT,ANSI_QUOTES,
IGNORE_SPACE
```

MySQL 4.1“ sql_mode”

```
SET GLOBAL TRANSACTION ISOLATION LEVEL SERIALIZABLE;
SET GLOBAL sql_mode = 'REAL_AS_FLOAT,PIPES_AS_CONCAT,ANSI_QUOTES,
IGNORE_SPACE';
```

1.8.2“SQL”

MySQL 4.1.1 sql_mode

```
SET GLOBAL sql_mode='ansi';
```

sql_modeANSI

```
mysql> SET GLOBAL sql_mode='ansi';
mysql> SELECT @@global.sql_mode;
        -> 'REAL_AS_FLOAT,PIPES_AS_CONCAT,ANSI_QUOTES,
            IGNORE_SPACE,ANSI';
```

1.8.4. MySQLSQL

MySQLSQL DBMSSQLMySQL“ MySQLMySQLSQL

```
SELECT /*! STRAIGHT_JOIN */ col_name FROM table1,table2 WHERE ...
```

“!”MySQL

```
CREATE /*!32302 TEMPORARY */ TABLE t (a INT);
```

3.23.02MySQL TEMPORARY

MySQL

.

MySQLMySQL1

o UnixMySQL

o MyISAMISAM MyISAM .MYD.MYI.frm

.

o “ ””“ ””“ ””

o “ \”

o SQL“ *db_name.tbl_name*”SQLMySQL CREATE TABLE ralph.my_table...IN my_tablespace.

· SQL

o ANALYZE TABLECHECK TABLEOPTIMIZE TABLEREPAIR TABLE

o CREATE DATABASEDROP DATABASE 13.1.3“CREATE DATABASE”

o DO

- EXPLAIN SELECT
- FLUSHRESET
- SET 13.5.3“SET”
- SHOW 13.5.4“SHOW”
- LOAD DATA INFILEOracle LOAD DATA INFILE 13.2.5 “LOAD DATA INFILE”
- RENAME TABLE13.1.9“RENAME TABLE”
- REPLACEDELETE + INSERT13.2.6“REPLACE”
- ALTER TABLECHANGE col_nameDROP col_nameDROP INDEXIGNORERENAMEALTER TABLE ADDALTERDROPCHANG 13.1.2“ALTER TABLE”
- CREATE TABLEINDEX KEY 13.1.5“CREATE TABLE
- CREATE TABLETEMPORARYIF NOT EXISTS
- DROP TABLEIF EXISTS
- DROP TABLE
- UPDATEDELETEORDER BYLIMIT
- INSERT INTO ... SET col_name = ... syntax.
- INSERTREPLACEDELAYED
- INSERTREPLACEDELETEUPDATELOW_PRIORITY
- SELECTINTO OUTFILESTRAIGHT_JOIN 13.2.7“SELECT”
- SELECTSQL_SMALL_RESULT
- GROUP BY 12.10“GROUP BY ”

- GROUP BYASCDESC
- “ :=”
- ```
  mysql> SELECT @a:=SUM(total),@b=COUNT(*),@a/@b
  ```
- ```
      -> FROM test_table;
  ```
- ```
  mysql> SELECT @t1:=(@t2:=1)+@t3:=4,@t1,@t2,@t3
  ```

.

- MEDIUMINTSETENUMBLOBTEXT
- AUTO_INCREMENTBINARYNULLUNSIGNEDZEROFILL

.

- SQLMySQLSQLODBC
- MySQL“ ||”“ &&” ORANDCMySQL ||OR&&AND MySQLSQL“ ||”CONCAT() CONCAT()
- 1COUNT(DISTINCT list)
- cp1252
- “%” MOD()“ N % M”MOD(N,M)Cyuyan“%”PostgreSQL
- SELECTFROM= <><=<>=><<>><=>ANDORLIKE
- ```
  mysql> SELECT col1=1 AND col2=2 FROM tbl_name;
  ```
- AUTO_INCREMENTLAST_INSERT_ID() 12.9.3“”
- LIKE
- REGEXPNOT REGEXP
- 12CONCAT()CHAR()MySQL
-

BIT_COUNT()CASEELT()FROM_DAYS()FORMAT()IF()PASSWORD()ENCF
WEEKDAY()

o TRIM()SQL

GROUP BYSTD()BIT_OR()BIT_AND()BIT_XOR() GROUP_CONCAT()
12.10“GROUP BY ”

1.8.5. MySQLSQL

1.8.5.1.
1.8.5.2. SELECT INTO TABLE
1.8.5.3.
1.8.5.4.
1.8.5.5.
1.8.5.6.
1.8.5.7. ‘--’

MySQLANSI SQLODBC SQLMySQL

· VARCHARMySQL 5.0.3 A.

· CHARVARCHAR MySQL 5.0.3 13.1.5.1“”

· REVOKE 13.5.1.3“GRANTREVOKE”

· CAST()REALBIGINT12.8“Cast”

· SQL SELECTHAVINGGROUP BYMySQL 5.0.2

1.8.5.1.

MySQL 4.1“”SELECT“”FROM
“Subquery”

MySQL 4.1 13.2.8.11“MySQL”

1.8.5.2. SELECT INTO TABLE

MySQLSybase SQL SELECT ... INTO TABLE ....MySQLSQLINSERT INTO ... SELECT ... 13.2.4.1“INSERT ... SELECT”

```
INSERT INTO tbl_temp2 (fld_id)
    SELECT tbl_temp1.fld_order_id
    FROM tbl_temp1 WHERE tbl_temp1.fld_order_id > 100;
```

SELECT INTO OUTFILE ...CREATE TABLE ... SELECT

5.0MySQL SELECT ... INTO 20.2.9.3“SELECT ... INTO”

1.8.5.3.

MySQL3.234.0 InnoDBBDBInnoDB ACID 15

MySQL MyISAM“” MyISAMAUTOCOMMIT=1

MySQL

CPU

MyISAM MySQL

1. ROLLBACKCOMMIT

MySQLMySQL

2. “”

3. MySQL

35

MySQL LOCK TABLES READ LOCAL INSERT

“”MySQL

· LOCK TABLES

· ROLLBACK

1. LOCK TABLES
2.
3.
4. UNLOCK TABLES

.

o

o

UPDATE

```
UPDATE tablename SET pay_back=pay_back+125;
```

```
UPDATE customer
  SET
    customer_date='current_date',
    address='new address',
    phone='new phone',
    money_owed_to_us=money_owed_to_us-125
  WHERE
    customer_id=id AND address='old address' AND phone='old phone';
```

pay_backmoney_owed_to_us

· LOCK TABLESROLLBACKID AUTO_INCREMENT LAST_INSERT_ID() SQL mysql_insert_id() C API 25.2.3.36“mysql_insert_id()”

InnoDB

```
UPDATE tbl_name SET row_flag=1 WHERE id=ID;
```

row_flag1 MySQL1

MySQL

```
UPDATE tbl_name SET row_flag=1 WHERE id=ID AND row_flag <> 1;
```

1.8.5.4.

MySQL5.0 20

5.0.2MySQLMySQL 5.1 21

1.8.5.5.

MySQL3.23.44 InnoDBCASCADE ON DELETEON UPDATE15.2.6.4 “FOREIGN KEY”

InnoDB MySQLCREATE TABLEFOREIGN KEY **mysqldump**ODBC MyISAM

.

.

.

.

MySQL MyISAM MyISAMINSERTSELECT 7.3.2“”

.

· ON DELETE MySQL4.0 DELE
”

· ON DELETEDELETE

.

· DBAMySQL 15.2.6.4“FOREIGN KEY
” MySQL 4.1.1 **mysqldump**

SQLSELECT

```
SELECT * FROM t1, t2 WHERE t1.id = t2.id;
```

13.2.7.1“JOIN” 3.6.6“”

ODBC“ ON DELETE ...” FOREIGN KEYWHERE

1.8.5.6.

MySQL5.05.0.1 22

ViewMySQL

SQL“ Codd's Rule #6” “”

1.8.5.7. ‘--’

SQL“ --”MySQL“ #”MySQLC /**/ 9.5“”

MySQL3.23.3“ --”1SQL“ !payment!”

“ payment”

```
UPDATE account SET credit=credit-!payment!
```

“ payment”“-1”

```
UPDATE account SET credit=credit--1
```

SQL“ credit--1” “--1”

```
UPDATE account SET credit=credit
```

“ --”

MySQL3.23.3“ credit--1”

mysql“ --”

3.23.3MySQL

1SQL“ --” **replace**“#”

```
shell> replace " --" " #" < text-file-with-funny-comments.sql \
         | mysql db_name
```

```
shell> mysql db_name < text-file-with-funny-comments.sql
```

“--”“#”

```
shell> replace " --" " #" -- text-file-with-funny-comments.sql
```

```
shell> replace " #" " --" -- text-file-with-funny-comments.sql
```

1.8.6. MySQL

1.8.6.1. PRIMARY KEYUNIQUE
1.8.6.2.
1.8.6.3. ENUMSET

MySQLMySQLDBMS

MySQL

MySQL

MySQL 5.0.2SQLMySQLDBMSSQL
5.3.2“SQL”

1.8.6.1. PRIMARY KEYUNIQUE

INSERTUPDATE InnoDB MySQLMySQL

MySQL INSERTUPDATEIGNORE MySQL 13.2.4 “INSERT” 3.2.10“UPDATE”

mysql_info() C API 25.2.3.34“m
WARNINGS 13.5.4.22“SHOW WARNINGS”

InnoDB 15.2.6.4“FOREIGN KEY” MySQL 5.1 MyIS

1.8.6.2.

MySQL 5.0.2MySQLMySQL
SQL

“”NULLNULLMySQL“”

· MySQL0

· MySQL

· MySQL0

· MySQLDATEDATETIME“ 2000-02-31”“2000-02-00” SQL MySQLMySQL“

· NULLNULLINSERT INSERTINSERT INTO ... SELECT

MySQL 0(")“zero” 13.1

· INSERT DEFAULT MySQL DEFAULT MySQL

“”“”

MySQL 5.0.2 STRICT_TRANS_TABLESSTRICT_ALL_TABLES SQL
5.3.2“SQL”

STRICT_TRANS_TABLES

·

· 1
STRICT_TRANS_TABLESMySQL

STRICT_ALL_TABLES STRICT_TRANS_TABLES

INSERT IGNOREUPDATE IGNOREIGNOREINSERT UPDATE

1.8.6.3. ENUMSET

ENUMSET MySQL 5.0.2 ENUMSET NOT NULL
“”

ENUM1NULLNULL1

ENUMIGNOREENUM 0 11.4.4“ENUM”

SET “a”“b”“c”“a,x,b,y”“a,b” 11.4.5“SET”

5.0.2SQL 5.3.2“SQL” ENUMSET

· ENUM 0 ENUM('a','b','c')" 'd''ax'

· SET1 SE

INSERT IGNOREUPDATE IGNORE ENU

'a,x,b,y''a,b'

MySQLMySQL dev.mysql.com

2MySQL

2.1.
2.1.1. MySQL
2.1.2. MySQL
2.1.3. MySQL
2.1.4. MD5GnuPG
2.1.5.
2.2. MySQL
2.3. WindowsMySQL
2.3.1. Windows
2.3.2.
2.3.3. MySQL
2.3.4. MySQL
2.3.5.
2.3.6. ZipMySQL
2.3.7.
2.3.8.
2.3.9. MySQL
2.3.10.
2.3.11. WindowsMySQL
2.3.12. WindowsMySQL
2.3.13. MySQL
2.3.14. WindowsMySQL
2.3.15. WindowsMySQL
2.3.16. WindowsMySQLUnixMySQL
2.4. LinuxMySQL
2.5.Mac OS XMySQL
2.6. NetWareMySQL
2.7. UnixMySQL
2.8. MySQL
2.8.1.
2.8.2.
2.8.3.
2.8.4. MySQL

2.8.5. MIT-pthreads
2.8.6. WindowsMySQL
2.8.7. WindowsMySQL
2.9.
2.9.1. Windows
2.9.2. Unix
2.9.3. MySQL
2.10. MySQL
2.10.1. 5.0
2.10.2.
2.10.3. MySQL
2.11. MySQL
2.12.
2.12.1. Linux
2.12.2. Mac OS X
2.12.3. Solaris
2.12.4. BSD
2.12.5. Unix
2.12.6. OS/2
2.13. Perl
2.13.1. UnixPerl
2.13.2. WindowsActiveState Perl
2.13.3. Perl DBI/DBD

MySQL

1. MySQL 2.1.1“MySQL”

2. **MySQL** 2.1.2“MySQL”

3. **MySQL** 2.1.3“MySQL” 2.1.4“MD5GnuPG ”

4. 2.2“MySQL” 2.8“MySQL”

   MySQL MySQL2.10“MySQL”

   2.12“”

5. MySQL 2.9“” MySQL MySQL **MySQL**

MySQL　　MySQLPerl2.13“Perl”

2.1.

2.1.1. MySQL
2.1.2. MySQL
2.1.3. MySQL
2.1.4. MD5GnuPG
2.1.5.

MySQL

1. MySQL

2.

3.

2.1.1. MySQL

MySQL

GNU Autoconf**MySQL**PosixC++ (C++)Linux(SuSERed Hat)FreeBSDSun Solaris(89)

MySQL/

· AIX 4.x5.x2.12.5.3“IBM-AIX”

· Amiga

· MIT-pthreadsBSDI 2.x2.12.4.4“BSD/OS 2.x”

· BSDI3.0,3.14.x2.12.4.4“BSD/OS 2.x”

· Digital Unix 4.x2.12.5.5“Alpha-DEC-UNIX(Tru64)”.

· MIT-pthreadsFreeBSD 2.x2.12.4.1“FreeBSD”

· FreeBSD 3.x4.x2.12.4.1“FreeBSD”

· LinuxThreadsFreeBSD 4.x2.12.4.1“FreeBSD”

· DCEMIT-pthreadsHP-UX 10.202.12.5.1“HP-UX 10.20”

· HP-UX 11.x2.12.5.2“HP-UX 11.x”

· LinuxThreads 0.7.1+glibc 2.0.7+CPULinux 2.0+2.12.1“Linux”

· Mac OS X2.12.2“Mac OS X”

· NetBSD 1.3/1.4 IntelNetBSD 1.3 Alpha(GNU make)2.12.4.2 “NetBSD”

· Novell NetWare 6.02.6“NetWareMySQL”

· OpenBSD > 2.5MIT-pthreadsOpenBSD < 2.52.12.4.3“OpenBSD 2.5 ”

· OS/2 Warp 3, FixPack 29OS/2 Warp 4, FixPack 4. 2.12.6“OS/2”

· FSU PthreadsSCO OpenServer 5.0.X2.12.5.8“SCO UNIXOpenServer 5.0.x”

· SCO UnixWare 7.1.x2.12.5.9“SCO UnixWare 7.1.xOpenUNIX 8.0.0 ”

· SCO Openserver 6.0.x2.12.5.10“SCO OpenServer 6.0.x”

· SGI Irix 6.x2.12.5.7“SGI Irix”

· SPARCx86Solaris 2.5 2.12.3“Solaris”

· MIT-pthreadsSunOS 4.x2.12.3“Solaris”

· Tru64 Unix2.12.5.5“Alpha-DEC-UNIX(Tru64)”

· Windows 9xMeNT2000XP20032.3“WindowsMySQL”

MySQLMySQL

· MySQL

· (SMP) CPU

· pthread_mutex_lock()CPU MySQL CPUMySQL

·

·

· MySQL AB MySQL

·

· MySQL

MySQLx86,SuSE Linux2.42.6 ReiserFS(Linux) Solaris(2.7-9) SPARCFreeBSD MySQL MySQL MySQL MySQL internals 1.7.1.1“The MySQL”

OSMySQL OSOS MySQL

2.1.2. MySQL

2.1.2.1. MySQL
2.1.2.2.
2.1.2.3.
2.1.2.4.
2.1.2.5. MySQL ABMySQL

MySQL MySQL

2.1.2.1. MySQL

MySQL

· MySQL 5.2 Alpha

· MySQL 5.1()

· MySQL 5.0()

· MySQL 4.03.23()

“”

, **MySQL** MySQL 5.1MySQLMySQL

BitKeeper

MySQL3 **mysql-5.0.9-beta**

· 1(**5**) 5

· 2(**0**)

· 3(**9**) (release)()

· **alpha** D *MySQL*alpha alpha

· **beta** alpha alpha**beta**

beta APISQL

· **rc** beta (gamma)

. “”

MySQL

MySQL

.

mysql-test 27.1.2“MySQL”

· MySQL

· crash-me

7.1.4“MySQL”

MySQL 100GB

2.1.2.2.

MySQL LinuxRPM Mac OS XDMG Zip**tar**

.

· () MySQLMySQL

MySQL-max **mysqld-max** 5.1.2“mysq **ld-maxMy**SQL”

MySQL-Max RPMMySQL-server RPM

MySQL

· MySQL MySQL

· **mysqld**

o --with-innodb(MySQL 5.1)

o --with-berkeley-db()

o --with-libwrap

o --with-d-z-libs()

o --with-debug[=full]

· **mysqld** MySQL

· (pgcc)

· BitKeeper MySQL

· ()**MySQL**CC++

·

2.1.2.3.

MySQL MySQL

D *MySQL*

MySQL

· 1

· 1-2

· /4-8

·

· BitKeeper

•

2.1.2.4.

MySQL (“” MySQL

A.8“MySQL”

MySQL ()

· http://bugs.mysql.com/ MySQL

·

· (90%

· MySQL

· MySQL MySQL(3.23.x4.0.x4.1.x5.0.x) (MySQL) A.8 “MySQL”

· (15+)

·

· 2-3 ( )

· http//dev.mysql.com/ mysqlannounce 1.7.1.1“The MySQL”

· MySQL 4-8MySQL http://downloads.mysql.com/snapshots.php

·

· 150 10 3 glibc

2.1.2.5. MySQL ABMySQL

MySQL AB MySQL MySQL

tar(.tar.gz) 2.2“MySQL”

Windows 2.3“WindowsMySQL”

Build-tools/Do-compile **scripts/make_binary_distribution**tar.gz

tarbin/mysqlbugCOMP_ENV_INFO CONFIGURE_LINE

- MySQL AB

  · Linux 2.4.xx x86**gcc** 2.95.3

  CFLAGS="-O2 -mcpu=pentiumpro" CXX=gcc CXXFLAGS="-O2 -mcpu=pentiumpro -felide-constructors" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --disable-shared --with-client-ldflags=-all-static --with-mysqld-ldflags=-all-static

  · Linux 2.4.x x86**icc**(Intel C++ Compiler 8.1)

  CC=icc CXX=icpc CFLAGS="-O3 -unroll2 -ip -mp -no-gcc -restrict" CXXFLAGS="-O3 -unroll2 -ip -mp -no-gcc -restrict" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --disable-shared --with-client-ldflags=-all-static --with-mysqld-ldflags=-all-static --with-embedded-server --with-innodb

  Intel 8.1“” C(icc)C++(icpc) **icc** 8.0MySQLCXX=icc

  · Linux 2.4.xx Intel Itanium 2**ecc** (Intel C++ Itanium Compiler 7.0)

  CC=ecc CFLAGS="-O2 -tpp2 -ip -nolib_inline" CXX=ecc CXXFLAGS="-O2 -tpp2 -ip -nolib_inline" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile

  · Linux 2.4.xx Intel Itanium**ecc**(Intel C++ Itanium Compiler 7.0)

  CC=ecc CFLAGS=-tpp1 CXX=ecc CXXFLAGS=-tpp1 ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile

  · Linux 2.4.xx alphaccc(Compaq C V6.2-505 / Compaq C++ V6.3-006)

  CC=ccc CFLAGS="-fast -arch generic" CXX=cxx CXXFLAGS="-fast -

arch generic -noexceptions -nortti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-mysqld-ldflags=-non_shared --with-client-ldflags=-non_shared --disable-shared

· Linux 2.x.xx ppc**gcc** 2.95.4

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-embedded-server --with-innodb

· Linux 2.4.xx s390**gcc** 2.95.3

CFLAGS="-O2" CXX=gcc CXXFLAGS="-O2 -felide-constructors" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-client-ldflags=-all-static --with-mysqld-ldflags=-all-static

· Linux 2.4.xx x86_64(AMD64)**gcc** 3.2.1

CXX=gcc ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared

· Sun Solaris 8 x86**gcc** 3.2.3

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-inno

· Sun Solaris 8 SPARC**gcc** 3.2

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-

exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --with-named-z-libs=no --with-named-curses-libs=-lcurses --disable-shared

· Sun Solaris 8 SPARC 64-bit**gcc** 3.2

CC=gcc CFLAGS="-O3 -m64 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -m64 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --with-named-curses-libs=-lcurses --disable-shared

· Sun Solaris 9 SPARC**gcc** 2.95.3

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --with-named-curses-libs=-lcurses --disable-shared

· Sun Solaris 9 SPARCcc-5.0(Sun Forte 5.0)

CC=cc-5.0 CXX=CC ASFLAGS="-xarch=v9" CFLAGS="-Xa -xstrconst -mt -D_FORTEC_ -xarch=v9" CXXFLAGS="-noex -mt -D_FORTEC_ -xarch=v9" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --with-named-z-libs=no --enable-thread-safe-client --disable-shared

· IBM AIX 4.3.2 ppc**gcc** 3.2.3

CFLAGS="-O2 -mcpu=powerpc -Wa,-many " CXX=gcc CXXFLAGS="-O2 -mcpu=powerpc -Wa,-many -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --disable-shared

· IBM AIX 4.3.3 ppcxlC_r(IBM Visual Age C/C++ 6.0)

CC=xlc_r CFLAGS="-ma -O2 -qstrict -qoptimize=2 -qmaxmem=8192" CXX=xlC_r CXXFLAGS ="-ma -O2 -qstrict -qoptimize=2 -qmaxmem=8192" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --disable-shared --with-innodb

· IBM AIX 5.1.0 ppc**gcc** 3.3

CFLAGS="-O2 -mcpu=powerpc -Wa,-many" CXX=gcc CXXFLAGS="-O2 -mcpu=powerpc -Wa,-many -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --disable-shared

· IBM AIX 5.2.0 ppcxlC_r(IBM Visual Age C/C++ 6.0)

CC=xlc_r CFLAGS="-ma -O2 -qstrict -qoptimize=2 -qmaxmem=8192" CXX=xlC_r CXXFLAGS="-ma -O2 -qstrict -qoptimize=2 -qmaxmem=8192" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --disable-shared --with-embedded-server --with-innodb

· HP-UX 10.20 pa-risc1.1**gcc** 3.1

CFLAGS="-DHPUX -I/opt/dce/include -O3 -fPIC" CXX=gcc CXXFLAGS="-DHPUX -I/opt/dce /include -felide-constructors -fno-exceptions -fno-rtti -O3 -fPIC" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-pthread --with-named-thread-libs=-ldce --with-lib-ccflags=-fPIC --disable-shared

· HP-UX 11.00 pa-riscaCC(HP ANSI C++ B3910B A.03.50)

CC=cc CXX=aCC CFLAGS=+DAportable CXXFLAGS=+DAportable ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-embedded-

server --with-innodb

· HP-UX 11.11 pa-risc2.0 64bitaCC(HP ANSI C++ B3910B A.03.33)

CC=cc CXX=aCC CFLAGS=+DD64 CXXFLAGS=+DD64 ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared

· HP-UX 11.11 pa-risc2.0 32bitaCC(HP ANSI C++ B3910B A.03.33)

CC=cc CXX=aCC CFLAGS="+DAportable" CXXFLAGS="+DAportable" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-innodb

· HP-UX 11.22 ia64 64bitaCC(HP aC++/ANSI C B3910B A.05.50)

CC=cc CXX=aCC CFLAGS="+DD64 +DSitanium2" CXXFLAGS="+DD64 +DSitanium2" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-embedded-server --with-innodb

· Apple Mac OS X 10.2 powerpc**gcc** 3.1

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared

· FreeBSD 4.7 i386**gcc** 2.95.4

CFLAGS=-DHAVE_BROKEN_REALPATH ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --with-named-z-libs=not-used --disable-shared

· LinuxThreadsFreeBSD 4.7 i386**gcc** 2.95.4

CFLAGS="-DHAVE_BROKEN_REALPATH -D__USE_UNIX98 -D_REENTRANT -D_THREAD_SAFE -I/usr/local/include/pthread/linuxthreads" CXXFLAGS="-DHAVE_BROKEN_REALPATH -D__USE_UNIX98 -D_REENTRANT -D_THREAD_SAFE -I/usr/local/include/pthread/linuxthreads" ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --enable-thread-safe-client --enable-local-infile --enable-assembler --with-named-thread-libs="-DHAVE_GLIBC2_STYLE_GETHOSTBYNAME_R -D_THREAD_SAFE -I /usr/local/include/pthread/linuxthreads -L/usr/local/lib -llthread -llgcc_r" --disable-shared --with-embedded-server --with-innodb

· QNX Neutrino 6.2.1 i386**gcc** 2.95.3qnx-nto 20010315

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared

MySQL AB MySQL AB

· SCO Unix 3.2v5.0.7 i386**gcc** 2.95.3:

CFLAGS="-O3 -mpentium" LDFLAGS=-static CXX=gcc CXXFLAGS="-O3 -mpentium -felide-constructors" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --enable-thread-safe-client --disable-shared

· SCO UnixWare 7.1.4 i386**CC** 3.2:

CC=cc CFLAGS="-O" CXX=CC ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --enable-thread-safe-client --disable-shared --with-readline

· CO OpenServer 6.0.0 i386**CC** 3.2:

CC=cc CFLAGS="-O" CXX=CC ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-z-libs=no --enable-thread-safe-client --disable-shared --with-readline

· Compaq Tru64 OSF/1 V5.1 732 alphacc/cxx(Compaq C V6.3-029i / DIGITAL C++ V6.1-027):

CC="cc -pthread" CFLAGS="-O4 -ansi_alias -ansi_args -fast -inline speed -speculate all" CXX="cxx -pthread" CXXFLAGS="-O4 -ansi_alias -fast -inline speed -speculate all -noexceptions -nortti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --with-named-thread-libs="-lpthread -lmach -lexc -lc" --disable-shared --with-mysqld-ldflags=-all-static

· SGI Irix 6.5 IP32**gcc** 3.0.1:

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared

· FreeBSD/sparc64 5.0**gcc** 3.2.1:

CFLAGS=-DHAVE_BROKEN_REALPATH ./configure --prefix=/usr/local/mysql --localstatedir=/usr/local/mysql/data --libexecdir=/usr/local/mysql/bin --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --disable-shared --with-innodb

MySQL AB

· Linux 2.2.xx SPARC**egcs** 1.1.2:

CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex --enable-thread-safe-client --enable-local-infile --enable-assembler --disable-shared

· Linux 2.2.x x686**gcc** 2.95.2:

CFLAGS="-O3 -mpentiumpro" CXX=gcc CXXFLAGS="-O3 -mpentiumpro -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --enable-assembler --with-mysqld-ldflags=-all-static --disable-shared --with-extra-charsets=complex

· SunOS 4.1.4 2 sun4c**gcc** 2.7.2.1:

CC=gcc CXX=gcc CXXFLAGS="-O3 -felide-constructors" ./configure --prefix=/usr/local/mysql --disable-shared --with-extra-charsets=complex --enable-assembler

· SunOS 5.5.1()sun4u**egcs** 1.0.3a2.90.27**gcc** 2.95.2:

· CC=gcc CFLAGS="-O3" CXX=gcc CXXFLAGS="-O3 -felide-constructors -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql --with-low-memory --with-extra-charsets=complex --enable-assembler

· SunOS 5.6 i86pc**gcc** 2.8.1:

CC=gcc CXX=gcc CXXFLAGS=-O3 ./configure --prefix=/usr/local/mysql --with-low-memory --with-extra-charsets=complex

· BSDI BSD/OS 3.1 i386**gcc** 2.7.2.1:

CC=gcc CXX=gcc CXXFLAGS=-O ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex

· BSDI BSD/OS 2.1 i386**gcc** 2.7.2:

CC=gcc CXX=gcc CXXFLAGS=-O3 ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex

· AIX 4.2**gcc** 2.7.2.2

CC=gcc CXX=gcc CXXFLAGS=-O3 ./configure --prefix=/usr/local/mysql --with-extra-charsets=complex

MySQL internals 1.7.1.1“The MySQL”

MySQL 5.1RPMMySQL AB

MySQL **configure**--with-debug--with-debug=full-fomit-frame-pointer

2.1.3. MySQL

MySQL(http://dev.mysql.com/downloads/) MySQL http://dev.mysql.com/downloads/mirrors.htmlMySQL

http://mirrors.sunsite.dk/mysql/

2.1.4. MD5GnuPG

2.1.4.1. MD5
2.1.4.2. GnuPG
2.1.4.3. RPM

MySQL MySQL AB3

· MD5

· GnuPGGNU Privacy Guard

· RPM RPM

MD5GPG <webmaster@mysql.com> <build@mysql.com>-

2.1.4.1. MD5

MySQL MD5MySQL package_name

```
shell> md5sum package_name
```

```
shell> md5sum mysql-stard-5.1.2-alpha-linux-i686.tar.gz
aaab65abbec64d5e907dcd41b8699945  mysql-stard-5.1.2-alpha-linux-i6
```

()

(.zip.tar.gz)

md5sum **md5** Linux **GNU Text Utilities** http//www.gnu.org/software/textutils/ OpenSSL**openssl md5** **package_name**http//www.fourmilab.ch/md5/DOS/Windows**md5** **winMd5Sum**MD5 http//www.nullriver.com/index/products/winmd5sum

2.1.4.2. GnuPG

MD5

MySQL AB**GnuPG**(GNU Privacy Guard)MySQ **GnuPG** Phil ZimmermannPretty Good Privacy (**PGP**)**GnuPG** http//www.gnupg.org/ Linux**GnuPGGnuPG** http//www.openpgp.org/

MySQL ABGPG http//www.keyserver.net/ build@mysql.com

```
Key ID:
pub  1024D/5072E1F5 2003-02-03
     MySQL Package signing key (www.mysql.com) <build@mysql.com>
Fingerprint: A4A9 4068 76FC BD3C 4567  70C8 8C71 8D3B 5072 E1F5

Public Key (ASCII-armored):

-----BEGIN PGP PUBLIC KEY BLOCK-----
Version: GnuPG v1.0.6 (GNU/Linux)
Comment: For info see http://www.gnupg.org

mQGiBD4+owwRBAC14GIfUfCyEDSIePvEW3SAFUdJBtoQHH/nJKZyQT7h9bPlUWC3
RODjQReyCITRrdwyrKUGku2FmeVGwn2u2WmDMNABLnpprWPkBdCk96+OmSLN9brZ
```

fw2vOUgCmYv2hW0hyDHuvYlQA/BThQoADgj8AW6/0Lo7V1W9/8VuHP0gQwCgvzV3
BqOxRznNCRCRxAuAuVztHRcEAJooQK1+iSiunZMYD1WufeXfshc57S/+yeJkegNW
hxwR9pRWVArNYJdDRT+rf2RUe3vpquKNQU/hnEIUHJRQqYHo8gTxvxXNQc7fJYLV
K2HtkrPbP72vwsEKMYhhr0eKCbtLGfls9krjJ6sBgACyP/Vb7hiPwxh6rDZ7ITnE
kYpXBACmWpP8NJTkamEnPCia2ZoOHODANwpUkP43I7jsDmgtobZX9qnrAXw+uNDI
QJEXM6FSbi0LLtZciNlYsafwAPEOMDKpMqAK6IyisNtPvaLd8lH0bPAnWqcyefep
rv0sxxqUEMcM3o7wwgfN83POkDasDbs3pjwPhxvhz6//62zQJ7Q7TXlTUUwgUGFj
a2FnZSBzaWduaW5nIGtleSAod3d3Lm15c3FsLmNvbSkgPGJ1aWxkQG15c3FsLmNv
bT6IXQQTEQIAHQUCPj6jDAUJCWYBgAULBwoDBAMVAwIDFgIBAheAAAoJEIxxjTtQ
cuH1cY4AnilUwTXn8MatQOiG0a/bPxrvK/gCAJ4oinSNZRYTnblChwFaazt7PF3q
zIhMBBMRAgAMBQI+PqPRBYMJZgC7AAoJEElQ4SqycpHyJOEAn1mxHijft00bKXvu
cSo/pECUmppiAJ41M9MRVj5VcdH/KN/KjRtW6tHFPYhMBBMRAgAMBQI+QoIDBYMJ
YiKJAAoJELb1zU3GuiQ/lpEAoIhpp6BozKI8p6eaabzF5MlJH58pAKCu/ROofK8J
Eg2aLos+5zEYrB/LsrkCDQQ+PqMdEAgA7+GJfxbMdY4wslPnjH9rF4N2qfWsEN/l
xaZoJYc3a6M02WCnHl6ahT2/tBK2w1QI4YFteR47gCvtgb6O1JHffOo2HfLmRDRi
Rjd1DTCHqeyX7CHhcghj/dNRlW2Z0l5QFEcmV9U0Vhp3aFfWC4Ujfs3LU+hkAWzE
7zaD5cH9J7yv/6xuZVw411x0h4UqsTcWMu0iM1BzELqX1DY7LwoPEb/O9Rkbf4fm
Le11EzIaCa4PqARXQZc4dhSinMt6K3X4BrRsKTfozBu74F47D8Ilbf5vSYHbuE5p
/1oIDznkg/p8kW+3FxuWrycciqFTcNz215yyX39LXFnlLzKUb/F5GwADBQf+Lwqq
a8CGrRfsOAJxim63CHfty5mUc5rUSnTslGYEIOCR1BeQauyPZbPDsDD9MZ1ZaSaf
anFvwFG6Llx9xkU7tzq+vKLoWkm4u5xf3vn55VjnSd1aQ9eQnUcXiL4cnBGoTbOW
I39EcyzgslzBdC++MPjcQTcA7p6JUVsP6oAB3FQWg54tuUo0Ec8bsM8b3Ev42Lmu
QT5NdKHGwHsXTPtl0klk4bQk4OajHsiy1BMahpT27jWjJlMiJc+IWJ0mghkKHt92
6s/ymfdf5HkdQ1cyvsz5tryVI3Fx78XeSYfQvuuwqp2H139pXGEkg0n6KdUOetdZ
Whe70YGNPw1yjWJT1IhMBBgRAgAMBQI+PqMdBQkJZgGAAAoJEIxxjTtQcuH17p4A
n3r1QpVC9yhnW2cSAjq+kr72GX0eAJ4295kl6NxYEuFApmr1+0uUq/SlsQ==

```
=YJkx
-----END PGP PUBLIC KEY BLOCK-----
```

gpg --importGPGkeyring mysql_pubkey.asc

```
shell> gpg --import mysql_pubkey.asc
```

GPG

MySQL an .asc

mysql-stard-5.1.2-alpha-linux-i686.tar.gz
mysql-stard-5.1.2-alpha-linux-i686.tar.gz.asc

```
shell> gpg --verify package_name.asc
```

```
shell> gpg --verify mysql-standard-5.1.2-alpha-linux-i686.tar.gz.a
gpg: Signature made Tue 12 Jul 2005 23:35:41 EST using DSA key ID
gpg: Good signature from "MySQL Package signing key (www.mysql.com
```

Good signature insecure memory

2.1.4.3. RPM

RPM RPMGPGMD5

```
shell> rpm --checksig package_name.rpm
```

```
shell> rpm --checksig MySQL-server-5.1.2-alpha-0.i386.rpm
```

```
MySQL-server-5.1.2-alpha-0.i386.rpm md5 gpg OK
```

RPM 4.1(GPG) NOT OK (MISSING KEYS: GPG#5072e1f5) MySQL GPG RPM RPM 4.1GPG(GPG)RPM 4.1 GPG MySQLRPM **rpm --import** mysql_pubkey.asc

```
shell> rpm --import mysql_pubkey.asc
```

MySQL 2.1.4.2“GnuPG ”

2.1.5.

MySQL AB

Windows MySQL 5.1C:\Program Files\MySQL\MySQL Server 5.1(Windows C\mysql

bin	**mysqld**
data	
Docs	
examples	
include	()
lib	
scripts	

share	

MySQL AB's Linux RPM

/usr/bin	
/usr/sbin	**mysqld**
/var/lib/mysql	
/usr/share/doc/packages	
/usr/include/mysql	()
/usr/lib/mysql	
/usr/share/mysql	
/usr/share/sql-bench	

Unix **tar**(typically /usr/local/mysql)

bin	**mysqld**
data	
docs	ChangeLog
include	()
lib	
scripts	**mysql_install_db**
share/mysql	
sql-bench	

/usr/local

bin	
include/mysql	()
info	Info

lib/mysql	
libexec	**mysqld**
share/mysql	
sql-bench	crash-me
var	

· **mysqld**“libexec”“bin”

· “var”“data”

· **mysql_install_db**“bin”“scripts”

· “include/mysql”“lib/mysql”“include”“lib”

scripts/make_binary_distribution

2.2. MySQL

MySQL(“ ” MySQL 2.7“UnixMySQL”

2.1“”

2.3. WindowsMySQL

2.3.1. Windows
2.3.2.
2.3.3. MySQL
2.3.4. MySQL
2.3.5.
2.3.6. ZipMySQL
2.3.7.
2.3.8.
2.3.9. MySQL
2.3.10.
2.3.11. WindowsMySQL
2.3.12. WindowsMySQL
2.3.13. MySQL
2.3.14. WindowsMySQL
2.3.15. WindowsMySQL
2.3.16. WindowsMySQLUnixMySQL

MySQL ABWindowsMySQL 3.21 MySQL WindowsMySQL

WindowsMySQL GUI MySQL

4.1.5MySQL,

1.

2.

3.

4.

5. MySQL

MySQL

WindowsMySQL 5.13

·

· Visual Studio 2003

MySQL

WindowsMySQL 2.8.6“WindowsMySQL”

2.3.1. Windows

WindowsMySQL

· 32Windows 9xMeNT2000XPWindows Server 2003

Windows NT(NT2000,XP2003)MySQL Windows NT 2.3.12“ WindowsMySQL”

· TCP/IP

· WindowsMySQL http//dev.mysql.com// 2.1.3“MySQL”

FTP FTP

· .zip

· (200)

· ODBCMySQL /ODBC 26.1“MySQL Connector/ODBC”

· 4GBNTFSMySQLMAX_ROWS AVG_ROW_LENGTH13.1.5 “CREATE TABLE”

2.3.2.

WindowsMySQL 3MySQL 5.1

· mysql-essential-5.1.2-alpha-win32.msiWindowsMySQL

· mysql-5.1.2-alpha-win32.zipWindowsMySQL

· mysql-noinstall-5.1.2-alpha-win32.zip

2.3.3“MySQL” MySQL2.3.6“ZipMySQL”

2.3.3. MySQL

WindowsMySQL MySQLMySQL Configuration Wizard MySQL MySQL

MySQL MySQL

2.3.4. MySQL

2.3.4.1.
2.3.4.2. MySQL
2.3.4.3.
2.3.4.4.
2.3.4.5.
2.3.4.6. MySQL
2.3.4.7. MySQL

2.3.4.1.

MySQLMySQL Microsoft Window MySQL

MySQLMySQL 5.1 MySQLMySQL MySQL

WindowsMicrosoft Windows(MSI)MSIWindows 2000Windows XPWindows Server 2003 MySQL

Microsoft WindowsWindows XP WindowsMicrosoft Windows

MicrosoftWiX(Windows XML) Microsoft WiX Windows

MySQL MySQL MySQL

2.3.4.2. MySQL

http://dev.mysql.com/downloads/MySQL Zip

setup.exe .msi

2.3.4.3.

3 **Typical()Complete()Custom()**

Typical() MySQL **mysql** **mysqldumpmyisamchk**MySQL

Complete()

Custom() 2.3.4.4“”

Typical()Complete() Next Next 2.3.4.4“”

2.3.4.4.

MySQL **Custom()**

X

Change...

Next

2.3.4.5.

MySQLInstall Back MySQL MySQLCancel

MySQL forums.mysql.comMySQL bugs.mysql.com
MySQL Configuration Wizard MySQL

2.3.4.6. MySQL

Install MySQL

MySQLHKEY_LOCAL_MACHINE\SOFTWARE\MySQL ABWindows

MySQL MySQL5.1 Loca Files\MySQL\MySQL Server 5.1\Version MySQL Server 5.1.2-alpha 5.1.2-alpha

MySQL MySQL noinstall Zip

MySQLWindows MySQL MySQL MySQL 5.1, MySQLMySQL Server 5.1

· MySQL**mysql** root root

· MySQLMySQL Configuration Wizard

· MySQLMySQL MySQL

MySQLMySQL 5.1C:*Program Files*\MySQL\MySQL Server *5.1Program Files 5.1*MySQL MySQL c\mysql

MySQLC:*Program Files*\MySQL *Program Files*Windows MySQL

```
C:\Program Files\MySQL\MySQL Server 5.1

C:\Program Files\MySQL\MySQL Administrator 1.0

C:\Program Files\MySQL\MySQL Query Browser 1.0
```

MySQL

2.3.4.7. MySQL

MSI MySQL MySQL

MySQL 4.1.5MySQL 4.1.6,MySQL 5.0MySQL 5.1

2.3.15“WindowsMySQL”

2.3.5.

2.3.5.1.
2.3.5.2. MySQL
2.3.5.3.
2.3.5.4.
2.3.5.5.
2.3.5.6.
2.3.5.7. InnoDB
2.3.5.8.
2.3.5.9.
2.3.5.10.
2.3.5.11.
2.3.5.12.
2.3.5.13.
2.3.5.14. my.ini
2.3.5.15. my.ini

2.3.5.1.

MySQL Configuration Wizard Windows MySQL Configuration Wizard my.ini

MySQL Configuration Wizard MySQL 5.1 Windows

MySQL Configuration Wizard MySQL AB MySQL

2.3.5.2. MySQL

MySQL MySQLMySQL Configuration Wizard WindowsM

MySQLMySQL Configuration Wizard

MySQLbinMySQLInstanceConfig.exe

2.3.5.3.

MySQL Configuration Wizard my.ini my.ini MySQL

Re-configure InstanceNext my.inimy*timestamp*.i
Remove InstanceNext

Remove Instance Execute MySQL Configuration Wizard
MySQL my.ini data

Re-configure Instance

2.3.5.4.

MySQL Configuration Wizard MySQLRe-configure Instance

Detailed Configuration Standard Configuration Standard
Configuration MySQL

MySQL Standard Configuration Standard Configuration
MySQL Configuration Wizard

Standard Configuration MySQL MySQL

Standard Configuration 2.3.5.11“” 2.3.5.12“”

2.3.5.5.

3 MySQL Configuration Wizard

· Developer Machine() MySQL

· Server Machine MySQL FTPemailweb MySQL

· Dedicated MySQL Server Machine MySQL MySQL

MySQL

2.3.5.6.

Database Usage MySQL InnoDB InnoDB

· Multifunctional Database InnoDBMyISAM

· Transactional Database Only InnoDBMyISAM InnoDB InnoDBMyISAM

· Non-Transactional Database Only InnoDB MyISAM InnoDB

2.3.5.7. InnoDB

InnoDB MySQL RAID

InnoDB

Modify

2.3.5.8.

MySQL Concurrent Connections

· Decision Support (DSS)/OLAP 100,20

· Online Transaction Processing (OLTP) 500

· Manual Setting

2.3.5.9.

Networking Options TCP/IP MySQL

TCP/IP TCP/IP Enable TCP/IP Networking

3306 MySQL

2.3.5.10.

MySQL Character Set MySQL

· Standard Character Set Latin1 Latin1

· Best Support For Multilingualism UTF8 UTF8

· Manual Selected Default Character Set/Collation/

2.3.5.11.

Windows NT MySQL MySQL Windows

MySQL Configuration Wizard MySQL MySQL Install As Windows Service

MySQL Launch the MySQL Server Automatically

2.3.5.12.

MySQLroot MySQL Configuration Wizard root root Modify Security Settings

root New root password()Confirm Current root password root root

root Root may only connect from localhost root root

Create An Anonymous Account

2.3.5.13.

MySQL Configuration Wizard Confirmation Execute Back MySQL Configuration Wizard Cancel

Execute MySQL Configuration Wizard

MySQL Configuration Wizard MySQL AB my-template.ini

MySQL Configuration Wizard my.ini my.ini

MySQL MySQL Configuration Wizard MySQL Configuration Wizard

root MySQL Configuration Wizard root

MySQL Configuration Wizard FinishMySQL Configuration Wizard

2.3.5.14. my.ini

MySQL Configuration Wizard my.iniMySQL

MySQLmy.ini MySQL --defaults-file="*C:\Program Files\MySQL\MySQL Server 5.1*\my.ini"*C:\Program Files\MySQL\MySQL Server 5.1* MySQL

--defaults-fileMySQL

2.3.5.15. my.ini

my.ini MySQL Administrator

MySQL **mysqlmysqldump**my.ini Windows C\Windows C\WINNTmy.ini

2.3.6. ZipMySQL

MySQLZipMySQL

1.

2.

3. MySQL

4. MySQL

5.

2.3.7.

MySQL

1. 2.3.15“WindowsMySQL”

2. Windows NT Windows NTWindows 2000Windows XPWindows Server 2003,

3. MySQLC\mysqlMySQL Installation Wizard MySQLC:\Program Files\MySQLMySQLC\mysql 2.3.8“”

4. zip

2.3.8.

· (C:\Program Files\MySQL\MySQL Server 5.1C:\Program Files\MySQL\MySQL Server 5.1\data)

.

MySQLWindows Windowsmy.iniC\my.cnf WindowsC\WINDOWS C\WINNTWINDIR

```
C\> echo %WINDIR%
```

MySQLmy.ini my.cnf PC C my.ini

MySQL my-small.cnfmy-medium.cnfmy-large.cnfmy-huge.cnf

MySQLE\mysqlE:\mydata\data [mysqld] basedirda

```
[mysqld]
# set basedir to your installation path
basedir=E:/mysql
```

```
# set datadir to the location of your data directory

datadir=E:/mydata/data
```

Windows

```
[mysqld]

# set basedir to your installation path

basedir=E:\\mysql

# set datadir to the location of your data directory

datadir=E:\\mydata\\data
```

Windows MySQLMySQL data MySQLC:\Program Files\MySQL\MySQL Server 5.1 C:\Program Files\MySQL\MySQL Server 5.1\dataE:\mydata

1. dataC:\Program Files\MySQL\MySQL Server 5.1\dataE:\mydata

2. --datadir

2.3.9. MySQL

WindowsMySQL 5.1

mysqld- debug	InnoDBBDB
mysqld	InnoDB
mysqld-nt	Windows NT2000 XP
mysqld-max	InnoDBBDB

mysqld-max-nt	**mysqld-max**

Intel Intel i386-

Windows MySQL 5.1

MySQLWindowsTCP/IP**mysqld-nt**mysql-max-ntWindows NT2000XP2003 TCP/IP(Windows TCP/IP

· --enable-named-pipe MySQL

· **mysqld-ntmysqld-max-nt** Windows(NT2000XP2003)

· Windows 98 Me TCP/IP

· Windows 95

mysqld **mysqld-nt**

2.3.10.

NoinstallMySQL MySQLGUI

Windows 95,98,Me MySQLTCP/IP (MySQL MySQL TCP/IP Windows CD-ROMTCP/IP

Windows 95(OSR2)Winsock MySQLWinsock 2 http://www.microsoft.com/WinsockWindows 98Winsock 2

NT Windows NT2000XP2003, TCP/IP MySQLWindows NT 4 TCP/IP,pack 3()

--shared-memory WindowsMySQL --protocol=memory

2.3.9“MySQL”

MySQL Windows MySQL

MySQLC:\Program Files\MySQL\MySQL Server 5.1MySQL

(“ DOS window”) window

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld --console
```

InnoDB

```
InnoDB: The first specified datafile c:\ibdata\ibdata1 did not exist
InnoDB: a new database to be created
InnoDB: Setting file c:\ibdata\ibdata1 size to 209715200
InnoDB: Database physically writes the file full: wait...
InnoDB: Log file c:\iblogs\ib_logfile0 did not exist: new to be crea
InnoDB: Setting log file c:\iblogs\ib_logfile0 size to 31457280
InnoDB: Log file c:\iblogs\ib_logfile1 did not exist: new to be crea
InnoDB: Setting log file c:\iblogs\ib_logfile1 size to 31457280
InnoDB: Log file c:\iblogs\ib_logfile2 did not exist: new to be crea
InnoDB: Setting log file c:\iblogs\ib_logfile2 size to 31457280
InnoDB: Doublewrite buffer not found: creating new
InnoDB: Doublewrite buffer created
InnoDB: creating foreign key constraint system tables
InnoDB: foreign key constraint system tables created
011024 10:58:25  InnoDB: Started

mysqld: ready for connections
Version: '5.1.2-alpha'  socket: ''  port: 3306
```

--console (C:\Program Files\MySQL\MySQL Server 5.1\data) .err

MySQL 2.9“”

2.3.11. WindowsMySQL

MySQL Windows

mysqld (“ DOS window”)

```
C\> C:\Program Files\MySQL\MySQL Server 5.0\bin\mysqld
```

MySQL

NTWindows **mysqld** Windows NT2000XP2003

MySQL

```
C\> C:\Program Files\MySQL\MySQL Server 5.0\bin\mysqladmin -u root s
```

MySQL**mysqladmin** MySQL root MySQL MySQLWindows

mysqld C:\Program Files\MySQL\MySQL Server 5.1\data .err **mysqld --console**

--standalone --debug**mysqld** **mysqld** C\mysqld.trace**mysqld** E.1.2“ ”

mysqld --verbose --helpmysqld

2.3.12. WindowsMySQL

NT (Windows NT2000,XP2003) MySQLWindows Windows MySQL **NET** **Services**AMySQL

Windows(Windows 2000,XPServer 2003)**Services**(Windows **Service Control Manager**)**Services**

MySQL Windows

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqladmin -u root s
```

MySQL root **C:\Program Files\MySQL\MySQ 5.1\bin\mysqladmin -u root -p shutdown**

MySQL**mysqladmin** MySQL root MySQL MySQLWindows

```
C\> mysqld --install
```

mysqld

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld --install
```

MySQL binWindowsPATH

· WindowsMy Computer Properties

· System PropertiesAdvanced Environment Variables

· System Variables Path Edit Edit System Variable

· Variable Value (**End**)MySQL bin (C:\Program Files\MySQL\MySQL Server 5.1\bin) OK DOSMySQLMySQL MySQLMySQL **mysqladminmysqldump**

· MySQL Windows PATHMySQL bin

PATH

MySQL 5.1

· --install MySQL

· defaults-file=*file_name*

--defaults-file --defaults-file

· --local-service LocalService Windows Windows XP --defaults-file--local-service

Windows MySQL

· --install(MySQL)MySQL[mysqld]

· --install(MySQL)

[mysqld] [mysqld]MySQL

· --defaults-file [mysqld]

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld --install MyS
```

--install(MySQL)--defaults-file [mysqld] --defaults-file [mysqld]

MySQL Windows **Services**

MySQL Windows **Services** **NET START MySQLNET**

mysqld **mysqld** MySQL(C:\Program Files\MySQL\MySQL Server 5.1\data).err

MySQL Windows Services **NET STOP MySQL** **mysqladmin shutdown**

--install-manual--install

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld --install-man
```

NET STOP MYSQL --remove

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld --remove
```

mysqld 2.3.11“WindowsMySQL”

2.3.14“WindowsMySQL”

2.3.13. MySQL

MySQL

```
C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqlshow

C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqlshow -u root m

C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqladmin version

C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysql test
```

mysqldTCP/IP DNS --skip-name-resolve**mysqld**MySQLHost localhostIP

--pipe--protocol=PIPEMySQLTCP/IP .() --socket

2.3.14. WindowsMySQL

MySQL MySQL

MySQL my.ini C:\Program Files\MySQL\MySQL Server 5.1\dat 5.11.1“”

MySQL **mysqld** **NET START mysql**MySQL 2.3.12“Windows MySQL”

MySQL

```
·               System error 1067 has occurred.

·               Fatal error: Can't open privilege tables: Table 'my
```

· MySQLMySQL MySQL(C\mysql C:\Program Files\MySQL\MySQL Server 5.1\data)

MySQL MySQL

MySQLC:\Program Files\MySQL\MySQL Server 5.1 (my.ini)MySQL my.iniWindows C\WINNTC\WINDOWSWINDIR

```
C\> echo %WINDIR%
```

MySQLE\mysqlD:\MySQLdata[mysqld]basedirdatadir

```
[mysqld]
# set basedir to your installation path
basedir=E:/mysql
# set datadir to the location of your data directory
datadir=D:/MySQLdata
```

()Windows

```
[mysqld]
# set basedir to your installation path
basedir=C:\\Program Files\\MySQL\\MySQL Server 5.1
# set datadir to the location of your data directory
datadir=D:\\MySQLdata
```

MySQLdatadir MySQL MySQL

2.3.8“”

· Error: Cannot create Windows service for MySql. Err

· MySQL MySQL Configuration Wizard MySQL

mysql

MySQL

```
C:\>sc delete mysql
[SC] DeleteService SUCCESS
```

Windowssc
http://www.microsoft.com/windows2000/techinfo/reskit/tools/existing/delsrv-o.asp delsrvdelsrvMySQL

2.3.15. WindowsMySQL

WindowsMySQL

1. MySQL 5.9.1“”

2. http://dev.mysql.com/downloads/WindowsMySQL

3. MySQL

```
C\> NET STOP MYSQL
```

MySQL

```
C\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqladmin -u root s
```

4. 4.1.5MySQL 5.1,ZipMySQLMySQL Installation Wizard MySQL MySQL

MySQL

```
C\> C:\mysql\bin\mysqld --remove
```

MySQL Installation Wizard MySQL

5. MySQL Installation Wizard 2.3.4“MySQL”

6. ZipMySQL MySQL(C\mysql) C\mysql4

7. MySQL **NET START MySQLmysqld**

8. WindowsMySQL 2.10“MySQL”

9. 2.3.14“WindowsMySQL”

2.3.16. WindowsMySQLUnixMySQL

WindowsMySQL WindowsMySQLUnix

· **Windows 95**

Windows 95200 MySQL Windows 95**mysqld**

.

Windows4,000 24 MySQL MySQL

http://support.microsoft.com/default.aspx?scid=kb;en-us;196271

.

MySQLpread()pwrite()INSERTSELECTpread()pwrite() NT2000XP readfile()/writefile() MySQL 5.12,048,Windows NT2000,XP2003Unix

.

MySQL

o 8 UnixMySQL

o MySQL

o **mysqladmin kill**

o **mysqladmin shutdown**

· **ALTER TABLE**

ALTER TABLE Windows

· **DROP TABLE**

WindowsMERGEDROP TABLE MERGEMySQL Windows MERGE(FLUSH TABLES)MERGE

· **DATA DIRECTORY and INDEX DIRECTORY**

WindowsDATA DIRECTORYINDEX DIRECTORY Windows realpath()

· **DROP DATABASE**

· **Task Manager MySQL**

Task Manager Windows 95shutdownMySQL**mysqladmin shutdown**

.

Windows WindowsMySQL 9.2.2“”

. **‘\’**

Windows‘ \’ MySQL LOAD DATA INFILESELECT ... INTO OUTFILE‘ /’ Unix-

```
mysql> LOAD DATA INFILE 'C:/tmp/skr.txt' INTO TABLE skr;
mysql> SELECT * INTO OUTFILE 'C:/tmp/skr.txt' FROM skr;
```

‘ \’

```
mysql> LOAD DATA INFILE 'C:\\tmp\\skr.txt' INTO TABLE skr;
mysql> SELECT * INTO OUTFILE 'C:\\tmp\\skr.txt' FROM skr;
```

.

Windows ^Z/CHAR(24)Windows

```
C\>mysqlbinlog binary-log-name | mysql --user=root
```

^Z / CHAR(24)

```
C:\> mysqlbinlog binary-log-file --result-file=/tmp/bin.sql
C:\> mysql --user=root --execute "source /tmp/bin.sql"
```

SQL

· **Access denied for user**

MySQL Access denied for user '*some-user*'@'unknown' to database 'mysql'
MySQL

\windows\hosts

```
127.0.0.1       localhost
```

WindowsMySQL

· Windows/

2.4. LinuxMySQL

LinuxRPMMySQLMySQL RPMSuSE Linux 7.3 **rpm**glibcLinux RPM 2.1.3“MySQL”

MySQL ABRPMRPMRPMRPM RPMLinux

MySQLRPM MySQL AB MySQLRPM

RPM(“ Sorry, the host '*xxxx*' could not be looked up”)2.12.1.2“Linux”

MySQL-serverMySQL-clientMySQL MySQL-Max MySQL-Max RPMM MySQL-server RPM 5.1.2“mysq **ld-maxMy**SQL”

MySQL(“ error: removing these packages would break dependencies: libmysqlclient.so.10 is needed by ..”)MySQL-shared-compat(MySQL 4.0 libmysqlclient.so.12MySQL 3.23libmysqlclient.so.10)

LinuxMySQL 3.23 (MySQL-shared)MySQL( )MySQL(Red Hat Linux)3.23 MySQL-shared RPMMySQL-shared-compat

RPM

· MySQL-server-*VERSION*.i386.rpm

MySQL MySQL MySQL 4.0.10 RPMMySQL-*VERSION*.i386.rpm -server

· MySQL-Max-*VERSION*.i386.rpm

MySQL-Max MySQL-server RPM MySQL-server RPMMySQL-Max RPM

· MySQL-client-*VERSION*.i386.rpm

MySQL

· MySQL-bench-*VERSION*.i386.rpm

PerlDBD mysql

· MySQL-devel-*VERSION*.i386.rpm

MySQL Perl

· MySQL-shared-*VERSION*.i386.rpm

(libmysqlclient.so*)MySQL

· MySQL-shared-compat-*VERSION*.i386.rpm

MySQL 3.23MySQL 4.0 MySQL 3.23MySQL 4.0 MySQL-shared MySQL 4.0.13

· MySQL-embedded-*VERSION*.i386.rpm

MySQL(MySQL 4.0)

· MySQL-*VERSION*.src.rpm

RPM(AlphaSPARC)

RPM(MySQL-server RPM)

```
shell> rpm -qpl MySQL-server-VERSION.i386.rpm


shell> rpm -i MySQL-server-VERSION.i386.rpm
shell> rpm -i MySQL-client-VERSION.i386.rpm


shell> rpm -i MySQL-client-VERSION.i386.rpm
```

RPM 2.1.4“MD5GnuPG ”

RPM/var/lib/mysql RPMmysql()MySQL /etc/init.d/ (RPM)MySQL 2.9.2.2“MySQL”

/etc/init.d()LinuxMySQL RPM /etc/rc.d/init.dRPM/etc/init.d

```
shell> cd /etc
shell> ln -s rc.d/init.d
```

Linux/etc/init.d LSB(Linux)

RPMMySQL-serverMySQL**d** MySQL

2.7“UnixMySQL”

MySQL 2.9“”

2.5.Mac OS XMySQL

Mac OS X 10.2.x(“Jaguar”)Mac OS XPKGMySQLMac OS X(10.1.x)

(.dmg)

MySQL2.1.3“MySQL”

MySQL(Mac OS X)**mysqladmin shutdown**MySQL

MySQL PKG Mac OS X MySQL

Mac OS X

```
You cannot install this software on this disk. (null)
```

Go Back Continue Apple

MySQLMac OS X PKG/usr/local/mysql-*VERSION* /usr/local/mysql /usr/local/mysql /usr/local/mysql.bak **mysql_install_db**MySQL

tar MySQL/usr/local/mysql/bin MySQL/tmp/mysql.sock2.1.5“ ”

MySQLMac OS Xmysql Mac OS X 10.2 mysql

Mac OS X MySQLMac OS XMySQL

Mac OS X	**MySQL**
10.2-10.2.2	3.23.51
10.2.3-10.2.6	3.23.53
10.3	4.0.14

10.3.2	4.0.16
10.4.0	4.1.10a

MySQL Mac OS X PKG AppleMySQL“ ”“ Mac OS X” “ MySQL”“ MySQL”

Mac OS XMySQL 4.0**mysqld_safesafe_mysqldmysqld**

Mac OS Xhttp://www.entropy.chMarc LiyanageMySQL

Marc3.23.xx Mac OS XMySQLMySQL PKGMySQL 2.10.2“”

MySQLMySQL Startup ItemMySQL 5.1,Mac OS X MySQLStartupItem.

Startup Item MySQL

MySQL 5.1Startup Item/Library/StartupItems/MySQLCOM(MySQL 4.1.2, /Library/StartupItems/MySQLMac OS XMySQL Startup Item)Startup Item /etc/hostconfigMySQLCOM=-YES-disableMySQLMySQLCOM=-NO-

Mac OS X MySQL/etc/hostconfigMySQLMySQL AB Startup Item MySQL=-NO- MySQL AB Startup ItemMySQLCOM MySQL

MySQL

Startup Item

shell> **sudo /Library/StartupItems/MySQLCOM/MySQLCOM start**

(Enter your password, if necessary)

(Press Control-D or enter "exit" to exit the shell)

Startup Item

shell> **cd /usr/local/mysql**

shell> **sudo ./bin/mysqld_safe**

(Enter your password, if necessary)

(Press Control-Z)

shell> **bg**

(Press Control-D or enter "exit" to exit the shell)

MySQL /usr/local/mysql/bin/mysql

MySQL 2.9“”

mysqlmysqladmintcsh

```
aliasMySQL /usr/local/mysql/bin/mysql
aliasMySQLadmin /usr/local/mysql/bin/mysqladmin
```

bash

```
aliasMySQL=/usr/local/mysql/bin/mysql
aliasMySQLadmin=/usr/local/mysql/bin/mysqladmin
```

PATH/usr/local/mysql/bin **tcsh**$HOME/.tcshrc

```
setenv PATH ${PATH}:/usr/local/mysql/bin
```

.tcshrc

MySQL PKG Mac OS X

MySQL /Library/Receipts/mysql-*VERSION*.pkg Package Receipt

2.6. NetWareMySQL

MySQLNetWareNovell Novell NetWare 6.5SQL NetWare

NetWareMySQLNetWareMetrowerks CodeWarriorGNU

http://dev.mysql.com/downloads/NetWare2.1.3“MySQL”

MySQL NetWare

· NetWare 6.5 NetWare 6.0Latest Support Pack

· NovellNetWare

· MySQL NSS

NetWareMySQL

1. MySQL

2. SERVER: mysqladmin -u root shutdown

3. MySQL

4. Zip Zip SYS\

(SYS:MYSQL\DATA)my.cnf MySQL

5. SYSMYSQL

NetWareMySQLNetWareMySQL SYS\MYSQLMySQL(MySQL 4.1)NetWare SYS\MySQLNetWare Support Pack

6. MySQL NLM

7. SERVER: SEARCH ADD SYS:MYSQL\BIN

8. **mysql_install_db**

9. **mysqld_safe**MySQL

10. autoexec.ncf MySQLSYSMYSQL MySQL

```
11.          #Starts the MySQL 5.1.x database server
12.         SEARCH ADD SYS:MYSQL\BIN
13.         MYSQLD_SAFE
```

MySQLNetWare 6.0,--skip-external-locking

```
#Starts the MySQL 5.1.x database server
SEARCH ADD SYS:MYSQL\BIN
MYSQLD_SAFE --skip-external-locking
```

CHECK TABLEREPAIR TABLE**myisamchkmyisamchk** NetWare 6.0 NetWare 6.5

NetWare**mysqld_safe** ()**mysqld_safe** NLM

```
*<NLM has terminated; Press any key to close the screen>*
```

NetWare **mysqld_safe**--autoclose

```
#Starts the MySQL 5.1.x database server
SEARCH ADD SYS:MYSQL\BIN
MYSQLD_SAFE --autoclose
```

14.MySQL 5.1 PerlPHP

· Perl for NetWare: http://forge.novell.com/modules/xfcontent/downloads.php/perl/Modules/

· PHP for NetWare: http://forge.novell.com/modules/xfcontent/downloads.php/php/Modules/

(MySQL 4.1PHP 5MySQL 5.1)

5.1.3“mysqld_safeMySQL” NetWare**mysqld_safe**

MySQLautoexec.ncfMySQL

MySQL 2.9“”

2.7. UnixMySQL

tarMySQL(.tar.gz)2.1.2.5“MySQL ABMySQL”

MySQL2.1.3“MySQL”

MySQL**tar**mysql-*VERSION*-*OS*.tar.gz*VERSION*(5.1.2-alpha)*OS*(pc-linux-i686)

2.2“MySQL”

MySQL **tar**

· GNU gunzip

· tar GNU tar **tar** Mac OS X **tar**Sun **tar** Mac OS X **gnutar** **tar** GNU **tar**

MySQL **mysqlbug** **mysqlbug** **mysqlbug** “ bin” **mysqlbug**1.7.1.3“”

MySQL

shell> **groupadd mysql**

shell> **useradd -g mysql mysql**

shell> **cd /usr/local**

shell> **gunzip < */path/to/mysql-VERSION-OS*.tar.gz | tar xvf -**

shell> **ln -s *full-path-to-mysql-VERSION-OS* mysql**

shell> **cd mysql**

shell> **scripts/mysql_install_db --user=mysql**

shell> **chown -R root .**

shell> **chown -R mysql data**

shell> **chgrp -R mysql .**

shell> **bin/mysqld_safe --user=mysql &**

MySQL 2.9“”

1. **mysqld**
2. shell> **groupadd mysql**
3. shell> **useradd -g mysql mysql**

MySQLMySQL Unix **useraddgroupadd adduseraddgroup**

mysql

4. “ /usr/local”“ /usr/local” root
5. shell> **cd /usr/local**
6. 2.1.3“MySQL” MySQL
7.
8. shell> **gunzip < */path/to/mysql-VERSION-OS*.tar.gz | tar xvf -**
9. shell> **ln -s *full-path-to-mysql-VERSION-OS* mysql**

tarmysql-*VERSION-OS* ln /usr/local/mysql

GNU **tar**gunzip

shell> **tar zxvf */path/to/mysql-VERSION-OS*.tar.gz**

10.
11. shell> **cd mysql**

mysql“ bin”“ scripts”

· bin

PATH shellMySQL F

· scripts

mysql_install_db mysql

12.MySQLMySQL

13. shell> **scripts/mysql_install_db --user=mysql**

root --user --user

14.root**mysqld** (/usr/local/mysql)

15. shell> **chown -R root .**

16. shell> **chown -R mysql data**

17. shell> **chgrp -R mysql .**

root mysql mysql

18.MySQLsupport-files/mysql.server support-files/mysql.server2.9.2.2 “MySQL”

19.DBIDBD::mysql Perl **bin/mysql_setpermission** ”

20.**mysqlaccess**MySQL **mysqlaccessmysql**“ bin/mysqlaccess” 18

21. $MYSQL = '/usr/local/bin/mysql'; # path to mysql

mysql **mysqlaccess** broken pipe

MySQL

```
shell> bin/mysqld_safe --user=mysql &
```

mysqld_safe5.1.3“mysqld_safeMySQL”

MySQL 2.9“”

2.8. MySQL

2.8.1.
2.8.2.
2.8.3.
2.8.4. MySQL
2.8.5. MIT-pthreads
2.8.6. WindowsMySQL
2.8.7. WindowsMySQL

MySQLa 2.1.3“MySQL”

MySQL**tar** mysql-*VERSION*.tar.gz *VERSION* 5.1.2-alpha

MySQL

· GNU gunzip

· tar GNU tar **tar** Mac OS X **tar**Sun **tar** Mac OS X **gnutar** **tar** GNU **tar**

· ANSI C++ **gcc**> = 2.95.2**egcs**> = 1.0.2**egcs 2.91.66**SGI C++SunPro C++ **gcc** libg++gcc2.7.x C++“ sql/sql_base.cc” gcc2.7.xgcc MySQL**gcc** 2.8.1 **gcc** 2.8.1

MySQL 3.23.x **gcc** 2.95.2

· **make** GNU **make** GNU **make**3.75

gcc -fno-exceptions -felide-constructors-fno-rtti

```
CFLAGS="-O3" CXX=gcc CXXFLAGS="-O3 -felide-constructors \
        -fno-exceptions -fno-rtti" ./configure \
        --prefix=/usr/local/mysql --enable-assembler \
        --with-mysqld-ldflags=-all-static
```

MySQL **mysqlbug** **mysqlbug** **mysqlbug** “ bin” **mysqlbug**1.7.1.3“”

2.8.1.

MySQL

```
shell> groupadd mysql
shell> useradd -g mysql mysql
shell> gunzip < mysql-VERSION.tar.gz | tar -xvf -
shell> cd mysql-VERSION
shell> ./configure --prefix=/usr/local/mysql
shell> make
shell> make install
shell> cp support-files/my-medium.cnf /etc/my.cnf
shell> cd /usr/local/mysql
shell> bin/mysql_install_db --user=mysql
shell> chown -R root  .
shell> chown -R mysql var
shell> chgrp -R mysql .
shell> bin/mysqld_safe --user=mysql &
```

RPM

```
shell> rpmbuild --rebuild --clean MySQL-VERSION.src.rpm
```

RPMRPM**rpmrpmbuild**

MySQL 2.9“”

MySQL

1. **mysqld**

```
2.              shell> groupadd mysql
3.              shell> useradd -g mysql mysql
```

MySQL MySQL Unix **useradd groupadd adduseraddgroup**

mysql

4.

5. 2.1.3“MySQL”

6.

```
7.              shell> gunzip < /path/to/mysql-VERSION.tar.gz | tar xv
```

mysql-*VERSION*

GNU **tar**gunzip

```
shell> tar zxvf /path/to/mysql-VERSION-OS.tar.gz
```

8.

```
9.              shell> cd  mysql-VERSION
```

MySQL

10.

```
11.         shell> ./configure --prefix=/usr/local/mysql
12.         shell> make
```

configure **./configure --help** 2.8.2“ ”

configure MySQL“ config.log” **configure** **mysqlbug** 1.7.1.3 “”

2.8.4“MySQL”

13.

```
14.         shell> make install
```

support-files

```
shell> cp support-files/my-medium.cnf /etc/my.cnf
```

root

InnoDB /etc/my.cnf innodb_...# 4.3.2"" 15.2.3"InnoDB "

15.

```
16.         shell> cd /usr/local/mysql
```

17.MySQLMySQL

```
18.         shell> bin/mysql_install_db --user=mysql
```

root --user --user

mysql_install_db MySQL

19.root**mysqld** (/usr/local/mysql)

```
20.         shell> chown -R root  .
21.         shell> chown -R mysql var
22.         shell> chgrp -R mysql .
```

root mysql mysql

23.MySQLsupport-files/mysql.server support-files/mysql.server2.9.2.2 "MySQL"

24.DBIDBD::mysql Perl **bin/mysql_setpermission** 2.13"Perl"

```
shell> /usr/local/mysql/bin/mysqld_safe --user=mysql &
```

mysqld daemon ended“ hostname'.err”

mysqld_safe5.1.3“mysqld_safeMySQL”

MySQL 2.9“”

2.8.2.

configureMySQL **configure** **configure**F **configure**

```
shell> ./configure --help
```

- MySQL --without-server
- shell> **./configure --without-server**

C++ **mysql**(C++) configureC++ --without-server**./configuremysql** “ mysql.cc” **make** **make -k**

· MySQL (libmysqld.a),--with-embedded-server

- “ /usr/local/var” (log) configure
- shell>**./configure--prefix=/usr/local/mysql**
- shell>**./configure--prefix=/usr/local –**
- **localstatedir=/usr/local/mysql/data**

“ /usr/local/mysql” “ /usr/loca /usr/local/mysql/dataMySQL 4.3.2“”

- UnixMySQL (“ /tmp”“ /var/run” **configu**
- shell> **./configure\-- with-unix-socket-**
- **path=/usr/local/mysql/tmp/mysql.sock**

MySQLmysql.sock A.4.5

- (RedHat)**configure**

· **shell>./configure --with-client-ldflags=-all-static**

· **--with-mysqld-ldflags=-all-static**

- gcclibg++libstdc++**configure**gccC++

- shell> **CC=gcc CXX=gcc ./configure**

gccC++ libg++libstdc++ MySQL

o **gcc** 2.7.2

o CC=gcc CXX=gcc CXXFLAGS="-O3 -felide-construct

o **egcs** 1.0.3a

o CC=gcc CXX=gcc CXXFLAGS="-O3 -felide-construct

o -fno-exceptions -fno-rtti"

o **gcc** 2.95.2

o CFLAGS="-O3 -mpentiumpro" CXX=gcc CXXFLAGS="-O

o -felide-constructors -fno-exceptions -fno-rtti

o pgcc 2.90.29

o CFLAGS="-O3 -mpentiumpro -mstack-align-double"

o CXXFLAGS="-O3 -mpentiumpro -mstack-align-doubl

o -felide-constructors -fno- exceptions -fno-rtt

configure MySQL

```
--prefix=/usr/local/mysql --enable-assembler \
--with-mysqld-ldflags=-all-static
```

gcc **configure**

```
CFLAGS="-O3 -mpentiumpro" CXX=gcc CXXFLAGS="-O3 -mpentiumpro \
-felide-constructors -fno- exceptions -fno-rtti" ./ configure \
--prefix=/usr/local/mysql --enable-assembler \
--with-mysqld-ldflags=-all-static
```

MySQLhttp://www.mysql.com/ 2.1.2.5“MySQL ABMySQL” 7.5.4“MySQL”

“ libmysqlclient.so.#”(“#”), **configure**--disable-shared **configure** libmysqlclient.so.#

- MySQLlatin1(cp1252) --with-charset
- shell> **./configure -- with-charset=*CHARSET***

CHARSET
big5cp1251cp1257czechdanishdec8doseuc_krgb2312gbkgerman1hebrewhp8hun win1251ukr5.10.1“”

MySQLlatin1_swedish_ci --with-collation

```
shell> ./configure --with-collation=COLLATION
```

--with-charset--with-collation (SHOW

SET OPTION CHARACTER SET 13.5.3“SET”

myisamchk -r -q --set-character-set=*charset* MySQL MySQL

configure--with-extra-charsets=*LIST* *LIST*

o

o complex -

o all –

- MySQL --with-debug
- shell> **./configure --with-debug**

· --enable-thread-safe-clientMySQL libmysqlclient_r 25.2.15 “”

· --with-big-tablesMySQL

unsigned long longunsigned long1.844E+19 ((2^32)^2)2^32 (~4.295E+09) -DBIG_TABLES

2.12“”

2.8.3.

MySQL()

1. http://www.bitmover.com/bk-client.sharBitKeeper
2. Unix

```
3.          shell> sh bk-client.shar
4.          shell> cd bk_client-1.1
5.          shell> make all
6.          shell> PATH=$PWD:$PATH
```

Windows

· http://cygwin.comCygwin

· **gccmake**Cygwin**which gcc** **which make** Cygwin **gccmake**

· Cygwin

```
·                   shell> sh bk-client.shar
·                   shell> cd bk_client-1.1
```

Makefiles $(CC) $(CFLAGS) -o sfio -lz sfio.c

```
$(CC) $(CFLAGS) -o sfio sfio.c -lz
```

make

```
shell> make all
```

```
shell> PATH=$PWD:$PATH
```

7. BitKeeper MySQL 5.1

```
8.          shell> sfioball -r+ bk://mysql.bkbits.net/mysql-5.1 my
```

http://dev.mysql.com/doc/ (HTMLPDF)MySQLdocDocBook XML

```
shell> sfioball -r+ bk://mysql.bkbits.net/mysqldoc mysqldoc
```

MySQL-5.1/

HTTP HTTPBitKeeper

http_proxy

```
shell> export http_proxy="http://your.proxy.server:8080/"
```

http://bk//

```
shell> sfioball -r+ http://mysql.bkbits.net/mysql-5.1 mysql-5.1
```

9. MySQL 5.1

```
10.       shell> update bk://mysql.bkbits.net/mysql-5.1
```

11.GNU **makeautoconf** 2.58 ()**automake** 1.8**libtool** 1.5**m4** **make** GNU **make**(**gmake**)

GNU

- http://www.gnu.org/software/autoconf/
- http://www.gnu.org/software/automake/
- http://www.gnu.org/software/libtool/
- http://www.gnu.org/software/m4/
- http://www.gnu.org/software/make/

MySQL 5.1,GNU **bison** 1.75 **bison**

```
sql_yacc.yy:#####: fatal error: maximum table size (32767) exceeded
```

bison

cd MySQL-5.1

```
shell> cd mysql-5.1
shell> bk -r edit
shell> aclocal; autoheader
shell> libtoolize --automake --force
shell> automake --force --add-missing; autoconf
shell> (cd innobase; aclocal; autoheader; autoconf; automake)
shell> (cd bdb/dist; sh s_all)
shell> ./configure  # Add your favorite options here
shell> make
```

BUILD/autorun.sh

```
shell> aclocal; autoheader
shell> libtoolize --automake --force
shell> automake --force --add-missing; autoconf
shell> (cd innobase; aclocal; autoheader; autoconf; automake)
shell> (cd bdb/dist; sh s_all)
```

innobasebdb/distInnoDB Berkeley DB (BDB) InnoDBBDB

libtool

BUILD/ BUILD/compile-pentium-debug Pentium

12. **make install** MySQL --pref
./configure

13. **make test**27.1.2“MySQL”

14.**make** http://bugs.mysql.com/ GNU aclocalcommand not found error PATH

15.(sfioball) (update)

16. BK/ ChangeLogChangeSet **sfioball** **diff** MySQL internals 1.7.1.1“The MySQL”

17.BitKeeper

MySQL 5.1 http://mysql.bkbits.net:8080/mysql-5.1

2.8.4. MySQL

MySQLSolarisLinux**gcc** MIT-pthreads 2.8.5“MIT-pthreads”

- **configure**“ config.cache” **configure**
- **configure** **make** ,

configure

shell> **rm config.cache**

shell> **make clean**

make distclean

MySQL

- “ sql_yacc.cc”

```
·               Internal compiler error: program cc1plus got fatal
·               Out of virtual memory
·               Virtual memory exhausted
```

gcc(inline function)“ sql_yacc.cc” --with-low-memory**configure**

shell> **./configure -- with-low-memory**

gcc-fno-inline -O0--with-low-memory --with-low-memory

- **configurec++**-lg++GNU **c++** **gcc**

· configure: error: installation or configuration problem:

· C++ compiler cannot create executables.

g++libg++libstdc++

g++g++libg++libstdc++“ config.log” c++ gccC++ CXX"gcc -O3"

shell> **CXX="gcc -O3" ./configure**

gccg++C++ libg++libstdc++

g++libg++libstdc++ MySQLlibg++libstdc++**mysqld**

· **makeGNUmake**

```
· making all in mit-pthreads
· make: Fatal error in reader: Makefile, line 18:
· Badly formed macro assignment

make: file `Makefile' line 18: Must be a separator (:

pthread.h: No such file or directory
```

SolarisFreeBSDmake

GNU make 3.75

· CC++ CFLAGSCXXFLAGS CCCXX

· shell> **CC=gcc**

· shell> **CFLAGS=-O3**

· shell> **CXX=gcc**

· shell> **CXXFLAGS=-O3**

· shell> **export CC CFLAGS CXX CXXFLAGS**

2.1.2.5“MySQL ABMySQL”

· **gcc**

· client/libmysql.c:273: parse error before `__attrib

gcc2.8.1 **gcc** 2.95.2**egcs** 1.0.3a

· **mysqld**, **configure**accept()getsockname()getpeername()

· cxx: Error: mysqld.cc, line 645: In this statement,

· type of the pointer value ''length'' is ''unsi

· which is not compatible with ''int''.

· new_sock = accept(sock, (struct sockaddr *)&cAddr,

“ config.h” (configure)

```
/* Define as the base type of the last arg to accept */
#define SOCKET_SIZE_TYPE XXX
```

- XXXsize_tint **configure** **configure**“ config.h”
- “sql_yacc.cc”“ sql_yacc.yy”“ sql_yacc.cc” MySQL

· "sql_yacc.yy", line xxx fatal: default action causes potential...

yacc **bison**GNU**yacc**)

· Debian Linux 3.0, MySQL 5.1Berkeley DBgawkmawk

· mysqldMySQL **configure**--with-debug E.2“MySQL”

· Linux(SuSE Linux 8.1Red Hat Linux 7.3)

```
· libmysql.c:1329: warning: passing arg 5 of `gethost
· incompatible pointer type
· libmysql.c:1329: too few arguments to function `get
· libmysql.c:1329: warning: assignment makes pointer
· without a cast
· make[2]: *** [libmysql.lo] Error 1
```

configureg++ GNU C++ **g++**

o GNU C++ **g++**Linux gpp**gcc-c++**

o **gcc**C++ CXX**gcc**

o

```
export CXX="gcc"
```

configure

2.8.5. MIT-pthreads

MIT-pthreads

Linux MIT-pthreadsLinuxThreads2.12.1“Linux”

MIT-pthreads**MySQL**FreeBSD SunOS 4.xSolaris 2.4 2.1.1 “MySQL”

MIT-pthreadsMySQL 5.1
http://www.mysql.com/Downloads/Contrib/pthreads-1_60_beta6-mysql.tar.gz

MySQL mit-pthreads

- **configure**--with-mit-threadsMIT-pthreads
- shell> **./configure -- with-mit-threads**

MIT-pthreads

· MIT-pthreads --without-server MIT-pthreads pthreads -h--host

· MIT-pthreadsMySQL --exte

- pthreadbind()(Solaris)
- shell> **mysqladmin version**
- mysqladmin: connect to server at '' failed;
- error: 'Can't connect to mysql server on localhost (146)'

mysqld

- MIT-pthreadsSIGINTbreak)sleep() **mysqladmin --sleep** sleep()
- (Solaris)
- ld: warning: symbol `_iob' has differing sizes:
- (file /my/local/pthreads/lib/libpthread.a(findfp.o) value=0x4;
- file /usr/lib/libc.so value=0x140);
- /my/local/pthreads/lib/libpthread.a(findfp.o) definition taken
- ld: warning: symbol `__iob' has differing sizes:
- (file /my/local/pthreads/lib/libpthread.a(findfp.o) value=0x4;
- file /usr/lib/libc.so value=0x140);
- /my/local/pthreads/lib/libpthread.a(findfp.o) definition taken

-
- implicit declaration of function `int strtoll(...)'
- implicit declaration of function `int strtoul(...)'
- readlineMIT-pthreads

2.8.6. WindowsMySQL

2.8.6.1. VC++MySQL
2.8.6.2. Windows

Windows5.1MySQL BitKeeper

WindowsBitKeeperMySQL MySQL ABMySQL MySQL AB

WindowsMySQL 2.3“WindowsMySQL”

WindowsMySQLWindows

· Visual Studio 2003(VC++ 7.0)

· 35GB

· Windows 2000

http://msdn.microsoft.com/vstudio/productinfo/sysreqs/default.aspx

WindowsMySQL MySQL 5.1

1. MySQL AB http://dev.mysql.co

2. BitKeeper Unix Windows (Unix BitKeeper

· UnixUnix Linux

· BitKeeper 3.0BitKeeper2.8.3“”

Windows 2.8.6.1“VC++MySQL” BitKeeper 2.8.6.2“ Windows”

Windows win32 1.7.1.1“The MySQL”

2.8.6.1. VC++MySQL

MySQL 4.1VC++Microsoft Visual Studio 2003 MySQL AB

MySQL

1. (C\ workdir)

2. **WinZip**.zipWindows

3. Visual Studio

4. File Open Workspace

5. MySQL.dsw

6. Build Set Active Configuration

7. mysqld - Win32 DebugOK

8. **F7**

9.

10.client_debuglib_debug client_releaselib_release BuildBuild All

11. MySQLC:\mysqlC:\mysql\data --basedir--datadir (WindowsC\my.cnfmy.ini)

12. client_releaseclient_debug 2.3“WindowsMySQL”

13. client_releaseclient_debugMySQL

MySQL

1. MySQL C\mysql

2. `C:\> mkdir C:\mysql`

3. `C:\> mkdir C:\mysql\bin`

4. `C:\> mkdir C:\mysql\data`

5. `C:\> mkdir C:\mysql\share`

6. `C:\> mkdir C:\mysql\scripts`

MySQL

```
C\> mkdir C\mysql\include
C\> mkdir C\mysql\lib
C\> mkdir C\mysql\lib\debug
C\> mkdir C\mysql\lib\opt
```

MySQL

```
C\> mkdir C\mysql\sql-bench
```

Perl [2.13“Perl”]

7. workdirC\mysql

```
8.            C:\> cd \workdir
9.            C:\workdir> copy client_release\*.exe C:\mysql\bin
10.        C:\workdir> copy client_debug\mysqld.exe C:\mysql\bin\mys
11.        C:\workdir> xcopy scripts\*.* C:\mysql\scripts /E
12.        C:\workdir> xcopy share\*.* C:\mysql\share /E
```

MySQL

```
C:\workdir> copy lib_debug\mysqlclient.lib C:\mysql\lib\debug
C:\workdir> copy lib_debug\libmysql.* C:\mysql\lib\debug
C:\workdir> copy lib_debug\zlib.* C:\mysql\lib\debug
C:\workdir> copy lib_release\mysqlclient.lib C:\mysql\lib\opt
C:\workdir> copy lib_release\libmysql.* C:\mysql\lib\opt
C:\workdir> copy lib_release\zlib.* C:\mysql\lib\opt
C:\workdir> copy include\*.h C:\mysql\include
C:\workdir> copy libmysql\libmysql.def C:\mysql\include
```

MySQL

```
C:\workdir> xcopy sql-bench\*.* C:\mysql\bench /E
```

Windows [2.3“WindowsMySQL”]

2.8.6.2. Windows

BitKeeperWindows UnixUnix Linux

1. MySQL 5.1BitKeeper [2.8.3“”]

2.

3. `shell> ./BUILD/compile-pentium-max`

4.

5. `shell> ./scripts/make_win_src_distribution`

Windows

· --help

· --debug

· --tmp

· --suffix

· --dirname

()

· --silent

· --tar

tar.gz.zip

make_win_src_distribution Zip- mysql-*VERSION*-win-src.zip*VERSION* MySQL

6. WindowsWindows 2.8.6.1“VC++MySQL”

2.8.7. WindowsMySQL

MySQL.hmy_global.h

```
#include <my_global.h>
#include <mysql.h>
```

my_global.hWindowsWindows(windows.h)

libmysql.lib libmysql.dllmysqlclient.lib

MySQL

2.9.

2.9.1. Windows
2.9.2. Unix
2.9.3. MySQL

MySQL Unix MySQL
Windows

WindowsUnix 2.9.2.3“MySQL” 2.9.3“MySQL”
MySQL

5.7“MySQL” 5.8“MySQL” MySQL

2.9.1. Windows

Windows MySQL WindowsMySQL
Windows Installation Wizard MySQL 2.3.4.1“” 2.9.3“
MySQL”

(2.3.10“”)

```
C:\> C:\mysql\bin\mysqlshow
+-----------+
| Databases |
+-----------+
| mysql     |
| test      |
+-----------+

C:\> C:\mysql\bin\mysqlshow mysql
Database: mysql
+--------------+
```

```
|    Tables    |
+--------------+
| columns_priv |
| db           |
| func         |
| host         |
| tables_priv  |
| user         |
+--------------+
```

```
C:\> C:\mysql\bin\mysql -e "SELECT Host,Db,User FROM db" mysql
+------+-------+------+
| host | db    | user |
+------+-------+------+
| %    | test% |      |
+------+-------+------+
```

Windows MySQLWindows 2.3.12“WindowsMySQL”

2.9.2. Unix

2.9.2.1. mysql_install_ **db**
2.9.2.2. MySQL
2.9.2.3. MySQL

UnixMySQL

Unix **mysql_install_db**

· RPMLinuxMySQLRPM**mysql_install_db**

· PKGMac OS XMySQL**mysql_install_db**

mysql_install_db

() 2.9.2.2“MySQL”

mysql_install_db 2.9.3“MySQL”

MySQLID

1. MySQL *BASEDIR*

2. shell> **cd *BASEDIR***

BASEDIR/usr/local/mysql /usr/local

3. **mysql_install_db** MySQL

MySQL **mysql_install_db** **mysql_install_db**

mysql_install_dbbinscripts

```
shell> bin/mysql_install_db --user=mysql
shell> scripts/mysql_install_db --user=mysql
```

mysql_install_db mysqlMySQLtest root
MySQL root testtest_

mysql

mysql_install_dbmysql userdbhost tables_privcolumns_privfunc 5.7 “MySQL”

test **mysqladmin -u root drop test**

mysql_install_db 2.9.2.1“mysql_install_**db**”

mysql_install_db,MySQL

· **mysql_install_db** GRANTREVOKE MySQL rootmysql -u rootMySQL GRANTREVOKE

MySQLGRANTREVOKE **mysql_install_db**mysql

```
shell> bin/ mysql_install_db --user=mysql
shell> bin/mysql -u root < your_script_file
```

· GRANTREVOKE**mysql_install_db**

MySQL .frm.MYI .MYD (mysql **mysqld --help mysql_install_db**

· --skip-grant-tables**mysqldmysql**

· `shell> bin/mysqld_safe --user=mysql --skip-gr`

· `shell> bin/mysql mysql`

mysqlmysql_install_dbSQL **mysqladmin flush-privilegesmysqladmin reload**

mysql_install_db

4. MySQL

5. `shell> bin/mysqld_safe --user=mysql &`

MySQL(non-root) rootmysql_safe--user mysql --user

A.3.2“MySQL” MySQL

```
mysqld: Can't find file: 'host.frm'
```

2.9.2.3“MySQL”

6. **mysqladmin**

7. `shell> bin/mysqladmin version`

8. shell> **bin/mysqladmin variables**

mysqladmin version MySQL

```
shell> bin/mysqladmin version
mysqladmin  Ver 8.41 Distrib 5.1.2-alpha, for pc-linux-gnu on i686
Copyright (C) 2000 MySQL AB & MySQL Finland AB & TCX DataKonsult AB
This software comes with ABSOLUTELY NO WARRANTY. This is free softwa
and you are welcome to modify and redistribute it under the GPL lice

Server version          5.1.2-alpha-Max
Protocol version        10
Connection              Localhost via UNIX socket
UNIX socket             /var/lib/mysql/mysql.sock
Uptime:                 14 days 5 hours 5 min 21 sec

Threads: 1  Questions: 366  Slow queries: 0
Opens: 0  Flush tables: 1  Open tables: 19
Queries per second avg: 0.000
```

mysqladmin-- help

9.

10. shell> **bin/mysqladmin -u root shutdown**

11. **mysqld_safemysqld**

12. shell> **bin/mysqld_safe --user=mysql --log &**

mysqld_safe 2.9.2.3“MySQL”

13.

```
shell> bin/mysqlshow
+-----------+
| Databases |
+-----------+
| mysql     |
| test      |
+-----------+

shell> bin/mysqlshow mysql
Database: mysql
+---------------------------+
|          Tables           |
+---------------------------+
| columns_priv              |
| db                        |
| func                      |
| help_category             |
| help_keyword              |
| help_relation             |
| help_topic                |
| host                      |
| proc                      |
| procs_priv                |
| tables_priv               |
| time_zone                 |
| time_zone_leap_second     |
```

```
| time_zone_name            |
| time_zone_transition      |
| time_zone_transition_type |
| user                      |
+---------------------------+

shell> bin/mysql -e "SELECT Host,Db,User FROM db" mysql
+------+--------+------+
| host | db     | user |
+------+--------+------+
| %    | test   |      |
| %    | test_% |      |
+------+--------+------+
```

53.sql-bench(MySQL) MySQL Perl Perl DBI Perl

```
DBI
DBD::mysql
Data::Dumper
Data::ShowTable
```

CPAN(http://www.cpan.org/) 2.13.1“UnixPerl”

sql-bench/Results

```
shell> cd sql-bench
shell> perl run-all-tests
```

sql-bench RPMMySQLRPM(RPMsql-bench benchmark mysql-bench-VERSION-i386.rpmRPM

tests auto_increment.tst

```
shell> mysql -vvf test < ./tests/auto_increment.tst
```

```
" ./tests/auto_increment.res"
```

58. MySQL [2.9.3"MySQL"]

MySQL 5.1MySQL [5.10.8"MySQL"]

2.9.2.1. mysql_install_ db

mysql_install_db MySQL MySQL

mysqld MySQL **mysql_install_db**

```
shell> mv mysql-data-directory/mysql mysql-data-directory/mysql-old
shell> mysql_install_db --user=mysql
```

mysql_install_db

· **mysql_install_db fails to install the grant tables**

mysql_install_db

```
Starting mysqld daemon with databases from XXXXXX
mysqld ended
```

"XXXXXX" **mysqld** [1.7.1.3""]

· **amysqld**

mysql_in

.

MySQL 2

```
Can't start server: Bind on TCP/IP port:
Address already in use
Can't start server: Bind on unix socket...
```

5.12“MySQL”

· **“ /tmp ”**

(“/tmp”)Unix “ /tmp” **mysql_install_dbmysqld**

mysql_install_dbmysqld Unix

```
shell> TMPDIR=/some_tmp_dir/
shell> MYSQL_UNIX_PORT=/some_tmp_dir/mysql.sock
shell> export TMPDIR MYSQL_UNIX_PORT
```

some_tmp_dir

mysql_install_db

```
shell> bin/mysql_install_db --user=mysql
shell> bin/mysqld_safe --user=mysql &
```

mysql_install_dbscripts scripts/mysql_install_db

A.4.5“MySQL/tmp/mysql.sock ”F

2.9.2.2. MySQL

mysqld

· **mysqld**

· WindowsMySQL Windows(NT2000XP2003) Windows 2.3.12“WindowsMySQL”

· **mysqld_safemysqld** BSD Unix 5.1.3“mysqld_safeMySQL ”

· **mysql.server**V-style mysql **mysql.servermysqld_safe** 5.1.4 “mysql.serverMySQL”

· Mac OS XMySQL Startup ItemMySQLStartup Item**mysql.server**

“Mac OS XMySQL”

mysql.servermysqld_safe Mac OS X Startup Item **mysql.server**Startup Item

mysql.server startstop

```
shell> mysql.server start
shell> mysql.server stop
```

mysql.server **MySQL** **safe_mysqld** /etc/my.cnf[**mysqld**]user (**mysql.server** **safe_mysqld** cd **mysql.serverMySQL**

mysql.server stop **mysqladmin shutdown**

MySQL“/etc/rc *

LinuxRPM(MySQL-server-VERSION.rpm)**mysql.server**/etc/init.d MySQL Linux RPM2.4“LinuxMySQL”

RPM **mysqld**

mysql.server MySQL MySQLMySQL support-files

mysql.servermysql/etc/init.d **mysql.server**is

```
shell> cp mysql.server /etc/init.d/mysql
shell> chmod +x /etc/init.d/mysql
```

Red Hat/etc/rc.d/init.d /etc/init.d /etc/rc.d/init.d/etc/init.d

```
shell> cd /etc
shell> ln -s rc.d/init.d .
```

Linux chkconfig

```
shell> chkconfig --addMySQL
```

Linux MySQL

```
shell> chkconfig --level 345MySQL on
```

FreeBSD /usr/local/etc/rc.d/rc(8)*.sh shell FreeBSD mysql.server /usr/local/etc/rc.d/mysql.server.sh

/etc/rc.local/etc/init.d/boot.local MySQL

```
/bin/sh -c 'cd /usr/local/mysql; ./bin/mysqld_safe --user=mysql &'
```

“/etc/my.cnf”**mysql.server** “ /etc/my.cnf”

```
[mysqld]
datadir=/usr/local/mysql/var
socket=/var/tmp/mysql.sock
port=3306
user=mysql
```

[**mysql.server**]

```
basedir=/usr/local/mysql
```

mysql.server basedirdatadirpid-file **mysql.server**startstop

mysqld	[mysqld], [server], [mysqld-major-version]
mysql.server	[mysqld], [mysql.server], [server]
mysqld_safe	[mysqld], [server], [mysqld_safe]

[mysqld-major-version][mysqld-5.0][mysqld-5.1]5.0.x5.1.x

mysql.server[mysql_server] **mysqld_safe**[safe_mysqld] MySQL 5.1 [mysql.server][mysqld_safe]

4.3.2“”

2.9.2.3. MySQL

.

.

.

.

.

my.cnf (InnoDBBDB)

· InnoDB InnoDB-specific InnoDB 15.2.3“InnoDB”

· BDB (Berkeley DB) BDB-specific 15.5.3“BDB”

mysqld Unix pid(ID)

--verbose--help**mysqld**

MySQL **mysqld mysqld_safe**

--datadir **mysqld** MySQL --basedir

--verbose--help**mysqld** **mysqld** /usr/local

```
shell> ./mysqld --basedir=/usr/local --verbose --help
```

--datadir--verbose--help

--verbose-- help

mysqld

```
shell> mysqladmin variables
```

```
shell> mysqladmin -h host_name variables
```

*host_name*MySQL

mysqldErrcode 13(Permission denied) root

Unix /usr/local/mysql/var

```
shell> ls -la /usr/local/mysql/var
```

```
shell> chown –R mySQL /usr/local/mysql/var
shell> chgrp –R mySQL /usr/local/mysql/var
```

(WindowsC:\Program Files\MySQL\MySQL Server 5.1\dataUnix /usr/local/mysql/dataUnix/usr/local/var)*host_name*.err*host_name*.log *host_name* Unix tail

```
shell> tail host_name.err
shell> tail host_name.log
```

```
000729 14:50:10  bdb:  Recovery function for LSN 1 27595 failed
000729 14:50:10  bdb:  warning: ./test/t1.db: No such file or direct
000729 14:50:10  Can't init databases
```

--bdb-no-recover**mysqld**Berkeley DB Berkeley DB BDB log.0000000001

BDB **mysqld**,**mysqld** BDB --bdb-no-recover**mysqld** BDB--bdb-no-recover**mysqld**

(**mysqld**)**mysqld**TCP/IPUnix

```
Can't start server: Bind on TCP/IP port: Address already in use

Can't start server: Bind Unix socket...
```

psmysqld **mysqld**(5.12“MySQL”)

telnet your-host-name tcp-ip-port-number(M
telnet: Unable to connect to remote host: Connection refused **mysqld** TCP/IP
mysqld--port TCP/IP

/etc/hosts

```
127.0.0.1       localhost
```

MySQLMIT-pthreads

mysqld--debug E.1.2“”

Windows 2.3.14“WindowsMySQL”

2.9.3. MySQL

MySQLMySQL

· Windows

· Unix **mysql_install_db**

MySQL

· root root rootMySQL

o Windows rootMySQL

o Unix root localhostIP

· MySQL

o Windows root testtest

o Unix localhostIPtesttest

MySQL

·

· MySQL root

MySQL root“ *newpwd*”

SET PASSWORDUPDATE PASSWORD()

WindowsPASSWORD

```
shell> mysql -u root
mysql> SET PASSWORD FOR ''@'localhost' = PASSWORD('newpwd');
mysql> SET PASSWORD FOR ''@'%' = PASSWORD('newpwd');
```

UnixPASSWORD

```
shell> mysql -u root
mysql> SET PASSWORD FOR ''@'localhost' = PASSWORD('newpwd');
mysql> SET PASSWORD FOR ''@'host_name' = PASSWORD('newpwd');
```

SET PASSWORD*host_name*userroot non-localhostHost SET PASSWORD

```
mysql> SELECT Host, User FROM mysql.user;
```

UserrootHostlocalhost SET PASSWORDHost

UPDATE root UPDATEuserPassword WindowsUnix UPDATE

```
shell> mysql -u root
```

```
mysql> UPDATE mysql.user SET Password = PASSWORD('newpwd')
    ->     WHERE User = '';
mysql> FLUSH PRIVILEGES;
```

userUPDATE FLUSH PRIVILEGES

```
shell> mysql -u root
mysql> DELETE FROM mysql.user WHERE User = '';
mysql> FLUSH PRIVILEGES;
```

WindowsUnixDELETE Windows root

```
shell> mysql -u root
mysql> DELETE FROM mysql.user WHERE Host='localhost' AND User='';
mysql> FLUSH PRIVILEGES;
```

root

· SET PASSWORD

· **mysqladmin**

· UPDATE

SET PASSWORD rootSET PASSWORD PASSWORD()

Windows

```
shell> mysql -u root
mysql> SET PASSWORD FOR 'root'@'localhost' = PASSWORD('newpwd');
mysql> SET PASSWORD FOR 'root'@'%' = PASSWORD('newpwd');
```

Unix

```
shell> mysql -u root
mysql> SET PASSWORD FOR 'root'@'localhost' = PASSWORD('newpwd');
mysql> SET PASSWORD FOR 'root'@'host_name' = PASSWORD('newpwd');
```

SET PASSWORD*host_name*

mysqladminroot

```
  shell> mysqladmin -u root password "newpwd"
  shell> mysqladmin -u root -h host_name password "newpwd"
```

WindowsUnix*host_name*

UPDATEuser UPDATEroot

```
shell> mysql -u root
mysql> UPDATE mysql.user SET Password = PASSWORD('newpwd')
    ->     WHERE User = 'root';
mysql> FLUSH PRIVILEGES;
```

UPDATEWindowsUnix

mysqladmin

```
shell> mysqladmin -u root -p shutdown
Enter password: (enter root password here)
```

root A.4.1“”

GRANT 5.8.2“MySQL”

2.10. MySQL

2.10.1. 5.0
2.10.2.
2.10.3. MySQL

MySQL 3.23 MySQL 4.05.05.1

· MySQL 5.05.1,2.10.1“5.0” D *MySQL*MySQL 5.1MySQL 5.0 MySQL 5.0, MySQL 5.0MySQL 5.1MySQL 5.0,MySQL *5.0* MySQL *4.1*

·

· WindowsMySQL 2.3.15“WindowsMySQL”

· MySQL 5.05.1MySQL
mysqlmysqlimport dump()

· 6.6“”

· **mysqld-max**MySQL-Max MaxMySQL**mysqld_safemysqld-max**
mysqld-maxmysqld_safemysqld

MySQL MySQL 5.1MySQL MyISAM**myisamchk -r -q --set-character-set=*charset***

MySQL**mysqld** MySQL 5.0.135.1.10, **mysqldmysqld-5.0.13mysqld mysqld**

Commands out of sync mysql.hlibmysqlclient.a MySQL

mysqld my.cnf --print-defaults(**mysqld --print-defaults**) my.cnf

MySQL Perl DBD mysql MySQL PHP mysqlPython MySQLdb

2.10.1. 5.0

5.05.0.10mysql_fix_privilege_tables(Windowsmysql_fix_privilege_tables.sql) 2.10.2“”

2.10.2.

(MySQL) MySQL **mysql_fix_privilege_tables** “mysql_fix_privilege_tablesMySQL”

MySQL 4.1 CREATE VIEWSHOW VIEW MySQL 5.1 MySQL**_fix_privilege_ tables**userCreate_privCreate_view_priv Show_view_priv

2.10.3. MySQL

MyISAM.frm.MYI.MYD (MySQL 15.1“MyISAM”

mysqldumpSQL MySQL

mysqldump --help MySQL**mysqldump –opt**

()

```
shell> mysqladmin -h 'other_hostname' create db_name
shell> mysqldump --opt db_name | mysql -h 'other_hostname' db_name


shell> mysqladmin create db_name
shell> mysqldump -h 'other_hostname' --opt --compress db_name | mysq


shell> mysqldump --quick db_name | gzip > db_name.contents.gz
```

(

```
shell> mysqladmin create db_name
```

```
shell> gunzip < db_name.contents.gz | mysql db_name
```

mysqldumpmysqlimport **mysqldump** DUMPDIR**mysqldump**

```
shell> mkdir DUMPDIR
shell>mysqldump --tab=DUMPDIR db_name
```

DUMPDIRMySQL

```
shell> mysqladmin create db_name           # create database
shell> cat DUMPDIR/*.sql | mysql db_name   # create tables in databa
shell> mysqlimport db_name DUMPDIR/*.txt   # load data into tables
```

MySQL MySQL root MySQL

mysql **mysqladmin flush-privileges**

2.11. MySQL

MySQL MySQL

(5.0.13 5.0.12)

· 2.10“MySQL”

·

MySQL MySQL 5.1

mysqldump **mysql**mysqlimport 2.10.3“MySQL”

1. MySQL
2. MySQL
3. **mysqldump**dump
4. MySQL MySQL

dump

2.12.

2.12.1. Linux
2.12.2. Mac OS X
2.12.3. Solaris
2.12.4. BSD
2.12.5. Unix
2.12.6. OS/2

2.12.1. Linux

2.12.1.1. Linux
2.12.1.2. Linux
2.12.1.3. Linux
2.12.1.4. Linux
2.12.1.5. Linux x86
2.12.1.6. Linux SPARC
2.12.1.7. Linux Alpha
2.12.1.8. Linux PowerPC
2.12.1.9. Linux MIPS
2.12.1.10. Linux IA-64

Linux Linux

Linux

2.12.1.1. Linux

MySQLLinux 2.0

SMPLinux 2.2.14 MySQL MySQL2.2.14MySQL 2.2.19 ()2.4 CPU 2.4

LinuxThreads **mysqld** LinuxThreads

2.12.1.2. Linux

MySQLLinux-IntelRPM

-staticis LinuxThreads-staticis (3-5%) (UDF)UDF(CC+

libcLinux(Red Hat 4.xSlackware) () libcglibc2,getpwnam() glibc getpwent(), -staticis

· **mysql_install_db**

· `Sorry, the host 'xxxx' could not be looked up`

mysql_install_db --force **mysql_install_dbresolveip** localhostIP —forceMySQLmysql_installresolveip

· --user**mysqld**

· `getpwnam: No such file or directory`

su**mysqld**--user **mysqld**ID**mysqld**

MySQL(RPMtar.gz)

Linux 2.2 TCP/IP**mysqld** Resource temporarily unavailableLinuxTCP/IP TCP/IP TCP/IP TCP/IPMySQL test-connect

Linux “ ”

2.12.1.3. Linux

glibcMySQL x86Linux glibc 2GB

MySQLLinux LinuxThreads glibc2Linux **MySQL**LinuxThreads http://dev.mysql.com/downloads/os-linux.htmlLinuxThreads

INSERT DELAYED 2.1.1glibcpthread__timedwait() INSERT DELAYEDglibc

Linux LinuxThreads1,024 1,000 LinuxThreads

· sysdeps/unix/sysv/linux/bits/local_lim.hPTHREAD_THREADS_MAX

4096LinuxThreads/internals.h STACK_SIZE256KBglibc (STACK_SIZE 2MBMySQL600-1000

· LinuxThreadslibpthreads.a MySQL

http://www.volano.com/linuxnotes.html LinuxThreads

MySQL SMP glibc 2.1LinuxThreads LinuxThreads MySQLSMPMySQL glibc 2.1.3 (http://www.mysql.com/Downloads/Linux/linuxthreads-2.1-patch)

glibc 2.2.2,MySQL glibc 2.1.3 glibc 2.2.2 MySQL **mysqld**

patch -p0 </tmp/lin

2.2 glibc 2.2.2,STACK_SIZE PTHREAD_THREADS_MAX MySQL **./configure; make; make install**

libpthreads.a MySQL MySQL

MySQL

MySQL

```
ld.so.1: fatal: libmysqlclient.so.#:
open failed: No such file or directory
```

· -Wl,r/full/path/to/libmysqlclient.so -Lpath)

· libmysqclient.so/usr/lib

· libmysqlclient.soLD_RUN_PATH

Fujitsu (fcc/FCC)MySQ Linux**gccconfigurefcc/FCC**

```
CC=fcc CFLAGS="-O -K fast -K lib -K omitfp -Kpreex -D_GNU_SOURCE \
    -DCONST=const -DNO_STRTOLL_PROTO" \
CXX=FCC CXXFLAGS="-O -K fast -K lib \
```

```
    -K omitfp -K preex --no_exceptions --no_rtti -D_GNU_SOURCE \
    -DCONST=const -Dalloca=__builtin_alloca -DNO_STRTOLL_PROTO \
    '-D_EXTERN_INLINE=static __inline'" \
./configure \
    --prefix=/usr/local/mysql --enable-assembler \
    --with-mysqld-ldflags=-all-static --disable-shared \
    --with-low-memory
```

2.12.1.4. Linux

MySQLMySQLsupport-files**mysql.server**/etc/init.d/mysqlMySQL2.9.2.2“ MySQL”

MySQL Linux

Linux 2.2

```
shell> cat /proc/sys/fs/file -max
shell> cat /proc/sys/fs/dquot-max
shell> cat /proc/sys/fs/super-max
```

16MB (SuSE Linux /etc/init.d/boot.local)

```
echo 65536 > /proc/sys/fs/file-max
echo 8192 > /proc/sys/fs/dquot-max
echo 1024 > /proc/sys/fs/super-max
```

rootecho

Linuxsysctl(SuSE Linux 8.0) /etc/sysctl.conf

```
# Increase some values for MySQL
fs.file-max = 65536
fs.dquot-max = 8192
```

```
fs.super-max = 1024
```

/etc/my.cnf

```
[mysqld_safe]
open-files-limit=8192
```

8,192

LinuxThreadsSTACK_SIZE **mysqld** mmap() Linux **mysqld**“ ” **mysqld** max_connections

MySQLLinuxThreads 2.12.1.3“Linux” LinuxThreads max_connections500 **mysqld** 2GB2.2 max_connections RPM max_connections1500 LinuxThreadsSTACK_SIZE 256KB

2.2“” MySQL CPU MySQL(1) CPU

MySQL

2.4 2.2 SMP2.4 SMP

CPU2.4MySQL MySQL 1,000 MySQL()180%-CPU 1,000, 300% 2.2SMP 2.4

2.4**mysqld** **mysqld_safe**renice -20 $$ -CPU 40060%

MySQLfour-wayeight-way2.4 email<benchmarks@mysql.com>

psmysqld MySQL A.4.2“MySQL”

mysqldSIGSEGV Linux --core-file**mysqldmysqld_safeulimit -c 1000000**--core-file-size=1000000**mysqld_safe** 5.1.3“mysqld_safe MySQL”

2.12.1.5. Linux x86

MySQL5.4.12libclibc 5.4.46 glibc 2.0.6 Red Hatglibc RPM

glibc 2.0.7-192.0.7-29 RPM

Red Hat 8.0glibc 2.2.x **mysqld**gethostbyaddr() glibc128KB --thread-stack=192K**mysqld**(MySQL 4-O thread_stack=192K MySQL 4.0.10

gcc 3.0MySQLMySQLlibstdc++v3 __cxa_pure_virtual

Linux **configure**

```
Syntax error in sched.h. Change _P to __P in the
/usr/include/sched.h file.
See the Installation chapter in the Reference Manual.
```

_P

```
mysqld.cc -o objs-thread/mysqld.o
mysqld.cc: In function `void init_signals()':
mysqld.cc:315: warning: assignment of negative value `-1' to
`long unsigned int'
mysqld.cc: In function `void * signal_hand(void *)':
mysqld.cc:346: warning: assignment of negative value `-1' to
`long unsigned int'
```

mysqld /lib/libc.a sql/**mysqldma**

mysqld libg++.a

```
/usr/lib/libc.a(putc.o): In function `_IO_putc':
putc.o(.text+0x0): multiple definitiof `_IO_putc'
```

libg++.a**configure**

```
shell> CXX=gcc ./configure
```

2.12.1.6. Linux SPARC

readdir_r() SHOW DATABASES config.hHAVE_RE

2.12.1.7. Linux Alpha

AlphaMySQL 5.1

Alpha EV6Compaq DS20 SuSE Linux 7.0AXP2.4.4-SMPCompaq C(V6.2-505)Compaq C++(V6.3-006)MySQL

http://www.support.compaq.com/alpha-tools/ MySQL**gcc**9-14%

AlphaMySQL -arch generic Alpha **configure**

```
CC=ccc CFLAGS="-fast -arch generic" CXX=cxx \
CXXFLAGS="-fast -arch generic -noexceptions -nortti" \
./configure --prefix=/usr/local/mysql --disable-shared \
    --with-extra-charsets=complex --enable-thread-safe-client \
    --with-mysqld-ldflags=-non_shared --with-client-ldflags=-non_sha
```

egcsconfigure

```
CFLAGS="-O3 -fomit-frame-pointer" CXX=gcc \
CXXFLAGS="-O3 -fomit-frame-pointer -felide-constructors \
    -fno-exceptions -fno-rtti" \
./configure --prefix=/usr/local/mysql --disable-shared
```

Linux-AlphaMySQL

· gdb 4.18 **gdb** 5.1

· **gccmysqld** **gcc**--with-mysqld-ldflags=-all-static

2.12.1.8. Linux PowerPC

MySQLglibc(glibc 2.0.7)MkLinux

2.12.1.9. Linux MIPS

MySQLQube2(Linux Mips) glibc glibc-2.0.7-29C2 **egcs** C++(**egc** 1.0.2-9**gcc** 2.95.2)

2.12.1.10. Linux IA-64

MySQLLinux IA-64, **gcc** 2.96**configure**

```
CC=gcc \
CFLAGS="-O3 -fno-omit-frame-pointer" \
CXX=gcc \
CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors \
    -fno-exceptions -fno-rtti" \
    ./configure --prefix=/usr/local/mysql \
    "--with-comment=Official MySQL binary" \
    --with-extra-charsets=complex
```

IA-64,MySQL /usr/local/mysql libmysqlclient.so/etc/ld.so.conf LD_LIBRARY_PATH

A.3.1“MySQL”

2.12.2. Mac OS X

2.12.2.1. Mac OS X 10.x (Darwin)
2.12.2.2. Mac OS X Server 1.2 (Rhapsody)

Mac OS X **tar** .tar.gz **gnutar**

2.12.2.1. Mac OS X 10.x (Darwin)

MySQLMac OS X 10.x(Darwin)

· (wait_timeoutinteractive_timeoutnet_read_timeout)

Darwin 6.3**configure**Mac OS X

```
CC=gcc CFLAGS="-O3 -fno-omit-frame-pointer" CXX=gcc \
CXXFLAGS="-O3 -fno-omit-frame-pointer -felide-constructors \
    -fno-exceptions -fno-rtti" \
    ./configure --prefix=/usr/local/mysql \
    --with-extra-charsets=complex --enable-thread-safe-client \
    --enable-local-infile --disable-shared
```

2.5“Mac OS XMySQL”

2.12.2.2. Mac OS X Server 1.2 (Rhapsody)

Mac OS X MySQL Mac OS X

(Mac OS X Server 1.2, a.k.a. Rhapsody)MySQLpthread

2.5“Mac OS XMySQL”

2.12.3. Solaris

2.12.3.1. Solaris 2.7/2.8
2.12.3.2. Solaris x86

Solaris MySQL Solaris **tar** MySQL

GNU **tar**(**gtar**) http://dev.mysql.com/downloads/os-solaris.htmlSolaris

SunSolaris 2.5　2.4　MySQLMIT-pthreads2.8.5“MIT-pthreads”

configure

```
checking for restartable system calls... configure: error can not
run test programs while cross compiling
```

config.cache

```
ac_cv_sys_restartable_syscalls=${ac_cv_sys_restartable_syscalls='no'
```

SPARCSolaris**gcc** 2.95.23.2http://gcc.gnu.org/　**egcs** 1.1.1**gcc** 2.8.1SPARC

gcc 2.95.2**configure**

```
CC=gcc CFLAGS="-O3" \
CXX=gcc CXXFLAGS="-O3 -felide-constructors -fno-exceptions -fno-rtti
./configure --prefix=/usr/local/mysql --with-low-memory \
    --enable-assembler
```

UltraSPARC　CFLAGSCXXFLAGS-mcpu=v8 -Wa,-xarch=v8plusa4%

Sun Forte 5.0()

```
CC=cc CFLAGS="-Xa -fast -native -xstrconst -mt" \
CXX=CC CXXFLAGS="-noex -mt" \
./configure --prefix=/usr/local/mysql --enable-assembler
```

Sun Forte 64-

```
CC=cc CFLAGS="-Xa -fast -native -xstrconst -mt -xarch=v9" \
CXX=CC CXXFLAGS="-noex -mt -xarch=v9" ASFLAGS="-xarch=v9" \
./configure --prefix=/usr/local/mysql --enable-assembler
```

gcc64-Solaris　CFLAGSCXXFLAGS-m64**configure**--enable-assembler

MySQL　UltraSPARC32Forte 5.0-mcpu**gcc** 3.2　4%

64**mysqld** 32-4%

x86_64Solaris 10,forcedirectioInnoDB () InnoDB

fdatasyncsched_yield **configure**LIBS=-lrt

WorkShop 5.3,**configure**

```
#if !defined(__STDC__) || __STDC__ != 1


#if !defined(__STDC__)
```

-Xc __STDC__Sun Solaris pthreads.h Sun (include)

mysqld -mt multi-threadSunMySQL

libc internal error: _rmutex_unlock: rmutex not held

-mtCFLAGSCXXFLAGS

gccSFW(Solaris 8)**configure**/opt/sfw/libLD_LIBRARY_PATH

sunfreeware.com**gcc** **gcc**GNU binutils

gccMySQL **gcc**Solaris

```
shell> gcc -O3 -g -O2 -DDBUG_OFF  -o thr_alarm ...
./thr_alarm.c: In function `signal_hand':
./thr_alarm.c:556: too many arguments to function `sigwait'
```

gccgcc Solaris 2.5,**gcc**include,

Solaris(libpthreadslibdl)--staticMySQL

```
ld: fatal: library -ldl: not found
undefined reference to `dlopen'
cannot find -lrt
```

MySQL

```
ld.so.1: fatal: libmysqlclient.so.#:
open failed: No such file or directory
```

· -Wl,r/full/path/to/libmysqlclient.so-Lpath)

· libmysqclient.so/usr/lib

· libmysqlclient.soLD_RUN_PATH

zlib -lz**configure**

· ftp.gnu.orgzlib

· MySQL--with-named-z-libs=no**configure**

gccMySQL(UDF) UDF-lgcc

MySQL support-files/mysql.server/etc/init.d/etc/rc3.d/S99**mysql.server**

mysqldMySQL

```
Error in accept: Protocol error
```

--back_log=50 (MySQL 4-O back_log=50

Solarissetuid() --user**mysqld**

2.12.3.1. Solaris 2.7/2.8

Solaris 2.72.8Solaris 2.6 Solaris 2.6Solaris 2.72.8

MySQLSolaris

Solaris 2.7/2.8include **gcc**

```
/usr/include/widec.h:42: warning: `getwc' redefined
```

```
/usr/include/wchar.h:326: warning: this is the location of the previ
definition
```

/usr/include/widec.h.../lib/gcc-lib/os/gcc-version/include41

```
#if     !defined(lint) && !defined(__lint)


#if     !defined(lint) && !defined(__lint) && !defined(getwc)
```

/usr/include/widec.h config.cache**configure**

make **configure**curses.h(/usr/include/widec.h)

```
In file included from mysql.cc:50:
/usr/include/term.h:1060: syntax error before `,'
/usr/include/term.h:1081: syntax error before `;'
```

· CFLAGS=-DHAVE_CURSES_H CXXFLAGS=-DHAVE_CURSES_H ./configure

· /usr/include/widec.h**configure**

· config.h#define HAVE_TERM**make**

-lzlibz.so/usr/local/lib

· LD_LIBRARY_PATH/usr/local/lib

· libz.so from /lib

· Solaris 8,Solaris 8 CDzlib

· MySQL--with-named-z-libs=no**configure**

2.12.3.2. Solaris x86

x86 Solaris 8, strip **mysqld**

Solaris x86**gccegcs** **configure**

```
CC=gcc CFLAGS="-O3 -fomit-frame-pointer -DHAVE_CURSES_H" \
CXX=gcc \
CXXFLAGS="-O3 -fomit-frame-pointer -felide-constructors \
    -fno-exceptions -fno-rtti -DHAVE_CURSES_H" \
./configure --prefix=/usr/local/mysql
```

libstdc++C++

gdb E.1.3“gdbm **ysqld**”

2.12.4. BSD

2.12.4.1. FreeBSD
2.12.4.2. NetBSD
2.12.4.3. OpenBSD 2.5
2.12.4.4. BSD/OS 2.x
2.12.4.5. BSD/OS 3.x
2.12.4.6. BSD/OS 4.x

BSD UnixMySQL

2.12.4.1. FreeBSD

MySQLFreeBSD 4.x -RELEASEFreeBSD

mysql-servermysql-client http://www.fre

- FreeBSD**MySQL**
-
- /usr/local/etc/rc.d

· pkg_info -L

· **MySQL**pkg_delete

FreeBSD 2.x MIT-pthreads3 2.2.x **mysqld**

FreeBSD gethostbyname() MySQLIP **mysqld**100%CPU --skip-name-resolveMySQL

FreeBSD 4.xMySQLLinuxThreads FreeBSD LinuxThreads Jeremy Zawodny*FreeBSD or Linux for your MySQL Server?* http://jeremy.zawodny.com/blog/archives/000697.html

FreeBSDLinuxThreads

· (wait_timeoutinteractive_timeoutnet_read_timeout) 'kill'

FreeBSD 5.0

MySQLGNU make(**gmake**) GNU **make**MySQL

FreeBSD**gcc**(2.95.2)MySQL

```
CC=gcc CFLAGS="-O2 -fno-strength-reduce" \
    CXX=gcc CXXFLAGS="-O2 -fno-rtti -fno-exceptions \
    -felide-constructors -fno-strength-reduce" \
    ./configure --prefix=/usr/local/mysql --enable-assembler
gmake
gmake install
cd /usr/local/mysql
bin/mysql_install_db --user=mysql
bin/mysqld_safe &
```

configureMIT-pthreadsMIT-pthreads 2.8.5“MIT-pthreads”

make install“/usr/include/pthreads” **configure**MIT-pthreads config.cache--with-mit-threads**configure**

mysqld “/etc/hosts”localhost

```
127.0.0.1       localhost localhost.your.domain
```

FreeBSD A.2.17“” --open-files-limit**mysqld_safe** /etc/login.conf **mysqld**cap_mkdb /etc/login.conf (chpass mysqld-user-name) 5.1.3 “mysqld_safeMySQL”

FreeBSD512MBRAM

```
Out of memory (Needed 16391 bytes)
```

FreeBSD(4.x) /boot/loader.conf(**sysctl**)

```
kern.maxdsiz="1073741824" # 1GB
kern.dfldsiz="1073741824" # 1GB
kern.maxssiz="134217728" # 128MB
```

FreeBSD LINTMAXDSIZ

MySQL TZ F

2.12.4.2. NetBSD

NetBSD GNU makemakeC++lint

2.12.4.3. OpenBSD 2.5

OpenBSD 2.5 **MySQL**

```
CFLAGS=-pthread CXXFLAGS=-pthread ./configure --with-mit-threads=no
```

2.12.4.4. BSD/OS 2.x

MySQL , **ulimit**

```
item_func.h: In method
`Item_func_ge::Item_func_ge(const Item_func_ge &)':
```

```
item_func.h:28: virtual memory exhausted
make[2]: *** [item_func.o] Error 1
```

ulimit -v 80000makebashcshshBSDI**bashulimit**

gccconfigure--with-low-memory“ `sql_yacc.cc`”

MySQL TZ F

2.12.4.5. BSD/OS 3.x

BSD/OS 3.1 BSDI patch M300-038

MySQL :

```
env CXX=shlicc++ CC=shlicc2 \
./configure \
    --prefix=/usr/local/mysql \
    --localstatedir=/var/mysql \
    --without-perl \
    --with-unix-socket-path=/var/mysql/mysql.sock


env CC=gcc CXX=gcc CXXFLAGS=-O3 \
./configure \
    --prefix=/usr/local/mysql \
    --with-unix-socket-path=/var/mysql/mysql.sock
```

--skip-thread-priority**mysqld** BSDI 3.1

virtual memory exhausted **ulimit -v 80000makebashcshsh**BSDI**bashulimit**

2.12.4.6. BSD/OS 4.x

BSDI 4.x **MySQL** M400-023

BSDI 4.x **mysqladmin** disable-shared

BSDI 4.0.1 **mysqld** /**mysqld**

MySQL3.23.34 **configure** **make**config.h#define HAVE_REALPATH

BSDI ()

2.12.5. Unix

2.12.5.1. HP-UX 10.20
2.12.5.2. HP-UX 11.x
2.12.5.3. IBM-AIX
2.12.5.4. SunOS 4
2.12.5.5. Alpha-DEC-UNIX(Tru64)
2.12.5.6. Alpha-DEC-OSF/1
2.12.5.7. SGI Irix
2.12.5.8. SCO UNIXOpenServer 5.0.x
2.12.5.9. SCO UnixWare 7.1.xOpenUNIX 8.0.0
2.12.5.10. SCO OpenServer 6.0.x

2.12.5.1. HP-UX 10.20

HP-UX**MySQL**"" **gcc**HP-UX **gcc**

HP-UX**gcc** 2.95(-O6)HP-UX

configuregcc 2.95

```
CFLAGS="-I/opt/dce/include -fpic" \
CXXFLAGS="-I/opt/dce/include -felide-constructors -fno-exceptions \
-fno-rtti" \
CXX=gcc \
```

```
./configure --with-pthread \
    --with-named-thread-libs='-ldce' \
    --prefix=/usr/local/mysql --disable-shared
```

configuregcc 3.1

```
CFLAGS="-DHPUX -I/opt/dce/include -O3 -fPIC" CXX=gcc \
CXXFLAGS="-DHPUX -I/opt/dce/include -felide-constructors \
    -fno-exceptions -fno-rtti -O3 -fPIC" \
./configure --prefix=/usr/local/mysql \
    --with-extra-charsets=complex --enable-thread-safe-client \
    --enable-local-infile  --with-pthread \
    --with-named-thread-libs=-ldce --with-lib-ccflags=-fPIC
    --disable-shared
```

2.12.5.2. HP-UX 11.x

HP-UX HP-UX 11.0MySQL

```
PHKL_22840 Streams cumulative
PHNE_22397 ARPA cumulative
```

recv()EWOULDBLOCKaccept()EBADF

HP-UX 11.x**gcc** 2.95.1

```
In file included from /usr/include/unistd.h:11,
                 from ../include/global.h:125,
                 from mysql_priv.h:15,
                 from item.cc:19:
/usr/include/sys/unistd.h:184: declaration of C function ...
/usr/include/sys/pthread.h:440: previous declaration ...
```

```
In file included from item.h:306,
                 from mysql_priv.h:158,
                 from item.cc:19:
```

HP-UXpthreads_atfork()/usr/include/sys/unistd.h184
/usr/include/sys/pthreads.h440

/usr/include/sys/unistd.hMySQL/includeunistd.hpthreads.h

```
extern int pthreads_atfork(void (*prepare)()void (*parent)(),
                                           void (*child)())


extern int pthreads_atfork(void (*prepare)(void)void (*parent)(void)
                                           void (*child)(void))
```

configure

```
CFLAGS="-fomit-frame-pointer -O3 -fpic" CXX=gcc \
CXXFLAGS="-felide-constructors -fno-exceptions -fno-rtti -O3" \
./configure --prefix=/usr/local/mysql --disable-shared
```

HP-UX (**cc** B.11.11.04)

```
CC=cc CXX=aCC CFLAGS=+DD64 CXXFLAGS=+DD64 ./configure \
    --with-extra-character-set=complex


aCC: warning 901: unknown option: `-3': use +help for online
documentation
```

configure HP-UX CC++K&R

```
checking for cc option to accept ANSI C... no
configure: error: MySQL requires an ANSI C compiler (and a C++ compi
```

```
Try gcc. See the Installation chapter in the Reference Manual.
```

+DD64

HP-UX 11http://dev.mysql.com/downloads/MySQL MySQLHP-UX 10.20HP-UX 11 HP-UX

2.12.5.3. IBM-AIX

AutoconfxlC **configure** IBM

```
export CC="xlc_r -ma -O3 -qstrict -qoptimize=3 -qmaxmem=8192 "
export CXX="xlC_r -ma -O3 -qstrict -qoptimize=3 -qmaxmem=8192"
export CFLAGS="-I /usr/local/include"
export LDFLAGS="-L /usr/local/lib"
export CPPFLAGS=$CFLAGS
export CXXFLAGS=$CFLAGS

./configure --prefix=/usr/local \
                --localstatedir=/var/mysql \
                --sbindir='/usr/local/bin' \
                --libexecdir='/usr/local/bin' \
                --enable-thread-safe-client \
                --enable-large-files
```

http://www-frec.bull.com/MySQL

configure-O3-O2-qstrict IBM C

gccegcsMySQL-fno-exceptions **gcc/egcs** **egcs**1.1 IBM **gcc**

AIX **egcsgcc 2.95configure**

```
CC="gcc -pipe -mcpu=power -Wa,-many" \
CXX="gcc -pipe -mcpu=power -Wa,-many" \
CXXFLAGS="-felide-constructors -fno-exceptions -fno-rtti" \
./configure --prefix=/usr/local/mysql --with-low-memory
```

-Wa,-many IBM **gcc** 2.95-fno-exceptions,MySQL **egcs**/**gcc**

-mcpu=*xxx*CPUpower2powerpowerpc 604604epower power2

CPU uname -m 000514676700 xxyyyyyymmssxxss00,yyyyyyIDmm CPU PlanarID
http://www16.boulder.ibm.com/pseries/en_US/cmds/aixcmds5/uname.htm

CPU

(**MySQL**)OS **MySQL**

```
CFLAGS=-DDONT_USE_THR_ALARM CXX=gcc \
CXXFLAGS="-felide-constructors -fno-exceptions -fno-rtti \
-DDONT_USE_THR_ALARM" \
./configure --prefix=/usr/local/mysql --with-debug \
    --with-low-memory
```

MySQL **mysqladmin killmysqladmin shutdown**“”

AIXlibbind.agetservbyname AIXIBM

AIX 4.2.1**gcc**

config.hinclude/my_config.h

```
#define HAVE_SNPRINTF 1
```

```
#undef HAVE_SNPRINTF
```

mysqld.ccinitgroups ()

```
#ifdef _AIX41
extern "C" int initgroups(const char *,int);
#endif
```

mysqld **ulimit -d unlimited** **mysqld_safe**

```
export LDR_CNTRL='MAXDATA=0x80000000'
```

http://publib16.boulder.ibm.com/pseries/en_US/aixprggd/genprogc/lrg_prg_supp

2.12.5.4. SunOS 4

SunOS 4 MIT-pthreads**MySQL**GNU make

SunOS 4**libtool** **configure**

```
./configure --disable-shared --with-mysqld-ldflags=-all-static
```

readline

mysqld implicit declaration of function

2.12.5.5. Alpha-DEC-UNIX(Tru64)

Digital Unix**egcs** 1.1.2**gcc** 2.95.2,**egcs**DEC

Digital UNIX **cccxx**-pthread-lmach -lexc -lpthread)**configure**

```
CC="cc -pthread" CXX="cxx -pthread -O" \
./configure --with-named-thread-libs="-lpthread -lmach -lexc -lc"
```

mysqld

```
mysqld.cc: In function void handle_connections()':
```

```
mysqld.cc:626: passing long unsigned int *' as argument 3 of
accept(int,sockadddr *, int *)'
```

configure

SIGHUP)

```
nohup mysqld [options] &
```

nohupSIGHUP **safe_mysqld** **nohupmysqld**5.1.3“mysqld_safe MySQL”

mysys/get_opt.c #define _NO_PROTO

CompaqCC **configure**

```
CC="cc -pthread"
CFLAGS="-O4 -ansi_alias -ansi_args -fast -inline speed all -arch hos
CXX="cxx -pthread"
CXXFLAGS="-O4 -ansi_alias -ansi_args -fast -inline speed all \
    -arch host -noexceptions -nortti"
export CC CFLAGS CXX CXXFLAGS
./configure \
    --prefix=/usr/local/mysql \
    --with-low-memory \
    --enable-large-files \
    --enable-shared=yes \
    --with-named-thread-libs="-lpthread -lmach -lexc -lc"
gnumake
```

libtool **mysql**

```
cd mysql
/bin/sh ../libtool --mode=link cxx -pthread  -O3 -DDBUG_OFF \
```

```
    -O4 -ansi_alias -ansi_args -fast -inline speed \
    -speculate all \ -arch host  -DUNDEF_HAVE_GETHOSTBYNAME_R \
    -o mysql  mysql.o readline.o sql_string.o completion_hash.o \
    ../readline/libreadline.a -lcurses \
    ../libmysql/.libs/libmysqlclient.so  -lm
cd ..
gnumake
gnumake install
scripts/mysql_install_db
```

2.12.5.6. Alpha-DEC-OSF/1

DEC **CCgccconfigure**

```
CC=cc CFLAGS=-O CXX=gcc CXXFLAGS=-O3 \
./configure --prefix=/usr/local/mysql
```

“c_asm.h”“ (dummy)”“c_asm.h”

```
touch include/c_asm.h
CC=gcc CFLAGS=-I./include \
CXX=gcc CXXFLAGS=-O3 \
./configure --prefix=/usr/local/mysql
```

http://ftp.support.compaq.com/public/unix/DEC(Compaq)**ld**

OSF1 V4.0D"DEC C V5.6-071 on Digital UNIX V4.0 (Rev. 878)")/bin/ld(**mysqld** _exit undefined) OSF 4.0C/bin/ld **configureMySQL**

```
CC=gcc CXX=gcc CXXFLAGS=-O3 ./configure --prefix=/usr/local/mysql
```

Digital“ C++ V6.1-029”

```
CC=cc -pthread
```

```
CFLAGS=-O4 -ansi_alias -ansi_args -fast -inline speed \
       -speculate all -arch host
CXX=cxx -pthread
CXXFLAGS=-O4 -ansi_alias -ansi_args -fast -inline speed \
         -speculate all -arch host -noexceptions -nortti
export CC CFLAGS CXX CXXFLAGS
./configure --prefix=/usr/mysql/mysql \
            --with-mysqld-ldflags=-all-static --disable-shared \
            --with-named-thread-libs="-lmach -lexc -lc"
```

OSF1 alloca() 'HAVE_ALLOCA'“ config.h”

alloca()/usr/include/alloca.h

configure --with-named-thread-libs="-lpthread -lmach -le

gcc configure

```
CFLAGS=-D_PTHREAD_USE_D4 CXX=gcc CXXFLAGS=-O3 ./configure ....
```

(**MySQL**)OS **MySQL**

```
CFLAGS=-DDONT_USE_THR_ALARM \
CXXFLAGS=-DDONT_USE_THR_ALARM \
./configure
```

MySQL mysqladmin killmysqladmin shutdown“”

gcc 2.95.2,

```
sql_acl.cc:1456: Internal compiler error in `scan_region',
at except.c:2566
Please submit a full bug report.
```

sql **gcc**-O3 -O0 (-O **gcc**-O0) **make**

2.12.5.7. SGI Irix

Irix 6.5.3 CAP_SCHED_MGT(root)**mysqld**shell**mysqld** **mysqld**

```
chcap "CAP_SCHED_MGT+epi" /opt/mysql/libexec/mysqld
```

configure“config.h”

Irix alloca() **mysqld**SELECT “config.h”HAVE_ALLOC HAVE_ALLOCA_H **mysqladmin create** “config.h” HAVE_READDIR_R HAVE_TERM_H

SGI

http://support.sgi.com/surfzone/patches/patchset/6.2_indigo.rps.html

(rollup)rldlibc

pthreads POSIX

http://support.sgi.com/surfzone/patches/patchset/6.2_posix.rps.html

“mysql.cc” :

```
"/usr/include/curses.h", line 82: error(1084):
invalid combinatiof type
```

MySQL

```
extra/replace bool curses_bool < /usr/include/curses.h > include/cur
make
```

gcc **configure**

```
CC=gcc CXX=gcc CXXFLAGS=-O3 \
./configure --prefix=/usr/local/mysql --enable-thread-safe-client \
    --with-named-thread-libs=-lpthread
```

Irix CC++7.3.1.2Irix 6.5.11,

```
CC=cc CXX=CC CFLAGS='-O3 -n32 -TARG:platform=IP22 -I/usr/local/inclu
-L/usr/local/lib' CXXFLAGS='-O3 -n32 -TARG:platform=IP22 \
-I/usr/local/include -L/usr/local/lib' \
./configure --prefix=/usr/local/mysql --with-innodb --with-berkeley-
    --with-libwrap=/usr/local \
    --with-named-curses-libs=/usr/local/lib/libncurses.a
```

2.12.5.8. SCO UNIXOpenServer 5.0.x

“ sco3.2v5.0.5”,“sco3.2v5.0.6”“ sco3.2v5.0.7” “ sco 3.2v4.2” OpenServer 5.0.8(Legend) 2GB2GB

OpenServer**gcc** 2.95.3**configure**MySQL

```
CC=gcc CXX=gcc ./configure --prefix=/usr/local/mysql \
    --enable-thread-safe-client --with-innodb \
    --with-openssl --with-vio --with-extra-charsets=complex
```

ftp://ftp.sco.com/pub/openserver5/opensrc/gnutools-5.0.7Kj**gcc**

OpenServer 5.0.6OpenServer Execution Environment Supplement oss646B oss656BOpenSource gwxlibsOpenSourceopensrc ftp://ftp.sco.com/pub/openserver5/opensrc/

MySQL

SCO OpenServer 5.0.[0-6]ftp://ftp.sco.com/pub/openserver5OpenServer 5.0.7ftp://ftp.sco.com/pub/openserverv5/507

SCO Server 5.0.xftp://ftp.sco.com/pub/security/OpenServer

OpenSever 5.0.x2GB

OpenServer 5.0.x clist60MB

4096 clists70 64

(NSTRPAGES * 4096) + (NCLIST * 70) + (MAX_FLCKREC * 64) <= 62914560

Database Services

1. root

2. /etc/conf/sdevice.d/sudsSUDS 2NY

3. mkdev aioHardware/Kernel Managerasynchronous I/O I/O aiomemlock(F) AIO

4. setuid

/etc/conf/cf.d/mtune

```
Value           Default         Min             Max
-----           -------         ---             ---
NBUF            0               24              450000
NHBUF           0               32              524288
NMPBUF          0               12              512
MAX_INODE       0               100             64000
MAX_FILE        0               100             64000
CTBUFSIZE       128             0               256
MAX_PROC        0               50              16000
MAX_REGION      0               500             160000
```

NCLIST	170	120	16640
MAXUP	100	15	16000
NOFILES	110	60	11000
NHINODE	128	64	8192
NAUTOUP	10	0	60
NGROUPS	8	0	128
BDFLUSHR	30	1	300
MAX_FLCKREC	0	50	16000
PUTBUFSZ	8000	2000	20000
MAXSLICE	100	25	100
ULIMIT	4194303	2048	4194303
* Streams Parameters			
NSTREAM	64	1	32768
NSTRPUSH	9	9	9
NMUXLINK	192	1	4096
STRMSGSZ	16384	4096	524288
STRCTLSZ	1024	1024	1024
STRMAXBLK	524288	4096	524288
NSTRPAGES	500	0	8000
STRSPLITFRAC	80	50	100
NLOG	3	3	3
NUMSP	64	1	256
NUMTIM	16	1	8192
NUMTRW	16	1	8192
* Semaphore Parameters			
SEMMAP	10	10	8192

```
SEMMNI          10              10              8192
SEMMNS          60              60              8192
SEMMNU          30              10              8192
SEMMSL          25              25              150
SEMOPM          10              10              1024
SEMUME          10              10              25
SEMVMX          32767           32767           32767
SEMAEM          16384           16384           16384
* Shared Memory Parameters
SHMMAX          524288          131072          2147483647
SHMMIN          1               1               1
SHMMNI          100             100             2000
FILE            0               100             64000
NMOUNT          0               4               256
NPROC           0               50              16000
NREGION         0               500             160000
```

NOFILES40962048

MAXUP2048

/etc/conf/bin**./idtune** *name parameter* SEMMS200root

```
# cd /etc/conf/bin
# ./idtune SEMMNS 200
```

()/etc/conf/cf.d/stune

SHMMAX(128MB)SHMSEG(15)MySQL

NOFILESMAXUP2048

MAXPROC3000/4000()

SEMMSLSEMMNSSEMMNU

```
SEMMSL = 13
```

13MySQL

SEMMNS = SEMMSL * db

SEMMNSSEMMSLdb()

```
SEMMNU = SEMMNS
```

SEMMNUSEMMNS 75%SEMMNS

"SCO OpenServer Linker and Application Development Libraries"OpenServer **gcc**GCC Dev

FSU PTHREADS
http://moss.csc.ncsu.edu/~mueller/ftp/pub/PART/pthreads.tar.gz
ftp://ftp.zenez.com/pub/zenez/prgms/FSU-threads-3.14.tar.gz

FSU PthreadstcpipSCO UNIX 4.2 OpenServer 3.0Open Desktop 3.0(OS 3.0 ODT 3.0)GCC 2.5.XSCO ODTOS 3.0GCC 2.5.x SCO UNIX SCO-3.2v4.2-includes.tar.gzSCO include MySQL include
ftp://ftp.zenez.com/pub/zenez/prgms/SCO-3.2v4.2-includes.tar.gz

FSU PthreadsGNU **make**FSU-threads-3.14.tar.gzMakefileFSU-

`“thread/src”`**./configure**SCO OpenServer `“Makefile.SCO5”“Makefile”` **make**

`“ /usr/include”` root cd `“ thread/src”` **make install**

MySQLGNU **make**

root**safe_mysqld** 110 **mysqld**

SCO 3.2V4.2,FSU PTHREADS 3.14 **configure**

```
CFLAGS="-D_XOPEN_XPG4" CXX=gcc CXXFLAGS="-D_XOPEN_XPG4" \

./configure \

    --prefix=/usr/local/mysql \

    --with-named-thread-libs="-lgthreads -lsocket -lgen -lgthreads"

    --with-named-curses-libs="-lcurses"
```

include ftp://www.mysql.com/pub/mysql/Downloads/SCO/SCO-3.2v4.2-includes.tar.gzSCOinclude **MySQL**“ include”

SCO

- **MySQL**FSU Pthreads-lgthreads -lsocket -lgthreads**mysqld**
- SCOFSU Pthreads(reentrant) SCO FSU Pthreads OpenServer FSU Pthreads SCO
- FSU Pthreads(ftp::/ftp.zenez.com)GNU malloc “gmalloc.o” “libgthreads.a”“libgthreads.so”

· FSU Pthreads pthreads read()write()getmsg()connect()accept()select()wait()

· CSSA-2001-SCO.35.2(erg711905-dscr_remap(2.0.0))FSU**mysqld** OpenServer 5.0.6**mysqld**

· SCO OpenServer 5,-DDRAFT7 in CFLAGSFSU pthreads **mysqld** InnoDB

· SCOftp://ftp.sco.com/pub/openserver5OpenServer 5.0.x

· SCOftp://ftp.sco.com/pub/security/sseftp://ftp.sco.com/pub/security/sse OpenServer 5.0.xlibsocket.so.2

· Pre-OSR506 ftp://stage.caldera.com/pub/security/openserver/ ftp://stage.caldera.com/pub/security/openserver/CSSA-2001-SCO.10/ libsocket.so.2libresolv.so.1telnetd pre-OSR506

/MySQL

Legend/ OpenServer 6.0.0　　2GB

2.12.5.9. SCO UnixWare 7.1.xOpenUNIX 8.0.0

MySQL

configureUnixWare 7.1.xMySQL

```
CC="cc" CFLAGS="-I/usr/local/include" \
CXX="CC" CXXFLAGS="-I/usr/local/include" \
./configure --prefix=/usr/local/mysql \
    --enable-thread-safe-client --with-berkeley-db=./bdb \
    --with-innodb --with-openssl --with-extra-charsets=complex
```

gccgcc 2.95.3

```
CC=gcc CXX=g++ ./configure --prefix=/usr/local/mysql
```

MySQLUnixWare 7.1.4OpenServer 6.0.0Berkeley DB　　MySQLBerkeley DB **configure***src_directory*/bdb/build_unix/　　MySQLBDB

1. MySQL
2. cdbdb/build_unix/
3. -p Makefile(cp)Makefile.sav
4. **../dist/configure**
5. **gmake**
6. cp -p Makefile.sav Makefile
7. **gmake**

SCOftp://ftp.sco.com/pub/unixware7UnixWare 7.1.1, ftp://ftp.sco.com/pub/unixware7/713/ UnixWare 7.1.3, UnixWare 7.1.4

ftp://ftp.sco.com/pub/unixware7/714/, OpenUNIX 8.0.0
ftp://ftp.sco.com/pub/openunix8

SCO OpenUNIXftp://ftp.sco.com/pub/security/OpenUNIXUnixWare
ftp://ftp.sco.com/pub/security/UnixWare

UnixWare 7.1.11GBUnixWare 7.1.41 TB VXFS OS 2C
71TB VXFS

UnixWare 7.1.4 UnixWare 7.1.x fsadm

```
# fsadm -Fvxfs -o largefiles /

# fsadm /         * Note

# ulimit unlimited

# cd /etc/conf/bin

# ./idtune SFSZLIM 0x7FFFFFFF     ** Note

# ./idtune HFSZLIM 0x7FFFFFFF     ** Note

# ./idbuild -B


* This should report "largefiles".

** 0x7FFFFFFF represents infinity for these values.
```

shutdown

/etc/conf/cf.d/mtune

```
Value           Default         Min             Max

-----           -------         ---             ---

SVMMLIM         0x9000000       0x1000000       0x7FFFFFFF

HVMMLIM         0x9000000       0x1000000       0x7FFFFFFF

SSTKLIM         0x1000000       0x2000          0x7FFFFFFF

HSTKLIM         0x1000000       0x2000          0x7FFFFFFF
```

```
SDATLIM 0x7FFFFFFF
HDATLIM 0x7FFFFFFF
SSTKLIM 0x7FFFFFFF
HSTKLIM 0x7FFFFFFF
SVMMLIM 0x7FFFFFFF
HVMMLIM 0x7FFFFFFF
SFNOLIM 2048
HFNOLIM 2048
```

SHMMAX(128MB)SHMSEG(15)MySQL

SFNOLIMHFNOLIM2048

NPROC3000/4000()

SEMMSLSEMMNSSEMMNU

```
SEMMSL = 13
```

13MySQL

SEMMNS = SEMMSL * db

SEMMNSSEMMSLdb()

SEMMNU = SEMMNS

SEMMNUSEMMNS 75%SEMMNS

2.12.5.10. SCO OpenServer 6.0.x

OpenServer6

· 1 TB

· 432

· 64GB

· UnixWareOpenServer6

·

OpenServer6.0.0

· /binOpenServer5.0.x

· /u95/bin (LFS)

· /udk/binUnixWare 7.1.4 LFS

OpenServer6PATH OpenServer5.0.x/binLFS /u95/bin/binUn
/udk/bin/u95/bin/bin

MySQL

OpenServer 6.0.x**configure**MySQL

```
CC="cc" CFLAGS="-I/usr/local/include" \
CXX="CC" CXXFLAGS="-I/usr/local/include" \
./configure --prefix=/usr/local/mysql \
    --enable-thread-safe-client --with-berkeley-db=./bdb \
    --with-innodb --with-openssl --with-extra-charsets=complex \
    --enable-readline
```

gccgcc2.95.3

```
CC=gcc CXX=g++ ./configure --prefix=/usr/local/mysql
```

MySQLUnixWare 7.1.4OpenServer 6.0.0Berkeley DB MySQLBerkeley DB
configure*src_directory*/bdb/build_unix/ MySQLBDB

1. MySQL
2. cdbdb/build_unix/
3. -p Makefile(cp)Makefile.sav
4. **../dist/configure**
5. **gmake**
6. cp -p Makefile.sav Makefile
7. **gmake**

OpenServer6.0.0 MySQLbdb/dist/config.guessconfig.guess
ftp://ftp.zenez.com/pub/zenez/prgms/mysql-4.1.12-osr6-patches.tar.gz
ftp://ftp.zenez.com/pub/zenez/prgms/mysql-4.x.x-osr6-patches README

SCOftp://ftp.sco.com/pub/openserver6OpenServer6

SCOftp://ftp.sco.com/pub/security/OpenServer

OpenServer6.0.01TB2GBUnixWare 71TB VXFSHTFS

/etc/conf/cf.d/mtune

```
Value           Default         Min             Max
-----           -------         ---             ---
SVMMLIM         0x9000000       0x1000000       0x7FFFFFFF
HVMMLIM         0x9000000       0x1000000       0x7FFFFFFF
SSTKLIM         0x1000000       0x2000          0x7FFFFFFF
HSTKLIM         0x1000000       0x2000          0x7FFFFFFF


SDATLIM 0x7FFFFFFF
HDATLIM 0x7FFFFFFF
SSTKLIM 0x7FFFFFFF
```

```
HSTKLIM 0x7FFFFFFF

SVMMLIM 0x7FFFFFFF

HVMMLIM 0x7FFFFFFF

SFNOLIM 2048

HFNOLIM 2048
```

SHMMAX(128MB)SHMSEG(15)MySQL

SFNOLIMHFNOLIM2048

NPROC3000/4000()

SEMMSLSEMMNSSEMMNU

```
SEMMSL = 13
```

13MySQL

SEMMNS = SEMMSL * db

SEMMNSSEMMSLdb()

SEMMNU = SEMMNS

SEMMNUSEMMNS 75%SEMMNS

2.12.6. OS/2

MySQL “CONFIG.SYS”

```
SET EMXOPT=-c -n -h1024
```

```
File 'xxxx' not found (Errcode: 24)
```

OS/2 Warp 3**MySQL** FixPack 29 OS/2 Wrap 4FixPack 4 Pthreads **MySQL** HPFSFAT32

“INSTALL.CMD”OS/2“CMD.EXE”“4OS2.EXE”

“scripts/mysql-install-db” “install.cmd”REXX **MySQI** WorkPlace Shell

Pthreads

```
gcc -Zdll -Zmt -Zcrtdll=pthrdrtl -I../include -I../regex -I.. \
    -o example udf_example.cc -L../lib -lmysqlclient udf_example.def
mv example.dll example.udf
```

OS/2 UDF8 “/mysql2/udf” safe-mysqld.cmdBEGINLIBPATH UDF --“.udf” Unix “ example.so”

mysql> CREATE FUNCTION metaphon RETURNS STRING SONAME 'example.so'

OS/2, example.udf

```
mysql> CREATE FUNCTION metaphon RETURNS STRING SONAME 'example'
```

2.13. Perl

2.13.1. UnixPerl
2.13.2. WindowsActiveState Perl
2.13.3. Perl DBI/DBD

Perl**MySQL**DBI/DBD Perl 5.6.0 Perl

Perl DBI 1.2216DBD mysql2.9003

MySQL 4.1 DBD mysql 2.9003

MySQLPerl http://search.cpan.orgUnix WindowsActiveState **ppm**

MySQL Perl 7.1.4“MySQL”

2.13.1. UnixPerl

MySQL Perl**MySQL**() LinuxRPMMySQLRPMRPM RPM

Perl http://search.cpan.orgCPAN (Comprehensive Perl Archive Network)

UnixPerlCPAN

```
shell> perl -MCPAN -e shell
cpan> install DBI
cpan> install DBD::mysql
```

DBD mysql MySQL (UnixWindowsODBC“ ”) ( ) force install DBD::mysql

DBIData::Dumper DBIData::Dumper

tar DBI

1.

2. shell> **gunzip < DBI-*VERSION*.tar.gz | tar xvf -**

DBI-*VERSION*

3.

4. shell> **cd DBI-*VERSION***

5.

6. shell> **perl Makefile.PL**

7. shell> **make**

8. shell> **make test**

9. shell> **make install**

make test DBD::mysql **MySQL**

MySQLDBD::mysql, **MySQL** DBI

Perl Perl
http://servers.digitaldaze.com/extensions/perl/modules.html#modules

“ Installing New Modules that Require Locally Installed Modules”

2.13.2. WindowsActiveState Perl

Windows ActiveState PerlMySQL DBD

· http://www.activestate.com/Products/ActivePerl/ActiveState Perl

· (“DOS)

· HTTP_proxy

· set HTTP_proxy=my.proxy.com:3128

· PPM

· C\> **C\perl\bin\ppm.pl**

· DBI

· ppm> install DBI

·

· install\

· ftp://ftp.de.uu.net/pub/CPAN/authors/id/JWIED/DBD-m

ActiveState Perl 5.6

MyODBCODBC**MySQL**

```
use DBI;
$dbh= DBI->connect("DBI:ODBC:$dsn",$user,$password) ||
die "Got error $DBI::errstr when connecting to $dsn\n";
```

2.13.3. Perl DBI/DBD

Perl../mysql/mysql.so Perllibmysqlclient.so

· perl Makefile.PL -static -configperl Makefile.PLDBD mysql

· libmysqlclient.so (/usr/lib /lib)

· DBD mysql-L libmysqlclient.so

· Linux libmysqlclient.so/etc/ld.so.conf

· libmysqlclient.soLD_RUN_PATH LD_LIBRARY_PATH

-L libc/lib-L/usr/lib -L-L/lib-L/lib

DBD mysql **gcc**(**gcc**)

```
/usr/bin/perl: can't resolve symbol '__moddi3'
/usr/bin/perl: can't resolve symbol '__divdi3'
```

mysql.so-L/usr/lib/gcc-lib/... -lgcc(Perlmysql.so**make**)-Llibgcc.a

PerlMySQL**gcc** **gcc**

DBD mysql

```
t/00base.....install_driver(mysql) failed:
Can't load '../blib/arch/auto/DBD/mysql/mysql.so' for module DBD::my
../blib/arch/auto/DBD/mysql/mysql.so: undefined symbol:
uncompress at /usr/lib/perl5/5.00503/i586-linux/DynaLoader.pm line 1
```

-lz lib/DBD/mysql/Install.pm

```
$sysliblist .= " -lm";


$sysliblist .= " -lm -lz";
```

make realclean

SCODBIDBI-*xxx* Makefile**gcc** 2.95.2

```
CC = cc                                 CC = gcc
CCCDLFLAGS = -KPIC -W1,-Bexport         CCCDLFLAGS = -fpic
CCDLFLAGS = -wl,-Bexport                CCDLFLAGS =

LD = ld                                 LD = gcc -G -fpic
LDDLFLAGS = -G -L/usr/local/lib         LDDLFLAGS = -L/usr/local/lib
LDFLAGS = -belf -L/usr/local/lib        LDFLAGS = -L/usr/local/lib

LD = ld                                 LD = gcc -G -fpic
OPTIMISE = -Od                          OPTIMISE = -O1
```

```
CCCFLAGS = -belf -dy -w0 -U M_XENIX -DPERL_SCO5 -I/usr/local/include
```

```
CCFLAGS = -U M_XENIX -DPERL_SCO5 -I/usr/local/include
```

iccccPerlDBI

(SCO)Perl DBIDBD mysqlPerlDBIPerl Perl DBDPerl

SCO

```
LD_LIBRARY_PATH=/lib:/usr/lib:/usr/local/lib:/usr/progressive/lib
```

Or

```
LD_LIBRARY_PATH=/usr/lib:/lib:/usr/local/lib:/usr/ccs/lib:\
    /usr/progressive/lib:/usr/skunk/lib
LIBPATH=/usr/lib:/lib:/usr/local/lib:/usr/ccs/lib:\
    /usr/progressive/lib:/usr/skunk/lib
MANPATH=scohelp:/usr/man:/usr/local1/man:/usr/local/man:\
    /usr/skunk/man:
```

DBDDBDPerl

```
shell> perl Makefile.PL -static -config
shell> make
shell> make install
shell> make perl
```

Perl**make perlmake** SCO **make -f Makefile.aperl inst_perl MAP_TARGET=perl**

PerlDBD mysqlPerlDBD mysql

```
shell> perl Makefile.PL -static -config
```

```
shell> make

shell> make install

shell> make perl
```

Perl**make perl**

MySQLMySQL dev.mysql.com.

3

3.1.
3.2.
3.3.
    3.3.1.
    3.3.2.
    3.3.3.
    3.3.4.
3.4.
3.5. **my**sql
3.6.
    3.6.1.
    3.6.2.
    3.6.3.
    3.6.4.
    3.6.5.
    3.6.6.
    3.6.7.
    3.6.8.
    3.6.9. AUTO_INCREMENT
3.7.
    3.7.1.
    3.7.2.
3.8. ApacheMySQL

mysql MySQL **mysql**“”“” MySQL **mysql** **mysql** **mysql**

mysql --help

```
shell> mysql --help
```

mysql MySQL MySQ**L** 5

3.1.

mysql MySQL

```
shell> mysql -h host -u user -p
Enter password: ********
```

hostuserMySQLMySQL ******** **mysql**Enter password:

mysql>

```
shell> mysql -h host -u user -p
Enter password: ********
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 25338 to server version: 5.1.2-alpha-sta

Type 'help;' or '\h' for help. Type '\c' to clear the buffer.

mysql>
```

mysql> mysql

MySQL **mysql**

```
shell> mysql
```

mysql>QUIT (\q)

```
mysql> QUIT
Bye
```

Unix control-D

mysql>

3.2.

mysql>

```
mysql> SELECT VERSION(), CURRENT_DATE;
+-----------------+--------------+
| VERSION()       | CURRENT_DATE |
+-----------------+--------------+
| 5.1.2-alpha-log | 2005-10-11   |
+-----------------+--------------+
1 row in set (0.01 sec)
mysql>
```

mysql:

· SQL QUIT

· **mysql** mysql>

· **mysql**() ()**mysql**

· **mysql** (CPU)“”

```
mysql> SELECT VERSION(), CURRENT_DATE;
mysql> select version(), current_date;
mysql> SeLeCt vErSiOn(), current_DATE;
```

mysql

```
mysql> SELECT SIN(PI()/4), (4+1)*5;
```

```
+------------------+---------+
| SIN(PI()/4)      | (4+1)*5 |
+------------------+---------+
| 0.70710678118655 |      25 |
+------------------+---------+
1 row in set (0.02 sec)
```

```
mysql> SELECT VERSION(); SELECT NOW();
+-----------------+
| VERSION()       |
+-----------------+
| 5.1.2-alpha-log |
+-----------------+
1 row in set (0.00 sec)

+---------------------+
| NOW()               |
+---------------------+
| 2005-10-11 15:15:00 |
+---------------------+
1 row in set (0.00 sec)
```

mysql mysql

```
mysql> SELECT
    -> USER()
```

```
    -> ,
    -> CURRENT_DATE;
+---------------+--------------+
| USER()        | CURRENT_DATE |
+---------------+--------------+
| jon@localhost | 2005-10-11   |
+---------------+--------------+
```

mysql>->**mysql** **mysql**

\c

```
mysql> SELECT
    -> USER()
    -> \c
mysql>
```

\c mysql>**mysql**

mysql

mysql>	
->	
'>	(“’”)
">	(“"”)

`>	(‘`’)
/*>	/*

“” **mysql**

```
mysql> SELECT USER()
    ->
```

(->)**mysql** **mysql**

```
mysql> SELECT USER()
    -> ;
+---------------+
| USER()        |
+---------------+
| jon@localhost |
+---------------+
```

'> "> MySQL MySQL‘ ’‘ "’ ('hello"'
'> "> ‘ ’‘ "’

```
mysql> SELECT * FROM my_table WHERE name = 'Smith AND age < 30;
    '>
```

SELECT **Enter** “” "> **mysql** "Smith

\c**mysql** (**mysql**)\c

```
mysql> SELECT * FROM my_table WHERE name = 'Smith AND age < 30;
    '> '\c
mysql>
```

mysql>**mysql**

`>  '> ">  `>

'>"> **mysql**--QUIT

3.3.

3.3.1.
3.3.2.
3.3.3.
3.3.4.

(“”)

.

.

.

.

.

() MySQL **tar** (http://www.mysql.com/Downloads/Contrib/Examples/menagerie.tar.gz)Zip (http://www.mysql.com/Downloads/Contrib/Examples/menagerie.zip)

SHOW

```
mysql> SHOW DATABASES;
+----------+
| Database |
+----------+
| mysql    |
| test     |
| tmp      |
+----------+
```

mysqltest mysql test

SHOW DATABASES 13.5.1.3“GRANTREVOKE”

test

```
mysql> USE test
Database changed
```

USEQUIT USE

test() MySQL menagerie

```
mysql> GRANT ALL ON menagerie.* TO 'your_mysql_name'@'your_client_ho
```

your_mysql_name**MySQL** your_client_host

3.3.1.

```
mysql> CREATE DATABASE menagerie;
```

Unix (SQL)menagerie MenagerieMENAGERIE Windows

menagerie

```
mysql> USE menagerie
Database changed
```

mysql USE **mysql**

```
shell> mysql -h host -u user -p menagerie
Enter password: ********
```

menagerie -p (-

3.3.2.

SHOW TABLES

```
mysql> SHOW TABLES;
Empty set (0.00 sec)
```

pet

, **MySQL**

.

.

pet

CREATE TABLE

```
mysql> CREATE TABLE pet (name VARCHAR(20), owner VARCHAR(20),
    -> species VARCHAR(20), sex CHAR(1), birth DATE, death DATE);
```

VARCHARnameownerspecies 20165535 **MySQL** ALTER TABLE

"m""f""male""female""m""f"

birthdeathDATE

SHOW TABLES

```
mysql> SHOW TABLES;
+---------------------+
| Tables in menagerie |
+---------------------+
| pet                 |
+---------------------+
```

DESCRIBE

```
mysql> DESCRIBE pet;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| name    | varchar(20) | YES  |     | NULL    |       |
| owner   | varchar(20) | YES  |     | NULL    |       |
| species | varchar(20) | YES  |     | NULL    |       |
| sex     | char(1)     | YES  |     | NULL    |       |
| birth   | date        | YES  |     | NULL    |       |
| death   | date        | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
```

DESCRIBE

3.3.3.

LOAD DATAINSERT

MySQLYYYY-MM-DD

name	**owner**	**species**	**sex**	**birth**	**death**
Fluffy	Harold	cat	f	1993-02-04	
Claws	Gwen	cat	m	1994-03-17	
Buffy	Harold	dog	f	1989-05-13	

Fang	Benny	dog	m	1990-08-27	
Bowser	Diane	dog	m	1979-08-31	1995-07-29
Chirpy	Gwen	bird	f	1998-09-11	
Whistler	Gwen	bird		1997-12-09	
Slim	Benny	snake	m	1996-04-29	

“pet.txt” (tab) CREATE TABLE ( )NULL \N N Whistler()

name	owner	species	sex	birth	death
Whistler	Gwen	bird	\N	1997-12-09	\N

“pet.txt”pet

```
mysql> LOAD DATA LOCAL INFILE '/path/pet.txt' INTO TABLE pet;
```

Windows \r\n

```
mysql> LOAD DATA LOCAL INFILE '/path/pet.txt' INTO TABLE pet
    -> LINES TERMINATED BY '\r\n';
```

OS XApple '\r'

LOAD DATA “pet.txt”

MySQL [5.6.4“LOAD DATA LOCAL ”]

INSERT CREATE TABLE DianePuffballINSERT

```
mysql> INSERT INTO pet
    -> VALUES ('Puffball','Diane','hamster','f','1999-03-30',NULL);
```

INSERTNULL LOAD DATA\N

INSERTLOAD DATA

3.3.4.

3.3.4.1.
3.3.4.2.
3.3.4.3.
3.3.4.4.
3.3.4.5.
3.3.4.6. NULL
3.3.4.7.
3.3.4.8.
3.3.4.9. 1

SELECT

```
SELECT what_to_select
FROM which_table
WHERE conditions_to_satisfy;
```

what_to_select *“” which_table WHERE conditions_to_satisfy

3.3.4.1.

SELECT

```
mysql> SELECT * FROM pet;
```

```
+----------+--------+---------+------+------------+------------+
| name     | owner  | species | sex  | birth      | death      |
+----------+--------+---------+------+------------+------------+
| Fluffy   | Harold | cat     | f    | 1993-02-04 | NULL       |
| Claws    | Gwen   | cat     | m    | 1994-03-17 | NULL       |
| Buffy    | Harold | dog     | f    | 1989-05-13 | NULL       |
| Fang     | Benny  | dog     | m    | 1990-08-27 | NULL       |
| Bowser   | Diane  | dog     | m    | 1979-08-31 | 1995-07-29 |
| Chirpy   | Gwen   | bird    | f    | 1998-09-11 | NULL       |
| Whistler | Gwen   | bird    | NULL | 1997-12-09 | NULL       |
| Slim     | Benny  | snake   | m    | 1996-04-29 | NULL       |
| Puffball | Diane  | hamster | f    | 1999-03-30 | NULL       |
+----------+--------+---------+------+------------+------------+
```

SELECT Bowser 19891979

· “pet.txt” DELETELOAD DATA:

· mysql> **DELETE FROM pet;**

· mysql> **LOAD DATA LOCAL INFILE 'pet.txt' INTO TABLE**

, Puffball

· UPDATE

· mysql> **UPDATE pet SET birth = '1989-08-31' WHERE na**

UPDATE

3.3.4.2.

SELECTWHERE

Bowser Bowser

```
mysql> SELECT * FROM pet WHERE name = 'Bowser';
+--------+-------+---------+------+------------+------------+
| name   | owner | species | sex  | birth      | death      |
+--------+-------+---------+------+------------+------------+
| Bowser | Diane | dog     | m    | 1989-08-31 | 1995-07-29 |
+--------+-------+---------+------+------------+------------+
```

19891979

"bowser""BOWSER"

name 1998 birth

```
mysql> SELECT * FROM pet WHERE birth > '1998-1-1';
+----------+-------+---------+------+------------+-------+
| name     | owner | species | sex  | birth      | death |
+----------+-------+---------+------+------------+-------+
| Chirpy   | Gwen  | bird    | f    | 1998-09-11 | NULL  |
| Puffball | Diane | hamster | f    | 1999-03-30 | NULL  |
+----------+-------+---------+------+------------+-------+
```

```
mysql> SELECT * FROM pet WHERE species = 'dog' AND sex = 'f';
+-------+--------+---------+------+------------+-------+
| name  | owner  | species | sex  | birth      | death |
+-------+--------+---------+------+------------+-------+
| Buffy | Harold | dog     | f    | 1989-05-13 | NULL  |
+-------+--------+---------+------+------------+-------+
```

AND OR

```
mysql> SELECT * FROM pet WHERE species = 'snake' OR species = 'bird'
+----------+-------+---------+------+------------+-------+
| name     | owner | species | sex  | birth      | death |
+----------+-------+---------+------+------------+-------+
| Chirpy   | Gwen  | bird    | f    | 1998-09-11 | NULL  |
| Whistler | Gwen  | bird    | NULL | 1997-12-09 | NULL  |
| Slim     | Benny | snake   | m    | 1996-04-29 | NULL  |
+----------+-------+---------+------+------------+-------+
```

ANDOR ANDOR

```
mysql> SELECT * FROM pet WHERE (species = 'cat' AND sex = 'm')
    -> OR (species = 'dog' AND sex = 'f');
+-------+--------+---------+------+------------+-------+
| name  | owner  | species | sex  | birth      | death |
+-------+--------+---------+------+------------+-------+
| Claws | Gwen   | cat     | m    | 1994-03-17 | NULL  |
| Buffy | Harold | dog     | f    | 1989-05-13 | NULL  |
+-------+--------+---------+------+------------+-------+
```

3.3.4.3.

```
mysql> SELECT name, birth FROM pet;
+----------+------------+
| name     | birth      |
+----------+------------+
| Fluffy   | 1993-02-04 |
| Claws    | 1994-03-17 |
```

```
| Buffy    | 1989-05-13 |
| Fang     | 1990-08-27 |
| Bowser   | 1989-08-31 |
| Chirpy   | 1998-09-11 |
| Whistler | 1997-12-09 |
| Slim     | 1996-04-29 |
| Puffball | 1999-03-30 |
+----------+------------+
```

```
mysql> SELECT owner FROM pet;
+--------+
| owner  |
+--------+
| Harold |
| Gwen   |
| Harold |
| Benny  |
| Diane  |
| Gwen   |
| Gwen   |
| Benny  |
| Diane  |
+--------+
```

owner DISTINCT

```
mysql> SELECT DISTINCT owner FROM pet;
+--------+
```

```
| owner  |
+--------+
| Benny  |
| Diane  |
| Gwen   |
| Harold |
+--------+
```

WHERE

```
mysql> SELECT name, species, birth FROM pet
    -> WHERE species = 'dog' OR species = 'cat';
+--------+---------+------------+
| name   | species | birth      |
+--------+---------+------------+
| Fluffy | cat     | 1993-02-04 |
| Claws  | cat     | 1994-03-17 |
| Buffy  | dog     | 1989-05-13 |
| Fang   | dog     | 1990-08-27 |
| Bowser | dog     | 1989-08-31 |
+--------+---------+------------+
```

3.3.4.4.

```
mysql> SELECT name, birth FROM pet ORDER BY birth;
+----------+------------+
| name     | birth      |
```

```
+----------+------------+
| Buffy    | 1989-05-13 |
| Bowser   | 1989-08-31 |
| Fang     | 1990-08-27 |
| Fluffy   | 1993-02-04 |
| Claws    | 1994-03-17 |
| Slim     | 1996-04-29 |
| Whistler | 1997-12-09 |
| Chirpy   | 1998-09-11 |
| Puffball | 1999-03-30 |
+----------+------------+
```

DESC

```
mysql> SELECT name, birth FROM pet ORDER BY birth DESC;
+----------+------------+
| name     | birth      |
+----------+------------+
| Puffball | 1999-03-30 |
| Chirpy   | 1998-09-11 |
| Whistler | 1997-12-09 |
| Slim     | 1996-04-29 |
| Claws    | 1994-03-17 |
| Fluffy   | 1993-02-04 |
| Fang     | 1990-08-27 |
| Bowser   | 1989-08-31 |
| Buffy    | 1989-05-13 |
```

```
+----------+------------+
```

```
mysql> SELECT name, species, birth FROM pet
    -> ORDER BY species, birth DESC;
+----------+---------+------------+
| name     | species | birth      |
+----------+---------+------------+
| Chirpy   | bird    | 1998-09-11 |
| Whistler | bird    | 1997-12-09 |
| Claws    | cat     | 1994-03-17 |
| Fluffy   | cat     | 1993-02-04 |
| Fang     | dog     | 1990-08-27 |
| Bowser   | dog     | 1989-08-31 |
| Buffy    | dog     | 1989-05-13 |
| Puffball | hamster | 1999-03-30 |
| Slim     | snake   | 1996-04-29 |
+----------+---------+------------+
```

DESC(birth)species

3.3.4.5.

MySQL

```
mysql> SELECT name, birth, CURDATE(),
    -> (YEAR(CURDATE())-YEAR(birth))
    -> - (RIGHT(CURDATE(),5)<RIGHT(birth,5))
```

```
    -> AS age
    -> FROM pet;
+----------+------------+------------+------+
| name     | birth      | CURDATE()  | age  |
+----------+------------+------------+------+
| Fluffy   | 1993-02-04 | 2003-08-19 |   10 |
| Claws    | 1994-03-17 | 2003-08-19 |    9 |
| Buffy    | 1989-05-13 | 2003-08-19 |   14 |
| Fang     | 1990-08-27 | 2003-08-19 |   12 |
| Bowser   | 1989-08-31 | 2003-08-19 |   13 |
| Chirpy   | 1998-09-11 | 2003-08-19 |    4 |
| Whistler | 1997-12-09 | 2003-08-19 |    5 |
| Slim     | 1996-04-29 | 2003-08-19 |    7 |
| Puffball | 1999-03-30 | 2003-08-19 |    4 |
+----------+------------+------------+------+
```

YEAR() RIGHT()MM-DD ()5 MM-DD10CURDATE()birth 1 *alias* (age)

ORDER BY name

```
mysql> SELECT name, birth, CURDATE(),
    -> (YEAR(CURDATE())-YEAR(birth))
    -> - (RIGHT(CURDATE(),5)<RIGHT(birth,5))
    -> AS age
    -> FROM pet ORDER BY name;
+----------+------------+------------+------+
| name     | birth      | CURDATE()  | age  |
+----------+------------+------------+------+
```

```
| Bowser   | 1989-08-31 | 2003-08-19 |   13 |
| Buffy    | 1989-05-13 | 2003-08-19 |   14 |
| Chirpy   | 1998-09-11 | 2003-08-19 |    4 |
| Claws    | 1994-03-17 | 2003-08-19 |    9 |
| Fang     | 1990-08-27 | 2003-08-19 |   12 |
| Fluffy   | 1993-02-04 | 2003-08-19 |   10 |
| Puffball | 1999-03-30 | 2003-08-19 |    4 |
| Slim     | 1996-04-29 | 2003-08-19 |    7 |
| Whistler | 1997-12-09 | 2003-08-19 |    5 |
+----------+------------+------------+------+
```

agename ORDER BY

```
mysql> SELECT name, birth, CURDATE(),
    -> (YEAR(CURDATE())-YEAR(birth))
    -> - (RIGHT(CURDATE(),5)<RIGHT(birth,5))
    -> AS age
    -> FROM pet ORDER BY age;
+----------+------------+------------+------+
| name     | birth      | CURDATE()  | age  |
+----------+------------+------------+------+
| Chirpy   | 1998-09-11 | 2003-08-19 |    4 |
| Puffball | 1999-03-30 | 2003-08-19 |    4 |
| Whistler | 1997-12-09 | 2003-08-19 |    5 |
| Slim     | 1996-04-29 | 2003-08-19 |    7 |
| Claws    | 1994-03-17 | 2003-08-19 |    9 |
| Fluffy   | 1993-02-04 | 2003-08-19 |   10 |
| Fang     | 1990-08-27 | 2003-08-19 |   12 |
```

```
| Bowser   | 1989-08-31 | 2003-08-19 |   13 |
| Buffy    | 1989-05-13 | 2003-08-19 |   14 |
+----------+------------+------------+------+
```

deathNULL NULL deathbirth

```
mysql> SELECT name, birth, death,
    -> (YEAR(death)-YEAR(birth)) - (RIGHT(death,5)<RIGHT(birth,5))
    -> AS age
    -> FROM pet WHERE death IS NOT NULL ORDER BY age;
+--------+------------+------------+------+
| name   | birth      | death      | age  |
+--------+------------+------------+------+
| Bowser | 1989-08-31 | 1995-07-29 |    5 |
+--------+------------+------------+------+
```

death IS NOT NULLdeath != NULLNULL 3.3.4.6“NULL ”

birth **MySQL** YEAR( )MONTH( )DAYOFMONTH( ) MONTH() birthMONTH(birth)

```
mysql> SELECT name, birth, MONTH(birth) FROM pet;
+----------+------------+--------------+
| name     | birth      | MONTH(birth) |
+----------+------------+--------------+
| Fluffy   | 1993-02-04 |            2 |
| Claws    | 1994-03-17 |            3 |
| Buffy    | 1989-05-13 |            5 |
| Fang     | 1990-08-27 |            8 |
| Bowser   | 1989-08-31 |            8 |
| Chirpy   | 1998-09-11 |            9 |
```

```
| Whistler | 1997-12-09 |           12 |
| Slim     | 1996-04-29 |            4 |
| Puffball | 1999-03-30 |            3 |
+----------+------------+--------------+
```

4 45 (5)

```
mysql> SELECT name, birth FROM pet WHERE MONTH(birth) = 5;
+-------+------------+
| name  | birth      |
+-------+------------+
| Buffy | 1989-05-13 |
+-------+------------+
```

12 1(12)13 1(1)

DATE_ADD( ) NOW( ) MONTH()

```
mysql> SELECT name, birth FROM pet
    -> WHERE MONTH(birth) = MONTH(DATE_ADD(CURDATE(),INTERVAL 1 MONT
```

1((MOD) 12“” 0)

```
mysql> SELECT name, birth FROM pet
    -> WHERE MONTH(birth) = MOD(MONTH(CURDATE()), 12) + 1;
```

MONTH112 MOD(something,12)011 MOD( )111(11)1(1)

3.3.4.6. NULL

NULL NULL“”“” NULL =<!

```
mysql> SELECT 1 = NULL, 1 <> NULL, 1 < NULL, 1 > NULL;
+----------+-----------+----------+----------+
| 1 = NULL | 1 <> NULL | 1 < NULL | 1 > NULL |
```

```
+----------+-----------+----------+----------+
|     NULL |      NULL |     NULL |     NULL |
+----------+-----------+----------+----------+
```

IS NULLIS NOT NULL

```
mysql> SELECT 1 IS NULL, 1 IS NOT NULL;
+-----------+---------------+
| 1 IS NULL | 1 IS NOT NULL |
+-----------+---------------+
|         0 |             1 |
+-----------+---------------+
```

MySQL 0 NULL 1

NULL death IS NOT NULLdeath != NULL

GROUP BY NULL

ORDER BY ORDER BY ... ASCNULL ORDER BY ... DESCNULL

NULLNOT NULL0 NULL"" IS [NOT] NULL

```
mysql> SELECT 0 IS NULL, 0 IS NOT NULL, '' IS NULL, '' IS NOT NULL;
+-----------+---------------+------------+----------------+
| 0 IS NULL | 0 IS NOT NULL | '' IS NULL | '' IS NOT NULL |
+-----------+---------------+------------+----------------+
|         0 |             1 |          0 |              1 |
+-----------+---------------+------------+----------------+
```

NOT NULL0 NOT NULLA.5.3“NULL ”

3.3.4.7.

MySQLSQL Unix**vigrepsed**

SQL“_” “%”() MySQL SQL SQL =!=LIKENOT LIKE

“b”

```
mysql> SELECT * FROM pet WHERE name LIKE 'b%';
+--------+--------+---------+------+------------+------------+
| name   | owner  | species | sex  | birth      | death      |
+--------+--------+---------+------+------------+------------+
| Buffy  | Harold | dog     | f    | 1989-05-13 | NULL       |
| Bowser | Diane  | dog     | m    | 1989-08-31 | 1995-07-29 |
+--------+--------+---------+------+------------+------------+
```

“fy”

```
mysql> SELECT * FROM pet WHERE name LIKE '%fy';
+--------+--------+---------+------+------------+-------+
| name   | owner  | species | sex  | birth      | death |
+--------+--------+---------+------+------------+-------+
| Fluffy | Harold | cat     | f    | 1993-02-04 | NULL  |
| Buffy  | Harold | dog     | f    | 1989-05-13 | NULL  |
+--------+--------+---------+------+------------+-------+
```

“w”

```
mysql> SELECT * FROM pet WHERE name LIKE '%w%';
+----------+-------+---------+------+------------+------------+
| name     | owner | species | sex  | birth      | death      |
+----------+-------+---------+------+------------+------------+
| Claws    | Gwen  | cat     | m    | 1994-03-17 | NULL       |
| Bowser   | Diane | dog     | m    | 1989-08-31 | 1995-07-29 |
```

```
| Whistler | Gwen  | bird    | NULL | 1997-12-09 | NULL       |
+----------+-------+---------+------+------------+------------+
```

5 “_”

```
mysql> SELECT * FROM pet WHERE name LIKE '_____';
+-------+--------+---------+------+------------+-------+
| name  | owner  | species | sex  | birth      | death |
+-------+--------+---------+------+------------+-------+
| Claws | Gwen   | cat     | m    | 1994-03-17 | NULL  |
| Buffy | Harold | dog     | f    | 1989-05-13 | NULL  |
+-------+--------+---------+------+------------+-------+
```

MySQL REGEXPNOT REGEXP(RLIKENOT RLIKE)

. ‘.’

· “[...]” “[abc]”“a”“b”“c”“ -” “[a-z]” “[0-9]”

· “ * ” “x*”“x” “[0-9]*” “.*”

- REGEXP (LIKE)
- “^”“$”

REGEXPLIKE

“b” “^”

```
mysql> SELECT * FROM pet WHERE name REGEXP '^b';
+--------+--------+---------+------+------------+------------+
| name   | owner  | species | sex  | birth      | death      |
+--------+--------+---------+------+------------+------------+
| Buffy  | Harold | dog     | f    | 1989-05-13 | NULL       |
```

```
| Bowser | Diane  | dog     | m    | 1989-08-31 | 1995-07-29 |
+--------+--------+---------+------+------------+------------+
```

REGEXP BINARY‘ b’

```
mysql> SELECT * FROM pet WHERE name REGEXP BINARY '^b';
```

“fy” “$”

```
mysql> SELECT * FROM pet WHERE name REGEXP 'fy$';
+--------+--------+---------+------+------------+-------+
| name   | owner  | species | sex  | birth      | death |
+--------+--------+---------+------+------------+-------+
| Fluffy | Harold | cat     | f    | 1993-02-04 | NULL  |
| Buffy  | Harold | dog     | f    | 1989-05-13 | NULL  |
+--------+--------+---------+------+------------+-------+
```

“w”

```
mysql> SELECT * FROM pet WHERE name REGEXP 'w';
+----------+-------+---------+------+------------+------------+
| name     | owner | species | sex  | birth      | death      |
+----------+-------+---------+------+------------+------------+
| Claws    | Gwen  | cat     | m    | 1994-03-17 | NULL       |
| Bowser   | Diane | dog     | m    | 1989-08-31 | 1995-07-29 |
| Whistler | Gwen  | bird    | NULL | 1997-12-09 | NULL       |
+----------+-------+---------+------+------------+------------+
```

5 “^”“$” 5“.”

```
mysql> SELECT * FROM pet WHERE name REGEXP '^.....$';
+-------+--------+---------+------+------------+-------+
```

```
| name  | owner  | species | sex  | birth      | death |
+-------+--------+---------+------+------------+-------+
| Claws | Gwen   | cat     | m    | 1994-03-17 | NULL  |
| Buffy | Harold | dog     | f    | 1989-05-13 | NULL  |
+-------+--------+---------+------+------------+-------+
```

“{n}”“ n”

```
mysql> SELECT * FROM pet WHERE name REGEXP '^.{5}$';
+-------+--------+---------+------+------------+-------+
| name  | owner  | species | sex  | birth      | death |
+-------+--------+---------+------+------------+-------+
| Claws | Gwen   | cat     | m    | 1994-03-17 | NULL  |
| Buffy | Harold | dog     | f    | 1989-05-13 | NULL  |
+-------+--------+---------+------+------------+-------+
```

G *MySQL*

3.3.4.8.

“ ?”

“ pet?” COUNT(*)

```
mysql> SELECT COUNT(*) FROM pet;
+----------+
| COUNT(*) |
+----------+
|        9 |
+----------+
```

COUNT( )

```
mysql> SELECT owner, COUNT(*) FROM pet GROUP BY owner;
+--------+----------+
| owner  | COUNT(*) |
+--------+----------+
| Benny  |        2 |
| Diane  |        2 |
| Gwen   |        3 |
| Harold |        2 |
+--------+----------+
```

GROUP BYowner

```
mysql> SELECT owner, COUNT(*) FROM pet;
ERROR 1140 (42000): Mixing of GROUP columns (MIN(),MAX(),COUNT(),...
with no GROUP columns is illegal if there is no GROUP BY clause
```

COUNT( )GROUP BY

```
mysql> SELECT species, COUNT(*) FROM pet GROUP BY species;
+---------+----------+
| species | COUNT(*) |
+---------+----------+
| bird    |        2 |
| cat     |        2 |
| dog     |        3 |
| hamster |        1 |
| snake   |        1 |
+---------+----------+
```

```
mysql> SELECT sex, COUNT(*) FROM pet GROUP BY sex;
+------+----------+
| sex  | COUNT(*) |
+------+----------+
| NULL |        1 |
| f    |        4 |
| m    |        4 |
+------+----------+
```

NULL“”

```
mysql> SELECT species, sex, COUNT(*) FROM pet GROUP BY species, sex;
+---------+------+----------+
| species | sex  | COUNT(*) |
+---------+------+----------+
| bird    | NULL |        1 |
| bird    | f    |        1 |
| cat     | f    |        1 |
| cat     | m    |        1 |
| dog     | f    |        1 |
| dog     | m    |        2 |
| hamster | f    |        1 |
| snake   | m    |        1 |
+---------+------+----------+
```

COUNT( ) ,

```
mysql> SELECT species, sex, COUNT(*) FROM pet
    -> WHERE species = 'dog' OR species = 'cat'
    -> GROUP BY species, sex;
+---------+------+----------+
| species | sex  | COUNT(*) |
+---------+------+----------+
| cat     | f    |        1 |
| cat     | m    |        1 |
| dog     | f    |        1 |
| dog     | m    |        2 |
+---------+------+----------+
```

```
mysql> SELECT species, sex, COUNT(*) FROM pet
    -> WHERE sex IS NOT NULL
    -> GROUP BY species, sex;
+---------+------+----------+
| species | sex  | COUNT(*) |
+---------+------+----------+
| bird    | f    |        1 |
| cat     | f    |        1 |
| cat     | m    |        1 |
| dog     | f    |        1 |
| dog     | m    |        2 |
| hamster | f    |        1 |
| snake   | m    |        1 |
+---------+------+----------+
```

3.3.4.9. 1

pet

.

.

.

eventCREATE TABLE

```
mysql> CREATE TABLE event (name VARCHAR(20), date DATE,
    -> type VARCHAR(15), remark VARCHAR(255));
```

pet

name	date	type	remark
Fluffy	1995-05-15	litter	4 kittens, 3 female, 1 male
Buffy	1993-06-23	litter	5 puppies, 2 female, 3 male
Buffy	1994-06-19	litter	3 puppies, 3 female
Chirpy	1999-03-21	vet	needed beak straightened
Slim	1997-08-03	vet	broken rib

Bowser	1991-10-12	kennel	
Fang	1991-10-12	kennel	
Fang	1998-08-28	birthday	Gave him a new chew toy
Claws	1998-03-17	birthday	Gave him a new flea collar
Whistler	1998-12-09	birthday	First birthday

```
mysql> LOAD DATA LOCAL INFILE 'event.txt' INTO TABLE event;
```

pet event event

event pet

```
mysql> SELECT pet.name,
    -> (YEAR(date)-YEAR(birth)) - (RIGHT(date,5)<RIGHT(birth,5)) AS
    -> remark
    -> FROM pet, event
    -> WHERE pet.name = event.name AND event.type = 'litter';
+--------+------+-----------------------------+
| name   | age  | remark                      |
+--------+------+-----------------------------+
| Fluffy |    2 | 4 kittens, 3 female, 1 male |
| Buffy  |    4 | 5 puppies, 2 female, 3 male |
| Buffy  |    5 | 3 puppies, 3 female         |
```

```
+--------+------+-----------------------------+
```

- FROM
- ()　　name　　WHEREname2
- name

2　　pet

```
mysql> SELECT p1.name, p1.sex, p2.name, p2.sex, p1.species
    -> FROM pet AS p1, pet AS p2
    -> WHERE p1.species = p2.species AND p1.sex = 'f' AND p2.sex = '
+--------+------+--------+------+---------+
| name   | sex  | name   | sex  | species |
+--------+------+--------+------+---------+
| Fluffy | f    | Claws  | m    | cat     |
| Buffy  | f    | Fang   | m    | dog     |
| Buffy  | f    | Bowser | m    | dog     |
+--------+------+--------+------+---------+
```

3.4.

( ) **MySQL**

SHOW DATABASES DATABASE( )

```
mysql> SELECT DATABASE();
+------------+
| DATABASE() |
+------------+
| menagerie  |
+------------+
```

NULL

( )

```
mysql> SHOW TABLES;
+---------------------+
| Tables in menagerie |
+---------------------+
| event               |
| pet                 |
+---------------------+
```

DESCRIBE

```
mysql> DESCRIBE pet;
+---------+-------------+------+-----+---------+-------+
| Field   | Type        | Null | Key | Default | Extra |
+---------+-------------+------+-----+---------+-------+
| name    | varchar(20) | YES  |     | NULL    |       |
```

```
| owner   | varchar(20) | YES  |     | NULL    |       |
| species | varchar(20) | YES  |     | NULL    |       |
| sex     | char(1)     | YES  |     | NULL    |       |
| birth   | date        | YES  |     | NULL    |       |
| death   | date        | YES  |     | NULL    |       |
+---------+-------------+------+-----+---------+-------+
```

Field Type NullNULL KeyDefault

SHOW INDEX FROM tbl_name

3.5. mysql

mysql mysql mysql

```
shell> mysql < batch-file
```

Windows**mysql**

```
C:\> mysql -e "source batch-file"
```

```
shell> mysql -h host -u user -p < batch-file
Enter password: ********
```

mysql

--force

- ( )
-
-
-

·

```
shell> mysql < batch-file | more
```

-

·

```
shell> mysql < batch-file > mysql.out
```

-
- , **cron**

mysql () SELECT DISTINCT species FROM pet

```
+---------+
```

```
| species |
+---------+
| bird    |
| cat     |
| dog     |
| hamster |
| snake   |
+---------+
```

```
species
bird
cat
dog
hamster
snake
```

mysql -t mysql -vvv

\.**mysql**

```
mysql> source filename;
mysql> \. filename
```

3.6.

3.6.1.
3.6.2.
3.6.3.
3.6.4.
3.6.5.
3.6.6.
3.6.7.
3.6.8.
3.6.9. AUTO_INCREMENT

MySQL

“ shop” () ( )

mysql

```
shell> mysql your-database-name
```

MySQL test

```
mysql> CREATE TABLE shop (
    -> article INT(4) UNSIGNED ZEROFILL DEFAULT '0000' NOT NULL,
    -> dealer  CHAR(20)                 DEFAULT ''     NOT NULL,
    -> price   DOUBLE(16,2)             DEFAULT '0.00' NOT NULL,
    -> PRIMARY KEY(article, dealer));
mysql> INSERT INTO shop VALUES
    -> (1,'A',3.45),(1,'B',3.99),(2,'A',10.99),(3,'B',1.45),
    -> (3,'C',1.69),(3,'D',1.25),(4,'D',19.95);

mysql> SELECT * FROM shop;
```

```
+---------+--------+-------+
| article | dealer | price |
+---------+--------+-------+
|    0001 | A      |  3.45 |
|    0001 | B      |  3.99 |
|    0002 | A      | 10.99 |
|    0003 | B      |  1.45 |
|    0003 | C      |  1.69 |
|    0003 | D      |  1.25 |
|    0004 | D      | 19.95 |
+---------+--------+-------+
```

3.6.1.

“”

```
SELECT MAX(article) AS article FROM shop;

+---------+
| article |
+---------+
|       4 |
+---------+
```

3.6.2.

```
SELECT article, dealer, price
FROM   shop
WHERE  price=(SELECT MAX(price) FROM shop);
```

MySQLLIMIT

```
SELECT article, dealer, price

FROM shop

ORDER BY price DESC

LIMIT 1;
```

:(19.95)LIMIT

3.6.3.

```
SELECT article, MAX(price) AS price
FROM   shop
GROUP BY article
```

```
+---------+-------+
| article | price |
+---------+-------+
|    0001 |  3.99 |
|    0002 | 10.99 |
|    0003 |  1.69 |
|    0004 | 19.95 |
+---------+-------+
```

3.6.4.

```
SELECT article, dealer, price
FROM   shop s1
WHERE  price=(SELECT MAX(s2.price)
              FROM shop s2
              WHERE s1.article = s2.article);
```

3.6.5.

MySQL 9.3“”

```
mysql> SELECT @min_price:=MIN(price),@max_price:=MAX(price) FROM sho
mysql> SELECT * FROM shop WHERE price=@min_price OR price=@max_price
+---------+--------+-------+
| article | dealer | price |
+---------+--------+-------+
|    0003 | D      |  1.25 |
|    0004 | D      | 19.95 |
+---------+--------+-------+
```

3.6.6.

MySQL InnoDB [15.2“InnoDB”] [1.8.5.5“”]

InnoDB REFERENCES *tbl_name*(*col_name*)

· MySQL*tbl_name* ON DELETEON UPDATE REFERENCESON DELETEON UPDATE

· *column*

· InnoDB

```
CREATE TABLE person (
    id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
    name CHAR(60) NOT NULL,
    PRIMARY KEY (id)
);

CREATE TABLE shirt (
    id SMALLINT UNSIGNED NOT NULL AUTO_INCREMENT,
    style ENUM('t-shirt', 'polo', 'dress') NOT NULL,
    color ENUM('red', 'blue', 'orange', 'white', 'black') NOT NULL,
    owner SMALLINT UNSIGNED NOT NULL REFERENCES person(id),
    PRIMARY KEY (id)
```

```
);

INSERT INTO person VALUES (NULL, 'Antonio Paz');

SELECT @last := LAST_INSERT_ID();

INSERT INTO shirt VALUES
(NULL, 'polo', 'blue', @last),
(NULL, 'dress', 'white', @last),
(NULL, 't-shirt', 'blue', @last);

INSERT INTO person VALUES (NULL, 'Lilliana Angelovska');

SELECT @last := LAST_INSERT_ID();

INSERT INTO shirt VALUES
(NULL, 'dress', 'orange', @last),
(NULL, 'polo', 'red', @last),
(NULL, 'dress', 'blue', @last),
(NULL, 't-shirt', 'white', @last);

SELECT * FROM person;
+----+---------------------+
| id | name                |
+----+---------------------+
|  1 | Antonio Paz         |
```

```
|  2 | Lilliana Angelovska |
+----+---------------------+
```

```
SELECT * FROM shirt;
+----+---------+--------+-------+
| id | style   | color  | owner |
+----+---------+--------+-------+
|  1 | polo    | blue   |     1 |
|  2 | dress   | white  |     1 |
|  3 | t-shirt | blue   |     1 |
|  4 | dress   | orange |     2 |
|  5 | polo    | red    |     2 |
|  6 | dress   | blue   |     2 |
|  7 | t-shirt | white  |     2 |
+----+---------+--------+-------+
```

```
SELECT s.* FROM person p, shirt s
 WHERE p.name LIKE 'Lilliana%'
   AND s.owner = p.id
   AND s.color <> 'white';

+----+-------+--------+-------+
| id | style | color  | owner |
+----+-------+--------+-------+
|  4 | dress | orange |     2 |
```

```
|  5 | polo  | red    |     2 |
|  6 | dress | blue   |     2 |
+----+-------+--------+-------+
```

REFERENCESSHOW CREATE TABLEDESCRIBE:

```
SHOW CREATE TABLE shirt\G
*************************** 1. row ***************************
Table: shirt
Create Table: CREATE TABLE `shirt` (
`id` smallint(5) unsigned NOT NULL auto_increment,
`style` enum('t-shirt','polo','dress') NOT NULL,
`color` enum('red','blue','orange','white','black') NOT NULL,
`owner` smallint(5) unsigned NOT NULL,
PRIMARY KEY  (`id`)
) ENGINE=MyISAM DEFAULT CHARSET=latin1
```

REFERENCES“” MyISAMBerkeleyDB

3.6.7.

OR AND

OR

```
SELECT field1_index, field2_index FROM test_table
WHERE field1_index = '1' OR  field2_index = '1'
```

7.2.6“”

UNIONSELECT 13.2.7.2“UNION ”

SELECT

```
SELECT field1_index, field2_index
    FROM test_table WHERE field1_index = '1'
UNION
SELECT field1_index, field2_index
    FROM test_table WHERE field2_index = '1';
```

3.6.8.

```
CREATE TABLE t1 (year YEAR(4), month INT(2) UNSIGNED ZEROFILL,
             day INT(2) UNSIGNED ZEROFILL);
INSERT INTO t1 VALUES(2000,1,1),(2000,1,20),(2000,1,30),(2000,2,2),
            (2000,2,23),(2000,2,23);

SELECT year,month,BIT_COUNT(BIT_OR(1<<day)) AS days FROM t1
       GROUP BY year,month;

+------+-------+------+
| year | month | days |
+------+-------+------+
| 2000 |    01 |    3 |
| 2000 |    02 |    2 |
+------+-------+------+
/
```

3.6.9. AUTO_INCREMENT

AUTO_INCREMENT

```
CREATE TABLE animals (
     id MEDIUMINT NOT NULL AUTO_INCREMENT,
     name CHAR(30) NOT NULL,
     PRIMARY KEY (id)
 );

INSERT INTO animals (name) VALUES
    ('dog'),('cat'),('penguin'),
    ('lax'),('whale'),('ostrich');

SELECT * FROM animals;


+----+---------+
| id | name    |
+----+---------+
|  1 | dog     |
|  2 | cat     |
|  3 | penguin |
|  4 | lax     |
|  5 | whale   |
|  6 | ostrich |
+----+---------+
```

LAST_INSERT_ID()SQLmysql_insert_id() C APIAUTO_INCREMENT

LAST_INSERT_ID()mysql_insert_id()AUTO_INCREMENT

MyISAMBDB AUTO_INCREMENT AUTO_INCREMENT MAX(*auto_increment_column*) + 1 WHERE prefix=*given-prefix*

```
CREATE TABLE animals (
    grp ENUM('fish','mammal','bird') NOT NULL,
    id MEDIUMINT NOT NULL AUTO_INCREMENT,
    name CHAR(30) NOT NULL,
    PRIMARY KEY (grp,id)
);

INSERT INTO animals (grp,name) VALUES
    ('mammal','dog'),('mammal','cat'),
    ('bird','penguin'),('fish','lax'),('mammal','whale'),
    ('bird','ostrich');

SELECT * FROM animals ORDER BY grp,id;
```

```
+--------+----+---------+
| grp    | id | name    |
+--------+----+---------+
| fish   |  1 | lax     |
| mammal |  1 | dog     |
| mammal |  2 | cat     |
| mammal |  3 | whale   |
| bird   |  1 | penguin |
| bird   |  2 | ostrich |
+--------+----+---------+
```

AUTO_INCREMENT AUTO_INCREMENT AUTO_INCREMENT MyISAM,AUTO_INCREMENT

AUTO_INCREMENT MySQLAUTO_INCREMENT animals PRIMARY KEY (grp, id)INDEX(id)MySQLPRIMARY KEY grp

AUTO_INCREMENT1CREATE TABLEALTER TABLE :

```
mysql> ALTER TABLE tbl AUTO_INCREMENT = 100;
```

AUTO_INCREMENT

· AUTO_INCREMENT 13.1.5“CREATE TABLE” 13.1.2 “ALTER TABLE”

· AUTO_INCREMENTSQL 5.3.2“SQL”

· AUTO_INCREMENT 12.1.3“”

· AUTO_INCREMENT: 13.5.3“SET”

· AUTO_INCREMENT 6.7“”.

· AUTO_INCREMENTServer-system(auto_increment_increment auto_increment_offset)5.3.3“”

3.7.

3.7.1.
3.7.2.

Institute of Environmental Medicine at Karolinska Institutet Stockholm the Section on Clinical Research in Aging and Psychology at the University of Southern California

65 /

http://www.mep.ki.se/twinreg/index_en.html

Perl**MySQL**web

MySQL

3.7.1.

```
SELECT
    CONCAT(p1.id, p1.tvab) + 0 AS tvid,
    CONCAT(p1.christian_name, ' ', p1.surname) AS Name,
    p1.postal_code AS Code,
    p1.city AS City,
    pg.abrev AS Area,
    IF(td.participation = 'Aborted', 'A', ' ') AS A,
    p1.dead AS dead1,
    l.event AS event1,
    td.suspect AS tsuspect1,
    id.suspect AS isuspect1,
    td.severe AS tsevere1,
    id.severe AS isevere1,
    p2.dead AS dead2,
    l2.event AS event2,
    h2.nurse AS nurse2,
    h2.doctor AS doctor2,
    td2.suspect AS tsuspect2,
    id2.suspect AS isuspect2,
```

```
    td2.severe AS tsevere2,
    id2.severe AS isevere2,
    l.finish_date
FROM
    twin_project AS tp
    /* For Twin 1 */
    LEFT JOIN twin_data AS td ON tp.id = td.id
              AND tp.tvab = td.tvab
    LEFT JOIN informant_data AS id ON tp.id = id.id
              AND tp.tvab = id.tvab
    LEFT JOIN harmony AS h ON tp.id = h.id
              AND tp.tvab = h.tvab
    LEFT JOIN lentus AS l ON tp.id = l.id
              AND tp.tvab = l.tvab
    /* For Twin 2 */
    LEFT JOIN twin_data AS td2 ON p2.id = td2.id
              AND p2.tvab = td2.tvab
    LEFT JOIN informant_data AS id2 ON p2.id = id2.id
              AND p2.tvab = id2.tvab
    LEFT JOIN harmony AS h2 ON p2.id = h2.id
              AND p2.tvab = h2.tvab
    LEFT JOIN lentus AS l2 ON p2.id = l2.id
              AND p2.tvab = l2.tvab,
    person_data AS p1,
    person_data AS p2,
    postal_groups AS pg
WHERE
    /* p1 gets main twin and p2 gets his/her twin. */
    /* ptvab is a field inverted from tvab */
    p1.id = tp.id AND p1.tvab = tp.tvab AND
    p2.id = p1.id AND p2.ptvab = p1.tvab AND
    /* Just the screening survey */
    tp.survey_no = 5 AND
    /* Skip if partner died before 65 but allow emigration (dead=9)
    (p2.dead = 0 OR p2.dead = 9 OR
     (p2.dead = 1 AND
      (p2.death_date = 0 OR
       (((TO_DAYS(p2.death_date) - TO_DAYS(p2.birthday)) / 365)
        >= 65))))
    AND
    (
    /* Twin is suspect */
    (td.future_contact = 'Yes' AND td.suspect = 2) OR
    /* Twin is suspect - Informant is Blessed */
    (td.future_contact = 'Yes' AND td.suspect = 1
                               AND id.suspect = 1) OR
    /* No twin - Informant is Blessed */
    (ISNULL(td.suspect) AND id.suspect = 1
                        AND id.future_contact = 'Yes') OR
```

```
    /* Twin broken off - Informant is Blessed */
    (td.participation = 'Aborted'
     AND id.suspect = 1 AND id.future_contact = 'Yes') OR
    /* Twin broken off - No inform - Have partner */
    (td.participation = 'Aborted' AND ISNULL(id.suspect)
                                  AND p2.dead = 0))
    AND
    l.event = 'Finished'
    /* Get at area code */
    AND SUBSTRING(p1.postal_code, 1, 2) = pg.code
    /* Not already distributed */
    AND (h.nurse IS NULL OR h.nurse=00 OR h.doctor=00)
    /* Has not refused or been aborted */
    AND NOT (h.status = 'Refused' OR h.status = 'Aborted'
    OR h.status = 'Died' OR h.status = 'Other')
ORDER BY
    tvid;
```

· CONCAT(p1.id, p1.tvab) + 0 AS tvid

idtvab 0**MySQL**

· id

· tvab

12

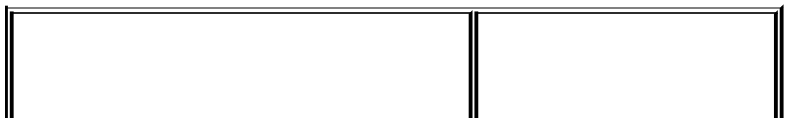
· ptvab

tvab tvab12 **MySQL**

(p1p2) 65

id,tvab id,ptvab (person_data)

(200MHz UltraSPARC) 150-200



person_data	71074
lentus	5291
twin_project	5286
twin_data	2012
informant_data	663
harmony	381
postal_groups	100

3.7.2.

event

```
SELECT
        t1.event,
        t2.event,
        COUNT(*)
FROM
        lentus AS t1,
        lentus AS t2,
        twin_project AS tp
WHERE
```

```
        /* We are looking at one pair at a time */
        t1.id = tp.id
        AND t1.tvab=tp.tvab
        AND t1.id = t2.id
        /* Just the screening survey */
        AND tp.survey_no = 5
        /* This makes each pair only appear once */
        AND t1.tvab='1' AND t2.tvab='2'
GROUP BY
        t1.event, t2.event;
```

3.8. ApacheMySQL

MySQL MySQL

Apache Apache MySQL

```
LogFormat \
        "\"%h\",%{%Y%m%d%H%M%S}t,%>s,\"%b\",\"%{Content-Type}o\",  \
        \"%U\",\"%{Referer}i\",\"%{User-Agent}i\""
```

MySQL:

```
LOAD DATA INFILE '/local/access_log' INTO TABLE tbl_name
FIELDS TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"' ESCAPED BY '\\'
```

LogFormat

MySQLMySQL dev.mysql.com

4MySQL

4.1. MySQL
4.2. MySQL
4.3.
4.3.1.
4.3.2.
4.3.3.
4.3.4.

MySQL AB

MySQL AB3GUIMySQL

· MySQLMySQL

· MySQLMySQL AB MySQL

· MySQLMySQL

4.1. MySQL

MySQL AB

· MYSQL

o **mysqld**MySQL

o **mysqld_safemysql.servermysqld_multi**

o **mysql_install_db**

5

.

o **mysql** SQL

o **mysqladmin**

o **mysqlcheck**

o **mysqldumpmysqlhotcopy**

o **mysqlimport**

o **mysqlshow**

8

.

o **myisamchk**

o **myisampack**

o **mysqlbinlog**

o **perror**

5 **myisamchk**8

MySQL (Windows RPM RPM RPM 2 MySQL

4.2. MySQL

MySQL(shell)“ shell>” **shbash**$**cshtcsh**%Windows **command.comcmd.exe**C:\>

```
shell> mysql test
shell> mysqladmin extended-status variables
shell> mysqlshow --help
shell> mysqldump --user=root personnel
```

4.3“”

() **mysql** mysql testtest

--host--user--password MySQLMySQL MySQL MySQLbinMySQL binMySQL“ ” MySQLbinPATH PATH

4.3.

4.3.1.
4.3.2.
4.3.3.
4.3.4.

MySQL

.

.

· (5.12.2“Unix” TCP/IPUnix

MySQL

MySQL

4.3.1.

.

· -?--helpMySQL

· -v-V (--verbose--version

· -h localhost--host=localhostMySQL MySQL

· ‘ =’ (-hlocalhost-h localhost MySQL --password=*pass_val*--password( ) -p*pass_val*-p

· shell> **mysql -ptest**

· shell> **mysql -p test**

mysqltest **mysql** test

mysql--column-names **mysql**

```
--disable-column-names
--skip-column-names
--column-names=0
```

--disable--skip=0

“ ”

```
--column-names
--enable-column-names
--column-names=1
```

--loose

```
shell> mysql --loose-no-such-option
mysql: WARNING: unknown option '--no-such-option'
```

MySQL --loose --loose(loose)

mysql-e--execute SQL ()(**mysql**

```
shell> mysql -u root -p -e "SELECT User, Host FROM User" mysql
Enter password: ******
+------+-----------+
| User | Host      |
+------+-----------+
|      | gigan     |
| root | gigan     |
```

```
|      | localhost |
| jon  | localhost |
| root | localhost |
+------+-----------+
shell>
```

mysql **mysql -u root -p -e "SELECT UserHost FROM mysql.User"**

SQL

```
shell> mysql -u root -p --execute="SELECT Name FROM Country WHERE Na
Enter password: ******
+-----------+
| Name      |
+-----------+
| Australia |
| Austria   |
+-----------+
+----------+
| COUNT(*) |
+----------+
|     4079 |
+----------+
```

(--execute)(=)

-eMySQL**ndb_mgm** [17.3.6“”](#)

4.3.2.

MySQL()

**myisamchkmyisampackmysqlmysql.servermysqladminmysqlbinlogmysqlccr
mysqlshow**

MySQL17.4“MySQL”

Windows MySQL

WINDIR\my.ini	
C:\my.cnf	
INSTALLDIR\my.ini	
defaults-extra-file	--defaults-extra-file=*path*

*WINDIR*Windows C:\WINDOWSC:\WINNTWINDIR

```
C:\> echo %WINDIR%
```

*INSTALLDIR*MySQL C:*PROGRAMDIR*\MySQL\MySQL 5.1 Server
PROGRAMDIR(WindowsProgram Files)MySQL 5.1 2.3.5.14“my.ini”

Unix MySQL

/etc/my.cnf	

$MYSQL_HOME/my.cnf	
defaults-extra-file	--defaults-extra-file=*path*
~/.my.cnf	

MYSQL_HOME my.cnf

MYSQL_HOME*DATADIR*my.cnf *BASEDIR*my.cnf mysqld_safe MYSQL_HOME*DATADIR* MYSQL_HOME*DATADIR*my.cnfmysqld_safe MYSQL_HOME*BASEDIR*

/usr/local/mysql/data/usr/local/var **m**

MySQL

Unix MySQL

MySQL --help

--quick--host=localhostquickhost=localhost--loose-*opt_name* loose-*opt_name*

· #

‘ #’‘ ’‘ #’

· [*group*]

group *opt_name*set-variable

· *opt_name*

--*opt_name*

· *opt_name=value*

--opt_name=value‘ =’‘ #’

‘ \b’‘ \t’‘ \n’‘ \r’‘ \\’‘ \s’ tab

Windows‘ /’‘ \’‘ \’‘ \\’‘ \’ MySQL

(**mysqld**)[client] [client] ([c

5.0MySQL 5.0.4 !include!includedir /home/mydir/myopt.cnf

```
!include /home/me/myopt.cnf
```

.cnf/home/mydir

```
!includedir /home/mydir
```

my.cnf

```
[mysqld]
!include /home/mydir/myopt.cnf
```

myopt.cnf!include

```
[mysqldump]
!includedir /home/mydir/my-dump-option
```

mysqldump.cnf/home/mydir/my-dump-option

Unix !includedir.cnf Windows .ini(.cnf)

mysqld [mysqld-5.0][mysqld-5.1] --new5.1.x MySQL

```
[mysqld-5.1]
new
```

```
[client]
```

```
port=3306
socket=/tmp/mysql.sock

[mysqld]
port=3306
socket=/tmp/mysql.sock
key_buffer_size=16M
max_allowed_packet=8M

[mysqldump]
quick
```

key_buffer_sizemax_allowed_packet*var_name=value*

```
[client]
# The following password will be sent to all standard MySQL clients
password="my_password"

[mysql]
no-auto-rehash
connect_timeout=2

[mysqlhotcopy]
interactive-timeout
```

support-filemy-*xxxx*.cnf MySQLsupport-file Windows MySQL (2MySQL) WindowsC:\my.cnfUnix.my.cnf

Windows .cnf

MySQL

· --no-defaults

· --print-defaults

· --defaults-file=*path_name*

path_name

· --defaults-extra-file=*path_name*

path_name

--print-defaults--defaults-file--defaults-extra-file

shell **my_print_defaults** [client][mysql]**my_print_defaults**

```
shell> my_print_defaults client mysql
--port=3306
--socket=/tmp/mysql.sock
--no-auto-rehash
```

C () CC++ MySQL

MySQLC PerlPython

4.3.3.

WindowsNetWare USERMySQL

```
SET USER=your_name
```

Unix MYSQL_TCP_PORTTCP/IP (**sh**bash**zsh**)

```
MYSQL_TCP_PORT=3306

export MYSQL_TCP_PORT
```

1 export MySQL

cshtcsh **setenv**

```
setenv MYSQL_TCP_PORT 3306
```

F MySQL

4.3.4.

MySQL **mysql**max_allowed_packet **mysql** max_allowed_packet16MB

```
shell> mysql --max_allowed_packet=16777216

shell> mysql --max_allowed_packet=16M
```

1 2 KMG()

```
[mysql]

max_allowed_packet=16777216
```

```
[mysql]

max_allowed_packet=16M
```

MySQL 5.1--set-variable = *option=value*

5.3.3.1“”

MySQLMySQL dev.mysql.com.

5

5.1. MySQL
- 5.1.1.
- 5.1.2. mysq**ld-maxMy**SQL
- 5.1.3. mysqld_safeMySQL
- 5.1.4. mysql.serverMySQL
- 5.1.5. mysqld_multiMySQL

5.2. mysqlmanagerMySQL
- 5.2.1. MySQLMySQL
- 5.2.2. MySQL
- 5.2.3. MySQL
- 5.2.4. MySQL
- 5.2.5. MySQL

5.3. mysqldMySQL
- 5.3.1. **mysqld**
- 5.3.2. SQL
- 5.3.3.
- 5.3.4.

5.4. mysql_fix_privilege_tablesMySQL

5.5. MySQL

5.6.
- 5.6.1.
- 5.6.2. MySQL
- 5.6.3. Mysqld
- 5.6.4. LOAD DATA LOCAL

5.7. MySQL
- 5.7.1.
- 5.7.2.
- 5.7.3. MySQL
- 5.7.4. MySQL
- 5.7.5. , 1
- 5.7.6. , 2
- 5.7.7.
- 5.7.8.

5.7.9. MySQL 4.1
5.8. MySQL
5.8.1. MySQL
5.8.2. MySQL
5.8.3. MySQL
5.8.4.
5.8.5.
5.8.6.
5.8.7.
5.9.
5.9.1.
5.9.2.
5.9.3.
5.9.4.
5.9.5. myisamchkMyISAM
5.9.6.
5.9.7.
5.10. MySQL
5.10.1.
5.10.2.
5.10.3.
5.10.4.
5.10.5.
5.10.6.
5.10.7.
5.10.8. MySQL
5.11. MySQL
5.11.1.
5.11.2.
5.11.3.
5.11.4.
5.11.5.
5.12. MySQL
5.12.1. Windows
5.12.2. Unix
5.12.3.
5.13. MySQL
5.13.1.
5.13.2. SELECT

5.13.3. _____
5.13.4. _____

MySQL

5.1. MySQL

5.1.1.
5.1.2. mysq**ld-maxMy**SQL
5.1.3. mysqld_safeMySQL
5.1.4. mysql.serverMySQL
5.1.5. mysqld_multiMySQL

MySQL **mysqld**MySQL MySQL

5.3“mysqldMySQL”

5.1.1.

MySQL MySQL--help, **mysqld --help**

4.3“”

MySQL

· **mysqld**

SQL(MySQL) 5.3“mysqldMySQL”

· mysqld-max

5.1.2“mysq **ld-maxMy**SQL”

· mysqld_safe

mysqld-max,**mysqld_safe** **mysqld**5.1.3“mysqld_safeMySQL”

· mysql.server

· mysqld_multi

5.1.5“mysqld_multiMySQL”

· mysql_install_db

MySQL MySQL 2.9.2“Unix”

· **mysql_fix_ privilege_tables**

MySQL 2.10.2“”

· myisamchk

MyISAM 5.9.5“myisamchkMyISAM” **myisamchk**

· make_binary_distribution

MySQL FTPftp.mysql.com/pub/mysql/upload/MySQL

· mysqlbug

MySQL MySQL (http://bugs.mysql.com/ 1.7.1.3‘

5.1.2. mysqld-maxMySQL

MySQL-Max**mysqld** MySQL

· WindowsMySQL (mysqld.exe)MySQL-Max(**mysqld-max.exe**) Windows http://dev.mysql.com/downloads/ 2.3“WindowsMySQL”

· LinuxRPMMySQLMySQL-server RPM**mysqld** MySQL-Max RPM **mysqld-max** MySQL-Max RPMRPMLinux RPM 2.4“Linux MySQL”

· MySQL-Max**mysqld**

MySQL ABhttp://dev.mysql.com/downloads/MySQL-Max

MySQL AB**configure**MySQL-Max

· --with-server-suffix=-max

mysqld-max

· --with-innodb

InnoDB MySQL-MaxInnoDB MySQL 4.0 InnoDB MySQL-Max InnoDB

· --with-bdb

Berkeley DB (BDB)

· --with-blackhole-storage-engine

BLACKHOLE

· USE_SYMDIR

Windows Windows Max

· --with-ndbcluster

NDB Cluster (5.1.2-alpha)LinuxSolarisMac OS XClusterBSD MySQL Cluster

MySQL-Max MySQLMySQL-MaxMax-like

MySQL-MaxBerkeleyDB (BDB) BDB

SolarisMac OS XLinux()MySQL-MaxNDB CLUSTER ndbcluster MySQL Cluster (17.4“MySQL”

MySQL-MaxBDB/NDB CLUSTER

	BDB	**NDB**
AIX 4.3	N	N

HP-UX 11.0	N	N
Linux-Alpha	N	Y
Linux-IA-64	N	N
Linux-Intel	Y	Y
Mac OS X	N	N
NetWare	N	N
SCO OSR5	Y	N
Solaris-SPARC	Y	Y
Solaris-Intel	N	Y
UnixWare	Y	N
Windows NT/2000/XP	Y	N

```
mysql> SHOW ENGINES;
+------------+---------+----------------------------------------------
```

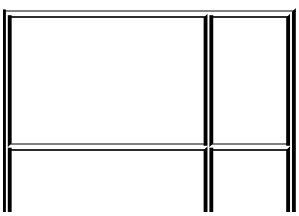
```
| Engine     | Support | Comment
+------------+---------+-----------------------------------------
| MyISAM     | DEFAULT | Default engine as of MySQL 3.23 with great
| MEMORY     | YES     | Hash based, stored in memory, useful for te
| HEAP       | YES     | Alias for MEMORY
| MERGE      | YES     | Collection of identical MyISAM tables
| MRG_MYISAM | YES     | Alias for MERGE
| ISAM       | NO      | Obsolete storage engine, now replaced by My
| MRG_ISAM   | NO      | Obsolete storage engine, now replaced by ME
| InnoDB     | YES     | Supports transactions, row-level locking, a
| INNOBASE   | YES     | Alias for INNODB
| BDB        | YES     | Supports transactions and page-level lockin
| BERKELEYDB | YES     | Alias for BDB
| NDBCLUSTER | NO      | Clustered, fault-tolerant, memory-based tab
| NDB        | NO      | Alias for NDBCLUSTER
| EXAMPLE    | NO      | Example storage engine
| ARCHIVE    | YES     | Archive storage engine
| CSV        | NO      | CSV storage engine
| FEDERATED  | YES     | Federated MySQL storage engine
| BLACKHOLE  | YES     | /dev/null storage engine (anything you writ
+------------+---------+-----------------------------------------
18 rows in set (0.00 sec)
```

(13.5.4.8“SHOW ENGINES”

SHOW ENGINES

```
mysql> SHOW VARIABLES LIKE 'have%';
+----------------------+----------+
```

```
| Variable_name          | Value    |
+------------------------+----------+
| have_archive           | YES      |
| have_bdb               | NO       |
| have_blackhole_engine  | YES      |
| have_compress          | YES      |
| have_crypt             | YES      |
| have_csv               | YES      |
| have_example_engine    | NO       |
| have_federated_engine  | NO       |
| have_geometry          | YES      |
| have_innodb            | YES      |
| have_isam              | NO       |
| have_ndbcluster        | DISABLED |
| have_openssl           | NO       |
| have_partition_engine  | YES      |
| have_query_cache       | YES      |
| have_raid              | NO       |
| have_rtree_keys        | YES      |
| have_symlink           | YES      |
+------------------------+----------+
18 rows in set (0.01 sec)
```

YES	
NO	
DISABLED	

NO

DISABLED *host_.err*

InnoDBBDB DISABLED--skip-innodb--skip-bdb NDB CLUSTER DISABLEDMySQL Cluster--ndb-cluster

MySQLMyISAM MyISAM

5.1.3. mysqld_safeMySQL

UnixNetWare**mysqld_safemysqldmysqld_safe** NetWare

MySQL MySQL**safe_mysqldmysqld_safe**

mysqld_safemysqld-max **mysqld**

· Linux MySQL-Max RPM**mysqld_safe** RPM**mysqld-max** **mysqld_safe**

· **mysqld-max**MySQL-Max -MaxMySQL **mysqld_safe** **max** **mysqld-maxmysqld_safemysqld**

mysqld_safe--mysqld--mysqld-version

mysqld_safemysqld 5.3.1“ **mysqld**”

mysqld_safemysqldmysqldmysqld_safe [mysqld_safe] 4.3.2 “”

mysqld_safe[mysqld][server][mysqld_safe]

5.1[mysqld_safe]

mysqld_safe

· --help

· --autoclose

(NetWare)NetWare **mysqld_safe** **mysqld_safe** NLM

```
*<NLM has terminated; Press any key to close the screen>*
```

NetWare **mysqld_safe**--autoclose

· --basedir=*path*

MySQL

· --core-file-size=*size*

mysqld **ulimit -c**

· --datadir=*path*

· --defaults-extra-file=*path*

· --defaults-file=*path*

· --ledir=*path*

mysqld

· --log-error=*path*

5.11.1“”

· --mysqld=*prog_name*

(ledir)MySQL

· --mysqld-version =*suffix*

--mysqld **mysqld** --mysqld-version =max**mysqld_safe**ledir**mysqld-max** --mysqld-version **mysqld_safemysqld**

· --nice=*priority*

nice

· --no-defaults

· --open-files-limit=*count*

mysqld **ulimit -n**root**mysqld_safe**

· --pid-file=path

ID

· --port=*port_num*

TCP/IP 1024 MySQLroot

· --skip-character-set-client-handshake

(MySQLMySQL 4.0

· --socket=path

Unix

· --timezone=*zone*

TZ

· --user={*user_name* | *user_id*}

*user_name*ID *user_id***mysqld**(“ ” MySQL

mysqld_safe --defaults-file--defaults-extra-option

```
mysqld_safe --port=port_num --defaults-file=file_name
```

```
mysqld_safe --defaults-file=file_name --port=port_num
```

mysqld_safe MySQL (2.1.5“” **mysqld_safe**

· **mysqld_safe** **mysqld_safe**bindata libexecvar MySQL **mysqld_safe**(/usr/local/mysql)

· **mysqld_safe** /usr/local/libexec/usr/local/varMySQL

mysqld_safe MySQL**mysqld_safe**MySQL

```
shell> cd mysql_installation_directory
shell> bin/mysqld_safe &
```

mysqld_safe MySQL --ledir--datadir

mysqld_safe my.cnf[mysqld_safe]**mysqld_safemysqld_safe** MySQL**mysqld_safe**

NetWare **mysqld_safe**NetWare Loadable Module (NLM)Unix shell

1.

2. MyISAM

3. MySQL

4. **mysqld**

5. **mysqld***host_name.err*

6. **mysqld_safe***host_name.safe*

5.1.4. mysql.serverMySQL

UnixMySQL**mysql.server** System V-style LinuxSolarisMySQLMac OS X Startup Item

mysql.server MySQLMySQLsupport-files

Linux RPM(MySQL-server-VERSION.rpm)**mysql.server**/etc/init.d mysql Linux RPM2.4“LinuxMySQL”

RPM **mysqld**

mysql.server MySQL 2.9.2.2“MySQL”

mysql.server [mysql.server][mysqld] ([safe_my [mysqld_safe]

5.1.5. mysqld_multiMySQL

mysqld_multi UnixTCP/IP**mysqld**

my.cnf[mysqld*N*](--config-file)*N* *GNR* **mysqld_multi** **mysqld** [mysqld] (2.9.2.2“MySQL” UnixTCP/IP 5.12 “MySQL”

mysqld_multi

```
shell> mysqld_multi [options] {start|stop|report} [GNR[,GNR] ...]
```

startstopreport *GNR* **mysqld_multi**

GNR *GNR* [mysqld17]*GNR*17 11 *GNR*10-13[mysqld10] [mysqld13] *GNR*(tab)

[mysqld17]

```
shell> mysqld_multi start 17
```

[mysql8][mysqld10][mysqld13]

```
shell> mysqld_multi stop 8,10-13
```

```
shell> mysqld_multi --example
```

mysqld_multi

· --config-file=*name*

mysqld_multi[mysqld*N*] my.cnf **mysqld_mu**
[mysqld_multi]

· --example

· --help

· --log=*name*

· --mysqladmin=*prog_name*

mysqladmin

· --mysqld=*prog_name*

mysqld **mysqld_safe** **mysqld**PATH**mysqld_safemysqld**

· --no-log

· --password=*password*

mysqladminMySQL MySQL

· --silent

· --tcp-ip

TCP/IPUnixMySQL (TCI

· --user=*user_name*

mysqladminMySQL

· --verbose

· --version

mysqld_multi

· **mysqld**(**mysqladmin**)MySQL SHUTDOWN multi_admin

· shell> **mysql -u root -S /tmp/mysql.sock -p*root_pass***

· mysql> **GRANT SHUTDOWN ON *.***

· -> **TO 'multi_admin'@'localhost' IDENTIFIED BY '**

5.7.2“” **mysqld** multi_admin**mysqld_multi**

· **mysqld_safemysqld(** --mysqld=mysqld_safe)--pid-file **mysqld**ID **mysqld_safemysqldmysqld_safe“” mysqld** kill –9 **mysqld_safe mysqld_multi mysqld_safe**

· ----------

· MY_PWD=`pwd`

```
·               # Check if we are starting this relative (for the b
·               if test -d $MY_PWD/data/mysql -a -f ./share/mysql/e
·               -x ./bin/mysqld
·               ------------------------------------------------
```

5.1.3“mysqld_safeMySQL”

· **mysqld**UnixTCP/IP

· **mysqld**--user Unix root**mysqld_multi** Unix**mysqld**

· **mysqld**Unix Unix root

· **mysqld_multi** **mysqldmysqld** **my**
“MySQL”

mysqld_multi15[mysqld*N*] **mysqld**

```
# This file should probably be in your home dir (~/.my.cnf)
# or /etc/my.cnf
# Version 2.1 by Jani Tolonen

[mysqld_multi]
mysqld     = /usr/local/bin/mysqld_safe
mysqladmin = /usr/local/bin/mysqladmin
user       = multi_admin
password   = multipass

[mysqld2]
socket     = /tmp/mysql.sock2
port       = 3307
pid-file   = /usr/local/mysql/var2/hostname.pid2
```

```
datadir    = /usr/local/mysql/var2
language   = /usr/local/share/mysql/english
user       = john

[mysqld3]
socket     = /tmp/mysql.sock3
port       = 3308
pid-file   = /usr/local/mysql/var3/hostname.pid3
datadir    = /usr/local/mysql/var3
language   = /usr/local/share/mysql/swedish
user       = monty

[mysqld4]
socket     = /tmp/mysql.sock4
port       = 3309
pid-file   = /usr/local/mysql/var4/hostname.pid4
datadir    = /usr/local/mysql/var4
language   = /usr/local/share/mysql/estonia
user       = tonu

[mysqld6]
socket     = /tmp/mysql.sock6
port       = 3311
pid-file   = /usr/local/mysql/var6/hostname.pid6
datadir    = /usr/local/mysql/var6
language   = /usr/local/share/mysql/japanese
```

```
user       = jani
```

4.3.2“”

5.2. mysqlmanagerMySQL

5.2.1. MySQLMySQL
5.2.2. MySQL
5.2.3. MySQL
5.2.4. MySQL
5.2.5. MySQL

MySQL(IM)TCP/IP MySQL MySQL Unix-Windows

mysqld_safeMySQLMySQL MySQL**mysqld_multi**()MySQL

5.2.1. MySQLMySQL

mysql.server MySQL Database ServerMySQL /etc/init.d/ **mysqld_safe** use_mysqld_safe0()MySQL

Instance ManagerMySQL MySQLmysqld() **mysqld**] MySQL 2.1.5“”

IM[mysqld]([mysqld][mysqld1][mysqld2]) IM IM

mysqld-path(mysqld-path = *path-to-mysqld- binary*)IM IM**mysqld** basedirdatadir

MySQLMySQL/

· **/etc/init.d/mysql**MySQL

· MySQL

· MySQL

· MySQL(**/etc/init.d/mysql stop**)MySQL

5.2.2. MySQL

MySQL-MySQL **mysql**MySQL C APIIMIMmysql-4.1MySQL-

IM /etc/mysqlmanager.passwd

```
petr:*35110DC9B4D8140F5DE667E28C72DD2597B5C848
```

--passwdIM/etc/mysqlmanager.passwd

```
./mysqlmanager --passwd >> /etc/mysqlmanager.passwd
Creating record for new user.
Enter user name: mike
Enter password: <password>
Re-type password: <password>
```

/etc/mysqlmanager.passwd

```
mike:*00A51F3F48415C7D4E8908980D443C29C69B60C9
```

/etc/mysqlmanager.passwd IM

5.2.3. MySQL

MySQL **./mysqlmanager --help**

· --help-?

· --bind-address=*name*

· --default-mysqld-path=*name*

Unix MySQL default-mysqld-path = /usr/sbin/mysqld

· --defaults-file=*file_name*

Instance ManagerMySQL Instance Manager Instance Manager

· --install

Windows Instance ManagerWindows

· --log=*name*

IM **--run-as-service**

· --monitoring-interval=*Seconds*

Instance Manager/ IM() nonguarded

· --passwd-P

passwd

· --password-file=*name*

Instance Manager /etc/mysqlmanager.passwd

· --pid-file=*name*

ID mysqlmanager.pid

· -- port=*port_num*

(IANA 2273)

· --print-defaults

Instance Manager

· --remove

Windows Instance Manager Windows --installInstance Manager

· --run-as-service

IM

· --socket=*name*

Unix /tmp/mysqlmanager.sock

· --standalone

WindowsInstance Manager

· --user=*name*

mysqlmanager mysqldmysqlmanager

· --version, -V

5.2.4. MySQL

Instance Managermy.cnf [manager][mysqld] [manager] [manager]

```
# MySQL Instance Manager options section
[manager]
default-mysqld-path = /usr/local/mysql/libexec/mysqld
socket=/tmp/manager.sock
pid-file=/tmp/manager.pid
password-file = /home/cps/.mysqlmanager.passwd
monitoring-interval = 2
port = 1999
bind-address = 192.168.1.5
```

MySQLUnix/etc/my.cnf Windows MySQLInstance Managermy.ini --defaults-file=*file_ name*

MySQL IM-

· mysqld-path = <path-to-mysqld-binary>

mysqld

· shutdown-delay = *Seconds*

IM 35 IM“ kill –9” largeInnoDB

· nonguarded

IM

```
[mysqld]
mysqld-path=/usr/local/mysql/libexec/mysqld
socket=/tmp/mysql.sock
port=3307
server_id=1
skip-stack-trace
core-file
skip-bdb
log-bin
log-error
log=mylog
log-slow-queries

[mysqld2]
nonguarded
port=3308
server_id=2
mysqld-path= /home/cps/mysql/trees/mysql-5.1/sql/mysqld
socket     = /tmp/mysql.sock5
pid-file   = /tmp/hostname.pid5
```

```
datadir= /home/cps/mysql_data/data_dir1
language=/home/cps/mysql/trees/mysql-5.1/sql/share/english
log-bin
```

log=/tmp/fordel.log

5.2.5. MySQL

MySQLIM **mysql**MySQL API MySQL

· START INSTANCE <instance_name>

```
mysql> START INSTANCE mysqld4;
Query OK, 0 rows affected (0,00 sec)
```

· STOP INSTANCE <instance_name>

```
mysql> STOP INSTANCE mysqld4;
Query OK, 0 rows affected (0,00 sec)
```

· SHOW INSTANCES

```
mysql> show instances;
+---------------+---------+
| instance_name | status  |
+---------------+---------+
| mysqld3       | offline |
| mysqld4       | online  |
| mysqld2       | offline |
```

```
+---------------+---------+
3 rows in set (0,04 sec)
```

· SHOW INSTANCE STATUS <instance_name>

```
mysql> SHOW INSTANCE STATUS mysqld3;
+---------------+--------+---------+
| instance_name | status | version |
+---------------+--------+---------+
| mysqld3       | online | unknown |
+---------------+--------+---------+
1 row in set (0.00 sec)
```

· SHOW INSTANCE OPTIONS <instance_name>

```
mysql> SHOW INSTANCE OPTIONS mysqld3;
+---------------+-----------------------------------------------------
| option_name   | value
+---------------+-----------------------------------------------------
| instance_name | mysqld3
| mysqld-path   | /home/cps/mysql/trees/mysql-4.1/sql/mysqld
| port          | 3309
| socket        | /tmp/mysql.sock3
| pid-file      | hostname.pid3
| datadir       | /home/cps/mysql_data/data_dir1/
| language      | /home/cps/mysql/trees/mysql-4.1/sql/share/english
+---------------+-----------------------------------------------------
```

```
7 rows in set (0.01 sec)
```

· SHOW <instance_name> LOG FILES

```
mysql> SHOW mysqld LOG FILES;
+-------------+-------------------------------------+----------+
| Logfile     | Path                                | Filesize |
+-------------+-------------------------------------+----------+
| ERROR LOG   | /home/cps/var/mysql/owlet.err       | 9186     |
| GENERAL LOG | /home/cps/var/mysql/owlet.log       | 471503   |
| SLOW LOG    | /home/cps/var/mysql/owlet-slow.log | 4463     |
+-------------+-------------------------------------+----------+
3 rows in set (0.01 sec)
```

· SHOW <instance_name> LOG {ERROR | SLOW | GENERAL} size[,offset_from_end]

size offset_from_end 21 23 2

```
mysql> SHOW mysqld LOG GENERAL 21, 2;
+---------------------+
| Log                 |
+---------------------+
| using password: YES |
+---------------------+
1 row in set (0.00 sec)
```

· SET instance_name.option_name=option_value

/ IM/etc/my.cnf

```
mysql> SET mysqld2.port=3322;
```

```
Query OK, 0 rows affected (0.00 sec)
```

MySQL FLUSH INSTANCES Instance Manager

· UNSET instance_name.option_name

```
mysql> UNSET mysqld2.port;
Query OK, 0 rows affected (0.00 sec)
```

MySQL FLUSH INSTANCES Instance Manager

· FLUSH INSTANCES

IM

```
mysql> FLUSH INSTANCES;
Query OK, 0 rows affected (0.04 sec)
```

5.3. mysqldMySQL

5.3.1. **mysqld**
5.3.2. SQL
5.3.3.
5.3.4.

mysqldMySQL MySQL

.

· SQL

.

.

5.3.1. mysqld

mysqld 4.3"" 4.3.2""

mysqld[mysqld][server] **mysqld_safe**[mysqld][server][mysqld_safe] [safe_mysqld] **mysql.server** [mysqld][mysql.server] MySQL [server][embedded][*xxxxx_SERVER*] *xxxxx*

mysqld **mysqld --help** **mysqld --verbose --help**

· 5.6.3"Mysqld "

· SSL- 5.8.7.6"SSL"

· 5.11.3""

· 6.8""

· 15.1.1"MyISAM" 15.5.3"BDB" 15.2.4"InnoDB"

· --help-?

--verbose--help

· --allow-suspicious-udfs

xxx UDF UDF 27.2.3.6“”

· --ansi

(ANSI)SQLMySQL 1.8.3“ANSIMySQL” --sql-modeSQL

· --basedir=*path*, -b *path*

MySQL

· --bind-address=*IP*

IP

· --bootstrap

mysql_install_db MySQL MySQL

· --console

stderrstdout--log-errorWindows **mysqld**

· --character-sets-dir=*path*

5.10.1“”

· --chroot=path

chroot()**mysqld**

· --character-set-server=*charset*

charset 5.10.1“”

· --core-file

mysqld **mysqld_safe**--core-file-size 5.1.3“mysqld_safe MySQL” Solaris--user

· --collation-server=*collation*

collation 5.10.1“”

· --datadir=*path*, -h *path*

· --debug[=*debug_options*], -# [*debug_options*]

MySQL--with-debug **mysqld** *debug_options*'d:t:o*file_name*'E.1.2“ ”

· (*DEPRECATED*) --default-character-set=*charset*

char --character-set-server 5.10.1“”

· --default-collation=*collation*

collation --collation-server 5.10.1“”

· --default-storage-engine=*type*

--default-table-type

· --default-table-type=*type*

15

· --default-time-zone=*type*

time_zone (system_time_zone)

· --delay-key-write[= OFF | ON | ALL]

DELAYED KEYS MyISAM OFF ONDELAYED KEYS ALL

MyISAM 7.5.2“” 15.1.1“MyISAM”

ALLMyISAMMyISAM(MySQL**myisamchk**)

· --des-key-file=*file_name*

DES_ENCRYPT()DES_DECRYPT()

· --enable-named-pipe

Windows NT2000XP2003 **mysqld-ntmysqld-max-nt**

· --exit-info[=*flags*], -T [*flags*]

mysqld

· --external-locking

lockd(Linux)**mysqld** --enable-locking

MySQLMyISAM

o

o --delay-key-write=ALLDELAY_KEY_WRITE=1

--external-locking--delay-key-write=OFF --query-cache-size=0

(

· --flush

SQL SQL MySQL A.4.2“MySQL”

· --init-file=*file*

SQL

· --language=*lang_name*, -L *lang_name*

lang_name 5.10.2“”

· --large-pages

/ (4 KB) OS Translation Lookaside Buffer (TLB)

MySQLLinux(LinuxHugeTLB)FreeBSDSolaris

Linux HugeTLB Linuxhugetlbpage.txt

· ---log[=*file*], -l [*file*]

5.11.2“” MySQL*host_name*.log

· --log-bin=[*file*]

5.11.3“” (A.8.1“MySQL”)MySQL*host_name*-bin

· --log-bin-index[=*file*]

5.11.3“” --log-bin MySQL*host_name*-bin.index

· --log-bin-trust-routine-creators[={0|1}]

1,log_bin_trust_routine_creators1 0 0log_bin_trust_routine_creatorsMySQL 20.4“”

· --log-error[=*file*]

5.11.1“” MySQL*host_name.err* .err

· --log-isam[=*file*]

MyISAM(MyISAM)

· (*DEPRECATED*) --log-long-format

indexes

· --log-queries-not-using-indexes

--log-slow-queries 5.11.4“”

· --log-short-format

· ---log-slow-admin-statements

OPTIMIZE TABLEANALYZE TABLEALTER TABLE

· --log-slow-queries[=*file*]

long_query_time 5.11.4“” --log-long-format--log-short-format

· --log-warnings, -W

Aborted connection... ( ) --skip-log-warnings 1A.2.10 “”

· --low-priority-updates

(INSERT, REPLACE, DELETE, UPDATE) {INSERT | REPLACE | DELETE | UPDATE} LOW_PRIORITY ... SET LOW_PRIORITY_UPDATES=1 7.3.2“”

· --memlock

mysqld mlockall() Solaris**mysqld** root

· --myisam-recover [=*option*[,*option*...]]]

MyISAM DEFAULTBACKUPFORCEQUICK "" **mysqld** MyISAM (--skip-external-lockingare **mysqld** **mysqld**

DEFAULT	--myisam-recover
BACKUP	*tbl_name*.MYD*tbl_name-datetime*.BAK
FORCE	.MYD
QUICK	

MySQL BACKUP,FORCE

· --ndb-connectstring=*connect_string*

NDB 17.4.4.2“MySQL”

· --ndbcluster

NDB CLUSTER MySQL Cluster 17 *MySQL*

· --old-passwords

(4.1) 5.7.9“MySQL 4.1”

· --one-thread

(Linux) E.1“MySQL”

· --open-files-limit=*count*

mysqld 0**mysqld**setrlimit() 0**mysqld** max_connections*5 max_connections + table_cache*2() **mysqld**" "

· --pid-file=path

mysqld_safeID

· --port=*port_num*, -P *port_num*

TCP/IP

· --safe-mode

· (*DEPRECATED*) --safe-show-database

5.7.3“MySQL”

· --safe-user-create

mysql.userINSERT GRANT

· --secure-auth

(4.1)

· --shared-memory

Windows

· --shared-memory-base-name=*name*

Windows

· --skip-bdb

BDB BDB

· --skip-concurrent-insert

MyISAM (

· --skip-external-locking

myisamchk (1.4.3“MySQL” MySQL MonitorCHECK

TABLEREPAIR TABLEMyISAM

· --skip-grant-tables

mysqladmin flush-privilegesmysqladmin reload MySQL FLUSH PRIVILEGES

· --skip-host-cache

-IP DNS 7.5.6“MySQLDNS”

· --skip-innodb

InnoDB BDB

· --skip-name-resolve

IP HostIPlocalhost7.5.6“MySQLDNS”

· --skip-ndbcluster

NDB CLUSTER NDB CLUSTER --ndbcluster--skip-ndbcluster 17.4.3“MySQL”

· --skip-networking

TCP/IP (Windows)Unix(Unix)**mysqld** 7.5.6“MySQLDNS”

· --standalone

Windows-NT MySQL

· --symbolic-links, --skip-symbolic-links

WindowsUnix

o Windows directory.sym 7.6.1.3“Windows”

Unix CREATE TABLEINDEX DIRECTORYDATA DIRECTORYMyISAM 13.1.5“CREA

· --skip-safemalloc

MySQL--with-debug=fullMySQL --skip-safemalloc

· --skip-show-database

SHOW DATABASESSHOW DATABASES SHOW DATABASESSHOW DATABASES

· --skip-stack-trace

mysqld E.1“MySQL”

· --skip-thread-priority

· --socket=path

Unix Unix /tmp/mysql.sockWindows

· --sql-mode=*value*[,*value*[,*value*...]]

MySQLSQL 5.3.2“SQL”

· --temp-pool

· --transaction-isolation=*level*

READ-UNCOMMITTEDREAD-COMMITTEEREPEATABLE-READ SERIALIZABLE13.4.6“SET TRANSACTION”

· --tmpdir=*path*, -t *path*

/tmp round-robin Unix(‘:’) WindowsNetWareOS/2(‘’) MySQL --tmpdir LOAD DATA INFILE

· --user={*user_name* | *user_id*}, -u {*user_name* | *user_id*}

*user_name*ID *user_id***mysqld**(“” MySQL

root**mysqld** IDroot 5.6.1“”

my.cnf--user=root(root) **mysqld**1--user --user /etc/my.cnf $MYSQL_HOME/my.cnf /etc/my.cnf--user root --user/etc/my.cnf --user

· --version, -V

--*var_name=value* --key_buffer_size=32Mkey_buffer_size32MB

MySQL

--set-variable=*var_name=value*-O *var_name=value*

5.3.3“” 7.5.2“”

SET 13.5.3“SET”

SET --maximum-var_name

5.3.2. SQL

MySQLSQL

MySQLSQL MySQLMySQL

--sql-mode="*modes*"**mysqld**SQL (--sql-mode ="")

SET [SESSION|GLOBAL] sql_mode='*modes*'sql_modeSQL GLOBAL SUPER SESSION s

*Modes*is(‘’) SELECT @@sql_mode ()

sql_mode

· ANSI

SQL

· STRICT_TRANS_TABLES

· TRADITIONAL

Make MySQL“ ”SQL“ ” INSERT/UPDATE“”“
”

“ ” STRICT _TRANS_TABLESSTRICT _ALL_TABLES

· ALLOW_INVALID_DATES

112131 Web () DATEDATETIME TIMESTAMP TIMESTAMP

112131 '2004-04-31' ALLOW_INVALID_DATES

· ANSI_QUOTES

‘ "’ (‘`’ ) ANSI‘ `’ ANSI_QUOTES

· ERROR_FOR_DIVISION_BY_ZERO

INSERTUPDATE (MOD(X0))() MySQLNULLINSERT IGNORE UPDATE IGNORE MySQL NULL

· HIGH_NOT_PRECEDENCE

NOTNOT a BETWEEN b AND cNOT (a BETWEEN b AND c)MySQL (NOT a) BETWEEN b AND cHIGH_NOT_PRECEDENCESQL

```
mysql> SET sql_mode = '';
mysql> SELECT NOT 1 BETWEEN -5 AND 5;
        -> 0
mysql> SET sql_mode = 'broken_not';
```

```
mysql> SELECT NOT 1 BETWEEN -5 AND 5;
        -> 1
```

· IGNORE_SPACE

‘ (’ USER() mysqluserUser

```
SELECT "User" FROM mysql."user";
```

· NO_AUTO_CREATE_USER

GRANT

· NO_AUTO_VALUE_ON_ZERO

NO_AUTO_VALUE_ON_ZEROAUTO_INCREMENT NULL0 NO_AUTO_VALUE_ON_ZERO0NULL

0AUTO_INCREMENT () **mysqldump** MySQL0 NO_AUTO_VALUE_ON_ZERO **mysqldump** NO_AUTO_VALUE_ON_ZERO

· NO_BACKSLASH_ESCAPES

(‘\’)

· NO_DIR_IN_CREATE

INDEX DIRECTORYDATA DIRECTORY

· NO_ENGINE_SUBSTITUTION

· NO_FIELD_OPTIONS

SHOW CREATE TABLEMySQL portability mode**mysqldump**

· NO_KEY_OPTIONS

SHOW CREATE TABLEMySQL portability mode**mysqldump**

· NO_TABLE_OPTIONS

SHOW CREATE TABLEMySQL ENGINE portability mode**mysqldump**

· NO_UNSIGNED_SUBTRACTION

UNSIGNEDUNSIGNED BIGINT100% 12.8“Cast”

· NO_ZERO_DATE

'0000-00-00' IGNORE

· NO_ZERO_IN_DATE

0 IGNORE '0000-00-00'

· ONLY_FULL_GROUP_BY

GROUP BY

· PIPES_AS_CONCAT

|| (CONCAT())OR

· REAL_AS_FLOAT

REALFLOAT DOUBLE

· STRICT_TRANS_TABLES

· STRICT_TRANS_TABLES

MySQL DEFAULT

STRICT_ALL_TABLESSTRICT_TRANS_TABLES

1 2

· STRICT_ALL_TABLESMySQL

· STRICT_TRANS_TABLESMySQL MySQL 13.1.5“CREATE TABLE”

'2004-04-31"“” '2004-04-00"“ ” NO_ZERO_IN_DATENO_ZERO_DATE SQL

(STRICT_TRANS_TABLESSTRICT_ALL_TABLES) MySQL INSERT IGNOREUPDATE IGNORE 13.5.4.22“SHOW WARNINGS”

MySQL

· ANSI

REAL_AS_FLOATPIPES_AS_CONCATANSI_QUOTESIGNORE_SPACE 1.8.3“ANSIMySQL”

· DB2

PIPES_AS_CONCATANSI_QUOTESIGNORE_SPACENO_KEY_OPTIONSN

· MAXDB

PIPES_AS_CONCATANSI_QUOTESIGNORE_SPACENO_KEY_OPTIONSN NO_AUTO_CREATE_USER

· MSSQL

PIPES_AS_CONCATANSI_QUOTESIGNORE_SPACENO_KEY_OPTIONSN NO_FIELD_OPTIONS

· MYSQL323

NO_FIELD_OPTIONSHIGH_NOT_PRECEDENCE

· MYSQL40

NO_FIELD_OPTIONSHIGH_NOT_PRECEDENCE

· ORACLE

PIPES_AS_CONCATANSI_QUOTESIGNORE_SPACENO_KEY_OPTIONSN

· POSTGRESQL

PIPES_AS_CONCATANSI_QUOTESIGNORE_SPACENO_KEY_OPTIONSN

· TRADITIONAL

STRICT_TRANS_TABLESSTRICT_ALL_TABLES
NO_ZERO_IN_DATENO_ZERO_DATE
ERROR_FOR_DIVISION_BY_ZERONO_AUTO_CREATE_USER

5.3.3.

5.3.3.1.

mysqld

SET GLOBAL *var_name* SUPER

SET SESSION *var_name*

KMG gigabytes 16 megabytes

```
mysqld --key_buffer_size=16M
```

16M16m

SET

```
mysql> SET sort_buffer_size = 10 * 1024 * 1024;
```

GLOBALSESSION

```
mysql> SET GLOBAL sort_buffer_size = 10 * 1024 * 1024;
mysql> SET SESSION sort_buffer_size = 10 * 1024 * 1024;
```

5.3.3.1“”

SET --maximum-*var_name* query_cache_size32MB--maximum-query_cache_size=32M

SHOW VARIABLES 9.4“”

```
mysql> SHOW VARIABLES;
+---------------------------------+---------------------------------
| Variable_name                   | Value
+---------------------------------+---------------------------------
| auto_increment_increment        | 1
| auto_increment_offset           | 1
| automatic_sp_privileges         | ON
| back_log                        | 50
| basedir                         | /home/jon/bin/mysql/
| binlog_cache_size               | 32768
| bulk_insert_buffer_size         | 8388608
| character_set_client            | latin1
| character_set_connection        | latin1
| character_set_database          | latin1
| character_set_results           | latin1
| character_set_server            | latin1
| character_set_system            | utf8
| character_sets_dir              | /home/jon/bin/mysql/share/mysql/
| collation_connection            | latin1_swedish_ci
| collation_database              | latin1_swedish_ci
| collation_server                | latin1_swedish_ci
| completion_type                 | 0
| concurrent_insert               | 1
| connect_timeout                 | 5
| datadir                         | /home/jon/bin/mysql/var/
```

date_format	%Y-%m-%d
datetime_format	%Y-%m-%d %H:%i:%s
default_week_format	0
delay_key_write	ON
delayed_insert_limit	100
delayed_insert_timeout	300
delayed_queue_size	1000
div_precision_increment	4
engine_condition_pushdown	OFF
expire_logs_days	0
flush	OFF
flush_time	0
ft_boolean_syntax	+ -><()~*:""&|
ft_max_word_len	84
ft_min_word_len	4
ft_query_expansion_limit	20
ft_stopword_file	(built-in)
group_concat_max_len	1024
have_archive	YES
have_bdb	NO
have_blackhole_engine	YES
have_compress	YES
have_crypt	YES
have_csv	YES
have_example_engine	NO
have_federated_engine	NO
have_geometry	YES
have_innodb	YES
have_isam	NO
have_ndbcluster	DISABLED
have_openssl	NO
have_partition_engine	YES
have_query_cache	YES
have_raid	NO
have_rtree_keys	YES
have_symlink	YES
init_connect	
init_file	
init_slave	
innodb_additional_mem_pool_size	1048576
innodb_autoextend_increment	8
innodb_buffer_pool_awe_mem_mb	0
innodb_buffer_pool_size	8388608
innodb_checksums	ON
innodb_commit_concurrency	0
innodb_concurrency_tickets	500
innodb_data_file_path	ibdata1:10M:autoextend
innodb_data_home_dir	
innodb_doublewrite	ON
innodb_fast_shutdown	1

innodb_file_io_threads	4
innodb_file_per_table	OFF
innodb_flush_log_at_trx_commit	1
innodb_flush_method	
innodb_force_recovery	0
innodb_lock_wait_timeout	50
innodb_locks_unsafe_for_binlog	OFF
innodb_log_arch_dir	
innodb_log_archive	OFF
innodb_log_buffer_size	1048576
innodb_log_file_size	5242880
innodb_log_files_in_group	2
innodb_log_group_home_dir	./
innodb_max_dirty_pages_pct	90
innodb_max_purge_lag	0
innodb_mirrored_log_groups	1
innodb_open_files	300
innodb_support_xa	ON
innodb_sync_spin_loops	20
innodb_table_locks	ON
innodb_thread_concurrency	20
innodb_thread_sleep_delay	10000
interactive_timeout	28800
join_buffer_size	131072
key_buffer_size	8388600
key_cache_age_threshold	300
key_cache_block_size	1024
key_cache_division_limit	100
language	/home/jon/bin/mysql/share/mysql/
large_files_support	ON
large_page_size	0
large_pages	OFF
license	GPL
local_infile	ON
locked_in_memory	OFF
log	ON
log_bin	ON
log_bin_trust_routine_creators	OFF
log_error	/home/jon/bin/mysql/var/master1.
log_slave_updates	OFF
log_slow_queries	OFF
log_warnings	1
long_query_time	10
low_priority_updates	OFF
lower_case_file_system	OFF
lower_case_table_names	0
max_allowed_packet	1048576
max_binlog_cache_size	4294967295
max_binlog_size	1073741824
max_connect_errors	10

| max_connections | 100
| max_delayed_threads | 20
| max_error_count | 64
| max_heap_table_size | 16777216
| max_insert_delayed_threads | 20
| max_join_size | 4294967295
| max_length_for_sort_data | 1024
| max_relay_log_size | 0
| max_seeks_for_key | 4294967295
| max_sort_length | 1024
| max_tmp_tables | 32
| max_user_connections | 0
| max_write_lock_count | 4294967295
| multi_range_count | 256
| myisam_data_pointer_size | 6
| myisam_max_sort_file_size | 2147483647
| myisam_recover_options | OFF
| myisam_repair_threads | 1
| myisam_sort_buffer_size | 8388608
| ndb_autoincrement_prefetch_sz | 32
| ndb_cache_check_time | 0
| ndb_force_send | ON
| ndb_index_stat_cache_entries | 32
| ndb_index_stat_enable | ON
| ndb_index_stat_update_freq | 20
| ndb_use_exact_count | ON
| ndb_use_transactions | ON
| net_buffer_length | 16384
| net_read_timeout | 30
| net_retry_count | 10
| net_write_timeout | 60
| new | OFF
| old_alter_table | OFF
| old_passwords | OFF
| open_files_limit | 1024
| optimizer_prune_level | 1
| optimizer_search_depth | 62
| pid_file | /home/jon/bin/mysql/var/hostname
| port | 3306
| preload_buffer_size | 32768
| protocol_version | 10
| query_alloc_block_size | 8192
| query_cache_limit | 1048576
| query_cache_min_res_unit | 4096
| query_cache_size | 0
| query_cache_type | ON
| query_cache_wlock_invalidate | OFF
| query_prealloc_size | 8192
| range_alloc_block_size | 2048
| read_buffer_size | 131072

```
| read_only                       | OFF
| read_rnd_buffer_size            | 262144
| relay_log_purge                 | ON
| relay_log_space_limit           | 0
| rpl_recovery_rank               | 0
| secure_auth                     | OFF
| server_id                       | 1
| skip_external_locking           | ON
| skip_networking                 | OFF
| skip_show_database              | OFF
| slave_compressed_protocol       | OFF
| slave_load_tmpdir               | /tmp/
| slave_net_timeout               | 3600
| slave_skip_errors               | OFF
| slave_transaction_retries       | 10
| slow_launch_time                | 2
| socket                          | /tmp/mysql.sock
| sort_buffer_size                | 2097144
| sql_mode                        |
| sql_notes                       | ON
| sql_warnings                    | ON
| storage_engine                  | MyISAM
| sync_binlog                     | 0
| sync_frm                        | ON
| sync_replication                | 0
| sync_replication_slave_id       | 0
| sync_replication_timeout        | 10
| system_time_zone                | EST
| table_cache                     | 64
| table_lock_wait_timeout         | 50
| table_type                      | MyISAM
| thread_cache_size               | 0
| thread_stack                    | 196608
| time_format                     | %H:%i:%s
| time_zone                       | SYSTEM
| timed_mutexes                   | OFF
| tmp_table_size                  | 33554432
| tmpdir                          |
| transaction_alloc_block_size    | 8192
| transaction_prealloc_size       | 4096
| tx_isolation                    | REPEATABLE-READ
| updatable_views_with_limit      | YES
| version                         | 5.1.2-alpha-log
| version_comment                 | Source distribution
| version_compile_machine         | i686
| version_compile_os              | suse-linux
| wait_timeout                    | 28800
+---------------------------------+---------------------------------
218 rows in set (0.03 sec)
```

MySQL 5.1 *MySQL 5.0MySQL 4.1*InnoI

7.5.2“”

· auto_increment_increment

auto_increment_incrementauto_increment_offsetmaster-to-master AUTO_INCREMENT 165,535 0165,5350 65,535 auto_increment_incrementauto_increment_offset

AUTO_INCREMENT

o auto_increment_increment :

```
o                       mysql> SHOW VARIABLES LIKE 'auto_inc%';
o                       +--------------------------+-------+
o                       | Variable_name            | Value |
o                       +--------------------------+-------+
o                       | auto_increment_increment | 1     |
o                       | auto_increment_offset    | 1     |
o                       +--------------------------+-------+
o                       2 rows in set (0.00 sec)
o
o                       mysql> CREATE TABLE autoinc1 (col INT NOT NU
o                       Query OK, 0 rows affected (0.04 sec)
o
o                       mysql> SET @auto_increment_increment=10;
o                       Query OK, 0 rows affected (0.00 sec)
o
o                       mysql> SHOW VARIABLES LIKE 'auto_inc%';
```

```
o                       +--------------------------+-------+
o                       | Variable_name            | Value |
o                       +--------------------------+-------+
o                       | auto_increment_increment | 10    |
o                       | auto_increment_offset    | 1     |
o                       +--------------------------+-------+
o                       2 rows in set (0.01 sec)
o
o                       mysql> INSERT INTO autoinc1 VALUES (NULL), (
o                       Query OK, 4 rows affected (0.00 sec)
o                       Records: 4  Duplicates: 0  Warnings: 0
o
o                       mysql> SELECT col FROM autoinc1;
o                       +-----+
o                       | col |
o                       +-----+
o                       |   1 |
o                       |  11 |
o                       |  21 |
o                       |  31 |
o                       +-----+
o                       4 rows in set (0.00 sec)
```

(SHOW VARIABLES

- auto_increment_offsetAUTO_INCREMENT

```
o                       mysql> SET @auto_increment_offset=5;
o                       Query OK, 0 rows affected (0.00 sec)
```

```
o
o                       mysql> SHOW VARIABLES LIKE 'auto_inc%';
o                       +--------------------------+-------+
o                       | Variable_name            | Value |
o                       +--------------------------+-------+
o                       | auto_increment_increment | 10    |
o                       | auto_increment_offset    | 5     |
o                       +--------------------------+-------+
o                       2 rows in set (0.00 sec)
o
o                       mysql> CREATE TABLE autoinc2 (col INT NOT NU
o                       Query OK, 0 rows affected (0.06 sec)
o
o                       mysql> INSERT INTO autoinc2 VALUES (NULL), (
o                       Query OK, 4 rows affected (0.00 sec)
o                       Records: 4  Duplicates: 0  Warnings: 0
o
o                       mysql> SELECT col FROM autoinc2;
o                       +-----+
o                       | col |
o                       +-----+
o                       |   5 |
o                       |  15 |
o                       |  25 |
o                       |  35 |
o                       +-----+
```

```
o                        4 rows in set (0.02 sec)
```

o

auto_increment_offsetauto_increment_increment auto_increment_offset

AUTO_INCREMENT AUTO_INCREMENT AUTO_INCREMENT

auto_increment_offset+ *N* * auto_increment_increment

N[1,2,3,...]

```
mysql> SHOW VARIABLES LIKE 'auto_inc%';
+--------------------------+-------+
| Variable_name            | Value |
+--------------------------+-------+
| auto_increment_increment | 10    |
| auto_increment_offset    | 5     |
+--------------------------+-------+
2 rows in set (0.00 sec)

mysql> SELECT col FROM autoinc1;
+-----+
| col |
+-----+
|   1 |
|  11 |
|  21 |
|  31 |
+-----+
4 rows in set (0.00 sec)
```

```
mysql> INSERT INTO autoinc1 VALUES (NULL), (NULL), (NULL), (NULL);
Query OK, 4 rows affected (0.00 sec)
Records: 4  Duplicates: 0  Warnings: 0

mysql> SELECT col FROM autoinc1;
+-----+
| col |
+-----+
|   1 |
|  11 |
|  21 |
|  31 |
|  35 |
|  45 |
|  55 |
|  65 |
+-----+
8 rows in set (0.00 sec)
```

auto_increment_incrementauto_increment_offset5 + *N* * 10,
[5,15,25,35,45,...]INSERTcol 31,AUTO_INCREMENT35,col SELECT

AUTO_INCREMENT

auto_increment_increment 16.12“Auto-Increment”

· auto_increment_offset

1auto_increment_increment

· back_log

MySQL MySQL () back_logMySQL

“” TCP/IP Unix listen() OS back_log

· basedir

MySQL --basedir

· bdb_cache_size

BDB BDB --skip-bdb**mysqld**

· bdb_home

BDB datadir

· bdb_log_buffer_size

BDB BDB 0--skip-bdb**mysqld**

· bdb_logdir

BDB --bdb-logdir

· bdb_max_lock

BDB(10,000)**mysqld**

```
bdb: Lock table is out of available locks
Got error 12 from ...
```

· bdb_shared_data

--bdb-shared-dataON

· bdb_tmpdir

--bdb-tmpdir

· binlog_cache_size

SQL (--log-bin) Binlog_cache_useBinlog_cache_disk_use 5.11.3“”

· bulk_insert_buffer_size

MyISAM INSERT ... SELECTINSERT ... VALUES (...)(...) ...LOAD DATA INFILE 0 8MB

· character_set_client

· character_set_connection

· character_set_database

· character_set_results

· character_set_ server

· character_set_system

utf8

· character_sets_dir

· collation_connection

· collation_database

· collation_server

· completion_type

o 0()COMMITROLLBACK

o 1COMMITROLLBACKCOMMIT AND CHAINROLLBACK AND CHAIN(

o 2COMMITROLLBACKCOMMRELEASEROLLBACK RELEASE(

· concurrent_insert

ON()MySQLINSERTSELECTMyISAM --safe--skip-new**mysqld**

3

0	
1	()MyISAM

2	MyISAM MySQL

· connect_timeout

mysqldBad handshake

· datadir

MySQL --datadir

· date_format

· datetime_format

· default_week_format

WEEK()

· delay_key_write

MyISAM CREATE TABLEDELAY_KEY_WRITE

OFF	DELAY_KEY_WRITE
ON	MySQLCREATE TABLEDELAY_KEY_WRITE
ALL	DELAY_KEY_WRITE

DELAY_KEY_WRITE --myisam-recover MyISAM(--myisam-recover=BACKUP,FORCE)5.3.1“ **mysqld**” 15.1.1“MyISAM ”

--external-locking

· delayed_insert_limit

delayed_insert_limit INSERT DELAYED SELECT

· delayed_insert_timeout

INSERT DELAYEDINSERT

· delayed_queue_size

INSERT DELAYED INSERT DELAYED

· div_precision_increment

/ 4030

```
mysql> SELECT 1/7;
+--------+
| 1/7    |
+--------+
| 0.1429 |
+--------+
mysql> SET div_precision_increment = 12;
mysql> SELECT 1/7;
+----------------+
| 1/7            |
+----------------+
| 0.142857142857 |
```

+----------------+

· engine_condition_pushdown

NDB0(OFF)SELECT * FROM t WHERE mycol = 42mycol NDB
WHEREMySQL engine_condition_pushdown1(ON)“ pushed down” NDB
MySQL

· expire_logs_days

0,“ ”

· flush

--flush**mysqld**ON

· flush_time

flush_time Windows 9xMe

· ft_boolean_syntax

IN BOOLEAN MODE 12.7.1“”

'+ -><()~*:""&|'

o

o 14

o ASCII

o 12

o 1112

o 101314(‘ :’‘ &’‘ |’)

· ft_max_word_len

FULLTEXT

FULLTEXT REPAIR TABLE *tbl_name* QUICK

· ft_min_word_len

FULLTEXT

FULLTEXT REPAIR TABLE *tbl_name* QUICK

· ft_query_expansion_limit

WITH QUERY EXPANSION

· ft_stopword_file

FULLTEXT REPAIR TABLE *tbl_name* QUICK

· group_concat_max_len

GROUP_CONCAT()

· have_archive

mysqldARCHIVEYESNO

· have_bdb

mysqldBDBYES--skip-bdbDISABLED

· have_blackhole_engine

mysqldBLACKHOLEYESNO

· have_compress

zlib COMPRESS()UNCOMPRESS()

· have_crypt

crypt() CRYPT()

· have_csv

mysqldARCHIVEYESNO

· have_example_engine

mysqldEXAMPLEYESNO

have_federated_engine

mysqldFEDERATEDYESNO

· have_geometry

· have_innodb

mysqldInnoDBYES--skip-innodbDISABLED

· have_isam

MySQL 5.1, NOISAM

· have_ndbcluster

mysqldNDB CLUSTERYES--skip-ndbclusterDISABLED

· have_partition_engine

mysqldYESMySQL 5.1.1

· have_openssl

mysqld/SSL()YES

· have_query_cache

mysqldYES

· have_raid

mysqldRAIDYES

· have_rtree_keys

RTREE (MyISAM

· have_symlink

UnixDATA DIRECTORYINDEX DIRECTORY

· init_connect

SQL autocommit autocommit init_connect

```
SET GLOBAL init_connect='SET AUTOCOMMIT=0';
```

```
[mysqld]
init_connect='SET AUTOCOMMIT=0'
```

init_connectSUPER ( ) SUPER SUPERinit_connect

· init_file

--init-file SQL

· init_slave

init_connectSQL init_connect

· innodb_*xxx*

InnoDB15.2.4“InnoDB”

· interactive_timeout

mysql_real_connect()CLIENT_INTERACTIVE wait_timeout

· join_buffer_size

() join_buffer_size

· key_buffer_size

MyISAM key_buffer_size

key_buffer_size4GB RAMRAM

()MySQL25% (50%) MySQL

LOCK TABLES13.4.5“LOCK TABLESUNLOCK TABLES”

SHOW STATUSKey_read_requestsKey_readsKey_write_requestsKey_writes 13.5.4“SHOW”

Key_reads/Key_read_requests0.01 Key_writes/Key_write_requests1 DELAY_KEY_WRITE

key_buffer_sizeKey_blocks_unused key_cache_block_size

```
1 - ((Key_blocks_unused * key_cache_block_size) / key_buffer_size)
```

MyISAM 4GB 7.4.6“MyISAM”

· key_cache_age_threshold

(sub-chain)(sub-chain) 100 3007.4.6“MyISAM”

· key_cache_block_size

10247.4.6“MyISAM”

· key_cache_division_limit

· language

· large_file_support

mysqld

· large_pages

· license

· local_infile

LOCALLOAD DATA INFILE

· locked_in_memory

–memlock**mysqld**

· log

5.11.2“”

· log_bin

5.11.3“”

· log_bin_trust_routine_creators

0 DETERMINISTIC READS SQL DATANO SQL 1,MySQL

20.4“”

· log_error

· log_slave_updates

· log_slow_queries

long_query_time“” 5.11.4“”

· log_warnings

1

· long_query_time

Slow_queries --log-slow-queries CPU 5.11.4“”

· low_priority_updates

1INSERTUPDATEDELETELOCK TABLE WRITESELECTLOCK TABLE READsql_low_priority_updates

· lower_case_file_system

ON OFF

· lower_case_table_names

1, 2 9.2.2“”

InnoDB 1

MySQL(WindowsMac OS X)0 MySQLlower_case_table_names2

· max_allowed_packet

/

net_buffer_length max_allowed_packet ()

BLOB BLOB max_allowed_packet1GB

· max_binlog_cache_size

Multi-statement transaction required more than 'max_binlog_cache_size' bytes of storage

· max_binlog_size

1GB4

max_relay_log_size0, max_binlog_size

· max_connect_errors

FLUSH HOSTS

· max_connections

mysqld 7.4.9“MySQL” A.2.6“”

· max_delayed_threads

INSERT DELAYED INSERT DELAYED DELAYED 0,MySQLDELAYED DELAYED

· max_error_count

SHOW ERRORSSHOW WARNINGS

· max_heap_table_size

MEMORY (HEAP) MEMORYMAX_ROWS MEMORY CREATE TABLETRUNCATE TABLE

· max_insert_delayed_threads

max_delayed_threads

· max_join_size

max_join_size()()max_join_sizeSELECT SELECT WHERE

DEFAULT SQL_BIG_SELECTS0SQL_BIG_SELECTS max_join_size

sql_max_join_size

· max_length_for_sort_data

filesort 7.2.12“MySQLORDER BY ”

· max_relay_log_size

6.3“”

· max_seeks_for_key

MySQL (13.5.4.11“SHOW INDEX”)(100?)MySQL

· max_sort_length

BLOBTEXT max_sort_length

· max_tmp_tables

(

· max_user_connections

MySQL 0“ ”

() MAX_USER_CONNECTIONS

· max_write_lock_count

· myisam_data_pointer_size

MAX_ROWS CREATE TABLEMyISAM 27 6A.2.11“”

· (*DEPRECATED*) myisam_max_extra_sort_file_size

MySQL 5.1 *MySQL 5.0*

· myisam_max_sort_file_size

MyISAM(REPAIR TABLEALTER TABLELOAD DATA INFILE) MySQL

· myisam_recover_options

--myisam-recover

· myisam_repair_threads

1Repair by sortingMyISAM() 1 *alpha*

· myisam_sort_buffer_size

REPAIR TABLECREATE INDEXALTER TABLE MyISAM

· myisam_stats_method

MyISAMNULL nulls_equalnulls_unequalnulls_equalNULL NULL nulls_unequalNULL NULL 1

7.4.7“MyISAM”

· multi_read_range

256 NDBCLUSTER

· named_pipe

(Windows)

· net_buffer_length

· net_read_timeout

net_read_timeout net_write_timeout slave_net_timeout

· net_retry_count

FreeBSD

· net_write_timeout

net_read_timeout

· new

MySQL 4.04.1 MySQL 5.1,OFF.

· old_passwords

MySQLpre-4.1-style A.2.3“”

· one_shot

13.5.3“SET”

· one_shot

13.5.3“SET”

· open_files_limit

mysqld **mysqld** MySQL 0

· optimizer_prune_level

0 1

· optimizer_search_depth

· pid_file

ID (PID) --pid-file

· plugin_dir

MySQL 5.1.2

· port

TCP/IP --port

· preload_buffer_size

· protocol_version

MySQL/

· query_alloc_block_size

· query_cache_limit

1048576(1MB)

· query_cache_min_res_unit

() 4096(4KB)5.13.3“”

· query_cache_size

0 query_cache_type0 5.13.3“”

· query_cache_type

GLOBAL SESSION

0OFF	query_cache_size0

1ON	SELECT SQL_NO_CACHE
2DEMAND	SELECT SQL_NO_CACHE

ON

· query_cache_wlock_invalidate

MyISAMWRITE 1WRITE

· query_prealloc_size

· range_alloc_block_size

· read_buffer_size

() 131072

· read_only

ON SUPER

· relay_log_purge

1()

· read_rnd_buffer_size

· secure_auth

--secure-authMySQL (4.1) ONOFF

()

pre-4.1 A.2.3“”

· server_id

--server-id

· shared_memory

(Windows)

· shared_memory_base_name

(Windows) MySQL

· skip_external_locking

mysqld OFF

· skip_networking

(TCP/IP) ONUnix Unix Windows NetWare TCP/IP ON

· skip_show_database

SHOW DATABASESSHOW DATABASES SHOW DATABASES ONSHOW DATABASESSHOW DATABASES DATABASESSHOW DATABASES

· slave_compressed_protocol

/

· slave_load_tmpdir

LOAD DATA INFILE

· slave_net_timeout

/

· slave_skip_errors

()

· slave_transaction_retries

ofInnoDBInnoDBinnodb_lock_wait_timeoutNDBCLUSTER
TransactionDeadlockDetectionTimeoutTransactionInactiveTimeoutSQL
slave_transaction_retries 10

· slow_launch_time

Slow_launch_threads

· socket

Unix /var/lib/mysql/mysql.sock

Windows mysql

· sort_buffer_size

ORDER BYGROUP BY A.4.4“MySQL”

· sql_mode

SQL 5.3.2“SQL”

· sql_slave_skip_counter

· storage_engine

table_typeis MySQL 5.1,storage_engine

· sync_binlog

sync_binlog'th MySQL(fdatasync())autocommit

/ ( )

· sync_frm

1,.frm(fdatasync()) 1

· system_time_zone

· table_cache

mysqld Opened_tables 5.3.4“” Opened_tables FLUSH TABLES()table_cache

7.4.9“MySQL”

· table_type

() --default-table-type 5.3.1“ **mysqld**”

· thread_cache_size

thread_cache_size ( )Connections Threads_created(5.3.4“”)

· thread_concurrency

Solaris **mysqld**thr_setconcurrency()

· thread_stack

crash-me 7.1.

· time_format

· time_zone

'SYSTEM'(system_time_zone)--default-time-zone

· tmp_table_size

MySQLMyISAM GROUP BY tmp_table_size

· tmpdir

round-robin Unix(‘:’) WindowsNetWareOS/2(‘’)

MySQL tmpdir LOAD DATA INFILE MySQL 4.0.0 slave_load_tmpdir tmpdirtmpdir

· transaction_alloc_block_size

()

· transaction_prealloc_size

transaction_alloc_blocks malloc()

· tx_isolation

REPEATABLE-READ

· updatable_views_with_limit

LIMIT (GUI)UPDATEDELETE PRIMARY KEYUNIQUE NULL

o 1YES()

o 0NO

· version

· version_bdb

BDB

· version_comment

configure--with-comment MySQL

· version_compile_machine

MySQL

· version_compile_os

MySQL

· wait_timeout

wait_timeoutinteractive_timeoutwait_timeout (mysql_real_connect() CLIENT_INTERACTIVE)interactive_timeout

5.3.3.1.

SET GLOBALSET SESSION SELECT 9.4“”

1GLOBALSESSION()

autocommit	boolean	SESSION
big_tables	boolean	SESSION
binlog_cache_size	numeric	GLOBAL
bulk_insert_buffer_size	numeric	GLOBAL | SESSION

character_set_client	string	GLOBAL | SESSION
character_set_connection	string	GLOBAL | SESSION
character_set_results	string	GLOBAL | SESSION
character_set_server	string	GLOBAL | SESSION
collation_connection	string	GLOBAL | SESSION
collation_server	string	GLOBAL | SESSION
completion_type	numeric	GLOBAL | SESSION
concurrent_insert	boolean	GLOBAL
connect_timeout	numeric	GLOBAL
convert_character_set	string	GLOBAL | SESSION
default_week_format	numeric	GLOBAL | SESSION
delay_key_write	OFF | ON | ALL	GLOBAL
delayed_insert_limit	numeric	GLOBAL

delayed_insert_timeout	numeric	GLOBAL
delayed_queue_size	numeric	GLOBAL
div_precision_increment	numeric	GLOBAL | SESSION
engine_condition_pushdown	boolean	GLOBAL | SESSION
error_count	numeric	SESSION
expire_logs_days	numeric	GLOBAL
flush	boolean	GLOBAL
flush_time	numeric	GLOBAL
foreign_key_checks	boolean	SESSION
ft_boolean_syntax	numeric	GLOBAL
group_concat_max_len	numeric	GLOBAL | SESSION
identity	numeric	SESSION
innodb_autoextend_increment	numeric	GLOBAL

innodb_concurrency_tickets	numeric	GLOBAL
innodb_max_dirty_pages_pct	numeric	GLOBAL
innodb_max_purge_lag	numeric	GLOBAL
innodb_support_xa	boolean	GLOBAL | SESSION
innodb_sync_spin_loops	numeric	GLOBAL
innodb_table_locks	boolean	GLOBAL | SESSION
innodb_thread_concurrency	numeric GLOBAL	
innodb_thread_sleep_delay	numeric GLOBAL	
insert_id	boolean	SESSION
interactive_timeout	numeric	GLOBAL | SESSION
join_buffer_size	numeric	GLOBAL | SESSION
key_buffer_size	numeric	GLOBAL
last_insert_id	numeric	SESSION

local_infile	boolean	GLOBAL
log_warnings	numeric	GLOBAL
long_query_time	numeric	GLOBAL | SESSION
low_priority_updates	boolean	GLOBAL | SESSION
max_allowed_packet	numeric	GLOBAL | SESSION
max_binlog_cache_size	numeric	GLOBAL
max_binlog_size	numeric	GLOBAL
max_connect_errors	numeric	GLOBAL
max_connections	numeric	GLOBAL
max_delayed_threads	numeric	GLOBAL
max_error_count	numeric	GLOBAL | SESSION
max_heap_table_size	numeric	GLOBAL | SESSION
max_insert_delayed_threads	numeric	GLOBAL

max_join_size	numeric	GLOBAL | SESSION
max_relay_log_size	numeric	GLOBAL
max_seeks_for_key	numeric	GLOBAL | SESSION
max_sort_length	numeric	GLOBAL | SESSION
max_tmp_tables	numeric	GLOBAL | SESSION
max_user_connections	numeric	GLOBAL
max_write_lock_count	numeric	GLOBAL
myisam_stats_method	enum	GLOBAL | SESSION
multi_read_range	numeric	GLOBAL | SESSION
myisam_data_pointer_size	numeric	GLOBAL
log_bin_trust_routine_creators	boolean	GLOBAL
myisam_max_sort_file_size	numeric	GLOBAL | SESSION
myisam_repair_threads	numeric	GLOBAL | SESSION

myisam_sort_buffer_size	numeric	GLOBAL | SESSION
net_buffer_length	numeric	GLOBAL | SESSION
net_read_timeout	numeric	GLOBAL | SESSION
net_retry_count	numeric	GLOBAL | SESSION
net_write_timeout	numeric	GLOBAL | SESSION
old_passwords	numeric	GLOBAL | SESSION
optimizer_prune_level	numeric	GLOBAL | SESSION
optimizer_search_depth	numeric	GLOBAL | SESSION
preload_buffer_size	numeric	GLOBAL | SESSION
query_alloc_block_size	numeric	GLOBAL | SESSION
query_cache_limit	numeric	GLOBAL
query_cache_size	numeric	GLOBAL
query_cache_type	enumeration	GLOBAL | SESSION

query_cache_wlock_invalidate	boolean	GLOBAL | SESSION
query_prealloc_size	numeric	GLOBAL | SESSION
range_alloc_block_size	numeric	GLOBAL | SESSION
read_buffer_size	numeric	GLOBAL | SESSION
read_only	numeric	GLOBAL
read_rnd_buffer_size	numeric	GLOBAL | SESSION
rpl_recovery_rank	numeric	GLOBAL
safe_show_database	boolean	GLOBAL
secure_auth	boolean	GLOBAL
server_id	numeric	GLOBAL
slave_compressed_protocol	boolean	GLOBAL
slave_net_timeout	numeric	GLOBAL
slave_transaction_retries	numeric	GLOBAL

slow_launch_time	numeric	GLOBAL
sort_buffer_size	numeric	GLOBAL | SESSION
sql_auto_is_null	boolean	SESSION
sql_big_selects	boolean	SESSION
sql_big_tables	boolean	SESSION
sql_buffer_result	boolean	SESSION
sql_log_bin	boolean	SESSION
sql_log_off	boolean	SESSION
sql_log_update	boolean	SESSION
sql_low_priority_updates	boolean	GLOBAL | SESSION
sql_max_join_size	numeric	GLOBAL | SESSION
sql_mode	enumeration	GLOBAL | SESSION
sql_notes	boolean	SESSION

sql_quote_show_create	boolean	SESSION
sql_safe_updates	boolean	SESSION
sql_select_limit	numeric	SESSION
sql_slave_skip_counter	numeric	GLOBAL
updatable_views_with_limit	enumeration	GLOBAL | SESSION
sql_warnings	boolean	SESSION
sync_binlog	numeric	GLOBAL
sync_frm	boolean	GLOBAL
storage_engine	enumeration	GLOBAL | SESSION
table_cache	numeric	GLOBAL
table_type	enumeration	GLOBAL | SESSION
thread_cache_size	numeric	GLOBAL
time_zone	string	GLOBAL | SESSION

timestamp	boolean	SESSION
tmp_table_size	enumeration	GLOBAL | SESSION
transaction_alloc_block_size	numeric	GLOBAL | SESSION
transaction_prealloc_size	numeric	GLOBAL | SESSION
tx_isolation	enumeration	GLOBAL | SESSION
unique_checks	boolean	SESSION
wait_timeout	numeric	GLOBAL | SESSION
warning_count	numeric	SESSION

string numeric boolean01ONOFF**enumeration** 10ENUM
11

5.3.4.

SHOW STATUS

```
mysql> SHOW STATUS;
+-----------------------------------+------------+
| Variable_name                     | Value      |
+-----------------------------------+------------+
| Aborted_clients                   | 0          |
| Aborted_connects                  | 0          |
```

```
| Bytes_received                    | 155372598  |
| Bytes_sent                        | 1176560426 |

…

| Connections                       | 30023      |
| Created_tmp_disk_tables           | 0          |
| Created_tmp_files                 | 3          |
| Created_tmp_tables                | 2          |

…

| Threads_created                   | 217        |
| Threads_running                   | 88         |
| Uptime                            | 1389872    |
+-----------------------------------+------------+
```

FLUSH STATUS0

MySQL 5.1 *MySQL 5.0*

· Aborted_clients

A.2.10“”

· Aborted_connects

MySQL A.2.10“”

· Binlog_cache_disk_use

binlog_cache_size

· Binlog_cache_use

· Bytes_received

· Bytes_sent

· Com_*xxx*

Com_*xxx xxx* Com_deleteCom_insertDELETE INSERT

Com_stmt_*xxx*

o Com_stmt_prepare

o Com_stmt_execute

o Com_stmt_fetch

o Com_stmt_send_long_data

o Com_stmt_reset

o Com_stmt_close

COM_*xxx* API**mysql_stmt_prepare()mysql_stmt_()** SQL Com_stmt_prepare, Com_stmt_executeCom_stmt_close PREPAREEXECUTEDEALLOCATE PREPARE (MySQL 4.1.3) Com_prepare_sqlCom_execute_sqlCom_dealloc_sqlPREPAREEXECUTE DEALLOCATE PREPARE Com_stmt_fetchround-trips

Com_stmt_*xxx*

· Connections

()MySQL

· Created_tmp_disk_tables

· Created_tmp_files

mysqld

· Created_tmp_files

Created_tmp_disk_tables tmp_table_size

· Delayed_errors

INSERT DELAYED(duplicate key)

· Delayed_insert_threads

INSERT DELAYED

· Delayed_writes

INSERT DELAYED

· Flush_commands

FLUSH

· Handler_commit

· Handler_discover

MySQLNDB CLUSTER Handler_discover

· Handler_delete

· Handler_read_first

SELECT col1 FROM foocol1

· Handler_read_key

· Handler_read_next

· Handler_read_prev

ORDER BY ... DESC

· Handler_read_rnd

· Handler_read_rnd_next

· Handler_rollback

ROLLBACK

· Handler_update

· Handler_write

· Innodb_buffer_pool_pages_data

()

· Innodb_buffer_pool_pages_dirty

· Innodb_buffer_pool_pages_flushed

· Innodb_buffer_pool_pages_free

· Innodb_buffer_pool_pages_latched

InnoDB

· Innodb_buffer_pool_pages_misc

Innodb_buffer_pool_pages_data

· Innodb_buffer_pool_pages_total

· Innodb_buffer_pool_read_ahead_rnd

InnoDB“ ”read-aheads

· Innodb_buffer_pool_read_ahead_seq

InnoDBread-aheads InnoDB

· Innodb_buffer_pool_read_requests

InnoDB

· Innodb_buffer_pool_reads

InnoDB

· Innodb_buffer_pool_wait_free

InnoDB

· Innodb_buffer_pool_write_requests

InnoDB

· Innodb_data_fsyncs

fsync()

· Innodb_data_pending_fsyncs

fsync()

· Innodb_data_pending_reads

· Innodb_data_pending_writes

· Innodb_data_read

· Innodb_data_reads

· Innodb_data_writes

· Innodb_data_written

· Innodb_dblwr_writes, Innodb_dblwr_pages_written

15.2.14.1“I/O”

· Innodb_log_waits

· Innodb_log_write_requests

· Innodb_log_writes

· Innodb_os_log_fsyncs

fsync()

· Innodb_os_log_pending_fsyncs

fsync()

· Innodb_os_log_pending_writes

· Innodb_os_log_written

· Innodb_page_size

InnoDB(16KB)

· Innodb_pages_created

· Innodb_pages_read

· Innodb_pages_written

- Innodb_row_lock_current_waits
- Innodb_row_lock_time
- Innodb_row_lock_time_avg
- Innodb_row_lock_time_max
- Innodb_row_lock_waits
- Innodb_rows_deleted

InnoDB

- Innodb_rows_inserted

InnoDB

- Innodb_rows_read

InnoDB

- Innodb_rows_updated

InnoDB

- Key_blocks_not_flushed

· Key_blocks_unused

5.3.3“” Key_buffer_size

· Key_blocks_used

· Key_read_requests

· Key_reads

Key_reads Key_buffer_size Key_reads/Key_read_requests

· Key_write_requests

· Key_writes

· Last_query_cost

· Max_used_connections

· Not_flushed_delayed_rows

INSERT DELAY

· Open_files

· Open_streams

()

· Open_tables

· Opened_tables

Opened_tables table_cache

· QCACHE_free_blocks

· QCACHE_free_memory

· QCACHE_hits

· QCACHE_inserts

· QCACHE_lowmem_prunes

· QCACHE_not_cached

(query_cache_type)

· Qcache_queries_in_cache

· Qcache_total_blocks

· Questions

· Rpl_status

()

· Select_full_join

0,

· Select_full_range_join

· Select_range

· Select_range_check

0

· Select_scan

· Slave_open_temp_tables

SQL

· Slave_running

ON

· Slave_retried_transactions

SQL

· Slow_launch_threads

slow_launch_time

· Slow_queries

long_query_time 5.11.4“”

· Sort_merge_passes

sort_buffer_size

· Sort_range

· Sort_rows

· Sort_scan

· Ssl_*xxx*

SSL

· Table_locks_immediate

· Table_locks_waited

· Threads_cached

· Threads_connected

· Threads_created

Threads_created thread_cache_size Threads_created/Connections

· Threads_running

· Uptime

5.4. mysql_fix_privilege_tablesMySQL

MySQLmysql MySQL mysql

UnixUnix **mysql_fix_privilege_tables**

```
shell> mysql_fix_privilege_tables
```

root root

```
shell> mysql_fix_privilege_tables--password=root_password
```

mysql_fix_privilege_tables Duplicate column name

Windows MySQLmysql_fix_privilege_tables.sql SQL **mysql** MySQLC:\Program Files\MySQL\MySQL Server 5.1

```
C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysql -u root -p my
mysql> SOURCE C:/Program Files/MySQL/MySQL Server 5.1/scripts/mysql_
```

mysqlroot

Unix **mysql**mysql_fix_privilege_tables.sql script Duplicate column name

5.5. MySQL

1.

    1.

    2.

    3.

    4.

    5.

    6.

    1.

        SHUTDOWN**mysqladmin shutdown** **mysqladmin**MySQL
        Unix SIGTERM Windows

    2.

    ```
    Error: Can't create thread to kill server
    ```

    3.

    4.

    “”
    REPAIR TABLEOPTIMIZE TABLE

UPI

I/OSQL SQL() SQL

5.

MyISAM InnoDB innodb_fast_shutdown2 LSN

6.

5.6.

5.6.1.
5.6.2. MySQL
5.6.3. Mysqld
5.6.4. LOAD DATA LOCAL

MySQL MySQL 5.7“MySQL”

5.6.1.

InternetMySQL

(MySQL)

MySQL(ACL) MySQLSSL- MySQL

MySQL

· **(MySQL root)mysqluser** **MySQL** user

· MySQL GRANTREVOKEMySQL

o mysql -u root MySQLrootMySQL MySQL root 2.9.3 “MySQL”

o SHOW GRANTS REVOKE

· MD5()SHA1()

· “ xfish98”“ duag98”“ fish” QWERTY “ Mhall”“ Mary had a little lamb.”

· 50% MySQL(DMZ)

o Internetnmap MySQL3306 MySQL server_hostMySQL

o
```
shell> telnet server_host 3306
```

Web URL“ ; DROP DATABASE mysql;”

234

FROM table WHERE ID=234 OR 1=1 SELECT * FROM table WHERE ID='234' MySQL

o Web(“’“ "’)MySQL

o URL%22(“"’)%23(“#’)%27(“’)

o URL

o MySQL MySQL

o MySQL

o

.

o MySQL C APImysql_real_escape_string() API

o MySQL++escapequote

o PHPmysql_escape_string()MySQL C API (PHP 4.0.3,addslashes()PHP 5,mysqli MySQL

o Perl DBIquote()

o Java JDBCPreparedStatement

· Internet() SSLSSHMySQLSSL 4.0.0SSH()

· tcpdumpstrings MySQL

· shell> **tcpdump -l -i eth0 -w - src or dst port 3306**

(Linux

5.6.2. MySQL

MySQL MySQL 4.1.1 pre-4.1.1- (5.7.9 “MySQL 4.1”

http://www.ssh.com/SSH

MySQLOpenSSL 5.8.7“”

MySQL

· MySQL / *other_user* mysql -u *other_user db_name* **mysql**

SET PASSWORD mysqluser rootMySQL

```
shell> mysql -u root
mysql> UPDATE mysql.user SET Password=PASSWORD('newpwd')
    -> WHERE User='root';
mysql> FLUSH PRIVILEGES;
```

· UnixrootMySQL FILEroot(~root/.bashrc) **mysqld**root --user=root

()**mysqld**Unixmysql MySQLUnix**mysqld**user/etc/my.cnfmy.cnf[mysqld]

```
[mysqld]
```

```
user=mysql
```

mysqld_safemysql.server A.3.2“MySQL”

Unixrootmysqlduserroot MySQLUnix

· (--skip-symbolic-links root**mysqld** 7.6.1.2“Unix ”

· **mysqld** Unix

· PROCESSSUPER **mysqladmin processlist** UPDATE user SET password=PASSWORD('not_secure')

mysqldSUPER MySQL root

SUPER

· FILE **mysqld** SELECT ... INTO OUTFILE

fileUnix LOAD DATA“/etc/passwd” SELECT

· DNSIP

· **mysqld**max_user_connections GRANT “GRANTREVOKE”

5.6.3. Mysqld

mysqld

· --allow-suspicious-udfs

xxx UDFUDF 27.2.3.6“”

· --local-infile[={0|1}]

--local-infile=0LOCAL in LOAD DATA 5.6.4“LOAD DATA LOCAL ”

· --old-passwords

(pre-4.1) 5.7.9“MySQL 4.1”

· (*OBSOLETE*) --safe-show-database

MySQL SHOW DATABASES MySQL 5.1
13.5.1.3“GRANTREVOKE”

· --safe-user-create

GRANT mysql.userINSERT

```
mysql> GRANT INSERT(user) ON mysql.user TO 'user_name'@'host_name';
```

GRANT

· --secure-auth

(pre-4.1)

· --skip-grant-tables

mysqladmin flush-privilegesmysqladmin reloadFLUSH PRIVILEGES

· --skip-name-resolve

HostIPlocalhost

· --skip-networking

TCP/IP mysqldUnix

· --skip-show-database

SHOW DATABASESSHOW DATABASES SHOW DATABASESSHOW DATABASES

5.6.4. LOAD DATA LOCAL

LOAD DATA LOCAL

LOCALLOAD DATA

· MySQL LOAD DATA

· Web Web LOAD DATA LOCALWeb(SQL) MySQLWeb Web

MySQL 3.23.49MySQL 4.0.2(Windows4.0.13)LOAD DATA LOCAL

· MySQL--enable-local-infile MySQL 3.23.48

· MySQL--enable-local-infile**configure**LOAD DATA LOCAL mysql_options (...MYSQL_OPT__INFILE0)25.2.3.48“mysql_options()”

· --local-infile=0**mysqld**LOAD DATA LOCAL

· **mysql** --local-infile[=1]LOAD DATA LOCAL--local-infile=0 **mysqlimport**--local or -L

· LOAD DATA LOCAL Perl[client] local-infile=1 local-infile loose- prefix

·
```
[client]
```
·
```
loose-local-infile=1
```

· LOAD DATA LOCAL INFILE

```
ERROR 1148: The used command is not allowed with this MySQL version
```

5.7. MySQL

5.7.1.
5.7.2.
5.7.3. MySQL
5.7.4. MySQL
5.7.5. , 1
5.7.6. , 2
5.7.7.
5.7.8.
5.7.9. MySQL 4.1

MySQL/

5.7.1.

MySQL SELECTINSERTUPDATEDELETE

MySQLLOAD DATA INFILE

5.7.2.

MySQL **MySQL**

MySQL office.comjoeelsewhere.comjoe **MySQL** joe office.com joeelsewhere.com

MySQL2

- 1
- 2 (select) SELECTDROP

() 5.7.7“”

mysql (mysql)MySQL 5.7.7“”

GRANTREVOKE 13.5

mysqluserdbhost

	user	**db**	**host**
	Host	Host	Host
	User	Db	Db
	Password	User	
	Select_priv	Select_priv	Select_priv
	Insert_priv	Insert_priv	Insert_priv
	Update_priv	Update_priv	Update_priv
	Delete_priv	Delete_priv	Delete_priv
	Index_priv	Index_priv	Index_priv
	Alter_priv	Alter_priv	Alter_priv
	Create_priv	Create_priv	Create_priv
	Drop_priv	Drop_priv	Drop_priv

	Grant_priv	Grant_priv	Grant_priv
	Create_view_priv	Create_view_priv	Create_view_priv
	Show_view_priv	Show_view_priv	Show_view_priv
	Create_routine_priv	Create_routine_priv	
	Alter_routine_priv	Alter_routine_priv	
	References_priv	References_priv	References_priv
	Reload_priv		
	Shutdown_priv		
	Process_priv		
	File_priv		
	Show_db_priv		
	Super_priv		
	Create_tmp_table_priv	Create_tmp_table_priv	Create_tmp_table_priv

	Lock_tables_priv	Lock_tables_priv	Lock_tables_priv
	Execute_priv		
	Repl_slave_priv		
	Repl_client_priv		
	ssl_type		
	ssl_cipher		
	x509_issuer		
	x509_subject		
	max_questions		
	max_updates		
	max_connections		
	max_user_connections		

() userdbhost tables_privcolumns_priv tables_privcolumns_priv

	tables_priv	**columns_priv**
	Host	Host
	Db	Db
	User	User
	Table_name	Table_name
		Column_name
	Table_priv	Column_priv
	Column_priv	
	Timestamp	Timestamp
	Grantor	

TimestampGrantor

procs_priv

	procs_priv

Host
Db
User
Routine_name
Routine_type
Proc_priv
Timestamp
Grantor

Routine_typeENUM 'FUNCTION''PROCEDURE'

TimestampGrantor

l , userHostUser'thomas.loc.gov''bob'thomas.loc.govbob dbHostUserDb'thomas.loc.gov''bob''reports'bobthomas.loc.govre tables_privcolumns_priv / procs_priv

Host UserPasswordDbTable_name Column_na

l

Host	CHAR(60)
User	CHAR(16)
Password	CHAR(16)
Db	CHAR(64)
Table_name	CHAR(64)
Column_name	CHAR(64)
Routine_name	CHAR(64)

Host UserPasswordDbTable_name Column_name

userdbhost ENUM('N','Y') DEFAULT 'N'

tables_privcolumns_privprocs_priv SET

tables_priv	Table_priv	'Select', 'Insert', 'Update', 'Delete', 'Create', 'Drop', 'Grant', 'References', 'Index', 'Alter'

tables_priv	Column_priv	'Select', 'Insert', 'Update', 'References'
columns_priv	Column_priv	'Select', 'Insert', 'Update', 'References'
procs_priv	Proc_priv	'Execute', 'Alter Routine', 'Grant'

· user user() *all*

· db

· db dbhost dbHost host 5.7.6“, 2”

hostGRANTREVOKE MySQL

· tables_privcolumns_privdb

· procs_priv

(RELOADSHUTDOWN)user user

FILEuser

mysqld FLUSH PRIVILEGES**mysqladmin flush-privileges** **mysqladmin reload** 5.7.7“”

mysql> **SHOW GRANTS FOR 'bob'@'pc84.example.com';**

mysqlaccess Carlier Yves **MySQL** --help**mysqlaccess** **mysqlaccess**userdbhost tables_privcolumns_privprocs_priv

5.7.8“ ” 5.6“”

5.7.3. MySQL

mysqluserdbhosttables_privcolumns_privprocs_priv **MySQL**5.7.7“”

GRANTREVOKE 13.5.1.3“GRANTREVOKE”

CREATE	Create_priv	
DROP	Drop_priv	
GRANT OPTION	Grant_priv	
REFERENCES	References_priv	
ALTER	Alter_priv	
DELETE	Delete_priv	
INDEX	Index_priv	
INSERT	Insert_priv	
SELECT	Select_priv	

UPDATE	Update_priv	
CREATE VIEW	Create_view_priv	
SHOW VIEW	Show_view_priv	
ALTER ROUTINE	Alter_routine_priv	
CREATE ROUTINE	Create_routine_priv	
EXECUTE	Execute_priv	
FILE	File_priv	
CREATE TEMPORARY TABLES	Create_tmp_table_priv	
LOCK TABLES	Lock_tables_priv	
CREATE USER	Create_user_priv	
PROCESS	Process_priv	
RELOAD	Reload_priv	
REPLICATION CLIENT	Repl_client_priv	

REPLICATION SLAVE	Repl_slave_priv	
SHOW DATABASES	Show_db_priv	
SHUTDOWN	Shutdown_priv	
SUPER	Super_priv	

CREATE VIEWSHOW VIEWCREATE ROUTINEALTER ROUTINE EXECUTEMySQL MySQL**mysql_fix_privilege_tables** “”

SUPER 20.4“”

CREATEDROP () *mysqlDROP* *MySQL*

SELECTINSERTUPDATEDELETE

SELECTSELECT SELECT **mysql**

```
mysql> SELECT 1+1;
mysql> SELECT PI()*2;
```

INDEX INDEXCREATE CREATE TABLE

ALTER ALTER TABLE

CREATE ROUTINE ALTER ROUTINE EXECUTE

GRANT

FILELOAD DATA INFILESELECT ... INTO OUTFILE FILEMySQL (FILEMySQL

mysqladminSQL **mysqladmin**

RELOAD	flush-hosts, flush-logs, flush-privileges, flush-status, flush-tables, flush-threads, refresh, reload
SHUTDOWN	shutdown
PROCESS	processlist
SUPER	kill

reload flush-privilegesreload refresh flush-*xxx*refresh flush-logsrefresh

shutdown **mysqladmin** SQL

processlist kill PROCESSSUPER 13.5.5.3“KILL”

CREATE TEMPORARY TABLESCREATE TABLETEMPORARY

LOCK TABLESLOCK TABLESSELECT

REPLICATION CLIENTSHOW MASTER STATUSSHOW SLAVE STATUS

REPLICATION SLAVE

SHOW DATABASESSHOW DATABASE --skip-show-database

FILE

- FILEMySQL SELECT
- GRANT GRANT2
- ALTER

- SHUTDOWN
- PROCESS
- SUPER
- mysql userPassword MySQL

MySQL

-
-

5.7.4. MySQL

MySQL MySQL

· MySQL

.

.

MySQL(shell>)

```
shell> MySQL -h host_name -u user_name -pyour_pass
```

-h, -u-p--host=*host_name*--user=*user_name*--password=*your_pass*-p--password=

-p--password **ps auxww** 5.8.6“”

MySQL

- localhost
- WindowsODBCUnixUnix

· -p

, Unixjoe

```
shell> MySQL -h localhost -u joe
shell> MySQL -h localhost
shell> MySQL -u joe
```

```
shell> MySQL
```

MySQL

- [client]

```
[client]
host=host_name
user=user_name
password=your_pass
```

4.3.2“”

- MYSQL_HOST **MySQL**USER(WindowsNetWare)MYSQL_PWD 5.8.6“” F

5.7.5. , 1

MySQL 2

2

-
- **MySQL**

3user(Host, UserPassword) userHostUser

userHost

- HostIP 'localhost'
- Host“%”“_”
- Host'%' Host'%'LIKE '%'Host '%.mysql.com'mysql.com

· IPHost

```
mysql> GRANT ALL PRIVILEGES ON db.*
    -> -> TO david@'192.58.197.0/255.255.255.0';
```

davidIPclient_ip

```
client_ip & netmask = host_ip
```

That is, for the GRANT statement just shown:

```
client_ip & 255.255.255.0 = 192.58.197.0
```

MySQLIP192.58.197.0192.58.197.255

· 8162432

· 192.0.0.0/255.0.0.0(192 A)

· 192.168.0.0/255.255.0.0(192.168 A)

· 192.168.1.0/255.255.255.0(192.168.1 C)

· 192.168.1.1(IP)

(28)

```
192.168.0.1/255.255.255.240
```

· dbHosthost AND()() 5.7.6“, 2” host

grantHost'%'

HostIP('144.155.166.%') 144.155.166.somewhere.com MySQL 1.2.foo.com Host IPIP

User user () (2)

Password

userPassword **MySQL** (PASSWORD( )) (MySQL mysql

MySQL 5.1(MySQL 4.1) TCP/IPmysql 5.7.9“MySQL 4.

userHostUser

Host	User	
'thomas.loc.gov'	'fred'	fred, thomas.loc.gov
'thomas.loc.gov'	''	, thomas.loc.gov
'%'	'fred'	fred,
'%'	''	,
'%.loc.gov'	'fred'	fred, loc.gov
'x.y.%'	'fred'	fred, x.y.netx.y.com,x.y.edu
'144.155.166.177'	'fred'	fred, 144.155.166.177 IP
'144.155.166.%'	'fred'	fred, 144.155.166 C

user fredthomas.loc.gov

l user

l

l

user user

+----------+----------+-

```
| Host      | User     | …
+-----------+----------+-
| %         | root     | …
| %         | jeffrey  | …
| localhost | root     | …
| localhost |          | …
+-----------+----------+-
```

Host IP '%'“” HostUser(User“”)user

```
+-----------+----------+-
| Host      | User     | …
+-----------+----------+-
| localhost | root     | … ...
| localhost |          | … ...
| %         | jeffrey  | … ...
| %         | root     | … ...
+-----------+----------+-
```

jeffreylocalhost HostUser'localhost'" '%"jeffrey' 'localhost'

user

```
+----------------+----------+-
| Host           | User     | …
+----------------+----------+-
| %              | jeffrey  | …
| thomas.loc.gov |          | …
+----------------+----------+-
```

```
+----------------+----------+-
| Host           | User     | …
+----------------+----------+-
| thomas.loc.gov |          | …
| %              | jeffrey  | …
+----------------+----------+-
```

jeffreythomas.loc.gov jeffreywhitehouse.gov

CURRENT_USER() *user_name@host_name* UserHost user jeffrey

```
mysql> SELECT CURRENT_USER();
+----------------+
| CURRENT_USER() |
+----------------+
| @localhost     |
+----------------+
```

userUser jeffrey

user [12.9.3“”]

5.7.6. , 2

2 userdbhosttables_privcolumns_priv [5.7.2“”]

user userDELETE

dbhost

- “%”“_”HostDb LIKE (‘_’)GRANT‘_’
- db'%'Host“” dbHost“ host”
- host'%'Host“”
- '%'Db“”
- User

dbhost(user)dbHostDbUser hostHostDb user

tables_privcolumns_priv

- “%”“_”Host
- '%'Host“”
- DbTable_nameColumn_name

tables_privcolumns_privHostDbUser db Host

(SHUTDOWNRELOAD)user **mysqladmin shutdown** userHUTDOWN dbhost hutdown_priv

(INSERTUPDATE)user() user dbhost

1. dbHostDbUser HostUser**MySQL** Db HostUser
2. dbHost
3. dbHost host hostHostDb host dbhost 'Y'( ) db host

dbhost user tables_privcolumns_priv

```
global privileges
OR (database privileges AND host privileges)
OR table privileges
OR column privileges
```

user INSERT INTO ... SELECT INSERTSELECT userdb

hostGRANTREVOKE MySQL TcXhost

host public.your.domain host

```
+--------------------+----+-
| Host               | Db | ...
+--------------------+----+-
| public.your.domain | %  | ... (all privileges set to 'N')
| %.your.domain      | %  | ... (all privileges set to 'Y')
+--------------------+----+-
```

(SHOW GRANTS**mysqlaccess**)

5.7.7.

mysqld

-
- USE *db_name*

.

GRANTREVOKESET PASSWORD

(INSERTUPDATEDELETE)**mysqladmin flush-privilegesmysqladmin reload**

5.7.8.

MySQL

.

```
shell> mysql
ERROR 2003: Can't connect to MySQL server on 'host_
shell> mysql
ERROR 2002: Can't connect to local MySQL server thr
'/tmp/mysql.sock' (111)
```

TCP/IP Unix Unix

```
shell> netstat -ln | grep mysql
```

- (WindowsLinuxRPM), mysql **mysql_** “Unix”

mysqldatavarMySQL**My**

shell> **mysql -u root test**

-

```
shell> mysql -u root mysql
```

MySQL root **MySQL** root 2.9.3“MySQL”

- MySQL **mysql_fix_privilege_tables** 2.10.2 “”

.

```
shell> mysql
Client does not support authentication protocol req
by server; consider upgrading MySQL client
```

5.7.9“MySQL 4.1” A.2.3“”

- root userUser'root'mysqld
- Access denied for user ''@'unknown' to database mysql

  --skip-grant-tables“/etc/hosts”“\windows\hosts”

- 3.22.11**MySQL**3.22.11 mysql_fix_privilege_tables GRANT **MySQL** 3.22.11

.

--no-defaults

```
shell> mysqladmin --no-defaults -u root version
```

4.3.2“” F

· root

· shell> **mysqladmin -u root -p*xxxx* ver**

· Access denied for user 'root'@'localhost' (using pa

--nc

5.8.5“”

root --skip-grant-tables **mysqld** A.4.1“” .

· SET PASSWORDINSERTUPDATE PASSWORD() PASSWORD()

· mysql> **SET PASSWORD FOR 'abe'@'*host_name*' = 'eagle'**

```
mysql> SET PASSWORD FOR 'abe'@'host_name' = PASSWORD('eagle');
```

GRANTCREATE USER**mysqladmin password** PASSWORD() PASSWORD() 5.8.5“” 13.5.1.1“CREATE USER”

· localhost

--host=127.0.0.1 TCP/IP**mysqld**--hostTCP/IP user

· mysql -u user_name Access denied user mysql -u root mysql SQL

· `mysql> SELECT * FROM user;`

HostUser**MySQL**

- Access denied user using password: NO

· **MySQL** user

· `Host ... is not allowed to connect to this MySQL se`

/ IP '%'Hostuser SELECT USER() user'%'

Linux glibcMySQL glibcMySQL RPM

· IP MySQLIP

· `shell> mysqladmin -u root -pxxxx -h some-hostname v`

· `Access denied for user 'root'@'' (using password: Y`

DNS **mysqladmin flush-hosts** DNS 7.5.6“MySQLDNS”

o DNS

o MySQLIP

o /etc/hosts

o --skip-name-resolve**mysqld**

o --skip-host-cache**mysqld**

o Unix localhostlocalhostUnixUnixTCP/IP

o Windows ()TCP/IP

- mysql -u root testmysql -h your_hostname -u root testAccess denied*your_hostname*user userHost () user'tcx' DNS**MySQL** 'tcx.subnet.se' user IPHost user 'tcx.%'Host “%”

- mysql -u *user_name* testmysql -u *user_name other_db_name other_db_name*
- mysql -u *user_name* mysql -h *host_name* -u *user_name*
- Access denieduserHost(“%”“_”)Host='%'User='*some_user*' localhost Host='localhost'User='' Host'localhost''%' localhost Host='localhost'User='*some_user*'2 Host='localhost'User='' FLUSH PRIVILEGES

· dbhost

· `Access to database denied`

dbHost host db

· MySQL SELECT ... INTO OUTFILELOAD DATA INFILE Access denied userFILE

· (INSERTUPDATEDELETE) FLUSH PRIVILEGES**mysqladmin flush-privileges** UPDATEroot

·

· PerlPythonODBC mysql -u *user_name db_name*mysql -u *user_name* -p*your_pass db_name* **mysql** -p --password=*your_pass* -p MySQL

· --skip-grant-tables**mysqld** **MySQLmysqlaccess mysqladmin flush-privilegesmysqld**

· (--debug=d,general,query)**mysqld** E.1.2“”

· **MySQL** **MySQL**(dump)**mysqldump mysql** **mysqlbug** 1.7.1.3“” --skip-grant-tables**mysqldmysqldump**

5.7.9. MySQL 4.1

5.7.9.1.

MySQLmysqluser MySQL userPassword PASSWORD()

MySQL/

· user

· () user PASSWORD() GRANTSET PASSWORD

PASSWORD()GRANTSET

MySQL 4.1 MySQL 4.1() 4.14.1 4.14.1 3.23 **mysql**5.1

```
shell> mysql -h localhost -u root
Client does not support authentication protocol requested
by server; consider upgrading MySQL client
```

MySQL 4.1 PHP **mysql** (25.3.1“MySQLPHP”

4.1 A.2.3“” MySQL4.04.1PHP

4.14.1 4.14.1.1 MySQL 4.1.0“” 4.1.1 MySQL 5.0 4.1.0

MySQL 4.1,PASSWORD()16

```
mysql> SELECT PASSWORD('mypass');
+-------------------+
| PASSWORD('mypass') |
+-------------------+
| 6f8c114b58f2ce9e   |
```

```
+--------------------+
```

MySQL 4.1 userPassword()16

MySQL 4.1,PASSWORD() 41

```
mysql> SELECT PASSWORD('mypass');
+-------------------------------------------+
| PASSWORD('mypass')                        |
+-------------------------------------------+
| *6C8989366EAF75BB670AD8EA7A7FC1176A95CEF4 |
+-------------------------------------------+
```

userPassword41

· MySQL 5.1, Password41

· MySQL 4.1(4.1.14.1)MySQL 5.1 MySQLMySQL5.1,4.14.15.1 Password

· (1641)

· 2‘ *’

Password

·

·

o 4.1

o 4.1

4.1

· 4.1

· 4.1

· 4.1

Password--old-passwords 4.1 Password--old-passwords

· Password(41) 4.116 PASSWORD()GRANTSET PASSWORD 4.1 **mysql_**

· Password PASSWORD()GRANTSET PASSWORD --old-passwords

--old-passwords 4.1 (4.1)user 4.1 --old-passwords

·

· --old-passwords

· (user 4.1 4.1

4.1 --old-passwords4.1 --old-passwords (

--old-passwords 4.1 (4.1)--old-passwords

4.1 MySQL 5.1

1userPassword

· Password

·

· PASSWORD()GRANTSET PASSWORD

· --old-passwords Password

2Password --old-passwords

· Password

· 4.1(5.1)

· 4.1

· PASSWORD()GRANTSET PASSWORD

4.1 PASSWORD()GRANTSET PASSWORDA 4.14.1

SET PASSWORD

```
mysql> SET PASSWORD FOR 'some_user'@'some_host' = PASSWORD('mypass')
```

OLD_PASSWORD()

```
mysql> SET PASSWORD FOR 'some_user'@'some_host' = OLD_PASSWORD('mypa
```

OLD_PASSWORD()

3Password --old-passwords4.1

· Password

· 4.1(--old-passwords)

· 4.1

· PASSWORD()GRANTSET PASSWORD

--old-passwords --old-passwords --old-passwords

1,

2, OLD_PASSWORD() 4.1

3,--old-passwords --old-passwords

5.7.9.1.

MySQL4.1 PASSWORD() PASSWORD()MySQL PASSWORD()

MySQL 4.14.1 PASSWORD() SHA1()MD5()
OLD_PASSWORD() OLD_PASSWORD()

OLD_PASSWORD()PASSWORD()

MySQL4.04.1PHP

5.8. MySQL

5.8.1. MySQL
5.8.2. MySQL
5.8.3. MySQL
5.8.4.
5.8.5.
5.8.6.
5.8.7.

MySQL

· MySQL

.

.

.

· SSL

5.8.1. MySQL

MySQL MySQL

· MySQLWindowsUnix() Unix MySQLUnixMySQL user MySQL

· MySQL16 MySQL mysql

:*mysql* *MySQL* *MySQL(!)*

MySQL Unix8

· MySQL WindowsUnixMySQL

· MySQL Unix MySQLPASSWORD()SQL Unix ENCRYPT()SQL PASSWORD()ENCRYPT()12.9.2“” 4.1

MySQL TCP/IPmysql (user MySQL

MySQL 2.9.3“MySQL” GRANTREVOKE MySQL 13.5.1.3“GRANTREVOKE”

MySQL

```
shell> mysql --user=monty --password=guess db_name
```

```
shell> mysql -u monty -pguess db_name
```

-p5.7.4“MySQL”

5.8.6“” --password-p

```
shell> mysql --user=monty --password db_name
shell> mysql -u monty -p db_name
```

(*db_name*

MySQL8 MySQL MySQL MySQL8

5.8.2. MySQL

MySQL

· GRANT

· MySQL

GRANT MySQL 3.22.11GRANT13.5.1.3“GRANTREVOKE”

MySQL phpMyAdmin

MySQL 2.9.3“MySQL” INSERTRELOAD

MySQLMySQL root

```
shell> MySQL --user=root MySQL
```

root **MySQL**--password-p

root GRANT

```
mysql> GRANT ALL PRIVILEGES ON *.* TO 'monty'@'localhost'
    ->     IDENTIFIED BY 'some_pass' WITH GRANT OPTION;
mysql> GRANT ALL PRIVILEGES ON *.* TO 'monty'@'%'
    ->     IDENTIFIED BY 'some_pass' WITH GRANT OPTION;
mysql> GRANT RELOAD,PROCESS ON *.* TO 'admin'@'localhost';
mysql> GRANT USAGE ON *.* TO 'dummy'@'localhost';
```

GRANT

· montysome_pass ('monty'@'localhost') ('monty'@'%') montymonty localhost monty **mysql_install_db**localhost monty Host'monty'@'%' user (user5.7.5“, 1”

· admin RELOADPROCESS admin**mysqladmin reloadmysqladmin refreshmysqladmin flush-*xxx* mysqladmin processlist** GRANT

· dummy GRANTUSAGE 'N'

GRANTINSERT FLUSH PRIVILEGES

```
shell> mysql --user=root mysql
mysql> INSERT INTO user
    ->     VALUES('localhost','monty',PASSWORD('some_pass'),
    ->     'Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y');
mysql> INSERT INTO user
    ->     VALUES('%','monty',PASSWORD('some_pass'),
    ->     'Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y','Y');
mysql> INSERT INTO user SET Host='localhost',User='admin',
```

```
    ->     Reload_priv='Y', Process_priv='Y';
mysql> INSERT INTO user (Host,User,Password)
    ->     VALUES('localhost','dummy','');
mysql> FLUSH PRIVILEGES;
```

INSERTFLUSH PRIVILEGES

INSERTPASSWORD() GRANT PASSWORD()

'Y' admin INSERT SET

dummyINSERT userHostUserPassword MySQL 'N'C

'Y'user user

3 customobscure

GRANT

```
shell> MySQL --user=root MySQL
shell> mysql --user=root mysql
mysql> GRANT SELECT,INSERT,UPDATE,DELETE,CREATE,DROP
    ->     ON bankaccount.*
    ->     TO 'custom'@'localhost'
    ->     IDENTIFIED BY 'obscure';
mysql> GRANT SELECT,INSERT,UPDATE,DELETE,CREATE,DROP
    ->     ON expenses.*
    ->     TO 'custom'@'whitehouse.gov'
    ->     IDENTIFIED BY 'obscure';
mysql> GRANT SELECT,INSERT,UPDATE,DELETE,CREATE,DROP
    ->     ON customer.*
    ->     TO 'custom'@'server.domain'
```

```
    ->     IDENTIFIED BY 'obscure';
```

3

· 1bankaccount

· 2expenses whitehouse.gov

· 3customer server.domain

GRANTcustom INSERT

```
shell> mysql --user=root mysql
mysql> INSERT INTO user (Host,User,Password)
    ->     VALUES('localhost','custom',PASSWORD('obscure'));
mysql> INSERT INTO user (Host,User,Password)
    ->     VALUES('whitehouse.gov','custom',PASSWORD('obscure'));
mysql> INSERT INTO user (Host,User,Password)
    ->     VALUES('server.domain','custom',PASSWORD('obscure'));
mysql> INSERT INTO db
    ->     (Host,Db,User,Select_priv,Insert_priv,
    ->     Update_priv,Delete_priv,Create_priv,Drop_priv)
    ->     VALUES('localhost','bankaccount','custom',
    ->     'Y','Y','Y','Y','Y','Y');
mysql> INSERT INTO db
    ->     (Host,Db,User,Select_priv,Insert_priv,
    ->     Update_priv,Delete_priv,Create_priv,Drop_priv)
    ->     VALUES('whitehouse.gov','expenses','custom',
    ->     'Y','Y','Y','Y','Y','Y');
mysql> INSERT INTO db
    ->     (Host,Db,User,Select_priv,Insert_priv,
```

```
    ->     Update_priv,Delete_priv,Create_priv,Drop_priv)
    ->     VALUES('server.domain','customer','custom',
    ->     'Y','Y','Y','Y','Y','Y');
mysql> FLUSH PRIVILEGES;
```

3INSERTuser custom ('N')3INSERTuser custombank customer FLUSH PRIVILEGES

(mydomain.com)‘ %’ GRANT

```
mysql> GRANT ...
    ->     ON *.*
    ->     TO 'myname'@'%.mydomain.com'
    ->     IDENTIFIED BY 'mypass';
```

```
mysql> INSERT INTO user (Host,User,Password,...)
    ->     VALUES('%.mydomain.com','myname',PASSWORD('mypass'),...);
```

mysql> **FLUSH PRIVILEGES;**

5.8.3. MySQL

DROP USER [13.5.1.2“DROP USER”]

5.8.4.

MySQLmax_user_connections MySQL Internet

MySQL 5.1,

.

.

.

user UserHost

mysqluser max_questionsmax_updatesmax_connections max_user_connections user 2.10.2“”

GRANT WITH customer

```
mysql> GRANT ALL ON customer.* TO 'francis'@'localhost'
    ->     IDENTIFIED BY 'frank'
    ->     WITH MAX_QUERIES_PER_HOUR 20
    ->          MAX_UPDATES_PER_HOUR 10
    ->          MAX_CONNECTIONS_PER_HOUR 5
    ->          MAX_USER_CONNECTIONS 2;
```

WITH GRANTWITH ()MAX_USEI MAX_USER_CONNECTIONS

GRANT USAGE(*.*)francis100

```
mysql> GRANT USAGE ON *.* TO 'francis'@'localhost'
    ->     WITH MAX_QUERIES_PER_HOUR 100;
```

francis

```
mysql> GRANT USAGE ON *.* TO 'francis'@'localhost'
    ->     WITH MAX_CONNECTIONS_PER_HOUR 0;
```

50,100

· FLUSH USER_RESOURCES (FLUSH PRIVILEGES **mysqladmin reload**)

· GRANT USAGE

MAX_USER_CONNECTIONS

5.8.5.

- **mysqladmin**

  ```
  shell> mysqladmin -u user_name -h host_name password "newpwd"
  ```

  userUser*user_name*Host

  SET PASSWORD

  ```
  mysql> SET PASSWORD FOR 'jeffrey'@'%' = PASSWORD('biscuit');
  ```

  rootmysql FOR

  ```
  mysql> SET PASSWORD = PASSWORD('biscuit');
  ```

  GRANT USAGE(*.*)

  ```
  mysql> GRANT USAGE ON *.* TO 'jeffrey'@'%' IDENTIFIED BY 'biscui
  ```

  user

  · Password

  · shell> **mysql -u root mysql**

  · mysql> **INSERT INTO user (Host,User,Password)**

```
·                     -> VALUES('%','jeffrey',PASSWORD('biscuit'
·                 mysql> FLUSH PRIVILEGES;
·
```

· UPDATEPassword

```
·                 shell> mysql -u root mysql
·                  mysql> UPDATE user SET Password = PASSWORD('ba
·                        -> WHERE Host = '%' AND User = 'francis'
·                 mysql> FLUSH PRIVILEGES;
```

SET PASSWORDINSERTUPDATE PASSWORD() (PASSWORD())PASSWORD()user

```
shell> mysql -u root mysql
mysql> INSERT INTO user (Host,User,Password)
    -> VALUES('%','jeffrey','biscuit');
mysql> FLUSH PRIVILEGES;
```

'biscuit'user jeffrey user 'biscuit'

```
shell> mysql -u jeffrey -pbiscuit test
Access denied
```

GRANT ... IDENTIFIED BY**mysqladmin password** PASSWORD()

PASSWORD()Unix [5.8.1“MySQL”](#)

5.8.6.

mysql.user

MySQL

· -p*your_pass*--password=*your_pass*

· shell> **mysql -u francis -pfrank *db_name***

(ps) **MySQL**

· -p--password()

· shell> **mysql -u francis -p *db_name***

· Enter password: ********

“*”

· Unix “.my.cnf”[client]

· [client]

· password=your_pass

“.my.cnf” 400600

shell> **chmod 600 .my.cnf**

4.3.2“”

· MYSQL_PWD MySQL ps MYSQL_PWD**ps** ps _ F

5.8.7.

5.8.7.1. SSL
5.8.7.2. (OpenSSL)
5.8.7.3. yaSSL
5.8.7.4. MySQLSSL
5.8.7.5. SSL GRANT
5.8.7.6. SSL
5.8.7.7. SSHWindowsMySQL

MySQLMySQL()(SSL) SSL WindowsSSH

MySQL / CPU MySQL

MySQL SSL

5.8.7.1. SSL

MySQLSSLSSLX509

MySQL --compress/

SSL SSL X509

X509Internet“ ”(CA) ()

SSLX509 Internet

5.8.7.2. (OpenSSL)

MySQLSSL OpenSSLyaSSLMySQL 5.8.7.3“yaSSL”

MySQL

1. OpenSSL OpenSSL 0.9.6MySQLOpenSSLhttp://www.openssl.org
2. MySQL--with-vio--with-openssl**configure**
3. mysql.userSSL MySQL 4.0.0 2.10.2“”
4. **mysqld**OpenSSLhave_openssl

```
mysql> SHOW VARIABLES LIKE 'have_openssl';
+---------------+-------+
| Variable_name | Value |
+---------------+-------+
```

```
9.            | have_openssl  | YES   |
10.       +---------------+-------+
```

YESOpenSSL

5.8.7.3. yaSSL

MySQLyaSSL OpenSSL5.8.7.2“(OpenSSL)” MySQL yaSSL

yaSSL

· Linux/x86-64 Red Hat Enterprise 3.0

· Linux RHAS21 Itanium-2gcc

· Linux Itanium-2gcc

· Windows

MySQLyaSSLMySQL

```
./configure --with-yassl=yes
```

MySQLyaSSLOpenSSL

```
shell> mysqld --ssl-ca=cacert.pem \
       --ssl-cert=server-cert.pem \
       --ssl-key=server-key.pem
```

· --ssl-ca

· --ssl-cert

· --ssl-key

yaSSLMySQL

```
shell> mysql --ssl-ca=cacert.pem \
```

```
--ssl-cert=server-cert.pem \
--ssl-key=server-key.pem
```

mysql_real_connect() mysql_ssl_set()API 25.2.3.64 “mysql_ssl_set()”

5.8.7.4. MySQLSSL

MySQSSL

```
DIR=`pwd`/openssl
PRIV=$DIR/private

mkdir $DIR $PRIV $DIR/newcerts
cp /usr/share/ssl/openssl.cnf $DIR
replace ./demoCA $DIR -- $DIR/openssl.cnf

# Create necessary files: $database, $serial and $new_certs_dir
# directory (optional)

touch $DIR/index.txt
echo "01" > $DIR/serial

#
# Generation of Certificate Authority(CA)
#

openssl req -new -x509 -keyout $PRIV/cakey.pem -out $DIR/cacert.pem
```

```
    -config $DIR/openssl.cnf

# Sample output:
# Using configuration from /home/monty/openssl/openssl.cnf
# Generating a 1024 bit RSA private key
# ................++++++
# .........++++++
# writing new private key to '/home/monty/openssl/private/cakey.pem'
# Enter PEM pass phrase:
# Verifying password - Enter PEM pass phrase:
# -----
# You are about to be asked to enter information that will be
# incorporated into your certificate request.
# What you are about to enter is what is called a Distinguished Name
# or a DN.
# There are quite a few fields but you can leave some blank
# For some fields there will be a default value,
# If you enter '.', the field will be left blank.
# -----
# Country Name (2 letter code) [AU]:FI
# State or Province Name (full name) [Some-State]:.
# Locality Name (eg, city) []:
# Organization Name (eg, company) [Internet Widgits Pty Ltd]:MySQL A
# Organizational Unit Name (eg, section) []:
# Common Name (eg, YOUR name) []:MySQL admin
# Email Address []:
```

```
#
# Create server request and key
#
openssl req -new -keyout $DIR/server-key.pem -out \
    $DIR/server-req.pem -days 3600 -config $DIR/openssl.cnf

# Sample output:
# Using configuration from /home/monty/openssl/openssl.cnf
# Generating a 1024 bit RSA private key
# ..++++++
# ..........++++++
# writing new private key to '/home/monty/openssl/server-key.pem'
# Enter PEM pass phrase:
# Verifying password - Enter PEM pass phrase:
# -----
# You are about to be asked to enter information that will be
# incorporated into your certificate request.
# What you are about to enter is what is called a Distinguished Name
# or a DN.
# There are quite a few fields but you can leave some blank
# For some fields there will be a default value,
# If you enter '.', the field will be left blank.
# -----
# Country Name (2 letter code) [AU]:FI
# State or Province Name (full name) [Some-State]:.
```

```
# Locality Name (eg, city) []:
# Organization Name (eg, company) [Internet Widgits Pty Ltd]:MySQL A
# Organizational Unit Name (eg, section) []:
# Common Name (eg, YOUR name) []:MySQL server
# Email Address []:
#
# Please enter the following 'extra' attributes
# to be sent with your certificate request
# A challenge password []:
# An optional company name []:

#
# Remove the passphrase from the key (optional)
#

openssl rsa -in $DIR/server-key.pem -out $DIR/server-key.pem

#
# Sign server cert
#
openssl ca  -policy policy_anything -out $DIR/server-cert.pem \
    -config $DIR/openssl.cnf -infiles $DIR/server-req.pem

# Sample output:
# Using configuration from /home/monty/openssl/openssl.cnf
# Enter PEM pass phrase:
```

```
# Check that the request matches the signature
# Signature ok
# The Subjects Distinguished Name is as follows
# countryName           :PRINTABLE:'FI'
# organizationName      :PRINTABLE:'MySQL AB'
# commonName            :PRINTABLE:'MySQL admin'
# Certificate is to be certified until Sep 13 14:22:46 2003 GMT
# (365 days)
# Sign the certificate? [y/n]:y
#
#
# 1 out of 1 certificate requests certified, commit? [y/n]y
# Write out database with 1 new entries
# Data Base Updated


#
# Create client request and key
#
openssl req -new -keyout $DIR/client-key.pem -out \
    $DIR/client-req.pem -days 3600 -config $DIR/openssl.cnf


# Sample output:
# Using configuration from /home/monty/openssl/openssl.cnf
# Generating a 1024 bit RSA private key
# ....................................++++++
# ..........................................++++++
```

```
# writing new private key to '/home/monty/openssl/client-key.pem'
# Enter PEM pass phrase:
# Verifying password - Enter PEM pass phrase:
# -----
# You are about to be asked to enter information that will be
# incorporated into your certificate request.
# What you are about to enter is what is called a Distinguished Name
# or a DN.
# There are quite a few fields but you can leave some blank
# For some fields there will be a default value,
# If you enter '.', the field will be left blank.
# -----
# Country Name (2 letter code) [AU]:FI
# State or Province Name (full name) [Some-State]:.
# Locality Name (eg, city) []:
# Organization Name (eg, company) [Internet Widgits Pty Ltd]:MySQL A
# Organizational Unit Name (eg, section) []:
# Common Name (eg, YOUR name) []:MySQL user
# Email Address []:
#
# Please enter the following 'extra' attributes
# to be sent with your certificate request
# A challenge password []:
# An optional company name []:

#
```

```
# Remove a passphrase from the key (optional)
#
openssl rsa -in $DIR/client-key.pem -out $DIR/client-key.pem

#
# Sign client cert
#

openssl ca  -policy policy_anything -out $DIR/client-cert.pem \
    -config $DIR/openssl.cnf -infiles $DIR/client-req.pem

# Sample output:
# Using configuration from /home/monty/openssl/openssl.cnf
# Enter PEM pass phrase:
# Check that the request matches the signature
# Signature ok
# The Subjects Distinguished Name is as follows
# countryName           :PRINTABLE:'FI'
# organizationName      :PRINTABLE:'MySQL AB'
# commonName            :PRINTABLE:'MySQL user'
# Certificate is to be certified until Sep 13 16:45:17 2003 GMT
# (365 days)
# Sign the certificate? [y/n]:y
#
#
# 1 out of 1 certificate requests certified, commit? [y/n]y
```

```
# Write out database with 1 new entries
# Data Base Updated

#
# Create a my.cnf file that you can use to test the certificates
#

cnf=""
cnf="$cnf [client]"
cnf="$cnf ssl-ca=$DIR/cacert.pem"
cnf="$cnf ssl-cert=$DIR/client-cert.pem"
cnf="$cnf ssl-key=$DIR/client-key.pem"
cnf="$cnf [mysqld]"
cnf="$cnf ssl-ca=$DIR/cacert.pem"
cnf="$cnf ssl-cert=$DIR/server-cert.pem"
cnf="$cnf ssl-key=$DIR/server-key.pem"
echo $cnf | replace " " '
' > $DIR/my.cnf
```

SSL $DIRmy.cnf

```
shell> MySQLd --defaults-file=$DIR/my.cnf &
```

```
shell> MySQL --defaults-file=$DIR/my.cnf
```

MySQL my.cnfSSL

5.8.7.5. SSL GRANT

MySQLX509 MySQLSSL GRANTREQUIRE 13.5.1.3“GRANT REVOKE”

· SSLX509

· REQUIRE SSLSSL ACLSSL

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'
· -> IDENTIFIED BY 'goodsecret' REQUIRE SSL;
```

· REQUIRE X509 CA

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
· -> IDENTIFIED BY 'goodsecret' REQUIRE X509;
```

· REQUIRE ISSUER 'issuer' CA 'issuer'X509 X509 SSL

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
· -> IDENTIFIED BY 'goodsecret'
· -> REQUIRE ISSUER '/C=FI/ST=Some-State/L=Helsin
· O=MySQL Finland AB/CN=Tonu Samuel/Email=tonu
```

ISSUER

· REQUIRE SUBJECT 'subject' 'subject'X5

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
· -> IDENTIFIED BY 'goodsecret'
· -> REQUIRE SUBJECT '/C=EE/ST=Some-State/L=Talli
· O=MySQL demo client certificate/
CN=Tonu Samuel/Email=tonu@example.com';
```

SUBJECT

· REQUIRE CIPHER 'cipher' SSL

· mysql> **GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo**

· -> **IDENTIFIED BY 'goodsecret'**

-> **REQUIRE CIPHER 'EDH-RSA-DES-CBC3-SHA';**

REQUIRE SUBJECTISSUERCIPHER

```
mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'localhost'
    -> IDENTIFIED BY 'goodsecret'
    -> REQUIRE SUBJECT '/C=EE/ST=Some-State/L=Tallinn/
       O=MySQL demo client certificate/
       CN=Tonu Samuel/Email=tonu@example.com'
    -> AND ISSUER '/C=FI/ST=Some-State/L=Helsinki/
       O=MySQL Finland AB/CN=Tonu Samuel/Email=tonu@example.com'
    -> AND CIPHER 'EDH-RSA-DES-CBC3-SHA';
```

SUBJECTISSUER

MySQL 5.1,REQUIREAND

5.8.7.6. SSL

SSL

· --ssl

SSL SSL SSL --ssl-ca--ssl-cert--ssl-key

SSL --skip-ssl--ssl=0

--sslSSL SSL

SSLREQUIRE SSLGRANT SSL

· --ssl-ca=*file_name*

SSL CA

· --ssl-capath=*directory_name*

pemSSL CA

· --ssl-cert=*file_name*

SSL

· --ssl-cipher=*cipher_list*

SSL *cipher_list*OpenSSL ciphers

--ssl-cipher=ALL:-AES:-EXP

· --ssl-key=*file_name*

SSL

5.8.7.7. SSHWindowsMySQL

SSHMySQL(David Carlson <dcarlson@mplcommcom>)

1. WindowsSSH http://www.vandyke.com/SecureCRThttp://www.f-secure.com/f-secure http://directory.google.com/Top/Computers/Security/Products_and_Tools/Crypto Google

2. Windows SSH Host_Name = yourmysqlserver_URL_or_IP userid=your_userid useridMySQL

3. (local_port: 3306, remote_host: yourmysqlservername_or_ip, remote_port: 3306)(port: 3306, host: localhost, remote port: 3306)

4.

5. SSH

6. WindowsODBC(Access)
7. WindowsODBCMySQLMySQLlocalhostyourmysqlservername

SSHODBCMySQL

5.9.

5.9.1.
5.9.2.
5.9.3.
5.9.4.
5.9.5. myisamchkMyISAM
5.9.6.
5.9.7.

() SQL5 MyISAM InnoDB15.2.8“InnoDB ”

5.9.1.

MySQL LOCK TABLES FLUSH TABLES13.4.5“LOCK TABLESUNLOCK TABLES” 13.5.5.2“FLUSH” FLUSH TABLES

SQL SELECT INTO ...OUTFILEBACKUP TABLESELECT INTO ...OUTFILE BACKUP TABLE 13.2.7“SELECT” 13.5.2.2 “BACKUP TABLE”

mysqldumpmysqlhotcopy8.8“mysqldump” 8.9“mysqlhotcopy”

1.

2.
```
shell> mysqldump --tab=/path/to/some/dir --opt db_name
```

```
shell> mysqlhotcopy db_name /path/to/some/dir
```

(*.frm*.MYD*.MYI)**mysqlhotcopy** (InnoDB InnoDB **mysqlhotcopy**MyISAM

3. **mysqld** --log-bin[=file_name] 5.11.3“” **mysqldump**

InnoDB 8.8“mysqldump”

MySQL:--log-bin 5.11.3“” ()FLUSH LOGS FLUSH LOGSmysqlhotcopy --flushlogs 8.8“mysqldump” “mysqlhotcopy”

MySQL master.inforelay-log.info LOAD DATA INFILE --slave-load-tmpdirSQL_LOAD-* (tmpdir LOAD DAT

MyISAM REPAIR TABLE**myisamchk -r** 99.9% **myisamchk** --log-binMySQL 5.11.3“”

1. **mysqldump**

2.

3. `shell> mysqlbinlog hostname-bin.[0-9]* | mysql`

( )**mysqlbinlog**8.6“mysqlbinlog”

· SELECT * INTO OUTFILE '*file_name*' FROM *tbl_name*

· LOAD DATA INFILE 'file_name' REPLACE ... PRIMARY KEYUNIQUE REPLACE

6.1“”

Veritas

1. FLUSH TABLES WITH READ LOCK
2. shellmount vxfs snapshot
3. UNLOCK TABLES
4.
5.

5.9.2.

5.9.2.1.
5.9.2.2.
5.9.2.3.

.

.

.

· ( )

mysqldumpmysql--user—password MySQL

MySQLInnoDB MySQL

MySQLś InnoDB InnoDB InnoDB MySQL

```
InnoDB: Database was not shut down normally.
InnoDB: Starting recovery from log files...
InnoDB: Starting log scan based on checkpoint at
InnoDB: log sequence number 0 13674004
InnoDB: Doing recovery: scanned up to log sequence number 0 13739520
InnoDB: Doing recovery: scanned up to log sequence number 0 13805056
InnoDB: Doing recovery: scanned up to log sequence number 0 13870592
InnoDB: Doing recovery: scanned up to log sequence number 0 13936128
...
InnoDB: Doing recovery: scanned up to log sequence number 0 20555264
InnoDB: Doing recovery: scanned up to log sequence number 0 20620800
InnoDB: Doing recovery: scanned up to log sequence number 0 20664692
InnoDB: 1 uncommitted transaction(s) which must be rolled back
InnoDB: Starting rollback of uncommitted transactions
```

```
InnoDB: Rolling back trx no 16745
InnoDB: Rolling back of trx no 16745 completed
InnoDB: Rollback of uncommitted transactions completed
InnoDB: Starting an apply batch of log records to the database...
InnoDB: Apply batch completed
InnoDB: Started
mysqld: ready for connections
```

MySQLś MySQL MySQL

5.9.2.1.

()MySQL InnoDB Hot BackupInnoDB **mysqldump** **mysqldump**

1 InnoDB

```
shell> mysqldump --single-transaction --all-databases > backup_sunda
```

InnoDB --single-transaction **mysqldump** (InnoDB**mysqldump** mysqlMyISAMMySQL

mysqldump.sqlSQL INSERT

--log-binMySQL SQLMySQL --log-binMySQL MySQL

```
-rw-rw---- 1 guilhem  guilhem   1277324 Nov 10 23:59 gbichot2-bin.00
-rw-rw---- 1 guilhem  guilhem         4 Nov 10 23:59 gbichot2-bin.00
-rw-rw---- 1 guilhem  guilhem        79 Nov 11 11:06 gbichot2-bin.00
-rw-rw---- 1 guilhem  guilhem       508 Nov 11 11:08 gbichot2-bin.00
-rw-rw---- 1 guilhem  guilhem 220047446 Nov 12 16:47 gbichot2-bin.00
-rw-rw---- 1 guilhem  guilhem    998412 Nov 14 10:08 gbichot2-bin.00
```

```
-rw-rw---- 1 guilhem  guilhem       361 Nov 14 10:07 gbichot2-bin.in
```

MySQL FLUSH LOGS SQL**mysqladmin flush-logs** **mysqldump** .indexMySQL

MySQL **mysqldump** MySQL

```
shell> mysqldump --single-transaction --flush-logs --master-data=2
           --all-databases > backup_sunday_1_PM.sql
```

gbichot2-bin.000007.sql

```
-- Position to start replication or point-in-time    y from
-- CHANGE MASTER TO MASTER_LOG_FILE='gbichot2-bin.000007',MASTER_LOG
```

mysqldump

· .sqlgbichot2-bin.000007

· .sql gbichot2-bin.000007

1 **mysqladmin flush-logs**gbichot2-bin.00000811gbichot2-bin.000007 (DVD 1 **mysqladmin flush-logs** 11 gbichot2-bin.000008()

MySQL

```
shell> mysqldump --single-transaction --flush-logs --master-data=2
           --all-databases --delete-master-logs > backup_sunday_1_PM
```

mysqldump --delete-master-logs MySQL

PURGE MASTER LOGSMySQL 13.6.1.1“PURGE MASTER LOGS”

5.9.2.2.

8 (1)SQL

```
shell> mysql < backup_sunday_1_PM.sql
```

1 gbichot2-bin.000007gbichot2-bin.000008

```
shell> mysqlbinlog gbichot2-bin.000007 gbichot2-bin.000008 | mysql
```

1 MySQLMySQL(RAID disks, SAN, ...) (--log-bin gbichot2-bin.000009

5.9.2.3.

InnoDB

· --log-bin--log-bin=*log_name*MySQL ()

· **mysqldump**

· FLUSH LOGS**mysqladmin flush-logs**

5.9.3.

5.9.3.1.
5.9.3.2.

MySQL **mysqlbinlog** ( ) 5.11.3“” **mysqlbinlog** 8.6 “mysqlbinlog”

(my.cnf or my.ini) --log-bin MySQL

```
SHOW BINLOG EVENTS \G
```

```
mysql --user=root -pmy_pwd -e 'SHOW BINLOG EVENTS \G'
```

*my_pwd*root

5.9.3.1.

MySQL 4.1.4**mysqlbinlog**--start-date--stop-dateDATETIME 10:00(20 420)SQL

```
mysqlbinlog --stop-date="2005-04-20 9:59:59" /var/log/mysql/bin.1234
     | mysql -u root -pmypwd
```

--stop-dateDATETIME SQL **mysqlbinlog**

```
mysqlbinlog --start-date="2005-04-20 10:01:00" /var/log/mysql/bin.12
     | mysql -u root -pmypwd \
```

10:01SQL **mysqlbinlog**10:00

5.9.3.2.

mysqlbinlog--start-position--stop-position **mysqlbinlog**

```
mysqlbinlog --start-date="2005-04-20 9:55:00" --stop-date="2005-04-2
      /var/log/mysql/bin.123456 > /tmp/mysql_restore.sql
```

/tmp SQLSQL log_pos

```
mysqlbinlog --stop-position="368312" /var/log/mysql/bin.123456 \
    | mysql -u root -pmypwd

mysqlbinlog --start-position="368315" /var/log/mysql/bin.123456 \
    | mysql -u root -pmypwd \
```

1 **mysqlbinlog**SQLSET TIMESTAMP MySQL

5.9.4.

myisamchkMyISAM(.MYI.MYD)

myisamchk **myisamchk** **myisamchk**

myisamchk ()

myisamchkULLTEXTfull-text MySQL 5.9.5.1“myisamchk ”

SQLMyISAM**myisamchk**

· MyISAM CHECK TABLEREPAIR TABLE

· MyISAM OPTIMIZE TABLE

· MyISAM ANALYZE TABLE

mysqlcheck

myisamchk **myisamchk** **myisamchk**

5.9.5. myisamchkMyISAM

5.9.5.1. myisamchk
5.9.5.2. myisamchk
5.9.5.3. myisamchk
5.9.5.4. myisamchk
5.9.5.5. **myisamchk**
5.9.5.6. myisa **mchk**
5.9.5.7. MyISAM
5.9.5.8.
5.9.5.9.

myisamchk **myisamchk**MyISAM(.MYI.MYD)

myisamchk

```
shell> myisamchk [options] tbl_name ...
```

*options***myisamchk** **myisamchk --help**

tbl_name **myisamchk** **myisamchk** **myisamchk**

myisamchk (" .MYI") "*.MYI" MyISAM

```
shell> myisamchk *.MYI
```

```
shell> myisamchk /path/to/database_dir/*.MYI
```

MySQL

```
shell> myisamchk /path/to/datadir/*/*.MYI
```

MyISAM

```
shell> myisamchk --silent --fast /path/to/datadir/*/*.MYI
```

MyISAM

```
shell> myisamchk --silent --force --fast --update-state \
          -O key_buffer=64M -O sort_buffer=64M \
          -O read_buffer=1M -O write_buffer=1M \
          /path/to/datadir/*/*.MYI
```

64MB **myisamchk** 5.9.5.5“ **myisamchk**”

myisamchk **myisamchk**

```
warning: clients are using or haven't closed the table properly
```

(**mysqld**)

mysqld FLUSH TABLES **myisamchk** CHECK TABLE **myisamchk**

5.9.5.1. myisamchk

myisamchk

· --help-?

· --debug=*debug_options*, -# *debug_options*

debug_options'd:t:o,*filename*'

· --silent-s

-s(-ss)**myisamchk**

· --verbose-v

-d-e -v(-vv, -vvv)

· --version, -V

· --wait, -w

--skip-exte

--var_name=value

decode_bits	9
ft_max_word_len	
ft_min_word_len	4
ft_stopword_file	
key_buffer_size	523264
myisam_block_size	1024

read_buffer_size	262136
sort_buffer_size	2097144
sort_key_blocks	16
stats_method	nulls_unequal
write_buffer_size	262136

myisamchk --helpmyisamchk

sort_buffer_size--recover

--extend-check()Key_buffer_size

· --safe-recover

· CHARVARCHARTEXT **myisamchk** --sort-recover

key_buffer_sizesort_buffer_size25%

myisam_block_size

stats_method--analyze NULL myisam_stats_method 5.3.3“” 7.4.7“MyISAM” myisam_stats_method

ft_min_word_lenft_max_word_lenFULLTEXT ft_stopword_file

myisamchk() I

MyISAM **mysqldmyisamchk**ft_min_word_lenft_max_word_len

ft_stopword_file 3,**myisamchk**

```
shell> myisamchk --recover --ft_min_word_len=3 tbl_name.MYI
```

myisamchk [mysqld][myisamchk]

```
[mysqld]
ft_min_word_len=3


[myisamchk]
ft_min_word_len=3
```

myisamchkREPAIR TABLEANALYZE TABLEOPTIMIZE TABLEALTER TABLE

5.9.5.2. myisamchk

myisamchk

· --check, -c

· --check-only-changed, -C

· --extend-check, -e

--extend-check key_buffer_size

· --fast-F

· --force, -f

myisamchk --repair-r

· --information, -i

· --medium-check, -m

--extend-check 99.99%

· --read-only, -T

myisamchk --skip-external-locking**mysqld**

· --update-state, -U

.MYI --check-only-changed **mysqld**--skip-external-locking

5.9.5.3. myisamchk

myisamchk

· --backup, -B

.MYDfile_name-time.BAK

· --character-sets-dir=*path*

5.10.1“”

· --correct-checksum

· --data-file-length=*len*, -D *len*

(“”)

· --extend-check-e

,

· --force, -f

(*tbl_name*.TMD)

· --keys-used=*val*, -k *val*

myisamchk 00 **myisamchk -r**

· --no-symlinks, -l

myisamchk MySQL 4.0 4.0

· --parallel-recover, -p

-r-n *alpha*

· --quick-q

myisamchk

· --recover, -r

(MyISAM) **myisamchk**-r -o-r

sort_buffer_size

· --safe-recover, -o

-r

sort_buffer_size

· (*OBSOLETE*) --set-character-set=*name*

MySQL 5.1 --set-collation

· --set-collation=*name*

· --sort-recover, -n

myisamchk

· --tmpdir=*path*, -t *path*

myisamchkTMPDIR tmpdir round-robin Unix (':') WindowsNetWareOS/2 ('')

· --unpack-u

myisampack

5.9.5.4. myisamchk

myisamchk

· --analyze-a

tbl_name

· --description, -d

· --set-auto-increment[=*value*], -A[*value*]

AUTO_INCREMENT(AUTO_INCREMENT)*value*AUTO_INCREMENT1

· --sort-index, -S

· --sort-records=*N*, -R *N*

SELECTORDI

(PACK_KEYS=0) **myisamchk** (PACK_KEYS=1)**myisamchk** (

5.9.5.5. myisamchk

myisamchk.MYI**samchk**-O **myisamchk** 32MBRAM()

```
shell> myisamchk -O sort=16M -O key=16M -O read=1M -O write=1M ...
```

-O sort=16M

myisamchkTMPDIR TMPDIR TMPDIR**myisamchk**

myisamchk

· ()--quick (

·

· --recover---sort-recover(--safe-recover)

· (*largest_key* + *row_pointer_length*) * *number_of_rows*

myisamchk -dv *tbl_name*row_pointer_length (TMPDIR--tmpdir=*path*)

--safe-recover--recover

5.9.5.6. myisa mchk

--skip-external-locking**mysqld**(Linux)**mysqld** **myisa** **myisamchkmysqld** **mysqladmin flush-tables** **mysqldmysqld** **myisamchk**

--skip-external-locking**myisamchk** **myisamchk**

myisamchk **mysqld**(--skip-external-locking)**mysqldmyisamchk** **mysqladmin flush-tablesmyisamchk**

MySQL A.4.2“MySQL”

MyISAM 15.1.4“MyISAM”

*MyISAM*tbl_name3

tbl_name.frm	()
tbl_name.MYD	
tbl_name.MYI	

3

myisamchk“.MYD” “.MYD --quick**myisamchk**“.MYD” “.MYD” “.MYD” **myisamchk**“.MYD” **myisamchk**--quick **myisamchk**() “.MYD” --quick **myisamchk**

5.9.5.7. MyISAM

MyISAM

· myisamchk *tbl_name*

99.99% () myisamchk-s--silent

· myisamchk -m *tbl_name*

99.99%

· myisamchk -e *tbl_name*

(-e“”) **myisamchk** --verbose(-v) **myisamchk**20

· myisamchk -e -i *tbl_name*

-i**myisamchk**

myisamchk

5.9.5.8.

MyISAM**myisamchk**(.MYI.MYD)

( )CHECK TABLEREPAIR TABLEMyISAM 13.5.2.3“CHECK TABLE” 13.5.2.6“REPAIR TABLE”

- “*tbl_name*.frm”
- “*tbl_name*.MYI”Errcode*nnn*
-
-
- *nnn*

perror *nnnnnn* **perror**

```
shell> perror 126 127 132 134 135 136 141 144 145
126 = Index file is crashed / Wrong file format
127 = Record-file is crashed
132 = Old database file
134 = Record was already deleted (or record file crashed)
135 = No more room in record file
136 = No more room in index file
141 = Duplicate unique key or constraint on write or update
144 = Table is crashed and last repair failed
```

145 = Table was marked as crashed and should be repaired

135()136() ALTER TABLEMAX_ROWSAVG_ROW_LENGTH

```
ALTER TABLE tbl_name MAX_ROWS=xxx AVG_ROW_LENGTH=yyy;
```

SHOW CREATE TABLEDESCRIBE

myisamchk

Unix **mysqld**( )

myisamchk5.9.5“myisamchkMyISAM”

myisamchk

mysqldmysqladmin shutdown **mysqladmin** **mysqld**

1

myisamchk *.MYImyisamchk -e *.MYI-s

mysqld--update-state**myisamchk**"

myisamchk 2

(out of memory)**myisamchk** 3

2

myisamchk sort_buffer_sizeKey_buffer_size25%

myisamchk -r -q *tbl_name*(-r -q“”)

1.
2. **myisamchk -r *tbl_name***(-r“”)
3. **myisamchk --safe-recover *tbl_name*** ()

(out of memory)**myisamchk** 3

3

16K

1.
2. ()
3. shell> **mysql *db_name***
4. mysql> **SET AUTOCOMMIT=1;**
5. mysql> **TRUNCATE TABLE *tbl_name*;**
6. mysql> **quit**

MySQLTRUNCATE TABLEDELETE FROM *tbl_name*

7.

2**myisamchk -r -q**

REPAIR TABLE *tbl_name* USE_FRM

4

.frm

1. 32 **myisamchk -r**
2.

5.9.5.9.

myisamchk

```
shell> myisamchk -r tbl_name
```

SQLOPTIMIZE TABLE OPTIMIZE TABLE OPTIMIZE T
13.5.2.5“OPTIMIZE TABLE”

myisamchk

· -S, --sort-index

· -R *index_num*, --sort-records=*index_num*

· -a, --analyze

5.9.5“myisamchkMyISAM”

5.9.6.

MyISAMCHECK TABLEREPAIR TABLE 13.5.2.3“CHECK TABLE” 13.5.2.6“REPAIR TABLE”

myisamchk **myisamchk -s** -s --silent**myisamchk**

“”

“.pid”

MySQL AB**cron** “crontab”

```
35 0 * * 0 /path/to/myisamchk --fast --silent /path/to/datadir/*/*.M
```

()()

24**myisamchk -sMySQL**

MySQL MyISAM(VARCHARBLOBTEXT) /

OPTIMIZE TABLE **mysqld**

shell> **myisamchk -r -s --sort-index -O sort_buffer_size=16M */*.MYI**

5.9.7.

· **myisamchk -d *tbl_name***

“” **myisamchk** --skip-external-locking**MySQL** **myisamchk** **myisamchk**

· **myisamchk -d -v *tbl_name***

myisamchk -v

· **myisamchk -eis *tbl_name***

· **myisamchk -eiv *tbl_name***

-eis

```
-rw-rw-r--   1 monty    tcx     317235748 Jan 12 17:30 company.MYD
-rw-rw-r--   1 davida   tcx      96482304 Jan 12 18:35 company.MYM
```

myisamchk -d

```
MyISAM file:     company.MYI
Record format:   Fixed length
Data records:    1403698  Deleted blocks:         0
Recordlength:    226

table description:
Key Start Len Index   Type
1   2     8   unique  double
2   15    10  multip. text packed stripped
3   219   8   multip. double
4   63    10  multip. text packed stripped
5   167   2   multip. unsigned short
6   177   4   multip. unsigned long
7   155   4   multip. text
8   138   4   multip. unsigned long
9   177   4   multip. unsigned long
    193   1           text
```

myisamchk -d -v

```
MyISAM file:         company
Record format:       Fixed length
File-version:        1
```

```
Creation time:       1999-10-30 12:12:51
Recover time:        1999-10-31 19:13:01
Status:              checked
Data records:            1403698  Deleted blocks:              0
Datafile parts:          1403698  Deleted data:                0
Datafile pointer (bytes):      3  Keyfile pointer (bytes):     3
Max datafile length:  3791650815  Max keyfile length: 4294967294
Recordlength:                226

table description:
Key Start Len Index   Type                    Rec/key     Root Blocksi
1   2     8   unique  double                        1 15845376      10
2   15    10  multip. text packed stripped         2 25062400      10
3   219   8   multip. double                       73 40907776      10
4   63    10  multip. text packed stripped         5 48097280      10
5   167   2   multip. unsigned short            4840 55200768      10
6   177   4   multip. unsigned long             1346 65145856      10
7   155   4   multip. text                      4995 75090944      10
8   138   4   multip. unsigned long               87 85036032      10
9   177   4   multip. unsigned long              178 96481280      10
    193   1           text
```

myisamchk -eis

```
Checking MyISAM file: company
Key:  1:  Keyblocks used:  97%  Packed:    0%  Max levels:  4
Key:  2:  Keyblocks used:  98%  Packed:   50%  Max levels:  4
Key:  3:  Keyblocks used:  97%  Packed:    0%  Max levels:  4
```

```
Key:  4:  Keyblocks used:  99%  Packed:   60%  Max levels:  3
Key:  5:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
Key:  6:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
Key:  7:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
Key:  8:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
Key:  9:  Keyblocks used:  98%  Packed:    0%  Max levels:  4
Total:    Keyblocks used:  98%  Packed:   17%

Records:          1403698    M.recordlength:     226
Packed:             0%
Recordspace used:     100%   Empty space:          0%
Blocks/Record:   1.00
Record blocks:    1403698    Delete blocks:        0
Recorddata:     317235748    Deleted data:         0
Lost space:             0    Linkdata:             0

User time 1626.51, System time 232.36
Maximum resident set size 0, Integral resident set size 0
Non physical pagefaults 0, Physical pagefaults 627, Swaps 0
Blocks in 0 out 0, Messages in 0 out 0, Signals 0
Voluntary context switches 639, Involuntary context switches 28966
```

myisamchk -eiv

```
Checking MyISAM file: company
Data records: 1403698   Deleted blocks:       0
- check file-size
- check delete-chain
```

```
block_size 1024:
index  1:
index  2:
index  3:
index  4:
index  5:
index  6:
index  7:
index  8:
index  9:
No recordlinks
- check index reference
- check data record references index: 1
Key:  1:  Keyblocks used:  97%  Packed:    0%  Max levels:  4
- check data record references index: 2
Key:  2:  Keyblocks used:  98%  Packed:   50%  Max levels:  4
- check data record references index: 3
Key:  3:  Keyblocks used:  97%  Packed:    0%  Max levels:  4
- check data record references index: 4
Key:  4:  Keyblocks used:  99%  Packed:   60%  Max levels:  3
- check data record references index: 5
Key:  5:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
- check data record references index: 6
Key:  6:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
- check data record references index: 7
Key:  7:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
```

```
- check data record references index: 8
Key:  8:  Keyblocks used:  99%  Packed:    0%  Max levels:  3
- check data record references index: 9
Key:  9:  Keyblocks used:  98%  Packed:    0%  Max levels:  4
Total:    Keyblocks used:   9%  Packed:   17%

- check records and index references
[LOTS OF ROW NUMBERS DELETED]

Records:         1403698   M.recordlength:   226   Packed:
Recordspace used:    100%  Empty space:        0%  Blocks/Record: 1.
Record blocks:   1403698   Delete blocks:      0
Recorddata:    317235748   Deleted data:       0
Lost space:            0   Linkdata:           0

User time 1639.63, System time 251.61
Maximum resident set size 0, Integral resident set size 0
Non physical pagefaults 0, Physical pagefaults 10580, Swaps 0
Blocks in 4 out 0, Messages in 0 out 0, Signals 0
Voluntary context switches 10604, Involuntary context switches 12279
```

myisamchk“ keyfile”“”“”

· MyISAM file

ISAM()

· File-version

ISAM 2

· Creation time

· Recover time

/

· Data records

· Deleted blocks

7

· Datafile parts

Data records

· Deleted data

7

· Datafile pointer

2345 2 **MySQL**

· Keyfile pointer

123 2 **MySQL**

· Max datafile length

(.MYD)

· Max keyfile length

(.MYI)

· Recordlength

· Record format

Fixed lengthCompressedPacked

· table description

o Key

o Start

o Len

o Index

uniquemultipmultiple)

o Type

packedstrippedemptyISAM

o Root

o Blocksize

1024MySQL

o Rec/key

9table description 2

· Keyblocks used

myisamchk ()

· Packed

MySQL CHAR/VARCHAR/DECIMAL 3 410 60%

· Max levels

B

· Records

· M.recordlength

· Packed

MySQL Packed

· Recordspace used

· Empty space

· Blocks/Record

( ) 11.0 7

· Recordblocks

()

· Deleteblocks

()

· Recorddata

· Deleted data

()

· Lost space

· Linkdata

(4 7) Linkdata

myisampack **myisamchk -d** 8.2“myisampackMyISAM”

5.10. MySQL

5.10.1.
5.10.2.
5.10.3.
5.10.4.
5.10.5.
5.10.6.
5.10.7.
5.10.8. MySQL

5.10.1.

5.10.1.1.

MySQLcp1252(Latin1)Swedish/Finnish

MySQL--with-extra-charsets=complex latin1

SELECTORDER BYGROUP BY

--default-character-set --with-charset=*charset*--with-extra-charsets=*list-of-charsets* | complex | all | none**configure**SHAREDIR/charsets/Index2.8.2“ ”

--default-collation (S

MySQL **myisamchk -r -q --set-character-set=*charset***

MySQL

SQL mysql_real_escape_string()mysql_real_escape_string() mysql_escape_string() MYSQL

MySQLMySQL

--character-sets-dirMySQL

```
[client]
character-sets-dir=/usr/local/mysql/share/mysql/charsets
```

```
[client]
default-character-set=charset
```

5.10.1.1.

MySQL 5.1, German latin1 latin1_ge latin1_german1_ci --character-set-server=latin1--collation-server=latin1_german1_ci

10.10.2“”

5.10.2.

mysqld

CzechDanishDutchEstonianFrenchGermanGreekHungarianItalianJapaneseK nyPolishPortugueseRomanianRussianSlovakSpanish Swedish

mysqld --language-L

```
shell> mysqld --language=swedish
```

```
shell> mysqld --language=/usr/local/share/swedish
```

()MySQLshare/*LANGUAGE*

errmsg.txt errmsg.sys

```
shell> comp_err errmsg.txt errmsg.sys
```

MySQLerrmsg.txt

5.10.3.

MySQL MySQL

.

.

latin1danish big5czech

MYSET

1. sql/share/charsets/Index*MYSET*
2. sql/share/charsets/*MYSET*.conf(sql/share/charsets/latin1.conf

. ‘ #’

.

.

· ctype257 to_lower[]to_upper[]sort_order[]256

5.10.4“”

3. configurE.inCHARSETS_AVAILABLECOMPILED_CHARSETS
4.

1. MySQLstrings/ctype-*MYSET*.c

2. sql/share/charsets/Index*MYSET*

3. ctype-*.c(strings/ctype-big5.c) ctype_*MYSET*to_lower_*MYSET* 5.10.4“”

4.

```
5.            /*
6.            * This comment is parsed by configure to create ctype.
7.            * so don't change it unless you know what you are doin
8.            *
9.            * .configure. number_MYSET=MYNUMBER
10.        * .configure. strxfrm_multiply_MYSET=N
11.        * .configure. mbmaxlen_MYSET=N
12.        */
```

configureMySQL

strxfrm_multiplymbmaxlen

13.

- my_strncoll_*MYSET*()
- my_strcoll_*MYSET*()
- my_strxfrm_*MYSET*()
- my_like_range_*MYSET*()

5.10.5“”

14.configurE.inCHARSETS_AVAILABLECOMPILED_CHARSETS

15.

sql/share/charsets/README

MySQL MySQL 1.7.1.1“The MySQL”

5.10.4.

to_lower[]to_upper[]

```
to_lower['A'] should contain 'a'
to_upper['a'] should contain 'A'
```

sort_order[] ()to_upper[] MySQLsort_order[] 5.10.5 “”

ctype[] (to_lower[]to_upper[]sort_order[]+ 1ctype[] EOF

m_ctype.h

```
#define _U      01      /* Uppercase */
#define _L      02      /* Lowercase */
#define _N      04      /* Numeral (digit) */
#define _S      010     /* Spacing character */
#define _P      020     /* Punctuation */
#define _C      040     /* Control character */
#define _B      0100    /* Blank */
#define _X      0200    /* heXadecimal digit */
```

ctype[] 'A'(_U)(_X)ctype['A'+1]

_U + _X = 01 + 0200 = 0201

5.10.5.

sort_order[]

big5czechgbksjistis160

strxfrm_multiply_*MYSET*=*N* *N*my_strxfrm_*MYSET*()

5.10.6.

euc_krgb2312,gbksjisujis stringsctype-*charset*.c

mbmaxlen_*MYSET=N* *N*

5.10.7.

· (/usr/local/mysql/share/mysql/charsets)--character-sets-dir

·

· MySQL

· Index

· ERROR 1105: File '/usr/local/share/mysql/charsets/?

· not found (Errcode2)

Index

MyISAM **myisamchk -dvv *tbl_name***

5.10.8. MySQL

MySQL

· system_time_zone

· time_zone 'SYSTEM' --default-time-zone=*timez* SUPER

· mysql> **SET GLOBAL time_zone = *timezone*;**

· time_zone time_zone

· mysql> **SET time_zone = *timezone*;**

```
mysql> SELECT @@global.time_zone, @@session.time_zone;
```

timezone UTC '+10:00''-6:00'mysql 'Europe/Helsinki''US/Eastern''MET''SYSTEM'

MySQLmysql (MySQL 4.1.3 mysql 2.10.2“”

()**mysql_tzinfo_to_sql** LinuxFreeBSDSun SolarisMac OS X /usr/share/zoneinfo

mysql_tzinfo_to_sql **mysql_tzinfo_to_sqlmysql**

```
shell> mysql_tzinfo_to_sql /usr/share/zoneinfo | mysql -u root mysql
```

mysql_tzinfo_to_sqlSQL **mysql**

mysql_tzinfo_to_sql

*tz_nametz_file***mysql_tzinfo_to_sql**

```
shell> mysql_tzinfo_to_sql tz_file tz_name | mysql -u root mysql
```

tz_file

```
shell> mysql_tzinfo_to_sql --leap tz_file | mysql -u root mysql
```

(WindowsHP-UX)http://dev.mysql.com/downloads/timezones.html MyISAM.frm.MYD.MYI mysql MySQLmysql

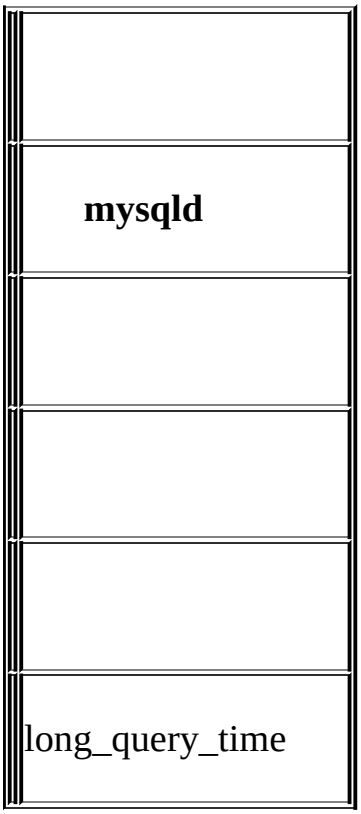
mysql_tzinfo_to_sql MySQL

6.7“”

5.11. MySQL

5.11.1.
5.11.2.
5.11.3.
5.11.4.
5.11.5.

MySQL **mysqld**



mysqld **mysqld** FLUSH LOGS**n**
mysqladmin refresh 13.5.5.2“FLUSH”

MySQL 6 *MySQL*

5.11.1.

mysqld

mysqldmysqld_safe **mysqld_safe**restarted mysqld **mysqld**

mysqld **mysqld** E.1.4“”

--log-error[=*file_name*]**mysqld** *file_name* **mysqld***host_name.err*
FLUSH LOGS-old**mysqld** (--log-error

--log-error(Windows)--console stderr

Windows --console .err

5.11.2.

mysqld --log[=*file_name*]-l [*file_name*] *file_name*
mysqld

mysqld (

()Unix

```
shell> mv hostname.log hostname-old.log
shell> mysqladmin flush-logs
shell> cp hostname-old.log to-backup-directory
shell> rm hostname-old.log
```

Windows

5.11.3.

DELETE“ ”

MySQL 5.1

6 *MySQL*

1%

--log-bin[=*file_name*] **mysqld**SQL *file_name* -bin A.8.1“MySQL”

(--log-bin=*file_name.extension*)

mysqld max_binlog_size max_binlog_size

mysqld '.index'--log-bin-index[=*file_name*] **mysqld** **mysqld**

RESET MASTER PURGE MASTER LOGS 13.5.5.5“RESET” 13.6.1“SQL”

6.7“”

20.4“”

mysqld

· --binlog-do-db=*db_name*

(USE)*db_name*

CREATE DATABASEALTER DATABASEDROP DATABASE

binlog-do-db=sales USE prices; UPDATE sales.january SET amount=amount+1000

· --binlog-ignore-db=*db_name*

(USE)*db_name*

binlog-ignore-db=sales USE prices; UPDATE sales.january SET amount=amount+1000

--binlog-do-dbCREATE DATABASEALTER DATABASEDROP DATABASE

CREATE/ALTER/DROP DATABASE

1. binlog-do-dbbinlog-ignore-db?

.

.

2. (binlog-do-dbbinlog-ignore-db)(USE?)?

.

.

3. binlog-do-db?

· binlog-do-db?

o

o

· No

4. binlog-ignore-db binlog-ignore-db?

.

.

binlog-do-db=salessales(binlog-do-db“ ”)

mysqladmin flush-logs PURGE MASTER LOGS(13.6.1 “SQL”)()

SUPERSET SQL_LOG_BIN=0 13.5.3“SET”

mysqlbinlog MySQL

```
shell> mysqlbinlog log-file | mysql -h server_name
```

mysqlbinlog 8.6“mysqlbinlog”

MySQL

BDBInnoDB (UPDATEDELETEINSERT) COMMIT COMMIT **mysqld** binlog_cache_size

Binlog_cache_use() Binlog_cache_disk_use binlog_cache_size

max_binlog_cache_size(4GB)

CREATE ... SELECT or INSERT ... SELECT

MySQL 5.1MySQL 6.5“MySQL”

(MySQL) sync_binlog(1)*N* 5.3.3“” sync_binlog 1, InnoDB MySQLCOMMIT InnoDB InnoDB --innodb-safe-binlog InnoDB (MySQL 5.1--innodb-safe-binlogXA

MySQL (sync_binlog =1)()InnoDB MySQL InnoDB ( )

MySQLInnoDB--innodb-safe-binlogInnoDB InnoDB/ MySQL(InnoDB) sync_binlog =1/() ("<>")

MyISAM A.4.3“MySQL”

5.11.4.

--log-slow-queries[=*file_name*] **mysqld**long_query_timeSQL

file_name -slow.log

mysqldumpslow

MySQL 5.1 --log-short-format 5.3.1“ **mysqld**”

MySQL 5.1,--log-slow-admin-statements OPTIMIZE TABLEANALYZE TABLE ALTER TABLE

5.11.5.

MySQL 5.11“MySQL”

MySQL MySQL 5.9.1“”

Linux (Redhat) mysql-log-rotate RPM**MySQL**

cron

mysqladmin flush-logsSQLFLUSH LOGS**MySQL**

- (--log)(--log-slow-queries) (mysql.log`hostname`-slow.log)
- (--log-update)(--log-bin)

```
shell> cd mysql-data-directory
shell> mv mysql.log mysql.old
shell> mysqladmin flush-logs
```

“mysql.old”

5.12. MySQL

5.12.1. Windows
5.12.2. Unix
5.12.3.

mysqldMySQL **mysqld** (Internet MySQL

4.3“”

· --port=*port_num*

--portTCP/IP

· --socket=*path*

--socketUnixUnixWindows Windows

· --shared-memory-base-name=*name*

Windows Windows

· --pid-file=*path*

Unix ID

· --log=*path*

· --log-bin=*path*

· --log-update=*path*

· --log-error=*path*

· --bdb-logdir=*path*

5.11.5“”

· --tmpdir=*path*

· --bdb-tmpdir=*path*

MySQL

--datadir=path

MyISAMMERGE

NFS MySQLNFS

· NFS

· NFS NFSlockd 100%

NFS CPU

MySQL --basedir=path PID
tarMySQL **bin/mysqld_safe** **mysqld_safe**--basedir**mysqld mysqld_safe**--socket--port

5.12.1. Windows

5.12.1.1. Windows
5.12.1.2. Windows

Windows Windows NT Windows MySQL
WindowsMySQL” 5.12“MySQL”

5.12.1.1. Windows

3307C:\mydata1**mysqld**3308C:\mydata1**mysqld-max**(my

C:\my-opts1.cnf

```
[mysqld]
datadir = C:/mydata1
port = 3307
```

C:\my-opts1.cnf

```
mysqld]
datadir = C:/mydata2
port = 3308
```

```
C:\> C:\mysql\bin\mysqld --defaults-file=C:\my-opts1.cnf
C:\> C:\mysql\bin\mysqld-max --defaults-file=C:\my-opts2.cnf
```

NT

C:\> **C:\mysql\bin\mysqladmin --port=3307 shutdown**

C:\> **C:\mysql\bin\mysqladmin --port=3308 shutdown**

TCP/IP Windows **mysqld-ntmysqld-max-nt** C:\my-opts1.cnf

```
[mysqld]
datadir = C:/mydata1
port = 3307
enable-named-pipe
socket = mypipe1
```

```
C:\> C:\mysql\bin\mysqld-nt --defaults-file=C:\my-opts1.cnf
```

2C:\my-opts2.cnf

5.12.1.2. Windows

NT MySQLWindows MySQL2.3.12“WindowsMySQL”

MySQL

mysqld-nt C:\mysql-4.1.8C:\mysql-5.1.2-alpha (4.1.8 5.1.2-alpha

--install--install-manualMySQL

· MySQL [mysqld]

· --install [mysqld]

· --defaults-file [mysqld]

MySQL 4.0.17 MySQL**mysqld**[mysqld] 4.0.17 [mysqld] [mysqld] MySQL

· **1** mysqld14.1.8**mysqld-nt**mysqld25.1.2-alpha**mysqld-nt** 4.1.8[mysqld1] 5.1.2-alpha[mysqld2] C:\my.cnf

```
· # options for mysqld1 service
· [mysqld1]
· basedir = C:/mysql-4.1.8
· port = 3307
· enable-named-pipe
· socket = mypipe1
·
· # options for mysqld2 service
```

```
·                [mysqld2]
·                basedir = C:/mysql-5.1.2-alpha
·                port = 3308
·                enable-named-pipe
·                socket = mypipe2
```

Windows

```
C:\> C:\mysql-4.1.8\bin\mysqld-nt --install mysqld1
C:\> C:\mysql-5.1.2-alpha\bin\mysqld-nt --install mysqld2
```

NET START

C:\> **NET START mysqld1**

C:\> **NET START mysqld2**

NET STOP

```
C:\> NET STOP mysqld1
C:\> NET STOP mysqld2
```

· **2** --defaults-file [mysqld]

4.1.8**mysqld-nt** C:\my-opts1.cnf

```
[mysqld]
basedir = C:/mysql-4.1.8
port = 3307
enable-named-pipe
socket = mypipe1
```

5.1.2-alpha**mysqld-nt**C:\my-opts2.cnf

```
[mysqld]
basedir = C:/mysql-5.1.2-alpha port = 3308
```

```
enable-named-pipe
socket = mypipe2
```

```
C:\> C:\mysql-4.1.8\bin\mysqld-nt -- installmysqld1
           --defaults-file=C:\my-opts1.cnf
C:\> C:\mysql-5.1.2-alpha\bin\mysqld-nt -- installmysqld2
           --defaults-file=C:\my-opts2.cnf
```

MySQL --defaults-file

mysqld --remove--remove (MySQL)

5.12.2. Unix

UnixTCP/IPsUnix PID

4.1.8TCP/IP(3306)Unix(/tmp/mysql.sock)5.1.2-alpha **configure**

```
shell> ./configure --with-tcp-port=port_number \
            --with-unix-socket-path=file_name \
            --prefix=/usr/local/mysql-5.1.2-alpha
```

*port_numberfile_name*TCP/IPUnix --prefixMySQL

MySQL Unix

```
shell> mysqladmin --host=host_name --port=port_number variables
```

localhost **mysqladmin**Unix TCP/IP MySQL 4.1 --protocol= TCP | SOCKET | PIPE | MEMORY}

UnixTCP/IP MySQL

```
shell> mysqld_safe --socket=file_name --port=port_number
```

--socket--port --datadir=path**mysqld_safe**

UnixTCP/IP

```
shell> MYSQL_UNIX_PORT=/tmp/mysqld-new.sock
shell> MYSQL_TCP_PORT=3307
shell> export MYSQL_UNIX_PORT MYSQL_TCP_PORT
shell> mysql_install_db --user=mysql
shell> mysqld_safe --datadir=/path/to/datadir &
```

shell

F **mysqld**

```
mysqld_safe --defaults-file=path
```

Unix **mysqld_multi** 5.1.5“mysqld_multiMySQL”

5.12.3.

MySQL

· --host=*host_name* --port=*port_number*TCP/IP --host=127.0.0.1 --port=*port_number*TCP/IP --host=localhost --socket=*file_name*UnixWindows

· MySQL 4.1 --protocol=tcpTCP/IP --protocol=socketUnix --protocol=pipe --protocol=memory TCP/IP --host--port --socket Unix --shared-memory-base-name Windows

· Unix MYSQL_UNIX_PORTMYSQL_TCP_PORTUnixTCP/IP .login F

· [client]UnixTCP/IP WindowsC:\my.cnf Unix.my.cnf 4.3.2 “”

· C mysql_real_connect() mysql_options() 25.2.3“C API ”

· Perl DBD::mysql MySQL

· $dsn = "DBI:mysql:test;mysql_read_default_group=cli

· . "mysql_read_default_file=/usr/local/mysql

· $dbh = DBI->connect($dsn, $user, $password);

25.4“MySQL Perl API”

5.13. MySQL

5.13.1.
5.13.2. SELECT
5.13.3.
5.13.4.

SELECT

Web

mysqldMyISAM

Linux Alpha 2 x 500MHz2GB RAM64MB MySQL

· () 13%

· 238%

query_cache_size0 MySQL **configure**--without-query-cache

5.13.1.

5.13.3“”

```
SELECT * FROM tbl_name
Select * from tbl_name
```

()

MySQLSELECT

Qcache_hits Com_select 5.13.4“”

MERGE INSERTUPDATEDELETETRUNCATEALTER TABLEDROP TABLEDROP DATABASE

COMMIT InnoDB

InnoDB

MySQL 5.1

SELECT SQL_CALC_FOUND_ROWS ...SELECT FOUND_ROWS() type FOUND_ROWS()

BENCHMARK()	CONNECTION_ID()	CURDATE()
CURRENT_DATE()	CURRENT_TIME()	CURRENT_TIMESTAMP()
CURTIME()	DATABASE()	ENCRYPT()
FOUND_ROWS()	GET_LOCK()	LAST_INSERT_ID()
LOAD_FILE()	MASTER_POS_WAIT()	NOW()
RAND()	RELEASE_LOCK()	SYSDATE()
UNIX_TIMESTAMP()	USER()	

· (UDFs)

.

· mysql

.

```
SELECT ...IN SHARE MODE
SELECT ...FOR UPDATE
SELECT ...INTO OUTFILE ...
SELECT ...INTO DUMPFILE ...
SELECT * FROM ...WHERE autoincrement_col IS NULL
```

ODBCID [26.1.14.1“ODBCAUTO_INCREMENT ”]

.

```
char *my_sql_stmt = "SELECT ab FROM table_c";
   /* ...*/
mysql_stmt_prepare(stmtmy_sql_stmtstrlen(my_sql_stmt));
```

[25.2.4“C API”]

· TEMPORARY

.

.

5.13.2. SELECT

SELECT

· SQL_CACHE

query_cache_typeONDEMAND

· SQL_NO_CACHE

```
SELECT SQL_CACHE id, name FROM customer;
SELECT SQL_NO_CACHE id, name FROM customer;
```

5.13.3.

have_query_cache

```
mysql> SHOW VARIABLES LIKE 'have_query_cache';
+------------------+-------+
| Variable_name    | Value |
+------------------+-------+
| have_query_cache | YES   |
+------------------+-------+
```

MySQL YES

mysqld query_cache_ 5.3.3“”

query_cache_size 0 0

query_cache_size 40KB (

mysql> **SET GLOBAL query_cache_size = 40000;**

Query OK, 0 rows affected, 1 warning (0.00 sec)

mysql> **SHOW WARNINGS\G**

*************************** 1. row ***************************

Level: Warning

Code: 1282

Message: Query cache failed to set size 39936; new query cache size is 0

mysql> **SET GLOBAL query_cache_size = 41984;**

Query OK, 0 rows affected (0.00 sec)

mysql> **SHOW VARIABLES LIKE 'query_cache_size';**

+------------------+-------+

| Variable_name | Value |

+------------------+-------+

| query_cache_size | 41984 |

+------------------+-------+

0query_cache_type

· 0OFF

· 1ON SELECT SQL_NO_CACHE

· 2DEMANDSELECT SQL_CACHE

query_cache_typeGLOBAL query_cache_type

mysql> **SET SESSION query_cache_type = OFF;**

query_cache_limit 1MB

query_cache_min_res_unit

· query_cache_min_res_unit4KB

·
Qcache_free_blocksQcache_lowmem_prunes

· Qcache_total_blocksQcache_queries_in_cache
query_cache_min_res_unit

5.13.4.

MySQL

mysql> **SHOW VARIABLES LIKE 'have_query_cache';**

```
+------------------+-------+
| Variable_name    | Value |
+------------------+-------+
| have_query_cache | YES   |
+------------------+-------+
```

FLUSH QUERY CACHE

RESET QUERY CACHE FLUSH TABLES

SHOW STATUS

```
mysql> SHOW STATUS LIKE 'Qcache%';
+-------------------------+--------+
|                       | |
+-------------------------+--------+
| Qcache_free_blocks      | 36     |
| Qcache_free_memory      | 138488 |
```

```
| Qcache_hits             | 79570  |
| Qcache_inserts          | 27087  |
| Qcache_lowmem_prunes    | 3114   |
| Qcache_not_cached       | 22989  |
| Qcache_queries_in_cache | 415    |
| Qcache_total_blocks     | 912    |
+-------------------------+--------+
```

5.3.4“”

SELECT

```
Com_select
+ Qcache_hits
+ queries with errors found by parser
```

Com_select

```
Qcache_inserts
+ Qcache_not_cached
+ queries with errors found during columns/rights check
```

Qcache_total_blocksQcache_free_blocks FLUSH QUERY CACHE

Qcache_lowmem_prunes (LRU) 5.13.3“”

MySQLMySQL dev.mysql.com

6MySQL

6.1.
6.2.
6.3.
6.3.1.
6.3.2. I/O
6.3.3. SQL
6.3.4.
6.4.
6.5. MySQL
6.6.
6.6.1. 5.0
6.7.
6.8.
6.9. FAQ
6.10.
6.11.
6.12. Auto-Increment

MySQL FAQ()

SQL 13.6“”

http://www.mysql.com

6.1.

MySQL (MySQL—17 *MySQL*

· /

· SELECT

· 5.9.1“”

6.2.

MySQL( ) 5.11.3“”

LOAD DATA FROM MASTER LOAD DATA FROM MASTERMyISAM

LOAD DATA FROM MASTERLOAD DATA FROM MASTER
1MB1 700MHz Pentium CPU100Mbps

6.3.

6.3.1.
6.3.2. I/O
6.3.3. SQL
6.3.4.

MySQL3(1 START SLAVE I/O SHOW PROCESSLIST Binlog Dump I/OBinlog Dump 3SQL

3 I/OSQL

SHOW PROCESSLIST

3SHOW PROCESSLIST

SHOW PROCESSLIST

```
mysql> SHOW PROCESSLIST\G
*************************** 1. row ***************************
     Id: 2
   User: root
   Host: localhost:32931
     db: NULL
Command: Binlog Dump
   Time: 94
  State: Has sent all binlog to slave; waiting for binlog to
         be updated
   Info: NULL
```

2

SHOW PROCESSLIST

```
mysql> SHOW PROCESSLIST\G
*************************** 1. row ***************************
     Id: 10
   User: system user
   Host:
     db: NULL
Command: Connect
   Time: 11
  State: Waiting for master to send event
   Info: NULL
*************************** 2. row ***************************
     Id: 11
   User: system user
   Host:
     db: NULL
Command: Connect
   Time: 11
  State: Has read all relay log; waiting for the slave I/O
         thread to update it
   Info: NULL
```

10I/O 11SQL SHOW PROCESSLIST

Time 6.9“FAQ”

6.3.1.

Binlog DumpState Binlog Dump—

· Sending binlog event to slave

· Finished reading one binlog; switching to next binlog

· Has sent all binlog to slave; waiting for binlog to be updated

· Waiting to finalize termination

6.3.2. I/O

I/OState Slave_IO_State SHOW SLAVE STATUS

· Connecting to master

· Checking master version

· Registering slave on master

· Requesting binlog dump

· Waiting to reconnect after a failed binlog dump request

() --master-connect-retry

· Reconnecting after a failed binlog dump request

· Waiting for master to send event

· Queueing master event to the relay log

SQL

· Waiting to reconnect after a failed master event read

() master-connect-retry

· Reconnecting after a failed master event read

Waiting for master to send event

· Waiting for the slave SQL thread to free enough relay log space

relay_log_space_limit I/OSQL

· Waiting for slave mutex on exit

6.3.3. SQL

SQLState

· Reading event from the relay log

· Has read all relay log; waiting for the slave I/O thread to update it

I/O

· Waiting for slave mutex on exit

I/OState

6.3.4.

host_name-relay-bin.nnnnnn *host_name* *nnnnnn* 000001 *host_name-relay-bin.index* --relay-log--relay-log-index

mysqlbinlog SQL SQL FLUSH LOGS SQL

· I/O

· FLUSH LOGS**mysqladmin flush-logs**

. “ ”

o max_relay_log_sizemax_relay_log_size > 0

o max_binlog_sizemax_relay_log_size = 0

master.inforelay-log.infoSHOW SLAVE STATUS(13.6.2“SQL”)

I/Omaster.info SHOW SLAVE STATUS

1	
2	Master_Log_File
3	Read_Master_Log_Pos
4	Master_Host

5	Master_User
6	(SHOW SLAVE STATUS)
7	Master_Port
8	Connect_Retry
9	Master_SSL_Allowed
10	Master_SSL_CA_File
11	Master_SSL_CA_Path
12	Master_SSL_Cert
13	Master_SSL_Cipher
14	Master_SSL_Key

SQLrelay-log.info SHOW SLAVE STATUS

1	Relay_Log_File

2	Relay_Log_Pos
3	Relay_Master_Log_File
4	Exec_Master_Log_Pos

CHANGE MASTER TO

LOAD DATA INFILE SQL_LOAD-* LOAD DATA INFILE --slave-load-tmpdir tmpdir

6.4.

MySQL

ID 6.9“FAQ”

MySQL 13.6.1“SQL” 13.6.2“SQL” 6.8“”

SQLSUPER

1. MySQL6.5“MySQL” MySQL

MySQLbug

2. REPLICATION SLAVE () (5.8“M

mydomain.com,repl slavepass GRANT

```
mysql> GRANT REPLICATION SLAVE ON *.*
    -> TO 'repl'@'%.mydomain.com' IDENTIFIED BY 'slavepass';
```

LOAD TABLE FROM MASTERLOAD DATA FROM MASTER

· SUPERRELOAD

· SELECT SELECTLOAD DATA FROM MASTER

3. FLUSH TABLES WITH READ LOCK

4. `mysql> FLUSH TABLES WITH READ LOCK`

InnoDB FLUSH TABLES WITH READ LOCKCOMMIT
InnoDB (InnoDB)(InnoDB) InnoDB InnoDB InnoDB
MySQL

FLUSH TABLES (

```
shell> tar -cvf /tmp/mysql-snapshot.tar .
```

this_db

```
shell> tar -cvf /tmp/mysql-snapshot.tar ./this_db
```

/tmp

```
shell> tar -xvf /tmp/mysql-snapshot.tar
```

mysql master.inforelay-log.info

FLUSH TABLES WITH READ LOCK

```
mysql > SHOW MASTER STATUS;
+---------------+----------+--------------+------------------+
| File          | Position | Binlog_Do_DB | Binlog_Ignore_DB |
+---------------+----------+--------------+------------------+
| mysql-bin.003 | 73       | test         | manual,mysql     |
+---------------+----------+--------------+------------------+
```

File Position mysql-bin.00373

```
mysql> UNLOCK TABLES
```

InnoDB **InnoDB Hot Backup** **Hot Backup**() MySQL http://www.innodb.com/manual.php**InnoDB Hot Backup**

Hot Backup InnoDBInnoDB (.frm)

```
mysql> FLUSH TABLES WITH READ LOCK;
mysql> SHOW MASTER STATUS;
```

SHOW MASTER STATUS

```
shell> mysqladmin -u root shutdown
```

MyISAMInnoDBSQL **mysqldump --master-data**SQL

--logs-binSHOW MASTER STATUS**mysqldump --master-data** (")4.

5. my.cnf[mysqld]log-bin server-id=Master_id master_id12^{32}–1

```
6.          [mysqld]
7.          log-bin=mysql-bin
8.          server-id=1
```

9. my.cnf

```
10.         [mysqld]
11.         server-id=slave_id
```

slave_idMaster_id 12^{32}–1 IDID

```
[mysqld]
server-id=2
```

server-id server-idIP ID

server-id master-host12server-id

12. MySQL

mysqldum ()

13. --skip-slave-start --logs-warnings()( ) 1

14.**mysqldump**

```
15.         shell> mysql -u root -p < dump_file.sql
16.
17.         mysql> CHANGE MASTER TO
```

```
18.             ->     MASTER_HOST='master_host_name',
19.             ->     MASTER_USER='replication_user_name',
20.             ->     MASTER_PASSWORD='replication_password',
21.             ->     MASTER_LOG_FILE='recorded_log_file_name',
22.             ->     MASTER_LOG_POS=recorded_log_position;
```

Master_Host	60
Master_USER	16
Master_PASSWORD	32
Master_Log_File	255

23.

```
24.         mysql> START SLAVE
```

server-id

server-id

```
Warning: You should set server-id to a non-0 value if master_host is
we will force server id to 2, but this MySQL server will not act as
```

dmaster.inforelay-log.info CHANGE MASTER TO

master.infoin my.cnf 6.8“”

InnoDB my.cnfinnodb_flush_log_at_trx_commit=1sync-binlog=1

6.5. MySQL

MySQL 5.1 LOAD DATA INFILE

(MySQL 5.0MySQL 4.1 6.6“”

MySQL alphabeta() MySQL 5.1.x(MySQL 3.234.04.1)

SQL 5.15.0 5.1SQL5.0 6.7“”

6.6.

6.6.1. 5.0

6.6.1. 5.0

MySQL 3.234.04.15.14.04.0.3

MySQL5.1 5.1.x 5.1.x 5.1 5.1

5.1.x 5.15.1 5.1 5.1

5.1 5.15.15.1 5.1

6.7.

SQL MySQL 5.0.0TIMESTAMPADD() MySQL 5.0.0 5.1 MySQL MySQL

InnoDB15.2.6.5“InnoDBMySQL”

20.4“”

· AUTO_INCREMENTLAST_INSERT_ID()TIMESTAMP

· USER()UUID()LOAD_FILE()

·
GET_LOCK()RELEASE_LOCK()IS_FREE_LOCK()IS_USED_LOCK()
(INSERT INTO mytable VALUES(GET_LC

· MySQL 5.1FOREIGN_KEY_CHECKSSQL_MODEUNIQUE_CHECKS SQL_AUTO_IS_NULL TABLE_TYPESTORAGE_ENGINE

·

· MySQL

1. (--default-character-set--default-collation)

2. MySQL 4.1.3(SET NAMESSET CHARACTER SET) 4.1.3 (NAMESCHARACTER SETCOLLATION_CLIENTCOLLATION_SERVER)

3. collation_server CREATE TABLE (Bug #2326)CREATE TABLE

· NOW()FROM_UNIXTIME() mysqld_safe--timezone=*timezone_name*TZMySQL --default-time-zone

· CONVERT_TZ(...,...,@global.time_zone) 5.0.4 CONVERT_TZ(...,...,@session.time_zone)

· SET MAX_JOIN_SIZE=1000INSERT INTO mytable

VALUES(@MAX_JOIN_SIZE) SET TIME_ZONE=...INSERT INTO mytable VALUES(CONVERT_TZ(...,...,@time_zone))

· InnoDBMyISAM BEGIN/COMMIT BEGIN TODO

· MySQL 5.1(*@var_name*) 4.1 MySQL 5.1 5.1

· SSL

· slave_transaction_retriesInnoDB InnoDBinnodb_lock_wait_timeoutNDB TransactionDeadlockDetectionTimeout TransactionInactiveTimeoutREPLICATION SLAVESQL slave_transaction_retries 10MySQL 5.0.4 SHOW STATUS 5.3 “”

· CREATE TABLEDATA DIRECTORYINDEX DIRECTORY MySQL 5.1NO_DIR_IN_CREATEsql_mode SQL CREATE TABLE MyISAM

· (A.8.1“MySQL”

· READ LOCKFLUSH LOGSFLUSH MASTERFLUSH SLAVEFLUSH TABLES 13.5.5.2“FLUSH” FLUSH TABLESANALYZE TABLEOPTIMIZE TABLEREPAIR TABLE mysqlGRANT FLUSH PRIVILEGES FLUSH TABLESMERGEMyISAM FLUSH TABLESNO_WRITE_TO_BINLOGLOCAL

· MySQL SELECT

· MEMORY 1MEMORY DELETE FROM 15.4 “MEMORY (HEAP)”

· ()

1. STOP SLAVE

2. SHOW STATUSslave_open_temp_tables

3. 0**mysqladmin shutdown**

4. 0START SLAVE

5.

· --logs-slave-updates/

```
A -> B -> C -> A
```

ID A(--replicate-same-server-idA) AC AC

· SQL ( )START SLAVE

.
slave_net_timeout slave_net_timeout5.3.3“”

.
“”(MySQL 5.1--innodb-safe-binlogXA

· MyISAM --slave-skip-errors()

· BEGIN/COMMIT

· ROLLBACK 1 2 2 1

6.8.

server-idID12^{32}–1 server-id=3

5.11.3“”

MySQL 5.1

master.info

· --master-host

· --master-user

· --master-password

· --master-port

· --master-connect-retry

· --master-ssl

· --master-ssl-ca

· --master-ssl-capath

· --master-ssl-cert

· --master-ssl-cipher

· --master-ssl-key

5.1master.infoSSL 1 smaster.info 1

master.info RESET SLAVE

master.info master.info

master.info master.info master.info ()CHANGE MASTER TO

my.cnf

```
[mysqld]

master-host=some_host
```

1 my.cnf master.info master.info my.cnfsome_other_host CHANGE MASTER TO

master.info CHANGE MASTER TO 13.6.2.1“CHANGE MASTER TO”

```
[mysqld]

server-id=2

master-host=db-master.mycompany.com

master-port=3306

master-user=pertinax

master-password=freitag

master-connect-retry=60

report-host=db-slave.mycompany.com
```

CHANGE MASTER TO --replicate-*

· --logs-slave-updates

```
A -> B -> C
```

AB BC B --logs-binAB --logs-slave-updatesB

· --logs-warnings

/ --skip-logs-warnings 1

· --master-connect-retry=*seconds*

· --master-host=*host*

IP .info

· --master-info-file=*file_name*

mysql.info

· --master-password=*password*

.info

· --master-port=*port_number*

TCP/IP .info **configure** 3306

· --master-ssl--master-ssl-ca=*file_name*--master-ssl-capath=*directory_name*--master-ssl-cert=*file_name*--master-ssl-cipher=*cipher_list*--master-ssl-key=*file_name*

SSL 5.8.7.6“SSL” —ssl--ssl-ca--ssl-capath--ssl-cert--ssl-cipher--ssl-key .info

· --master-user=*username*

REPLICATION SLAVE .info test

· --max-relay-logs-size=*size*

5.3.3“”

· --read-only

SUPER

· --relay-log=*file_name*

host_name-relay-bin.nnnnnnhost_name *nnnnnn* (max_relay_log_size)

· --relay-log-index=*file_name*

host_name-relay-bin.indexhost_name

· --relay-log-info-file=*file_name*

relay-log.info

· --relay-log-purge={0|1}

1() SET GLOBAL Relay_log_purge

· --relay-log-space-limit=*size*

(0“ ”) I/O SQL SQL I/O SQL (--relay-log-space-limit--max-relay-logs-size(--max-relay-logs-size0--max-binlog-size) I/O --relay-log-space-limitSQL I/O I/O--relay-log-space-limit

· --replicate-do-db=*db_name*

(USE)*db_name* UPDATE *some_db.some_table* SET foo='bar' --replicate-wild-do-table=*db_name*.%

--replicate-do-db=sales UPDATE

```
USE prices;
UPDATE sales.january SET amount=amount+1000;
```

--replicate-wild-do-table=*db_name*.%

“” (DELETEUPDATE)

· --replicate-do-table=*db_name.tbl_name*

· --replicate-ignore-db=*db_name*

(USE)*db_name*

--replicate-ignore-db=sales UPDATE

· `USE prices;`

· `UPDATE sales.january SET amount=amount+1000;`

--replicate-wild-ignore-table=*db_name*.%

· --replicate-ignore-table=*db_name.tbl_name*

() --replicate-ignore-db

· --replicate-wild-do-table=*db_name.tbl_name*

‘ %’‘ _’ LIKE

--replicate-wild-do-table=foo%.bar%foobar

% (CREATE DATABASEDROP DATABASEALTER DATABASE) --replicate-wild-do-table=foo%.%foo%

my_own%db my1ownAABCdb‘ _’‘ %’ --replicate-wild-do-table=my_own\%db **bash**--replicate-wild-do-table=my_own\\%db

· --replicate-wild-ignore-table=*db_name.tbl_name*

--replicate-wild-ignore-table=foo%.bar%foobar

--replicate-wild-do-table --replicate-wild-ignore-table

· --replicate-rewrite-db=*from_name->to_name*

(USE)*from_nameto_name*(CREATE DATABASEDROP DATABASEALTER DATABASE)*from_name* --replicate-*

‘ >’

```
shell> mysqld --replicate-rewrite-db="olddb->newdb"
```

· --replicate-same-server-id

0 1id --logs-slave-updates1idI/O()--replicate-same-server-idSQL

· --report-host=*slave_name*

IP SHOW SLAVE HOSTS TCP/IPIP NAT I

· --report-port=*slave_port*

TCP/IP

· --skip-slave-start

START SLAVE

· --slave_compressed_protocol={0|1}

1 /

· --slave-load-tmpdir=*file_name*

tmpdir SQLLOAD DATA INFILE --relay-log --slave-load-tmpdir LOAD DATA INFILE

· --slave-net-timeout=*seconds*

· --slave-skip-errors=[*err_code1*,*err_code2*,... | all]

bugMySQLbug

SHOW SLAVE STATUS B

()all (bug)

```
--slave-skip-errors=1062,1053
--slave-skip-errors=all
```

--replicate-*

1. --replicate-do-db--replicate-ignore-db

· --binlog-do-db--binlog-ignore-db(5.11.3“”)

o

o

.

2.

.

.

3. --replicate-*-table

.

· ( )(INSERT INTO sales SELECT * FROM prices:sales)()1(
“ do”“ ignore”) 1 2

4. --replicate-do-table

.

o

o

.

5. --replicate-ignore-table

.

o

o

.

6. --replicate-wild-do-table

.

o

o

.

7. --replicate-wild-ignore-table

.

o

o

.

8. --replicate-*-table

.

· --replicate-do-table--replicate-wild-do-table

o “ do”

o

6.9. FAQ

Q

A (SHOW MASTER STATUS)

1. ID

2.

```
mysql> CHANGE MASTER TO
    ->     MASTER_HOST='master_host_name',
    ->     MASTER_USER='master_user_name',
    ->     MASTER_PASSWORD='master_pass',
    ->     MASTER_LOG_FILE='recorded_log_file_name',
   ->     MASTER_LOG_POS=recorded_log_position;
```

3. START SLAVE

1.

```
mysql> FLUSH TABLES WITH READ LOCK
```

2.

```
shell> tar zcf /tmp/backup.tar.gz /var/lib/mysql
```

3.

```
mysql>SHOW MASTER STATUS
```

4.

```
mysql> UNLOCK TABLES
```

SQL **mysqldump --master-data**SQL

LOAD DATA FROM MASTER LOAD DATA FROM MASTER
MyISAM FLUSH TABLES WITH READ LOCK

Q

A /

Q?

ASHOW SLAVE STATUSSeconds_Behind_Master 6.3“”

SQL TIMESTAMP SHOW PROCESSLISTTime SQL
SHOW PROCESSI

Q

A

1.

```
mysql> FLUSH TABLES WITH READ LOCK;
```

mysql> **SHOW MASTER STATUS;**

SHOW

2. Master_POS_WAIT()

```
mysql> SELECT MASTER_POS_WAIT('log_name', log_offset);
```

SELECT

3.

```
mysql> UNLOCK TABLES
```

Q

AMySQL() A-1 -2 B-2 A-1 A-2 -1 -2

Q

A --skip-innodb--skip-bdb--low-priority-updates--delay-key-write=ALL MyISAMInnoDBBDB

Q

A

· safe_writer_connect()

· safe_reader_connect()

· safe_reader_statement()

· safe_writer_statement()

safe_

replace MySQL

QMySQL

AMySQL /

10%90% max_reads1200 –2 × max_writes 1,200 *N*

reads = 1200 – 2 × writes

reads = 9 × writes / (*N* + 1) (,)

9 × writes / (*N* + 1) + 2 × writes = 1200

writes = 1200 / (2 + 9/(*N*+1))

N 1,200 9

· *N* = 0 1200/11 = 109

· *N* = 1184

· *N* = 8400

· *N* = 17480

· *N* 600 5.5 8 4

· /?

·

· ?

Q/?

A

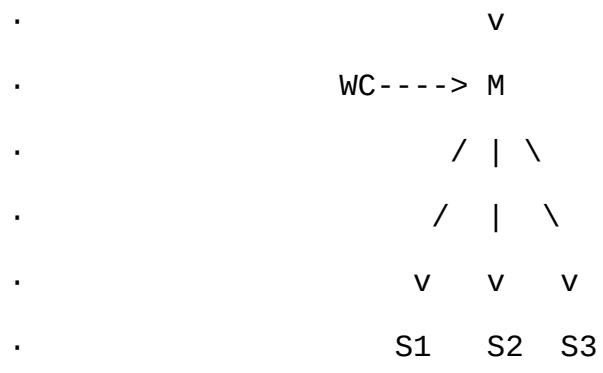
· CHANGE MASTER TO

· DNS bindnsupdateDNS

· --logs-bin --logs-slave-updates STOP SLAVE; RESET MASTER, CHANGE MASTER TO

· WC

· \

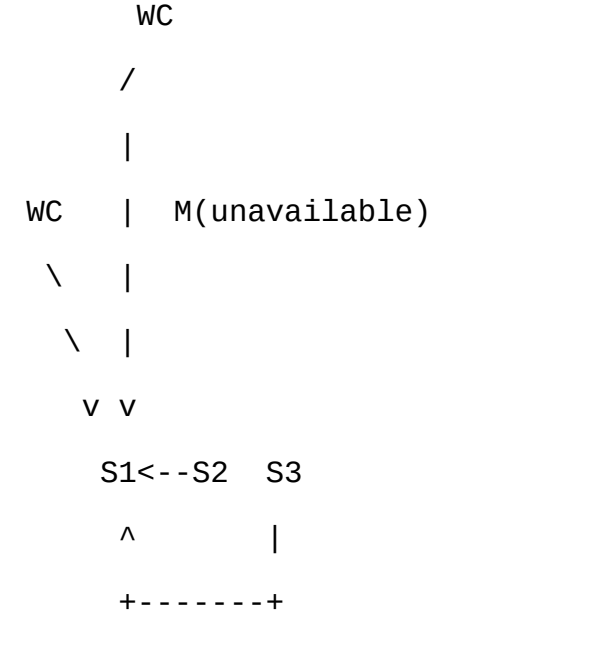


M S WC S1S2S3 --logs-bin--logs-slave-updates -logs-slave-updates **M S1WCS1S2S3S1**

STOP SLAVE IO_THREAD SHOW PROCESSLIST Has read all relay log **S1** STOP SLAVERESET MASTER

S2S3STOP SLAVECHANGE MASTER TO MASTER_HOST='S1' 'S1'**S1** CHANGE MASTER**S2S3S1***userpasswordport* CHANGE MASTER **S1** 1 4CHANGE MASTER **S2S3**START SL

WC S1 WCS1S1 S1M S1



M MCHANGE MASTER **S2S3 MS1WC M S1**

M **S1S2S3M** **M**RESET MASTER **MWC**

MySQL

6.10.

.

· SHOW MASTER STATUS Position log-binserver-id

· SHOWSHOW SLAVE STATUSslave_IO_Running slave_SQL_RunningYes

· SHOW PROCESSLISTI/OSQLState 6.3“” I/O Connecting to master DNS

.

· ()

1. START SLAVE

2. ()

3.

4. `mysql> SET GLOBAL SQL_slave_SKIP_COUNTER = n`

5. `mysql> START SLAVE`

AUTO_INCREMENTLAST_INSERT_ID()*n* 1 2AUTO_INCREMENT LAST_INSERT_ID()2

6. bug MySQL

6.11.

bug bugbug

bugbug http://bugs.mysql.com/“ phantom” ()

1.

2. --logs-slave-updates--logs-bin

3.

.

.

· SHOW MASTER STATUS

· SHOW SLAVE STATUS

.

4. **mysqlbinlog**

```
5.          shell> mysqlbinlog -j pos_from_slave_status \
6.                      /path/to/log_from_slave_status | head
```

bug http://bugs.mysql.com/

6.12. Auto-Increment

auto_increment auto_increment

auto_increment_incrementauto_increment_offsetAUTO_INCREMENT ()1 65,535

AUTO_INCREMENT

AUTO_INCREMENT

· auto_increment_increment

```
· mysql> SHOW VARIABLES LIKE 'auto_inc%';
· +--------------------------+-------+
· | Variable_name            | Value |
· +--------------------------+-------+
· | auto_increment_increment | 1     |
· | auto_increment_offset    | 1     |
· +--------------------------+-------+
· 2 rows in set (0.00 sec)
·
· mysql> CREATE TABLE autoinc1 (col INT NOT NULL AUTO
· Query OK, 0 rows affected (0.04 sec)
·
· mysql> SET @auto_increment_increment=10;
· Query OK, 0 rows affected (0.00 sec)
·
· mysql> SHOW VARIABLES LIKE 'auto_inc%';
· +--------------------------+-------+
```

```
·               | Variable_name            | Value |
·               +--------------------------+-------+
·               | auto_increment_increment | 10    |
·               | auto_increment_offset    | 1     |
·               +--------------------------+-------+
·               2 rows in set (0.01 sec)
·
·               mysql> INSERT INTO autoinc1 VALUES (NULL), (NULL),
·               Query OK, 4 rows affected (0.00 sec)
·               Records: 4  Duplicates: 0  Warnings: 0
·
·               mysql> SELECT col FROM autoinc1;
·               +-----+
·               | col |
·               +-----+
·               |   1 |
·               |  11 |
·               |  21 |
·               |  31 |
·               +-----+
·               4 rows in set (0.00 sec)
```

(SHOW VARIABLES

· auto_increment_offsetAUTO_INCREMENT (1010)

```
mysql> SET @auto_increment_offset=5;
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> SHOW VARIABLES LIKE 'auto_inc%';
+--------------------------+-------+
| Variable_name            | Value |
+--------------------------+-------+
| auto_increment_increment | 10    |
| auto_increment_offset    | 5     |
+--------------------------+-------+
2 rows in set (0.00 sec)

mysql> CREATE TABLE autoinc2 (col INT NOT NULL AUTO_INCREMENT PRIMAR
Query OK, 0 rows affected (0.06 sec)

mysql> INSERT INTO autoinc2 VALUES (NULL), (NULL), (NULL), (NULL);
Query OK, 4 rows affected (0.00 sec)
Records: 4  Duplicates: 0  Warnings: 0

mysql> SELECT col FROM autoinc2;
+-----+
| col |
+-----+
|   5 |
|  15 |
|  25 |
|  35 |
+-----+
```

```
4 rows in set (0.02 sec)
```

5.3.3“”

MySQLMySQL dev.mysql.com

7

7.1.
- 7.1.1. MySQL
- 7.1.2.
- 7.1.3. MySQL
- 7.1.4. MySQL
- 7.1.5.

7.2. SELECT
- 7.2.1. EXPLAINSELECT
- 7.2.2.
- 7.2.3. SELECT
- 7.2.4. MySQLWHERE
- 7.2.5.
- 7.2.6.
- 7.2.7. MySQLIS NULL
- 7.2.8. MySQLDISTINCT
- 7.2.9. MySQLLEFT JOINRIGHT JOIN
- 7.2.10. MySQLJoin
- 7.2.11. MySQL
- 7.2.12. MySQLORDER BY
- 7.2.13. MySQLGROUP BY
- 7.2.14. MySQLLIMIT
- 7.2.15.
- 7.2.16. INSERT
- 7.2.17. UPDATE
- 7.2.18. DELETE
- 7.2.19.

7.3.
- 7.3.1.
- 7.3.2.

7.4.
- 7.4.1.
- 7.4.2.
- 7.4.3.

7.4.4.
7.4.5. MySQL
7.4.6. MyISAM
7.4.7. MyISAM
7.4.8. MySQL
7.4.9. MySQL
7.4.10.
7.5. MySQL
7.5.1.
7.5.2.
7.5.3.
7.5.4. MySQL
7.5.5. MySQL
7.5.6. MySQLDNS
7.6.
7.6.1.

MySQL

7.1.

7.1.1. MySQL
7.1.2.
7.1.3. MySQL
7.1.4. MySQL
7.1.5.

- 10ms1
- / 10-20Mb/s
- CPU

· CPUCPU

7.1.1. MySQL

MyISAM MySQL 15

MySQL ()MySQL INSERTUPDATEIGNORE

· SQL(TRADITIONAL SQL) NOT NULL

· MySQL“ ” 0 TRADITIONAL SQL

· 1/0NULL(ERROR_FOR_DIVISION_BY_ZERO SQL)

MySQL ()

1.8.6“MySQL” 13.2.4“INSERT” 5.3.2“SQL”

7.1.2.

SQLSQL SQL /

SQL

MySQLcrash-me **crash-me** 450

crash-me InformixDB218

crash-meMySQL **MySQL**“sql-bench” DBIPerl DBI

crash-me http://dev.mysql.com/tech-resources/crash-me.php
http://dev.mysql.com/tech-resources/benchmarks/

SQL **MySQL**MyISAM () Oracle

“” C

(**MySQL**REPLACE)SQL

MySQL/*! */**MySQL** /**/SQL()

web‘’

MySQL 5.13“MySQL”

7.1.3. MySQL

Mysql

MySQL MySQL MySQL

(7)4-10“”

“” /(id...)

C SQLGIF Webperl

SQL

ODBC

Sun Ultra SPARC(2x200MHz) L

7.1.4. MySQL

MySQL(**crash-me**) MySQL“sql-bench”

SQL

· MySQL http://dev.mysql.com/downloads/ (2.8.3“”)

· Perl Perl DBI DBIDBD MySQLPostgreSQLDB2 DBD::mysqlDBD::PgDBD::DB2 2.13“Perl”

MySQL sql-bench MySQLsql-benchrun-all-tests

shell> **cd sql-bench**

shell> **perl run-all-tests --server=*server_name***

server_name

```
shell> perl run-all-tests --help
```

crash-mesql-bench **crash-me**

.

.

.

.

· VARCHAR

http://dev.mysql.com/tech-resources/crash-me.php**crash-me**
http://dev.mysql.com/tech-resources/benchmarks/

7.1.5.

(“”)

MySQL 7.1.4“MySQL”

http://osdb.sourceforge.net/

7.2. SELECT

7.2.1. EXPLAINSELECT
7.2.2.
7.2.3. SELECT
7.2.4. MySQLWHERE
7.2.5.
7.2.6.
7.2.7. MySQLIS NULL
7.2.8. MySQLDISTINCT
7.2.9. MySQLLEFT JOINRIGHT JOIN
7.2.10. MySQLJoin
7.2.11. MySQL
7.2.12. MySQLORDER BY
7.2.13. MySQLGROUP BY
7.2.14. MySQLLIMIT
7.2.15.
7.2.16. INSERT
7.2.17. UPDATE
7.2.18. DELETE
7.2.19.

GRANT MySQL tables_privcolumns_priv

MySQL **mysql**BENCHMARK() BENCHMARK(*loop_*

```
mysql> SELECT BENCHMARK(1000000,1+1)
+------------------------+
| BENCHMARK(1000000,1+1) |
+------------------------+
|                      0 |
```

```
+------------------------+
1 row in set (0.32 sec)
```

PentiumII 400MHz **MySQL**0.321,000,000+

MySQL BENCHMARK()

7.2.1. EXPLAINSELECT

```
EXPLAIN tbl_name
```

```
EXPLAIN [EXTENDED] SELECT select_options
```

EXPLAINDESCRIBE MySQLSELECT

· EXPLAIN *tbl_name*DESCRIBE *tbl_name*SHOW COLUMNS FROM *tbl_name*

· SELECTEXPLAIN**MySQL**SELECT

EXPLAIN2

EXPLAINSELECT

ANALYZE TABLE 13.5.2.

SELECT STRAI(

EXPLAINSELECT MySQL **MySQL***single-sweep multi-join* **MySQL** 3

EXTENDED EXPLAIN SHOW WARNINGS SELECT SELE

EXPLAIN

· id

SELECT SELECT

· select_type

SELECT

o SIMPLE

SELECT(UNION)

o PRIMARY

SELECT

o UNION

UNIONSELECT

o DEPENDENT UNION

UNIONSELECT

o UNION RESULT

UNION

o SUBQUERY

SELECT

o DEPENDENT SUBQUERY

SELECT

o DERIVED

SELECT(FROM)

· table

· type

o system

(=)const

o const

constPRIMARY KEYUNIQUE *tbl_name*const

```
SELECT * from tbl_name WHERE primary_key=1
```

```
SELECT * from tbl_name
WHERE primary_key_part1=1  primary_key_part2=2
```

o eq_ref

const

eq_ref=

MySQLeq_ref*ref_tables*

```
SELECT * FROM ref_table,other_table
  WHERE ref_table.key_column=other_table.column;
```

```
SELECT * FROM ref_table,other_table
  WHERE ref_table.key_column_part1=other_table.column
    AND ref_table.key_column_part2=1;
```

o ref

ref=<=>

MySQLref*ref_tables*

```
SELECT * FROM ref_table WHERE key_column=expr;

SELECT * FROM ref_table,other_table
  WHERE ref_table.key_column=other_table.column;

SELECT * FROM ref_table,other_table
  WHERE ref_table.key_column_part1=other_table.column
    AND ref_table.key_column_part2=1;
```

o ref_or_null

refMySQLNULL

MySQLref_or_null*ref_tables*

```
SELECT * FROM ref_table
WHERE key_column=expr OR key_column IS NULL;
```

7.2.7“MySQLIS NULL ”

o index_merge

key key_len 7.2.6“”

o unique_subquery

INref

```
value IN (SELECT primary_key FROM single_table WHERE some_expr)
```

unique_subquery

o index_subquery

unique_subqueryIN

```
value IN (SELECT key_column FROM single_table WHERE some_expr)
```

o range

key key_len refNULL

=<>>>=<<=IS NULL<=>BETWEENIN range

```
SELECT * FROM tbl_name
WHERE key_column = 10;

SELECT * FROM tbl_name
WHERE key_column BETWEEN 10 and 20;

SELECT * FROM tbl_name
WHERE key_column IN (10,20,30);

SELECT * FROM tbl_name
WHERE key_part1= 10 AND key_part2 IN (10,20,30);
```

o index

ALL ALL

MySQL

o ALL

const

· possible_keys

possible_keys**MySQL** EXPLAIN possible_keys

NULL WHERE EXPLAIN [13.1.2“ALTER TABL

SHOW INDEX FROM *tbl_name*

· key

key**MySQL** NULLMySQLpossible_keys FORCE INDEXUSE INDEXIGNORE INDEX13.2.7“SELECT”

MyISAMBDB ANALYZE TABLE MyISAM **myisamchk --analyz** 13.5.2.1“ANALYZE TABLE” 5.9.4“”

· key_len

key_len**MySQL** NULLNULLkey_lenMySQL

· ref

refkey

· rows

rows**MySQL**

· Extra

MySQL

o Distinct

MySQL1

o Not exists

MySQLLEFT JOIN 1LEFT JOIN

```
SELECT * t1 LEFT JOIN t2 ON t1.id=t2.id
  WHERE t2.id IS NULL
```

t2.idNOT NULL MySQLt1.idt1t2 MySQLt2 t2.idNULLt2id MySQLt2 t2

o range checked for each record (index map: #)

MySQL MySQLrangeindex_merge 7.2.5“” 7.2.6 “”

o Using filesort

MySQL WHERE 7.2.12“MySQLORDER BY ”

o Using index

o Using temporary

MySQL GROUP BYORDER BY

o Using where

WHERE ExtraUsing whereALLindex

Using filesort Using temporaryExtra

o Using sort_union(...), Using union(...), Using intersect(...)

index_merge 7.2.6“”

o Using index for group-by

Using index Using index for group-byMySQL GROUP BYD

EXPLAINrows **MySQL** max_join_size SELECT 7.5.2“ ”

JOINEXPLAIN

SELECT EXPLAIN

```
EXPLAIN SELECT tt.TicketNumber, tt.TimeIn,
               tt.ProjectReference, tt.EstimatedShipDate,
               tt.ActualShipDate, tt.ClientID,
               tt.ServiceCodes, tt.RepetitiveID,
               tt.CurrentProcess, tt.CurrentDPPerson,
               tt.RecordVolume, tt.DPPrinted, et.COUNTRY,
               et_1.COUNTRY, do.CUSTNAME
        FROM tt, et, et AS et_1, do
        WHERE tt.SubmitTime IS NULL
          AND tt.ActualPC = et.EMPLOYID
          AND tt.AssignedPC = et_1.EMPLOYID
          AND tt.ClientID = do.CUSTNMBR;
```

.

tt	ActualPC	CHAR(10)
tt	AssignedPC	CHAR(10)
tt	ClientID	CHAR(10)
et	EMPLOYID	CHAR(15)
do	CUSTNMBR	CHAR(15)

.

tt	ActualPC
tt	AssignedPC
tt	ClientID
et	EMPLOYID()
do	CUSTNMBR()

· tt.ActualPC

EXPLAIN

```
table type possible_keys key  key_len ref  rows  Extra
et    ALL  PRIMARY       NULL NULL    NULL 74
do    ALL  PRIMARY       NULL NULL    NULL 2135
et_1  ALL  PRIMARY       NULL NULL    NULL 74
tt    ALL  AssignedPC,   NULL NULL    NULL 3872
           ClientID,
           ActualPC
```

```
      range checked for each record (key map: 35)
```

typeALL**MySQL** 74 * 2135 * 74 * 3872 = 45,268,558,72(
……

MySQL VARCHARCHAR tt.ActualPCCHAR(10) CHAR(15)

ALTER TABLEActualPC1015

```
mysql> ALTER TABLE tt MODIFY ActualPC VARCHAR(15);
```

tt.ActualPCet.EMPLOYIDVARCHAR(15)EXPLAIN

```
table type   possible_keys key     key_len ref         rows    Extra
tt    ALL    AssignedPC,   NULL    NULL    NULL        3872    Using
             ClientID,                                        where
             ActualPC
do    ALL    PRIMARY       NULL    NULL    NULL        2135
      range checked for each record (key map: 1)
et_1  ALL    PRIMARY       NULL    NULL    NULL        74
      range checked for each record (key map: 1)
et    eq_ref PRIMARY       PRIMARY 15      tt.ActualPC 1
```

rows74

2tt.AssignedPC = et_1.EMPLOYIDtt.ClientID = do.CUSTNMBR

```
mysql> ALTER TABLE tt MODIFY AssignedPC VARCHAR(15),
    ->                MODIFY ClientID   VARCHAR(15);
```

EXPLAIN

```
table type   possible_keys key      key_len ref           rows Extra
et    ALL    PRIMARY       NULL     NULL    NULL          74
tt    ref    AssignedPC,   ActualPC 15      et.EMPLOYID   52   Using
             ClientID,                                        where
             ActualPC
et_1  eq_ref PRIMARY       PRIMARY  15      tt.AssignedPC 1
do    eq_ref PRIMARY       PRIMARY  15      tt.ClientID   1
```

MySQLtt.ActualPC tt **MySQL**

```
mysql> ANALYZE TABLE tt
```

“” EXPLAIN

```
table type   possible_keys key     key_len ref           rows Extra
tt    ALL    AssignedPC    NULL    NULL    NULL          3872 Using
             ClientID,                                        where
             ActualPC
et    eq_ref PRIMARY       PRIMARY 15      tt.ActualPC   1
et_1  eq_ref PRIMARY       PRIMARY 15      tt.AssignedPC 1
do    eq_ref PRIMARY       PRIMARY 15      tt.ClientID   1
```

EXPLAINrows**MySQL**“” SELECTSTRAIGHT_JOINFROM

7.2.2.

1() B log(*r*

2/(*index_length* + *data_pointer_length*))+1

MySQL 1024 4 3()500,000 log(500,000)/log(1024/3*2/(3+4))+1=

4

500,000 * 7 * 3/2 = 5.2MB(2/3) 1-2OS

4() 2

log*N* OSSQL (log*N*)
key_buffer_size 7.5.2“”

7.2.3. SELECT

SELECT ... WHERE EXPLAINSELECT
” 7.2.1“EXPLAINSELECT ”

MyISAM

· **MySQL** ANALYZE TABLE**myisamchk --analyze**
1 MySQL SHOW INDEX FROM *tbl_name*Cardinality **myisamchk --description --verbose**

· **myisamchk --sort-index --sort-records=1** 1

7.2.4. MySQLWHERE

WHERE SELECT DELETEUPDATEWHERE

MySQL MySQL

MySQL

·

· ((a AND b) AND c OR (((a AND b) AND (c AND

· -> (a AND b AND c) OR (a AND b AND c AND d)

·

· (a<b AND b=c) AND a=5

```
·                -> b>5 AND b=c AND a=5
```

· ()

```
·                   (B>=5 AND B=5) OR (B=6 AND 5=5) OR (B=7 AND 5=6)
·                -> B=5 OR B=6
```

·

- MyISAMHEAP WHERECOUNT(*) NOT NULL
- **MySQL**SELECT
- GROUP BY(COUNT()MIN()……)HAVINGWHERE
- WHEREWHERE
-
  - 1
  - PRIMARY KEYUNIQUEWHERE NOT NULL

```
mysql> SELECT * FROM t WHERE primary_key=1;

mysql> SELECT * FROM t1,t2
           WHERE t1.primary_key=1 AND t2.primary_key=t1.id;
```

- ORDER BYGROUP BY
- ORDER BYGROUP BY ORDER BYGROUP BY
- SQL_SMALL_RESULT**MySQL**
-
- MySQL
- HAVING

```
SELECT COUNT(*) FROM tbl_name;


SELECT MIN(key_part1),MAX(key_part1) FROM tbl_name;


SELECT MAX(key_part2) FROM tbl_name
```

```
    WHERE key_part1=constant;

SELECT ... FROM tbl_name
    ORDER BY key_part1,key_part2,... LIMIT 10;

SELECT ... FROM tbl_name
    ORDER BY key_part1 DESC, key_part2 DESC, ... LIMIT 10;
```

()

```
SELECT key_part1,key_part2 FROM tbl_name WHERE key_part1=val;

SELECT COUNT(*) FROM tbl_name
    WHERE key_part1=val1 AND key_part2=val2;

SELECT key_part2 FROM tbl_name GROUP BY key_part1;

SELECT ... FROM tbl_name
    ORDER BY key_part1,key_part2,... ;

SELECT ... FROM tbl_name
    ORDER BY key_part1 DESC, key_part2 DESC, ... ;
```

7.2.5.

7.2.5.1.
7.2.5.2.

range WHERE

7.2.5.1.

WHERE “”

· BTREEHASH =<=>INIS NULLIS NOT NULL

· BTREE ><>=<=BETWEEN!=<>LIKE '*pattern*'('*pattern*')

· ORAND

“ ”

.

· constsystem

.

.

WHERE

```
SELECT * FROM t1
    WHERE key_col > 1
    AND key_col < 10;

SELECT * FROM t1
    WHERE key_col = 1
    OR key_col IN (15,18,20);

SELECT * FROM t1
    WHERE key_col LIKE 'ab%'
    OR key_col BETWEEN 'bar' AND 'foo';
```

MySQLWHERE

key1 nonkey

```
SELECT * FROM t1 WHERE
   (key1 < 'abc' AND (key1 LIKE 'abcde%' OR key1 LIKE '%b')) OR
   (key1 < 'bar' AND nonkey = 4) OR
   (key1 < 'uux' AND key1 > 'z');
```

key1

1. WHERE
2. (key1 < 'abc' AND (key1 LIKE 'abcde%' OR key1 LIKE '%b')) OR
3. (key1 < 'bar' AND nonkey = 4) OR
4. (key1 < 'uux' AND key1 > 'z')
5. nonkey = 4key1 LIKE '%b' TRUE TRUE

```
6.            (key1 < 'abc' AND (key1 LIKE 'abcde%' OR TRUE)) OR
7.            (key1 < 'bar' AND TRUE) OR
8.            (key1 < 'uux' AND key1 > 'z')
```

9. truefalse

· (key1 LIKE 'abcde%' OR TRUE)true

· (key1 < 'uux' AND key1 > 'z')false

```
(key1 < 'abc' AND TRUE) OR (key1 < 'bar' AND TRUE) OR (FALSE)
```

TRUEFALSE

```
(key1 < 'abc') OR (key1 < 'bar')
```

10.

```
11.        (key1 < 'bar')
```

()WHERE MySQLWHERE

AND/OR WHERE

7.2.5.2.

key1(*key_part1*, *key_part2*, *key_part3*)

```
key_part1  key_part2  key_part3
  NULL       1          'abc'
  NULL       1          'xyz'
  NULL       2          'foo'
   1         1          'abc'
   1         1          'xyz'
   1         2          'abc'
   2         1          'aaa'
```

key_part1 = 1

```
(1-inf-inf) <= (key_part1key_part2key_part3) < (1+inf+inf)
```

456

key_part3 = 'abc'

· HASH

· *key_part1 cmp const1*

· AND *key_part2 cmp const2*

· AND ...

· AND *key_partN cmp constN*;

const1const2... *cmp*=<=>IS NULL (*N* *N*-

7.2.5.1“”

HASH

key_part1 = 1 AND *key_part2* IS NULL AND *key_part3* = 'foo'

· BTREE AND =<=>IS NULL><>=<=!=<>BETWEENLIKE '*pattern*' ('*pattern*') (<>!=)

· *key_part1* = 'foo' AND *key_part2* >= 10 AND *key_par*

('foo'1010)

< (*key_part1key_part2key_part3*)

< ('foo'+inf+inf)

('foo'110)

· OR AND

· (*key_part1* = 1 AND *key_part2* < 2)

· OR (*key_part1* > 5)

(1, -inf) < (*key_part1*, *key_part2*) < (1, 2)

(5, -inf) < (*key_part1*, *key_part2*)

1 2 EXPLAINkey_len

key_len *key_part1key_part2*NULLkey_len

```
key_part1 >= 1 AND key_part2 < 2
```

```
key_part1 >= 1 AND key_part2 IS NOT NULL
```

7.2.5.1“”

7.2.6.

7.2.6.1.
7.2.6.2.
7.2.6.3.

range

EXPLAIN typeindex_merge key key_len

SELECT * FROM *tbl_name* WHERE *key_part1* = 10 OR *key_part2* = 20;

SELECT * FROM *tbl_name*

WHERE (*key_part1* = 10 OR *key_part2* = 20) AND *non_key_part*=30;

SELECT * FROM t1, t2

WHERE (t1.*key1* IN (1,2) OR t1.*key2* LIKE '*value*%')

AND t2.*key1*=t1.*some_col*;

SELECT * FROM t1, t2

WHERE t1.*key1*=1

AND (t2.*key1*=t1.*some_col* OR t2.*key2*=t1.*some_col2*);

(EXPLAINExtra)

.

.

.

.

. SELECT * FROM t1 WHERE (goodkey1 < 10 OR goodkey2 <

1. (goodkey1 < 10 OR goodkey2 < 20)
2. badkey < 30

2 IGNORE INDEXFORCE INDEXindex_merge

SELECT * FROM t1 FORCE INDEX(goodkey1,goodkey2)

WHERE (goodkey1 < 10 OR goodkey2 < 20) AND badkey < 30;

SELECT * FROM t1 IGNORE INDEX(badkey)

WHERE (goodkey1 < 10 OR goodkey2 < 20) AND badkey < 30;

· WHERE AND/OR MySQL

· `(x AND y) OR z = (x OR z) AND (y OR z)`

· `(x OR y) AND z = (x AND z) OR (y AND z)`

index_merge

7.2.6.1.

WHEREAND

· *N*()

· `key_part1=const1 AND key_part2=const2 ... AND key_p`

· InnoDBBDB

SELECT * FROM *innodb_table* WHERE *primary_key* < 10 AND *key_col1*=20;

SELECT * FROM *tbl_name*

WHERE (*key1_part1*=1 AND *key1_part2*=2) AND *key2*=2;

EXPLAIl

```
SELECT COUNT(*) FROM t1 WHERE key1=1 AND key2=1;
```

InnoDBBDB

7.2.6.2.

WHEREOR

· *N*()

· *key_part1=const1* AND *key_part2=const2* ... AND *key_p*

· InnoDBBDB

·

```
SELECT * FROM t1 WHERE key1=1 OR key2=2 OR key3=3;
```

```
SELECT * FROM innodb_table WHERE (key1=1 AND key2=2) OR
  (key3='foo' AND key4='bar') AND key5=5;
```

7.2.6.3.

WHEREOR

```
SELECT * FROM tbl_name WHERE key_col1 < 10 OR key_col2 < 20;
```

```
SELECT * FROM tbl_name
     WHERE (key_col1 > 10 OR key_col2 = 20) AND nonkey_col=30;
```

ID

7.2.7. MySQLIS NULL

MySQL*col_name = constant_valuecol_name* IS NULL MySQLIS NULL NULL

```
SELECT * FROM tbl_name WHERE key_col IS NULL;
```

```
SELECT * FROM tbl_name WHERE key_col <=> NULL;
```

```
SELECT * FROM tbl_name
    WHERE key_col=const1 OR key_col=const2 OR key_col IS NULL;
```

WHERENOT NULL*col_name* IS NULL NULL LEFT JOI

MySQL*col_name = expr* AND *col_name* IS NULL EXPLAINref_or_null

IS NULL

t2ab

```
SELECT * FROM t1 WHERE t1.a=expr OR t1.a IS NULL;
```

```
SELECT * FROM t1, t2 WHERE t1.a=t2.a OR t2.a IS NULL;
```

```
SELECT * FROM t1, t2
    WHERE (t1.a=t2.a OR t2.a IS NULL) AND t2.b=t1.b;
```

```
SELECT * FROM t1, t2
    WHERE t1.a=t2.a AND (t2.b=t1.b OR t2.b IS NULL);
```

```
SELECT * FROM t1, t2
    WHERE (t1.a=t2.a AND t2.a IS NULL AND ...)
    OR (t1.a=t2.a AND t2.a IS NULL AND ...);
```

ref_or_null NULL

IS NULL MySQL(t1.a=t2.a AND t2.a IS NULL)

```
SELECT * FROM t1, t2
     WHERE (t1.a=t2.a AND t2.a IS NULL)
```

```
    OR (t1.b=t2.b AND t2.b IS NULL);
```

7.2.8. MySQLDISTINCT

ORDER BYDISTINCT

DISTINCTGROUP BYMySQLORDER BYHAVING 12.10.3“GRC BY”

DISTINCTGROUP BY

```
SELECT DISTINCT c1, c2, c3 FROM t1 WHERE c1 > const;
```

```
SELECT c1, c2, c3 FROM t1 WHERE c1 > const GROUP BY c1, c2, c3;
```

GROUP BYDISTINCT DISTINCT 7.2.13“MySC BY”

LIMIT *row_count*DISTINCT MySQL*row_count*

MySQL1 t1t2(EXPLAIN)t21 MySQL

```
SELECT DISTINCT t1.a FROM t1, t2 where t1.a=t2.a;
```

7.2.9. MySQLLEFT JOINRIGHT JOIN

MySQL *A* LEFT JOIN *B* join_condition

· *AA*B

· LEFT JOIN(*B*)*A*

· LEFT JOIN*B* (WHERE

· MySQL

· WHERE

· *A*WHERE *B*ON *B* NULL

· LEFT JOIN WHERE*col_name* IS NULL*col_name* NOT MySQLLEFT JOIN()

RIGHT JOINLEFT JOIN

LEFT JOINSTRAIGHT_JOIN MySQLb

```
SELECT *
    FROM a,b LEFT JOIN c ON (c.key=a.key) LEFT JOIN d ON (d.key=a.ke
    WHERE b.key=d.key;
```

a bFROM

```
SELECT *
    FROM b,a LEFT JOIN c ON (c.key=a.key) LEFT JOIN d ON (d.key=a.ke
    WHERE b.key=d.key;
```

MySQLLEFT JOIN NULL WHERE LEFT JOIN

t2.column1NULLWHERE false

```
SELECT * FROM t1 LEFT JOIN t2 ON (column1) WHERE t2.column2=5;
```

```
SELECT * FROM t1, t2 WHERE t2.column2=5 AND t1.column1=t2.column1;
```

MySQLt1t2 STRAIGHT_JOIN

7.2.10. MySQLJoin

13.2.7.1“JOIN”

SQL *table_factor* *table_reference*

table_reference

```
SELECT * FROM t1 LEFT JOIN (t2, t3, t4)
                ON (t2.a=t1.a AND t3.b=t1.b AND t4.c=t1.c)
```

```
SELECT * FROM t1 LEFT JOIN (t2 CROSS JOIN t3 CROSS JOIN t4)
                 ON (t2.a=t1.a AND t3.b=t1.b AND t4.c=t1.c)
```

MySQL CROSS JOININNER JOIN (SQL INNER JOINON CROSS JOIN

```
t1 LEFT JOIN (t2 LEFT JOIN t3 ON t2.b=t3.b OR t2.b IS NULL)
   ON t1.a=t2.a
```

```
(t1 LEFT JOIN t2 ON t1.a=t2.a) LEFT JOIN t3
    ON t2.b=t3.b OR t2.b IS NULL
```

t1t2t3

- t1{1}{2}
- t2{1,101}
- t3{101}

1{1,1,101,101}{2,NULL,NULL,NULL} 2 {1,1,101,101}{2,NULL,NULL,101}

```
mysql> SELECT *
    -> FROM t1
    ->      LEFT JOIN
    ->      (t2 LEFT JOIN t3 ON t2.b=t3.b OR t2.b IS NULL)
    ->      ON t1.a=t2.a;
+------+------+------+------+
| a    | a    | b    | b    |
```

```
+------+------+------+------+
|    1 |    1 |  101 |  101 |
|    2 | NULL | NULL | NULL |
+------+------+------+------+
```

```
mysql> SELECT *
    -> FROM (t1 LEFT JOIN t2 ON t1.a=t2.a)
    ->      LEFT JOIN t3
    ->      ON t2.b=t3.b OR t2.b IS NULL;
+------+------+------+------+
| a    | a    | b    | b    |
+------+------+------+------+
|    1 |    1 |  101 |  101 |
|    2 | NULL | NULL |  101 |
+------+------+------+------+
```

```
t1 LEFT JOIN (t2t3) ON t1.a=t2.a
```

```
t1 LEFT JOIN t2 ON t1.a=t2.at3.
```

1{1,1,101,101}{2,NULL,NULL,NULL}2
{1,1,101,101}{2,NULL,NULL,101}

```
mysql> SELECT *
    -> FROM t1 LEFT JOIN (t2, t3) ON t1.a=t2.a;
+------+------+------+------+
| a    | a    | b    | b    |
+------+------+------+------+
```

```
|    1 |    1 |  101 |  101 |
|    2 | NULL | NULL | NULL |
+------+------+------+------+

mysql> SELECT *
    -> FROM t1 LEFT JOIN t2 ON t1.a=t2.a, t3;
+------+------+------+------+
| a    | a    | b    | b    |
+------+------+------+------+
|    1 |    1 |  101 |  101 |
|    2 | NULL | NULL |  101 |
+------+------+------+------+
```

t1t2t3t2.bt3.bP

```
(t1,t2) LEFT JOIN t3 ON P(t2.b,t3.b)

t1t2 LEFT JOIN t3 ON P(t2.b,t3.b)
```

(*join_table*)

```
SELECT * FROM t1 LEFT JOIN (t2 LEFT JOIN t3 ON t2.b=t3.b) ON t1.a=t2
  WHERE t1.a > 1

SELECT * FROM t1 LEFT JOIN (t2, t3) ON t1.a=t2.a
  WHERE (t2.b=t3.b OR t2.b IS NULL) AND t1.a > 1
```

```
t2 LEFT JOIN t3 ON t2.b=t3.b
t2, t3
```

1

1 2 (2(t2t3) LEFT JOINON(t2,t3)

· () ( )

.

.

T1T2T3

```
SELECT * FROM T1 INNER JOIN T2 ON P1(T1,T2)
                INNER JOIN T3 ON P2(T2,T3)
  WHERE P(T1,T2,T3).
```

P1(T1,T2)P2(T3,T3)()P(t1,t2,t3)T1T2T3

```
FOR each row t1 in T1 {
  FOR each row t2 in T2 such that P1(t1,t2) {
    FOR each row t3 in T3 such that P2(t2,t3) {
      IF P(t1,t2,t3) {
         t:=t1||t2||t3; OUTPUT t;
      }
    }
```

```
  }
}
```

t1||t2||t3“ t1t2t3” NULLNULL t1||t2||NULL“ t1t2t3NULL”

```
SELECT * FROM T1 LEFT JOIN
              (T2 LEFT JOIN T3 ON P2(T2,T3))
              ON P1(T1,T2)
  WHERE P(T1,T2,T3)


FOR each row t1 in T1 {
  BOOL f1:=FALSE;
  FOR each row t2 in T2 such that P1(t1,t2) {
    BOOL f2:=FALSE;
    FOR each row t3 in T3 such that P2(t2,t3) {
      IF P(t1,t2,t3) {
        t:=t1||t2||t3; OUTPUT t;
      }
      f2=TRUE;
      f1=TRUE;
    }
    IF (!f2) {
      IF P(t1,t2,NULL) {
        t:=t1||t2||NULL; OUTPUT t;
      }
      f1=TRUE;
```

```
    }
  }
  IF (!f1) {
    IF P(t1,NULL,NULL) {
      t:=t1||NULL||NULL; OUTPUT t;
    }
  }
}
```

```
(T2 LEFT JOIN T3 ON P2(T2,T3))
```

```
FOR each row t3 in T3 {
  FOR each row t2 in T2 such that P2(t2,t3) {
    FOR each row t1 in T1 such that P1(t1,t2) {
      IF P(t1,t2,t3) {
         t:=t1||t2||t3; OUTPUT t;
      }
    }
  }
}
```

```
SELECT * T1 LEFT JOIN (T2,T3) ON P1(T1,T2) AND P2(T1,T3)
  WHERE P(T1,T2,T3)
```

```
FOR each row t1 in T1 {
  BOOL f1:=FALSE;
  FOR each row t2 in T2 such that P1(t1,t2) {
    FOR each row t3 in T3 such that P2(t1,t3) {
      IF P(t1,t2,t3) {
        t:=t1||t2||t3; OUTPUT t;
      }
      f1:=TRUE
    }
  }
  IF (!f1) {
    IF P(t1,NULL,NULL) {
      t:=t1||NULL||NULL; OUTPUT t;
    }
  }
}
```

```
FOR each row t1 in T1 {
  BOOL f1:=FALSE;
  FOR each row t3 in T3 such that P2(t1,t3) {
    FOR each row t2 in T2 such that P1(t1,t2) {
      IF P(t1,t2,t3) {
        t:=t1||t2||t3; OUTPUT t;
      }
      f1:=TRUE
```

```
    }
  }
  IF (!f1) {
    IF P(t1,NULL,NULL) {
      t:=t1||NULL||NULL; OUTPUT t;
    }
  }
}
```

T1 T2T3 T2T3

“”

```
P(T1,T2,T2) = C1(T1) AND C2(T2) AND C3(T3)
```

MySQL

```
FOR each row t1 in T1 such that C1(t1) {
  FOR each row t2 in T2 such that P1(t1,t2) AND C2(t2)  {
    FOR each row t3 in T3 such that P2(t2,t3) AND C3(t3) {
      IF P(t1,t2,t3) {
         t:=t1||t2||t3; OUTPUT t;
      }
    }
  }
}
```

C1(T1)C2(T2)C3(T3) C1(T1) T1

WHERE

```
P(T1,T2,T3)=C1(T1) AND C(T2) AND C3(T3)
```

```
FOR each row t1 in T1 such that C1(t1) {
  BOOL f1:=FALSE;
  FOR each row t2 in T2
      such that P1(t1,t2) AND (f1?C2(t2):TRUE) {
    BOOL f2:=FALSE;
    FOR each row t3 in T3
        such that P2(t2,t3) AND (f1&&f2?C3(t3):TRUE) {
      IF (f1&&f2?TRUE:(C2(t2) AND C3(t3))) {
        t:=t1||t2||t3; OUTPUT t;
      }
      f2=TRUE;
      f1=TRUE;
    }
    IF (!f2) {
      IF (f1?TRUE:C2(t2) && P(t1,t2,NULL)) {
        t:=t1||t2||NULL; OUTPUT t;
      }
      f1=TRUE;
    }
  }
  IF (!f1 && P(t1,NULL,NULL)) {
      t:=t1||NULL||NULL; OUTPUT t;
  }
}
```

P1(T1,T2)P(T2,T3) NULL-

WHERE (MySQL 5.1

7.2.11. MySQL

FROM

```
(T1, ...) RIGHT JOIN (T2,...) ON P(T1,...,T2,...) =
(T2, ...) LEFT JOIN (T1,...) ON P(T1,...,T2,...)
```

T1 INNER JOIN T2 ON P(T1,T2)T1,T2P(T1,T2)WHERE( )

SELECT * T1 LEFT JOIN T2 ON P1(T1,T2)

WHERE P(T1,T2) AND R(T2)

R(T2)T2 T2T1

WHEREnullMySQL NULLFALSEUNKNOWNnull

```
T1 LEFT JOIN T2 ON T1.A=T2.A
```

null

```
T2.B IS NOT NULL,
T2.B > 3,
T2.C <= T1.C,
T2.B < 2 OR T2.C > 1
```

null

```
T2.B IS NULL,
T1.B < 3 OR T2.B IS NOT NULL,
T1.B < 3 OR T2.B > 3
```

null null

· A IS NOT NULLA

· NULLUNKNOWN

· null

· null

nullnull

SELECT * FROM T1 LEFT JOIN T2 ON T2.A=T1.A

LEFT JOIN T3 ON T3.B=T1.B

WHERE T3.C > 0

WHERE2null1null

WHEREnull

SELECT * FROM T1 LEFT JOIN T2 ON T2.A=T1.A

INNER JOIN T3 ON T3.B=T1.B

WHERE T3.C > 0

T1T2T3 T3T1T2

SELECT * FROM T1 LEFT JOIN T2 ON T2.A=T1.A

```
        LEFT JOIN T3 ON T3.B=T2.B
  WHERE T3.C > 0

SELECT * FROM T1 LEFT JOIN T2 ON T2.A=T1.A
        INNER JOIN T3 ON T3.B=T2.B
  WHERE T3.C > 0

SELECT * FROM (T1 LEFT JOIN T2 ON T2.A=T1.A), T3
  WHERE T3.C > 0 AND T3.B=T2.B
                                          T3.B=T2.Bnull
SELECT * FROM (T1 INNER JOIN T2 ON T2.A=T1.A), T3
  WHERE T3.C > 0 AND T3.B=T2.B

SELECT * FROM T1 LEFT JOIN
        (T2 LEFT JOIN T3 ON T3.B=T2.B)
        ON T2.A=T1.A
  WHERE T3.C > 0

SELECT * FROM T1 LEFT JOIN
        (T2 INNER JOIN T3 ON T3.B=T2.B)
        ON T2.A=T1.A
```

WHERE T3.C > 0

SELECT * FROM T1 LEFT JOIN

(T2,T3)

ON (T2.A=T1.A AND T3.B=T2.B)

WHERE T3.C > 0

WHE

```
SELECT * FROM T1 LEFT JOIN
             (T2 LEFT JOIN T3 ON T3.B=T2.B)
             ON T2.A=T1.A AND T3.C=T1.C
  WHERE T3.D > 0 OR T1.D > 0
```

WHERE null T2.A=T1.A AND T3.C=T1.C null

SELECT * FROM T1 LEFT JOIN

(T2, T3)

ON T2.A=T1.A AND T3.C=T1.C AND T3.B=T2.B

WHERE T3.D > 0 OR T1.D > 0

7.2.12. MySQLORDER BY

MySQLORDER BY

ORDER BY WHEREORDER BY ORDER BY

SELECT * FROM t1

ORDER BY *key_part1,key_part2,...* ;

SELECT * FROM t1

WHERE *key_part1=constant*

ORDER BY *key_part2*;

SELECT * FROM t1

ORDER BY *key_part1* DESC, *key_part2* DESC;

SELECT * FROM t1

WHERE *key_part1*=1

ORDER BY *key_part1* DESC, *key_part2* DESC;

MySQLORDER BYWHERE

· ORDER BY

· SELECT * FROM t1 ORDER BY *key1, key2*

· ORDER BY

· SELECT * FROM t1 WHERE *key2=constant* ORDER BY *key_p*

· ASCDESC

· SELECT * FROM t1 ORDER BY *key_part1* DESC, *key_part2*

· ORDER BY

· SELECT * FROM t1 WHERE *key2=constant* ORDER BY *key1*

· ORDER BY1 (EXPLAINconst1

· ORDER BYGROUP BY

· HEAPHASH

EXPLAIN SELECT ...ORDER BYMySQL ExtraUsing filesort 7.2.1 “EXPLAINSELECT ”

1. WHERE
2.
3.
4.

Mysql

extramax_length_for_sort_data (CPU

ORDER BY MySQL

· sort_buffer_size
· read_rnd_buffer_size
· tmpdir round-robin() Unix(‘:’) WindowsNetWareOS/2(‘’)

MySQLGROUP BY *col1col2*...ORDER BY *col1col2*...ORDER BY MySQL GROUP BY ORDER BY NULL

```
INSERT INTO foo
SELECT a, COUNT(*) FROM bar GROUP BY a ORDER BY NULL;
```

7.2.13. MySQLGROUP BY

7.2.13.1.
7.2.13.2.

GROUP BY () MySQL

GROUP BY GROUP BY (B- HASH)

GROUP BY 1 ()2

7.2.13.1.

MySQL(B-) range7.2.1“EXPLAINSELECT ”)

.

· GROUP BY1(GROUP BYDISTINCT)

· ()MIN()MAX()

· GROUP BY( )MIN()MAX()

EXPLAINExtraUsing indexforgroup-by

t1(c1,c2,c3,c4)idx(c1c2c3)

SELECT c1, c2 FROM t1 GROUP BY c1, c2;

SELECT DISTINCT c1, c2 FROM t1;

SELECT c1, MIN(c2) FROM t1 GROUP BY c1;

SELECT c1, c2 FROM t1 WHERE c1 < *const* GROUP BY c1, c2;

SELECT MAX(c3), MIN(c3), c1, c2 FROM t1 WHERE c2 > *const* GROUP BY c1, c2;

SELECT c2 FROM t1 WHERE c1 < *const* GROUP BY c1, c2;

SELECT c1, c2 FROM t1 WHERE c3 = *const* GROUP BY c1, c2

1. MIN()MAX()

```
SELECT c1, SUM(c2) FROM t1 GROUP BY c1;
```

2. GROUP BY

```
SELECT c1,c2 FROM t1 GROUP BY c2, c3;
```

3. GROUP BY

```
SELECT c1,c3 FROM t1 GROUP BY c1, c2
```

7.2.13.2.

GROUP BY WHERE WHERE

GROUP BY“” GROUP BY MySQL

2(t1idx)

· GROUP BY c2 = 'a'

```
SELECT c1c2c3 FROM t1 WHERE c2 = 'a' GROUP BY c1c3;
```

· GROUP BY1

```
SELECT c1c2c3 FROM t1 WHERE c1 = 'a' GROUP BY c2c3;
```

7.2.14. MySQLLIMIT

LIMIT *row_count*HAVING **MySQL**

· LIMIT **MySQL**

· LIMIT *row_count*ORDER BY**MySQL***row_count*
filesort LIMIT 1*row_count* MySQL

· LIMIT *row_count*DISTINCT **MySQL***row_count*

· GROUP BY() LIMIT *row_count*GROUP BY

· MySQL SQL_CALC_FOUND_ROWS

· LIMIT 0 MySQL API (MySQL Monitor Empty set SHOW COLUMNSDESCRIBE

· LIMIT *row_count*

7.2.15.

EXPLAINMySQL

· 10

· ONWHERE

· MySQL() 7.2.4“MySQLWHERE ”

· () MySQL

· ANALYZE TABLE *tbl_name* 13.5.2.1“ANALYZE TABLE”

· FORCE INDEXMySQL 13.2.7“SELECT”

· `SELECT * FROM t1, t2 FORCE INDEX (`*`index_for_column`*`)`

· `WHERE t1.`*`col_name`*`=t2.`*`col_name`*

· --max-seeks-for-key=1000**mysqld**SET max_seeks_for_key=10001,000 5.3.3“”

7.2.16. INSERT

- (3)
- (2)
- (2)
- 1x
- 1x
- (1)

log*N* (B)

· VALUEINSERT INSERT() bulk_insert_buffer_size 5.3.3“”

· INSERT DELAYED 13.2.4“INSERT”

· MyISAM SELECT

· LOAD DATA INFILEINSERT20 13.2.5“LOAD DATA INFILE”

· LOAD DATA INFILE

1. CREATE TABLE
2. FLUSH TABLES**mysqladmin flush-tables**
3. **myisamchk --keys-used=0 -rq** ***/path/to/db/tbl_name***
4. LOAD DATA INFILE
5. **myisampack** 15.1.3.3“”
6. **myisamchk -r -q** ***/path/to/db/tbl_name***
7. FLUSH TABLES**mysqladmin flush-tables**

MyISAM LOAD DATA INFILE **myisamchk** LOAI

ALTER TABLE *tbl_name* DISABLE KEYS**myisamchk --keys-used=0 /path/to/db/tbl_name**ALTER TABLE *tbl_name* ENABLE KEYS**myisamchk -r -q** ***/path/to/db/tbl_name*** FLUSH TABLES

· INSERT

- LOCK TABLES a WRITE;
- INSERT INTO a VALUES (1,23),(2,34),(4,33);
- INSERT INTO a VALUES (8,26),(6,29);
- UNLOCK TABLES;

INSERT INSERT

BEGINCOMMITLOCK TABLES

Connection 1 does 1000 inserts

Connections 2, 3, and 4 do 1 insert

Connection 5 does 1000 inserts

23415 23415 40%

INSERTUPDATEDELETE**MySQL** 5 LOCK TABLESUNLOCK TABLES(1000)

INSERTLOAD DATA INFILE

· LOAD DATA INFILEINSERTMyISAM key_buffer_size

7.2.17. UPDATE

SELECT

MyISAM OPTIMIZE TABLE 13.5.2.5“C

”

7.2.18. DELETE

TRUNCATE TABLE *tbl_name* DELETE FROM

“TRUNCATE”

7.2.19.

· thread_cache_size 7.5.2“”

· **MySQL** EXPLAIN 7.2.1“EXPLAINSELECT ”

· SELECT

· MyISAM OPTIMIZE TABLE15.1“MyISAM”

· ARCHIVE OPTIMIZE TABLE15.8“ARCHIVE”

· *expr1expr2*... ALTER TABLE ... ORDER BY *expr1*, *expr2*, ...

. “ ”

·
```
SELECT * FROM tbl_name
```
·
```
    WHERE hash_col=MD5(CONCAT(col1,col2))
```
·
```
    AND col1='constant' AND col2='constant';
```

· MyISAM (VARCHARBLOBTEXT) 15

.

.

```
UPDATE tbl_name SET count_col=count_col+1 WHERE key_col=constant;
```

MyISAM**MySQL**(/)

. “”

- “”“”
- MySQL
- BLOB /
- ()
- UDF() 20 27.2“MySQL”
- // (**MySQL**Oracle) MySQL 5.13“MySQL”

- INSERT DELAYED
- INSERT /*! LOW_PRIORITY */
- INSERT LOW_PRIORITY SELECT
- INSERTSQL(SQL MySQL)
- LOAD DATA INFILE INSERT
- AUTO_INCREMENT
- MyISAM OPTIMIZE TABLE 15.1.3“MyISAM”
- MEMORY 15.4“MEMORY (HEAP)”
- Web Web
- (Web cookie) Web
-
- SQL **MySQL** MyISAM SQL 2-5 ()**MySQL** MyISAM( )
- ()

.

· DELAY_KEY_WRITE=1MyISAM --myisam-recover **myisamchk**(DELAY_KEY_WRITE

7.3.

7.3.1.
7.3.2.

7.3.1.

MySQL 5.1MyISAMMEMORY BDB InnoDB

MySQL

WRITE**MySQL**

-
-

READ**MySQL**

-
-

SELECT

table_locks_waitedtable_locks_immediate

mysql> **SHOW STATUS LIKE 'Table%';**

+----------------------+---------+

| Variable_name | Value |

+----------------------+---------+

| Table_locks_immediate | 1151552 |

| Table_locks_waited | 15324 |

+----------------------+---------+

INSERT MyISAMINSERTSELECT MyISAM (

INSERTSELECT

mysql> **LOCK TABLES real_table WRITE, insert_table WRITE;**

mysql> **INSERT INTO real_table SELECT * FROM insert_table;**

mysql> **TRUNCATE TABLE insert_table;**

mysql> **UNLOCK TABLES;**

InnoDB BDB SQL InnoDBBDB

.

.

.

.

.

· GROUP BY

·

·

·

· UPDATE *tbl_name* SET *column=value* WHERE *unique_key_c*

· DELETE FROM *tbl_name* WHERE *unique_key_col=key_value*

· SELECT INSERT UPDATEDELETE

· GROUP BY

· (MySQL)“ ”“ ”“ ”

·

· MySQLGET_LOCK()RELEASE_LOCK()

7.3.2.

InnoDBBDB MySQL( )

InnoDBBDB LOCK TABLES MySQL LOCK TABLESInnoDB
BDB

“

·

· SELECT

· SELECT UPDATESELECT SELECTUPDATE 1SELECT

· SELECT (summary)

· --low-priority-updates**mysqld**()SELECT 2SELECTUPDATE 1 SELECT

· SET LOW_PRIORITY_UPDATES=1 13.5.3“SET”

· LOW_PRIORITYINSERTUPDATEDELETE

· HIGH_PRIORITYSELECT 13.2.7“SELECT”

· **max_write_lock_countmysqld**MySQLSELECT WRITEREAD

· INSERTSELECT MyISAM SELECTINSERT

· INSERT DELAYED 13.2.4.2“INSERT DELAYED”

· SELECTDELETE DELETELIMIT 13.2.1“DELETE”

· SELECTSQL_BUFFER_RESULT 13.2.7“SELECT”

· mysys/thr_lock.c

MySQL

·

· LOCK TABLES

· MySQL InnoDBBDB 15.2“InnoDB” 15.5“BDB (BerkeleyDB)”

7.4.

7.4.1.
7.4.2.
7.4.3.
7.4.4.
7.4.5. MySQL
7.4.6. MyISAM
7.4.7. MyISAM
7.4.8. MySQL
7.4.9. MySQL
7.4.10.

7.4.1.

MySQL () MySQL

(SDBMFocus)

(Oracle/Sybase)

.

.

· ()

· ()

.

7.4.2.

MySQL() 15

- () **MySQL**
- MEDIUMINTINT MEDIUMINT25%
- NOT NULL NULL
- MyISAM (VARCHARTEXTBLOB) 15.1.3“MyISAM” CREATEVARCHARROW_FORMAT=fixed
- MySQL/InnoDB InnoDB MySQL InnoDB (ROW_FORMAT=COMPACT)MySQL/InnoDB ROW_FORMAT=REDUNDANT
- InnoDBUTF-8CHAR ROW_FORMAT=REDUNDANTUTF-8 CHAR(*n*)3**n*UTF-83 UTF-8 ROW_FORMAT=COMPACT n..3*n n
-
-
- **MySQL**(13.1.4“CREATE INDEX”) 7.5.2 “”

· 2

7.4.3.

MySQL SELECT

15 16 256

col_name(*length*) CHARVARCHAR1*length*

MyISAMInnoDBBLOBTEXT BLOBTEXT

```
CREATE TABLE test (blob_col BLOB, INDEX(blob_col(10)));
```

MySQL 5.1 MyISAMInnoDB 1000 CREATE TABLE

FULLTEXT MyISAMFULLTEXT CHARVARCHARTEXT 12.7“”

MyISAM R-

MEMORY(HEAP)hash B-

7.4.4.

MySQL 15 (7.4.3“”)

MySQL WHERE1

```
CREATE TABLE test (
    id INT NOT NULL,
    last_name CHAR(30) NOT NULL,
    first_name CHAR(30) NOT NULL,
    PRIMARY KEY (id),
    INDEX name (last_name,first_name)
);
```

namelast_namefirst_name last_namelast_namefirst_name name

```
SELECT * FROM test WHERE last_name='Widenius';

SELECT * FROM test
    WHERE last_name='Widenius' AND first_name='Michael';

SELECT * FROM test
    WHERE last_name='Widenius'
    AND (first_name='Michael' OR first_name='Monty');

SELECT * FROM test
    WHERE last_name='Widenius'
    AND first_name >='M' AND first_name < 'N';
```

name

```
SELECT * FROM test WHERE first_name='Michael';


SELECT * FROM test
    WHERE last_name='Widenius' OR first_name='Michael';
```

MySQL7.4.5“MySQL”

7.4.5. MySQL

MySQL1 My

MySQL(PRIMARY KEYUNIQUEINDEXFULLTEXT)B R- MEMC hash

13.1.4“CREATE INDEX”

hash(MEMORY)

· WHERE

· MySQL

·

· *key_col*MAX()MIN() key_*col*WHERE *key_part_# = constant* MySQLMIN()MAX()

· SELECT MIN(*key_part2*),MAX(*key_part2*)

· FROM *tbl_name* WHERE *key_part1*=10;

· (ORDER BY key_part_1,key_part_2) DESC 7.2.12 “MySQLORDER BY ”

·

· SELECT *key_part3* FROM *tbl_name*

. WHERE *key_part1*=1

SELECT

```
mysql> SELECT * FROM tbl_name WHERE col1=val1 AND col2=val2;
```

col1col2 col1col2

3(col

MySQL SELECT

```
SELECT * FROM tbl_name WHERE col1=val1;
SELECT * FROM tbl_name WHERE col1=val1 AND col2=val2;

SELECT * FROM tbl_name WHERE col2=val2;
SELECT * FROM tbl_name WHERE col2=val2 AND col3=val3;
```

(col1col2col3) 2 34 (col2)(col2col3) (col1col2col3)

=>>=<<=BETWEENB- LIKE LIKE SELECT

```
SELECT * FROM tbl_name WHERE key_col LIKE 'Patrick%';
SELECT * FROM tbl_name WHERE key_col LIKE 'Pat%_ck%';
```

1 'Patrick' <=key_*col* < 'Patricl' 2 'Pat' <=key_*col* < 'Pau'

SELECT

```
SELECT * FROM tbl_name WHERE key_col LIKE '%Patrick%';
SELECT * FROM tbl_name WHERE key_col LIKE other_col;
```

LIKE LIKE

... LIKE '%*string*%'*string*3 MySQL*Turbo Boyer-Moore*

col_name *col_name* IS NULL

WHEREAND AND

WHERE

```
... WHERE index_part1=1 AND index_part2=2 AND other_column=3
    /* index = 1 OR index = 2 */
... WHERE index=1 OR A=10 AND index=2
    /* optimized like "index_part1='hello'" */
... WHERE index_part1='hello' AND index_part3=5
    /* Can use index on index1 but not on index2 or index3 */
... WHERE index1=1 AND index2=2 OR index1=3 AND index3=3;
```

WHERE

```
    /* index_part1 is not used */
... WHERE index_part2=1 AND index_part3=2

    /*  Index is not used in both parts of the WHERE clause  */
... WHERE index=1 OR A=10

    /* No index spans all rows  */
... WHERE index_part1=1 OR index_part2=10
```

MySQL MySQL (LIMIT MySQL

Hash

· =<=>() <

· hashORDER BY (

· MySQL()MyISAMhash-MEMORY

· (B-

7.4.6. MyISAM

7.4.6.1.
7.4.6.2.
7.4.6.3.
7.4.6.4.
7.4.6.5.
7.4.6.6.

I/O MyISAM

· ()

· MySQL

MyISAM

.

.

key_buffer_size

(

MyISAM B- (B-

“”

LRU()

7.4.6.1.

.

.

. ( )

7.4.6.2.

MyISAM MyISAM “CACHE INDEX”)

t1t2t3hot_cache

```
mysql> CACHE INDEX t1, t2, t3 IN hot_cache;
+---------+--------------------+----------+----------+
| Table   | Op                 | Msg_type | Msg_text |
+---------+--------------------+----------+----------+
| test.t1 | assign_to_keycache | status   | OK       |
| test.t2 | assign_to_keycache | status   | OK       |
| test.t3 | assign_to_keycache | status   | OK       |
+---------+--------------------+----------+----------+
```

SET GLOBALCACHE INDEX

```
mysql> SET GLOBAL keycache1.key_buffer_size=128*1024;
```

```
mysql> SET GLOBAL keycache1.key_buffer_size=0;
```

```
mysql> set global key_buffer_size = 0;

mysql> show variables like 'key_buffer_size';
+-----------------+---------+
| Variable_name   | Value   |
+-----------------+---------+
| key_buffer_size | 8384512 |
+-----------------+---------+
```

keycache1.key_buffer_sizekey

“”

()

· 20%“”

· 20%“”

· 20%“”

3

·

· B-

·

CACHE INDEX

```
key_buffer_size = 4G
hot_cache.key_buffer_size = 2G
cold_cache.key_buffer_size = 2G
```

```
init_file=/path/to/data-directory/mysqld_init.sql
```

mysqld_init.sql SQL hot_cachecold_cache

```
CACHE INDEX a.t1, a.t2, b.t3 IN hot_cache
CACHE INDEX a.t4, b.t5, b.t6 IN cold_cache
```

7.4.6.3.

LRU“ ”

LRU
key_cache_division_limit

()

N *N* *key_cache_age_thres

LRU key_cache

B- key_ca

7.4.6.4.

LOAD INDEX INTO CACHE t1t2()

```
mysql> LOAD INDEX INTO CACHE t1, t2 IGNORE LEAVES;
+---------+--------------+----------+----------+
| Table   | Op           | Msg_type | Msg_text |
+---------+--------------+----------+----------+
| test.t1 | preload_keys | status   | OK       |
```

```
| test.t2 | preload_keys | status   | OK       |
+---------+--------------+----------+----------+
```

IGNORE LEAVES t1 t2

CACHE INDEX

7.4.6.5.

key_cache_block_size

I/O I/O I/O

.MYI I/O

7.4.6.6.

```
mysql> SET GLOBAL cold_cachekey_buffer_size=4*1024*1024
```

key_buffer_sizekey_cache_block_size

7.4.7. MyISAM

MySQL

· ref

.

· (...) JOIN *tbl_name* ON *tbl_name.key = expr*

SHOW INDEX *N*/*S* *N*

<=> NULL NULL <=> NULL*N* *N* <=> *N*

= NULLNULL *expr1expr2*()NULL *expr1 = expr2* *tbl_* = *expr*ref *expr*NULLMySQL

= NULL NULL MySQL

MyISAM myisam_stats_method

· myisam_stats_methodnulls_equal NULL( )

NULLNULL NULL nulls_equalref

· myisam_stats_methodnulls_unequal NULL NULL 1

NULL NULL 1NULLNULL nulls_unequalref

<=>= NULL NULLNULL nulls_equal

myisam_stats_method MyISAM MyISAM myisam_stats_method

· myisam_stats_methodCHECK TABLE

· **myisamchk --stats_method=method_name --analyze**

· ( )myisam_stats_methodANALYZE TABLE

myisam_stats_method

MySQL MySQL myisam_stats_method myisam_stats_method

MyISAM

myisam_stats_methodMyISAM nulls_equal

7.4.8. MySQL

mysqladmin status

```
Uptime: 426 Running threads: 1 Questions: 11082
Reloads: 1 Open tables: 12
```

6 Open tables12

MySQL MyISAM ()

7.4.9“MySQL”

7.4.9. MySQL

table_cachemax_connectionsmax_tmp_tables

table_cachemax_connections 200 200 * *NN*

table_cache table_cacheis MySQL MyISAM
-open-files-limitMySQL A.2.17“”

table_cache 64**mysqld**--table_cache MySQL

.

· table_cache

· FLUSH TABLES**mysqladmin flush-tablesmysqladmin refresh**

.

.

2( ) 2

HANDLER *tbl_name* OPEN HANDLER *tbl_name* CLOSE 13.2.3“HANDLER”

mysqldOpened_tables

```
mysql> SHOW STATUS LIKE 'Opened_tables';
+---------------+-------+
| Variable_name | Value |
+---------------+-------+
| Opened_tables | 2741  |
+---------------+-------+
```

FLUSH TABLES 5.3.3“” 5.3.4“”

7.4.10.

MyISAM SELECT

7.5. MySQL

7.5.1.
7.5.2.
7.5.3.
7.5.4. MySQL
7.5.5. MySQL
7.5.6. MySQLDNS

7.5.1.

CPU Solaris()Linux(2.4SMP)Linux2GB XFS2GB

MySQL

· RAM

· --skip-external-locking MySQL

--skip-external-lockingMySQL **myisamchk**()

--skip-external-lockingMySQL() **myisamchk**() MySQL MySQ Cluster

--skip-external-lockingLOCK TABLESUNLOCK TABLES

7.5.2.

mysqld

```
shell> mysqld --verbose --help
```

mysqld

```
help                                TRUE
abort-slave-event-count             0
allow-suspicious-udfs               FALSE
auto-increment-increment            1
auto-increment-offset               1
automatic-sp-privileges             TRUE
basedir                             /home/jon/bin/mysql/
bdb                                 FALSE
bind-address                        (No default value)
character-set-client-handshake      TRUE
character-set-server                latin1
character-sets-dir                  /home/jon/bin/mysql/share/mysql/ch
chroot                              (No default value)
collation-server                    latin1_swedish_ci
completion-type                     0
concurrent-insert                   1
console                             FALSE
datadir                             /home/jon/bin/mysql/var/
default-character-set               latin1
default-collation                   latin1_swedish_ci
default-time-zone                   (No default value)
disconnect-slave-event-count        0
enable-locking                      FALSE
enable-pstack                       FALSE
engine-condition-pushdown           FALSE
external-locking                    FALSE
```

gdb	FALSE
large-pages	FALSE
init-connect	(No default value)
init-file	(No default value)
init-slave	(No default value)
innodb	TRUE
innodb_checksums	TRUE
innodb_data_home_dir	(No default value)
innodb_doublewrite	TRUE
innodb_fast_shutdown	1
innodb_file_per_table	FALSE
innodb_flush_log_at_trx_commit	1
innodb_flush_method	(No default value)
innodb_locks_unsafe_for_binlog	FALSE
innodb_log_arch_dir	(No default value)
innodb_log_group_home_dir	(No default value)
innodb_max_dirty_pages_pct	90
innodb_max_purge_lag	0
innodb_status_file	FALSE
innodb_table_locks	TRUE
innodb_support_xa	TRUE
isam	FALSE
language	/home/jon/bin/mysql/share/mysql/en
local-infile	TRUE
log	/home/jon/bin/mysql/var/master1.lo
log-bin	/home/jon/bin/mysql/var/master1

```
log-bin-index                    (No default value)
log-bin-trust-routine-creators   FALSE
log-error                        /home/jon/bin/mysql/var/master1.er
log-isam                         myisam.log
log-queries-not-using-indexes    FALSE
log-short-format                 FALSE
log-slave-updates                FALSE
log-slow-admin-statements        FALSE
log-slow-queries                 (No default value)
log-tc                           tc.log
log-tc-size                      24576
log-update                       (No default value)
log-warnings                     1
low-priority-updates             FALSE
master-connect-retry             60
master-host                      (No default value)
master-info-file                 master.info
master-password                  (No default value)
master-port                      3306
master-retry-count               86400
master-ssl                       FALSE
master-ssl-ca                    (No default value)
master-ssl-capath                (No default value)
master-ssl-cert                  (No default value)
master-ssl-cipher                (No default value)
master-ssl-key                   (No default value)
```

master-user	test
max-binlog-dump-events	0
memlock	FALSE
myisam-recover	OFF
ndbcluster	FALSE
ndb-connectstring	(No default value)
ndb-mgmd-host	(No default value)
ndb-nodeid	0
ndb-autoincrement-prefetch-sz	32
ndb-distibution	KEYHASH
ndb-force-send	TRUE
ndb_force_send	TRUE
ndb-use-exact-count	TRUE
ndb_use_exact_count	TRUE
ndb-shm	FALSE
ndb-optimized-node-selection	TRUE
ndb-cache-check-time	0
ndb-index-stat-enable	TRUE
ndb-index-stat-cache-entries	32
ndb-index-stat-update-freq	20
new	FALSE
old-alter-table	FALSE
old-passwords	FALSE
old-style-user-limits	FALSE
pid-file	/home/jon/bin/mysql/var/hostname.p
port	3306

relay-log	(No default value)
relay-log-index	(No default value)
relay-log-info-file	relay-log.info
replicate-same-server-id	FALSE
report-host	(No default value)
report-password	(No default value)
report-port	3306
report-user	(No default value)
rpl-recovery-rank	0
safe-user-create	FALSE
secure-auth	FALSE
server-id	1
show-slave-auth-info	FALSE
skip-grant-tables	FALSE
skip-slave-start	FALSE
slave-load-tmpdir	/tmp/
socket	/tmp/mysql.sock
sporadic-binlog-dump-fail	FALSE
sql-mode	OFF
symbolic-links	TRUE
tc-heuristic-recover	(No default value)
temp-pool	TRUE
timed_mutexes	FALSE
tmpdir	(No default value)
use-symbolic-links	TRUE
verbose	TRUE

warnings	1
back_log	50
binlog_cache_size	32768
bulk_insert_buffer_size	8388608
connect_timeout	5
date_format	(No default value)
datetime_format	(No default value)
default_week_format	0
delayed_insert_limit	100
delayed_insert_timeout	300
delayed_queue_size	1000
expire_logs_days	0
flush_time	0
ft_max_word_len	84
ft_min_word_len	4
ft_query_expansion_limit	20
ft_stopword_file	(No default value)
group_concat_max_len	1024
innodb_additional_mem_pool_size	1048576
innodb_autoextend_increment	8
innodb_buffer_pool_awe_mem_mb	0
innodb_buffer_pool_size	8388608
innodb_concurrency_tickets	500
innodb_file_io_threads	4
innodb_force_recovery	0
innodb_lock_wait_timeout	50

innodb_log_buffer_size	1048576
innodb_log_file_size	5242880
innodb_log_files_in_group	2
innodb_mirrored_log_groups	1
innodb_open_files	300
innodb_sync_spin_loops	20
innodb_thread_concurrency	20
innodb_commit_concurrency	0
innodb_thread_sleep_delay	10000
interactive_timeout	28800
join_buffer_size	131072
key_buffer_size	8388600
key_cache_age_threshold	300
key_cache_block_size	1024
key_cache_division_limit	100
long_query_time	10
lower_case_table_names	0
max_allowed_packet	1048576
max_binlog_cache_size	4294967295
max_binlog_size	1073741824
max_connect_errors	10
max_connections	100
max_delayed_threads	20
max_error_count	64
max_heap_table_size	16777216
max_join_size	4294967295

max_length_for_sort_data	1024
max_relay_log_size	0
max_seeks_for_key	4294967295
max_sort_length	1024
max_tmp_tables	32
max_user_connections	0
max_write_lock_count	4294967295
multi_range_count	256
myisam_block_size	1024
myisam_data_pointer_size	6
myisam_max_extra_sort_file_size	2147483648
myisam_max_sort_file_size	2147483647
myisam_repair_threads	1
myisam_sort_buffer_size	8388608
myisam_stats_method	nulls_unequal
net_buffer_length	16384
net_read_timeout	30
net_retry_count	10
net_write_timeout	60
open_files_limit	0
optimizer_prune_level	1
optimizer_search_depth	62
preload_buffer_size	32768
query_alloc_block_size	8192
query_cache_limit	1048576
query_cache_min_res_unit	4096

query_cache_size	0
query_cache_type	1
query_cache_wlock_invalidate	FALSE
query_prealloc_size	8192
range_alloc_block_size	2048
read_buffer_size	131072
read_only	FALSE
read_rnd_buffer_size	262144
div_precision_increment	4
record_buffer	131072
relay_log_purge	TRUE
relay_log_space_limit	0
slave_compressed_protocol	FALSE
slave_net_timeout	3600
slave_transaction_retries	10
slow_launch_time	2
sort_buffer_size	2097144
sync-binlog	0
sync-frm	TRUE
sync-replication	0
sync-replication-slave-id	0
sync-replication-timeout	10
table_cache	64
table_lock_wait_timeout	50
thread_cache_size	0
thread_concurrency	10

```
thread_stack                    196608
time_format                     (No default value)
tmp_table_size                  33554432
transaction_alloc_block_size    8192
transaction_prealloc_size       4096
updatable_views_with_limit      1
wait_timeout                    28800
```

mysqld

```
mysql> SHOW VARIABLES;
```

```
mysql>SHOW STATUS
```

mysqladmin

```
shell> mysqladmin variables
shell> mysqladmin extended-status
```

5.3.3“” 5.3.4“”

MySQL MySQL

MySQL key_buffer_sizetable_cache

· 256MB

· shell> **mysqld_safe --key_buffer_size=64M --table_ca**

· **--sort_buffer_size=4M --read_buffer_size**

· 128MB

· shell> **mysqld_safe --key_buffer_size=16M --sort_buf**

mysqld mysqld

.

· shell> **mysqld_safe --key_buffer_size=512K --sort_bu**

· **--read_buffer_size=100K &**

```
shell> mysqld_safe --key_buffer_size=512K --sort_buffer_size=16K \
           --table_cache=32 --read_buffer_size=8K \
           --net_buffer_length=1K &
```

GROUP BYORDER BY read_rnd_buffer_size

MySQLsupport-filesmy.cnf my-huge.cnfmy-.cnfmy-medium.cnf small.cnf

mysqldmysqld_safe

```
shell> mysqld --key_buffer_size=32M --verbose ---help
```

--verbose---help

InnoDB [15.2.11“InnoDB”](#)

7.5.3.

SQL“ ”“ ” ( ) MySQL MySC

· optimizer_prune_level“ ” on(optimizer_prune_level=1) (optimizer_prune_level=0)

· optimizer_search_depth“” optimizer_search_depth optimizer_search_depth 1213 optimizer_search_depth34 optimizer_search_depth 0

7.5.4. MySQL

LinuxMySQL

-static

Linux **pgcc**-O3 “sql_yacc.cc”200M **gccpgcc**inline **MySQL** CXX=gcclibstdc++()**pgcc**Pentium x586-(AMD)

10-30% SQL

Cygnus CodeFusionFujitsu MySQL

MySQL MySQL **configure**--with-charset

· **pgcc**-O6 **mysqldgcc** 2.95.211%

· (-static)Linux13%MySQL

· strip mysqld**mysqld** 4%

· TCP/IPUnix 7.5%(Unix localhost MySQL

· TCP/IP 8-11%100Mb/s

· (SSL)55%

· --with-debug=full 20% MySQL35%--with-debug(=full)15%--with-debug=full**mysqld** --skip-safemalloc --with-debug

· Sun UltraSPARC-Iie Forte 5.0**gcc** 3.24%

· Sun UltraSPARC-Iie Forte 5.032644%

· **gcc** 2.95.2-mcpu=v8 -WaUltraSPARC-xarch=v8plusa4%

· Solaris 2.5.1 MIT-pthreadsSolaris8-12%/cpus

· Linux-x86**gcc**(-fomit-frame-pointer or -fomit-frame-pointer -ffixed-ebp) **mysqld**1-4%

MySQL ABLinuxMySQL**pgcc** **gcc**pgccbugAMD **gcc**bug AMD **pgcc** MySQL Linux

7.5.5. MySQL

mysqld

· (key_buffer_size) 7.5.2“”

·

o (64KBthread_stack)

o (net_buffer_length)

o (net_buffer_length)

max_allowed_packet

·

· MyISAM 4GB32 64

· (read_buffer_size)

· ( ) (read_rnd_buffer_size)

· (HEAP) ()BLOB

heap tmp_table_sizeMySQLheapMyISAM **mysqld**tmp_table_size SQLSQL_BIG_TABLE13.5.3“SET”

· A.4.4“MySQL”

·

· MyISAM 3 * *N*(*N* BLOB)BLOB58BLOB MyISAM

· BLOB BLOB BLOB

· FIFO 64 7.4.9“MySQL”

· FLUSH TABLE**mysqladmin flush-table** FLUSH TABLE

psmysqld Solarisps swap -s mysqld

7.5.6. MySQLDNS

mysqld mysqld

· gethostbyaddr_r ()gethostbyname_r()

· gethostbyaddr()gethostbyname() 1

--skip-name-resolve**mysqld**DNS MySQLIP

DNS --skip-name-resolveDNSHOST_CACHE_SIZE(12

--skip-host-cache FLUSH HOSTS**mysqladmin flush-hosts**

TCP/IP --skip-networking**mysqld**

7.6.

7.6.1.

.

.

o

MyISAM / 7.6.1“”

o

11 22 *NN* mod number_of_disks

“”

· RAID 0+1 2*NN

· RAID RAID 0 RAID 0+1RAID N
RAID N

· Linux hdparm 100% hdparm MySQl

```
hdparm -m 16 -d 1
```

hdparm

.

-o async Linux

7.6.1.

7.6.1.1. Unix

7.6.1.2. Unix
7.6.1.3. Windows

7.6.1.1. Unix

Unix MySQL

```
shell> mkdir /dr1/databases/test
shell> ln -s /dr1/databases/test /path/to/datadir
```

MySQL db1MySQL db2 db1

```
shell> cd /path/to/datadir
shell> ln -s db1 db2
```

db1tbl_adb2tbl_adb1.tbl_adb2.tbl_a

mysys/my_symlink.c

```
if (!(MyFlags & MY_RESOLVE_LINK) ||
   (!lstat(filename,&stat_buff) && S_ISLNK(stat_buff.st_mode)))
```

if (1)

Windows

7.6.1.2. Unix

realpath() LinuxSolarisrealpath())SHOW VARIABLES

MyISAM

MyISAM

·

·

· **mysqld** ln -s DATA DIRECTORYINDEX DIRECTORY MySQL 13.1.5“CREATE TABLE”

· **myisamchk**

· root**mysqld**MySQL

· ALTER TABLE ... RENAME

· ALTER TABLE ... RENAME

· **mysqld**--skip-symbolic-links**mysqld**

· ALTER TABLEDATA DIRECTORY INDEX DIRECTORY

· BACKUP TABLE RESTORE TABLE

· .frm MySQLdb1tbl1db1tbl2tbl1

· `shell> cd /path/to/datadir/db1`

· `shell> ln -s tbl1.frm tbl2.frm`

· `shell> ln -s tbl1.MYD tbl2.MYD`

· `shell> ln -s tbl1.MYI tbl2.MYI`

db1.tbl1 db1.tbl2

o “” (tbl1)

o tbl2ALTER

7.6.1.3. Windows

Windows**mysqld-max**mysql-max-nt-DUSE_SYMDIR Unix

skip-symbolic-links

```
[mysqld]
```

skip-symbolic-links

Windows MySQL db_name.sym*db_name*

MySQC:\mysql\datafooD:\data\foo

1. D:\data\foo foo D:\data
2. C:\mysql\data\foo.symD:\data\foo\

   fooD:\data\foo *MySQL*

MySQLMySQL dev.mysql.com

8

8.1.
8.2. myisampackMyISAM
8.3. mysqlMySQL
    8.3.1.
    8.3.2. **mysql**
    8.3.3. SQL
    8.3.4. **mysql**
8.4. mysqlaccess
8.5. mysqladminMySQL
8.6. mysqlbinlog
8.7. mysqlcheck
8.8. mysqldump
8.9. mysqlhotcopy
8.10. mysqlimport
8.11. mysqlshow
8.12. myisamlogMyISAM
8.13. perror
8.14. replace
8.15. mysql_zap

MySQL MySQL

8.1.

MySQL

· myisampack

MyISAM 8.2“myisampackMyISAM”

· mysql

SQL 8.3“mysqlMySQL”

· mysqlaccess

· mysqladmin

· mysqlbinlog

· mysqlcheck

8.7“mysqlcheck”

· mysqldump

MySQL SQLtab Igor Romanenko 8.8“mysqldump”

· mysqlhotcopy

MyISAMISAM 8.9“mysqlhotcopy”

· mysql import

LOAD DATA INFILE 8.10“mysqlimport”

· mysqlshow

8.11“mysqlshow”

· perror

MySQL 8.13“perror”

· replace

8.14“replace”

MySQL ABGUIMySQL 4 *MySQL*

MySQL MySQL---help **mysql---help**

mysqlclientMySQL

MYSQL_UNIX_PORT	Unix localhost
MYSQL_TCP_PORT	TCP/IP
MYSQL_PWD	
MYSQL_DEBUG	
TMPDIR	

MYSQL_PWD 5.8.6“”

4.3“”

8.2. myisampackMyISAM

myisampackMyISAM.MYI**sampack** **myisampack**40%-70%

MySQLmmap() mmap() MySQL/

· --skip-external-locking**mysqld** **myisampack**

· (CD)TODO

· **myisampack**BLOBTEXT ISAM**pack_isam**

myisampack

```
shell> myisampack [options] filename ...
```

(.MYI) .MYI

myisampack

· --help-

· --backup-b

tbl_name.OLD

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*'

· --force-f

myisampack (**myisampack***t*

myisampack*tbl_name*.TMD --force**myisampack**

· -join=*big_tbl_name*-j *big_tbl_name*

big_tbl_name( )

· --pack length=*len*-p *len*

123**myisampack**123 **myisampack**

· --silent-s

· --test-t

· --tmpdir=*path*-T *path*

myisamchk

· --verbose-v

· --version-V

· --wait-w

--skip-external-locking**mysqld** **myisampac**

```
shell> ls -l station.*
-rw-rw-r--   1 monty    my         994128 Apr 17 19:00 station.MYD
-rw-rw-r--   1 monty    my          53248 Apr 17 19:00 station.MYI
-rw-rw-r--   1 monty    my           5767 Apr 17 19:00 station.frm
```

```
shell> myisamchk -dvv station

MyISAM file:     station
Isam-version:  2
Creation time: 1996-03-13 10:08:58
Recover time:  1997-02-02  3:06:43
Data records:              1192  Deleted blocks:              0
Datafile parts:            1192  Deleted data:                0
Datafile pointer (bytes):     2  Keyfile pointer (bytes):     2
Max datafile length:   54657023  Max keyfile length:   33554431
Recordlength:               834
Record format: Fixed length

table description:
Key Start Len Index   Type                 Root  Blocksize    Rec/ke
1   2     4   unique  unsigned long        1024       1024
2   32    30  multip. text                10240       1024

Field Start Length Type
1     1     1
2     2     4
3     6     4
4     10    1
5     11    20
6     31    1
```

7	32	30
8	62	35
9	97	35
10	132	35
11	167	4
12	171	16
13	187	35
14	222	4
15	226	16
16	242	20
17	262	20
18	282	20
19	302	30
20	332	4
21	336	4
22	340	1
23	341	8
24	349	8
25	357	8
26	365	2
27	367	2
28	369	4
29	373	4
30	377	1
31	378	2
32	380	8

33	388	4
34	392	4
35	396	4
36	400	4
37	404	1
38	405	4
39	409	4
40	413	4
41	417	4
42	421	4
43	425	4
44	429	20
45	449	30
46	479	1
47	480	1
48	481	79
49	560	79
50	639	79
51	718	79
52	797	8
53	805	1
54	806	1
55	807	20
56	827	4
57	831	4

```
shell> myisampack station.MYI
Compressing station.MYI: (1192 records)
- Calculating statistics

normal:     20  empty-space:   16  empty-zero:     12  empty-fill:
pre-space:   0  end-space:     12  table-lookups:   5  zero:
Original trees:  57  After join: 17
- Compressing file
87.14%
Remember to run myisamchk -rq on compressed tables

shell> ls -l station.*
-rw-rw-r--   1 monty    my         127874 Apr 17 19:00 station.MYD
-rw-rw-r--   1 monty    my          55296 Apr 17 19:04 station.MYI
-rw-rw-r--   1 monty    my           5767 Apr 17 19:00 station.frm

shell> myisamchk -dvv station

MyISAM file:     station
Isam-version:  2
Creation time: 1996-03-13 10:08:58
Recover time:  1997-04-17 19:04:26
Data records:               1192  Deleted blocks:              0
Datafile parts:             1192  Deleted data:                0
Datafile pointer (bytes):      3  Keyfile pointer (bytes):     1
Max datafile length:    16777215  Max keyfile length:     131071
```

Recordlength: 834

Record format: Compressed

table description:

Key	Start	Len	Index	Type	Root	Blocksize	Rec/ke
1	2	4	unique	unsigned long	10240	1024	
2	32	30	multip.	text	54272	1024	

Field	Start	Length	Type	Huff tree	Bits
1	1	1	constant	1	0
2	2	4	zerofill(1)	2	9
3	6	4	no zeros, zerofill(1)	2	9
4	10	1		3	9
5	11	20	table-lookup	4	0
6	31	1		3	9
7	32	30	no endspace, not_always	5	9
8	62	35	no endspace, not_always, no empty	6	9
9	97	35	no empty	7	9
10	132	35	no endspace, not_always, no empty	6	9
11	167	4	zerofill(1)	2	9
12	171	16	no endspace, not_always, no empty	5	9
13	187	35	no endspace, not_always, no empty	6	9
14	222	4	zerofill(1)	2	9
15	226	16	no endspace, not_always, no empty	5	9
16	242	20	no endspace, not_always	8	9
17	262	20	no endspace, no empty	8	9

18	282	20	no endspace, no empty	5	9
19	302	30	no endspace, no empty	6	9
20	332	4	always zero	2	9
21	336	4	always zero	2	9
22	340	1		3	9
23	341	8	table-lookup	9	0
24	349	8	table-lookup	10	0
25	357	8	always zero	2	9
26	365	2		2	9
27	367	2	no zeros, zerofill(1)	2	9
28	369	4	no zeros, zerofill(1)	2	9
29	373	4	table-lookup	11	0
30	377	1		3	9
31	378	2	no zeros, zerofill(1)	2	9
32	380	8	no zeros	2	9
33	388	4	always zero	2	9
34	392	4	table-lookup	12	0
35	396	4	no zeros, zerofill(1)	13	9
36	400	4	no zeros, zerofill(1)	2	9
37	404	1		2	9
38	405	4	no zeros	2	9
39	409	4	always zero	2	9
40	413	4	no zeros	2	9
41	417	4	always zero	2	9
42	421	4	no zeros	2	9
43	425	4	always zero	2	9

```
44    429   20     no empty                          3     9
45    449   30     no empty                          3     9
46    479   1                                       14    4
47    480   1                                       14    4
48    481   79     no endspace, no empty             15    9
49    560   79     no empty                          2     9
50    639   79     no empty                          2     9
51    718   79     no endspace                       16    9
52    797   8      no empty                          2     9
53    805   1                                       17    1
54    806   1                                       3     9
55    807   20     no empty                          3     9
56    827   4      no zeros, zerofill(2)             2     9
57    831   4      no zeros, zerofill(1)             2     9
```

myisampack

- normal

- empty-space

- empty-zero

- empty-fill

- pre-space

· end-space

· table-lookup

ENUM

· zero

· Original trees

· After join

myisamchk -dvv

· Type

o constant

o no endspace

o no endspacenot_always

o no endspaceno empty

o table-lookup

ENUM

o zerofill(*n*)

*n*0

o no zeros

o always zeros

· Huff tree

· Bits

myisampack **myisamchk** MySQL

```
shell> myisamchk -rq --sort-index --analyze tbl_name.MYI
```

MySQL **mysqladmin flush-tablesmysqld**

myisamchkisamchk--unpack

8.3. mysqlMySQL

8.3.1.
8.3.2. **mysql**
8.3.3. SQL
8.3.4. **mysql**

mysqlSQL(GNU readline) ASCII ( ) tab

--quick **mysql** mysql_use_result

mysql

```
shell> mysql db_name
```

```
shell> mysql --user=user_name --password=your_password db_name
```

SQL‘ ’ \g\G

```
shell> mysql db_name < script.sql > output.tab
```

8.3.1.

mysql

· ---help-

· --batch-B

tab **mysql**

· --character-sets -dir=*path*

5.10.1“”

· --compress-C

· ---database=*db_name*-D *db_name*

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*' 'd:t:o,/tmp/mysql.trace'

· ---debug-info-T

· --default-character-set=*charset*

*charset*as 5.10.1“”

· --execute=*statement*, -e *statement*

--batch 4.3.1“”

· --force-f

SQL

· --host=*host_name*-h *host_name*

MySQL

· --html-H

HTML

· --ignore-space-i

5.3.2“SQL” IGNORE_SPACE

· --local-infile[={0|1}]

LOAD DATA INFILELOCAL LOCAL--local-infile=0--local-infile=1 LOCAL LOCAL

· --named-commands-G

* quit\q

· --no-auto-rehash-A

mysql rehash

· --no-beep-b

· --no-named-commands-g

* (‘’) MySQL 3.23.22**mysql** 1

· --no-pager

8.3.2“ **mysql**”

· --no-tee

8.3.2“ **mysql**” Tee

· --one--database-O

· --pager[=*command*]

PAGER pagers**less**r

“ **mysql**”

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P *port_num*

TCP/IP

- --prompt=*format_str*

  mysql>8.3.2“ **mysql**”

- --protocol={TCP | SOCKET | PIPE | MEMORY}

- --quick-q

- --raw-r

  --batch

- --reconnect

- --safe-updates--i-am-a-dummy-U

  UPDATEDELETE --safe-updates 8.3.4“

- --secure-auth

  (pre-4.1.1)

- --show-warnings

- --sigint-ignore

  SIGINT(Control-C)

- --silent-s

- --skip-column-names-N
- --skip-line-numbers-L
- --socket=*path*-S *path*
- --tables-t
- --tee=*file_name*

  8.3.2“ **mysql**” Tee
- --unbuffered-n
- --user=*user_name*-u *user_name*

  MySQL
- --verbose-v

  (-v -v -v
- --version-V
- --vertical-E

  \G
- --wait-w

· --xml-X

XML

--var_name=value

· connect_timeout

(0

· max_allowed_packet

(16MB

· max_join_size

--safe-updates (1,000,000

· net_buffer_length

TCP/IP (16KB

· select_limit

--safe-updatesSELECT (1,000

--set-variable=*var_name=value* or -O *var_name=value*

Unix **mysql** .mysql_history MYSQL_HISTFILE

.mysql_history

· MYSQL_HISTFILE/dev/null

· .mysql_history/dev/null

· shell> **ln -s /dev/null $HOME/.mysql_history**

8.3.2. mysql

mysqlSQL **mysql** mysql>help\h

```
mysql> help

List of all MySQL commands:
Note that all text commands must be first on line and end with ';'
?         (\?) Synonym for `help'.
clear     (\c) Clear command.
connect   (\r) Reconnect to the server. Optional arguments are db an
delimiter (\d) Set statement delimiter. NOTE: Takes the rest of the
edit      (\e) Edit command with $EDITOR.
ego       (\G) Send command to mysql server, display result vertical
exit      (\q) Exit mysql. Same as quit.
go        (\g) Send command to mysql server.
help      (\h) Display this help.
nopager   (\n) Disable pager, print to stdout.
notee     (\t) Don't write into outfile.
pager     (\P) Set PAGER [to_pager]. Print the query results via PAG
print     (\p) Print current command.
prompt    (\R) Change your mysql prompt.
quit      (\q) Quit mysql.
rehash    (\#) Rebuild completion hash.
source    (\.) Execute a SQL script file. Takes a file name as an ar
status    (\s) Get status information from the server.
system    (\!) Execute a system shell command.
tee       (\T) Set outfile [to_outfile]. Append everything into give
use       (\u) Use another database. Takes database name as argument
warnings  (\W) Show warnings after every statement.
nowarning (\w) Don't show warnings after every statement.
```

delimiter (‘\’)MySQL

EditnopagerpagersystemUnix

status --safe-updates statusMySQL

tee --tee **tee** **noteetee** **tee** **tee** **mysql**

--pager Unix **lessmore** **mysql**PAGERPAGER **pager** **nopager** stdout

Unixpopen() Windows Windows **tee** **pager**

pager

·

· mysql> **pager cat > /tmp/log.txt**

mysql> **pager less -n -i -S**

· -S **less**-S **less**-S **less**

· shell> **man less**

· pager

· mysql> **PAGER cat | tee /dr1/tmp/res.txt **

· **| tee /dr2/tmp/res2.txt | less -n -i -S**

/dr1/dr2 **less**

teepager **teepagerlessless** **pager**Unix **tee** **mysqltee**Un
tee **pager**Unix **tee** MySQL**tee**

mysql>

\v	
\d	
\h	

\p	TCP/IP
\u	
\U	*user_name@host_name*
\\	‘\’
\n	
\t	Tab
\	()
_	
\R	24-(0-23)
\r	12-(1-12)
\m	
\y	
\Y	

\D	
\s	
\w	3(MonTue...)
\P	am/pm
\o	
\O	3(JanFeb...)
\c	
\S	
\'	
\"	

‘\’

mysqlmysql>

.

MYSQL_PS1

```
shell> export MYSQL_PS1="(\u@\h) [\d]> "
```

.

MySQL[mysql] /etc/my.cnf.my.cnf

```
[mysql]
prompt=(\\u@\\h) [\\d]>\\_
```

prompt (4.3.2“”

```
[mysql]
prompt="\\r:\\m:\\s> "
```

.

mysql--prompt

```
shell> mysql --prompt="(\u@\h) [\d]> "
(user@host) [database]>
```

.

prompt(\R)

```
mysql> prompt (\u@\h) [\d]>\_
PROMPT set to '(\u@\h) [\d]>\_'
(user@host) [database]>
(user@host) [database]> prompt
Returning to default PROMPT of mysql>
mysql>
```

8.3.3. SQL

mysql

```
shell> mysql db_name
```

SQL**mysql** text_file **mysql**

```
shell> mysql db_name < text_file
```

USE *db_name*

```
shell> mysql < text_file
```

mysqlsource\.SQL

```
mysql> source filename
mysql> \. filename
```

```
SELECT '<info_to_display>' AS ' '
```

<info_to_display>

3.5“ **my**sql”

8.3.4. mysql

8.3.4.1.
8.3.4.2. --safe-updates
8.3.4.3. mysql

mysql

8.3.4.1.

\G

```
mysql> SELECT * FROM mails WHERE LENGTH(txt) < 300 LIMIT 300,1\G
*************************** 1. row ***************************
  msg_nro: 3068
     date: 2000-03-01 23:29:50
time_zone: +0200
mail_from: Monty
    reply: monty@no.spam.com
  mail_to: "Thimble Smith" <tim@no.spam.com>
      sbj: UTF-8
```

```
      txt: >>>>> "Thimble" == Thimble Smith writes:

Thimble> Hi.  I think this is a good idea.  Is anyone familiar
Thimble> with UTF-8 or Unicode? Otherwise, I'll put this on my
Thimble> TODO list and see what happens.

Yes, please do that.

Regards,
Monty
     file: inbox-jani-1
     hash: 190402944
1 row in set (0.09 sec)
```

8.3.4.2. --safe-updates

--safe-updates(--i-am-a-dummy)DELETE FROM *tb*

--safe-updates

--safe-updates **mysql**MySQL

```
SET SQL_SAFE_UPDATES=1,SQL_SELECT_LIMIT=1000, SQL_MAX_JOIN_SIZE=1000
```

13.5.3“SET”

SET

· UPDATEDELETE WHERELIMIT()

· UPDATE *tbl_name* SET *not_key_column=val* WHERE *key_co*

·

· UPDATE *tbl_name* SET *not_key_column=val* LIMIT 1;

· SELECT1,000 LIMIT

· 1,000,000sELECT

1,0001,000,000 --select_limit--max_join_size

```
shell> mysql --safe-updates --select_limit=500 --max_join_size=10000
```

8.3.4.3. mysql

mysql **mysql** 1

```
mysql> SET @a=1;
Query OK, 0 rows affected (0.05 sec)

mysql> INSERT INTO t VALUES(@a);
ERROR 2006: MySQL server has gone away
No connection. Trying to reconnect...
Connection id:    1
Current database: test

Query OK, 1 row affected (1.30 sec)

mysql> SELECT * FROM t;
+------+
| a    |
+------+
| NULL |
+------+
1 row in set (0.05 sec)
```

@a **mysql** --skip-reconnect**mysql**

8.4. mysqlaccess

mysqlaccessYves CarlierMySQL
tables_privcolumns_privprocs_priv

mysqlaccess

```
shell> mysqlaccess [host_name [user_name [db_name]]] [options]
```

mysqlaccess

· ---help-

· --brief-b

· --commit

(**mysql**

· --copy

· --db=*db_name*-d *db_name*

· ---debug=*N*

*N*03

· --host=*host_name*-h *host_name*

· --howto

mysqlaccess

· --old_server

MySQL(MySQL 3.21)WHERE

· --password[=*password*]-p[*password*]

--password-p

· --plan

· --preview

· --relnotes

· --rhost=*host_name*-H *host_name*

MySQL

· --rollback

· --spassword[=*password*]-P[*password*]

super --password-p

· --superuser=*user_name*-U *user_name*

super

· --tables-t

· --user=*user_name*-u *user_name*

· --version-v

MySQL **mysqlaccessmysql** 18mysqlaccess

```
$MYSQL     = '/usr/local/bin/mysql';    # path to mysql executable
```

mysql **mysqlaccess**Broken pipe

8.5. mysqladminMySQL

mysqladmin

mysqladmin

```
shell> mysqladmin [options] command [command-options] [command [comm
```

mysqladmin

· create *db_name*

db_name

· debug

· drop *db_name*

db_nam

· extended-status

· flush-hosts

· flush-logs

· flush-privileges

(reload)

· flush-status

· flush-tables

· flush-threads

· kill id,id,...

· old-password *new-password*

password(pre-4.1) (5.7.9“MySQL 4.1”

· password *new-password*

mysqladmin new-password

new-password Windows

shell> mysqladmin password "my new password"

· ping

mysqladmin01Access denied0

· processlist

SHOW PROCESSLIST --verbose SHOW FU
13.5.4.16“SHOW PROCESSLIST”

· reload

· refresh

- shutdown
- start-slave
- status
- stop-slave
- variables
- version

```
shell> mysqladmin proc stat
+----+-------+-----------+----+---------+------+-------+------------
| Id | User  | Host      | db | Command | Time | State | Info
+----+-------+-----------+----+---------+------+-------+------------
| 51 | monty | localhost |    | Query   | 0    |       | show proces
+----+-------+-----------+----+---------+------+-------+------------
Uptime: 1473624  Threads: 1  Questions: 39487
Slow queries: 0  Opens: 541  Flush tables: 1
Open tables: 19  Queries per second avg: 0.0268
```

mysqladmin status

· Uptime

MySQL

· Threads

()

· Questions

()

· Slow queries

long_query_time 5.11.4“”

· Opens

· Flush tables

flush ...refreshreload

· Open tables

· Memory in use

mysqld --with--debug=fullMySQL

· Maximum memory used

mysqld --with--debug=fullMySQL

Unix**mysqladmin shutdownmysqladmin**ID

mysqladmin

· ---help-

· --character-sets-dir=*path*

5.10.1“”

· --compress-C

· --count=*num*-c *num*

--sleep (-i)

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*' 'd:t:o,/tmp/mysqladmin.trace'

· --default-character-set=*charset*

*charset*as 5.10.1“”

· --force-f

drop database

· --host=*host_name*-h *host_name*

MySQL

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P *port_num*

TCP/IP

· --protocol={TCP | SOCKET | PIPE | MEMORY}

· --relative-r

-I extended-status

· --silent-s

· --sleep=*delay*-i *delay*

delay

· --socket=*path*-S *path*

· --user=*user_name*-u *user_name*

MySQL

· --verbose-v

· --version-V

· --vertical-E

--relative

· --wait[=*count*]-w[*count*]

--*var_name=value*

· connect_timeout

43200(12)

· shutdown_timeout

3600(1)

--set-variable=*var_name=value*-O *var_name=value*

8.6. mysqlbinlog

mysqlb

mysqlbinlog

```
shell> mysqlbinlog [options] log-files...
```

binlog.000003

```
shell> mysqlbinlog binlog.0000003
```

binlog.000003 ID

mysqlbinlogMySQL --read-from-remote-server

socket--user

mysqlbinlog

5.11.3“”

mysqlbinlog

· ---help-

· ---database=*db_name*-d *db_name*

()

· --force-read-f

mysqlbinlog **mysqlbinlog**

· --hexdump-H

MySQL 5.1.2

· --host=*host_name*-h *host_name*

MySQL

· --local-load=*path*-l *pat*

LOAD DATA INFILE

· --offset=*N*-o *N*

N

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P port_*num*

TCP/IP

· --position=*N*-j *N*

--start-position

· --protocol={TCP | SOCKET | PIPE | -position

· --read-from-remote-server-R

MySQL --host--password--port--protocol--socket--user

· --result-file=*name*, -r *name*

· --short-form-s

· --socket=*path*-S *path*

· --start-datetime=*datetime*

1*datetime* *datetime***mysqlbinlog**DATETIMETIMESTAMP

```
shell> mysqlbinlog --start-datetime="2004-12-25 11:25:56" binlog.000
```

· --stop-datetime=*datetime*

1*datetime* *datetime*--start-datetime

· --start-position=*N*

1*N*

· --stop-position=*N*

1*N*

· --to-last-logs-t

MySQL MySQL --read-from-remote-server

· --disable-logs-bin-D

--to-last-logsMySQL SUPER

· --user=*user_name*-u *user_name*

MySQL

· --version-V

--var_name=value

· open_files_limit

mysqlbinlogmysql (5.9.1“”)

```
shell> mysqlbinlog hostname-bin.000001 | mysql
```

```
shell> mysqlbinlog hostname-bin.[0-9]* | mysql
```

mysqlbinlog ( ) **mysql**

mysqlbinlog--position () --stop-datetime(“ 10:30 AM”)

MySQL

```
shell> mysqlbinlog hostname-bin.000001 | mysql # DANGER!!
shell> mysqlbinlog hostname-bin.000002 | mysql # DANGER!!
```

1CREATE TEMPORARY TABLE

“ ”

```
shell> mysqlbinlog hostname-bin.000001 hostname-bin.000002 | mysql
```

```
shell> mysqlbinlog hostname-bin.000001 >  /tmp/statements.sql
shell> mysqlbinlog hostname-bin.000002 >> /tmp/statements.sql
shell> mysql -e "source /tmp/statements.sql"
```

mysqlbinlogLOAD DATA INFILE **mysqlbinlog**LOAD DATA LOCAL INFILE --local-load

mysqlbinlogLOAD DATA INFILELOAD DATA LOCAL INFILE(LOCA LOCAL 5.6.4“LOAD DATA LOCAL ”

LOAD DATA LOCAL original_file_name-#-#

--hexdump

```
shell> mysqlbinlog --hexdump master-bin.000001


/*!40019 SET @@session.max_insert_delayed_threads=0*/;
/*!50003 SET @OLD_COMPLETION_TYPE=@@COMPLETION_TYPE,COMPLETION_TYPE=
# at 4
#051024 17:24:13 server id 1  end_log_pos 98
# Position  Timestamp   Type   Master ID        Size      Master Pos
# 00000004 9d fc 5c 43   0f   01 00 00 00   5e 00 00 00   62 00 00 0
# 00000017 04 00 35 2e 30 2e 31 35  2d 64 65 62 75 67 2d 6c |..5.0.1
# 00000027 6f 67 00 00 00 00 00 00  00 00 00 00 00 00 00 00 |og.....
# 00000037 00 00 00 00 00 00 00 00  00 00 00 00 00 00 00 00 |.......
# 00000047 00 00 00 00 9d fc 5c 43  13 38 0d 00 08 00 12 00 |.......
# 00000057 04 04 04 04 12 00 00 4b  00 04 1a               |.......
#       Start: binlog v 4, server v 5.0.15-debug-log created 051024
#       at startup
ROLLBACK;
```

· Position: The byte position within the log file.

· Timestamp: The event timestamp. In the example just shown, '9d fc 5c 43' is the representation of '051024 17:24:13' in hexadecimal.

· Type: The type of the log event. '0f' means that the example event is a FORMAT_DESCRIPTION_EVENT. The types are:

```
·               00  UNKNOWN_EVENT
·                   This event should never be present in the log.
·               01  START_EVENT_V3
```

· This indicates the start of a log file written
· 02 QUERY_EVENT
· The most common type of events. These contain
· on the master.
· 03 STOP_EVENT
· Indicates that master has stopped.
· 04 ROTATE_EVENT
· Written when the master switches to a new log f
· 05 INTVAR_EVENT
· Used mainly for AUTO_INCREMENT values and if th
· function is used in the statement.
· 06 LOAD_EVENT
· Used for LOAD DATA INFILE in MySQL 3.23.
· 07 SLAVE_EVENT
· Reserved for future use.
· 08 CREATE_FILE_EVENT
· Used for LOAD DATA INFILE statements. This ind
· of execution of such a statement. A temporary
· on the slave. Used in MySQL 4 only.
· 09 APPEND_BLOCK_EVENT
· Contains data for use in a LOAD DATA INFILE sta
· data is stored in the temporary file on the sla
· 0a EXEC_LOAD_EVENT
· Used for LOAD DATA INFILE statements. The cont
· temporary file is stored in the table on the sl
· Used in MySQL 4 only.

```
·               0b  DELETE_FILE_EVENT
·                   Rollback of LOAD DATA INFILE statement.  The te
·                   should be deleted on slave.
·               0c  NEW_LOAD_EVENT
·                   Used for LOAD DATA INFILE in MySQL 4 and earlie
·               0d  RAND_EVENT
·                   Used to send information about random values if
·                   function is used in the query.
·               0e  USER_VAR_EVENT
·                   Used to replicate user variables.
·               0f  FORMAT_DESCRIPTION_EVENT
·                   This indicates the start of a log file written
·               10  XID_EVENT
·                   Event indicating commit of XA transaction
·               11  BEGIN_LOAD_QUERY_EVENT
·                   Used for LOAD DATA statements in MySQL 5 and la
·               12  EXECUTE_LOAD_QUERY_EVENT
·                   Used for LOAD DATA statements in MySQL 5 and la
·               13  TABLE_MAP_EVENT
·                   Reserved for future use
·               14  WRITE_ROWS_EVENT
·                   Reserved for future use
·               15  UPDATE_ROWS_EVENT
·                   Reserved for future use
·               16  DELETE_ROWS_EVENT
·                   Reserved for future use
```

- Master ID: The server id of the master that created the event.
- Size: The size in bytes of the event.
- Master Pos: The position of the event in the original master log file.
- Flags: 16 flags.

```
·               01  LOG_EVENT_BINLOG_IN_USE_F
·                   Log file correctly closed (Used only in FORMAT_
·                   If this flag is set (if the flags are e.g. '01
·                   FORMAT_DESCRIPTION_EVENT, then the log file has
·                   properly closed.  Most probably because of a ma
·                   example, due to power failure).
·               02  Reserved for future use.
·               04  LOG_EVENT_THREAD_SPECIFIC_F
·                   Set if the event is dependent on the connection
·                   executed in (example '04 00'), e.g. if the even
·                   temporary tables.
·               08  LOG_EVENT_SUPPRESS_USE_F
·                   Set in some circumstances when the event is not
·                   the current database
```

8.7. mysqlcheck

mysqlcheckMyISAM

mysqlcheckmyisamchk mysqldmysqlcheckmyisamchk mysqlcheck

MysqlcheckSQLCHECK TABLEREPAIR TABLEANALYZE TABLE OPTIMIZE TABLE

3**mysqlcheck**

```
shell> mysqlcheck[options] db_name [tables]
shell> mysqlcheck[options] ---database DB1 [DB2 DB3...]
shell> mysqlcheck[options] --all--database
```

---database--all--database

mysqlcheck (--check) **mysqlcheckmysqlrepairmysqlre**
mysqlcheckmysqlrepair

mysqlcheck

mysqlrepair	--repair
mysqlanalyze	--analyze
mysqloptimize	--optimize

mysqlcheck

· ---help-

· --all--database-A

---database

· --all-in-1-1

· --analyze-a

· --auto-repair

· --character-sets-dir=*path*

5.10.1“”

· --check-c

· --check-only-changed-C

· --compress

· ---database-B

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*'

· --default-character-set=*charset*

*charset*as 5.10.1“”

· --extended-e

100%

· --fast-F

· --force-f

SQL

· --host=*host_name*-h *host_name*

MySQL

· --medium-check-m

--extended 99.99%

· --optimize-o

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P port_*num*

TCP/IP

· --protocol={TCP | SOCKET | PIPE | MEMORY}

· --quick-q

· --repair-r

· --silent-s

· --socket=*path*-S *path*

· --tables

---database-B

· --user=*user_name*-u *user_name*

MySQL

· --verbose-v

· --version-V

8.8. mysqldump

mysqldumpSQL(MySQL)/SQL

MyISAM **mysqlhotcopy** 8.9“mysqlhot

3**mysqldump**

```
shell> mysqldump [options] db_name [tables]
shell> mysqldump [options] ---database DB1 [DB2 DB3...]
shell> mysqldump [options] --all--database
```

---database--all--database

mysqldump **mysqldump ---help**

mysqldump--quick--opt **mysqldump** --skip-opt

mysqldumpMySQL --opt-e

mysqldump

· ---help-

· --add-drop--database

CREATE DATABASEDROP DATABASE

· --add-drop-tables

CREATE TABLEDROP TABLE

· --add-locking

LOCK TABLESUNLOCK TABLES 7.2.16“INSERT”

· --all--database-A

---database

· --allow-keywords

· ---comments[={0|1}]

0 --skip—comments---comments=0 1

· --compact

--skip-add-drop-tables--no-set-names--skip-disa

· --compatible=*name*

MySQL
ansimysql323mysql40postgresqloraclemssqldb2maxdbno_key_optionsno_tables_
no_field_options SQL 5.3.2“SQL”

SQL

· --complete-insert-c

INSERT

· --compress-C

· --create-option

CREATE TABLEMySQL

· ---database-B

mysqldump1 CREATE DATABASE IF
*db_name*USE *db_name*

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*'

· --default-character-set=*charset*

*charset*as 5.10.1“” **mysqldump**utf8

· --delayed-insert

INSERT DELAYED

· --delete-master-logs

--master-data

· --disable-keys-K

/*!40000 ALTER TABLE *tbl_name* DISABLE KEYS */;/*!40000 A
TABLE *tbl_name* ENABLE KEYS */;INSERT MyISAM

· --extended-insert-e

VALUESINSERT

· --fields-terminated-by=...--fields-enclosed-by=...--fields-optionally-enclosed-by=...--fields-escaped-by=...---terminated-by=...

-T LOAD DATA INFILE 13.2.5“LOAD DATA INFILE”

· --first-slave-x

--lock-all-tables

· --flush-logs-F

MySQL RELOAD --all--database(-A) --lock-all-table data

· --force-f

SQL

· --host=*host_name*-h *host_name*

MySQL localhost

· --hex-blob

('abc' 0x616263)BINARYVARBINARYBL(

· --lock-all-tables-x

--sing

· --lock-tables-l

READ LOCALMyISAM InnoDBBDB--single-transac

--lock-tables

· --master-data[=*value*]

RELOAD 1CHAI
MASTERSQL *value*

--master-data--lock-all-tables--single-transaction(--single-transaction
--lock-tables

· --no-create-db-n

CREATE DATABASE /*!32312 IF NOT EXISTS*/ db_name ---dat
all--database

· --no-create-info-t

CREATE TABLE

· --no-data-d

· --opt

--add-drop-tables--add-locking --create-option --disable-k
insert --lock-tables --quick --set-charsetMySQL --*skip-opt*-opt --skip
--skip-add-drop-tables--skip-quick

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P port_*num*

TCP/IP

· --protocol={TCP | SOCKET | PIPE | MEMORY}

· --quick-q

mysqldump

· --quote-names-Q

‘ `’ SQLANSI_QUOTES‘ "’ --skip-quote-names
--quote-names--compatible

· --result-file=*file*-r *file*

Windows‘ \n’‘ \r\n’ /

· --routines-R

()---routinesCREATE PROCEDURECREATE FUNC

--routines mysqlMyS

MySQL 5.1.2

· --set-charset

SET NAMES *default_character_set* SET NAMES --skip-set-charset

· --single-transaction

BEGIN SQL InnoDBBDBBEGIN

InnoDB MyISAMHEAP

--single-transaction--lock-tables LOCK TABLES

--quick

· --socket=*path*-S *path*

localhost()

· --skip--comments

---comments

· --tab=*path*-T *path*

tab **mysqldump**CREATE TABLE*tbl_name*.sql *tbl_name*.txt

.txttab --fields-*xxx*----*xxx*

mysqldumpmysqld FILE

· --tables

---database-B

· --triggers

--skip-triggers

· --tz-utc

SET TIME_ZONE='+00:00'TIMESTAMP (TIMESTAMP --tz-utc --skip-tz-utcMySQL 5.1.2

· --user=*user_name*-u *user_name*

MySQL

· --verbose-v

· --version-V

· --where='*where-condition*', -w '*where-condition*'

WHERE

```
"--where=user='jimf'"
"-wuserid>1"
"-wuserid<1"
```

· --xml-X

XML

--var_name=value

· max_allowed_packet

/ 1GB

· net_buffer_length

/ (--extended-insert--opt)**mysqldump**net_buffer_length MySQL net_buffer_length

--set-variable=*var_name*=*value*-O *var_name*=*value*

mysqldump

```
shell> mysqldump --opt db_name > backup-file.sql
```

```
shell> mysql db_name < backup-file.sql
```

```
shell> mysql -e "source /path-to--backup/backup-file.sql" db_name
```

mysqldumpMySQL

```
shell> mysqldump --opt db_name | mysql --host=remote_host -C db_name
```

```
shell> mysqldump ---database db_name1 [db_name2 ...] > my_databases.
```

--all--database

```
shell> mysqldump --all-databases > all_databases.sql
```

InnoDB mysqldump()(FLUSH TABLES WITH READ LOCK)
FLUSH... MySQL MySQL("")

```
shell> mysqldump --all-databases --single-transaction > all_database
```

(“”)(5.11.3“”)

```
shell> mysqldump --all-databases --master-data=2 > all_databases.sql
```

```
shell> mysqldump --all-databases --flush-logs --master-data=2 > all_
```

InnoDB --master-data--single-transaction

5.9.1“”

8.9. mysqlhotcopy

mysqlhotcopyPerl Tim Bunce LOCK TABLESFLUSH TABLEScpscp
mysq

```
shell> mysqlhotcopy db_name [/path/to/new_directory]
shell> mysqlhotcopy db_name_1 ... db_name_n /path/to/new_directory
```

```
shell> mysqlhotcopy db_name./regex/
```

(‘~’)

```
shell> mysqlhotcopy db_name./~regex/
```

mysqlhotcopy

· ---help-

· --allowold

(_old)

· --checkpoint=*db_name.tbl_name*

db_name.tbl_name

· ---debug

· --dryrun-n

· --flushlog

· --keepold

()

· -- method=*command*

(cpscp)

· --noindices

myisamchk -rq

· --password=*password*-p *password*

MySQL

· --port=*port_num*-P port_*num*

TCP/IP

· --quiet-q

· --regexp=*expr*

· --socket=*path*-S *path*

Unix

· --suffix=*str*

· --tmpdir=*path*

(/tmp)

· --user=*user_name*-u *user_name*

MySQL

mysqlhotcopy[client][mysqlhotcopy]

mysqlhotcopy SELECTRELOAD(FLUSH TABLES)

perldoc**mysqlhotcopy**

```
shell> perldoc mysqlhotcopy
```

8.10. mysqlimport

mysqlimportLOAD DATA INFILEQL **mysqlimport**LOAD DATA INFILE 13.2.5“LOAD DATA INFILE”

mysqlimport

```
shell> mysqlimport [options] db_name textfile1 [textfile2 ...]
```

mysqlimport

mysqlimport

· ---help-

· --columns=*column_list*, -c *column_list*

· --compress-C

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*'

· --delete-D

· --fields-terminated-by=...--fields-enclosed-by=...--fields-optionally-enclosed-by=...--fields-escaped-by=...--lines-terminated-by=...

LOAD DATA INFILE 13.2.5“LOAD DATA INFILE”

· --force-f

--force**mysqlin**

· --host=*host_name*-h *host_name*

MySQL localhost

· --ignore-i

--replace

· --ignore-lines=*n*

n

· --local-L

· --lock-tables-l

· --password[=*password*]-p[*password*]

(-p) --password-p

· --port=*port_num*-P port_*num*

TCP/IP

· --protocol={TCP | SOCKET | PIPE | MEMORY}

· --replace-r

--replace--ignore --replace --ignore

· --silent-s

· --socket=*path*-S *path*

localhost()

· --user=*user_name*-u *user_name*

MySQL

· --verbose-v

· --version-V

mysqlimport

```
shell> mysql -e 'CREATE TABLE imptest(id INT, n VARCHAR(30))' test
shell> ed
a
100     Max Sydow
101     Count Dracula
.
w imptest.txt
32
q
shell> od -c imptest.txt
0000000   1   0   0  \t   M   a   x       S   y   d   o   w  \n   1
0000020   1  \t   C   o   u   n   t       D   r   a   c   u   l   a
0000040
shell> mysqlimport --local test imptest.txt
test.imptest: Records: 2  Deleted: 0  Skipped: 0  Warnings: 0
```

```
shell> mysql -e 'SELECT * FROM imptest' test
+------+---------------+
| id   | n             |
+------+---------------+
|  100 | Max Sydow     |
|  101 | Count Dracula |
+------+---------------+
```

8.11. mysqlshow

mysqlshow

mysqlshowSQL **mysql** 13.5.4“SHOW”

mysqlshow

```
shell> mysqlshow[  ] [db_name [tbl_name [col_name]]]
```

.

.

.

MySQL

shellSQL (‘*’‘ ?’‘ %’‘ _’) Unix shells‘ ‘ %’‘ _’‘ _’ **my**

mysqlshow

· ---help-

· --character-sets-dir=*path*

5.10.1“”

· --compress-C

· ---debug[=*debug_options*]-# [*debug_options*]

debug_options'd:t:o,*file_name*'

· --default-character-set=*charset*

charset 5.10.1“”

· --host=*host_name*-h *host_name*

MySQL

· --keys, -k

· --password[=*password*]-p[*password*]

(-p) --p

· --port=*port_num*, -P *port_num*

TCP/IP

· --protocol={TCP | SOCKET | PIPE | MEMORY}

· --show-table-type

SHOW FULL TABLES

· --socket=*path*-S *path*

localhost

· --status, -i

· --user=*user_name*-u *user_name*

MySQL

· --verbose-v

- --version-V

8.12. myisamlogMyISAM

myisamlogMyISAM

myisamlog

```
shell> myisamlog [options] [logfile-name [tbl_name] ...]
```

-u -r myisam.log

myisamlog

· -?-I

· -c *N*

N

· -f *N*

· -F *filepath/*

TODO

· -i

· -o *offset*

· -p *N*

N

- -r

- -R *record-pos-file record-pos*

- -u

- -v

Verbose

- -w *write-file*

- -V

8.13. perror

MySQL

message ... (errno: #)

message ... (Errcode: #)

perror

perror

perror

```
shell> perror [options] errorcode ...
```

```
shell> perror13 64
```

Error code 13: Permission denied

Error code 64: Machine is not on the network

MySQL --ndb**perror**

```
shell> perror --ndb errorcode
```

8.14. replace

replace file1file2ab

```
shell> replace a b b a -- file1 file2 ...
```

---

replace --

replacemsql2mysql25.9.1“msql2mysqlmSQLMySQL”

replace

· -?-I

· -# *debug_options*

debug_options'd:t:o,*file_name*'

· -s

· -v

· -V

8.15. mysql_zap

mysql_zap

```
shell> mysql_zap [-signal] [-?Ift] pattern
```

ps **mysql_zap** y q **mysql_zap** **mysql_zap**

-signal **mysql_zap**TERM 15KILL 9

mysql_zap

· ---help-?-I

· -f

mysql_zap

· -t

9

9.1.
    9.1.1.
    9.1.2.
    9.1.3.
    9.1.4.
    9.1.5.
    9.1.6. NULL
9.2.
    9.2.1.
    9.2.2.
9.3.
9.4.
    9.4.1.
9.5.
9.6. MySQL

MySQLSQL

.

.

.

.

.

9.1.

9.1.1.
9.1.2.
9.1.3.
9.1.4.
9.1.5.
9.1.6. NULL

MySQL NULLMySQL“”

9.1.1.

(‘’)(‘"’)

```
'a string'
"another string"
```

SQLNSI_QUOTES

COLLATE

```
[_charset_name]'string' [COLLATE collation_name]
```

```
SELECT _latin1'string';
SELECT _latin1'string' COLLATE latin1_danish_ci;
```

10.3.7“”

(‘\’) MySQL

\0	ASCII 0(NUL)
\'	(‘’)

\"	(‘"’)
\b	
\n	
\r	
\t	tab
\Z	ASCII 26(Ctrl-Z)‘ \Z’ WindowsASCII 26 (mysql *db_name* < *file_name*ASCII 26
\\	(‘\’)
\%	‘%’
_	‘_’

‘ \b’‘ \B’‘ B’

‘\%’‘ _’‘ %’‘ _’ [12.3.1“”](#) ‘ \%’‘ _’‘ \%’‘ _’ ‘ %’‘ _’

. ‘ ’’‘ ’’‘ "’

. ‘ ”’‘ ”’‘ ””’

· (‘\’)

. ‘ ”’‘ ”’‘ ”’‘ ”’

SELECT

```
mysql> SELECT 'hello', '"hello"', '""hello""', 'hel''lo', '\'hello';
+-------+---------+-----------+--------+--------+
| hello | "hello" | ""hello"" | hel'lo | 'hello |
+-------+---------+-----------+--------+--------+

mysql> SELECT "hello", "'hello'", "''hello''", "hel""lo", "\"hello";
+-------+---------+-----------+--------+--------+
| hello | 'hello' | ''hello'' | hel"lo | "hello |
+-------+---------+-----------+--------+--------+

mysql> SELECT 'This\nIs\nFour\nLines';
+--------------------+
| This
Is
Four
Lines |
+--------------------+

mysql> SELECT 'disappearing\ backslash';
+------------------------+
| disappearing backslash |
```

```
+-----------------------+
```

(BLOB)

NUL	NUL(ASCII 0)‘ \0’(ASCII‘0’)
\	(ASCII 92)‘ \\’
'	(ASCII 39)‘ \'’
"	(ASCII 34)‘ \"’

MySQLSQL

· C mysql_real_escape_string() C API 25.2.3.52 “mysql_real_escape_string()” Perl DBIquote 25.4“MySQL Perl API”

· MySQL API API

9.1.2.

‘ .’‘ -’

```
1221

0

-32


294.42

-32032.6809e+10
```

```
148.00
```

9.1.3.

MySQL (64)

```
mysql> SELECT x'4D7953514C'
    -> 'MySQL'
mysql> SELECT 0xa+0
    -> 10
mysql> SELECT 0x5061756c
    -> 'Paul'
```

CAST(...AS UI

```
mysql> SELECT 0x41CAST(0x41 AS UNSIGNED)
    -> 'A'65
```

0xODBCODBCBLOB x'hexstring'SQL

HEX()

```
mysql> SELECT HEX('cat')
    -> '636174'
mysql> SELECT 0x636174
    -> 'cat'
```

9.1.4.

TRUE1FALSE0

```
mysql> SELECT TRUEtrueFALSEfalse
    -> 1100
```

9.1.5.

b'*value*' *value*01

BIT

```
mysql> CREATE TABLE t (b BIT(8));
mysql> INSERT INTO t SET b = b'11111111';
mysql> INSERT INTO t SET b = b'1010';
+------+----------+----------+----------+
| b+0  | BIN(b+0) | OCT(b+0) | HEX(b+0) |
+------+----------+----------+----------+
|  255 | 11111111 | 377      | FF       |
|   10 | 1010     | 12       | A        |
+------+----------+----------+----------+
```

9.1.6. NULL

NULL“ ” NULL

NULL0 A.5.3“NULL ”

LOAD DATA INFILESELECT ...INTO OUTFILE NULL\N 13.2.5 “LOAD DATA INFILE”

9.2.

9.2.1.
9.2.2.

MySQL

()	
64	‘ /’‘ \’‘ ’
64	‘ /’‘ \’‘ ’
64	
64	
255	

ASCII 0255

Unicode(UTF8) .frmmysqlUnicode(UTF8) MySQL 5.1() (MyS

(‘`’)

```
mysql> SELECT * FROM `select` WHERE `select`.id > 100;
```

SQLANSI_QUOTES

```
mysql> CREATE TABLE "test" (col INT);
ERROR 1064: You have an error in your SQL syntax. (...)
mysql> SET sql_mode='ANSI_QUOTES';
mysql> CREATE TABLE "test" (col INT);
Query OK, 0 rows affected (0.00 sec)
```

5.3.2“SQL”

a`bc"d

```
mysql> CREATE TABLE `a``b` (`c"d` INT)
```

*X*e*X* 1e2e21e+1 1e + 11e+1

MD5

9.2.1.

MySQL (‘.’)

MySQL

col_name	*col_name*
tbl_name.col_name	*tbl_namecol_name*
db_name.tbl_name.col_name	*db_nametbl_namecol_name*

`my-table

tbl_namedb_name.tbl_name t1t2cSELECTt1t2c c
db1tdb2tdb1.t.col_namedb2.t.col_name

.*tbl_nametbl_name*ODBC ODBC‘ .’

9.2.2.

MySQL ( ) Unix Windows Mac OS XUnix(HFS+)
Mac OS XUFS Unix 1.8.4“MySQLSQL”

my_tablesas MY_tables

```
mysql> SELECT * FROM my_table WHERE MY_TABLE.col=1;
```

Unix WindowsMac OS X Unix aA

```
mysql> SELECT col_name FROM tbl_name AS a
    -> WHERE a.col_name = 1 OR A.col_name = 2;
```

Windows

MySQLlower_case_tables_name **mysqld** lower_case_tables_name

0	CREATE TABLECREATE DATABASE Unix --lower-case-table-names=00MyISAM
1	MySQL WindowsMac OS X

2	CREATE TABLECREATE DATABASE MySQL ! InnoDB lower_case_tables_name=1

WindowsMac OS X lower_case_tables_name 1

MySQLlower_case_tables_name Unix MY_tables Windows

· lower_case_tables_name=1SHOW TABLESSHOW DATABASES

· Unixlower_case_tables_name=0Windowslower_case_tables_name=2 Windows Unix Unix

InnoDB lower_case_tables_name1

Unixlower_case_tables_name1 **mysqld**

9.3.

@var_namevar_name‘ .‘‘ _‘‘ $’ cp1252 (I character-set 5.10.1“”

SET

```
SET @var_name = expr [, @var_name = expr] ...
```

SET=:= *expr* NULL

SET :==SET=

```
mysql> SET @t1=0, @t2=0, @t3=0;
mysql> SELECT @t1:=(@t2:=1)+@t3:=4,@t1,@t2,@t3;
+----------------------+------+------+------+
| @t1:=(@t2:=1)+@t3:=4 | @t1  | @t2  | @t3  |
+----------------------+------+------+------+
|                    5 |    5 |    1 |    4 |
+----------------------+------+------+------+
```

SELECTLIMIT

NULL

SELECT HAVINGGROUP BYORDER BY SELECT

```
mysql> SELECT (@aa:=id) AS a(@aa+3) AS b tbl_name HAVING b=5
```

HAVINGSELECT @aa @aa id

```
mysql> SET @a='test';
mysql> SELECT @a,(@a:=20) FROM tbl_name;
```

SELECT MySQL1 @a @a2 SELECT @a

NULL

9.4.

9.4.1.

MySQL

mysqld

sort_buffer_sizeas

GLOBAL

```
mysql> SET GLOBAL sort_buffer_size=value;
mysql> SET @@global.sort_buffer_size=value;
```

SESSION

```
mysql> SET SESSION sort_buffer_size=value;
mysql> SET @@session.sort_buffer_size=value;
mysql> SET sort_buffer_size=value;
```

LOCALSESSION

GLOBALSESSIONLOCALSESSION13.5.3“SET”

GLOBAL

```
mysql> SELECT @@global.sort_buffer_size;
mysql> SHOW GLOBAL VARIABLES like 'sort_buffer_size';
```

SESSION

```
mysql> SELECT @@sort_buffer_size;

mysql> SELECT @@session.sort_buffer_size;

mysql> SHOW SESSION VARIABLES like 'sort_buffer_size';
```

LOCALSESSION

SELECT *@@var_name*(global.session.local.)MySQLSESSION GLOBAL

SHOW VARIABLESGLOBALSESSIONLOCALMySQLSESSION

GLOBALGLOBAL GLOBALSESSION SUPERGLOBALSESSION GLOBALSESSION GLOBALSESSION

5.3.1“ **mysqld**” 5.3.3“” 5.3.3.1“”

9.4.1.

.

.

MySQL 5.1

· key_buffer_size

· key_cache_block_size

· key_cache_division_limit

· key_cache_age_threshold

instance_name.component_name

```
hot_cache.key_buffer_size
```

```
hot_cache.key_cache_block_size
cold_cache.key_cache_block_size
```

default default default.key_bu

.

· ( )

· hot-cache `hot-cache`

· globalsessionlocal @@global.*var_name*

```
shell> mysqld --hot_cache.key_buffer_size=64K
```

```
[mysqld]
hot_cache.key_buffer_size=64K
```

8MB hot_cache 64KB

```
shell> mysqld --key_buffer_size=256K \
         --extra_cache.key_buffer_size=128K \
         --extra_cache.key_cache_block_size=2048
```

256KB(--default.key_buffer_size=25

3 3:1:1

```
shell> mysqld --key_buffer_size=6M \
         --hot_cache.key_buffer_size=2M \
         --cold_cache.key_buffer_size=2M
```

hot_cache10MB

```
mysql> SET GLOBAL hot_cache.key_buffer_size = 10*1024*1024;
mysql> SET @@global.hot_cache.key_buffer_size = 10*1024*1024;


mysql> SELECT @@global.hot_cache.key_buffer_size;
```

LIKE

```
mysql> SHOW GLOBAL VARIABLES LIKE 'hot_cache.key_buffer_size';
```

9.5.

MySQL3

. ‘ #’

. ‘ -- ’‘ -- ’()2(tab)SQL 1.8.5.7, “‘--’”

. /**/

3

```
mysql> SELECT 1+1;     # This comment continues to the end of line
mysql> SELECT 1+1;     -- This comment continues to the end of line
mysql> SELECT 1 /* this is an in-line comment */ + 1;
mysql> SELECT 1+
/*
this is a
multiple-line comment
*/
1;
```

mysqldSQL **mysql** (

MySQL 5.1 **mysql**/* ...*/SQL **mysql** **mysqlmysql** < ***file_name*** 1.8.4“MySQLSQL”

9.6. MySQL

MySQL TIMESTAMPGROUP (ABS

```
mysql> CREATE TABLE abs (val INT)
```

abs ABS()

```
mysql> CREATE TABLE abs(val INT);
```

SQLIGNORE_SPACE‘ (’ 9.2“” SQI 5.3.2“SQL”

MySQL SQL/(GROUP) MySQL ()**yacc**

ADD	ALL	ALTER
ANALYZE	AND	AS
ASC	ASENSITIVE	BEFORE
BETWEEN	BIGINT	BINARY
BLOB	BOTH	BY
CALL	CASCADE	CASE
CHANGE	CHAR	CHARACTER
CHECK	COLLATE	COLUMN
CONDITION	CONNECTION	CONSTRAINT
CONTINUE	CONVERT	CREATE
CROSS	CURRENT_DATE	CURRENT_TIME
CURRENT_TIMESTAMP	CURRENT_USER	CURSOR
DATABASE	DATABASES	DAY_HOUR
DAY_MICROSECOND	DAY_MINUTE	DAY_SECOND
DEC	DECIMAL	DECLARE

DEFAULT	DELAYED	DELETE
DESC	DESCRIBE	DETERMINISTIC
DISTINCT	DISTINCTROW	DIV
DOUBLE	DROP	DUAL
EACH	ELSE	ELSEIF
ENCLOSED	ESCAPED	EXISTS
EXIT	EXPLAIN	FALSE
FETCH	FLOAT	FLOAT4
FLOAT8	FOR	FORCE
FOREIGN	FROM	FULLTEXT
GOTO	GRANT	GROUP
HAVING	HIGH_PRIORITY	HOUR_MICROSE
HOUR_MINUTE	HOUR_SECOND	IF
IGNORE	IN	INDEX
INFILE	INNER	INOUT
INSENSITIVE	INSERT	INT
INT1	INT2	INT3
INT4	INT8	INTEGER
INTERVAL	INTO	IS
ITERATE	JOIN	KEY
KEYS	KILL	LABEL
LEADING	LEAVE	LEFT
LIKE	LIMIT	LINEAR
LINES	LOAD	LOCALTIME
LOCALTIMESTAMP	LOCK	LONG
LONGBLOB	LONGTEXT	LOOP
LOW_PRIORITY	MATCH	MEDIUMBLOB
MEDIUMINT	MEDIUMTEXT	MIDDLEINT
MINUTE_MICROSECOND	MINUTE_SECOND	MOD
MODIFIES	NATURAL	NOT
NO_WRITE_TO_BINLOG	NULL	NUMERIC

ON	OPTIMIZE	OPTION
OPTIONALLY	OR	ORDER
OUT	OUTER	OUTFILE
PRECISION	PRIMARY	PROCEDURE
PURGE	RAID0	RANGE
READ	READS	REAL
REFERENCES	REGEXP	RELEASE
RENAME	REPEAT	REPLACE
REQUIRE	RESTRICT	RETURN
REVOKE	RIGHT	RLIKE
SCHEMA	SCHEMAS	SECOND_MICRO
SELECT	SENSITIVE	SEPARATOR
SET	SHOW	SMALLINT
SPATIAL	SPECIFIC	SQL
SQLEXCEPTION	SQLSTATE	SQLWARNING
SQL_BIG_RESULT	SQL_CALC_FOUND_ROWS	SQL_SMALL_RE
SSL	STARTING	STRAIGHT_JOIN
TABLE	TERMINATED	THEN
TINYBLOB	TINYINT	TINYTEXT
TO	TRAILING	TRIGGER
TRUE	UNDO	UNION
UNIQUE	UNLOCK	UNSIGNED
UPDATE	USAGE	USE
USING	UTC_DATE	UTC_TIME
UTC_TIMESTAMP	VALUES	VARBINARY
VARCHAR	VARCHARACTER	VARYING
WHEN	WHERE	WHILE
WITH	WRITE	X509
XOR	YEAR_MONTH	ZEROFILL

MySQL

- ACTION
- BIT
- DATE
- ENUM
- NO
- TEXT
- TIME
- TIMESTAMP

MySQLMySQL dev.mysql.com.

10

10.1.
10.2. MySQL
10.3.
    10.3.1.
    10.3.2.
    10.3.3.
    10.3.4.
    10.3.5.
    10.3.6.
    10.3.7.
    10.3.8. SQLCOLLATE
    10.3.9. COLLATE
    10.3.10. BINARY
    10.3.11.
    10.3.12.
    10.3.13.
10.4.
    10.4.1.
    10.4.2. CONVERT()
    10.4.3. CAST()
    10.4.4. SHOW
10.5. Unicode
10.6. UTF8
10.7. DBMS
10.8.
10.9.
10.10. MySQL
    10.10.1. Unicode
    10.10.2.
    10.10.3.
    10.10.4.
    10.10.5.
    10.10.6.

10.10.7.

.

.

.

.

· Unicode

.

MySQL5.1MyISAMMEMORYInnoDB

10.1.

‘ A’‘ B’‘ a’‘ b’‘ A’=0‘ B’= 1‘ a’= 2‘ b’= 3‘ A’ 0‘ A’

‘ A’‘ B’‘ A’ 0‘ B’ 10 1‘ A’‘ B’
binary

1‘ a’‘ b’‘ A’‘ B’ 2

‘ A’‘ B’
‘ Ö’=‘OE’

MySQL5.1

.

.

.

.

MySQL5.1MySQL4.1

10.2. MySQL

MySQL SHOW CHARACTER SET

```
mysql> SHOW CHARACTER SET;
+----------+-----------------------------+---------------------+----
| Charset  | Description                 | Default collation   | Max
+----------+-----------------------------+---------------------+----
| big5     | Big5 Traditional Chinese    | big5_chinese_ci     |
| dec8     | DEC West European           | dec8_swedish_ci     |
| cp850    | DOS West European           | cp850_general_ci    |
| hp8      | HP West European            | hp8_english_ci      |
| koi8r    | KOI8-R Relcom Russian       | koi8r_general_ci    |
| latin1   | cp1252     West European   | latin1_swedish_ci   |
| latin2   | ISO 8859-2 Central European | latin2_general_ci   |
| swe7     | 7bit Swedish                | swe7_swedish_ci     |
| ascii    | US ASCII                    | ascii_general_ci    |
| ujis     | EUC-JP Japanese             | ujis_japanese_ci    |
| sjis     | Shift-JIS Japanese          | sjis_japanese_ci    |
| hebrew   | ISO 8859-8 Hebrew           | hebrew_general_ci   |
| tis620   | TIS620 Thai                 | tis620_thai_ci      |
| euckr    | EUC-KR Korean               | euckr_korean_ci     |
| koi8u    | KOI8-U Ukrainian            | koi8u_general_ci    |
| gb2312   | GB2312 Simplified Chinese   | gb2312_chinese_ci   |
| greek    | ISO 8859-7 Greek            | greek_general_ci    |
| cp1250   | Windows Central European    | cp1250_general_ci   |
| gbk      | GBK Simplified Chinese      | gbk_chinese_ci      |
```

```
| latin5    | ISO 8859-9 Turkish          | latin5_turkish_ci   |
...
```

10.10“MySQL”

SHOW COLLATION latin1“ ISO-8859-1”

```
mysql> SHOW COLLATION LIKE 'latin1%';
+--------------------+---------+----+---------+----------+---------
| Collation          | Charset | Id | Default | Compiled | Sortlen
+--------------------+---------+----+---------+----------+---------
| latin1_german1_ci  | latin1  |  5 |         |          |       0
| latin1_swedish_ci  | latin1  |  8 | Yes     | Yes      |       1
| latin1_danish_ci   | latin1  | 15 |         |          |       0
| latin1_german2_ci  | latin1  | 31 |         | Yes      |       2
| latin1_bin         | latin1  | 47 |         | Yes      |       1
| latin1_general_ci  | latin1  | 48 |         |          |       0
| latin1_general_cs  | latin1  | 49 |         |          |       0
| latin1_spanish_ci  | latin1  | 94 |         |          |       0
+--------------------+---------+----+---------+----------+---------
```

latin1

latin1_german1_ci	DIN-1
latin1_swedish_ci	/

latin1_danish_ci	/
latin1_german2_ci	DIN-2
latin1_bin	latin1
latin1_general_ci	()
latin1_general_cs	(ISO),
latin1_spanish_ci	

.

· latin1latin1_swedish_ci

· _ci _cs _bin

10.3.

10.3.1.
10.3.2.
10.3.3.
10.3.4.
10.3.5.
10.3.6.
10.3.7.
10.3.8. SQLCOLLATE
10.3.9. COLLATE
10.3.10. BINARY
10.3.11.
10.3.12.
10.3.13.

10.3.1.

MySQL

MySQL

.

.

mysqld --def
default-character-set=latin1 latin1 --d
default-collation=latin1_swedish_cilatin1_swedish_cilatin1

shell> **mysqld**

shell> **mysqld --default-character-set=latin1**

shell> **mysqld --default-character-set=latin1 **

--default-collation=latin1_swedish_ci

```
shell> ./configure --with-charset=latin1
```

shell> **./configure --with-charset=latin1** \

--with-collation=latin1_german1_ci

mysqldconfigure/

character_set_servercollation_server

10.3.2.

CREATE DATAI

```
CREATE DATABASE db_name
    [[DEFAULT] CHARACTER SET charset_name]
    [[DEFAULT] COLLATE collation_name]

ALTER DATABASE db_name
    [[DEFAULT] CHARACTER SET charset_name]
    [[DEFAULT] COLLATE collation_name]

CREATE DATABASE db_name
    DEFAULT CHARACTER SET latin1 COLLATE latin1_swedish_ci;
```

MySQL

· CHARACTER SET XCOLLATE Y*XY*

· CHARACTER SET XCOLLATE YCHARACTER SET XCHARACTER

SET X

.

MySQLCREATE DATABASE ... DEFAULT CHARACTER SET ...SQL
CREATE SCHEMA ... CHARACTER SET ... MySQL

CREATE TABLE

character_set_database collation_database
collation_server

10.3.3.

CREAT

```
CREATE TABLE tbl_name (column_list)
    [DEFAULT CHARACTER SET charset_name [COLLATE collation_name]]

ALTER TABLE tbl_name
    [DEFAULT CHARACTER SET charset_name] [COLLATE collation_name]

CREATE TABLE t1 ( ... )
```

DEFAULT CHARACTER SET latin1 COLLATE latin1_danish_ci;

MySQL

· CHARACTER SET XCOLLATE YCHARACTER SET XCOLLATE Y

· CHARACTER SET XCOLLATE YCHARACTER SET XCHARACTER SET X

.

MySQL;SQL

10.3.4.

“ ” CHARVARCHARTEXT

```
col_name {CHAR | VARCHAR | TEXT} (col_length)
    [CHARACTER SET charset_name [COLLATE collation_name]]
```

CREATE TABLE Table1

(

column1 VARCHAR(5) CHARACTER SET latin1 COLLATE latin1_german1_ci

);

MySQL

· CHARACTER SET XCOLLATE YCHARACTER SET XCOLLATE Y

· CHARACTER SET XCOLLATE YCHARACTER SET XCHARACTER SET X

.

CHARACTER SETCOLLATESQL

10.3.5.

MySQL

1

```
CREATE TABLE t1
(
    c1 CHAR(10) CHARACTER SET latin1 COLLATE latin1_german1_ci
) DEFAULT CHARACTER SET latin2 COLLATE latin2_bin;
```

latin1latin1_german1_ci latin2latin1

2

```
CREATE TABLE t1
(
    c1 CHAR(10) CHARACTER SET latin1
) DEFAULT CHARACTER SET latin1 COLLATE latin1_danish_ci;
```

latin1 latin1latin1_swedish_cic1latin1_swedish_ci latin1_danish_ci

3

```
CREATE TABLE t1
(
    c1 CHAR(10)
) DEFAULT CHARACTER SET latin1 COLLATE latin1_danish_ci;
```

MySQL c1latin1 la

4

```
CREATE DATABASE d1
    DEFAULT CHARACTER SET latin2 COLLATE latin2_czech_ci;
USE d1;
CREATE TABLE t1
(
    c1 CHAR(10)
);
```

MySQL c1latin2 latin2_czech_ci

10.3.6.

· character_set_servercollation_server

· character_set_databasecollation_database

“ ” SQL

.

character_set_client

.

character_set_connectioncollation_connection character_set_client character_set_connection _latin1_utf8 collation_connection

.

character_set_results

```
SET NAMES 'charset_name'
SET CHARACTER SET charset_name
```

SET NAMESSQL SET NAMES 'cp1251'“ cp1251” SELECT

SET NAMES '*x*'

```
mysql> SET character_set_client = x;
mysql> SET character_set_results = x;
mysql> SET character_set_connection = x;
```

xcharacter_set_connectioncollation_connectionx

SET CHARACTER SET SE

```
mysql> SET character_set_client = x;

mysql> SET character_set_results = x;

mysql> SET collation_connection = @@collation_database;
```

character_set_clientcharacter_set_results character_set_connection SET NAMES

mysql SET NAMES **mysql**--default-character-set **mysql** koi8r

[mysql]

default-character-set=koi8r

column1CHAR(5) CHARACTER SET latin2SET NAMESSET CHARACTER SETSELECT column1 FROM t column1 SET NAMES 'latin1'SET CHARACTER SET latin1 latin2latin1

character_set_resultsNULL

```
mysql> SET character_set_results = NULL;
```

10.3.7.

COLLATE

```
[_charset_name]'string' [COLLATE collation_name]
```

```
SELECT 'string';

SELECT _latin1'string';

SELECT _latin1'string' COLLATE latin1_danish_ci;
```

SELECT '*string*'character_set_connectioncollation_connection

_charset_name“ X” ; x'*literal*' 0x*nnnn*

```
SELECT _latin1 x'AABBCC';

SELECT _latin1 0xAABBCC;

SELECT _latin1 ?;
```

MySQL

· CHARACTER SET XCOLLATE YCHARACTER SET XCOLLATE Y

· CHARACTER SET XCOLLATE YCHARACTER SET XCHARACTER SET X

· character_set_connection collation_connection

· latin1latin1_german1_ci

· `SELECT _latin1'Müller' COLLATE latin1_german1_ci;`

· latin1 latin1_swedish_ci

· `SELECT _latin1'Müller';`

·

· `SELECT 'Müller';`

COLLATESQL

10.3.8. SQLCOLLATE

- COLLATE COLLATESQL

  · ORDER BY

```
SELECT k
FROM t1
ORDER BY k COLLATE latin1_german2_ci;
```

- AS

```
SELECT k COLLATE latin1_german2_ci AS k1
FROM t1
ORDER BY k1;
```

- GROUP BY

```
SELECT k
FROM t1
GROUP BY k COLLATE latin1_german2_ci;
```

```
SELECT MAX(k COLLATE latin1_german2_ci)
FROM t1;
```

- DISTINCT

```
SELECT DISTINCT k COLLATE latin1_german2_ci
FROM t1;
```

- WHERE

```
    SELECT *
    FROM t1
    WHERE _latin1 'Müller' COLLATE latin1_germ
    SELECT *
    FROM t1
    WHERE k LIKE _latin1 'Müller' COLLATE lati
```

· HAVING

```
· SELECT k
· FROM t1
· GROUP BY k
· HAVING k = _latin1 'Müller' COLLATE latin1_germ
```

10.3.9. COLLATE

COLLATE ||

```
x || y COLLATE z
x || (y COLLATE z)
```

10.3.10. BINARY

BINARYCOLLATE BINARY '*x*"*x*' COLLATE *yy*'*x*'
latin1_bin alatin1

```
SELECT * FROM t1 ORDER BY BINARY a;
SELECT * FROM t1 ORDER BY a COLLATE latin1_bin;
```

10.3.11.

MySQL“ x”

```
SELECT x FROM T ORDER BY x;
SELECT x FROM T WHERE x = x;
SELECT DISTINCT x FROM T;


SELECT x FROM T WHERE x = 'Y';
```

x 'Y'

SQL“ ” x'Y'

· COLLATE0

· 1

· 2

· “” USER()VERSION() 3

· 4

· NULLNULL 5

MySQL5.1

.

.

column1 = 'A'	column1
column1 = 'A' COLLATE x	'A'
column1 COLLATE x = 'A' COLLATE y	

COERCIBILITY

```
mysql> SELECT COERCIBILITY('A' COLLATE latin1_swedish_ci);
        -> 0
mysql> SELECT COERCIBILITY(VERSION());
        -> 3
```

```
mysql> SELECT COERCIBILITY('A');
        -> 4
```

12.9.3“”

USER()2334

10.3.12.

latin2_binlatin1

mysql> **SELECT _latin1 'x' COLLATE latin2_bin;**

ERROR 1251: COLLATION 'latin2_bin' is not valid

for CHARACTER SET 'latin1'

10.3.13.

TXlatin1

Muffler

Müller

MX Systems

MySQL

SELECT X FROM T ORDER BY X COLLATE *collation_name*;

latin1_swedish_ci	latin1_german1_ci	latin1_german2_ci
Muffler	Muffler	Müller

MX	Müller	Muffler
Müller	MX	MX
MySQL	MySQL	MySQL

ORDER BY Uü "U-umlaut"

· /SELECT U-umlautY

· DIN-1SELECT U-umlautU

· DIN-2SELECT U-umlautUE

10.4.

10.4.1.
10.4.2. CONVERT()
10.4.3. CAST()
10.4.4. SHOW

MySQL5.1

10.4.1.

MySQL

INSTR()LCASE()LOWER()LTRIM()MID()REPEAT()REPLACE()REVERSE()
UPPER() REPLACE()

SQL“ ”

· *XX*

· *XY*

· *XX*

·

CASE ... WHEN a THEN b WHEN b THEN c COLLATE *X* ENDX
CASEUNION||CONCAT()ELT()GREATEST()IF()LEAST()

character_set_connectioncollation_connection
CAST()CHAR()CONV()FORMAT()HEX()SPACE()

10.4.2. CONVERT()

CONVERT

```
CONVERT(expr USING transcoding_name)
```

MySQL

```
SELECT CONVERT(_latin1'Müller' USING utf8);

INSERT INTO utf8table (utf8column)

    SELECT CONVERT(latin1field USING utf8) FROM latin1table;
```

CONVERT(... USING ...)SQL

SQL“ 0” CONVERT NULLMySQL5.1

10.4.3. CAST()

CAST()

CAST(*character_string* AS *character_data_type* CHARACTER SET *charset_name*)

SELECT CAST(_latin1'test' AS CHAR CHARACTER SET utf8);

CAST()CHARACTER SETcharacter_set_connection collation_connection CAST()CHARACTER SET X X

CAST()COLLATE CAST(... COLLATE ...)CAST(...) COLLATE ...

SELECT CAST(_latin1'test' AS CHAR CHARACTER SET utf8) COLLATE utf8_bin;

SQL“ 0” CAST()NULLMySQL5.1

10.4.4. SHOW

SHOW SHOW CHARACTER SETSHOW COLLATIONSHOW CREATE DATABASESHOW CREATE TABLESHOW COLUMNS

SHOW CHARACTER SET LIKE

mysql> **SHOW CHARACTER SET LIKE 'latin%';**

```
+---------+----------------------------+-------------------+--------+
| Charset | Description                | Default collation | Maxlen |
+---------+----------------------------+-------------------+--------+
| latin1  | cp1252 West European       | latin1_swedish_ci |      1 |
| latin2  | ISO 8859-2 Central European | latin2_general_ci |      1 |
| latin5  | ISO 8859-9 Turkish         | latin5_turkish_ci |      1 |
| latin7  | ISO 8859-13 Baltic         | latin7_general_ci |      1 |
+---------+----------------------------+-------------------+--------+
```

13.5.4.1“SHOW CHARACTER SET”

SHOW COLLATION LIKE

```
mysql> SHOW COLLATION LIKE 'latin1%';
+-------------------+---------+----+---------+----------+---------+
| Collation         | Charset | Id | Default | Compiled | Sortlen |
+-------------------+---------+----+---------+----------+---------+
| latin1_german1_ci | latin1  |  5 |         |          |       0 |
| latin1_swedish_ci | latin1  |  8 | Yes     | Yes      |       0 |
| latin1_danish_ci  | latin1  | 15 |         |          |       0 |
| latin1_german2_ci | latin1  | 31 |         | Yes      |       2 |
| latin1_bin        | latin1  | 47 |         | Yes      |       0 |
| latin1_general_ci | latin1  | 48 |         |          |       0 |
| latin1_general_cs | latin1  | 49 |         |          |       0 |
```

```
| latin1_spanish_ci | latin1  | 94 |         |          |       0 |
+-------------------+---------+----+---------+----------+---------+
```

13.5.4.2“SHOW COLLATION”

SHOW CREATE DATABASECREATE DATABASE DEFAULT CHARACTER SETCOLLATEdb.Opt

```
mysql> SHOW CREATE DATABASE test;
+----------+-----------------------------------------------------------
| Database | Create Database
+----------+-----------------------------------------------------------
| test     | CREATE DATABASE `test` /*!40100 DEFAULT CHARACTER SET l
+----------+-----------------------------------------------------------
```

13.5.4.4“SHOW CREATE DATABASE”

SHOW CREATE TABLESHOW CREATE DATABASE CREATE TABLE

13.5.4.5“SHOW CREATE TABLE”

SHOW FULL COLUMNS SHOW COLUMNS CHARVARCHARTEXT NULL NULL

mysql> **SHOW FULL COLUMNS FROM person\G**

*************************** 1. row ***************************

Field: id

Type: smallint(5) unsigned

Collation: NULL

Null: NO

Key: PRI

Default: NULL

Extra: auto_increment

Privileges: select,insert,update,references

Comment:

*************************** 2. row ***************************

Field: name

Type: char(60)

Collation: latin1_swedish_ci

Null: NO

Key:

Default:

Extra:

Privileges: select,insert,update,references

Comment:

13.5.4.3“SHOW COLUMNS”

10.5. Unicode

MySQL 5.1Unicode

· ucs2UCS-2 Unicode

· utf8UnicodeUTF8

UCS-2 Unicode Unicode "LATIN CAPITAL LETTER A" Unicode0x0041 0x00 0x41"CYRILLIC SMALL LETTER YERU"Unicode 0x044B 0x04 0x4BUnicode Unicode

UCS-2 SET NAMES 'ucs2'

UTF8 Unicode Unicode RFC 3629 UTF8Unicode

.

.

.

RFC 3629 MySQLUTF8 UTF8RFC 2279 UTF8 RFC 3629 RFC 2279 56

UTF8 VARCHARCHAR MySQLCHAR(10) CHARACTER SET utf830

10.6. UTF8

“ ”—— SHOW INFORMATION_SCHEMA

· INFORMTION_SCHEMASHOWSELECT

.

MySQLUnicode UTF8 UTF8

USER()CURRENT_USER()DATABASE()VERSION() SESSION_USER() SYSTEM_USER()

character_set_system

```
mysql> SHOW VARIABLES LIKE 'character_set_system';
+----------------------+-------+
| Variable_name        | Value |
+----------------------+-------+
| character_set_system | utf8  |
+----------------------+-------+
```

UnicodeDESCRIBEcharacter_set_system SELECT column1 FROM t column1SET NAMES character_set_results NULL character_set_system

UTF8 SET NAMES 10.3.6“”

USER() MySQL

```
SELECT * FROM Table1 WHERE USER() = latin1_column;
```

latin1_columnUTF8

```
INSERT INTO Table1 (latin1_column) SELECT USER();
```

USER()latin1

SQL SQL Unicode“ ”“” Unicode U

MySQL5.1 errmsg.txtUTF8

10.7. DBMS

MaxDB

```
CREATE TABLE t1 (f1 CHAR(n) UNICODE);
CREATE TABLE t1 (f1 CHAR(n) CHARACTER SET ucs2);
```

10.8.

XML

10.9.

ANSI SQLNCHARNATIONAL CHARCHAR MySQL5.1utf8

```
CHAR(10) CHARACTER SET utf8
```

```
NATIONAL CHARACTER(10)
```

```
NCHAR(10)
```

```
VARCHAR(10) CHARACTER SET utf8
```

```
NATIONAL VARCHAR(10)
```

```
NCHAR VARCHAR(10)
```

```
NATIONAL CHARACTER VARYING(10)
```

```
NATIONAL CHAR VARYING(10)
```

N'*literal*'

```
SELECT N'some text';
```

```
SELECT _utf8'some text';
```

MySQL4.15.1 *MySQL4.1*

10.10. MySQL

10.10.1. Unicode
10.10.2.
10.10.3.
10.10.4.
10.10.5.
10.10.6.
10.10.7.

MySQL3070 SHOW CHARACTER

```
mysql> SHOW CHARACTER SET;
+----------+-----------------------------+---------------------+
| Charset  | Description                 | Default collation   |
+----------+-----------------------------+---------------------+
| big5     | Big5 Traditional Chinese    | big5_chinese_ci     |
| dec8     | DEC West European           | dec8_swedish_ci     |
| cp850    | DOS West European           | cp850_general_ci    |
| hp8      | HP West European            | hp8_english_ci      |
| koi8r    | KOI8-R Relcom Russian       | koi8r_general_ci    |
| latin1   | cp1252 West European        | latin1_swedish_ci   |
| latin2   | ISO 8859-2 Central European | latin2_general_ci   |
| swe7     | 7bit Swedish                | swe7_swedish_ci     |
| ascii    | US ASCII                    | ascii_general_ci    |
| ujis     | EUC-JP Japanese             | ujis_japanese_ci    |
| sjis     | Shift-JIS Japanese          | sjis_japanese_ci    |
| hebrew   | ISO 8859-8 Hebrew           | hebrew_general_ci   |
| tis620   | TIS620 Thai                 | tis620_thai_ci      |
| euckr    | EUC-KR Korean               | euckr_korean_ci     |
| koi8u    | KOI8-U Ukrainian            | koi8u_general_ci    |
| gb2312   | GB2312 Simplified Chinese   | gb2312_chinese_ci   |
| greek    | ISO 8859-7 Greek            | greek_general_ci    |
| cp1250   | Windows Central European    | cp1250_general_ci   |
| gbk      | GBK Simplified Chinese      | gbk_chinese_ci      |
| latin5   | ISO 8859-9 Turkish          | latin5_turkish_ci   |
| armscii8 | ARMSCII-8 Armenian          | armscii8_general_ci |
| utf8     | UTF-8 Unicode               | utf8_general_ci     |
| ucs2     | UCS-2 Unicode               | ucs2_general_ci     |
| cp866    | DOS Russian                 | cp866_general_ci    |
| keybcs2  | DOS Kamenicky Czech-Slovak  | keybcs2_general_ci  |
| macce    | Mac Central European        | macce_general_ci    |
| macroman | Mac West European           | macroman_general_ci |
| cp852    | DOS Central European        | cp852_general_ci    |
| latin7   | ISO 8859-13 Baltic          | latin7_general_ci   |
```

```
| cp1251   | Windows Cyrillic            | cp1251_general_ci   |
| cp1256   | Windows Arabic              | cp1256_general_ci   |
| cp1257   | Windows Baltic              | cp1257_general_ci   |
| binary   | Binary pseudo charset       | binary              |
| geostd8  | GEOSTD8 Georgian            | geostd8_general_ci  |
| cp932    | SJIS for Windows Japanese   | cp932_japanese_ci   |
| eucjpms  | UJIS for Windows Japanese   | eucjpms_japanese_ci |
+----------+-----------------------------+---------------------+
```

10.10.1. Unicode

MySQLUnicode 650

· ucs2 (UCS-2 Unicode):

- mysql> **SHOW COLLATION LIKE 'ucs2%';**

```
+--------------------+---------+-----+---------+----------+-----
| Collation          | Charset | Id  | Default | Compiled | Sort
+--------------------+---------+-----+---------+----------+-----
| ucs2_general_ci    | ucs2    |  35 | Yes     | Yes      |
| ucs2_bin           | ucs2    |  90 |         | Yes      |
| ucs2_unicode_ci    | ucs2    | 128 |         | Yes      |
| ucs2_icelandic_ci  | ucs2    | 129 |         | Yes      |
| ucs2_latvian_ci    | ucs2    | 130 |         | Yes      |
| ucs2_romanian_ci   | ucs2    | 131 |         | Yes      |
| ucs2_slovenian_ci  | ucs2    | 132 |         | Yes      |
| ucs2_polish_ci     | ucs2    | 133 |         | Yes      |
| ucs2_estonian_ci   | ucs2    | 134 |         | Yes      |
| ucs2_spanish_ci    | ucs2    | 135 |         | Yes      |
| ucs2_swedish_ci    | ucs2    | 136 |         | Yes      |
| ucs2_turkish_ci    | ucs2    | 137 |         | Yes      |
| ucs2_czech_ci      | ucs2    | 138 |         | Yes      |
| ucs2_danish_ci     | ucs2    | 139 |         | Yes      |
| ucs2_lithuanian_ci | ucs2    | 140 |         | Yes      |
| ucs2_slovak_ci     | ucs2    | 141 |         | Yes      |
| ucs2_spanish2_ci   | ucs2    | 142 |         | Yes      |
| ucs2_roman_ci      | ucs2    | 143 |         | Yes      |
| ucs2_persian_ci    | ucs2    | 144 |         | Yes      |
| ucs2_esperanto_ci  | ucs2    | 145 |         | Yes      |
+--------------------+---------+-----+---------+----------+-----
```

- utf8 (UTF-8 Unicode):

```
mysql> SHOW COLLATION LIKE 'utf8%';
+--------------------+---------+-----+---------+----------+-----
| Collation          | Charset | Id  | Default | Compiled | Sort
+--------------------+---------+-----+---------+----------+-----
```

```
| utf8_general_ci    | utf8    |  33 | Yes     | Yes      |
| utf8_bin           | utf8    |  83 |         | Yes      |
| utf8_unicode_ci    | utf8    | 192 |         | Yes      |
| utf8_icelandic_ci  | utf8    | 193 |         | Yes      |
| utf8_latvian_ci    | utf8    | 194 |         | Yes      |
| utf8_romanian_ci   | utf8    | 195 |         | Yes      |
| utf8_slovenian_ci  | utf8    | 196 |         | Yes      |
| utf8_polish_ci     | utf8    | 197 |         | Yes      |
| utf8_estonian_ci   | utf8    | 198 |         | Yes      |
| utf8_spanish_ci    | utf8    | 199 |         | Yes      |
| utf8_swedish_ci    | utf8    | 200 |         | Yes      |
| utf8_turkish_ci    | utf8    | 201 |         | Yes      |
| utf8_czech_ci      | utf8    | 202 |         | Yes      |
| utf8_danish_ci     | utf8    | 203 |         | Yes      |
| utf8_lithuanian_ci | utf8    | 204 |         | Yes      |
| utf8_slovak_ci     | utf8    | 205 |         | Yes      |
| utf8_spanish2_ci   | utf8    | 206 |         | Yes      |
| utf8_roman_ci      | utf8    | 207 |         | Yes      |
| utf8_persian_ci    | utf8    | 208 |         | Yes      |
| utf8_esperanto_ci  | utf8    | 209 |         | Yes      |
+--------------------+---------+-----+---------+----------+-----
```

utf8_unicode_ciUnicodeUCA http://www.unicode.org/repo 4.0.0 http://www.unicode.org/Public/UC/4.0.0/llkeys-4.0.0.txt utf8_unicode_ciucs2_unicode_ci

utf8_unicode_ciUnicode Udmurt TatarBashkirMari

utf8_unicode_ci‘ ß’‘ ss’

utf8_general_ci

utf8_general_ciutf8_unicode_ci

```
Ä = A
Ö = O
Ü = U
```

utf8_general_ci

```
ß = s
```

utf8_unicode_ci

ß = ss

utf8_unicode_ci utf8 utf8_unicode_ci u

utf8_general_ci‘ ß’‘ s’‘ ss’ utf8_general_ci
utf8_unicode_ci

utf8_swedish_ciutf8 utf8_unicode_ci

Ü = Y < Ö

utf8_spanish_ciutf8_spanish2_ci
‘ ch’‘ c’ d‘ ll’‘ l’‘ m’

10.10.2.

· asciiUS ASCII

o ascii_bin

o ascii_general_ci

· cp850DOS

o cp850_bin

o cp850_general_ci

· dec8DEC

o dec8_bin

o dec8_swedish_ci

· hp8HP

o hp8_bin

o hp8_english_ci

· latin1cp1252

o latin1_bin

o latin1_danish_ci

o latin1_general_ci

o latin1_general_cs

o latin1_german1_ci

o latin1_german2_ci

o latin1_spanish_ci

o latin1_swedish_ci

latin1 latin1_swedish_ci MySQL /

latin1_german1_cilatin1_german2_ciDIN-1DIN-2 DIN*Deutsches Institut für Normung* ANSI DIN-1“ ” DIN-2“ ”

o latin1_german1_ci

o Ä = a

o Ö = O

o Ü = U

o ß = s

o latin1_german2_ci

o Ä = aE

o Ö = OE

o Ü = UE

o ß = ss

latin1_spanish_ci‘ ñ’ n-tilde‘ n’‘ o’

· macromaMac

o macroman_bin

o macroman_general_ci

· swe77

o swe7_bin

o swe7_swedish_ci

10.10.3.

· cp1250Windows

o cp1250_bin

o cp1250_croatian_ci

o cp1250_czech_cs

o cp1250_general_ci

· cp852DOS

o cp852_bin

o cp852_general_ci

· keybcs2DOS Kamenicky Czech-Slovak

o keybcs2_bin

o keybcs2_general_ci

· latin2ISO 8859-2

o latin2_bin

- latin2_croatian_ci
- latin2_czech_cs
- latin2_general_ci
- latin2_hungarian_ci

· macceMac

- macce_bin
- macce_general_ci

10.10.4.

MySQL

· armscii8ARMSCII-8

- armscii8_bin
- armscii8_general_ci

· cp1256 Windows

- cp1256_bin
- cp1256_general_ci

· geostd8GEOSTD8

- geostd8_bin
- geostd8_general_ci

· greekISO 8859-7

- greek_bin
- greek_general_ci

- hebrewISO 8859-8
  - hebrew_bin
  - hebrew_general_ci
- latin5ISO 8859-9
  - latin5_bin
  - latin5_turkish_ci

10.10.5.

- cp1257Windows
  - cp1257_bin
  - cp1257_general_ci
  - cp1257_lithuanian_ci
- latin7ISO 8859-13
  - latin7_bin
  - latin7_estonian_cs
  - latin7_general_ci
  - latin7_general_cs

10.10.6.

Belarusian

- cp1251Windows

- cp1251_bin
- cp1251_bulgarian_ci
- cp1251_general_ci
- cp1251_general_cs
- cp1251_ukrainian_ci
- cp866DOS
- cp866_bin
- cp866_general_ci
- koi8rKOI8-R Relcom
- koi8r_bin
- koi8r_general_ci
- koi8uKOI8-U
- koi8u_bin
- koi8u_general_ci

10.10.7.

10.10.7.1. cp932

- big5Big5
- big5_bin
- big5_chinese_ci
- cp932SJIS Windows

- cp932_bin
- cp932_japanese_ci
- eucjpmsUJIS Windows
- eucjpms_bin
- eucjpms_japanese_ci
- euckrEUC-KR
- euckr_bin
- euckr_korean_ci
- gb2312GB2312
- gb2312_bin
- gb2312_chinese_ci
- gbkGBK
- gbk_bin
- gbk_chinese_ci
- sjisShift-JIS
- sjis_bin
- sjis_japanese_ci
- tis620TIS620
- tis620_bin
- tis620_thai_ci
- ujisEUC-JP

o ujis_bin

o ujis_japanese_ci

10.10.7.1. cp932

cp932

MySQL sjisIANAShift_JIS JIS X0201JIS X0208 http://www.iana.org/assignments/character-sets

“ SHIFT JIS” Shift_JIS

Windows“ SHIFT JIS” MicrosoftShift_JISMicrosoft Microsoft Windows Codepage: 932cp932Shift_JIS cp932 NECIBMIBM

· MySQL

· Unicodeucs2

· sjis

· “ SHIFT JIS” Unicode Unicode MySQL

MySQLcp932

MySQL IANA Shift_JIS cp932

cp932sjis

cp932sjis

· cp932NEC NECIBMIBM

· cp932 Unicode Unicodecp932“ ”Microsoft http//support.microsoft.com/kb/170559/EN-US/

o JIS X 0208 NEC JIS X 0208

o NECIBM NEC

o IBMNECIBM IBM

cp932Unicode http://www.microsoft.com/globaldev/reference/dbcs/932.htm
cp932 Unicodeucs2 cp932 cp932Unicode

o NEC

http://www.microsoft.com/globaldev/reference/dbcs/932/932_87.htm

o NECIBM

o http://www.microsoft.com/globaldev/reference/d

o http://www.microsoft.com/globaldev/reference/d

o IBM

o http://www.microsoft.com/globaldev/reference/d

o http://www.microsoft.com/globaldev/reference/d

o http://www.microsoft.com/globaldev/reference/d

· cp932eucjpms sjis/ujis http://www.opengroup.or.jp/jvc/cde/sjis-euc-e.html

· ucs2sjiscp932

ucs2

sjis/cp932	**sjis → ucs2**	**cp932 → ucs2**
5C	005C	005C

7E	007E	007E
815C	2015	2015
815F	005C	FF3C
8160	301C	FF5E
8161	2016	2225
817C	2212	FF0D
8191	00a2	FFE0
8192	00a3	FFE1
81Ca	00aC	FFE2

ucs2

ucs2	**ucs2 → sjis**	**ucs2 → cp932**
005C	815F	5C
007E	7E	7E

00a2	8191	3F
00a3	8192	3F
00aC	81Ca	3F
2015	815C	815C
2016	8161	3F
2212	817C	3F
2225	3F	8161
301C	8160	3F
FF0D	3F	817C
FF3C	3F	815F
FF5E	3F	8160
FFE0	3F	8191
FFE1	3F	8192

FFE2	3F	81Ca

MySQLMySQL dev.mysql.com

11

11.1.
11.1.1.
11.1.2.
11.1.3.
11.2.
11.3.
11.3.1. DATETIMEDATETIMESTAMP
11.3.2. TIME
11.3.3. YEAR
11.3.4. Y2K
11.4. String
11.4.1. CHARVARCHAR
11.4.2. BINARYVARBINARY
11.4.3. BLOBTEXT
11.4.4. ENUM
11.4.5. SET
11.5.
11.6.
11.7.

MySQL /()

MySQL 19 *MySQL*

· *M*

255

· *D*

30*M*-2

· (‘[’‘]’)

11.1.

11.1.1.
11.1.2.
11.1.3.

11.1.1.

11.2“” 11.5“”

M 255 11.2“”

ZEROFILLMySQLUNSIGNED

SERIALBIGINT UNSIGNED NOT NULL AUTO_INCREMENT UNIQUE

SERIAL DEFAULT VALUENOT NULL AUTO_INCREMENT U

UNSIGNED 12.8“Cast”

· BIT[(*M*)]

M 164*M* 1

· TINYINT[(*M*)] [UNSIGNED] [ZEROFILL]

-1281270255

· BOOLBOOLEAN

TINYINT(1) zero zero

SQL

· SMALLINT[(*M*)] [UNSIGNED] [ZEROFILL]

-3276832767065535

· MEDIUMINT[(*M*)] [UNSIGNED] [ZEROFILL]

-8388608838860701677721 5

· INT[(*M*)] [UNSIGNED] [ZEROFILL]

-2147483648214748364704294967295

· INTEGER[(*M*)] [UNSIGNED] [ZEROFILL]

INT

· BIGINT[(*M*)] [UNSIGNED] [ZEROFILL]

-9223372036854775808922337203685477580701844674(

BIGINT

o BIGINTDOUBLE 922337203685477580 7(63)! BIGINT DOUBLE

MySQLBIGINT

§ BIGINT

§ MIN(*col_name*)MAX(*col_name*) *col_name*BIGINT

§ (+-*)

o BIGINT MySQL-

o -+* BIGINT ()9223372036854775807

· FLOAT[(*M,D*)] [UNSIGNED] [ZEROFILL]

() -3.402823466E+38-1.175494351E-3801.175494351E-38 3.402823466E+38 IEEE

M *D* *MD* 7

UNSIGNED

MySQL A.5.7“”

· DOUBLE[(*M*,*D*)] [UNSIGNED] [ZEROFILL]

() -1.7976931348623157E+308-2.2250738585072014E-3080 2.2250738585072014E-308 1.7976931348623157E+308 IEEE

M *D* *MD* 15

UNSIGNED

· DOUBLE PRECISION[(*M*,*D*)] [UNSIGNED] [ZEROFILL], REAL[(*M*,*D*)] [UNSIGNED] [ZEROFILL]

DOUBLE SQLREAL_AS_FLOAT REALFLOATDOUBLE

· FLOAT(*p*) [UNSIGNED] [ZEROFILL]

p MySQLFLOATDOUBLE*p*024*MD*FLOAT*p*2553*MD*DOUBLE FLOATDOUBLE

FLOAT(*p*)ODBC

· DECIMAL[(*M*[,*D*])] [UNSIGNED] [ZEROFILL]

“ ” *M*() *D*() ()‘ -’ *M* *D*0 DECIMAL(*M*)65(*D*)30*D* 10

UNSIGNED

DECIMAL(+-*/)65

· DEC[(*M*[,*D*])] [UNSIGNED] [ZEROFILL], NUMERIC[(*M*[,*D*])] [UNSIGNED] [ZEROFILL], FIXED[(*M*[,*D*])] [UNSIGNED] [ZEROFILL]

DECIMAL FIXED

11.1.2.

11.3“” 11.5“”

· DATE

'1000-01-01"9999-12-31'MySQL'YYYY-MM-DD'DATE D

· DATETIME

'1000-01-01 00:00:00"9999-12-31 23:59:59'MySQL HH:MM:SS'DATETIME DATETIME

· TIMESTAMP[(*M*)]

'1970-01-01 00:00:00'2037

TIMESTAMPINSERTUPDATE TIMESTAMP NULL TIMESTAMP

TIMESTAMP'YYYY-MM-DD HH:MM:SS' 19 TIMESTAMP +0

MySQL 4.1TIMESTAMPMySQL 5.1 *MySQL 4.1*

· TIME

'-838:59:59"838:59:59'MySQL'HH:MM:SS'TIME TIME

· YEAR[(2|4)]

190121550000 706919702069 MySQLYYYY YEAR YEAR

11.1.3.

11.4“String” 11.5“”

MySQLCREATE TABLEALTER TABLE 13.1.5.1“”

MySQL 5.1MySQL 4.1

· CHARACTER SET (CHARSETCHARACTER SET CHARVARCHARTEXT ENUMSET

· CREATE TABLE t

```
·                 (
·                     c1 CHAR(20) CHARACTER SET utf8,
·                     c2 CHAR(20) CHARACTER SET latin1 COLLATE latin1
·                 );
```

c1 utf8 c2latin1

· MySQL 5.1 (MySQL

· CHARVARCHARTEXT BINARY

· CHARVARCHAR BINARY

MySQL 5.1 10

· [NATIONAL] CHAR(*M*) [BINARY| ASCII | UNICODE]

M *M*0255

CHAR

CHAR255CREATE TABLEALTER TABLE

```
mysql> CREATE TABLE c1 (col1 INT, col2 CHAR(500));
ERROR 1074 (42000): Column length too big for column 'col' (max = 25
mysql> SHOW CREATE TABLE c1;
ERROR 1146 (42S02): Table 'test.c1' doesn't exist
```

CHARCHARACTER NATIONAL CHAR(NCHAR)CHAR

BINARY

CHAR BYTECHAR BINARY

CHARASCII latin1

CHARUNICODE ucs2

MySQLCHAR(0)　　NOT NULLCHAR(0)　NULL"()

· CHAR

CHAR(1)

· [NATIONAL] VARCHAR(*M*) [BINARY]

M　*M*065,535(VARCHAR　65,532

MySQL 5.1SQL　VARCHAR

VARCHARVARYING

BINARY

VARCHAR+　VARCHAR255

· BINARY(*M*)

BINARYCHAR

· VARBINARY(*M*)

VARBINARYVARCHAR

· TINYBLOB

255(2^8–1)BLOB

· TINYTEXT

255(2^8–1)TEXT

· BLOB[(*M*)]

65,535(2^{16}–1)BLOB

M　MySQL*M*BLOB

· TEXT[(*M*)]

65,535(2^{16}–1)TEXT

*M*MySQL*M*TEXT

· MEDIUMBLOB

16,777,215(2^{24}–1)BLOB

· MEDIUMTEXT

16,777,215(2^{24}–1)TEXT

· LONGBLOB

4,294,967,2954GB(2^{32}–1)BLOB LONGBLOB()/

· LONGTEXT

4,294,967,2954GB(2^{32}–1)TEXT LONGTEXT()/

· ENUM('*value1*','*value2*',...)

'*value1*"*value2*'...NULL " ENUM(

· SET('*value1*','*value2*',...)

'*value1*"*value2*'...SET64

11.2.

MySQLSQL (INTEGERSMALLINTDECIMALNUMERIC)(FLOATREAL DOUBLE PRECISION)INTINTEGER DECDECIMAL

BIT MyISAMMEMORYInnoDBBDB

SQL MySQLTINYINTMEDIUMINTBIGINT

		(/)	**(/)**
TINYINT	1	-128	127
		0	255
SMALLINT	2	-32768	32767
		0	65535
MEDIUMINT	3	-8388608	8388607
		0	16777215
INT	4	-2147483648	2147483647

		0	4294967295
BIGINT	8	-9223372036854775808	9223372036854775807
		0	18446744073709551615

MySQL(INT(4))

ZEROFILL INT(5) ZEROFILL 4

()UNSIGNED

UNSIGNED

ZEROFILLMySQLUNSIGNED

MySQL4 8

FLOAT SQLFLOAT()MySQL 023FLOAT4 2453DOUBLE8

MySQL FLOAT(*M*,*D*)REAL(*M*,*D*)DOUBLE PRECISION(*M*,*D*)
“ (*M*,*D*)” *M* *D* FLOAT(7,4)-999.9999MySQL FLOAT(7,4)
999.00009999.0001

MySQLDOUBLEDOUBLE PRECISION() MySQLREALDOUBLE
PRECISION() SQLREAL_AS_FLOAT

FLOATDOUBLI

DECIMALNUMERICMySQL ()

```
salary DECIMAL(5,2)
```

5 2

MySQL 5.1DECIMALNUMERIC

SQLsalary5 salary-999.99999.99

SQL DECIMAL(*M*)DECIMAL(*M*,0) DECIMALDECIMAL(*M*,0)*M* MySQL 5.1DECIMALNUMERIC *M*10

DECIMALNUMERIC65DECIMALNUMERIC (

BIT BIT(*M*)*M* *M*164

b'*value*' *value*01 b'111'b'100000000'7128[9.1.5“”]

BIT(M)*M* 0 BIT(6)b'101'b'000101'

MySQLSQL MySQL traditional(“ ”) SQL [5.3.2 “SQL”]

INTUNSIGNED 04294967295-99999999999999999999904294967296

() MySQL

MySQL ALTER TABLELOAD DATA INFILEUPDATEINSERT MySQL [5.3.2“SQL”]

11.3.

11.3.1. DATETIMEDATETIMESTAMP
11.3.2. TIME
11.3.3. YEAR
11.3.4. Y2K

DATEDATETIMEDATETIMESTAMPTIMEYEAR“ ” MySQL “ ” TIMESTAMP

MySQL ALLOW_INVALID_DATES SQLMySQL '1999-11-31'“ ” (web) MySQL012031 MySQLDATEDATETIME/ '1999-00-00"1999-01-00' DATE_SUB()DATE_ADD (NO_ZERO_IN_DATE SQL)

MySQL'0000-00-00'“” (NO_ZERO_DATE SQL)NULL()

sql_mode MySQL 5.3.2“SQL”

· MySQL ( )

· MySQL

o 70-991970-1999

o 00-692000-2069

· MySQL --('98-09-04')----('09-04-98"04-09-98')

· MySQL

· MySQL()“ ” TIMETIME

“ ” NO_ZERO_DATE SQL

	“”

DATETIME	'0000-00-00 00:00:00'
DATE	'0000-00-00'
TIMESTAMP	00000000000000
TIME	'00:00:00'
YEAR	0000

· “” '0'0

· MyODBC“ ” MyODBC 2.50.12NULLODBC

11.3.1. DATETIMEDATETIMESTAMP

11.3.1.1. MySQL 4.1TIMESTAMP

DATETIMEDATETIMESTAMP

DATETIME MySQL'YYYY-MM-DI 01 00:00:00"9999-12-31 23:59:59'(“”)

DATE MySQL'YYYY-MM-DD'DATE '1000-01-01' '9999-12-31'

TIMESTAMP MySQLSQL

DATETIMEDATETIMESTAMP

· 'YYYY-MM-DD HH:MM:SS"YY-MM-DD HH:MM:SS'“ ” '98-12-31 11:30:45"98.12.31 11+30+45"98/12/31 11*30*45"98@12@3 11^30^45'

· 'YYYY-MM-DD"YY-MM-DD'“” '98-12-31"98.12.31"98/12/31"98@12@31'

· 'YYYYMMDDHHMMSS"YYMMDDHHMMSS' '19970523091528"970523091528"1997-05-23 09:15:28"971122129015'() '0000-00-00 00:00:00'

· 'YYYYMMDD"YYMMDD' '19970523"970523' '1997-(23"971332'()'0000-00-00'

· YYYYMMDDHHMMSSYYMMDDHHMMSS 19830905132800830905132800 '1983-09-05 13:28:00'

· YYYYMMDDYYMMDD 19830905830905'1983-09-05'

· DATETIMEDATETIMESTAMP NOW()CURRENT_DATE

DATETIMEDATETIMESTAMP“ ” ('0000-00-00 00:00:00"0000-00-00' 00000000000000)

10 '1979-6-9"1979-06-09' 10 '1979-10-30 1:2:3"1979-10-30 01:02:03'

681214 814 YYYYMMDDYYYYMMDDHHMMSS 4 YYMMDDYYMMDDHHMMSS 2

814 4 2 MySQL“ ” 9903 '990300"1999-03-00'

· DATETIMETIMESTAMPDATE '00:00:00'DATE

· DATEDATETIMETIMESTAMP DATE

· DATETIMEDATETIMESTAMP TIMESTAMP19702037 '1968-01-01'DATETIMEDATE TIMESTAMP 0

· '10:11:12'‘ :’ '2010-11-12"10:45:15"0000-00-00"45'

· MySQL 10009999001200 31'0000-00-00' '2002-04-31'

5.3.2“SQL”

· MySQL

o 00-692000-2069

o 70-991970-1999

11.3.1.1. MySQL 4.1TIMESTAMP

MySQL(4.1)TIMESTAMP TIMESTAMPMySQL 5.1 *MySQL 4.1*

TIMESTAMPDATETIME 19 YYYY-MM-DD HH:MM:SS

MySQLMAXDB TIMESTAMPDATETIME MAXDB TIMESTAMPDATETIME DATETIME

MAXDB --sql-mode=MAXDBsql_modeSQLMAXDB

```
mysql> SET GLOBAL sql_mode=MAXDB
```

MAXDB

```
mysql> SET SESSION sql_mode=MAXDB;
```

MySQL '0000-00-00 00:00:00'

TIMESTAMP

· (

· TIMESTAMP 1TIMESTAMP

MAXDBTIMESTAMP (MAXDBI

· 1TIMESTAMPDEFAULT CURRENT_TIMEST/

· DEFAULT NULL1*TIMESTAMP* DEFAULT CURRENT_TIMESTAMP TIMESTAMP DEFAULT NULLDEFAULT 0

· TIMESTAMP/

· CREATE TABLE 1TIMESTAMP

o DEFAULT CURRENT_TIMESTAMPON UPDATE CURRENT_TIMESTAMP

o DEFAULTON UPDATE DEFAULT CURRENT_TIMESTAMP ON UPDATECURRENT_TIMESTAMP

o DEFAULT CURRENT_TIMESTAMPON UPDATE

o DEFAULTON UPDATE CURRENT_TIMESTAMP 0

o DEFAULT ON UPDATE CURRENT_TIM

· DEFAULTON UPDATE CURRENT_TIMESTAMPCURRENT_TIMESTAMP()NOW()

TIMESTAMPDEFAULTON UPDATE

```
CREATE TABLE t (ts TIMESTAMP);
CREATE TABLE t (ts TIMESTAMP DEFAULT CURRENT_TIMESTAMP
                             ON UPDATE CURRENT_TIMESTAMP);
CREATE TABLE t (ts TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
                             DEFAULT CURRENT_TIMESTAMP);
```

· TIMESTAMP1 1TIMESTAMPDEFAULT (DEFAULT 0 DEFAULT'2003-01-01 00:00:00') TIMESTAMP 1TIMESTAMP DEFAULTON UPDATE

```
CREATE TABLE t (
    ts1 TIMESTAMP DEFAULT 0,
    ts2 TIMESTAMP DEFAULT CURRENT_TIMESTAMP
                  ON UPDATE CURRENT_TIMESTAMP);
CREATE TABLE t (
    ts1 TIMESTAMP DEFAULT 0,
    ts2 TIMESTAMP ON UPDATE CURRENT_TIMESTAMP
                  DEFAULT CURRENT_TIMESTAMP);
```

[5.10.8“MySQL”](#) TIMESTAMPUT(

time_zone

TIMESTAMPNULLNULL

```
CREATE TABLE t
(
  ts1 TIMESTAMP NULL DEFAULT NULL,
  ts2 TIMESTAMP NULL DEFAULT 0,
  ts3 TIMESTAMP NULL DEFAULT CURRENT_TIMESTAMP
);
```

NULL NULL NULLTIMESTAMP NOW()CURRENT_TIMESTAMP

```
CREATE TABLE t (ts NULLDEFAULT CURRENT_TIMESTAMP)
```

- NULLDEFAULT TIMESTAMPTIMESTAMP ...

```
CREATE TABLE t1 (ts NULL DEFAULT NULL);
CREATE TABLE t2 (ts NULL DEFAULT '0000-00-00 00:00:00');
```

...

```
INSERT INTO t1 VALUES (NOW());

INSERT INTO t2 VALUES (CURRENT_TIMESTAMP);
```

11.3.2. TIME

MySQL'HH:MM:SS'TIME('HHH:MM:SS')TIME'-838:59:59"838:59:59'TIME(
24)(24)

TIME

· 'D HH:MM:SS.fraction'“ ”
'HH:MM:SS.fraction"HH:MM:SS"HH:MM"D HH:MM:SS"D HH:MM"D
HH"SS'D 034 MySQL

· 'HHMMSS' '101112"10:11:12"109712'()'00:00:00'

· HHMMSS 101112'10:11:12'
SSMMSSHHMMSSHHMMSS.fractionMySQL

· TIME CURRENT_TIME

TIME 10 '8:3:2"08:03:02'

TIME MySQL (MySQLTIME '1112'1112'11:12:00'(1112)
MySQL'00:11:12'(11 12) '12'12 '00:00:12' TIME '11:12
'11:12:00"00:11:12'

TIME '-850:00:00"850:00:00"-838:59:59"838:59:59'

TIME'00:00:00"00:00:00'TIME '00:00:00' '00:00:00'

11.3.3. YEAR

YEAR

MySQLYYYYYEAR 19012155

YEAR

· '1901"2155'

· 19012155

· '00"99"00"69"70"99'2000206919701999YEAR

· 199169709920012069197019 99YEAR 2000'0"00'0000

· YEAR NOW()

YEAR0000

11.3.4. Y2K

MySQL2000(Y2K)(1.4.5“2000”)MySQL MySQL

DATETIMEDATETIMESTAMPYEAR MySQL

· 00-692000-2069

· 70-991970-1999

MySQL

ORDER BYTIMESTAMPYEAR

MIN()MAX()TIMESTAMPYEAR TIMESTAMPYEAR MIN(DATE_ADD(TIMESTAMP,INTERVAL 0 DAYS))

11.4. String

11.4.1. CHARVARCHAR
11.4.2. BINARYVARBINARY
11.4.3. BLOBTEXT
11.4.4. ENUM
11.4.5. SET

CHARVARCHARBINARYVARBINARYBLOBTEXTENUMSET

11.4.1. CHARVARCHAR

CHARVARCHAR

CHARVARCHAR CHAR(30)30

CHAR 0255 CHAR CHAR

VARCHAR 065,535 (VARCHAR 65,532

CHAR VARCHAR (255)

VARCHAR SQL

CHARVARCHAR ()SQL 5.3.2“SQL”

CHAR(4)VARCHAR(4) CHARVARCHAR

	CHAR(4)		VARCHAR(4)	
''	' '	4	''	1
'ab'	'ab '	4	'ab '	3

'abcd'	'abcd'	4	'abcd'	5
'abcdefgh'	'abcd'	4	'abcd'	5

MySQL

CHAR(4)VARCHAR(4)　CHAR

```
mysql> CREATE TABLE vc (v VARCHAR(4), c CHAR(4));
Query OK, 0 rows affected (0.02 sec)

mysql> INSERT INTO vc VALUES ('ab  ', 'ab  ');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT CONCAT(v, '+'), CONCAT(c, '+') FROM vc;
+---------------+---------------+
| CONCAT(v, '+') | CONCAT(c, '+') |
+---------------+---------------+
| ab  +          | ab+            |
+---------------+---------------+
1 row in set (0.00 sec)
```

CHARVARCHAR

MySQLPADSPACE　MySQLCHARVARCHAR

```
mysql> CREATE TABLE names (myname CHAR(10), yourname VARCHAR(10));
Query OK, 0 rows affected (0.09 sec)

mysql> INSERT INTO names VALUES ('Monty ', 'Monty ');
```

```
Query OK, 1 row affected (0.00 sec)

mysql> SELECT myname = 'Monty  ', yourname = 'Monty  ' FROM names;
+--------------------+----------------------+
| myname = 'Monty  ' | yourname = 'Monty  ' |
+--------------------+----------------------+
|                  1 |                    1 |
+--------------------+----------------------+
1 row in set (0.00 sec)
```

MySQL SQL

CHAR BYTECHAR BINARY

ASCIICHARlatin1 UNICODEucs2

11.4.2. BINARYVARBINARY

BINARYVARBINARYCHARVARCHAR

BINARYVARBINARY CHARVARCHARBINARYVARBINARY

BINARYVARBINARYCHAR BINARYVARCHAR BINARY BINARY

COLLATE latin1_binlatin1BINARY(5)5

BINARY 0x00()0x00 on ORDER BYDISTINCT 0x00 0x00<

BINARY(3) 'a' 'a \0"a\0"a\0\0'

VARBINARY ORDER BYDISTINCT 0x00 0x00<

0x00BINARY

```
mysql> CREATE TABLE t (c BINARY(3));
Query OK, 0 rows affected (0.01 sec)

mysql> INSERT INTO t SET c = 'a';
Query OK, 1 row affected (0.01 sec)

mysql> SELECT HEX(c), c = 'a', c = 'a\0\0' from t;
+--------+---------+-------------+
| HEX(c) | c = 'a' | c = 'a\0\0' |
+--------+---------+-------------+
| 610000 |       0 |           1 |
+--------+---------+-------------+
1 row in set (0.09 sec)
```

BLOB

MySQLBINARYVARBINARY [13.1.5.1“”]

11.4.3. BLOBTEXT

BLOB 4BLOB TINYBLOBBLOBMEDIUMBLOBLONGBLOB

4TEXT TINYTEXTTEXTMEDIUMTEXTLONGTEXT4BLOB

[11.5“”]

BLOB ()TEXT()BLOB TEXT

TEXTBLOB

BLOBTEXT SQL [5.3.2“S]

BLOBVARBINARY TEXTVARCHAR BLOBTEXT VARBINARYVARCHAR

· BLOBTEXT (VARBINARYVARCHAR

TEXT CHARVARCHAR

· BLOBTEXT CHARVARCHAR 7.4.3“”

· BLOBTEXT

LONGLONG VARCHARMEDIUMTEXT TEXTBINARY

MySQL/ODBCBLOBLONGVARBINARYTEXTLONGVARCHAR

BLOBTEXT

· max_sort_length max_sort_length 1024**mysqld**--max_sort_leng 5.3.3“”

max_sort_length max_sort_length

```
mysql> SET max_sort_length = 2000;
mysql> SELECT id, comment FROM tbl_name
    -> ORDER BY comment;
```

max_sort_length BLOBTEXTGROUP BYORDER BY SUBSTRING comment2000

```
mysql> SELECT id, SUBSTRING(comment,1,2000) FROM tbl_name
    -> ORDER BY SUBSTRING(comment,1,2000);
```

· BLOBTEXT max_allowed_packet **mysqldump**max_allowed_packet 7.5.2“” 8.3“mysqlMySQL” 8.8“mysqldump”

BLOBTEXT 1

11.4.4. ENUM

ENUM

ENUM(")NULL

· ENUM( )“” 0

· ENUMNULLNULL NULLENUMNOT N

· 1

· 0SELECTENUM

· mysql> **SELECT * FROM *tbl_name* WHERE *enum_col*=0;**

· NULLNULL

ENUM('one"two"three')

NULL	NULL
''	0
'one'	1
'two'	2
'three'	3

65,535

ENUM

ENUM ENUM

ENUM ENUM

```
mysql> SELECT enum_col+0 FROM tbl_name;
```

ENUM (LOAD DATA ENUM '0"1"2' 123

```
numbers ENUM('0','1','2')
```

ENUM (ENUM ENUM('a"b')'a"b' ENUM('b"a')'b"a' NULL ENUM GROUP BY CAST(col AS CHAR)GROUP BY CONCAT(col)

ENUM SHOW COLUMNS FROM *tbl_name* LIKE *enum_col*2ENUM

11.4.5. SET

SET SETSET(‘,’) SET

SET('one', 'two') NOT NULL

```
''
'one'
'two'
'one,two'
```

SET64

SET

SET SET

MySQLSET 1SET SET SET SET

```
mysql> SELECT set_col+0 FROM tbl_name;
```

SET SET SET('a','b','c','d')

SET		
'a'	1	0001
'b'	2	0010
'c'	4	0100
'd'	8	1000

9100114SET'a"d' 'a,d'

SET SET('a','b','c','d')

```
mysql> CREATE TABLE myset (col SET('a', 'b', 'c', 'd'));
```

'a,d"d,a"a,d,d"a,d,a"d,a,d':

```
mysql> INSERT INTO myset (col) VALUES
-> ('a,d'), ('d,a'), ('a,d,a'), ('a,d,d'), ('d,a,d');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0
```

'a,d'

```
mysql> SELECT col FROM myset;
+------+
| col  |
+------+
```

```
| a,d  |
| a,d  |
| a,d  |
| a,d  |
| a,d  |
+------+
5 rows in set (0.04 sec)
```

SET

```
mysql> INSERT INTO myset (col) VALUES ('a,d,d,s');
Query OK, 1 row affected, 1 warning (0.03 sec)

mysql> SHOW WARNINGS;
+---------+------+-----------------------------------------+
| Level   | Code | Message                                 |
+---------+------+-----------------------------------------+
| Warning | 1265 | Data truncated for column 'col' at row 1 |
+---------+------+-----------------------------------------+
1 row in set (0.04 sec)

mysql> SELECT col FROM myset;
+------+
| col  |
+------+
| a,d  |
| a,d  |
| a,d  |
```

```
| a,d  |
| a,d  |
| a,d  |
+------+
6 rows in set (0.01 sec)
```

SET NULLNULL SET

FIND_IN_SET()LIKESET

```
mysql> SELECT * FROM tbl_name WHERE FIND_IN_SET('value',set_col)>0;
mysql> SELECT * FROM tbl_name WHERE set_col LIKE '%value%';
```

1*SET_colvalue* set 2 *set_colvalue* SET

```
mysql> SELECT * FROM tbl_name WHERE set_col & 1;
mysql> SELECT * FROM tbl_name WHERE set_col = 'val1,val2';
```

11set 2 2 set'*val1*,*val2*"*val2*,*val1*'

SET SHOW COLUMNS FROM *tbl_name* LIKE *set_col*2SET

11.5.

MySQL

MyISAM65,534 BLOBTEXT 59

MyISAM MySQL 13.1.5.1“”

TINYINT	1
SMALLINT	2
MEDIUMINT	3
INT, INTEGER	4
BIGINT	8
FLOAT(*p*)	0 <= *p* <= 244, 25 <= *p* <= 538
FLOAT	4
DOUBLE [PRECISION], item REAL	8

DECIMAL(*M*,*D*), NUMERIC(*M*,*D*)	
BIT(*M*)	(*M*+7)/8

DECIMAL(NUMERIC)

9(10)4DECIMAL 94“” 4

0	0
1	1
2	1
3	2
4	2
5	3
6	3
7	4

8	4
9	4

DATE	3
DATETIME	8
TIMESTAMP	4
TIME	3
YEAR	1

CHAR(*M*)	*M* 0 <= *M* <= 255
VARCHAR(*M*)	*L*+1 *L* <= *M* 0 <= *M* <= 65535()

BINARY(*M*)	*M* 0 <= *M* <= 255
VARBINARY(*M*)	*L*+1 *L* <= *M* 0 <= *M* <= 255
TINYBLOB, TINYTEXT	*L*+1 *L* < 2^8
BLOB, TEXT	*L*+2 *L* < 2^{16}
MEDIUMBLOB, MEDIUMTEXT	*L*+3 *L* < 2^{24}
LONGBLOB, LONGTEXT	*L*+4 *L* < 2^{32}
ENUM('*value1*','*value2*',...)	12 (65,535)
SET('*value1*','*value2*',...)	12348 set(64)

VARCHARBLOBTEXT (*L*) VARCHAR(10)10 (*L*) 'abcd'*L*4 5

CHARVARCHARTEXT *LM* TINYTEXT*L*+ 1

CHARVARCHARTEXT Unicode Unicode “Unicode”

VARCHAR65,532

NDBCLUSTER MySQLVARCHARCHAR() Cluster VARCHAR(100)101

BLOBTEXT 1234 11.4.3“BLOBTEXT ”

NDB Cluster TEXTBLOB TEXT (256) 256 22,000 *size*<= 256TEXT256(*size*) 256 +*size*+(2000–(*size*–256)%2000)

ENUM 255 25665,535 11.4.4“ENUM”

SETset set*N*(*N*+7)/8 12348 SET64 11.4.5“SET”

11.6.

199999

65(10)DECIMAL (+-*/)11.1.1“”

DECIMAL DOUBLE BIGINT 64

11.7.

SQL MySQL MySQL

	MySQL
BOOL,	TINYINT
BOOLEAN	TINYINT
CHAR VARYING(*M*)	VARCHAR(*M*)
DEC	DECIMAL
FIXED	DECIMAL
FLOAT4	FLOAT
FLOAT8	DOUBLE
INT1	TINYINT
INT2	SMALLINT
INT3	MEDIUMINT

INT4	INT
INT8	BIGINT
LONG VARBINARY	MEDIUMBLOB
LONG VARCHAR	MEDIUMTEXT
LONG	MEDIUMTEXT
MIDDLEINT	MEDIUMINT
NUMERIC	DECIMAL

DESCRIBE *tbl_name* MySQLMySQL

```
mysql> CREATE TABLE t (a BOOL, b FLOAT8, c LONG, d NUMERIC);
Query OK, 0 rows affected (0.08 sec)

mysql> DESCRIBE t;
+-------+---------------+------+-----+---------+-------+
| Field | Type          | Null | Key | Default | Extra |
+-------+---------------+------+-----+---------+-------+
| a     | tinyint(1)    | YES  |     | NULL    |       |
| b     | double        | YES  |     | NULL    |       |
| c     | mediumtext    | YES  |     | NULL    |       |
| d     | decimal(10,0) | YES  |     | NULL    |       |
```

```
+-------+---------------+------+-----+---------+-------+
4 rows in set (0.00 sec)
```

MySQLMySQL dev.mysql.com

12

12.1.
12.1.1.
12.1.2.
12.1.3.
12.1.4.
12.2.
12.3.
12.3.1.
12.4.
12.4.1.
12.4.2.
12.5.
12.6. MySQL
12.7.
12.7.1.
12.7.2.
12.7.3.
12.7.4.
12.7.5. MySQL
12.8. Cast
12.9.
12.9.1.
12.9.2.
12.9.3.
12.9.4.
12.10. GROUP BY
12.10.1. GROUP BY
12.10.2. GROUP BY
12.10.3. GROUP BY

SQL SELECTORDER BY HAVING SELECT DELETE UPDATE WHERE SET column NULL

NULL NULL

, MySQL

--sql-mode=IGNORE_SPACEMySQL
CLIENT_IGNORE_SPACE 5.3.2“SQL” .

mysql

mysql> **SELECT MOD(29,9);**

+-----------+

| mod(29,9) |

+-----------+

| 2 |

+-----------+

1 rows in set (0.00)

mysql> **SELECT MOD(29,9);**

  -> 2

12.1.

12.1.1.
12.1.2.
12.1.3.
12.1.4.

12.1.1.

:=

||, OR, XOR

&&, AND

NOT

BETWEEN, CASE, WHEN, THEN, ELSE

=, <=>, >=, >, <=, <, <>, !=, IS, LIKE, REGEXP, IN

|

&

<<, >>

-, +

*, /, DIV, %, MOD

^

- (), ~ ()

!

BINARY, COLLATE

HIGH_NOT_PRECEDENCE SQL NOT the ! 5.3.2“SQL”

12.1.2.

- (...)

```
mysql> SELECT 1+2*3;
        -> 7
mysql> SELECT (1+2)*3;
        -> 9
```

12.1.3.

1(TRUE)0 (FALSE) NULL

(LEAST()GREATEST()) 1 (TRUE) 0 (FALSE) NULL

MySQL

- NULLNULL-safe <=> NULL
-
-
-
- TIMESTAMP DATETIME timestam datetime/date/time
-

(cp1252 Latin1)

CAST() CONVERT() 12.8“Cast”

mysql> **SELECT 1 > '6x';**

-> 0

```
mysql> SELECT 7 > '6x';
    -> 1
mysql> SELECT 0 > 'x6';
    -> 0
mysql> SELECT 0 = 'x6';
    -> 1
```

MySQL

SELECT * FROM *tbl_name* WHERE *str_col*=1;

1: '1' ' 1' '1a' ……

- =

```
mysql> SELECT 1 = 0;
    -> 0
mysql> SELECT '0' = 0;
    -> 1
mysql> SELECT '0.0' = 0;
    -> 1
mysql> SELECT '0.01' = 0;
    -> 0
mysql> SELECT '.01' = 0.01;
    -> 1
```

- <=>

NULL-safe equal.= NULL 1NULLNULL 0NULL

mysql> **SELECT 1 <=> 1, NULL <=> NULL, 1 <=> NULL;**

-> 1, 1, 0

mysql> **SELECT 1 = 1, NULL = NULL, 1 = NULL;**

-> 1, NULL, NULL

- <> !=

mysql> **SELECT '.01' <> '0.01';**

-> 1

mysql> **SELECT .01 <> '0.01';**

-> 0

mysql> **SELECT 'zapp' <> 'zappp';**

-> 1

- <=

mysql> **SELECT 0.1 <= 2;**

-> 1

- <

mysql> **SELECT 2 < 2;**

-> 0

- >=

mysql> **SELECT 2 >= 2;**

-> 1

- >

mysql> **SELECT 2 > 2;**

-> 0

- IS *boolean_value* IS NOT *boolean_value*

TRUEFALSEUNKNOWN

mysql> **SELECT 1 IS TRUE, 0 IS FALSE, NULL IS UNKNOWN;**

-> 1, 1, 1

mysql> **SELECT 1 IS NOT UNKNOWN, 0 IS NOT UNKNOWN, NULL IS NOT UNKNOWN;**

-> 1, 1, 0

- IS NULL IS NOT NULL

NULL

mysql> **SELECT 1 IS NULL, 0 IS NULL, NULL IS NULL;**

-> 0, 0, 1

mysql> **SELECT 1 IS NOT NULL, 0 IS NOT NULL, NULL IS NOT NULL;**

-> 1, 1, 0

ODBC IS NULL MySQL

- AUTO_INCREM

o SELECT * FROM *tbl_name* WHERE *auto_col* IS NULL

SQL_AUTO_IS_NULL=0 13.5.3“SET”

- NOT NULL DATE DATETIME '00

o SELECT * FROM *tbl_name* WHERE *date_column* IS NULL

ODBC ODBC '0000-00-00'

- *expr* BETWEEN *min* AND *max*

expr min expr max, BETWEEN 1,0 (*min* <= *expr* AND *expr* <= *max*) 3

mysql> **SELECT 1 BETWEEN 2 AND 3;**

-> 0

mysql> **SELECT 'b' BETWEEN 'a' AND 'c';**

-> 1

mysql> **SELECT 2 BETWEEN 2 AND '3';**

-> 1

mysql> **SELECT 2 BETWEEN 2 AND 'x-3';**

-> 0

- *expr* NOT BETWEEN *min* AND *max*

NOT(*expr* BETWEEN *min* AND *max*)

· COALESCE(*value*,...)

NULL NULL NULL

mysql> **SELECT COALESCE(NULL,1);**

-> 1

mysql> **SELECT COALESCE(NULL,NULL,NULL);**

-> NULL

· GREATEST(*value1*,*value2*,...)

2 ()LEAST()

mysql> **SELECT GREATEST(2,0);**

-> 2

mysql> **SELECT GREATEST(34.0,3.0,5.0,767.0);**

-> 767.0

mysql> **SELECT GREATEST('B','A','C');**

-> 'C'

NULL GREATEST()NULL

· *expr* IN (*value*,...)

- *expr* IN 1 , 0 *expr*

mysql> **SELECT 2 IN (0,3,5,'wefwf');**

-> 0

mysql> **SELECT 'wefwf' IN (0,3,5,'wefwf');**

-> 1

IN max_allowed_packet

SQL NULL NULL INNULL

IN() 13.2.8.3“ANYINSOME”

· *expr* NOT IN (*value*,...)

NOT (*expr* IN (*value*,...))

- ISNULL(*expr*)

expr NULLISNULL() 1 0

mysql> **SELECT ISNULL(1+1);**

  -> 0

mysql> **SELECT ISNULL(1/0);**

  -> 1

= NULL

 ISNULL() IS NULL IS NULL

· INTERVAL(*N*,*N1*,*N2*,*N3*,...)

N < *N1*0*N* < *N2* 1*N* NULL -1 *N1* < *N2* < *N3* < ……< *Nn* ()

mysql> **SELECT INTERVAL(23, 1, 15, 17, 30, 44, 200);**

  -> 3

mysql> **SELECT INTERVAL(10, 1, 10, 100, 1000);**

  -> 2

mysql> **SELECT INTERVAL(22, 23, 30, 44, 200);**

  -> 0

· LEAST(*value1*,*value2*,...)

()

- INTEGER
- REAL
-
-

NULL LEAST()NULL

mysql> **SELECT LEAST(2,0);**

-> 0

mysql> **SELECT LEAST(34.0,3.0,5.0,767.0);**

-> 3.0

mysql> **SELECT LEAST('B','A','C');**

-> 'A'

mysql> **SELECT CAST(LEAST(3600, 9223372036854775808.0) as SIGNED);**

-> -9223372036854775808

MySQL9223372036854775808.0

12.1.4.

SQL TRUEFALSE NULL (UNKNOWN) MyS
(FALSE) NULLSQL TRUE

- NOT !

NOT0 1 0 NOT NULL NULL

mysql> **SELECT NOT 10;**

-> 0

mysql> **SELECT NOT 0;**

-> 1

mysql> **SELECT NOT NULL;**

-> NULL

mysql> **SELECT ! (1+1);**

-> 0

mysql> **SELECT ! 1+1;**

-> 1

1(!1)+1

- AND &&

AND NULL 1 0 0 NULL

mysql> **SELECT 1 && 1;**

-> 1

mysql> **SELECT 1 && 0;**

-> 0

mysql> **SELECT 1 && NULL;**

-> NULL

mysql> **SELECT 0 && NULL;**

-> 0

mysql> **SELECT NULL && 0;**

-> 0

- OR ||

OR NULL 10NULL 1 NULL NULL NULL

mysql> **SELECT 1 || 1;**

-> 1

mysql> **SELECT 1 || 0;**

-> 1

mysql> **SELECT 0 || 0;**

-> 0

mysql> **SELECT 0 || NULL;**

-> NULL

mysql> **SELECT 1 || NULL;**

-> 1

- XOR

XOR NULL NULL NULL 1 0

mysql> **SELECT 1 XOR 1;**

-> 0

mysql> **SELECT 1 XOR 0;**

-> 1

mysql> **SELECT 1 XOR NULL;**

-> NULL

mysql> **SELECT 1 XOR 1 XOR 1;**

-> 1

a XOR b (a AND (NOT b)) OR ((NOT a) b)

12.1.1“”

12.2.

- CASE *value* WHEN [*compare-value*] THEN *result* [WHEN [*compare-value*] THEN *result* ...] [ELSE *result*] END CASE WHEN [*condition*] THEN *result* [WHEN [*condition*] THEN *result* ...] [ELSE *result*] END

value=compare-value ELSE ELSE NULL

mysql> **SELECT CASE 1 WHEN 1 THEN 'one'**

-> **WHEN 2 THEN 'two' ELSE 'more' END;**

-> 'one'

mysql> **SELECT CASE WHEN 1>0 THEN 'true' ELSE 'false' END;**

-> 'true'

mysql> **SELECT CASE BINARY 'B'**

-> **WHEN 'a' THEN 1 WHEN 'b' THEN 2 END;**

-> NULL

CASE

- IF(*expr1*,*expr2*,*expr3*)

expr1 TRUE (*expr1* <> 0 and *expr1* <> NULL) IF()*expr2*; *expr3*IF()

mysql> **SELECT IF(1>2,2,3);**

-> 3

mysql> **SELECT IF(1<2,'yes ','no');**

-> 'yes'

mysql> **SELECT IF(STRCMP('test','test1'),'no','yes');**

-> 'no'

expr2 expr3 NULLIF() NULL

expr1

mysql> **SELECT IF(0.1,1,0);**

-> 0

mysql> **SELECT IF(0.1<>0,1,0);**

-> 1

IF(0.1)0 0.1 IF(0)

IF() ( )

expr2 expr3
expr2 expr3
expr2 *expr3*

expr2 expr3

- IFNULL(*expr1*,*expr2*)

expr1 NULL IFNULL() *expr1*; *expr2*IFNULL()

mysql> **SELECT IFNULL(1,0);**

-> 1

mysql> **SELECT IFNULL(NULL,10);**

-> 10

mysql> **SELECT IFNULL(1/0,10);**

-> 10

mysql> **SELECT IFNULL(1/0,'yes');**

-> 'yes'

IFNULL(*expr1*,*expr2*)“” STRING REAL INTEGER MySQL IFNULL()

CREATE TABLE tmp SELECT IFNULL(1,'test') AS test

CHAR(4)

- NULLIF(*expr1*,*expr2*)

expr1 = expr2 NULL *expr1*CASE WHEN *expr1 = expr2* THEN ELSE *expr1* END

mysql> **SELECT NULLIF(1,1);**

-> NULL

mysql> **SELECT NULLIF(1,2);**

-> 1

MySQL expr1

12.3.

12.3.1.

max_allowed_packet NULL7.5.2“”

1

- ASCII(*str*)

str *str* 0 *str* NULL NULL ASCII() 0255

mysql> **SELECT ASCII('2');**

-> 50

mysql> **SELECT ASCII(2);**

-> 50

mysql> **SELECT ASCII('dx');**

-> 100

ORD()

- BIN(*N*)

N *N* longlong (BIGINT) CONV(*N*,10,2)*N* NULL NULL

mysql> **SELECT BIN(12);**

-> '1100'

- BIT_LENGTH(*str*)

str

mysql> **SELECT BIT_LENGTH('text');**

-> 32

- CHAR(*N*,... [USING *charset*])

CHAR()*N* NULL

mysql> **SELECT CHAR(77,121,83,81,'76');**

-> 'MySQL'

mysql> **SELECT CHAR(77,77.3,'77.3');**

-> 'MMM'

255CHAR() CHAR(256) CHAR(1,0), CHAR(256*256) CHAR(1,0,0)

mysql> **SELECT HEX(CHAR(1,0)), HEX(CHAR(256));**

```
+----------------+----------------+
| HEX(CHAR(1,0)) | HEX(CHAR(256)) |
+----------------+----------------+
| 0100           | 0100           |
+----------------+----------------+
```

mysql> **SELECT HEX(CHAR(1,0,0)), HEX(CHAR(256*256));**

```
+------------------+--------------------+
| HEX(CHAR(1,0,0)) | HEX(CHAR(256*256)) |
+------------------+--------------------+
| 010000           | 010000             |
+------------------+--------------------+
```

CHAR() USING

mysql> **SELECT CHARSET(CHAR(0x65)), CHARSET(CHAR(0x65 USING utf8));**

```
mysql> SELECT CHARSET(CHAR(0x65)), CHARSET(CHAR(0x65 USING utf8));
+--------------------+------------------------------+
| CHARSET(CHAR(0x65)) | CHARSET(CHAR(0x65 USING utf8)) |
+--------------------+------------------------------+
| binary              | utf8                         |
+--------------------+------------------------------+
```

USING SQL CHAR() NULL

- CHAR_LENGTH(*str*)

str , LENGTH() 10, CHAR

- CHARACTER_LENGTH(*str*)

CHARACTER_LENGTH()CHAR_LENGTH()

- COMPRESS(*string_to_compress*)

MySQLzlib NULLUNCOMPRESS()

mysql> **SELECT LENGTH(COMPRESS(REPEAT('a',1000)));**

-> 21

mysql> **SELECT LENGTH(COMPRESS(''));**

-> 0

mysql> **SELECT LENGTH(COMPRESS('a'));**

-> 13

mysql> **SELECT LENGTH(COMPRESS(REPEAT('a',16)));**

-> 15

-
- (), ".",CHARVARCHA

- CONCAT(*str1*,*str2*,...)

NULL NULL
CONCAT(CAST(int_col AS CHAR), char_col)

mysql> **SELECT CONCAT('My', 'S', 'QL');**

-> 'MySQL'

mysql> **SELECT CONCAT('My', NULL, 'QL');**

-> NULL

mysql> **SELECT CONCAT(14.3);**

-> '14.3'

- CONCAT_WS(*separator*,*str1*,*str2*,...)

CONCAT_WS() CONCAT With Separator CONCAT()
NULL NULL NULL

mysql> **SELECT CONCAT_WS(',','First name','Second name','Last Name');**

-> 'First name,Second name,Last Name'

mysql> **SELECT CONCAT_WS(',','First name',NULL,'Last Name');**

-> 'First name,Last Name'

CONCAT_WS() (NULL

- CONV(*N*,*from_base*,*to_base*)

N *from_base* *to_base* NULL NUI
N *N* CONV() 64

```
mysql> SELECT CONV('a',16,2);
    -> '1010'
mysql> SELECT CONV('6E',18,8);
    -> '172'
mysql> SELECT CONV(-17,10,-18);
    -> '-H'
mysql> SELECT CONV(10+'10'+'10'+0xa,10,10);
    -> '40'
```

- ELT(*N*,*str1*,*str2*,*str3*,...)

N = 1 *str1* *N* = 2 *str2* *N* 1 NULL ELT() FIELD()

```
mysql> SELECT ELT(1, 'ej', 'Heja', 'hej', 'foo');
    -> 'ej'
mysql> SELECT ELT(4, 'ej', 'Heja', 'hej', 'foo');
    -> 'foo'
```

- EXPORT_SET(*bits*,*on*,*off*[,*separator*[,*number_of_bits*]])

bits *on*

```
mysql> SELECT EXPORT_SET(5,'Y','N',',',4);
    -> 'Y,N,Y,N'
mysql> SELECT EXPORT_SET(6,'1','0',',',10);
```

-> '0,1,1,0,0,0,0,0,0,0'

- FIELD(*str*,*str1*,*str2*,*str3*,...)

str1, *str2*, *str3*,……*str* *str* 0

FIELD()

str NULL0 NULL FIELD() ELT()

mysql> **SELECT FIELD('ej', 'Hej', 'ej', 'Heja', 'hej', 'foo');**

-> 2

mysql> **SELECT FIELD('fo', 'Hej', 'ej', 'Heja', 'hej', 'foo');**

-> 0

- FIND_IN_SET(*str*,*strlist*)

str N *strlist* 1 *N* ‘ ,’ type S
strstrlist strlist 0 NULL NULL (‘,’)

mysql> **SELECT FIND_IN_SET('b','a,b,c,d');**

-> 2

- FORMAT(*X*,*D*)

number *X* '#,###,###.##', *D*,

- HEX(*N_or_S*)

N_OR_S *N* *N* longlong (BIGINT) CONV(N,10,16)

N_OR_S *N_OR_S* *N_OR_S*

mysql> **SELECT HEX(255);**

-> 'FF'

mysql> **SELECT 0x616263;**

-> 'abc'

mysql> **SELECT HEX('abc');**

-> 616263

- INSERT(*str*,*pos*,*len*,*newstr*)

str, *pos* *newstr*len *pos* *len* *pos* nullNULL

mysql> **SELECT INSERT('Quadratic', 3, 4, 'What');**

-> 'QuWhattic'

mysql> **SELECT INSERT('Quadratic', -1, 4, 'What');**

-> 'Quadratic'

mysql> **SELECT INSERT('Quadratic', 3, 100, 'What');**

-> 'QuWhat'

- INSTR(*str*,*substr*)

str LOCATE()

mysql> **SELECT INSTR('foobarbar', 'bar');**

-> 4

mysql> **SELECT INSTR('xbar', 'foobar');**

-> 0

- LCASE(*str*)

LCASE() LOWER()

- LEFT(*str*,*len*)

str len

mysql> **SELECT LEFT('foobarbar', 5);**

    -> 'fooba'

- LENGTH(*str*)

str 52 LENGTH() 10, CHAR_LENGTH()5

mysql> **SELECT LENGTH('text');**

    -> 4

- LOAD_FILE(*file_name*)

, FILE

NULL

mysql> **UPDATE *tbl_name***

    SET *blob_column*=LOAD_FILE('/tmp/picture')

    WHERE id=1;

- LOCATE(*substr*,*str*) , LOCATE(*substr*,*str*,*pos*)

strsubstr *strsubstr, possı*

mysql> **SELECT LOCATE('bar', 'foobarbar');**

    -> 4

mysql> **SELECT LOCATE('xbar', 'foobar');**

    -> 0

mysql> **SELECT LOCATE('bar', 'foobarbar',5);**

-> 7

- LOWER(*str*)

str (cp1252 Latin1)

mysql> **SELECT LOWER('QUADRATICALLY');**

-> 'quadratically'

- LPAD(*str*,*len*,*padstr*)

str, *padstr len* *str len*, *len*

mysql> **SELECT LPAD('hi',4,'??');**

-> '??hi'

mysql> **SELECT LPAD('hi',1,'??');**

-> 'h'

- LTRIM(*str*)

str

mysql> **SELECT LTRIM(' barbar');**

-> 'barbar'

- MAKE_SET(*bits*,*str1*,*str2*,...)

(‘ ,’) *bits* *str1* 0, *str2* 1, *str1*, *str2*, ... NULL

mysql> **SELECT MAKE_SET(1,'a','b','c');**

-> 'a'

mysql> **SELECT MAKE_SET(1 | 4,'hello','nice','world');**

-> 'hello,world'

mysql> **SELECT MAKE_SET(1 | 4,'hello','nice',NULL,'world');**

-> 'hello'

mysql> **SELECT MAKE_SET(0,'a','b','c');**

-> ''

- MID(*str*,*pos*,*len*)

MID(*str*,*pos*,*len*) SUBSTRING(*str*,*pos*,*len*)

- OCT(*N*)

N *N* longlong (BIGINT) CONV(N,10,8)*N* NULL NULL

mysql> **SELECT OCT(12);**

-> '14'

- OCTET_LENGTH(*str*)

OCTET_LENGTH() LENGTH()

- ORD(*str*)

str :

```
   (1st byte code)
+ (2nd byte code × 256)
+ (3rd byte code × 256²) ...
```

ORD()ASCII()

mysql> **SELECT ORD('2');**

-> 50

- POSITION(*substr* IN *str*)

POSITION(*substr* IN *str*) LOCATE(*substr*,*str*)

- QUOTE(*str*)

SQL (‘’) (‘\’) ASCII NULCon

mysql> **SELECT QUOTE('Don\'t!');**

-> 'Don\'t!'

mysql> **SELECT QUOTE(NULL);**

-> NULL

- REPEAT(*str*,*count*)

str *strcount* *count* <= 0, *str* *cc*

mysql> **SELECT REPEAT('MySQL', 3);**

-> 'MySQLMySQLMySQL'

- REPLACE(*str*,*from_str*,*to_str*)

str to_strfrom_str

mysql> **SELECT REPLACE('www.mysql.com', 'w', 'Ww');**

-> 'WwWwWw.mysql.com'

- REVERSE(*str*)

  str

mysql> **SELECT REVERSE('abc');**

    -> 'cba'

- RIGHT(*str*,*len*)

str *len*

mysql> **SELECT RIGHT('foobarbar', 4);**

    -> 'rbar'

- RPAD(*str*,*len*,*padstr*)

str, *padstr*len *str* *len*, *len*

mysql> **SELECT RPAD('hi',5,'?');**

    -> 'hi???'

mysql> **SELECT RPAD('hi',1,'?');**

    -> 'h'

- RTRIM(*str*)

  str

mysql> **SELECT RTRIM('barbar   ');**

    -> 'barbar'

- SOUNDEX(*str*)

*str*soundex soundex sounde
soundex *str* A-Z

mysql> **SELECT SOUNDEX('Hello');**

-> 'H400'

mysql> **SELECT SOUNDEX('Quadratically');**

-> 'Q36324'

Soundex (D. Knuth)

- *expr1* SOUNDS LIKE *expr2*

SOUNDEX(*expr1*) = SOUNDEX(*expr2*)

- SPACE(*N*)

N

mysql> **SELECT SPACE(6);**

-> ' '

- SUBSTRING(*str*,*pos*) , SUBSTRING(*str* FROM *pos*)
  SUBSTRING(*str*,*pos*,*len*) , SUBSTRING(*str* FROM *pos* FOR *len*)

len str *poslenstrlen* *pos* FROM SQL *pos*
pos

mysql> **SELECT SUBSTRING('Quadratically',5);**

-> 'ratically'

mysql> **SELECT SUBSTRING('foobarbar' FROM 4);**

-> 'barbar'

mysql> **SELECT SUBSTRING('Quadratically',5,6);**

-> 'ratica'

mysql> **SELECT SUBSTRING('Sakila', -3);**

-> 'ila'

mysql> **SELECT SUBSTRING('Sakila', -5, 3);**

-> 'aki'

mysql> **SELECT SUBSTRING('Sakila' FROM -4 FOR 2);**

-> 'ki'

*len*1

SUBSTR() SUBSTRING()

- SUBSTRING_INDEX(*str*,*delim*,*count*)

delim count *str* *count*,() *count*

mysql> **SELECT SUBSTRING_INDEX('www.mysql.com', '.', 2);**

-> 'www.mysql'

mysql> **SELECT SUBSTRING_INDEX('www.mysql.com', '.', -2);**

-> 'mysql.com'

- TRIM([{BOTH | LEADING | TRAILING} [*remstr*] FROM] *str*)
  TRIM(*remstr* FROM] *str*)

str *remstr* / BOTHLEADINTRAILING,BOTH *remstr*

mysql> **SELECT TRIM(' bar ');**

-> 'bar'

mysql> **SELECT TRIM(LEADING 'x' FROM 'xxxbarxxx');**

-> 'barxxx'

mysql> **SELECT TRIM(BOTH 'x' FROM 'xxxbarxxx');**

-> 'bar'

mysql> **SELECT TRIM(TRAILING 'xyz' FROM 'barxxyz');**

-> 'barx'

- UCASE(*str*)

UCASE()UPPER()

- UNCOMPRESS(*string_to_uncompress*)

COMPRESS() NULL MySQL zlib , NULL

mysql> **SELECT UNCOMPRESS(COMPRESS('any string'));**

-> 'any string'

mysql> **SELECT UNCOMPRESS('any string');**

-> NULL

- UNCOMPRESSED_LENGTH(*compressed_string*)

mysql> **SELECT**

UNCOMPRESSED_LENGTH(COMPRESS(REPEAT('a',30)));

-> 30

- UNHEX(*str*)

HEX(*str*)

mysql> **SELECT UNHEX('4D7953514C');**

-> 'MySQL'

mysql> **SELECT 0x4D7953514C;**

-> 'MySQL'

mysql> **SELECT UNHEX(HEX('string'));**

-> 'string'

mysql> **SELECT HEX(UNHEX('1267'));**

-> '1267'

- UPPER(*str*)

str (cp1252 Latin1).

mysql> **SELECT UPPER('Hej');**

-> 'HEJ'

12.3.1.

MySQL

mysql> **SELECT 1+'1';**

-> 2

mysql> **SELECT CONCAT(2,' test');**

-> '2 test'

CAST() CONCAT()

mysql> **SELECT 38.8, CAST(38.8 AS CHAR);**

-> 38.8, '38.8'

mysql> **SELECT 38.8, CONCAT(38.8);**

-> 38.8, '38.8'

CAST() .

,

- *expr* LIKE *pat* [ESCAPE '*escape-char*']

  SQL 1 (TRUE) 0 (FALSE) *expr* *pat* NULL, NULL

  LIKE

%	
_	

mysql> **SELECT 'David!' LIKE 'David_';**

-> 1

mysql> **SELECT 'David!' LIKE '%D%v%';**

-> 1

, ESCAPE, ‘ \’

\%	‘%’
_	‘ _’

mysql> **SELECT 'David!' LIKE 'David_';**

-> 0

mysql> **SELECT 'David_' LIKE 'David_';**

-> 1

,ESCAPE

mysql> **SELECT 'David_' LIKE 'David|_' ESCAPE '|';**

-> 1

MySQL 5.1.2, NO_BACKSLASH

mysql> **SELECT 'abc' LIKE 'ABC';**

-> 1

mysql> **SELECT 'abc' LIKE BINARY 'ABC';**

-> 0

MySQL, LIKE (SQL LIKE

mysql> **SELECT 10 LIKE '1%';**

-> 1

MySQL C(, ‘ \n’)LIKE‘ \’ ‘ \n’, ‘ \\n’ ‘

- *expr* NOT LIKE *pat* [ESCAPE '*escape-char*']

NOT (*expr* LIKE *pat* [ESCAPE '*escape-char*'])

- *expr* NOT REGEXP *pat expr* NOT RLIKE *pat*

NOT (*expr* REGEXP *pat*)

- *expr* REGEXP *pat expr* RLIKE *pat*

expr *pat*
RLIKE REGEXP, mSQL

,

MySQL C (, ‘ \n’),REGEXP‘ \’

REGEXP ,

mysql> **SELECT 'Monty!' REGEXP 'm%y%%';**

-> 0

mysql> **SELECT 'Monty!' REGEXP '.*';**

-> 1

mysql> **SELECT 'new*\n*line' REGEXP 'new*.*line';**

-> 1

mysql> **SELECT 'a' REGEXP 'A', 'a' REGEXP BINARY 'A';**

-> 1 0

mysql> **SELECT 'a' REGEXP '^[a-d]';**

-> 1

REGEXP RLIKE (cp1252 Latin1)

- STRCMP(*expr1*,*expr2*)

STRCMP() -1 1

mysql> **SELECT STRCMP('text', 'text2');**

-> -1

mysql> **SELECT STRCMP('text2', 'text');**

-> 1

mysql> **SELECT STRCMP('text', 'text');**

-> 0

STRCMP()

12.4.

12.4.1.
12.4.2.

12.4.1.

- + *, BIGINT (64) , 12.8“Cast”

- +

:

mysql> **SELECT 3+5;**

-> 8

- -

:

mysql> **SELECT 3-5;**

-> -2

- -

mysql> **SELECT - 2;**

-> -2

BIGINT BIGINT– 2^{63} –

- *

:

mysql> **SELECT 3*5;**

-> 15

mysql> **SELECT 18014398509481984*18014398509481984.0;**

-> 324518553658426726783156020576256.0

mysql> **SELECT 18014398509481984*18014398509481984;**

-> 0

BIGINT 64 (11.2“”

- /

:

mysql> **SELECT 3/5;**

-> 0.60

NULL

mysql> **SELECT 102/(1-1);**

-> NULL

BIGINT

- DIV

FLOOR()BIGINT

mysql> **SELECT 5 DIV 2;**

-> 2

12.4.2.

NULL

- ABS(*X*)

X

mysql> **SELECT ABS(2);**

-> 2

mysql> **SELECT ABS(-32);**

-> 32

BIGINT

- ACOS(*X*)

X , , *X* *X* -1 1 NULL

mysql> **SELECT ACOS(1);**

-> 0

mysql> **SELECT ACOS(1.0001);**

-> NULL

mysql> **SELECT ACOS(0);**

-> 1.5707963267949

- ASIN(*X*)

X *X* *X* *X* -1 1 NULL

```
mysql> SELECT ASIN(0.2);
        -> 0.20135792079033
mysql> SELECT ASIN('foo');
```

```
+-------------+
| ASIN('foo') |
+-------------+
|           0 |
+-------------+
1 row in set, 1 warning (0.00 sec)

mysql> SHOW WARNINGS;
+---------+------+----------------------------------------+
| Level   | Code | Message                                |
+---------+------+----------------------------------------+
| Warning | 1292 | Truncated incorrect DOUBLE value: 'foo' |
+---------+------+----------------------------------------+
```

- ATAN(*X*)

X *X*

mysql> **SELECT ATAN(2);**

-> 1.1071487177941

mysql> **SELECT ATAN(-2);**

-> -1.1071487177941

- ATAN(*Y*,*X*) , ATAN2(*Y*,*X*)

X *Y* *Y* *X*,

mysql> **SELECT ATAN(-2,2);**

-> -0.78539816339745

mysql> **SELECT ATAN2(PI(),0);**

-> 1.5707963267949

- CEILING(*X*) CEIL(*X*)

X

mysql> **SELECT CEILING(1.23);**

-> 2

mysql> **SELECT CEIL(-1.23);**

-> -1

BIGINT

- COS(*X*)

X *X*

mysql> **SELECT COS(PI());**

-> -1

- COT(*X*)

X

mysql> **SELECT COT(12);**

-> -1.5726734063977

mysql> **SELECT COT(0);**

-> NULL

- CRC32(*expr*)

32 NULL NULL

mysql> **SELECT CRC32('MySQL');**

-> 3259397556

mysql> **SELECT CRC32('mysql');**

-> 2501908538

- DEGREES(*X*)

X,

mysql> **SELECT DEGREES(PI());**

-> 180

mysql> **SELECT DEGREES(PI() / 2);**

-> 90

- EXP(*X*)

e*X*()

mysql> **SELECT EXP(2);**

-> 7.3890560989307

mysql> **SELECT EXP(-2);**

-> 0.13533528323661

mysql> **SELECT EXP(0);**

-> 1

- FLOOR(*X*)

X

mysql> **SELECT FLOOR(1.23);**

-> 1

mysql> **SELECT FLOOR(-1.23);**

-> -2

BIGINT

- FORMAT(*X*,*D*)

X '#,###,###.##', *D* D 12.9.4“”

- LN(*X*)

X ,, *X* e

mysql> **SELECT LN(2);**

-> 0.69314718055995

mysql> **SELECT LN(-2);**

-> NULL

LOG(*X*)

- LOG(*X*) LOG(*B*,*X*)

X

mysql> **SELECT LOG(2);**

-> 0.69314718055995

mysql> **SELECT LOG(-2);**

-> NULL

X B

mysql> **SELECT LOG(2,65536);**

-> 16

mysql> **SELECT LOG(10,100);**

-> 2

LOG(*B*,*X*) LOG(*X*) / LOG(*B*)

- LOG2(*X*)

X 2

mysql> **SELECT LOG2(65536);**

-> 16

mysql> **SELECT LOG2(-100);**

-> NULL

LOG2() LOG(*X*) / LOG(2)

- LOG10(*X*)

*X*10

mysql> **SELECT LOG10(2);**

-> 0.30102999566398

mysql> **SELECT LOG10(100);**

-> 2

mysql> **SELECT LOG10(-100);**

-> NULL

LOG10(*X*)LOG(10,*X*)

- MOD(*N*,*M*) , *N* % *M* *N* MOD *M*

N *M*

mysql> **SELECT MOD(234, 10);**

-> 4

mysql> **SELECT 253 % 7;**

-> 1

mysql> **SELECT MOD(29,9);**

-> 2

mysql> **SELECT 29 MOD 9;**

-> 2

BIGINT

MOD()

mysql> **SELECT MOD(34.5,3);**

-> 1.5

- PI()

ϖ (pi) 7, MySQL

mysql> **SELECT PI();**

-> 3.141593

mysql> **SELECT PI()+0.000000000000000000;**

-> 3.141592653589793116

- POW(*X*,*Y*) , POWER(*X*,*Y*)

X Y

mysql> **SELECT POW(2,2);**

-> 4

mysql> **SELECT POW(2,-2);**

-> 0.25

- RADIANS(*X*)

X, (ϖ 180

mysql> **SELECT RADIANS(90);**

-> 1.5707963267949

- RAND() RAND(*N*)

v 0 1 (, $0 \le v \le 1.0$) *N*

mysql> **SELECT RAND();**

-> 0.9233482386203

mysql> **SELECT RAND(20);**

-> 0.15888261251047

mysql> **SELECT RAND(20);**

-> 0.15888261251047

mysql> **SELECT RAND();**

-> 0.63553050033332

mysql> **SELECT RAND();**

-> 0.70100469486881

mysql> **SELECT RAND(20);**

-> 0.15888261251047

i ≤ *R* ≤ *j* *R* FLOOR(*i* + RAND() * (*j* – *i* + 1)) 7 12 712,

SELECT FLOOR(7 + (RAND() * 6));

ORDER BY RAND() ORDER BY

mysql> **SELECT * FROM *tbl_name* ORDER BY RAND();**

ORDER BY RAND() LIMIT

mysql> **SELECT * FROM table1, table2 WHERE a=b AND c<d**

-> **ORDER BY RAND() LIMIT 1000;**

WHERE WHERE RAND()

RAND() MySQL*ad hoc*

- ROUND(*X*) ROUND(*X*,*D*)

X, *X D* *D* *XD* *D*

mysql> **SELECT ROUND(-1.23);**

-> -1

mysql> **SELECT ROUND(-1.58);**

-> -2

mysql> **SELECT ROUND(1.58);**

-> 2

mysql> **SELECT ROUND(1.298, 1);**

-> 1.3

mysql> **SELECT ROUND(1.298, 0);**

-> 1

mysql> **SELECT ROUND(23.298, -1);**

-> 20

( ),()

ROUND()

- , ROUND() “” “” : .5 .5
- C ROUND()“”

mysql> **SELECT ROUND(2.5), ROUND(25E-1);**

+-----------+-------------+

| ROUND(2.5) | ROUND(25E-1) |

+-----------+-------------+

| 3 | 2 |

+-----------+-------------+

- SIGN(*X*)

-1 01 *X*

mysql> **SELECT SIGN(-32);**

-> -1

mysql> **SELECT SIGN(0);**

-> 0

mysql> **SELECT SIGN(234);**

-> 1

- SIN(*X*)

X *X*

mysql> **SELECT SIN(PI());**

-> 1.2246063538224e-16

mysql> **SELECT ROUND(SIN(PI()));**

-> 0

- SQRT(*X*)

X

mysql> **SELECT SQRT(4);**

-> 2

mysql> **SELECT SQRT(20);**

-> 4.4721359549996

mysql> **SELECT SQRT(-16);**

-> NULL

- TAN(*X*)

X *X*

mysql> **SELECT TAN(PI());**

-> -1.2246063538224e-16

mysql> **SELECT TAN(PI()+1);**

-> 1.5574077246549

- TRUNCATE(*X*,*D*)

  DXD 0, D,() XD.

```
mysql> SELECT TRUNCATE(1.223,1);
    -> 1.2
mysql> SELECT TRUNCATE(1.999,1);
    -> 1.9
mysql> SELECT TRUNCATE(1.999,0);
    -> 1
mysql> SELECT TRUNCATE(-1.999,1);
    -> -1.9
mysql> SELECT TRUNCATE(122,-2);
    -> 100
mysql> SELECT TRUNCATE(10.28*100,0);
    -> 1028
```

12.5.

30date_col

```
mysql> SELECT something FROM tbl_name
    -> WHERE DATE_SUB(CURDATE(),INTERVAL 30 DAY) <= date_col;
```

UTC_TIME()UTC_TIMESTAMP()

CURRENT_TIMESTAMP() CURRENT_TIME() CURRENT_DATE() FROM_UNIXTIME() time_zone UNIX_TIMESTAMP() 5.10.8 “MySQL”

“” '200

- ADDDATE(*date*,INTERVAL *expr type*) ADDDATE(*expr*,*days*)

INTERVAL ADDDATE()DATE_ADD() SUBDATE() DATE_SUB() INTERVAL DATE_ADD()

```
mysql> SELECT DATE_ADD('1998-01-02', INTERVAL 31 DAY);
    -> '1998-02-02'
mysql> SELECT ADDDATE('1998-01-02', INTERVAL 31 DAY);
    -> '1998-02-02'
```

days MySQL 5.1 *expr*

```
mysql> SELECT ADDDATE('1998-01-02', 31);
```

-> '1998-02-02'

- ADDTIME(*expr*,*expr2*)

ADDTIME() *expr2expr* *expr* *expr2*

mysql> **SELECT ADDTIME('1997-12-31 23:59:59.999999',**

-> **'1 1:1:1.000002');**

-> '1998-01-02 01:01:01.000001'

mysql> **SELECT ADDTIME('01:00:00.999999', '02:00:00.999998');**

-> '03:00:01.999997'

- CONVERT_TZ(*dt*,*from_tz*,*to_tz*)

CONVERT_TZ() *dt* *from_tz* *to_tz* 5.10.8“MySQL”

from_tz UTC TIMESTAMP TIMESTAMP 11.1.2“”

mysql> **SELECT CONVERT_TZ('2004-01-01 12:00:00','GMT','MET');**

-> '2004-01-01 13:00:00'

mysql> **SELECT CONVERT_TZ('2004-01-01 12:00:00','+00:00','+10:00');**

-> '2004-01-01 22:00:00'

'MET' 'Europe/Moscow' 5.10.8“MySQL”

- CURDATE()

'YYYY-MM-DD' YYYYMMDD

mysql> **SELECT CURDATE();**

-> '1997-12-15'

mysql> **SELECT CURDATE() + 0;**

-> 19971215

- CURRENT_DATE CURRENT_DATE()

CURRENT_DATECURRENT_DATE().

- CURTIME()

'HH:MM:SS' HHMMSS

mysql> **SELECT CURTIME();**

-> '23:50:26'

mysql> **SELECT CURTIME() + 0;**

-> 235026

- CURRENT_TIME, CURRENT_TIME()

CURRENT_TIME CURRENT_TIME() CURTIME()

- CURRENT_TIMESTAMP, CURRENT_TIMESTAMP()

CURRENT_TIMESTAMP CURRENT_TIMESTAMP()NOW()

- DATE(*expr*)

expr

mysql> **SELECT DATE('2003-12-31 01:02:03');**

-> '2003-12-31'

- DATEDIFF(*expr*,*expr2*)

DATEDIFF() *exprexpr2* *Exprexpr2* date-and-time

mysql> **SELECT DATEDIFF('1997-12-31 23:59:59','1997-12-30');**

-> 1

mysql> **SELECT DATEDIFF('1997-11-30 23:59:59','1997-12-31');**

-> -31

- DATE_ADD(*date*,INTERVAL *expr type*) DATE_SUB(*date*,INTERVAL *expr type*)

date DATETIME DATE *expr*

INTERVA *type*

type expr

type	*expr*
MICROSECOND	MICROSECONDS
SECOND	SECONDS
MINUTE	MINUTES
HOUR	HOURS
DAY	DAYS
WEEK	WEEKS
MONTH	MONTHS

QUARTER	QUARTERS
YEAR	YEARS
SECOND_MICROSECOND	'SECONDS.MICROSECONDS'
MINUTE_MICROSECOND	'MINUTES.MICROSECONDS'
MINUTE_SECOND	'MINUTES:SECONDS'
HOUR_MICROSECOND	'HOURS.MICROSECONDS'
HOUR_SECOND	'HOURS:MINUTES:SECONDS'
HOUR_MINUTE	'HOURS:MINUTES'
DAY_MICROSECOND	'DAYS.MICROSECONDS'
DAY_SECOND	'DAYS HOURS:MINUTES:SECONDS'
DAY_MINUTE	'DAYS HOURS:MINUTES'
DAY_HOUR	'DAYS HOURS'
YEAR_MONTH	'YEARS-MONTHS'

MySQL *expr* *date* DATE YEARMONTHDAY(,), DATE DATETIME

INTERVAL *expr type* + –

```
mysql> SELECT '1997-12-31 23:59:59' + INTERVAL 1 SECOND;
    -> '1998-01-01 00:00:00'
mysql> SELECT INTERVAL 1 DAY + '1997-12-31';
    -> '1998-01-01'
mysql> SELECT '1998-01-01' - INTERVAL 1 SECOND;
    -> '1997-12-31 23:59:59'
mysql> SELECT DATE_ADD('1997-12-31 23:59:59',
   ->              INTERVAL 1 SECOND);
    -> '1998-01-01 00:00:00'
mysql> SELECT DATE_ADD('1997-12-31 23:59:59',
   ->              INTERVAL 1 DAY);
    -> '1998-01-01 23:59:59'
mysql> SELECT DATE_ADD('1997-12-31 23:59:59',
   ->              INTERVAL '1:1' MINUTE_SECOND);
    -> '1998-01-01 00:01:00'
mysql> SELECT DATE_SUB('1998-01-01 00:00:00',
   ->              INTERVAL '1 1:1:1' DAY_SECOND);
    -> '1997-12-30 22:58:59'
```

mysql> **SELECT DATE_ADD('1998-01-01 00:00:00',**

-> **INTERVAL '-1 10' DAY_HOUR);**

-> '1997-12-30 14:00:00'

mysql> **SELECT DATE_SUB('1998-01-02', INTERVAL 31 DAY);**

-> '1997-12-02'

mysql> **SELECT DATE_ADD('1992-12-31 23:59:59.000002',**

-> **INTERVAL '1.999999' SECOND_MICROSECOND);**

-> '1993-01-01 00:00:01.000001'

(*type*), MySQL
, '1:10' DAY_SECOND '1:10' MINUTE_SECON

mysql> **SELECT DATE_ADD('1999-01-01', INTERVAL 1 DAY);**

-> '1999-01-02'

mysql> **SELECT DATE_ADD('1999-01-01', INTERVAL 1 HOUR);**

-> '1999-01-01 01:00:00'

, NULL MONTHYEAR_MONTHYEAR

mysql> **SELECT DATE_ADD('1998-01-30', INTERVAL 1 MONTH);**

-> '1998-02-28'

- DATE_FORMAT(*date*,*format*)

format date

format

%a	(Sun..Sat)
%b	(Jan..Dec)
%c	(0..12)
%D	(0th, 1st, 2nd, 3rd, ...)
%d	, (00..31)
%e	, (0..31)
%f	(000000..999999)
%H	(00..23)
%h	(01..12)
%I	(01..12)
%i	, (00..59)
%j	(001..366)

%k	(0..23)
%l	(1..12)
%M	(January..December)
%m	, (00..12)
%p	AM PM
%r	, 12 (hh:mm:ss AMPM)
%S	(00..59)
%s	(00..59)
%T	, 24 (hh:mm:ss)
%U	(00..53),
%u	(00..53),
%V	(01..53), ; %X
%v	(01..53), ; %x

%W	(..)
%w	(0=..6=)
%X	, ,4;%V
%x	, ,4;%v
%Y	, ,4
%y	, (2)
%%	‘%’

‘ %’

MySQL '2004-00-00'.

```
mysql> SELECT DATE_FORMAT('1997-10-04 22:23:00', '%W %M %Y');
        -> 'Saturday October 1997'
mysql> SELECT DATE_FORMAT('1997-10-04 22:23:00', '%H:%i:%s');
        -> '22:23:00'
mysql> SELECT DATE_FORMAT('1997-10-04 22:23:00',
                          '%D %y %a %d %m %b %j');
        -> '4th 97 Sat 04 10 Oct 277'
mysql> SELECT DATE_FORMAT('1997-10-04 22:23:00',
```

```
                          '%H %k %I %r %T %S %w');
        -> '22 22 10 10:23:00 PM 22:23:00 00 6'
mysql> SELECT DATE_FORMAT('1999-01-01', '%X %V');
        -> '1998 52'
```

- DAY(*date*)

DAY() DAYOFMONTH()

- DAYNAME(*date*)

date

mysql> **SELECT DAYNAME('1998-02-05');**

-> "

- DAYOFMONTH(*date*)

date 131

mysql> **SELECT DAYOFMONTH('1998-02-03');**

-> 3

- DAYOFWEEK(*date*)

date (1 = , 2 = , ..., 7 =) ODBC

mysql> **SELECT DAYOFWEEK('1998-02-03');**

-> 3

- DAYOFYEAR(*date*)

date 1366

mysql> **SELECT DAYOFYEAR('1998-02-03');**

-> 34

- EXTRACT(*type* FROM *date*)

EXTRACT() DATE_ADD()DATE_SUB(),

mysql> **SELECT EXTRACT(YEAR FROM '1999-07-02');**

-> 1999

mysql> **SELECT EXTRACT(YEAR_MONTH FROM '1999-07-02 01:02:03');**

-> 199907

mysql> **SELECT EXTRACT(DAY_MINUTE FROM '1999-07-02 01:02:03');**

-> 20102

mysql> **SELECT EXTRACT(MICROSECOND**

-> **FROM '2003-01-02 10:30:00.00123');**

-> 123

- FROM_DAYS(*N*)

N, DATE

mysql> **SELECT FROM_DAYS(729669);**

-> '1997-10-07'

FROM_DAYS() (1582)12.6“MySQL”

- FROM_UNIXTIME(*unix_timestamp*) , FROM_UNIXTIME(*unix_timestamp*,*format*)

'YYYY-MM-DD HH:MM:SS'YYYYMMDDHHMMSS *unix_timestamp*

format *format* *format* DATE_FORMAT()

mysql> **SELECT FROM_UNIXTIME(875996580);**

-> '1997-10-04 22:23:00'

mysql> **SELECT FROM_UNIXTIME(875996580) + 0;**

-> 19971004222300

mysql> **SELECT FROM_UNIXTIME(UNIX_TIMESTAMP(),**

-> **'%Y %D %M %h:%i:%s %x');**

-> '2003 6th August 06:22:58 2003'

- GET_FORMAT(DATE|TIME|DATETIME, 'EUR'|'USA'|'JIS'|'ISO'|'INTERNAL')

DATE_FORMAT() STR_TO_DATE()

35 15 (DATE_FORMAT())

GET_FORMAT(DATE,'USA')	'%m.%d.%Y'
GET_FORMAT(DATE,'JIS')	'%Y-%m-%d'
GET_FORMAT(DATE,'ISO')	'%Y-%m-%d'
GET_FORMAT(DATE,'EUR')	'%d.%m.%Y'
GET_FORMAT(DATE,'INTERNAL')	'%Y%m%d'

GET_FORMAT(DATETIME,'USA')	'%Y-%m-%d-%H.%i.%s'
GET_FORMAT(DATETIME,'JIS')	'%Y-%m-%d %H:%i:%s'
GET_FORMAT(DATETIME,'ISO')	'%Y-%m-%d %H:%i:%s'
GET_FORMAT(DATETIME,'EUR')	'%Y-%m-%d-%H.%i.%s'
GET_FORMAT(DATETIME,'INTERNAL')	'%Y%m%d%H%i%s'
GET_FORMAT(TIME,'USA')	'%h:%i:%s %p'
GET_FORMAT(TIME,'JIS')	'%H:%i:%s'
GET_FORMAT(TIME,'ISO')	'%H:%i:%s'
GET_FORMAT(TIME,'EUR')	'%H.%i.%S'
GET_FORMAT(TIME,'INTERNAL')	'%H%i%s'

ISO ISO 9075, ISO 8601.

TIMESTAMP, GET_FORMAT()DATETIME

mysql> **SELECT DATE_FORMAT('2003-10-03',GET_FORMAT(DATE,'EUR'));**

-> '03.10.2003'

mysql> **SELECT STR_TO_DATE('10.31.2003',GET_FORMAT(DATE,'USA'));**

-> '2003-10-31'

13.5.3“SET”

- HOUR(*time*)

time 0 23

mysql> **SELECT HOUR('10:05:03');**

-> 10

, TIME , HOUR23

mysql> **SELECT HOUR('272:59:59');**

-> 272

- LAST_DAY(*date*)

NULL

mysql> **SELECT LAST_DAY('2003-02-05');**

-> '2003-02-28'

mysql> **SELECT LAST_DAY('2004-02-05');**

-> '2004-02-29'

mysql> **SELECT LAST_DAY('2004-01-01 01:01:01');**

-> '2004-01-31'

mysql> **SELECT LAST_DAY('2003-03-32');**

-> NULL

- LOCALTIME, LOCALTIME()

LOCALTIME LOCALTIME()NOW()

- LOCALTIMESTAMP, LOCALTIMESTAMP()

LOCALTIMESTAMPLOCALTIMESTAMP()NOW()

- MAKEDATE(*year*,*dayofyear*)

  dayofyear 0 NULL

mysql> **SELECT MAKEDATE(2001,31), MAKEDATE(2001,32);**

-> '2001-01-31', '2001-02-01'

mysql> **SELECT MAKEDATE(2001,365), MAKEDATE(2004,365);**

-> '2001-12-31', '2004-12-30'

mysql> **SELECT MAKEDATE(2001,0);**

-> NULL

- MAKETIME(*hour*,*minute*,*second*)

hour *minutesecond*

mysql> **SELECT MAKETIME(12,15,30);**

-> '12:15:30'

- MICROSECOND(*expr*)

  expr 0 999999

mysql> **SELECT MICROSECOND('12:00:00.123456');**

-> 123456

mysql> **SELECT MICROSECOND('1997-12-31 23:59:59.000010');**

-> 10

- MINUTE(*time*)

time , 0 59

mysql> **SELECT MINUTE('98-02-03 10:05:03');**

-> 5

- MONTH(*date*)

date 1 12

mysql> **SELECT MONTH('1998-02-03');**

-> 2

- MONTHNAME(*date*)

date

mysql> **SELECT MONTHNAME('1998-02-05');**

-> 'February '

- NOW()

'YYYY-MM-DD HH:MM:SS' YYYYMMDDHHM

mysql> **SELECT NOW();**

-> '1997-12-15 23:50:26'

mysql> **SELECT NOW() + 0;**

-> 19971215235026

, NOW()

- PERIOD_ADD(*P*,*N*)

N P (YYMM YYYYMM) YYYYMM *P*

mysql> **SELECT PERIOD_ADD(9801,2);**

-> 199803

- PERIOD_DIFF(*P1*,*P2*)

P1 *P2* *P1 P2* YYMMYYYYMM *P1P2*

mysql> **SELECT PERIOD_DIFF(9802,199703);**

-> 11

- QUARTER(*date*)

date 1 4

mysql> **SELECT QUARTER('98-04-01');**

-> 2

- SECOND(*time*)

time , 059

mysql> **SELECT SECOND('10:05:03');**

-> 3

- SEC_TO_TIME(*seconds*)

seconds, 'HH:MM:SS' HHMMSS

mysql> **SELECT SEC_TO_TIME(2378);**

-> '00:39:38'

mysql> **SELECT SEC_TO_TIME(2378) + 0;**

-> 3938

- STR_TO_DATE(*str*,*format*)

DATE_FORMAT() *str format* STR_TO_DATE() DATETIME
DATE TIME

str *format* *format* DATE_FORMAT() *str*
STR_TO_DATE()NULL

11.3.1“DATETIMEDATETIMESTAMP” ,, 1 3

mysql> **SELECT STR_TO_DATE('00/00/0000', '%m/%d/%Y');**

-> '0000-00-00'

mysql> **SELECT STR_TO_DATE('04/31/2004', '%m/%d/%Y');**

-> '2004-04-31'

- SUBDATE(*date*,INTERVAL *expr type*) SUBDATE(*expr*,*days*)

INTERVAL, SUBDATE()DATE_SUB() INTERVAL DATE

mysql> **SELECT DATE_SUB('1998-01-02', INTERVAL 31 DAY);**

-> '1997-12-02'

mysql> **SELECT SUBDATE('1998-01-02', INTERVAL 31 DAY);**

-> '1997-12-02'

days *expr*

mysql> **SELECT SUBDATE('1998-01-02 12:00:00', 31);**

-> '1997-12-02 12:00:00'

"%X%V" year-week

mysql> **select str_to_date('200442 Monday', '%X%V %W');**

-> 2004-10-18

- SUBTIME(*expr*,*expr2*)

SUBTIME()*expr expr2* *expr* *xpr2*

mysql> **SELECT SUBTIME('1997-12-31 23:59:59.999999','1 1:1:1.000002');**

-> '1997-12-30 22:58:58.999997'

mysql> **SELECT SUBTIME('01:00:00.999999', '02:00:00.999998');**

-> '-00:59:59.999999'

- SYSDATE()

'YYYY-MM-DD HH:MM:SS' YYYYMMDDHHMMSS

, SYSDATE(), NOW()

- TIME(*expr*)

mysql> **SELECT TIME('2003-12-31 01:02:03');**

-> '01:02:03'

mysql> **SELECT TIME('2003-12-31 01:02:03.000123');**

-> '01:02:03.000123'

- TIMEDIFF(*expr*,*expr2*)

TIMEDIFF() *expr expr2* *expr expr2* date-and-time ,

mysql> **SELECT TIMEDIFF('2000:01:01 00:00:00',**

-> **'2000:01:01 00:00:00.000001');**

-> '-00:00:00.000001'

mysql> **SELECT TIMEDIFF('1997-12-31 23:59:59.000001',**

-> **'1997-12-30 01:01:01.000002');**

-> '46:58:57.999999'

- TIMESTAMP(*expr*) , TIMESTAMP(*expr,expr2*)

, *expr* ., *expr2* *expr* theresult

mysql> **SELECT TIMESTAMP('2003-12-31');**

-> '2003-12-31 00:00:00'

mysql> **SELECT TIMESTAMP('2003-12-31 12:00:00','12:00:00');**

-> '2004-01-01 00:00:00'

- TIMESTAMPADD(*interval,int_expr,datetime_expr*)

int_expr *datetime_expr* *int_expr*
MINUTE HOUR DAY WEEK MONTH QUARTER YEAR

Interval SQL_TSI_ , DAYSQL_TSI_DAY

mysql> **SELECT TIMESTAMPADD(MINUTE,1,'2003-01-02');**

-> '2003-01-02 00:01:00'

mysql> **SELECT TIMESTAMPADD(WEEK,1,'2003-01-02');**

-> '2003-01-09'

- TIMESTAMPDIFF(*interval,datetime_expr1,datetime_expr2*)

*datetime_expr1 datetime_expr2*the *interval* *interval* TIMESTAMPADD()

mysql> **SELECT TIMESTAMPDIFF(MONTH,'2003-02-01','2003-05-01');**

-> 3

mysql> **SELECT TIMESTAMPDIFF(YEAR,'2002-05-01','2001-01-01');**

-> -1

- TIME_FORMAT(*time*,*format*)

DATE_FORMAT(), *format* NULL0

time value23 %H %k 0..23 12

mysql> **SELECT TIME_FORMAT('100:00:00', '%H %k %h %I %l');**

-> '100 100 04 04 4'

- TIME_TO_SEC(*time*)

time

mysql> **SELECT TIME_TO_SEC('22:23:00');**

-> 80580

mysql> **SELECT TIME_TO_SEC('00:39:38');**

-> 2378

- TO_DAYS(*date*)

date, (0)

mysql> **SELECT TO_DAYS(950501);**

-> 728779

mysql> **SELECT TO_DAYS('1997-10-07');**

-> 729669

TO_DAYS() (1582) 12.6“MySQL”

MySQL11.3“” '1997-10-07' '97-10-07' :

mysql> **SELECT TO_DAYS('1997-10-07'), TO_DAYS('97-10-07');**

-> 729669, 729669

1582 ( ), 12.6“MySQL”

- UNIX_TIMESTAMP(), UNIX_TIMESTAMP(*date*)

Unix timestamp ('1970-01-01 00:00:00' GMT) *date* UNIX_TIMESTAMP()'1970-01-01 00:00:00' GMT *date* DATE DATETIME TIMESTAMPYYMMDD YYYMMDD

mysql> **SELECT UNIX_TIMESTAMP();**

-> 882226357

mysql> **SELECT UNIX_TIMESTAMP('1997-10-04 22:23:00');**

-> 875996580

UNIX_TIMESTAMP TIMESTAMP, “ string-to-Unix-timestamp” UNIX_TIMESTAMP() 0, (1970 2037 0112, 01 31)

UNIX_TIMESTAMP() , 12.8“Cast”

- UTC_DATE, UTC_DATE()

UTC 'YYYY-MM-DD' YYYYMMDD

mysql> **SELECT UTC_DATE(), UTC_DATE() + 0;**

-> '2003-08-14', 20030814

- UTC_TIME, UTC_TIME()

UTC 'HH:MM:SS' HHMMSS

mysql> **SELECT UTC_TIME(), UTC_TIME() + 0;**

-> '18:07:53', 180753

- UTC_TIMESTAMP, UTC_TIMESTAMP()

UTC 'YYYY-MM-DD HH:MM:SS' YYYYMMDDHHMMSS

mysql> **SELECT UTC_TIMESTAMP(), UTC_TIMESTAMP() + 0;**

-> '2003-08-14 18:08:04', 20030814180804

- WEEK(*date*[,*mode*])

date WEEK()
“”

mode d

Mode			**Week 1** ...
0		0-53	
1		0-53	3
2		1-53	
3		1-53	3
4		0-53	3
5		0-53	

6		1-53	3
7		1-53	

mysql> **SELECT WEEK('1998-02-20');**

-> 7

mysql> **SELECT WEEK('1998-02-20',0);**

-> 7

mysql> **SELECT WEEK('1998-02-20',1);**

-> 8

mysql> **SELECT WEEK('1998-12-31',1);**

-> 53

2367*mode* MySQL 0

mysql> **SELECT YEAR('2000-01-01'), WEEK('2000-01-01',0);**

-> 2000, 0

MySQL WEEK() 52 199952 0“” WEEK()

025 7 *mode*

mysql> **SELECT WEEK('2000-01-01',2);**

-> 52

YEARWEEK():

mysql> **SELECT YEARWEEK('2000-01-01');**

-> 199952

mysql> **SELECT MID(YEARWEEK('2000-01-01'),5,2);**

-> '52'

- WEEKDAY(*date*)

date (0 = , 1 = , ... 6 =) weekday index for

mysql> **SELECT WEEKDAY('1998-02-03 22:23:00');**

-> 1

mysql> **SELECT WEEKDAY('1997-11-05');**

-> 2

- WEEKOFYEAR(*date*)

153 WEEK(*date*,3)

mysql> **SELECT WEEKOFYEAR('1998-02-20');**

-> 8

- YEAR(*date*)

date ,10009999

mysql> **SELECT YEAR('98-02-03');**

-> 1998

- YEARWEEK(*date*), YEARWEEK(*date*,*start*)

start *start* WEEK()

mysql> **SELECT YEARWEEK('1987-01-01');**

-> 198653

WEEK()0 1(0) w WEEK()

- -> '1997-10-07'

12.6. MySQL

MySQL *proleptic*

10 158210 :

1	2	3	4	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

104 1015 ,

proleptic,
DATETIME , 1752,92 914 191
“ 10” 11

12.7.

12.7.1.
12.7.2.
12.7.3.
12.7.4.
12.7.5. MySQL

- MATCH (col1,col2,...) AGAINST (expr [IN BOOLEAN MODE | WITH QUERY EXPANSION])

MySQL MySQLFULLTEXT FULLTEXT MyISAM CHAR VARCHARTEXTCREATE TABLE ALTER TABLE CREATE INDEX FULLTEXT

12.7.4“” .

MATCH()

```
mysql> CREATE TABLE articles (
    ->   id INT UNSIGNED AUTO_INCREMENT NOT NULL PRIMARY KEY,
    ->   title VARCHAR(200),
    ->   body TEXT,
    ->   FULLTEXT (title,body)
    -> );
Query OK, 0 rows affected (0.00 sec)


mysql> INSERT INTO articles (title,body) VALUES
    -> ('MySQL Tutorial','DBMS stands for DataBase ...'),
    -> ('How To Use MySQL Well','After you went through a ...'),
    -> ('Optimizing MySQL','In this tutorial we will show ...'),
    -> ('1001 MySQL Tricks','1. Never run mysqld as root. 2. ...'),
    -> ('MySQL vs. YourSQL','In the following database comparison ..
```

```
    -> ('MySQL Security','When configured properly, MySQL ...');
Query OK, 6 rows affected (0.00 sec)
Records: 6  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM articles
    -> WHERE MATCH (title,body) AGAINST ('database');
+----+-------------------+----------------------------------------
| id | title             | body
+----+-------------------+----------------------------------------
|  5 | MySQL vs. YourSQL | In the following database comparison ...
|  1 | MySQL Tutorial    | DBMS stands for DataBase ...
+----+-------------------+----------------------------------------
2 rows in set (0.00 sec)
```

MATCH() 112FULLTEXT AGAINST() , MATCH() , MATCH()

, , latin1latin1_bin

MATCH() WHERE

MATCH() FULLTEXT MATCH()()FU
FULLTEXT

12.7.1“”

MATCH() SELE

```
mysql> SELECT id, MATCH (title,body) AGAINST ('Tutorial')
    -> FROM articles;
+----+----------------------------------------+
| id | MATCH (title,body) AGAINST ('Tutorial') |
```

```
+----+----------------------------------------+
|  1 |                  0.65545833110809 |
|  2 |                                   0 |
|  3 |                  0.66266459226608 |
|  4 |                                   0 |
|  5 |                                   0 |
|  6 |                                   0 |
+----+----------------------------------------+
6 rows in set (0.00 sec)
```

```
mysql> SELECT id, body, MATCH (title,body) AGAINST
    -> ('Security implications of running MySQL as root') AS score
    -> FROM articles WHERE MATCH (title,body) AGAINST
    -> ('Security implications of running MySQL as root');
+----+-------------------------------------+-----------------+
| id | body                                | score           |
+----+-------------------------------------+-----------------+
|  4 | 1. Never run mysqld as root. 2. ... | 1.5219271183014 |
|  6 | When configured properly, MySQL ... | 1.3114095926285 |
+----+-------------------------------------+-----------------+
2 rows in set (0.00 sec)
```

2(0.00)

MySQL FULLTEXT ( ) ('), aaa'bbb aaa''bbb 'aaa'bbb' aaa'bbb

FULLTEXT '' () , () . ( ) ( ), FULLTEXT

- 4
- “ the” “ some”

12.7.3“” 12.7.5“MySQL”

(,)

mysql> **SELECT * FROM articles**

-> **WHERE MATCH (title,body) AGAINST ('MySQL');**

(0.00)

“ MySQL” 50% ,

,

50%

12.7.1.

IN BOOLEAN MODE MySQL

```
mysql> SELECT * FROM articles WHERE MATCH (title,body)
    -> AGAINST ('+MySQL -YourSQL' IN BOOLEAN MODE);
+----+-----------------------+-------------------------------------+
| id | title                 | body                                |
+----+-----------------------+-------------------------------------+
|  1 | MySQL Tutorial        | DBMS stands for DataBase ...        |
|  2 | How To Use MySQL Well | After you went through a ...        |
|  3 | Optimizing MySQL      | In this tutorial we will show ...   |
|  4 | 1001 MySQL Tricks     | 1. Never run mysqld as root. 2. ... |
```

```
|  6 | MySQL Security        | When configured properly, MySQL ... |
+----+-----------------------+-------------------------------------+
```

“ MySQL” “ YourSQL”

- 50% .
- “
- FULLTEXT
-
-

- +

- -

- ()

(+ –) MATCH() ... AGAINST()IN BOOLEAN MODE

- > <

> <

- ( )

- ~

“ noise”

- *

- "

(‘"’) FULLTEXT "test phrase" "test, phrase"

- 'apple banana'

- '+apple +juice'

- '+apple macintosh'

“ apple”“ macintosh”

- '+apple -macintosh'

“ apple” “ macintosh”

- '+apple +(>turnover <strudel)'

“ apple”“ turnover” “ apple” “ strudel” (), “ apple turnover” “ apple strudel”

- 'apple*'

“ apple”“ apples”“ applesauce”“ applet”

- '"some words"'

“ some words” (,“ some words of wisdom” “some noise words”) ‘ "’

12.7.2.

(“”), , “ database” “ MySQL”“ Oracle”“ DB2” and “RDBMS” “ databases”

WITH QUERY EXPANSION() , “ databases” “ MySQL” “ database”

```
mysql> SELECT * FROM articles
    -> WHERE MATCH (title,body) AGAINST ('database');
+----+-------------------+----------------------------------------
| id | title             | body
+----+-------------------+----------------------------------------
|  5 | MySQL vs. YourSQL | In the following database comparison ...
|  1 | MySQL Tutorial    | DBMS stands for DataBase ...
+----+-------------------+----------------------------------------
2 rows in set (0.00 sec)

mysql> SELECT * FROM articles
    -> WHERE MATCH (title,body)
    -> AGAINST ('database' WITH QUERY EXPANSION);
+----+-------------------+----------------------------------------
| id | title             | body
+----+-------------------+----------------------------------------
|  1 | MySQL Tutorial    | DBMS stands for DataBase ...
|  5 | MySQL vs. YourSQL | In the following database comparison ...
|  3 | Optimizing MySQL  | In this tutorial we will show ...
+----+-------------------+----------------------------------------
3 rows in set (0.00 sec)
```

Georges Simenon Maigret, “ Maigret”“ Megre and the reluctant witnesses” “ Maigret and the Reluctant Witnesses” “ Maigret”

12.7.3.

a's	able	about	above	according
accordingly	across	actually	after	afterwards
again	against	ain't	all	allow
allows	almost	alone	along	already
also	although	always	am	among
amongst	an	and	another	any
anybody	anyhow	anyone	anything	anyway
anyways	anywhere	apart	appear	appreciate
appropriate	are	aren't	around	as
aside	ask	asking	associated	at
available	away	awfully	be	became
because	become	becomes	becoming	been
before	beforehand	behind	being	believe
below	beside	besides	best	better
between	beyond	both	brief	but
by	c'mon	c's	came	can
can't	cannot	cant	cause	causes
certain	certainly	changes	clearly	co
com	come	comes	concerning	consequently
consider	considering	contain	containing	contains
corresponding	could	couldn't	course	currently
definitely	described	despite	did	didn't
different	do	does	doesn't	doing
don't	done	down	downwards	during
each	edu	eg	eight	either
else	elsewhere	enough	entirely	especially

et	etc	even	ever	every
everybody	everyone	everything	everywhere	ex
exactly	example	except	far	few
fifth	first	five	followed	following
follows	for	former	formerly	forth
four	from	further	furthermore	get
gets	getting	given	gives	go
goes	going	gone	got	gotten
greetings	had	hadn't	happens	hardly
has	hasn't	have	haven't	having
he	he's	hello	help	hence
her	here	here's	hereafter	hereby
herein	hereupon	hers	herself	hi
him	himself	his	hither	hopefully
how	howbeit	however	i'd	i'll
i'm	i've	ie	if	ignored
immediate	in	inasmuch	inc	indeed
indicate	indicated	indicates	inner	insofar
instead	into	inward	is	isn't
it	it'd	it'll	it's	its
itself	just	keep	keeps	kept
know	knows	known	last	lately
later	latter	latterly	least	less
lest	let	let's	like	liked
likely	little	look	looking	looks
ltd	mainly	many	may	maybe
me	mean	meanwhile	merely	might
more	moreover	most	mostly	much
must	my	myself	name	namely
nd	near	nearly	necessary	need
needs	neither	never	nevertheless	new

next	nine	no	nobody	non
none	noone	nor	normally	not
nothing	novel	now	nowhere	obviously
of	off	often	oh	ok
okay	old	on	once	one
ones	only	onto	or	other
others	otherwise	ought	our	ours
ourselves	out	outside	over	overall
own	particular	particularly	per	perhaps
placed	please	plus	possible	presumably
probably	provides	que	quite	qv
rather	rd	re	really	reasonably
regarding	regardless	regards	relatively	respectively
right	said	same	saw	say
saying	says	second	secondly	see
seeing	seem	seemed	seeming	seems
seen	self	selves	sensible	sent
serious	seriously	seven	several	shall
she	should	shouldn't	since	six
so	some	somebody	somehow	someone
something	sometime	sometimes	somewhat	somewhere
soon	sorry	specified	specify	specifying
still	sub	such	sup	sure
t's	take	taken	tell	tends
th	than	thank	thanks	thanx
that	that's	thats	the	their
theirs	them	themselves	then	thence
there	there's	thereafter	thereby	therefore
therein	theres	thereupon	these	they
they'd	they'll	they're	they've	think
third	this	thorough	thoroughly	those

though	three	through	throughout	thru
thus	to	together	too	took
toward	towards	tried	tries	truly
try	trying	twice	two	un
under	unfortunately	unless	unlikely	until
unto	up	upon	us	use
used	useful	uses	using	usually
value	various	very	via	viz
vs	want	wants	was	wasn't
way	we	we'd	we'll	we're
we've	welcome	well	went	were
weren't	what	what's	whatever	when
whence	whenever	where	where's	whereafter
whereas	whereby	wherein	whereupon	wherever
whether	which	while	whither	who
who's	whoever	whole	whom	whose
why	will	willing	wish	with
within	without	won't	wonder	would
would	wouldn't	yes	yet	you
you'd	you'll	you're	you've	your
yours	yourself	yourselves	zero	

12.7.4.

- MyISAM
- Unicode; utf8 , ucs2
- FULLTEXT 12.7“”
- FULLTEXT
- MATCH() FULLTEXT,MATCH()IN BOOLEAN MODE
- AGAINST()

12.7.5. MySQL

MySQL MySQL [2.8“MySQL”]

FULLTEXT

- ft_min_word_len and ft_max_word_len ([5.3.3“”].) MySQL FULLTEXT

· [mysqld]

· ft_min_word_len=3

FULLTEXT **myisamchk**

- ft_stopword_file ([5.3.3“”] , newline spacecomma (_) (')

- 50% myisam/ftdefs.h

· #define GWS_IN_USE GWS_PROB

#define GWS_IN_USE GWS_FREQ

MySQL By MySQLMATCH() IN BOOLEAN MODE 50%

- ft_boolean_syntax

(ft_min_word_len ft_max_word_lenft_stopword_file), FULLTEXT QUICK

mysql> **REPAIR TABLE *tbl_name* QUICK;**

myisamchk ( ), FULLTEXT

MyISAM

ft_max_word_lenft_stopword_file 3, **myisamchk**

shell> **myisamchk --recover --ft_min_word_len=3 *tbl_name*.MYI**

myisamchk [mysq

[mysqld]

ft_min_word_len=3

[myisamchk]

ft_min_word_len=3

REPAIR TABLE ANALYZE TABLEOPTIMIZE TABLEALTER TABLE **myisamchk**

12.8. Cast

- BINARY

BINARY BINARY BLOBBINARY

mysql> **SELECT 'a' = 'A';**

-> 1

mysql> **SELECT BINARY 'a' = 'A';**

-> 0

mysql> **SELECT 'a' = 'a ';**

-> 1

mysql> **SELECT BINARY 'a' = 'a ';**

-> 0

BINARY

BINARY *str* CAST(*str* AS BINARY)

BINARY, MySQL

BLOB CONVERT() LIKE

SELECT 'A' LIKE CONVERT(*blob_col* USING latin1) FROM *tbl_name*;

, latin1

CONVERT()

- CAST(*expr* AS *type*), CONVERT(*expr*,*type*) , CONVERT(*expr* USING *transcoding_name*)

CAST() CONVERT()

- BINARY[(*N*)]
- CHAR[(*N*)]
- DATE
- DATETIME
- DECIMAL
- SIGNED [INTEGER]
- TIME
- UNSIGNED [INTEGER]

BINARY BINARY

N BINARY[*N*] cast *N* CHAR[*N*] cast *N*

CAST() and CONVERT(... USING ...) SQL CONVERT()USING ofis ODBC

USINGCONVERT() MySQL, 'abc'utf8

SELECT CONVERT('abc' USING utf8);

CREATE ... SELECT cast

CREATE TABLE new_table SELECT CAST('2000-01-01' AS DATE);

ENUM ENUM CHAR

SELECT *enum_col* FROM *tbl_name* ORDER BY CAST(*enum_col* AS CHAR);

CAST(*str* AS BINARY)BINARY *str* CAST(*expr* AS CHAR)

CONCAT('Date: ',CAST(NOW() AS DATE)) CAST()

CAST() LEFT() EXTRACT() 12.5“”

,

mysql> **SELECT 1+'1';**

-> 2

BINARY

mysql> **SELECT CONCAT('hello you ',2);**

-> 'hello you 2'

MySQL 64 (+) SIGNED UNSIGNED cast 6

mysql> **SELECT CAST(1-2 AS UNSIGNED)**

-> 18446744073709551615

mysql> **SELECT CAST(CAST(1-2 AS UNSIGNED) AS SIGNED);**

-> -1

(,

mysql> **SELECT CAST(1 AS UNSIGNED) - 2.0;**

-> -1.0

12.9.

12.9.1.
12.9.2.
12.9.3.
12.9.4.

12.9.1.

MySQL BIGINT (64) 64

- |

Bitwise OR:

mysql> **SELECT 29 | 15;**

-> 31

64

- &

Bitwise AND:

mysql> **SELECT 29 & 15;**

-> 13

64

- ^

Bitwise XOR:

mysql> **SELECT 1 ^ 1;**

-> 0

mysql> **SELECT 1 ^ 0;**

-> 1

mysql> **SELECT 11 ^ 3;**

-> 8

64

- <<

longlong (BIGINT)

mysql> **SELECT 1 << 2;**

-> 4

64

- >>

longlong (BIGINT)

mysql> **SELECT 4 >> 2;**

-> 1

64

- ~

mysql> **SELECT 5 & ~1;**

-> 4

64

- BIT_COUNT(*N*)

N

mysql> **SELECT BIT_COUNT(29);**

-> 4

12.9.2.

- AES_ENCRYPT(*str*,*key_str*) , AES_DECRYPT(*crypt_str*,*key_str*)

AES ( ) , “ Rijndael” 128 256 128

NULL,NULL

AES 16 * (trunc(*string_length* / 16) + 1)

AES_DECRYPT() NULL AES_DECRYPT() NULL ( )

AES

INSERT INTO t VALUES (1,AES_ENCRYPT('text','password'));

AES_ENCRYPT()AES_DECRYPT() MySQL

- DECODE(*crypt_str*,*pass_str*)

pass_str *crypt_str* *crypt_str* ENCODE()

- ENCODE(*str*,*pass_str*)

pass_str *str* DECODE()

str BLOB

- DES_DECRYPT(*crypt_str*[,*key_str*])

DES_ENCRYPT() NULL

MySQLSSL 5.8.7“”.

key_str DES_DECRYPT()
key-file

key_str

crypt_str MySQL *crypt_str*

- DES_ENCRYPT(*str*[,(*key_num*|*key_str*)])

Triple-DES NULL

MySQL SSL [5.8.7“”](#).

DES_ENCRYPT()

	DES
key_num	DES (0-9)
key_str	*str*

--des-key-file

CHAR(128 | key_num)

128 *key_num* 127

new_len = *orig_len* + (8-(*orig_len* % 8))+1

DES

key_num des_key_str

key_num 00 *des_key_str*

FLUSH DES_KEY_FILE MySQL RELOAD

mysql> **SELECT customer_address FROM customer_table**

> WHERE crypted_credit_card = DES_ENCRYPT('credit_card_number');

- ENCRYPT(*str*[,*salt*])

Unix crypt() *str* *salt* 2 *salt*

mysql> **SELECT ENCRYPT('hello');**

-> 'VxuFAJXVARROc'

ENCRYPT()s*tr* crypt()

crypt()(Windows), ENCRYPT() NULL MD5() SHA1() ,

- MD5(*str*)

MD5 128 32, NULL NULL

mysql> **SELECT MD5('testing');**

-> 'ae2b1fca515949e5d54fb22b8ed95575'

"RSA Data Security, Inc. MD5 Message-Digest Algorithm."

12.8“Cast” BINARY

- OLD_PASSWORD(*str*)

PASSWORD() OLD_PASSWORD() MySQLOLD_PASSWORD()
PASSWORD()(4.1)4.1 5.1 MySQL 5.7.9“MySQL 4.1”

- PASSWORD(*str*)

str NULL NULLPasswordMySQL

mysql> **SELECT PASSWORD('badpwd');**

-> '7f84554057dd964b'

PASSWORD() ( )

PASSWORD() Unix ENCRYPT()

PASSWORD()MySQL MD5()SHA1() RFC 2195

- SHA1(*str*) SHA(*str*)

SHA1 160 RFC 3174 ( ) 40 NULL NULL

mysql> **SELECT SHA1('abc');**

-> 'a9993e364706816aba3e25717850c26c9cd0d89d'

SHA1() MD5() SHA() SHA1()

12.9.3.

- BENCHMARK(*count*,*expr*)

BENCHMARK() *count* *expr* MySQL 0 **mysql**,

```
mysql> SELECT BENCHMARK(1000000,ENCODE('hello','goodbye'));
+----------------------------------------------+
| BENCHMARK(1000000,ENCODE('hello','goodbye')) |
+----------------------------------------------+
|                                            0 |
+----------------------------------------------+
1 row in set (4.74 sec)
```

CPU BENCHMARK()

· CHARSET(*str*)

```
mysql> SELECT CHARSET('abc');
        -> 'latin1'
mysql> SELECT CHARSET(CONVERT('abc' USING utf8));
        -> 'utf8'
mysql> SELECT CHARSET(USER());
        -> 'utf8'
```

· COERCIBILITY(*str*)

```
mysql> SELECT COERCIBILITY('abc' COLLATE latin1_swedish_ci);
        -> 0
mysql> SELECT COERCIBILITY(USER());
        -> 3
mysql> SELECT COERCIBILITY('abc');
        -> 4
```

0	COLLATE
1	
2	

3	USER()
4	
5	NULLNULL

- COLLATION(*str*)

mysql> **SELECT COLLATION('abc');**

-> 'latin1_swedish_ci'

mysql> **SELECT COLLATION(_utf8'abc');**

-> 'utf8_general_ci'

- CONNECTION_ID()

ID (ID) ID

mysql> **SELECT CONNECTION_ID();**

-> 23786

- CURRENT_USER, CURRENT_USER()

MySQL

CURRENT_USER()USER()

mysql> **SELECT USER();**

-> 'davida@localhost'

mysql> **SELECT * FROM mysql.user;**

ERROR 1044: Access denied for user "@'localhost' to

database 'mysql'

mysql> **SELECT CURRENT_USER();**

-> '@localhost'

davida (USER()), (CURRENT_USER()) One

CURRENT_USER() utf8

- DATABASE()

utf8 ()

mysql> **SELECT DATABASE();**

-> 'test'

, DATABASE() NULL

- FOUND_ROWS()

A SELECT LIMIT LIMIT , SELECT SQL_CALC_FOUND_ROWS FOUND_ROWS()

mysql> **SELECT SQL_CALC_FOUND_ROWS * FROM *tbl_name***

-> **WHERE id > 100 LIMIT 10;**

mysql> **SELECT FOUND_ROWS();**

SELECT LIMIT SELECT (SELECT SQL_CALC_FOUND_ROWS , LIMIT FOUND_ROWS()

FOUND_ROWS() SELECT SQL_CALC_FOUND_ROWS

mysql> **SELECT SQL_CALC_FOUND_ROWS * FROM ... ;**

mysql> **SET @rows = FOUND_ROWS();**

SELECT SQL_CALC_FOUND_ROWS, MySQL

SQL_CALC_FOUND_ROWS FOUND_ROWS()
FOUND_ROWS()

SQL_CALC_FOUND_ROWS FOUND_ROWS() UNION SELECT
UNION LIMIT UNION SELECT UNION

SQL_CALC_FOUND_ROWS UNIONLIMIT
SQL_CALC_FOUND_ROWS UNION

- SQL_CALC_FOUND_ROWS UNION SELECT
- FOUND_ROWS() UNION ALL ALLUNION
  FOUND_ROWS()
- UNION LIMIT SQL_CALC_FOUND_ROWS UNION

- LAST_INSERT_ID() LAST_INSERT_ID(*expr*)

INSERT UPDATE AUTO_INCREMENT

mysql> **SELECT LAST_INSERT_ID();**

-> 195

ID AUTO_INCREMENT AUTO_INCREMENT
AUTO_INCREMENT ID

“ magic” AUTO_INCREMENT LAST_INSERT_ID() (, NU

: INSERT LAST_INSERT_ID() INSERT

```
mysql> USE test;
Database changed
mysql> CREATE TABLE t (
    ->   id INT AUTO_INCREMENT NOT NULL PRIMARY KEY,
    ->   name VARCHAR(10) NOT NULL
    -> );
Query OK, 0 rows affected (0.09 sec)

mysql> INSERT INTO t VALUES (NULL, 'Bob');
Query OK, 1 row affected (0.01 sec)

mysql> SELECT * FROM t;
+----+------+
| id | name |
+----+------+
|  1 | Bob  |
+----+------+
1 row in set (0.01 sec)

mysql> SELECT LAST_INSERT_ID();
+------------------+
| LAST_INSERT_ID() |
+------------------+
|                1 |
+------------------+
1 row in set (0.00 sec)
```

```
mysql> INSERT INTO t VALUES
    -> (NULL, 'Mary'), (NULL, 'Jane'), (NULL, 'Lisa');
Query OK, 3 rows affected (0.00 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM t;
+----+------+
| id | name |
+----+------+
|  1 | Bob  |
|  2 | Mary |
|  3 | Jane |
|  4 | Lisa |
+----+------+
4 rows in set (0.01 sec)

mysql> SELECT LAST_INSERT_ID();
+------------------+
| LAST_INSERT_ID() |
+------------------+
|                2 |
+------------------+
1 row in set (0.00 sec)
```

3 t, ID 2, LAST_INSERT_ID()

INSERT IGNORE AUTO_INCREMENT LAST_INSERT_

LAST_INSERT_ID()*expr* LAST_INSERT_ID()

-

o mysql> **CREATE TABLE sequence (id INT NOT NULL);**

o mysql> **INSERT INTO sequence VALUES (0);**

-

o mysql> **UPDATE sequence SET id=LAST_INSERT_ID(id+1);**

o mysql> **SELECT LAST_INSERT_ID();**

UPDATE LAST_INSERT_ID() 25.2.3.36“mysql_insert_id()” .

LAST_INSERT_ID() ID UPDATESELECT(mysql_

mysql_insert_id() INSERT UPDATE LAST_INSERT_ID(*expr*)

- ROW_COUNT()

ROW_COUNT() **mysql**

mysql> **INSERT INTO t VALUES(1),(2),(3);**

, 3 (0.00)

: 3 : 0 : 0

mysql> **SELECT ROW_COUNT();**

+-------------+

| ROW_COUNT() |

+-------------+

| 3 |

+-------------+

1 (0.00)

mysql> **DELETE FROM t WHERE i IN(1,2);**

, 2 (0.00)

mysql> **SELECT ROW_COUNT();**

+-------------+

| ROW_COUNT() |

+-------------+

| 2 |

+-------------+

1 (0.00)

- SCHEMA()

DATABASE()

- SESSION_USER()

SESSION_USER() USER()

- SYSTEM_USER()

SYSTEM_USER() USER()

- USER()

MySQL/

mysql> **SELECT USER();**

-> 'davida@localhost'

, CURRENT_USER()

mysql> **SELECT SUBSTRING_INDEX(USER(),'@',1);**

-> 'davida'

USER() utf8 '@'

mysql> **SELECT SUBSTRING_INDEX(USER(),_utf8'@',1);**

-> 'davida'

- VERSION()

MySQL utf8

mysql> **SELECT VERSION();**

-> '5.1.2-alpha-standard'

-log

12.9.4.

- DEFAULT(*col_name*)

mysql> **UPDATE t SET i = DEFAULT(i)+1 WHERE id < 100;**

- FORMAT(*X*,*D*)

X '#,###,###.##', *D* *D* 0,

mysql> **SELECT FORMAT(12332.123456, 4);**

-> '12,332.1235'

mysql> **SELECT FORMAT(12332.1,4);**

-> '12,332.1000'

mysql> **SELECT FORMAT(12332.2,0);**

-> '12,332'

- GET_LOCK(*str*,*timeout*)

str *timeout* 10 (,),NULL (**mysq**
RELEASE_LOCK()()

app_name.str

mysql> **SELECT GET_LOCK('lock1',10);**

-> 1

mysql> **SELECT IS_FREE_LOCK('lock2');**

-> 1

mysql> **SELECT GET_LOCK('lock2',10);**

-> 1

mysql> **SELECT RELEASE_LOCK('lock2');**

-> 1

mysql> **SELECT RELEASE_LOCK('lock1');**

-> NULL

RELEASE_LOCK() NULL 'lock1' GET_LOCK()

- INET_ATON(*expr*)

4

mysql> **SELECT INET_ATON('209.207.224.40');**

-> 3520061480

$209\times256^3 + 207\times256^2 + 22$

INET_ATON() IP

mysql> **SELECT INET_ATON('127.0.0.1'), INET_ATON('127.1');**

-> 2130706433, 2130706433

INET_ATON() INT UNSIGNED () INT, 127IP INET_ATON('127.255.255.255'))11.2“”

- INET_NTOA(*expr*)

(4 8),

mysql> **SELECT INET_NTOA(3520061480);**

-> '209.207.224.40'

- IS_FREE_LOCK(*str*)

str (,) 1 (), 0 NULL ( )

- IS_USED_LOCK(*str*)

str(,) NULL

- MASTER_POS_WAIT(*log_name*,*log_pos*[,*timeout*])

NULL

MASTER_POS_WAIT() 0

- NAME_CONST(*name*,*value*)

, NAME_CONST()

mysql> **SELECT NAME_CONST('myname', 14);**

+--------+

| myname |

+--------+

| 14 |

+--------+

MySQL 5.0.12

- RELEASE_LOCK(*str*)

GET_LOCK() *str* 1 0 ( ), NULLGET_LOCK()

DO RELEASE_LOCK() 13.2.2“DO”

- SLEEP(*duration*)

() *duration* 0 SLEEP() , 1 duration

- UUID()

(UUID) DCE 1.1: (A) CAE () 1
http://www.opengroup.org/public/pubs/catalog/c706.htm).

UUID 2UUID() 2

UUID 5128 aaaaaaaa-bbbb-cccc-dddd-eeeeeeeeeeee

  - 3
  - 4 (,)

- 5 IEEE 802 (,

, MAC FreeBSD Linux , MySQL 48

mysql> **SELECT UUID();**

-> '6ccd780c-baba-1026-9564-0040f4311e29'

UUID()

- VALUES(*col_name*)

INSERT … ON DUPLICATE KEY UPDATE … UPDATE VALUES(*col_name*) INSERT UPDATE VALUES(*col_name*) *col_name* , VALUES()INSERT ... UPDATE "INSERT" .

mysql> **INSERT INTO table (a,b,c) VALUES (1,2,3),(4,5,6)**

-> **ON DUPLICATE KEY UPDATE c=VALUES(a)+VALUES(b);**

12.10. GROUP BY

12.10.1. GROUP BY
12.10.2. GROUP BY
12.10.3. GROUP BY

12.10.1. GROUP BY

group () group NULL

ROUP BY group

- AVG([DISTINCT] *expr*)

expr DISTINCT *expr*

AVG() NULL

mysql> **SELECT student_name, AVG(test_score)**

-> **FROM student**

-> **GROUP BY student_name;**

- BIT_AND(*expr*)

expr bitwise AND 64(BIGINT)

18446744073709551615 (BIGINT 1

- BIT_OR(*expr*)

expr bitwise OR64(BIGINT)

0

- BIT_XOR(*expr*)

expr bitwise XOR64(BIGINT)

0

- COUNT(*expr*)

SELECTNULL

COUNT() 0

mysql> **SELECT student.student_name,COUNT(*)**

-> **FROM student,course**

-> **WHERE student.student_id=course.student_id**

-> **GROUP BY student_name;**

COUNT(*) NULL

SELECT WHERE COUNT(*)

mysql> **SELECT COUNT(*) FROM student;**

MyISAM,

- COUNT(DISTINCT *expr*,[*expr*...])

NULL

COUNT(DISTINCT) 0

mysql> **SELECT COUNT(DISTINCT results) FROM student;**

MySQL, NULL SQL,COUNT(DISTINCT ...)

- GROUP_CONCAT(*expr*)

NULL

GROUP_CONCAT([DISTINCT] *expr* [,*expr* ...]

[ORDER BY {*unsigned_integer* | *col_name* | *expr*}

[ASC | DESC] [,*col_name* ...]]

[SEPARATOR *str_val*])

mysql> **SELECT student_name,**

-> **GROUP_CONCAT(test_score)**

-> **FROM student**

-> **GROUP BY student_name;**

Or:

mysql> **SELECT student_name,**

-> **GROUP_CONCAT(DISTINCT test_score**

-> **ORDER BY test_score DESC SEPARATOR ' ')**

-> **FROM student**

-> **GROUP BY student_name;**

MySQL, DISTINCT ORDER BY DESC () ORDER BY ASC SEPARATOR (‘,’)SEPARATOR "

group_concat_max_len val

SET [SESSION | GLOBAL] group_concat_max_len = val;

- MIN([DISTINCT] *expr*), MAX([DISTINCT] *expr*)

expr MIN() MAX()
DISTINCT

MIN()MAX() NULL

mysql> **SELECT student_name, MIN(test_score), MAX(test_score)**

-> **FROM student**

-> **GROUP BY student_name;**

MIN() MAX() MySQL ENUM SET ORDER BY MySQL

- STD(*expr*) STDDEV(*expr*)

expr SQL STDDEV() Oracle SQL STDDEV_POP()

NULL

- STDDEV_POP(*expr*)

expr (VAR_POP()) STD() STDDEV(), SQL

STDDEV_POP() NULL

- STDDEV_SAMP(*expr*)

expr (VAR_SAMP())

STDDEV_SAMP() NULL

- SUM([DISTINCT] *expr*)

expr SUM() NULLDISTINCT MySQL 5.1 *expr*

SUM() NULL

- VAR_POP(*expr*)

expr VARIANCE(), SQL

VAR_POP()NULL

- VAR_SAMP(*expr*)

expr 1

VAR_SAMP()NULL

- VARIANCE(*expr*)

expr SQL SQL VAR_POP()

VARIANCE()NULL

12.10.2. GROUP BY

GROUP BY WITH ROLLUP () ROLLUP OLAP ()

sales

CREATE TABLE sales

(

year INT NOT NULL,

country VARCHAR(20) NOT NULL,

product VARCHAR(32) NOT NULL,

profit INT

);

GROUP BY

mysql> **SELECT year, SUM(profit) FROM sales GROUP BY year;**

+------+-------------+

| year | SUM(profit) |

+------+-------------+

| 2000 | 4525 |

| 2001 | 3010 |

+------+-------------+

ROLLUP, WITH ROLLUPGROUP BY

mysql> **SELECT year, SUM(profit) FROM sales GROUP BY year WITH ROLLUP;**

+------+-------------+

| year | SUM(profit) |

+------+-------------+

| 2000 | 4525 |

| 2001 | 3010 |

| NULL | 7535 |

+------+-------------+

NULL

GROUP BY ROLLUP

ROLLUP sales

mysql> **SELECT year, country, product, SUM(profit)**

 -> **FROM sales**

 -> **GROUP BY year, country, product;**

+------+---------+------------+-------------+

| year | country | product | SUM(profit) |

+------+---------+------------+-------------+

| 2000 | Finland | Computer | 1500 |

| 2000 | Finland | Phone | 100 |

| 2000 | India | Calculator | 150 |

| 2000 | India | Computer | 1200 |

| 2000 | USA | Calculator | 75 |

| 2000 | USA | Computer | 1500 |

| 2001 | Finland | Phone | 10 |

| 2001 | USA | Calculator | 50 |

| 2001 | USA | Computer | 2700 |

| 2001 | USA | TV | 250 |

+------+---------+------------+-------------+

// ROLLUP

mysql> **SELECT year, country, product, SUM(profit)**

-> **FROM sales**

-> **GROUP BY year, country, product WITH ROLLUP;**

+------+---------+------------+-------------+

| year | country | product | SUM(profit) |

+------+---------+------------+-------------+

| 2000 | Finland | Computer | 1500 |

| 2000 | Finland | Phone | 100 |

| 2000 | Finland | NULL | 1600 |

| 2000 | India | Calculator | 150 |

| 2000 | India | Computer | 1200 |

| 2000 | India | NULL | 1350 |

| 2000 | USA | Calculator | 75 |

| 2000 | USA | Computer | 1500 |

| 2000 | USA | NULL | 1575 |

| 2000 | NULL | NULL | 4525 |

| 2001 | Finland | Phone | 10 |

| 2001 | Finland | NULL | 10 |

| 2001 | USA | Calculator | 50 |

| 2001 | USA | Computer | 2700 |

| 2001 | USA | TV | 250 |

| 2001 | USA | NULL | 3000 |

| 2001 | NULL | NULL | 3010 |

| NULL | NULL | NULL | 7535 |

+------+---------+------------+-------------+

ROLLUP

- ,
-
- , NULL

ROLLUP

MySQLROLLUP

ROLLUP, ORDER BY ROLLUP ORDER BY MySQL GROUP BY GROUP BY ASCDESC (ROLLUP

LIMIT LIMIT ROLLUP, ROLLUP :

```
mysql> SELECT year, country, product, SUM(profit)
    -> FROM sales
    -> GROUP BY year, country, product WITH ROLLUP
    -> LIMIT 5;
+------+---------+------------+-------------+
| year | country | product    | SUM(profit) |
+------+---------+------------+-------------+
| 2000 | Finland | Computer   |        1500 |
| 2000 | Finland | Phone      |         100 |
| 2000 | Finland | NULL       |        1600 |
| 2000 | India   | Calculator |         150 |
| 2000 | India   | Computer   |        1200 |
+------+---------+------------+-------------+
```

ROLLUP LIMIT

NULL

NULL NULL HAVING product IS NULL

, NULL NULL MySQL

12.10.3. GROUP BY

MySQL GROUP BY SELECT GROUP BY “
customer.name

mysql> **SELECT order.custid, customer.name, MAX(payments)**

-> **FROM order,customer**

-> **WHERE order.custid = customer.custid**

-> **GROUP BY order.custid;**

SQL, customer.name GROUP BY MySQL, ANSI

GROUP BY !

,MIN()MAX()

SUBSTR(MIN(CONCAT(RPAD(sort,6,' '),column)),7)

See 3.6.4“”.

SQL, GROUP BY ORDER BY

mysql> **SELECT id,FLOOR(value/100) AS val**

-> **FROM *tbl_name***

-> **GROUP BY id, val ORDER BY val;**

, MySQLGROUP BY ORDER BY

mysql> **SELECT id, FLOOR(value/100) FROM *tbl_name* ORDER BY RAND();**

MySQLMySQL dev.mysql.com

13SQL

13.1.
- 13.1.1. ALTER DATABASE
- 13.1.2. ALTER TABLE
- 13.1.3. CREATE DATABASE
- 13.1.4. CREATE INDEX
- 13.1.5. CREATE TABLE
- 13.1.6. DROP DATABASE
- 13.1.7. DROP INDEX
- 13.1.8. DROP TABLE
- 13.1.9. RENAME TABLE

13.2.
- 13.2.1. DELETE
- 13.2.2. DO
- 13.2.3. HANDLER
- 13.2.4. INSERT
- 13.2.5. LOAD DATA INFILE
- 13.2.6. REPLACE
- 13.2.7. SELECT
- 13.2.8. Subquery
- 13.2.9. TRUNCATE
- 13.2.10. UPDATE

13.3. MySQL
- 13.3.1. DESCRIBE
- 13.3.2. USE

13.4. MySQL
- 13.4.1. START TRANSACTION, COMMITROLLBACK
- 13.4.2.
- 13.4.3.
- 13.4.4. SAVEPOINTROLLBACK TO SAVEPOINT
- 13.4.5. LOCK TABLESUNLOCK TABLES
- 13.4.6. SET TRANSACTION
- 13.4.7. XA

13.5.

13.5.1.
13.5.2.
13.5.3. SET
13.5.4. SHOW
13.5.5.
13.6.
13.6.1. SQL
13.6.2. SQL
13.7. SQL

SQL

13.1.

13.1.1. ALTER DATABASE
13.1.2. ALTER TABLE
13.1.3. CREATE DATABASE
13.1.4. CREATE INDEX
13.1.5. CREATE TABLE
13.1.6. DROP DATABASE
13.1.7. DROP INDEX
13.1.8. DROP TABLE
13.1.9. RENAME TABLE

13.1.1. ALTER DATABASE

```
ALTER {DATABASE | SCHEMA} [db_name]
    alter_specification [, alter_specification] ...

alter_specification:
    [DEFAULT] CHARACTER SET charset_name
  | [DEFAULT] COLLATE collation_name
```

ALTER DATABASE db.opt ALTER DATABASEALTER

CHARACTER SET COLLATE 10

ALTER SCHEMA

13.1.2. ALTER TABLE

```
ALTER [IGNORE] TABLE tbl_name
    alter_specification [, alter_specification] ...

alter_specification:
    ADD [COLUMN] column_definition [FIRST | AFTER col_name ]
  | ADD [COLUMN] (column_definition,...)
  | ADD INDEX [index_name] [index_type] (index_col_name,...)
  | ADD [CONSTRAINT [symbol]]
        PRIMARY KEY [index_type] (index_col_name,...)
  | ADD [CONSTRAINT [symbol]]
        UNIQUE [index_name] [index_type] (index_col_name,...)
  | ADD [FULLTEXT|SPATIAL] [index_name] (index_col_name,...)
```

```
  | ADD [CONSTRAINT [symbol]]
        FOREIGN KEY [index_name] (index_col_name,...)
        [reference_definition]
  | ALTER [COLUMN] col_name {SET DEFAULT literal | DROP DEFAULT}
  | CHANGE [COLUMN] old_col_name column_definition
        [FIRST|AFTER col_name]
  | MODIFY [COLUMN] column_definition [FIRST | AFTER col_name]
  | DROP [COLUMN] col_name
  | DROP PRIMARY KEY
  | DROP INDEX index_name
  | DROP FOREIGN KEY fk_symbol
  | DISABLE KEYS
  | ENABLE KEYS
  | RENAME [TO] new_tbl_name
  | ORDER BY col_name
  | CONVERT TO CHARACTER SET charset_name [COLLATE collation_name]
  | [DEFAULT] CHARACTER SET charset_name [COLLATE collation_name]
  | DISCARD TABLESPACE
  | IMPORT TABLESPACE
  | table_options
  | partition_options
  | ADD PARTITION partition_definition
  | DROP PARTITION partition_names
  | COALESCE PARTITION number
  | REORGANIZE PARTITION partition_names INTO (partition_definitions
  | ANALYZE PARTITION partition_names
  | CHECK PARTITION partition_names
  | OPTIMIZE PARTITION partition_names
  | REBUILD PARTITION partition_names
  | REPAIR PARTITION partition_names
```

ALTER TABLE

CREATE TABLE *table_options* ENGINE, AUTO_INCREMENT AVG_ROW_LENGTH [13.1.5“CREATE TABLE”]

SHOW WARNINGS [13.5.4.22“SHOW WARNINGS”]

ALTER TABLE DESCRIBE *tbl_name* MySQL [13.1.5.1“”] VARCHARCHAR MySQLVARCHAR

ALTER TABLE ALTER TABLE

ALTER TABLERENAME MySQL MySQL MyISAM myisam_sort_buffer_size

· ALTER TABLEALTER, INSERTCREATE

· IGNOREMySQLSQL STRICT IGNOREALTER TABLE IGNORE IGNORE

· ALTER TABLEADD, ALTER, DROPCHANGE MySQLSQL SQL ALTER TABLE

· mysql> **ALTER TABLE t2 DROP COLUMN c, DROP COLUMN d;**

· CHANGE *col_name*, DROP *col_name*DROP INDEXMySQLSQL

· MODIFYOracleALTER TABLE

· COLUMN

· ALTER TABLE *tbl_name* RENAME TO *new_tbl_name* MySQLtable *tbl_name* RENAME TABLE 13.1.9“RENAME TABLE”

· *column_definition*CREATE TABLEADDCHANGE 13.1.5 “CREATE TABLE”

· CHANGE *old_col_name column_definition* INTEGERab

· mysql> **ALTER TABLE t1 CHANGE a b INTEGER;**

CHANGE

```
mysql> ALTER TABLE t1 CHANGE b b BIGINT NOT NULL;
```

MODIFY

```
mysql> ALTER TABLE t1 MODIFY b BIGINT NOT NULL;
```

· CHANGEMODITY MySQL

· CHANGEMODIFY MySQL

· FIRSTAFTER *col_name* CHANGEMODIFYFIRSTAFTER

· AFTER COLUMN NULLNULLNULLMySQL 13.1.5

“CREATE TABLE”

· DROP INDEX MySQLSQL 13.1.7“DROP INDEX”

·

· DROP TABLE

· DROP PRIMAY DEY MySQL DROP PRIMARY KEY UNIQUE MySQL 5.1 MySQL 5.1DROP PRIMARY KEY

UNIQUE KEYPRIMARY KEYUNIQUE KEYPRIMARY KEY MySQL

· ORDER BY MySQL

· MyISAMALTER TABLE REPAIR TABLE ALTER TABLE

ALTER TABLE...DISABLE KEYSMySQLMyISAM ALTER TABLE ... ENABLE KEYS MySQL ALTER TABLE ... DISABLE KEYS INDEX

· InnodbFOREIGN KEYREFERENCES InnodbADD [CONSTRAINT [*symbol*]] FOREIGN KEY (...) REFERENCES ... (...)15.2.6.4“FOREIGN KEY” CHECK 13.1.5“CREATE TABLE” S 1.8.5“MySQLSQL”

· InnoDBALTER TABLE

· `ALTER TABLE yourtablename DROP FOREIGN KEY fk_symbo`

15.2.6.4“FOREIGN KEY”

· ALTER TABLEDATA DIRECTORYINDEX DIRECTORY

· CHAR, VARCHAR, TEXT

· `ALTER TABLE tbl_name CONVERT TO CHARACTER SET chars`

latin1 utf8

```
ALTER TABLE t1 CHANGE c1 c1 BLOB;

ALTER TABLE t1 CHANGE c1 c1 TEXT CHARACTER SET utf8;
```

BLOBBLOB

CONVERT TO CHARACTER SET TEXTBINARY, VARBINARY, BLOB CONVERT TO

```
ALTER TABLE tbl_name DEFAULT CHARACTER SET charset_name;
```

DEFAULT ALTER TABLE...ADD column

ALTER TABLE...DEFAULT CHARACTER SETALTER TABLE...CHARACTER SET

· InnoDB .ibd .ibd

· `ALTER TABLE tbl_name DISCARD TABLESPACE;`

.ibd

.ibd

```
ALTER TABLE tbl_name IMPORT TABLESPACE;
```

15.2.6.6“”

· mysql_info() C API IGNORE 25.2.3.34 “mysql_info()”

· ALTER TABLE

*partition_options*ALTER TABLE *partition_options* PARTITION BY CREATE TABLE*partition_options* 13.1.5“CREATE TABLE” MySQL 5.1 MySQL 5.1

ALTER TABLE ADD PARTITION*partition_definition*CREATE TABLE *partition_definition* 13.1.5“CREATE TABLE”

```
CREATE TABLE t1 (
    id INT,
    year_col INT
)
PARTITION BY RANGE (year_col) (
    PARTITION p0 VALUES LESS THAN (1991),
    PARTITION p1 VALUES LESS THAN (1995),
    PARTITION p2 VALUES LESS THAN (1999)
);
```

p32002

```
ALTER TABLE t1 ADD PARTITION p3 VALUES LESS THAN (2002);
```

ALTER TABLE

DROP PARTITIONRANGELIST HASHKEY COALESCE PARTITION *partition_names* t1p0p1

```
ALTER TABLE DROP PARTITION p0, p1;
```

ADD PARTITIONDROP PARTITIONIF [NOT] EXISTS

COALESCE PARTITIONHASHKEY *number* t2

```
CREATE TABLE t2 (
    name VARCHAR (30),
    started DATE
)
PARTITION BY HASH(YEAR(started))
PARTITIONS (6);
```

t264

```
ALTER TABLE t2 COALESCE PARTITION 2;
```

number　　454　　0123

　　REORGANIZE PARTITION

o　　*partition_names*　　*partition_definition*

o　　*partition_names*　　*partition_definitions*

o　　VALUES LESS THANVALUES IN

　　MySQLp0, p1, p2

ALTER TALBE...REORANIZE PARTITION　　18.3“”

·　　CHECK TABLEREPAIR TABLE　　ANALYZE PARTITION, CHECK PARTITION, OPTIMIZE PARTITION, REBUILD PARTITIONREPAIR PARTITION.*partition_names*
18.3.3“”

ALTER TABLE　　t1t1

```
mysql> CREATE TABLE t1 (a INTEGER,b CHAR(10));
```

t1t2

```
mysql> ALTER TABLE t1 RENAME t2;
```

aINTERGERTINYINT NOT NULL　　bCHAR(10)CHAR(20)bc

```
mysql> ALTER TABLE t2 MODIFY a TINYINT NOT NULL, CHANGE b c CHAR(20)
```

TIMESTAMP　　d

```
mysql> ALTER TABLE t2 ADD d TIMESTAMP;
```

da

```
mysql> ALTER TABLE t2 ADD INDEX (d), ADD INDEX (a);
```

c

```
mysql> ALTER TABLE t2 DROP COLUMN c;
```

AUTO_INCREMENT c

```
mysql> ALTER TABLE t2 ADD c INT UNSIGNED NOT NULL AUTO_INCREMENT,
    ->     ADD PRIMARY KEY (c);
```

c PRIMARY KEY AUTO_INCREMENT cNOT NULLNULL

AUTO_INCREMENT MyISAM ALTER TABLESET INSERT_ID=*value* AUTO_INCREMENT=*value* 13.5.3“SET”

AUTO_INCREMENT InnoDBALTER TALBE...AUTO_INCREMENT=*value*

MyISAM AUTO_INCREMENT AUTO_INCREMENT AUTO_INCREMENT 1

A.7.1“ALTER TABLE”

13.1.3. CREATE DATABASE

```
CREATE {DATABASE | SCHEMA} [IF NOT EXISTS] db_name
    [create_specification [, create_specification] ...]

create_specification:
    [DEFAULT] CHARACTER SET charset_name
  | [DEFAULT] COLLATE collation_name
```

CREATE DATABASE CREATE DATABASECREATE

9.2“”IF NOT EXISTS

create_specification db.opt CHARACTER SET COLLATE 10

MySQL CREATE DATABASE MySQLdb.opt

mkdir SHOW DATABASES

CREATE SCHEMA

mysqladmin 8.5“mysqladminMySQL”

13.1.4. CREATE INDEX

```
CREATE [UNIQUE|FULLTEXT|SPATIAL] INDEX index_name
    [USING index_type]
    ON tbl_name (index_col_name,...)

index_col_name:
    col_name [(length)] [ASC | DESC]
```

CREATE INDEXALTER TABLE 13.1.2“ALTER TABLE”

CREATE TABLE 13.1.5“CREATE TABLE”CREATE INDEX

col1, col2,...

CHARVARCHAR *col_name*(*length*) *length* BLOBTEXT

10

```
CREATE INDEX part_of_name ON customer (name(10));
```

10 INSERT

255 MyISAMInnoDB 1000 CREATE INDEX

MySQL 5.1

· MyISAM, InnoDBBDB NULL

· MyISAM, BDBInnoDB BLOBTEXT

*index_col_name*ASCDESC

*index_type*USING *type_nametype_name* *index_type*

MyISAM	BTREE
InnoDB	BTREE
MEMORY/HEAP	HASH, BTREE

```
CREATE TABLE lookup (id INT) ENGINE = MEMORY;
CREATE INDEX id_index USING BTREE ON lookup (id);
```

TYPE *type_name*USING *type_name* USING TYPE USING TYPE

MySQL 7.4.5“MySQL”

FULLTEXTCHAR, VARCHARTEXT MyISAM 12.7“”

SPATIAL MyISAM 19 *MySQL*

13.1.5. CREATE TABLE

13.1.5.1.

```
CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name
    [(create_definition,...)]
    [table_options] [select_statement]
```

```
CREATE [TEMPORARY] TABLE [IF NOT EXISTS] tbl_name
    [(] LIKE old_tbl_name [)];

create_definition:
    column_definition
  | [CONSTRAINT [symbol]] PRIMARY KEY [index_type] (index_col_name,.
  | KEY [index_name] [index_type] (index_col_name,...)
  | INDEX [index_name] [index_type] (index_col_name,...)
  | [CONSTRAINT [symbol]] UNIQUE [INDEX]
        [index_name] [index_type] (index_col_name,...)
  | [FULLTEXT|SPATIAL] [INDEX] [index_name] (index_col_name,...)
  | [CONSTRAINT [symbol]] FOREIGN KEY
        [index_name] (index_col_name,...) [reference_definition]
  | CHECK (expr)

column_definition:
    col_name type [NOT NULL | NULL] [DEFAULT default_value]
        [AUTO_INCREMENT] [UNIQUE [KEY] | [PRIMARY] KEY]
        [COMMENT 'string'] [reference_definition]

type:
    TINYINT[(length)] [UNSIGNED] [ZEROFILL]
  | SMALLINT[(length)] [UNSIGNED] [ZEROFILL]
  | MEDIUMINT[(length)] [UNSIGNED] [ZEROFILL]
  | INT[(length)] [UNSIGNED] [ZEROFILL]
```

```
  | INTEGER[(length)] [UNSIGNED] [ZEROFILL]
  | BIGINT[(length)] [UNSIGNED] [ZEROFILL]
  | REAL[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | DOUBLE[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | FLOAT[(length,decimals)] [UNSIGNED] [ZEROFILL]
  | DECIMAL(length,decimals) [UNSIGNED] [ZEROFILL]
  | NUMERIC(length,decimals) [UNSIGNED] [ZEROFILL]
  | DATE
  | TIME
  | TIMESTAMP
  | DATETIME
  | CHAR(length) [BINARY | ASCII | UNICODE]
  | VARCHAR(length) [BINARY]
  | TINYBLOB
  | BLOB
  | MEDIUMBLOB
  | LONGBLOB
  | TINYTEXT [BINARY]
  | TEXT [BINARY]
  | MEDIUMTEXT [BINARY]
  | LONGTEXT [BINARY]
  | ENUM(value1,value2,value3,...)
  | SET(value1,value2,value3,...)
  | spatial_type

index_col_name:
```

```
    col_name [(length)] [ASC | DESC]

reference_definition:
    REFERENCES tbl_name [(index_col_name,...)]
                [MATCH FULL | MATCH PARTIAL | MATCH SIMPLE]
                [ON DELETE reference_option]
                [ON UPDATE reference_option]

reference_option:
    RESTRICT | CASCADE | SET NULL | NO ACTION

table_options: table_option [table_option] ...

table_option:
    {ENGINE|TYPE} = engine_name
  | AUTO_INCREMENT = value
  | AVG_ROW_LENGTH = value
  | [DEFAULT] CHARACTER SET charset_name [COLLATE collation_name]
  | CHECKSUM = {0 | 1}
  | COMMENT = 'string'
  | CONNECTION = 'connect_string'
  | MAX_ROWS = value
  | MIN_ROWS = value
  | PACK_KEYS = {0 | 1 | DEFAULT}
  | PASSWORD = 'string'
  | DELAY_KEY_WRITE = {0 | 1}
```

```
  | ROW_FORMAT = {DEFAULT|DYNAMIC|FIXED|COMPRESSED|REDUNDANT|COMPACT
  | UNION = (tbl_name[,tbl_name]...)
  | INSERT_METHOD = { NO | FIRST | LAST }
  | DATA DIRECTORY = 'absolute path to directory'
  | INDEX DIRECTORY = 'absolute path to directory'

partition_options:
    PARTITION BY
            [LINEAR] HASH(expr)
        |  [LINEAR] KEY(column_list)
        |  RANGE(expr)
        |  LIST(column_list)
    [PARTITIONS num]
    [  SUBPARTITION BY
            [LINEAR] HASH(expr)
         | [LINEAR] KEY(column_list)
      [SUBPARTITIONS(num)]
    ]
    [(partition_definition), [(partition_definition)], ...]

partition_definition:
    PARTITION partition_name
        [VALUES {
                  LESS THAN (expr) | MAXVALUE
                | IN (value_list) }]
        [[STORAGE] ENGINE [=] engine-name]
```

```
        [COMMENT [=] 'comment_text' ]
        [DATA DIRECTORY [=] 'data_dir']
        [INDEX DIRECTORY [=] 'index_dir']
        [MAX_ROWS [=] max_number_of_rows]
        [MIN_ROWS [=] min_number_of_rows]
        [TABLESPACE [=] (tablespace_name)]
        [NODEGROUP [=] node_group_id]
        [(subpartition_definition), [(subpartition_definition)], ...

subpartition_definition:
    SUBPARTITION logical_name
        [[STORAGE] ENGINE [=] engine-name]
        [COMMENT [=] 'comment_text' ]
        [DATA DIRECTORY [=] 'data_dir']
        [INDEX DIRECTORY [=] 'index_dir']
        [MAX_ROWS [=] max_number_of_rows]
        [MIN_ROWS [=] min_number_of_rows]
        [TABLESPACE [=] (tablespace_name)]
        [NODEGROUP [=] node_group_id]

select_statement:
    [IGNORE | REPLACE] [AS] SELECT ...   (Some legal select statemen
```

CREATE TABLE CREATE

9.2“”

db_name.tbl_name `mydb`.`mytbl` `mydb.mytbl`

TEMPORARY TEMPORARY TEMPORARY
CREATE TEMPORARY TA

IF NOT EXISTS CREATE TABLE CREATE
TABLE...SELECTIF NOT EXISTS SELECT

MySQL.frm MyISAM MyISAM*tbl_name*

tbl_name.frm	
tbl_name.MYD	
tbl_name.MYI	

15

11 19 *MySQL*

· NULLNOT NULLNULL

· AUTO_INCREMENTAUTO_INCREMENTNULL 0
value+1*value* AUTO_INCREMENT1 11.1.1“” 1.0
25.2.3.36“mysql_insert_id()”

--sql-modesql_modeNO_AUTO_VALUE_ON_ZERO 0
AUTO_INCREMENT 5.3.1“ **mysqld**”

AUTO_INCREMENT DEFAULT AUTO_INCREMENT

MyISAMBDB AUTO_INCREMENT 3.6.9“AUTO_INCREMENT”

MySQLODBC AUTO_INCREMENT

```
SELECT * FROM tbl_name WHERE auto_col IS NULL
```

· CHARACTER SET 10 CHARSETCHARACTER SET

· CREATE TABLE t (c CHAR(20) CHARACTER SET utf8 COLLA

MySQL 5.1

· DEFAULT NOW()CURRENT_DATE TIMESTAMPCURRENT_TIMESTAMP 11.3.1.1“MySQL 4.1 TIMESTAMP”

BLOBTEXT

DEFAULT MySQL

NULL DEFAULT NULL MySQL

NULL MySQLDEFAULT INSERTREPLACE MySQLSQL

o MySQL

o

t

```
CREATE TABLE t (i INT NOT NULL);
```

i DEFAULT(i)

```
INSERT INTO t VALUES();
INSERT INTO t VALUES(DEFAULT);
INSERT INTO t VALUES(DEFAULT(i));
```

5.3.2“SQL”

SHOW CREATE TABLEDEFAULT

· COMMENT SHOW CREATE TABLESHOW FULL COLUMNS

· SERIALBIGINT UNSIGNED NOT NULL AUTO_INCREMENT UNIQUE

· KEYINDEX PRIMARY KEY PRIMARY KEYKEY

· UNIQUE NULL NULL BDB BDB NULL

· PRIMARY KEYKEY NOT NULLNOT NULLMySQL PRIMARY KEYPRIMARY KEYPRIMARY KEYMySQLUNIQUE PRIMARY KEY NULL

· PRIMARY KEY UNIQUE MySQL UNIQUE

· PRIMARY KEY PRIMARY KEY PRIMARY KEYindex_col_name, ...

· PRIMARY KEYUNIQUE SELECT_rowid

· MySQL PRIMARY KEYPRIMARY _2, _3,... SHOW INDEX FROM *tbl_name* 13.5.4.11“SHOW INDEX”

· *index_type*USING type_name

```
CREATE TABLE lookup
  (id INT, INDEX USING BTREE (id))
  ENGINE = MEMORY;
```

USING 13.1.4“CREATE INDEX”

MySQL 7.4.5“MySQL”

· MySQL 5.1 MyISAMInnoDB, BDBMEMORYNULL NOT NULL

· *col_name*(*length*) CHARVARCHAR*length* 7.4.3“”

MyISAMInnoDBBLOBTEXT BLOBTEXT

```
CREATE TABLE test (blob_col BLOB, INDEX(blob_col(10)));
```

MyISAMInnoDB 1000 255 CREATE TABLE

· *index_col_name*ASCDESC

· SELECTTEXTBLOBORDER BYGROUP BY max_sort_length 11.4.3“BLOBTEXT ”

· FULLTEXT MyISAMFULLTEXT FULLTEXTCHAR, VARCHARTEXT 12.7“”

· SPATIAL MyISAM NOT NULL19 *MySQL*

· InnoDB 15.2“InnoDB” InnoDB FOREIGN KEYCREATE TABLE InnoDBON DELETEON UPDATE 15.2.6.4 “FOREIGN KEY”

MySQLCREATE TABLEFOREIGN KEYREFERENCES CHECK CHECK 1.8.5.5“”

· MyISAM NULL

```
· row length = 1
· + (sum of column lengths)
· + (number of NULL columns + delete_fla
· + (number of variable-length columns)
```

*delete_flag*1 *delete_flag*0

InnoDB InnoDB NULLNOT NULL

ENGINETYPE ENGINE

ENGINETYPE

ARCHIVE	15.8“ARCHIVE”
BDB	BerkeleyDB15.5“BDB (BerkeleyDB)”
CSV	15.9“CSV
EXAMPLE	15.6“EXAMPLE”
FEDERATED	15.7“FEDERATED”
HEAP	15.4“MEMORY (HEAP)”
(*OBSOLETE*) ISAM	MySQL 5.1 MySQL 5.1ISAMMyISAM 15
InnoDB	15.2“InnoDB”
MEMORY	MySQLHEAP
MERGE	MyISAM MRG_MyISAM15.3“MERGE”
MyISAM	MySQL 15.1“MyISAM”
NDBCLUSTER	NDB17 *MySQL*

MySQL 15

MySQLMyISAM ENGINE=BDB MySQLBDB MyISAM

· AUTO_INCREMENT

AUTO_INCREMENT MySQL 5.1 MyISAMMEMORY InnoDB AUTO_INCREMENT auto-increment“”

CREATE TABLEAUTO_INCREMENT ALTER TABLE *tbl_name* AUTO_INCREMENT = *n*AUTO_INCREMENT

· AVG_ROW_LENGTH

MyISAM MySQLMAX_ROWSAVG_ROW_LENGTH 65,5

· [DEFAULT] CHARACTER SET

CHARSETCHARACTER SET

CHARACTER SET.

· COLLATE

· CHECKSUM

MySQL MySQL 1 CHECKSUM TABLE MyISAM

· COMMENT

60

· CONNECTION

FEDERATED MySQLCOMMENT

· MAX_ROWS

· MIN_ROWS

· PACK_KEYS

1 0 DEFAULT CHARVARCHAR MyISAM

PACK_KEYS PACK_KEYS=1

MySQL

o

o

“”

· PASSWORD

.frm MySQL

· DELAY_KEY_WRITE

1 MyISAM

· ROW_FORMAT

MyISAM FIXEDDYNAMIC**myisampack**COMPRESSED15.1.3 “MyISAM”

InnoDBROW_FORMAT=COMPACT ROW_FORMAT=REDUNDANT MySQL

· RAID_TYPE

MySQL 5.0,RAID RAID http://dev.mysql.com/doc/refman/4.1/en/create-table.html

· UNION

UNIONUNIONMERGE 15.3“MERGE”

MERGE SELECT, UPDATEDELETE MERGE

· INSERT_METHOD

MERGE INSERT_METHOD INSERT_METHODMERGE FIRST LAST NO 15.3“MERGE”

· DATA DIRECTORY, INDEX DIRECTORY

DATA DIRECTORY='*directory*'INDEX DIRECTORY='*directory*'MyISAM

--skip-symbolic-links DATA DIRECTORY, INDEX DIRECTORY realpath() 7.6.1.2“Unix ”

· CREATE TABLE *partition_options* *partition_options*PARTITION BY 1*numnum*
MySQL 18

o HASH*expr* *expr* MySQL MySQL CREATE TABLE PARTITION BY HASH

```
o                    CREATE TABLE t1 (col1 INT, col2 CHAR(5))
o                        PARTITION BY HASH(col1);
o
o                    CREATE TABLE t1 (col1 INT, col2 CHAR(5))
o                        PARTITION BY HASH( ORD(col2) );
o
o                    CREATE TABLE t1 (col1 INT, col2 CHAR(5), col3
```

o PARTITION BY HASH (YEAR(col3));

VALUES LESS THANVALUES INPARTITION BY HASH

PARTITION BY HASH*expr* 18.2.3“HASH”

LENEAR AND 18.2.3.1“LINEAR HASH”

o KEY(*column_list*)HASH MySQL *column_list* 4

o CREATE TABLE tk (col1 INT, col2 CHAR(5), col3

o PARTITION BY KEY(col3)

o PARTITIONS 4;

LINEAR HASH & 18.2.3.1“LINEAR HASH” 18.2.4 “KEY” 5

```
CREATE TABLE tk (col1 INT, col2 CHAR(5), col3 DATE)
    PARTITION BY LINEAR KEY(col3)
    PARTITIONS 5;
```

VALUES LESS THANVALUES INPARTITION BY KEY

o RANGE *expr*VALUES LESS THAN VALUES LESS THAN VALUES IN

VALUES LESS THAN

0	1990
1	1991 - 1994

2	1995 - 1998
3	1999 - 2002
4	2003 - 2005
5	2006

CREATE TABLE

```
CREATE TABLE t1 (
    year_col INT,
    some_data INT
)
PARTITION BY RANGE (year_col) (
    PARTITION p0 VALUES LESS THAN (1991),
    PARTITION p1 VALUES LESS THAN (1995),
    PARTITION p2 VALUES LESS THAN (1999),
    PARTITION p3 VALUES LESS THAN (2002),
    PARTITION p4 VALUES LESS THAN (2006),
    PARTITION p5 VALUES LESS THAN MAXVALUE
);
```

PARTITION ... VALUES LESS THAN ... VALUES LESS THAN MAXVALUE“”

VALUES LESS THAN switch ... case C, JavaPHP VALUES LESS THANVALUES LESS THAN MAXVALUE

VALUES IN

```
CREATE TABLE client_firms (
    id INT,
    name VARCHAR(35)
)
PARTITION BY RANGE (id) (
    PARTITION r0 VALUES IN (1, 5, 9, 13, 17, 21),
    PARTITION r1 VALUES IN (2, 6, 10, 14, 18, 22),
    PARTITION r2 VALUES IN (3, 7, 11, 15, 19, 23),
    PARTITION r3 VALUES IN (4, 8, 12, 16, 20, 24)
);
```

VALUES IN...

VALUES IN PARTITION BY LIST PARTITION BY RANGE

VALUES LESS THANVALUES IN PARTITION *name* *name* VALUES...

o LIST(*expr*) LIST(*expr*)RANGE VALUES IN

VALUES IN VALUES LESS THANPARTITION BY LIST

o PARTITION *num* *num* PARTITION *num*PARTITION

RANGELISTPARTITIONS PARTITION VALUES

o SUBPARTITION BY HASHKEY LINEAR LIST RANGE

SUBPARTITIONS

· *partition_definition*

- PARTITION *partition_name*
- VALUE VALUES LESS THAN VALUES IN 18
- COMMENT
- COMMENT = 'Data for the years previous to 1999
- DATA DIRECTORYINDEX DIRECTORY *data_dirindex_dir*
- CREATE TABLE th (id INT, name VARCHAR(30), ada
- PARTITION BY LIST(YEAR(adate))
- (
- PARTITION p1999 VALUES IN (1995, 1999, 200
- PARTITION p2000 VALUES IN (1996, 2000, 200
- PARTITION p2001 VALUES IN (1997, 2001, 200
- PARTITION p2000 VALUES IN (1998, 2002, 200

```
);
```

DATA DIRECTORYINDEX DIRECTORYCREATE TABLE*table_option* *table_option*MyISAM

- MAX_ROWSMIN_ROWS *max_number_of_rows* *min_number_of_rows* *max_number_of_rowsmin_number_of_rows*“ ”
- TABLESPACE MySQL Cluster
- [STORAGE] ENGINE MySQL STORAGE(=)

PARTITIONSUBPARTITION[STORAGE] ENGINE ERROR 1469 (HY000)MySQL MySQL 5.1

- NODEGROUP *node_group_id* MySQL Cluster

o *subpartition_definition* SUBPARTITION *name* *name* SUBPARTITIONPARTITION

HASHKEY RANGELIST 18.2.5“”

· MySQL 13.1.2“ALTER TABLE” 18.3“”

CREATE TABLESELECT

```
CREATE TABLE new_tbl SELECT * FROM orig_tbl;
```

MySQLSELECT

```
mysql> CREATE TABLE test (a INT NOT NULL AUTO_INCREMENT,
    ->        PRIMARY KEY (a), KEY(b))
    ->        TYPE=MyISAM SELECT b,c FROM test2;
```

a, b, cMyISAM SELECT

```
mysql> SELECT * FROM foo;
+---+
| n |
+---+
| 1 |
+---+

mysql> CREATE TABLE bar (m INT) SELECT n FROM foo;
Query OK, 1 row affected (0.02 sec)
Records: 1  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM bar;
+------+---+
```

```
| m    | n |
+------+---+
| NULL | 1 |
+------+---+
1 row in set (0.00 sec)
```

foo bar foo

CREATE TABLE...SELECT CREATE TABLE SELECT CREATE TABLESELECT

CREATE TABLE...SELECT SELECT

```
mysql> CREATE TABLE bar (UNIQUE (n)) SELECT n FROM foo;
```

AUTO_INCREAMENT VARCHARCHAR

CREATE...SELECT CREATE

```
CREATE TABLE artists_and_works
SELECT artist.name, COUNT(work.artist_id) AS number_of_works
FROM artist LEFT JOIN work ON artist.id = work.artist_id
GROUP BY artist.id;
```

```
CREATE TABLE foo (a TINYINT NOT NULL) SELECT b+1 AS a FROM bar;
```

LIKE:

```
CREATE TABLE new_tbl LIKE orig_tbl;
```

CREATE TABLE...LIKEDATA DIRECTORYINDEX DIRECTORY

SELECTIGNOREREPLACE IGNORE REPLACE IGNOREREPLACE

/ MySQLCREATE TABLE...SELECT

13.1.5.1.

MySQLCREATE TABLEALTER TABLE MySQL 5.1

13.1.6. DROP DATABASE

```
DROP {DATABASE | SCHEMA} [IF EXISTS] db_name
```

DROP DATABASE DROP DATABASEDROP

IF EXISTS

DROP SCHEMA

DROP DATABASE

DROP DATABASE .frm

MySQL DROP DATABASE

.

.BAK	.DAT	.HSH	
.MRG	.MYD	.ISD	
.MYI	.db	.frm	

· 1600-ff RAID RAID MySQL 5.0 MySQL 5.0RAID MySQL 5.0MySQL 5.0 MySQL 5.0MySQL

· db.opt

MySQL DROP DATABASE

mysqladmin 8.5“mysqladminMySQL”

13.1.7. DROP INDEX

```
DROP INDEX index_name ON tbl_name
```

DROP INDEX*tbl_name*index_name ALTER TABLE 13.1.2 “ALTER TABLE”

13.1.8. DROP TABLE

```
DROP [TEMPORARY] TABLE [IF EXISTS]
    tbl_name [, tbl_name] ...
    [RESTRICT | CASCADE]
```

DROP TABLE DROP

DROP TABLE DROP TABLE.par

IF EXISTS IF EXISTS NOTE13.5.4.22“SHOW WARNINGS ”

RESTRICTCASCADE RESTRICTCASCADE

TEMPORARY DROP TABLE

TEMPORARY

· TEMPORARY

·

· TEMPORARY

TEMPORARYTEMPORARY

13.1.9. RENAME TABLE

```
RENAME TABLE tbl_name TO new_tbl_name
```

```
    [, tbl_name2 TO new_tbl_name2] ...
```

old_tablenew_table

```
CREATE TABLE new_table (...);
RENAME TABLE old_table TO backup_table, new_table TO old_table;
```

tmp_table

```
RENAME TABLE old_table TO tmp_table,
             new_table TO old_table,
             tmp_table TO new_table;
```

```
RENAME TABLE current_db.tbl_name TO other_db.tbl_name;
```

RENAME ALTERDROP CREATEINSERT

MySQL MySQL

RENAME TABLE

13.2.

13.2.1. DELETE
13.2.2. DO
13.2.3. HANDLER
13.2.4. INSERT
13.2.5. LOAD DATA INFILE
13.2.6. REPLACE
13.2.7. SELECT
13.2.8. Subquery
13.2.9. TRUNCATE
13.2.10. UPDATE

13.2.1. DELETE

```
DELETE [LOW_PRIORITY] [QUICK] [IGNORE] FROM tbl_name
    [WHERE where_definition]
    [ORDER BY ...]
    [LIMIT row_count]


DELETE [LOW_PRIORITY] [QUICK] [IGNORE]
    tbl_name[.*] [, tbl_name[.*] ...]
    FROM table_references
    [WHERE where_definition]


DELETE [LOW_PRIORITY] [QUICK] [IGNORE]
    FROM tbl_name[.*] [, tbl_name[.*] ...]
    USING table_references
```

[WHERE *where_definition*]

tbl_namewhere_definition DELETE

DELETEWHERE TRUNCATE TABLE13.2.9“TRUNCATE ”

AUTO_INCREMENT BDB MyISAMInnoDB AUTOCOMMIT DELETE FROM *tbl_name* WHERE InnoDBMyISAM InnoDB 15.2.6.3“AUTO_INCREMENTInnoDB”

MyISAMBDB AUTO_INCREMENT MyISAM 3.6.9“ AUTO_INCREMENT”

DELETE

· LOW_PRIORITYDELETE

· MyISAM QUICK

· IGNOREMySQL

7.2.18“DELETE”

MyISAM INSERT OPTIMIZE TABLE**myisamchk** OPTIMIZE TABLE **myisamchk** 13.5.2.5“OPTIMIZE TABLE” 7

QUICK DELETE QUICK

DELETE QUICK QUICK

1. AUTO_INCREMENT

2.

3. DELETE QUICK

QUICK DELETEQUICK OPTIMIZE TABLE

DELETE QUICKOPTIMIZE TABLE

DELETEMySQLLIMIT *row_count* DELETE DELETE LIMIT

DELETEORDER BY LIMIT WHERE timestamp_column

```
DELETE FROM somelog
WHERE user = 'jcole'
ORDER BY timestamp_column
LIMIT 1;
```

DELETE DELETEORDER BYLIMIT

table_references 13.2.7.1“JOIN”

FROM FROM USING

```
DELETE t1, t2 FROM t1, t2, t3 WHERE t1.id=t2.id AND t2.id=t3.id;
```

```
DELETE FROM t1, t2 USING t1, t2, t3 WHERE t1.id=t2.id AND t2.id=t3.i
```

t1t2

DELETESELECT LEFT JOIN

.*Access

DELETEInnoDB MySQL InnoDBON DELETE

```
DELETE t1 FROM test AS t1, test2 WHERE ...
```

```
DELETE test1.tmp1, test2.tmp2 FROM test1.tmp1, test2.tmp2 WHERE ...
```

13.2.2. DO

```
DO expr [, expr] ...
```

DO DOSELECT *expr*DO DO

DO RELEASE_LOCK()

13.2.3. HANDLER

```
HANDLER tbl_name OPEN [ AS alias ]
HANDLER tbl_name READ index_name { = | >= | <= | < } (value1,value2,
    [ WHERE where_condition ] [LIMIT ... ]
HANDLER tbl_name READ index_name { FIRST | NEXT | PREV | LAST }
    [ WHERE where_condition ] [LIMIT ... ]
HANDLER tbl_name READ { FIRST | NEXT }
    [ WHERE where_condition ] [LIMIT ... ]
HANDLER tbl_name CLOSE
```

HANDLER HANDLERMyISAMInnoDB

HANDLER...OPEN HANDLER...READ HANDLER...CLOSE
HANDLER

WHERE HANDLER...READ col_a, col_b,col_c
HANDLER

```
HANDLER ... index_name = (col_a_val,col_b_val,col_c_val) ...

HANDLER ... index_name = (col_a_val,col_b_val) ...

HANDLER ... index_name = (col_a_val) ...
```

HANDLER...READ WHERE

HANDLER...READ WHERE HANDLER *tbl_name* READ
index_name MyISAM InnoDB

LIMIT HANDLER...READ LIM
“SELECT”

HANDLER...CLOSEHANDLER...OPEN

HANDLERPRIMARY KEY`PRIMARY`

```
HANDLER tbl_name READ `PRIMARY` > (...);
```

HANDLER HANDLER...OPEN HANDLER...OPEN
HANDLI

HANDLERSELECT

· HANDLERSELECT

o HANDLER...OPEN HANDLER

o

o

o

o SELECT

· ISAMMySQL HANDLER

· HANDLER SELECT HANDLER

13.2.4. INSERT

13.2.4.1. INSERT ... SELECT
13.2.4.2. INSERT DELAYED

```
INSERT [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name [(col_name,...)]
    VALUES ({expr | DEFAULT},...),(...),...
    [ ON DUPLICATE KEY UPDATE col_name=expr, ... ]
```

```
INSERT [LOW_PRIORITY | DELAYED | HIGH_PRIORITY] [IGNORE]
```

```
    [INTO] tbl_name
    SET col_name={expr | DEFAULT}, ...
    [ ON DUPLICATE KEY UPDATE col_name=expr, ... ]


INSERT [LOW_PRIORITY | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name [(col_name,...)]
    SELECT ...
    [ ON DUPLICATE KEY UPDATE col_name=expr, ... ]
```

INSERT INSERT...VALUESINSERT...SET INSERT...SELECT 13.2.4.1“INSERT ... SELECT” INSERT...SELECT

tbl_name

· SET

· INSERT...VALUESINSERT...SELECT VALUES SELECT DESCRIBE *tbl_name*

·
“”

INS

· DEFAULT INSERT DEFAULT VALUES DEFUALT VALUES

DEFAULT(*col_name*)

· VALUES INSERT

· mysql> **INSERT INTO *tbl_name* () VALUES();**

STRICT MySQL

· *expr* INT, FLOAT, DECIMAL(10,6)YEAR '1999.0e-2'199919.992119.9921001999INTYEAR1999

expr col2col1col1

```
mysql> INSERT INTO tbl_name (col1,col2) VALUES(15,col1*2);
```

col1col2col2col1

```
mysql> INSERT INTO tbl_name (col1,col2) VALUES(col2*2,15);
```

AUTO_INCREMENT AUTO_INCREMENT AUTO_INCREMENT0

INSERT

· DELAYED INSERT DELAYED 13.2.4.2“INSERT DELAYED”

· LOW_PRIORITY INSERT INSERT LOW_PRIORITY INSERT LOW_PRIORITY INSERT DELAYED INSERT DELAYED 13.2.4.2“INSERT DELAYED” LOW_PRIORITYMyISAM 15.1“MyISAM”

· HIGH_PRIORITY--low-priority-updates HIGH_PRIORITY--low-priority-updates

· mysql_affected_rows() C API INSERT 25.2.3.1 “mysql_affected_rows()”

· INSERTIGNORE IGNORE UNIQUEPRIMARY KEY IGNORE IGNORE IGNORE mysql_info() C API

ON DUPLICATE KEY UPDATEUNIQUEPRIMARY KEY UPDATE a UNIQUE1

```
mysql> INSERT INTO table (a,b,c) VALUES (1,2,3)
    -> ON DUPLICATE KEY UPDATE c=c+1;

mysql> UPDATE table SET c=c+1 WHERE a=1;
```

1 2

b INSERTUPDATE

```
mysql> UPDATE table SET c=c+1 WHERE a=1 OR b=2 LIMIT 1;
```

a=1 OR b=2 ON DUPLICATE KEY

UPDATEVALUES(col_name)INSERT...UPDATEINSERT UPDATE VALUES(*col_name*)*col_name* VALUES()INSERT...UPDATE NULL

```
mysql> INSERT INTO table (a,b,c) VALUES (1,2,3),(4,5,6)
    -> ON DUPLICATE KEY UPDATE c=VALUES(a)+VALUES(b);
```

```
mysql> INSERT INTO table (a,b,c) VALUES (1,2,3)
    -> ON DUPLICATE KEY UPDATE c=3;
mysql> INSERT INTO table (a,b,c) VALUES (4,5,6)
    -> ON DUPLICATE KEY UPDATE c=9;
```

ON DUPLICATE KEY UPDATE DELAYED

SQL LAST_INSERT_ID()AUTO_INCREMENT C API mysql_insert_id() 12.9.3“” 25.2.3.36 “mysql_insert_id()” AUTO_INCREMENTINSERT

INSERT...VALUESINSERT...SELECT

```
Records: 100 Duplicates: 0 Warnings: 0
```

· NOT NULLNULLINSERTINSERT INTO...SELECT 0 (")“ zero” INSERT INTO...SELECT SELECT INSERT NULLNOT NULL

.

· '10.34 a' 0

· CHAR, VARCHAR, TEXTBLOB

·

C APImysql_info() 25.2.3.34“mysql_info()”

13.2.4.1. INSERT ... SELECT

```
INSERT [LOW_PRIORITY | HIGH_PRIORITY] [IGNORE]
    [INTO] tbl_name [(col_name,...)]
    SELECT ...
    [ ON DUPLICATE KEY UPDATE col_name=expr, ... ]
```

INSERT...SELECT

```
INSERT INTO tbl_temp2 (fld_id)
    SELECT tbl_temp1.fld_order_id
    FROM tbl_temp1 WHERE tbl_temp1.fld_order_id > 100;
```

INSERT...SELECT

· IGNORE

· DELAYEDINSERT...SELECT

· INSERTSELECTFROM MySQL

· AUTO_INCREMENT

· MySQLINSERT...SELECT

·

ON DUPLICATE KEY UPDATE SELECTGROUP BY

REPLACEINSERT REPLACEINSERT IGNORE

13.2.4.2. INSERT DELAYED

```
INSERT DELAYED ...
```

INSERTDELAYEDMySQLSQL INSERT MySQL SELECT UPDATE

INSERT DELAYED

INSERT DELAYED

DELAYED

· INSERT DELAYEDMyISAM, MEMORYARCHIVE MyISAM SELECTINSERT MyISAMINSERT DELAYED15.1“M” , 15.4“MEMORY (HEAP)” 15.8“ARCHIVE”

· INSERT DELAYEDINSERT INSERT DELAYED...SELECT DELAYED

· INSERT DELAYED...ON DUPLICATE UPDATEDELAYED

· LAST_INSERT_ID()AUTO_INCREMENT AUTO_INCREMENT

· SELECT DELAYED

· DELAYED DELAYED

mysqld kill -9**mysqld**

INSERTREPLACEDELAYED“” INSERT DELAYED“” INSERT DELAYED

· DELAYED DELAYED

· DELAYED READWRITE DELAYED ALTER TABLE FLUSH TABLE

· INSERT

· INSERT AUTO_INCREMENT C API mysql_info()

·

· delayed_insert_limit SELECT

· delayed_insert_timeout INSERT DELAYED

· delayed_queue_size INSERT DELAYED **mysqld**

· MySQL delayed_insertFLUSH TABLESKILL thread_id

INSERT DELAYED INSERT DELAYEDINSERT INSERT DELAYED KILL thread_id FLUSH TABLES

· INSERT DELAYED

Delayed_insert_threads	
Delayed_writes	INSERT DELAYED
Not_flushed_delayed_rows	

· SHOW STATUS **mysqladmin extended-status**

INSERT DELAYEDINSERT INSERT DELAYED

13.2.5. LOAD DATA INFILE

```
LOAD DATA [LOW_PRIORITY | CONCURRENT] [LOCAL] INFILE 'file_name.txt'
    [REPLACE | IGNORE]
    INTO TABLE tbl_name
    [FIELDS
        [TERMINATED BY 'string']
        [[OPTIONALLY] ENCLOSED BY 'char']
        [ESCAPED BY 'char' ]
    ]
    [LINES
        [STARTING BY 'string']
        [TERMINATED BY 'string']
    ]
    [IGNORE number LINES]
    [(col_name_or_user_var,...)]
    [SET col_name = expr,...)]
```

LOAD DATA INFILE

INSERTLOAD DATA INFILELOAD DATA INFILE [7.2.16“INSERT”]

character_set_database SET NAMEScharacter_set_client

UCS2

mysqlimport LOAD DATA INFILE --local**mysqlimport** —compress [8.10“mysqlimport]

LOW_PRIORITYLOAD DATA

MyISAM MyISAMCONCURRENTLOAD DATA LOAD DATA

LOCAL

· LOCAL

· LOCAL

.

.

.

./myfile.txt myfile.txt LOAD DATAdb1data.txtdb1 db2 db1

```
mysql> USE db1;
mysql> LOAD DATA INFILE 'data.txt' INTO TABLE db2.my_table;
```

Windows

LOAD DATA INFILEFILE

5.7.3“MySQL”

LOCAL FILE

LOCAL— local-infile=0**mysqld**LOCAL 5.6.4“LOAD DATA LOCAL ”

LOAD DATA /

```
mkfifo /mysql/db/x/x
chmod 666 /mysql/db/x/x
find / -ls > /mysql/db/x/x
mysql -e "LOAD DATA INFILE 'x' INTO TABLE x" x
```

REPLACEIGNORE

REPLACE 13.2.6“REPLACE”

IGNORE LOCAL LOCAL LOCAL IGNORE

LOAD DATASET FOREIGN_KEY_CHECKS=0

MyISAMLOAD DATA INFILE REPAIR TABLE LOAD DATA INFILE LOAD DATA INFILE ALTER TABLE...DISABLE KEYSLOAD DATA INFILEALTER TABLE...ENABLE KEYS 7.2.16 “INSERT”

LOAD DATA INFILESELECT...INTO OUTFILE 13.2.7“SELECT ” SELECT...INTO OUTFILE LOAD DATA INFILEFIELDS LINES FIELDSLINES

FIELDS TERMINATED BY, [OPTIONALLY] ENCLOSED BYESCAPED BY

FIELDS

```
FIELDS TERMINATED BY '\t' ENCLOSED BY '' ESCAPED BY '\\'
```

LINES

```
LINES TERMINATED BY '\n' STARTING BY ''
```

LOAD DATA INFILE

.

.

.

.

. ‘ \’‘ \’

SELECT...INTO OUTFILE

.

.

. ‘ \’‘ \’

.

FIELDS ESCAPED BY ‘\\’

Windows LINES TERMINATED BY ‘\r\n’ Windows **WordPad** \r LINES TERMINATED BY ‘\r’

'*prefix_string*' *prefix_string*

```
mysql> LOAD DATA INFILE '/tmp/test.txt'
    -> INTO TABLE test LINES STARTING BY "xxx";
```

```
xxx"row",1
something xxx"row",2
```

("row",1)("row",2)

IGNORE *number* LINES IGNORE 1 LINES

```
mysql> LOAD DATA INFILE '/tmp/test.txt'
    -> INTO TABLE test IGNORE 1 LINES;
```

SELECT...INTO OUTFILELOAD DATA INFILE field-line-handling LOAD DATA INFILE SELECT...INTO OUTFILE

```
mysql> SELECT * INTO OUTFILE 'data.txt'
    ->          FIELDS TERMINATED BY ','
    ->          FROM table2;
```

```
mysql> LOAD DATA INFILE 'data.txt' INTO TABLE table2
    ->           FIELDS TERMINATED BY ',';
```

LOAD DATA INFILE

```
mysql> LOAD DATA INFILE 'data.txt' INTO TABLE table2
    ->           FIELDS TERMINATED BY '\t';
```

LOAD DATA INFILE dBASE field-line-handling

```
mysql> LOAD DATA INFILE 'data.txt' INTO TABLE tbl_name
    ->           FIELDS TERMINATED BY ',' ENCLOSED BY '"'
    ->           LINES TERMINATED BY '\n';
```

field-line-handling(") FIELDS [OPTIONALLY] ENCLOSED BYFIELDS ESCAPED BY FIELDS TERMINATED BY, LINES STARTING BYLINES TERMINATED BY / LINES TERMINATED BY '\r\n'

jokes%% jokes

```
mysql> CREATE TABLE jokes
    ->     (a INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
    ->     joke TEXT NOT NULL);
mysql> LOAD DATA INFILE '/tmp/jokes.txt' INTO TABLE jokes
    ->     FIELDS TERMINATED BY ''
    ->     LINES TERMINATED BY '\n%%\n' (joke);
```

FIELDS [OPTIONALLY] ENCLOSED BY SELECT...INTO OUTFILE OPTIONALLYENCLOSED BY

```
"1","a string","100.20"
"2","a string containing a , comma","102.20"
"3","a string containing a \" quote","102.20"
```

```
"4","a string containing a \", quote and comma","102.20"
```

OPTINALLYENCLOSED BY CHAR, BINARY, TEXTENUM

```
1,"a string",100.20

2,"a string containing a , comma",102.20

3,"a string containing a \" quote",102.20

4,"a string containing a \", quote and comma",102.20
```

ENCLOSED BY ESCAPED BY ENCLOSED BY ESCAPED BY LOAD DATA INFILE

```
1,"a string",100.20

2,"a string containing a , comma",102.20

3,"a string containing a " quote",102.20

4,"a string containing a ", quote and comma",102.20
```

ENCLOSED BY OPTIONALLY OPTIONALLY ENCLOSED BYESCAPED BY

ENCLOSED BY TERMINATED BY ENCLOSED BY ENCLOSED BY ""

```
"The ""BIG"" boss"  -> The "BIG" boss

The "BIG" boss      -> The "BIG" boss

The ""BIG"" boss    -> The ""BIG"" boss
```

FIELDS ESCAPED BY FIELDS ESCAPED BY

· FIELDS ESCAPED BY

· FIELDS [OPTIONALLY] ENCLOSED BY

· FIELDS TERMINATED BYLINES TERMINATED BY

· ASCII 0 ASCII‘0’ 0

FIELDS ESCAPED BY NULLNULL \N

FIELDS ESCAPED BY‘ 0’‘ N’ \0\N‘ \’ ASCII NUL NULLNULL

‘ \’-escape 9.1“”

field-line-handling

· LINES TERMINATED BY FIELDS TERMINATED BY FIELDS TERMINATED BY

· FIELDS TERMINATED BYFIELDS ENCLOSED BY(")

LINES TERMINATED BY "

NULL

FIELDSLINES NULL

· FIELDSLINES NULL\N \NNULL ESCAPED BY ‘ \’

· FIELDS ENCLOSED BY NULLNULL FIELDS ENCLOSED BY NULL 'NULL'

· FIELDS ESCAPED BY NULLNULL

· FIELDS TERMINATED BYFIELDS ENCLOSED BY NULL NULL

LOAD DATA INFILE

· FIELDS TERMINATED BYFIELDS ENCLOSED BY BLOBTEXT

· LOAD DATA INFILE FIELDS

· `FIELDS TERMINATED BY '"' ENCLOSED BY '"'`

· FIELDS ESCAPED BY FIELDS ENCLOSED BYLINES TERMINATED BYFIELDS TERMINATED BYLOAD DATA INFILE LOAD DATA INFILE

persondata

```
mysql> LOAD DATA INFILE 'persondata.txt' INTO TABLE persondata;
```

LOAD DATA INFILE

```
mysql> LOAD DATA INFILE 'persondata.txt'
    ->           INTO TABLE persondata (col1,col2,...);
```

MySQL

SET

SET t1.column1 t2.column2

```
LOAD DATA INFILE 'file.txt'
  INTO TABLE t1
  (column1, @var1)
  SET column2 = @var1/100;
```

SET column3

```
LOAD DATA INFILE 'file.txt'
  INTO TABLE t1
  (column1, column2)
  SET column3 = CURRENT_TIMESTAMP;
```

```
LOAD DATA INFILE 'file.txt'
  INTO TABLE t1
  (column1, @dummy, column2, @dummy, column3);
```

/SET

· SET

· SET

· /SET IGNORE

·

LOAD DATA/SET BEFORE INSERTAFTER INSERT

13.1.5“CREATE TABLE”

·

· 0

· “ zero” 11.3“”

INSERTUPDATE

TIMESTAMP NULL \N TIMESTAMP TIMESTAMP

LOAD DATA INFILE INSERTENUMSET ENUMSET

LOAD DATA INFILE

```
Records: 1  Deleted: 0  Skipped: 0  Warnings: 0
```

C APImysql_info() 25.2.3.34“mysql_info()”

INSERT 13.2.4“INSERT” LOAD DATA INFILE

SHOW WARNINGSmax_error_count 13.5.4.22“SHOW

WARNINGS”

13.2.6. REPLACE

```
REPLACE [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name [(col_name,...)]
    VALUES ({expr | DEFAULT},...),(...),...


REPLACE [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name
    SET col_name={expr | DEFAULT}, ...


REPLACE [LOW_PRIORITY | DELAYED]
    [INTO] tbl_name [(col_name,...)]
    SELECT ...
```

REPLACEINSERT PRIMARY KEYUNIQUE 13.2.4 “INSERT”

PRIMARY KEYUNIQUE REPLACE INSERT

REPLACE INSERT“ SET *col_name* = *col_name* + 1” DEFAULT(*col_name*) SET *col_name* = DEFAULT(*col_name*) + 1

REPLACEINSERTDELETE

REPLACE REPLACE1 1

REPLACE REPLACE 1

C APImysql_affected_rows()

LOAD DATA...REPLACE

1.

2.

a.

b.

13.2.7. SELECT

13.2.7.1. JOIN
13.2.7.2. UNION

```
SELECT
    [ALL | DISTINCT | DISTINCTROW ]
      [HIGH_PRIORITY]
      [STRAIGHT_JOIN]
      [SQL_SMALL_RESULT] [SQL_BIG_RESULT] [SQL_BUFFER_RESULT]
      [SQL_CACHE | SQL_NO_CACHE] [SQL_CALC_FOUND_ROWS]
    select_expr, ...
    [INTO OUTFILE 'file_name' export_options
      | INTO DUMPFILE 'file_name']
    [FROM table_references
    [WHERE where_definition]
    [GROUP BY {col_name | expr | position}
      [ASC | DESC], ... [WITH ROLLUP]]
    [HAVING where_definition]
    [ORDER BY {col_name | expr | position}
      [ASC | DESC] , ...]
```

```
    [LIMIT {[offset,] row_count | row_count OFFSET offset}]
    [PROCEDURE procedure_name(argument_list)]
    [FOR UPDATE | LOCK IN SHARE MODE]]
```

SELECT UNION [13.2.7.2“UNION ”](#) [13.2.8“Subquery”](#)

· *select_expr*

· *table_references* [13.2.7.1“JOIN”](#)

· *where_definition*WHERE

SELECT

```
mysql> SELECT 1 + 1;
        -> 2
```

HAVINGGROUP BY ORDER BY

· AS *alias_nameselect_expr* GROUP BYORDER BYHAVING

· mysql> **SELECT CONCAT(last_name,', ',first_name) AS**

· -> **FROM mytable ORDER BY full_name;**

select_expr AS

```
mysql> SELECT CONCAT(last_name,', ',first_name) full_name
    -> FROM mytable ORDER BY full_name;
```

AS *select_expr* MySQL columnb

```
mysql> SELECT columna columnb FROM mytable;
```

AS

· WHERE WHERE A.5.4“”

· FROM *table_references* 13.2.7.1“JOIN”

· *tbl_name* [[AS] *alias*]

· [{USE|IGNORE|FORCE} INDEX (*key_list*)]

USE INDEXIGNORE INDEXFORCE INDEX 13.2.7.1“JOIN”

SET max_seeks_for_key=*value* MySQL

· *tbl_name* *db_name.tbl_name* *col_name*, *tbl_name.col_name* *db_name.tbl_name.col_name* *tbl_namedb_name.tbl_name* 9.2 “”

· DUAL

· mysql> **SELECT 1 + 1 FROM DUAL;**

· -> 2

FROM DUAL MySQL

```
mysql> SELECT 1 + 1;
    -> 2
```

· *tbl_name* AS *alias_nametbl_name alias_name*

· mysql> **SELECT t1.name, t2.salary FROM employee AS t**

· -> **WHERE t1.name = t2.name;**

· mysql> **SELECT t1.name, t2.salary FROM employee t1,**

· -> **WHERE t1.name = t2.name;**

· WHERE MySQL 12

· ORDER BYGROUP BY 1

· mysql> **SELECT college, region, seed FROM tournament**

· -> **ORDER BY region, seed;**

```
· mysql> SELECT college, region AS r, seed AS s FROM
· -> ORDER BY r, s;
· mysql> SELECT college, region, seed FROM tournament
· -> ORDER BY 2, 3;
```

DESC ORDER BY ASC

SQL

· GROUP BYGROUP BY ORDER BYMySQLGROUP BY ASCDESC

```
· SELECT a, COUNT(b) FROM test_table GROUP BY a DESC
```

· MySQLGROUP BY GROUP BY GROUP BY 12.10“ GROUP BY ”

· GROUP BYWITH ROLLUP 12.10.2“GROUP BY”

· HAVING LIMITHAVING

SQLHAVINGGROUP BY MySQL HAVINGSELECT

HAVING col2

```
mysql> SELECT COUNT(col1) AS col2 FROM t GROUP BY col2 HAVING col2 =
```

SQL HAVINGGROUP BY GROUP BY

· HAVINGWHERE

```
· mysql> SELECT col_name FROM tbl_name HAVING col_nam
```

```
mysql> SELECT col_name FROM tbl_name WHERE col_name > 0;
```

· HAVING WHERE

```
· mysql> SELECT user, MAX(salary) FROM users
```

· -> **GROUP BY user HAVING MAX(salary)>10;**

MySQL

· LIMITSELECT LIMIT

```
mysql> SELECT * FROM tbl LIMIT 5,10;  # Retrieve rows 6-15
```

PostgreSQL MySQLLIMIT *row_count* OFFSET *offset*

```
mysql> SELECT * FROM tbl LIMIT 95,18446744073709551615;
```

1

```
mysql> SELECT * FROM tbl LIMIT 5;     # Retrieve first 5 rows
```

LIMIT nLIMIT 0,n

tb1

```
mysql> SET @a=1;
mysql> PREPARE STMT FROM "SELECT * FROM tbl LIMIT ?";
mysql> EXECUTE STMT USING @a;
```

tb1

```
mysql> SET @skip=1; SET @numrows=5;
mysql> PREPARE STMT FROM "SELECT * FROM tbl LIMIT ?, ?";
mysql> EXECUTE STMT USING @skip, @numrows;
```

· SELECT...INTO OUTFILE '*file_name*'SELECT FILE *file_name*“ /etc/passwd”

SELECT...INTO OUTFILE SELECT...INTO OUTFILE“ mysql –e "SELECT ..." > file_name”

SELECT...INTO OUTFILELOAD DATA INFILE exort_optionsFIELDS LINES LOAD DATA INFILE 13.2.5“LOAD DATA INFILE”

FIELDS ESCAPED BY FIELDS ESCAPED BY

o FIELDS ESCAPED BY

o FIELDS [OPTIONALLY] ENCLOSED BY

o FIELDS TERMINATED BYLINES TERMINATED BY

o ASCII 0 ASCII ‘0’

FIELDS ESCAPED BY NULLNULL \N

FIELDS TERMINATED BY, ENCLOSED BY, ESCAPED BYLINES TERMINATED BY ASCII NUL

SQL

```
SELECT a,b,a+b INTO OUTFILE '/tmp/result.text'
FIELDS TERMINATED BY ',' OPTIONALLY ENCLOSED BY '"'
LINES TERMINATED BY '\n'
FROM test_table;
```

· INTO DUMPFILEINTO OUTFILEMySQL BLOB

· INTO OUTFILEINTO DUMPFILE MySQL **mysqld**

· PROCEDURE 27.3.1“”

· FOR UPDATE LOCK IN SHARE MODE 15.2.10.5 “SELECT ... FOR UPDATESELECT ... LOCK IN SHARE MODE”

SELECT

ALL, DISTINCTDISTINCTROW ALL DISTINCT

DISTINCTROW

HIGH_PRIORITY, STRAIGHT_JOINSQL_MySQLSQL

· HIGH_PRIORITYSELECT HIGH_PRIORITY SELECT HIGH_PRIORITY

HIGH_PRIORITYSELECT SELECTUNION

· STRAIGHT_JOIN FROM STRAIGHT_JOIN 7.2.1 "EXPLAINSELECT "STRAIGHT_JOIN*table_reference* "JOIN"

· SQL_BIG_RESULTGROUP BYDISTINCT MySQL MySQL GROUP BY

· SQL_BUFFER_RESULT MySQL

· SQL_SMALL_RESULTGROUP BYDISTINCT MySAL MySQL 5.1

· SQL_CALC_FOUND_ROWSMySQL LIMIT SELECT FOUND_ROWS() 12.9.3""

· query_cache_type 2DEMANDSQL_CACHEMySQL UNION SELECT5.13"MySQL"

· SQL_NO_CACHEMySQL 5.13"MySQL" UNION SELECT

13.2.7.1. JOIN

MySQLJOIN SELECT*table_references*DELETEUPDATE

```
table_references:
    table_reference [, table_reference] …

table_reference:
    table_factor
  | join_table

table_factor:
    tbl_name [[AS] alias]
```

```
        [{USE|IGNORE|FORCE} INDEX (key_list)]
  | ( table_references )
  | { OJ table_reference LEFT OUTER JOIN table_reference
        ON conditional_expr }

join_table:
    table_reference [INNER | CROSS] JOIN table_factor [join_conditio
  | table_reference STRAIGHT_JOIN table_factor
  | table_reference STRAIGHT_JOIN table_factor ON condition
  | table_reference LEFT [OUTER] JOIN table_reference join_condition
  | table_reference NATURAL [LEFT [OUTER]] JOIN table_factor
  | table_reference RIGHT [OUTER] JOIN table_reference join_conditio
  | table_reference NATURAL [RIGHT [OUTER]] JOIN table_factor

join_condition:
    ON conditional_expr
  | USING (column_list)
```

SQL *table_factor* SQL*table_reference*

table_reference

```
SELECT * FROM t1 LEFT JOIN (t2, t3, t4)
                 ON (t2.a=t1.a AND t3.b=t1.b AND t4.c=t1.c)
```

```
SELECT * FROM t1 LEFT JOIN (t2 CROSS JOIN t3 CROSS JOIN t4)
                 ON (t2.a=t1.a AND t3.b=t1.b AND t4.c=t1.c)
```

MySQL CROSS JOININNER JOIN SQL INNER JOINON CROSS JOIN

MySQL [7.2.10“MySQLJoin”](#)

ON ON WHERE

{ OJ ... LEFT OUTER JOIN ...}ODBC

· *tbl_name* AS *alias_nametbl_name alias_name*

· mysql> **SELECT t1.name, t2.salary FROM employee AS t**

```
    ->        WHERE t1.name = t2.name;
mysql> SELECT t1.name, t2.salary FROM employee t1,
    ->        WHERE t1.name = t2.name;
```

- ONWHERE
- LEFT JOINONUSING NULL

```
mysql> SELECT table1.* FROM table1
    ->        LEFT JOIN table2 ON table1.id=table2.
    ->        WHERE table2.id IS NULL;
```

table1id table2id table1table2 table2.idNOT NULL7.2.9 “MySQLLEFT JOINRIGHT JOIN”

- USING(*column_list*) abc1, c2c3

```
a LEFT JOIN b USING (c1,c2,c3)
```

- NATURAL [LEFT] JOININNER JOIN USINGLEFT JOIN USING

- INNER JOIN
- RIGHT JOINLEFT JOIN LEFT JOINRIGHT JOIN
- STRAIGHT_JOINJOIN STRAIGH_JOIN

MySQL USE INDEXkey_list MySQL IGNORE INDEXkey_listMySQL EXPLAINMySQL

FORCE INDEXUSE INDEXkey_list

USE KEYIGNORE KEYFORCE KEYUSE INDEXIGNORE INDEXFORCE INDEX

MySQL USE INDEXIGNORE INDEXFORCE INDEX ORDER BY GROUP BY

```
mysql> SELECT * FROM table1,table2 WHERE table1.id=table2.id;
mysql> SELECT * FROM table1 LEFT JOIN table2 ON table1.id=table2.id;
mysql> SELECT * FROM table1 LEFT JOIN table2 USING (id);
mysql> SELECT * FROM table1 LEFT JOIN table2 ON table1.id=table2.id
    ->          LEFT JOIN table3 ON table2.id=table3.id;
mysql> SELECT * FROM table1 USE INDEX (key1,key2)
    ->          WHERE key1=1 AND key2=2 AND key3=3;
mysql> SELECT * FROM table1 IGNORE INDEX (key3)
    ->          WHERE key1=1 AND key2=2 AND key3=3;
```

7.2.9“MySQLLEFT JOINRIGHT JOIN”

USING SQL:2003 MySQLSQL 5.0.12

· NATURALUSING SELECT *

```
CREATE TABLE t1 (i INT, j INT);
CREATE TABLE t2 (k INT, j INT);
INSERT INTO t1 VALUES(1,1);
INSERT INTO t2 VALUES(1,1);
SELECT * FROM t1 NATURAL JOIN t2;
SELECT * FROM t1 JOIN t2 USING (j);
```

```
+------+------+------+------+
| i    | j    | k    | j    |
+------+------+------+------+
```

```
|    1 |    1 |    1 |    1 |
+------+------+------+------+
+------+------+------+------+
| i    | j    | k    | j    |
+------+------+------+------+
|    1 |    1 |    1 |    1 |
+------+------+------+------+
```

SELECT i SQL SELECT jUSING SQL

```
+------+------+------+
| j    | i    | k    |
+------+------+------+
|    1 |    1 |    1 |
+------+------+------+
+------+------+------+
| j    | i    | k    |
+------+------+------+
|    1 |    1 |    1 |
+------+------+------+
```

SQL

o

o

o

· t1(a,b), t2(c,b)t3(a,c) t1(1,2), t2(10,2)t3(7,10) NATURAL

JOIN

· SELECT … FROM t1 NATURAL JOIN t2 NATURAL JOIN t3;

t2t1 NATURAL JOIN t2 t3 t2 t3t1 equi-join MySQL equi-join

```
SELECT … FROM t1, t2, t3
  WHERE t1.b = t2.b AND t2.c = t3.c;
```

equi-joint1.a = t3.a

```
SELECT … FROM t1, t2, t3
  WHERE t1.b = t2.b AND t2.c = t3.c AND t1.a = t3.a;
```

MySQL equi-join

· JOIN t1, t2 JOIN t3((t1, t2) JOIN t3) JOIN (t1, (t2 JOIN t3))ON

```
CREATE TABLE t1 (i1 INT, j1 INT);
CREATE TABLE t2 (i2 INT, j2 INT);
CREATE TABLE t3 (i3 INT, j3 INT);
INSERT INTO t1 VALUES(1,1);
INSERT INTO t2 VALUES(1,1);
INSERT INTO t3 VALUES(1,1);
SELECT * FROM t1, t2 JOIN t3 ON (t1.i1 = t3.i3);
```

SELECT t1, t2(t1,t2) JOIN ONt2t3t1.i1 'on clause"t1.i1' ON(t1,t2)t3

```
SELECT * FROM (t1, t2) JOIN t3 ON (t1.i1 = t3.i3);
```

INNER JOINCROSS JOINLEFT JOINRIGHT JOIN

· ON ON

```
CREATE TABLE t1 (i1 INT);
CREATE TABLE t2 (i2 INT);
CREATE TABLE t3 (i3 INT);
SELECT * FROM t1 JOIN t2 ON (i1 = i3) JOIN t3;
```

SELECT 'on clause"i3' i3t3 t3ON

```
SELECT * FROM t1 JOIN t2 JOIN t3 ON (i1 = i3);
```

· USINGON ON

```
· a LEFT JOIN b USING (c1,c2,c3)
· a LEFT JOIN b ON a.c1=b.c1 AND a.c2=b.c2 AND a.c3=b
```

o

o SELECT * USING ON USING SELECT *

```
o COALESCE(a.c1,b.c1), COALESCE(a.c2,b.c2), COAL
```

ON SELECT *

```
a.c1, a.c2, a.c3, b.c1, b.c2, b.c3
```

COALESCE(a.c1,b.c1)a.c1b.c1 LEFT JOIN NULL

13.2.7.2. UNION

```
SELECT ...
UNION [ALL | DISTINCT]
SELECT ...
[UNION [ALL | DISTINCT]
```

```
SELECT ...]
```

UNIONSELECT

SELECT SELECT

SELECT

· SELECTINTO OUTFILE

· HIGH_PRIORITYUNIONSELECT SELECTHIGH_PRIORITY SELECTHIGH_PRIORITY

UNIONALL DISTINCTALLSELECT

DISTINCT SQL MySQL DISTINCT

UNION ALLUNION DISTINCTUNION DISTICTALL DISTINCT UNION DISTINCT UNION DISTINCTALL

ORDER BYLIMITUNION SELECT ORDER BYLIMIT

```
(SELECT a FROM tbl_name WHERE a=10 AND B=1)
UNION
(SELECT a FROM tbl_name WHERE a=11 AND B=2)
ORDER BY a LIMIT 10;
```

ORDER BY *tbl_name.col_name* SELECT ORDER BY ORDER BY

ORDER BY 'order clause"a'

```
(SELECT a AS b FROM t) UNION (SELECT ...) ORDER BY b;
(SELECT a AS b FROM t) UNION (SELECT ...) ORDER BY a;
```

To apply ORDER BY or LIMIT to an individual SELECT, place the clause inside the parentheses that enclose the SELECT: SELECTORDER BYLIMIT SELECT

```
(SELECT a FROM tbl_name WHERE a=10 AND B=1 ORDER BY a LIMIT 10)
```

```
UNION
(SELECT a FROM tbl_name WHERE a=11 AND B=2 ORDER BY a LIMIT 10);
```

SELECTORDER BYLIMIT ORDER BY

UNIONSELECT

```
mysql> SELECT REPEAT('a',1) UNION SELECT REPEAT('b',10);
+---------------+
| REPEAT('a',1) |
+---------------+
| a             |
| bbbbbbbbbb    |
+---------------+
```

MySQL 1

13.2.8. Subquery

13.2.8.1.
13.2.8.2.
13.2.8.3. ANY, INSOME
13.2.8.4. ALL
13.2.8.5.
13.2.8.6. EXISTSNOT EXISTS
13.2.8.7.
13.2.8.8. FROM
13.2.8.9.
13.2.8.10.
13.2.8.11. MySQL

SELECT

MySQLSQL MySQL

```
SELECT * FROM t1 WHERE column1 = (SELECT column1 FROM t2);
```

SELECT * FROM t1... ,SELECT column1 FROM t2

.

.

· SQL“”

SQLMySQL

```
DELETE FROM t1
WHERE s11 > ANY
(SELECT COUNT(*) /* no hint */ FROM t2
WHERE NOT EXISTS
(SELECT * FROM t3
WHERE ROW(5*t2.s1,77)=
(SELECT 50,11*s1 FROM t4 UNION SELECT 50,77 FROM
(SELECT * FROM t5) AS t5)));
```

SELECT DISTINCT, GROUP BY, ORDER BY, LIMIT, , , UNION,

SELECT, INSERT, UPDATE, DELETE, SETDO
DELETE, INSERT, REPLACEUPDATE I

13.2.8.1.

```
CREATE TABLE t1 (s1 INT, s2 CHAR(5) NOT NULL);
```

```
INSERT INTO t1 VALUES(100, 'abcde');
SELECT (SELECT s2 FROM t1);
```

SELECT('abcde')CHAR5CREATE TABLE NULL NULL NULL

LIMIT LOAD DATA

SELECT column1 FROM t1

```
CREATE TABLE t1 (s1 INT);
INSERT INTO t1 VALUES (1);
CREATE TABLE t2 (s1 INT);
INSERT INTO t2 VALUES (2);
```

SELECT

```
SELECT (SELECT s1 FROM t2) FROM t1;
```

2t2s1s12

```
SELECT UPPER((SELECT s1 FROM t1)) FROM t2;
```

13.2.8.2.

non_subquery_operand comparison_operator (*subquery*)

comparison_operator

```
=  >  <  >=  <=  <>
```

```
  ... 'a' = (SELECT column1 FROM t1)
```

DBMSs

t1t2

```
SELECT column1 FROM t1
WHERE column1 = (SELECT MAX(column2) FROM t2);
```

t1

```
SELECT * FROM t1 AS t
WHERE 2 = (SELECT COUNT(*) FROM t1 WHERE t1.id = t.id);
```

13.2.8.5“”

13.2.8.3. ANY, INSOME

```
operand comparison_operator ANY (subquery)
operand IN (subquery)
operand comparison_operator SOME (subquery)
```

ANY ANY“ TRUE TRUE”

```
SELECT s1 FROM t1 WHERE s1 > ANY (SELECT s1 FROM t2);
```

t110 t221147 TRUEt2710t22010 t2 FALSEt2NULL, NULL, NULL UNKNOWN

INANY

```
SELECT s1 FROM t1 WHERE s1 = ANY (SELECT s1 FROM t2);
SELECT s1 FROM t1 WHERE s1 IN    (SELECT s1 FROM t2);
```

NOT IN<> ANY <> ALL 13.2.8.4“ALL ”

SOMEANY

```
SELECT s1 FROM t1 WHERE s1 <> ANY  (SELECT s1 FROM t2);
```

```
SELECT s1 FROM t1 WHERE s1 <> SOME (SELECT s1 FROM t2);
```

SOME SOME“ a is not equal to any b”“ ba” SQL“ b a” <> SOME

13.2.8.4. ALL

```
operand comparison_operator ALL (subquery)
```

ALL ALL“ TRUETRUE”

```
SELECT s1 FROM t1 WHERE s1 > ALL (SELECT s1 FROM t2);
```

110 t2-505 TRUE10t2 t2126NULL100 FALSEt21210t2 0NULL1 unknown

t2 TRUE t2 TRUE

```
SELECT * FROM t1 WHERE 1 > ALL (SELECT s1 FROM t2);
```

t2 NULL

```
SELECT * FROM t1 WHERE 1 > (SELECT s1 FROM t2);
```

t2 NULL

```
SELECT * FROM t1 WHERE 1 > ALL (SELECT MAX(s1) FROM t2);
```

NULL“”

NOT IN<> ALL

```
SELECT s1 FROM t1 WHERE s1 <> ALL (SELECT s1 FROM t2);
SELECT s1 FROM t1 WHERE s1 NOT IN (SELECT s1 FROM t2);
```

13.2.8.5.

```
SELECT * FROM t1 WHERE (1,2) = (SELECT column1, column2 FROM t2);
```

```
SELECT * FROM t1 WHERE ROW(1,2) = (SELECT column1, column2 FROM t2);
```

t2 column1=1column2=2TRUE

12ROW12

```
  SELECT * FROM t1 WHERE (column1,column2) = (1,1);
  SELECT * FROM t1 WHERE column1 = 1 AND column2 = 1;
```

“ t1t2”

```
SELECT column1,column2,column3
FROM t1
WHERE (column1,column2,column3) IN
(SELECT column1,column2,column3 FROM t2);
```

13.2.8.6. EXISTSNOT EXISTS

EXISTS *subquery*FALSE

```
SELECT column1 FROM t1 WHERE EXISTS (SELECT * FROM t2);
```

EXISTSSELECT * SELECT 5SELECT column1 MySQLSELECT

t2 NULL EXISTSTRUE [NOT] EXISTS

```
.
.               SELECT DISTINCT store_type FROM stores
.                 WHERE EXISTS (SELECT * FROM cities_stores
.                               WHERE cities_stores.store_type = st
.
.               SELECT DISTINCT store_type FROM stores
.                 WHERE NOT EXISTS (SELECT * FROM cities_stores
.                                   WHERE cities_stores.store_type
```

.

```
·                SELECT DISTINCT store_type FROM stores s1
·                  WHERE NOT EXISTS (
·                    SELECT * FROM cities WHERE NOT EXISTS (
·                      SELECT * FROM cities_stores
·                       WHERE cities_stores.city = cities.city
·                       AND cities_stores.store_type = stores.store_
```

NOT EXISTS NOT EXISTS NOT EXISTS“ Stores” NOT EXISTS“ yxTRUE”

13.2.8.7.

```
SELECT * FROM t1 WHERE column1 = ANY
(SELECT column1 FROM t2 WHERE t2.column2 = t1.column2);
```

FROMt1t1 MySQL t1

t1 column1=5column2=6 t2 column1=5column2=7... WHERE column1 = ANY (SELECT column1 FROM t2)TRUE WHEREFALSE 56 57 FALSE

MySQL

```
SELECT column1 FROM t1 AS x
WHERE x.column1 = (SELECT column1 FROM t2 AS x
WHERE x.column1 = (SELECT column1 FROM t3
WHERE x.column2 = t3.column1));
```

x.column2t2 SELECT column1 FROM t2 AS x ...t2 t1 SELECT column1 FROM t1 ...

HAVINGORDER BY MySQL

```
val IN (SELECT key_val FROM tbl_name WHERE correlated_condition)
```

13.2.8.8. FROM

SELECTFROM

```
SELECT ... FROM (subquery) [AS] name ...
```

[AS] *name* FROM“”

```
CREATE TABLE t1 (s1 INT, s2 CHAR(5), s3 FLOAT);
```

FROM

```
INSERT INTO t1 VALUES (1,'1',1.0);
INSERT INTO t1 VALUES (2,'2',2.0);
SELECT sb1,sb2,sb3
FROM (SELECT s1 AS sb1, s2 AS sb2, s3*2 AS sb3 FROM t1) AS sb
WHERE sb1 > 1;
```

2, '2', 4.0

```
SELECT AVG(SUM(column1)) FROM t1 GROUP BY column1;
```

```
SELECT AVG(sum_column1)
FROM (SELECT SUM(column1) AS sum_column1
FROM t1 GROUP BY column1) AS t1;
```

sum_column1

FROM FROM

EXPLAIN FROM

13.2.8.9.

.

· ERROR 1241 (ER_OPERAND_COL)

· SQLSTATE = 21000

· Message = "Operand should contain 1 column(s)"

```
SELECT (SELECT column1, column2 FROM t2) FROM t1;
```

13.2.8.5“”

.

· ERROR 1242 (ER_SUBSELECT_NO_1_ROW)

· SQLSTATE = 21000

· Message = "Subquery returns more than 1 row"

```
SELECT * FROM t1 WHERE column1 = (SELECT column1 FROM t2);
```

SELECT column1 FROM t2 1242

```
SELECT * FROM t1 WHERE column1 = ANY (SELECT column1 FROM t2);
```

.

· Error 1093 (ER_UPDATE_TABLE_USED)

```
·               SQLSTATE = HY000
·               Message = "You can't specify target table 'x'
·               for update in FROM clause"
```

```
UPDATE t1 SET column2 = (SELECT MAX(column1) FROM t1);
```

SELECT UPDATEDELETE UPDATE t1FROM

13.2.8.10.

```
·
·               SELECT * FROM t1 WHERE t1.column1 IN
·               (SELECT column1 FROM t2 ORDER BY column1);
·               SELECT * FROM t1 WHERE t1.column1 IN
·               (SELECT DISTINCT column1 FROM t2);
·               SELECT * FROM t1 WHERE EXISTS
·               (SELECT * FROM t2 LIMIT 1);
·
·               SELECT DISTINCT column1 FROM t1 WHERE t1.column1 IN
·               SELECT column1 FROM t2);
```

```
SELECT DISTINCT t1.column1 FROM t1, t2
WHERE t1.column1 = t2.column1;
```

· MySQL 13.2.8.11“MySQL”

```
·
·                SELECT * FROM t1
·                WHERE s1 IN (SELECT s1 FROM t1 UNION ALL SELECT s1

SELECT * FROM t1
WHERE s1 IN (SELECT s1 FROM t1) OR s1 IN (SELECT s1 FROM t2);

SELECT (SELECT column1 + 5 FROM t1) FROM t2;

SELECT (SELECT column1 FROM t1) + 5 FROM t2;
·
·                SELECT * FROM t1
·                WHERE (column1,column2) IN (SELECT column1,column2

SELECT * FROM t1
WHERE EXISTS (SELECT * FROM t2 WHERE t2.column1=t1.column1
AND t2.column2=t1.column2);
```

- Use NOT (a = ANY (...)) rather than a <> ALL (...).
- Use x = ANY (table containing (1,2)) rather than x=1 OR x=2.
- Use = ANY rather than EXISTS.
- IN

```
·                SELECT * FROM t1 WHERE t1.col_name
·                = (SELECT a FROM t2 WHERE b = some_const);
```

```
SELECT * FROM t1 WHERE t1.col_name
IN (SELECT a FROM t2 WHERE b = some_const);
```

BENCHMARK()MySQL

MySQL

· MySQL EXPLAIN

· MySQLIN, ALL, ANYSOME select-list

· MySQLindex-lookup EXPLAINunique_subqueryindex_subquery

· ... IN (SELECT *indexed_column* FROM *single_table* ...

· NULL MySQLMIN()MAX()

· *value* {ALL|ANY|SOME} {> | < | >= | <=} (*non-correla*

WHERE

```
WHERE 5 > ALL (SELECT x FROM t)
```

```
WHERE 5 > (SELECT MAX(x) FROM t)
```

MySQL“ MySQL” http://dev.mysql.com/doc/

13.2.8.11. MySQL

MySQL MySQL 4.1 INSERT...SELECTREPLACE...SELECT. MySQL 5.1 IN()

```
SELECT * FROM t1 WHERE id IN (SELECT id FROM t2);
```

```
SELECT DISTINCT t1.* FROM t1, t2 WHERE t1.id=t2.id;
```

```
SELECT * FROM t1 WHERE id NOT IN (SELECT id FROM t2);
SELECT * FROM t1 WHERE NOT EXISTS (SELECT id FROM t2 WHERE t1.id=t2.
```

IN()

```
SELECT table1.* FROM table1 LEFT JOIN table2 ON table1.id=table2.id
WHERE table2.id IS NULL;
```

LEFT [OUTER] JOIN—— MySQL SQL-92 MySQL

MySQLmultiple-table DELETE Multiple-table UPDATE

13.2.9. TRUNCATE

```
TRUNCATE [TABLE] tbl_name
```

TRUNCATE TABLE DELETE

InnoDB TRUNCATE TABLEDELETE TRUNCATE TABLEAUTO_INCREMENT

MySQL 5.1 TRUNCATE TABLEDELETE FROM

.

.

.

· *tbl_name*.frm TRUNCATE TABLE

· AUTO_INCREMENT MyISAMInnoDB MyISAMInnoDB

· TRUNCATE TABLE .par

TRUNCATE TABLEMySQLOracle SQL

13.2.10. UPDATE

Single-table

```
UPDATE [LOW_PRIORITY] [IGNORE] tbl_name
    SET col_name1=expr1 [, col_name2=expr2 ...]
    [WHERE where_definition]
    [ORDER BY ...]
    [LIMIT row_count]
```

Multiple-table

```
UPDATE [LOW_PRIORITY] [IGNORE] table_references
    SET col_name1=expr1 [, col_name2=expr2 ...]
    [WHERE where_definition]
```

UPDATE SET WHERE WHERE ORDER BY LIMIT

UPDATE

· LOW_PRIORITY UPDATE

· IGNORE

tbl_name UPDATE

```
mysql> UPDATE persondata SET age=age+1;
```

UPDATE

```
mysql> UPDATE persondata SET age=age*2, age=age+1;
```

MySQL

NOT NULLNULL 0 (")“ zero”

UPDATE Mysql_info() C API UPDATE

LIMIT *row_count*UPDATE LIMIT WHERE*row_count*

UPDATEORDER BY

UPDATE *table_references* 13.2.7.1“JOIN”

```
UPDATE items,month SET items.price=month.price
WHERE items.id=month.id;
```

multiple-table UPDATESELECT LEFT JOIN

ORDER BYLIMITmultiple-table UPDATE

multiple-table UPDATE UPDATE SELECT

multiple-table UPDATEInnoDB MySQL
InnoDB 15.2.6.4“FOREIGN KEY”

13.3. MySQL

13.3.1. DESCRIBE
13.3.2. USE

13.3.1. DESCRIBE

```
{DESCRIBE | DESC} tbl_name [col_name | wild]
```

DESCRIBE SHOW COLUMNS FROM

13.5.4.3“SHOW COLUMNS”

col_name‘’‘ _’

```
mysql> DESCRIBE city;
+------------+----------+------+-----+---------+----------------+
| Field      | Type     | Null | Key | Default | Extra          |
+------------+----------+------+-----+---------+----------------+
| Id         | int(11)  | NO   | PRI | NULL    | auto_increment |
| Name       | char(35) | NO   |     |         |                |
| Country    | char(3)  | NO   | UNI |         |                |
| District   | char(20) | YES  | MUL |         |                |
| Population | int(11)  | NO   |     | 0       |                |
+------------+----------+------+-----+---------+----------------+
5 rows in set (0.00 sec)
```

NULLNULL

Key PRI UNI UNIQUE MUL

MULUNIQUE UNIQUE Key

Extra Extra IdAUTO_INCREMENT

CREATE TABLE MySQL 13.1.5.1“”

DESCRIBE Oracle

SHOW CREATE TABLESHOW TABLE STATUS 13.5.4“SHOW”

13.3.2. USE

```
USE db_name
```

USE *db_name*MySQL*db_name* USE

```
mysql> USE db1;
mysql> SELECT COUNT(*) FROM mytable;   # selects from db1.mytable
mysql> USE db2;
mysql> SELECT COUNT(*) FROM mytable;   # selects from db2.mytable
```

USE db1 db2

```
mysql> USE db1;
mysql> SELECT author_name,editor_name FROM author,db2.editor
    ->        WHERE author.editor_id = db2.editor.editor_id;
```

USE Sybase

13.4. MySQL

13.4.1. START TRANSACTION, COMMITROLLBACK
13.4.2.
13.4.3.
13.4.4. SAVEPOINTROLLBACK TO SAVEPOINT
13.4.5. LOCK TABLESUNLOCK TABLES
13.4.6. SET TRANSACTION
13.4.7. XA

MySQLSET AUTOCOMMIT, START TRANSACTION, COMMIT ROLLBACK 13.4.1“START TRANSACTION, COMMIT ROLLBACK” XAMySQL 13.4.7“XA”

13.4.1. START TRANSACTION, COMMITROLLBACK

```
START TRANSACTION | BEGIN [WORK]

COMMIT [WORK] [AND [NO] CHAIN] [[NO] RELEASE]

ROLLBACK [WORK] [AND [NO] CHAIN] [[NO] RELEASE]

SET AUTOCOMMIT = {0 | 1}
```

START TRANSACTIONBEGIN COMMIT ROLLBACK SET AUTOCOMMITautocommit

WORK COMMITRELEASECHAINRELEASE CHAINRELEASE Completion_type 5.3.3“”

AND CHAIN RELEASE NOCHAINRELEASE completion_type NO

MySQLautocommit MySQL

InnoDB, BDBNDB autocommit

```
SET AUTOCOMMIT=0;
```

AUTOCOMMIT autocommit COMMIT ROLLBACK

autocommit START TRANSACTION

```
START TRANSACTION;

SELECT @A:=SUM(salary) FROM table1 WHERE type=1;

UPDATE table2 SET summary=@A WHERE type=1;

COMMIT;
```

START TRANSACTIONautocommit COMMITROLLBACK autocommit

BEGINBEGIN WORKSTART TRANSACTION START TRANSACTIONSQL ad-hoc BEGINBEGIN BEGINBEGIN...END 20.2.7“BEGIN ... END”

```
START TRANSACTION WITH CONSISTENT SNAPSHOT;
```

WITH CONSISTENT SNAPSHOT InnoDBSTART TRANSACTIONInnoDBSELECT 15.2.10.4“”

UNLOCK TABLES

· InnoDBBDB SERIALIZABLE SET TRANSACTION ISOLATION LEVELSERIALIZABLE

· autocommit

ROLLBACK ER_WARNING_NOT_COMPLETE_ROLLBACK

COMMIT

SET TRANSACTION ISOLATION LEVEL 13.4.6“SET TRANSACTION”

ROLLBACK SQL SHOW PROCESSLIST

StageRolling back

13.4.2.

DDL

13.4.3.

COMMIT

· ALTER FUNCTION, ALTER PROCEDURE, ALTER TABLE, BEGIN, CREATE DATABASE, CREATE FUNCTION, CREATE INDEX, CREATE PROCEDURE, CREATE TABLE, DROP DATABASE, DROP FUNCTION, DROP INDEX, DROP PROCEDURE, DROP TABLE, LOAD MASTER DATA, LOCK TABLES, RENAME TABLE, SET AUTOCOMMIT=1, START TRANSACTION, TRUNCATE TABLE, UNLOCK TABLES.

· UNLOCK TABLES

· CREATE TABLE, CREATE DATABASE DROP DATABASE, TRUNCATE TABLE, ALTER FUNCTION, ALTER PROCEDURE, CREATE FUNCTION, CREATE PROCEDURE, DROP FUNCTIONDROP PROCEDURE

· InnoDBCREATE TABLE ROLLBACKCREATE TABLE

COMMIT START TRANSACTION COMMIT

13.4.4. SAVEPOINTROLLBACK TO SAVEPOINT

```
SAVEPOINT identifier

ROLLBACK [WORK] TO SAVEPOINT identifier

RELEASE SAVEPOINT identifier
```

InnoDBSQLSAVEPOINT, ROLLBACK TO SAVEPOINT, RELEASE SAVEPOINTROLLBACKWORK

SAVEPOINT

ROLLBACK TO SAVEPOINT

```
ERROR 1181: Got error 153 during ROLLBACK
```

RELEASE SAVEPOINT

COMMITROLLBACK

13.4.5. LOCK TABLESUNLOCK TABLES

```
LOCK TABLES
    tbl_name [AS alias] {READ [LOCAL] | [LOW_PRIORITY] WRITE}
    [, tbl_name [AS alias] {READ [LOCAL] | [LOW_PRIORITY] WRITE}] ..
UNLOCK TABLES
```

LOCK TABLES UNLOCK TABLES LOCK TABLES

LOCK TABLES

· LOCK TABLES START TRANSACTION UNLOCK TABLES 13.4.3“”

· InnoDBLOCK TABLES AUTOCOMMIT=0UNLOCK TABLES LOCK TABLES InnoDB MySQL InnoDB MySQL UNLOCK TABLESAUTOCOMMIT=1 InnoDBLOCK TABLES AUTOCOMMIT=1InnoDB

· ROLLBACKMySQL

LOCK TABLESLOCK TABLESSELECT

LOCK TABLES

READ WRITE

READ LOCALREAD READ LOCAL INSERT MySQL READ LOCALInnoDB READ LOCALREAD

LOCK TABLES LOCK TABLES——

```
mysql> LOCK TABLE t WRITE, t AS t1 WRITE;
mysql> INSERT INTO t SELECT * FROM t;
ERROR 1100: Table 't' was not locked with LOCK TABLES
mysql> INSERT INTO t SELECT * FROM t AS t1;
```

```
mysql> LOCK TABLE t READ;
mysql> SELECT * FROM t AS myalias;
ERROR 1100: Table 'myalias' was not locked with LOCK TABLES
```

```
mysql> LOCK TABLE t AS myalias READ;
mysql> SELECT * FROM t;
ERROR 1100: Table 't' was not locked with LOCK TABLES
mysql> SELECT * FROM t AS myalias;
```

WRITEREAD READ WRITE READ WRITE LOW_PRIORITY WRITEWRITEREAD READ LOW_PRIORITY WRITE

LOCK TABLES

1.

2.

3.

LOW_PRIORITY WRITE MySQL READ WRITE WRITE

KILL 13.5.5.3“KILL”

INSERT DELAYED INSERT

UPDATE SQL

· MyISAM MyISAM READ WRITE

MyISAMLOCK TABLES MySQL UNLOCK TABLE SQL

· MySQL SELECTUPDATE LOCK TABLESLOCK TABLES

```
· mysql> LOCK TABLES trans READ, customer WRITE;
· mysql> SELECT SUM(value) FROM trans WHERE customer_
· mysql> UPDATE customer
·     ->     SET total_value=sum_from_previous_statem
·     ->     WHERE customer_id=some_id;
· mysql> UNLOCK TABLES;
```

LOCK TABLESSELECTUPDATEtrans

UPDATE customer SET *value*=*value*+*new_value*LAST_INSERT_ID()
LOCK TABLES1.8.5.3“”

GET_LOCK()RELEASE_LOCK() pthread_mutex_lock()
pthread_mutex_unlock() 12.9.4“”

7.3.1“”

FLUSH TABLES WITH READ LOCK 13.5.5.2“FLUSH” Veritas

ALTER TABLE A.7.1“ALTER TABLE”

13.4.6. SET TRANSACTION

```
SET [GLOBAL | SESSION] TRANSACTION ISOLATION LEVEL
{ READ UNCOMMITTED | READ COMMITTED | REPEATABLE READ | SERIALIZABLE
```

SET TRANSACTION GLOBAL SUPER SESSION

InnoDB 15.2.10.3“InnoDBTRANSACTION ISOLATION LEVEL”InnoDBMySQL 5.1 REPEATABLE READ

--transaction-isolation **mysqld** 5.3.1“ **mysqld**”

13.4.7. XA

13.4.7.1. XASQL
13.4.7.2. XA

InnoDB XA MySQL XAX/Open CAE*Distributed Transaction Processing: The XA Specification*Open Group http://www.opengroup.org/public/pubs/catalog/c193.htm I.5“XA” XA

MySQLXAXASQL MySQLSQL XA MySQL

MySQL MySQL/J 5.0.0XA XA SQL

XA RDBMSs

SERAILIZABLE ACID REPEATABLE READ REPEATABLE READ

· RDBMS“”

· MySQLOracle MySQL

· RDBMS ATMs ATM RDBMS ATM

· RM

· TM TMRMs“”

MySQLXA MySQL MySQLXA MySQL

2PC

1. TM RM

2. TMRMs

1PC

13.4.7.1. XASQL

MySQLXA

```
XA {START|BEGIN} xid [JOIN|RESUME]

XA END xid [SUSPEND [FOR MIGRATE]]

XA PREPARE xid

XA COMMIT xid [ONE PHASE]
```

```
XA ROLLBACK xid
```

```
XA RECOVER
```

XA STARTJOINRESUME

XA ENDSUSPEND [FOR MIGRATE]

XAXA xid xidXA xid MySQL xid

```
xid: gtrid [, bqual [, formatID ]]
```

gtrid bqual formatID gtridbqual bqualformatID bqual" fromatID1

gtridbqual 64 gtridbqual ('ab')(0x6162, X'ab')(b'*nnnn*')

formatID

MySQLXA gtridbqual XASQL gtridbqual

xid TMTMs TMxid XA RECOVER

XA START xidxidXA XAxid XA gtridbqual XAXAXA STARTxid xidXA

XA XAxidgtrid gtrid XA XA xidbqual bqual MySQL XA XA

MySQLPREPAREDXA XA RECOVER 13.4.7.2“XA” . XA

XA RECOVER xid'abc', 'def' 7

```
mysql> XA RECOVER;
+----------+--------------+--------------+--------+
| formatID | gtrid_length | bqual_length | data   |
+----------+--------------+--------------+--------+
```

```
|        7 |            3 |            3 | abcdef |
+----------+--------------+--------------+--------+
```

· formatIDxidformatID

· gtrid_lengthxidgtrid

· bqual_lengthxidbqual

· dataxidgtridbqual

13.4.7.2. XA

XA

1. XA STARTXA ACTIVE

2. ACTIVE XA SQL XA END XA ENDIDLE

3. IDLE XA XA PREPAREXA COMMIT…ONE PHASE

· XA PREPAREPREPARED XA RECOVERxid XA RECOVER PREPAREDXA

· XA COMMIT…ONE PHASE xidXA RECOVER

4. PREPARED XA XA COMMIT XA ROLLBACK

XA

```
mysql> XA START 'xatest';
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO mytable (i) VALUES(10);
Query OK, 1 row affected (0.04 sec)
```

```
mysql> XA END 'xatest';
Query OK, 0 rows affected (0.00 sec)

mysql> XA PREPARE 'xatest';
Query OK, 0 rows affected (0.00 sec)

mysql> XA COMMIT 'xatest';
Query OK, 0 rows affected (0.00 sec)
```

XA XA XA STARTXA XA TRANSACTION XA

13.5.

13.5.1.
13.5.2.
13.5.3. SET
13.5.4. SHOW
13.5.5.

13.5.1.

13.5.1.1. CREATE USER
13.5.1.2. DROP USER
13.5.1.3. GRANTREVOKE
13.5.1.4. RENAME USER
13.5.1.5. SET PASSWORD

13.5.1.1. CREATE USER

```
CREATE USER user [IDENTIFIED BY [PASSWORD] 'password']
    [, user [IDENTIFIED BY [PASSWORD] 'password']] ...
```

CREATE USERMySQL CREATE USERmysqlCREATE USER INSERT CREATE USERmysql.user

IDENTIFIED BY user GRANT PASSWORD PASSWORD() PASSWORD13.5.1.3“GRANTREVOKE”

13.5.1.2. DROP USER

```
DROP USER user [, user] ...
```

DROP USERMySQL DROP USERmysqlCREATE USERDELETE GRANTREVOKE 'jeffrey'@'localhost'

DROP USER

```
DROP USER user;
```

DROP USER

13.5.1.3. GRANTREVOKE

```
GRANT priv_type [(column_list)] [, priv_type [(column_list)]] ...
    ON [object_type] {tbl_name | * | *.* | db_name.*}
    TO user [IDENTIFIED BY [PASSWORD] 'password']
        [, user [IDENTIFIED BY [PASSWORD] 'password']] ...
    [REQUIRE
        NONE |
        [{SSL| X509}]
        [CIPHER 'cipher' [AND]]
        [ISSUER 'issuer' [AND]]
        [SUBJECT 'subject']]
    [WITH with_option [with_option] ...]

object_type =
    TABLE
  | FUNCTION
  | PROCEDURE

with_option =
    GRANT OPTION
  | MAX_QUERIES_PER_HOUR count
  | MAX_UPDATES_PER_HOUR count
  | MAX_CONNECTIONS_PER_HOUR count
  | MAX_USER_CONNECTIONS count

REVOKE priv_type [(column_list)] [, priv_type [(column_list)]] ...
    ON [object_type] {tbl_name | * | *.* | db_name.*}
    FROM user [, user] ...

REVOKE ALL PRIVILEGES, GRANT OPTION FROM user [, user] ...
```

GRANTREVOKEMySQL

MySQLmysql [5](#)

mixed-case lower_case_table_names REVOKE
lower_case_table_names GRANT

.

mysql.user GRANT ALL ON *.*REVOKE ALL ON *.*

.

mysql.dbmysql.host GRANT ALL ON *db_name*.*REVOKE ALL ON *db_name*.*

.

mysql.talbes_priv GRANT ALL ON *db_name.tbl_name*REVOKE ALL ON *db_name.tbl_name*

.

mysql.columns_priv REVOKE

.

CREATE ROUTINE, ALTER ROUTINE, EXECUTEGRANT
CREATE ROUTINE mysql.procs_priv

*object_type*TABLEFUNCTIONPROCEDUREMySQL 2.10.2 “”

GRANTREVOKEGRANT OPTION

```
REVOKE ALL PRIVILEGES, GRANT OPTION FROM user [, user] ...
```

REVOKE mysqlCREATE USERUPDATE

GRANTREVOKE priv_type

ALL	GRANT OPTION

[PRIVILEGES]	
ALTER	ALTER TABLE
ALTER ROUTINE	
CREATE	CREATE TABLE
CREATE ROUTINE	
CREATE TEMPORARY TABLES	CREATE TEMPORARY TABLE
CREATE USER	CREATE USER, DROP USER, RENAME USERREVOKE ALL PRIVILEGES
CREATE VIEW	CREATE VIEW
DELETE	DELETE
DROP	DROP TABLE
EXECUTE	
FILE	SELECT...INTO OUTFILELOAD DATA INFILE

INDEX	CREATE INDEXDROP INDEX
INSERT	INSERT
LOCK TABLES	SELECTLOCK TABLES
PROCESS	SHOW FULL PROCESSLIST
REFERENCES	
RELOAD	FLUSH
REPLICATION CLIENT	
REPLICATION SLAVE	
SELECT	SELECT
SHOW DATABASES	SHOW DATABASES
SHOW VIEW	SHOW CREATE VIEW
SHUTDOWN	**mysqladmin shutdown**

SUPER	CHANGE MASTER, KILL, PURGE MASTER LOGSSET GLOBAL **mysqladmin debug** max_connections
UPDATE	UPDATE
USAGE	“”
GRANT OPTION	

MySQL EXECUTE, CREATE VIEW, SHOW VIEW, CREATE USER, CREATE ROUTINEALTER ROUTINE 2.10.2“”

REFERENCES

USAGE

SHOW GRANTS 13.5.4.10“SHOW GRANTS”

ON *.* ON *db_name*.* ON * ON *

FILE, PROCESS, RELOAD, REPLICATION CLIENT, REPLICATION SLAVE, SHOW DATABASES, SHUTDOWNSUPER ON *.*

priv_typeSELECT, INSERT, UPDATE, DELETE, CREATE, DROP, GRANT OPTION, INDEXALTER

column_list priv_typeSELECT, INSERTUPDATE

priv_typeALTER ROUTINE, EXECUTEGRANT OPTIONCREATE ROUTINE

GRANT ALL GRANT ALL ON *db_name*.* FILE

MySQL CREATE

MySQL

GRANT GRANT‘ _’‘ %’‘ _’ GRANT‘ _’
GRANT ... ON `foo\_bar`.* TO ...

MySQL*user_name@host_name*user user_namehost_name
‘ -’ user_name‘ %’ 'test-user'@'test-hostname'username
hostname

hostname *user_name*@'%.loc.gov'loc.govuser_name
user_name@'144.155.166.%'144.155.166 Cuser_name

user_name*user_name*@'%'

MySQLusernames User="mysql.user GRANT

```
mysql> GRANT ALL ON test.* TO ''@'localhost' ...
```

(‘`’) (‘'’)hostnamesusernames

MySQL *user_name*@localhost MySQL mysql.userlocalhost

```
mysql> SELECT Host, User FROM mysql.user WHERE User='';
```

```
mysql> DELETE FROM mysql.user WHERE Host='localhost' AND User='';
mysql> FLUSH PRIVILEGES;
```

GRANT60hostnames 64 Usernames16 mysql.u
MySQL My

OR mysql.userSELECT

```
global privileges
OR (database privileges AND host privileges)
OR table privileges
OR column privileges
```

5.7“MySQL”

mysql.userusername/hostname DELETE GRANT REVOKE DROP USERDELETE

IDENTIFIED BY

IDENTIFIED BY NO_ GRANT GRANT IDENTIFIED BY

SET PASSWORD 13.5.1.5“SET PASSWORD”

IDENTIFIED BY PASSWORD() SET PASSWORD

```
GRANT ... IDENTIFIED BY 'mypass';
```

PASSWORD() PASSWORD

```
GRANT ...
IDENTIFIED BY PASSWORD '*6C8989366EAF75BB670AD8EA7A7FC1176A95CEF4';
```

C make_scrambled_password() C API

mysql.db REVOKE

SHOW TABLES

SHOW DATABASESSHOW DATABASE --skip-show-database

WITH GRANT OPTION GRANT OPTION

GRANT OPTION

GRANT OPTION INSERT SELECT WITH GRANT OPTIONSELECT INSERTUPDATE INSERT, SELECTUPDATE

ALTER

The MAX_QUERIES_PER_HOUR *count*, MAX_UPDATES_PER_HOUR *count*, and MAX_CONNECTIONS_PER_HOUR *count* options limit the number of queries, updates, and logins a user can perform during any given one-hour period. If *count* is 0 (the default), this means that there is no limitation for that user. MAX_QUERIES_PER_HOUR *count*, MAX_UPDATES_PER_HOUR *count*MAX_CONNECTIONS_PER_HOUR *count* count0

MAX_USER_CONNECTIONS *count* count0 max_user_connections

GRANT USAGE ON *.* ... WITH MAX_...

5.8.4“”

username MySQLX509 MySQLSSL GRANTREQUIRE MySQLSSL 5.8.7“”

· SSLX509 username

· REQUIRE SSL SSL SSL

· mysql> **GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo**

· -> **IDENTIFIED BY 'goodsecret' REQUIRE SSL;**

· REQUIRE X509 CA

· mysql> **GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo**

· -> **IDENTIFIED BY 'goodsecret' REQUIRE X509;**

· REQUIRE ISSUER '*issuer*' CA’issuer’ X509 X509 SSL

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
·     -> IDENTIFIED BY 'goodsecret'
·     -> REQUIRE ISSUER '/C=FI/ST=Some-State/L=Helsin
·        O=MySQL Finland AB/CN=Tonu Samuel/Email=tonu
```

ISSUER

· REQUIRE SUBJECT '*subject*' subjectX509

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
·     -> IDENTIFIED BY 'goodsecret'
·     -> REQUIRE SUBJECT '/C=EE/ST=Some-State/L=Talli
·        O=MySQL demo client certificate/
·        CN=Tonu Samuel/Email=tonu@example.com';
```

SUBJECT

· REQUIRE CIPHER '*cipher*' SSL

```
· mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'lo
·     -> IDENTIFIED BY 'goodsecret'
·     -> REQUIRE CIPHER 'EDH-RSA-DES-CBC3-SHA';
```

SUBJECT, ISSUERCIPHERREQUIRE

```
mysql> GRANT ALL PRIVILEGES ON test.* TO 'root'@'localhost'
    -> IDENTIFIED BY 'goodsecret'
    -> REQUIRE SUBJECT '/C=EE/ST=Some-State/L=Tallinn/
       O=MySQL demo client certificate/
       CN=Tonu Samuel/Email=tonu@example.com'
    -> AND ISSUER '/C=FI/ST=Some-State/L=Helsinki/
       O=MySQL Finland AB/CN=Tonu Samuel/Email=tonu@example.com'
    -> AND CIPHER 'EDH-RSA-DES-CBC3-SHA';
```

SUBJECTISSUER

REQUIRE AND

mysqld 5.7.7“”

MySQL

SQLMySQLGRANT

· MySQL hostnameusername username

· SQL MySQL

· MySQLSQL TRIGGERUNDER

· SQL MySQL DROP USER 13.5.1.2“DROP USER ”

· SQL SQL MySQL REVOKE MySQL

· MySQL INSERT INSERT INSERT SQL 5.3.2“SQL” 13.1.5“CREATE TABLE”

INSERT SQLINSERT

MySQL INSERT INSERT INSERT sql_mode='traditional' INSERT

13.5.1.4. RENAME USER

```
RENAME USER old_user TO new_user
    [, old_user TO new_user] ...
```

RENAME USERMySQL RENAME USERCREATE USERmysqlUPDATE *old_user**new_user*GRANT

13.5.1.5. SET PASSWORD

```
SET PASSWORD = PASSWORD('some password')

SET PASSWORD FOR user = PASSWORD('some password')
```

SET PASSWORDMySQL

mysqlUPDATE user*user_name@host_name* *user_namehost_name* mysql.userUserHost UserHost'bob"%.loc.gov'

```
mysql> SET PASSWORD FOR 'bob'@'%.loc.gov' = PASSWORD('newpass');
```

```
mysql> UPDATE mysql.user SET Password=PASSWORD('newpass')
    -> WHERE User='bob' AND Host='%.loc.gov';
mysql> FLUSH PRIVILEGES;
```

4.1MySQL 4.1MySQL 4.1 5.7.9“MySQL 4.1” SET PASSWORDUPDATE MySQL 4.1

SELECT CURRENT_USER()user@host

13.5.2.

13.5.2.1. ANALYZE TABLE
13.5.2.2. BACKUP TABLE
13.5.2.3. CHECK TABLE
13.5.2.4. CHECKSUM TABLE
13.5.2.5. OPTIMIZE TABLE
13.5.2.6. REPAIR TABLE
13.5.2.7. RESTORE TABLE

13.5.2.1. ANALYZE TABLE

```
ANALYZE [LOCAL | NO_WRITE_TO_BINLOG] TABLE tbl_name [, tbl_name] ...
```

MyISAM, BDBInnoDB MyISAM **myisamchk -a**

MySQL

Table	
Op	
Msg_type	
Msg_text	

SHOW INDEX [13.5.4.11“SHOW INDEX”]

ANALYZE TABLE

ANALYZE TABLE NO_WRITE_TO_BINLOG LOCAL

13.5.2.2. BACKUP TABLE

```
BACKUP TABLE tbl_name [, tbl_name] ... TO '/path/to/backup/directory
```

mysqlhotcopy

BACKUP TABLE MyISAM .frm.MYD .MYI

[5.9.1“”]

Table	
Op	
Msg_type	
Msg_text	

13.5.2.3. CHECK TABLE

```
CHECK TABLE tbl_name [, tbl_name] ... [option] ...

option = {QUICK | FAST | MEDIUM | EXTENDED | CHANGED}
```

CHECK TABLEMyISAMInnoDB MyISAM

CHECK TABLE

CHECK TABLE

Table	
Op	

Msg_type	
Msg_text	

Msg_type Msg_textOKOK [5.9.4“”]

MyISAM InnoDB

QUICK	
FAST	
CHANGED	
MEDIUM	
EXTENDED	100

QUICK, MEDIUMEXTENDED MyISAM MEDIUM**myisamchk --medium-check *tbl_name*** MyISAM MEDIUMCHANGEDFAST QUICKCHANGEDFAST

```
CHECK TABLE test_table FAST QUICK;
```

CHECK TABLE“ corrupted”“ not closed properly” CHECK

TABLE CHECK TABLE

QUICK QUICKQUICK MySQL
“ corrupted”

FASTCHANGED cron FASTCHANGED FAST CHANGEDMyISAM

MySQL EXTENDED EXTENDED

CHECK TABLE

· auto_increment0

AUTO_INCREMENT0 UPDATE 0AUTO_INCREMENT0

ALTER TABLE AUTO_INCREMENTAUTO_INCREMENT

UPDATE 0

13.5.2.4. CHECKSUM TABLE

```
CHECKSUM TABLE tbl_name [, tbl_name] ... [ QUICK | EXTENDED ]
```

QUICK NULL CHECKSUM1 MyISAM 13.1.5“CREATE TABLE”

EXTENDED

QUICKEXTENDED MySQL

CHECKSUM TABLENULL

13.5.2.5. OPTIMIZE TABLE

```
OPTIMIZE [LOCAL | NO_WRITE_TO_BINLOG] TABLE tbl_name [, tbl_name] ..
```

VARCHAR, BLOBTEXT OPTIMIZE TABLE INSERT OPTIMIZE TABLE

OPTIMIZE TABLE

OPTIMIZE TABLEMyISAM, BDBInnoDB

MyISAM OPTIMIZE TABLE

1.

2.

3.

BDB OPTIMIZE TABLEANALYZE TABLE InnoDB OPTIMIZE TABLEALTER TABLE 13.5.2.1“ANALYZE TABLE”

—skip-new—safe-modemysqldmysqldOPTIMIZE TABLE

OPTIMIZE TABLE MySQL

OPTIMIZE TABLE NO_WRITE_TO_BINLOG LOCAL MySQLOPTIMIZE TABLE

13.5.2.6. REPAIR TABLE

```
REPAIR [LOCAL | NO_WRITE_TO_BINLOG] TABLE
    tbl_name [, tbl_name] ... [QUICK] [EXTENDED] [USE_FRM]
```

REPAIR TABLE REPAIR TABLE**myisamchk --recover *tbl_name***
REPAIR TABLEMyISAMARCHIVE 15.1“MyISAM”, 15.8 “ARCHIVE”

REPAIR TABLEMyISAM REPAIR TALBEA.4.2 “MySQL” 15.1.4“MyISAM”

Table	
Op	
Msg_type	
Msg_text	

REPAIR TABLE Msg_type Msg_testOKOK**myisamchk --safe-recover** REPAIR TABLE**myisamchk**

QUICKREPAIR TABLE **myisamchk --recover --quick**

EXTENDEDMySQL **myisamchk --safe-recover**

REPAIR TABLEUSE_FRM .MYI MySQL.frm.MYI **myisamchk** REPAIR .MYI AUTO_ REPAIR...USE_FRM USE_FRM.MYI

REPAIR TABLE NO_WRITE_TO_BINLOG LOCAL

REPAIR TABLE REPAIR TABLE

13.5.2.7. RESTORE TABLE

```
RESTORE TABLE tbl_name [, tbl_name] ... FROM '/path/to/backup/direct
```

BACKUP TABLE BACKUP TABLE RESTORE TABLE MyISAM

.frm.MYD .MYI

Table	
Op	
Msg_type	
Msg_text	

13.5.3. SET

```
SET variable_assignment [, variable_assignment] ...

variable_assignment:
      user_var_name = expr
    | [GLOBAL | SESSION] system_var_name = expr
    | @@[global. | session.]system_var_name = expr
```

SET SET

SET PASSWORD13.5.1.5“SET PASSWORD”

5.3.3.1“”

MySQLSET OPTION SETSET OPTION

@var_name

```
SET @var_name = expr;
```

9.3“”

*var_name*SET GLOBAL@@global SESSION, @@session@@ LOCAL@@localSESSION@@session SET

@@var_name MySQL

GLOBALSESSION

```
SET sort_buffer_size=10000;
SET @@local.sort_buffer_size=10000;
SET GLOBAL sort_buffer_size=1000000, SESSION sort_buffer_size=100000
SET @@sort_buffer_size=1000000;
SET @@global.sort_buffer_size=1000000, @@local.sort_buffer_size=1000
```

SESSION GLOBAL SUPER 4.3.2“”

SET GLOBALSET SESSION GLOBAL @@ MySQL

SESSIONGLOBALGLOBALMySQL DEFAULT max_join_size

```
SET max_join_size=DEFAULT;
SET @@session.max_join_size=@@global.max_join_size;
```

SHOW VARIABLES 13.5.4.21“SHOW VARIABLES” LIKE

```
SHOW VARIABLES LIKE 'max_join_size';
SHOW GLOBAL VARIABLES LIKE 'max_join_size';
```

‘ %’

```
SHOW VARIABLES LIKE 'have%';

SHOW GLOBAL VARIABLES LIKE 'have%';
```

@@[global.|local.]var_nameSELECT

```
SELECT @@max_join_size, @@global.max_join_size;
```

SELECT @@var_name MySQLSESSION GLOBAL

5.3.3“” SHOW VARIABLES SELECT CHARACTER SETSET NAMES

```
mysql> SELECT @@AUTOCOMMIT;

+--------------+

| @@AUTOCOMMIT |

+--------------+

|            1 |

+--------------+
```

· AUTOCOMMIT = {0 | 1}

autocommit 1 0COMMIT ROLLBACK AUTOCOMMIT01 MySQLCOMMITSTART TRANSACTIONBEGIN 13.4.1“START TRANSACTION, COMMITROLLBACK”

· BIG_TABLES = {0 | 1}

1 SELECT The table *tbl_name* is full 0 SQL_BIG_

· CHARACTER SET {*charset_name* | DEFAULT}

MyS

character_set_results character_set_connectioncharacter_set_database

DEFAULT

SET CHARACTER SET

· FOREIGN_KEY_CHECKS = {0 | 1}

1 InnoDB 0 InnoDB/ 15.2.6.4“FOREIGN KEY”

· IDENTITY = *value*

LAST_INSERT_ID SELECT @@IDENTITY SET IDENTITY

· INSERT_ID = *value*

INSERTALTER TABLE AUTO_INCREMENT

· LAST_INSERT_ID = *value*

LAST_INSERT_ID() LAST_INSERT_ID() mysql_insert_id() C API

· NAMES {'*charset_name*' | DEFAULT}

SET NAMEScharacter_set_client, character_set_connection
character_set_results character_set_connectioncharset_name
collation_connectioncharset_name

DEFAULT

SET NAMES

· ONE_SHOT

ONE_SHOT

```
mysql> SET ONE_SHOT max_allowed_packet = 1;
ERROR 1382 (HY000): The 'SET ONE_SHOT' syntax is reserved for purpos
```

ONE_SHOT SET SET

```
mysql> SET ONE_SHOT character_set_connection = latin5;

mysql> SET ONE_SHOT collation_connection = latin5_turkish_ci;

mysql> SHOW VARIABLES LIKE '%_connection';
+--------------------------+-------------------+
| Variable_name            | Value             |
+--------------------------+-------------------+
| character_set_connection | latin5            |
| collation_connection     | latin5_turkish_ci |
+--------------------------+-------------------+

mysql> SHOW VARIABLES LIKE '%_connection';
+--------------------------+-------------------+
| Variable_name            | Value             |
+--------------------------+-------------------+
| character_set_connection | latin1            |
| collation_connection     | latin1_swedish_ci |
+--------------------------+-------------------+
```

· SQL_NOTES = {0 | 1}

1“” 0“” Mysqldump 0

· SQL_AUTO_IS_NULL = {0 | 1}

1 AUTO_INCREMENT

```
WHERE auto_increment_column IS NULL
```

ODBC Access

· SQL_BIG_SELECTS = {0 | 1}

0MySQLSELECT max_join_size WHERE 1SELECT

max_join_sizeDEFAULT SQL_BIG_SELECTS0

· SQL_BUFFER_RESULT = {0 | 1}

SQL_BUFFER_RESULTSELECT MySQL

· SQL_LOG_BIN = {0 | 1}

0 SUPER

· SQL_LOG_OFF = {0 | 1}

1 SUPER

· SQL_LOG_UPDATE = {0 | 1}

SQL_LOG_BIN

· SQL_QUOTE_SHOW_CREATE = {0 | 1}

1SHOW CREATE TABLE 0 13.5.4.5“SHOW CREATE TABLE”

· SQL_SAFE_UPDATES = {0 | 1}

1MySQLWHERELIMITUPDATEDELETE UPDATEDELETE

· SQL_SELECT_LIMIT = {*value* | DEFAULT}

SELECT“ unlimited” SQL_SELECT_LIMIT DEFAULT

SELECTLIMIT LIMITSQL_SELECT_LIMIT

SQL_SELECT_LIMTSELECT SELECT SELECT CREATE TABLE...SELECTINSERT INTO...SELECT

· SQL_WARNINGS = {0 | 1}

INSERT 01

· TIMESTAMP = {*timestamp_value* | DEFAULT}

· UNIQUE_CHECKS = {0 | 1}

1 InnoDB 0InnoDB 0InnoDB

13.5.4. SHOW

13.5.4.1. SHOW CHARACTER SET
13.5.4.2. SHOW COLLATION
13.5.4.3. SHOW COLUMNS
13.5.4.4. SHOW CREATE DATABASE
13.5.4.5. SHOW CREATE TABLE
13.5.4.6. SHOW DATABASES
13.5.4.7. SHOW ENGINE
13.5.4.8. SHOW ENGINES
13.5.4.9. SHOW ERRORS
13.5.4.10. SHOW GRANTS
13.5.4.11. SHOW INDEX
13.5.4.12. SHOW INNODB STATUS
13.5.4.13. SHOW LOGS
13.5.4.14. SHOW OPEN TABLES
13.5.4.15. SHOW PRIVILEGES
13.5.4.16. SHOW PROCESSLIST
13.5.4.17. SHOW STATUS
13.5.4.18. SHOW TABLE STATUS
13.5.4.19. SHOW TABLES
13.5.4.20. SHOW TRIGGERS
13.5.4.21. SHOW VARIABLES
13.5.4.22. SHOW WARNINGS

SHOW

```
SHOW [FULL] COLUMNS FROM tbl_name [FROM db_name] [LIKE 'pattern']
```

```
SHOW CREATE DATABASE db_name

SHOW CREATE TABLE tbl_name

SHOW DATABASES [LIKE 'pattern']

SHOW ENGINE engine_name {LOGS | STATUS }

SHOW [STORAGE] ENGINES

SHOW ERRORS [LIMIT [offset,] row_count]

SHOW GRANTS FOR user

SHOW INDEX FROM tbl_name [FROM db_name]

SHOW INNODB STATUS

SHOW [BDB] LOGS

SHOW PRIVILEGES

SHOW [FULL] PROCESSLIST

SHOW [GLOBAL | SESSION] STATUS [LIKE 'pattern']

SHOW TABLE STATUS [FROM db_name] [LIKE 'pattern']

SHOW [OPEN] TABLES [FROM db_name] [LIKE 'pattern']

SHOW TRIGGERS

SHOW [GLOBAL | SESSION] VARIABLES [LIKE 'pattern']

SHOW WARNINGS [LIMIT [offset,] row_count]
```

SHOW [13.6“”]

```
SHOW BINLOG EVENTS

SHOW MASTER LOGS

SHOW MASTER STATUS

SHOW SLAVE HOSTS

SHOW SLAVE STATUS
```

SHOWLIKE '*pattern*' '*pattern*'SQL ‘%’‘ _’

13.5.4.1. SHOW CHARACTER SET

```
SHOW CHARACTER SET [LIKE 'pattern']
```

SHOW CHARACTER SET LIKE

```
mysql> SHOW CHARACTER SET LIKE 'latin%';
+---------+-----------------------------+-------------------+-------
| Charset | Description                 | Default collation | Maxlen
+---------+-----------------------------+-------------------+-------
| latin1  | cp1252 West European        | latin1_swedish_ci |      1
| latin2  | ISO 8859-2 Central European | latin2_general_ci |      1
| latin5  | ISO 8859-9 Turkish          | latin5_turkish_ci |      1
| latin7  | ISO 8859-13 Baltic          | latin7_general_ci |      1
+---------+-----------------------------+-------------------+-------
```

Maxlen

13.5.4.2. SHOW COLLATION

```
SHOW COLLATION [LIKE 'pattern']
```

SHOW COLLATION LIKE pattern

```
mysql> SHOW COLLATION LIKE 'latin1%';
+-------------------+---------+----+---------+----------+---------+
| Collation         | Charset | Id | Default | Compiled | Sortlen |
+-------------------+---------+----+---------+----------+---------+
| latin1_german1_ci | latin1  |  5 |         |          |       0 |
| latin1_swedish_ci | latin1  |  8 | Yes     | Yes      |       0 |
| latin1_danish_ci  | latin1  | 15 |         |          |       0 |
| latin1_german2_ci | latin1  | 31 |         | Yes      |       2 |
```

```
| latin1_bin        | latin1  | 47 |         | Yes      |       0 |
| latin1_general_ci | latin1  | 48 |         |          |       0 |
| latin1_general_cs | latin1  | 49 |         |          |       0 |
| latin1_spanish_ci | latin1  | 94 |         |          |       0 |
+-------------------+---------+----+---------+----------+---------+
```

Default Compiled Sortlen

13.5.4.3. SHOW COLUMNS

```
SHOW [FULL] COLUMNS FROM tbl_name [FROM db_name] [LIKE 'pattern']
```

SHOW COLUMNS

CREATE TABLE MySQL [13.1.5.1“”]

FULL

db_name.tbl_nametbl_name FROM db_name

```
mysql> SHOW COLUMNS FROM mytable FROM mydb;
mysql> SHOW COLUMNS FROM mydb.mytable;
```

SHOW FIELDSSHOW COLUMNS mysqlshow db_name tbl_name

DESCRIBESHOW COLUMNS [13.3.1“DESCRIBE”]

13.5.4.4. SHOW CREATE DATABASE

```
SHOW CREATE {DATABASE | SCHEMA} db_name
```

CREATE DATABASE SHOW CREATE SCHEMA

```
mysql> SHOW CREATE DATABASE test\G
*************************** 1. row ***************************
       Database: test
Create Database: CREATE DATABASE `test`
```

```
                /*!40100 DEFAULT CHARACTER SET latin1 */

mysql> SHOW CREATE SCHEMA test\G
*************************** 1. row ***************************
       Database: test
Create Database: CREATE DATABASE `test`
                /*!40100 DEFAULT CHARACTER SET latin1 */
```

13.5.4.5. SHOW CREATE TABLE

```
SHOW CREATE TABLE tbl_name
```

CREATE TABLE

```
mysql> SHOW CREATE TABLE t\G
*************************** 1. row ***************************
       Table: t
Create Table: CREATE TABLE t (
  id INT(11) default NULL auto_increment,
  s char(60) default NULL,
  PRIMARY KEY (id)
) ENGINE=MyISAM
```

SQL_QUOTE_SHOW_CREATE SHOW CREATE TABLE 13.5.3 “SET”

13.5.4.6. SHOW DATABASES

```
SHOW {DATABASES | SCHEMAS} [LIKE 'pattern']
```

SHOW DATABASESMySQL mysqlshow SHOW DATABASES

--skip-show-database SHOW DATABASES

SHOW SCHEMAS

13.5.4.7. SHOW ENGINE

```
SHOW ENGINE engine_name {LOGS | STATUS }
```

SHOW ENGINE

```
SHOW ENGINE BDB LOGS
```

```
SHOW ENGINE INNODB STATUS
```

SHOW ENGINE BDB LOGSBDB

· File

· Type

Berkeley DBBDB

· Status

FREE IN USE

SHOW ENGINE INNODB STATUSInnoDB

SHOW [BDB] LOGSSHOW INNODB STATUS

SHOW ENGINEMySQL 4.1.2

13.5.4.8. SHOW ENGINES

```
SHOW [STORAGE] ENGINES
```

SHOW ENGINES SHOW TABLE TYPES

```
mysql> SHOW ENGINES\G
*************************** 1. row ***************************
```

```
 Engine: MyISAM
Support: DEFAULT
Comment: Default engine as of MySQL 3.23 with great performance
*************************** 2. row ***************************
 Engine: MEMORY
Support: YES
Comment: Hash based, stored in memory, useful for temporary tables
*************************** 3. row ***************************
 Engine: HEAP
Support: YES
Comment: Alias for MEMORY
*************************** 4. row ***************************
 Engine: MERGE
Support: YES
Comment: Collection of identical MyISAM tables
*************************** 5. row ***************************
 Engine: MRG_MYISAM
Support: YES
Comment: Alias for MERGE
*************************** 6. row ***************************
 Engine: ISAM
Support: NO
Comment: Obsolete storage engine, now replaced by MyISAM
*************************** 7. row ***************************
 Engine: MRG_ISAM
Support: NO
Comment: Obsolete storage engine, now replaced by MERGE
*************************** 8. row ***************************
 Engine: InnoDB
Support: YES
Comment: Supports transactions, row-level locking, and foreign keys
*************************** 9. row ***************************
 Engine: INNOBASE
Support: YES
Comment: Alias for INNODB
*************************** 10. row ***************************
 Engine: BDB
Support: NO
Comment: Supports transactions and page-level locking
*************************** 11. row ***************************
 Engine: BERKELEYDB
Support: NO
Comment: Alias for BDB
*************************** 12. row ***************************
 Engine: NDBCLUSTER
Support: DISABLED
Comment: Clustered, fault-tolerant, memory-based tables
*************************** 13. row ***************************
 Engine: NDB
```

```
Support: DISABLED
Comment: Alias for NDBCLUSTER
*************************** 14. row ***************************
 Engine: EXAMPLE
Support: NO
Comment: Example storage engine
*************************** 15. row ***************************
 Engine: ARCHIVE
Support: YES
Comment: Archive storage engine
*************************** 16. row ***************************
 Engine: CSV
Support: YES
Comment: CSV storage engine
*************************** 17. row ***************************
 Engine: FEDERATED
Support: NO
Comment: Federated MySQL storage engine
*************************** 18. row ***************************
 Engine: BLACKHOLE
Support: YES
Comment: /dev/null storage engine (anything you write to it disappea
```

Support --default-table-type=InnoDB InnoDBSupportDEFAULT 15

13.5.4.9. SHOW ERRORS

```
SHOW ERRORS [LIMIT [offset,] row_count]

SHOW COUNT(*) ERRORS
```

SHOW WARNINGS

LIMITSELECT 13.2.7“SELECT”

SHOW COUNT(*) ERRORS error_count

```
SHOW COUNT(*) ERRORS;

SELECT @@error_count;
```

13.5.4.22“SHOW WARNINGS”

13.5.4.10. SHOW GRANTS

```
SHOW GRANTS FOR user
```

MySQLGRANT

```
mysql> SHOW GRANTS FOR 'root'@'localhost';
+-----------------------------------------------------------------
| Grants for root@localhost
+-----------------------------------------------------------------
| GRANT ALL PRIVILEGES ON *.* TO 'root'@'localhost' WITH GRANT OPTIO
+-----------------------------------------------------------------
```

```
SHOW GRANTS;
SHOW GRANTS FOR CURRENT_USER;
SHOW GRANTS FOR CURRENT_USER();
```

13.5.4.11. SHOW INDEX

```
SHOW INDEX FROM tbl_name [FROM db_name]
```

SHOW INDEX ODBCSQLStatistics

SHOW INDEX

· Table

· Non_unique

0 1

· Key_name

· Seq_in_index

1

· Column_name

· Collation

MySQL‘ A’ NULL

· Cardinality

ANALYZE TABLE**myisamchk -a** MySQL

· Sub_part

NU

· Packed

NULL

· Null

NULLYES NO

· Index_type

BTREE, FULLTEXT, HASH, RTREE

· Comment

db_name.tbl_nametbl_name FROM db_name

```
mysql> SHOW INDEX FROM mytable FROM mydb;
mysql> SHOW INDEX FROM mydb.mytable;
```

SHOW KEYSSHOW INDEX **mysqlshow -k *db_name tbl_name***

13.5.4.12. SHOW INNODB STATUS

```
SHOW INNODB STATUS
```

MySQL 5.1 SHOW ENGINE INNODB STATUS 13.5.4.7“SHOW ENGINE”

13.5.4.13. SHOW LOGS

```
SHOW [BDB] LOGS
```

MySQL 5.1 SHOW ENGINE BDB LOGS 13.5.4.7“SHOW ENGINE”

13.5.4.14. SHOW OPEN TABLES

```
SHOW OPEN TABLES [FROM db_name] [LIKE 'pattern']
```

SHOW OPEN TABLESTEMPORARY 7.4.9“MySQL”

SHOW OPEN TABLES

- Database
- Table
- In_use
- Name_locked

13.5.4.15. SHOW PRIVILEGES

```
SHOW PRIVILEGES
```

SHOW PRIVILEGESMySQL

```
mysql> SHOW PRIVILEGES\G
*************************** 1. row ***************************
Privilege: Alter
Context: Tables
Comment: To alter the table
*************************** 2. row ***************************
Privilege: Alter routine
Context: Functions,Procedures
Comment: To alter or drop stored functions/procedures
*************************** 3. row ***************************
Privilege: Create
Context: Databases,Tables,Indexes
Comment: To create new databases and tables
*************************** 4. row ***************************
Privilege: Create routine
Context: Functions,Procedures
Comment: To use CREATE FUNCTION/PROCEDURE
*************************** 5. row ***************************
Privilege: Create temporary tables
Context: Databases
Comment: To use CREATE TEMPORARY TABLE
*************************** 6. row ***************************
Privilege: Create view
Context: Tables
```

```
Comment: To create new views
*************************** 7. row ***************************
Privilege: Create user
Context: Server Admin
Comment: To create new users
*************************** 8. row ***************************
Privilege: Delete
Context: Tables
Comment: To delete existing rows
*************************** 9. row ***************************
Privilege: Drop
Context: Databases,Tables
Comment: To drop databases, tables, and views
*************************** 10. row ***************************
Privilege: Execute
Context: Functions,Procedures
Comment: To execute stored routines
*************************** 11. row ***************************
Privilege: File
Context: File access on server
Comment: To read and write files on the server
*************************** 12. row ***************************
Privilege: Grant option
Context: Databases,Tables,Functions,Procedures
Comment: To give to other users those privileges you possess
*************************** 13. row ***************************
```

```
Privilege: Index
Context: Tables
Comment: To create or drop indexes
*************************** 14. row ***************************
Privilege: Insert
Context: Tables
Comment: To insert data into tables
*************************** 15. row ***************************
Privilege: Lock tables
Context: Databases
Comment: To use LOCK TABLES (together with SELECT privilege)
*************************** 16. row ***************************
Privilege: Process
Context: Server Admin
Comment: To view the plain text of currently executing queries
*************************** 17. row ***************************
Privilege: References
Context: Databases,Tables
Comment: To have references on tables
*************************** 18. row ***************************
Privilege: Reload
Context: Server Admin
Comment: To reload or refresh tables, logs and privileges
*************************** 19. row ***************************
Privilege: Replication client
Context: Server Admin
```

```
Comment: To ask where the slave or master servers are
*************************** 20. row ***************************
Privilege: Replication slave
Context: Server Admin
Comment: To read binary log events from the master
*************************** 21. row ***************************
Privilege: Select
Context: Tables
Comment: To retrieve rows from table
*************************** 22. row ***************************
Privilege: Show databases
Context: Server Admin
Comment: To see all databases with SHOW DATABASES
*************************** 23. row ***************************
Privilege: Show view
Context: Tables
Comment: To see views with SHOW CREATE VIEW
*************************** 24. row ***************************
Privilege: Shutdown
Context: Server Admin
Comment: To shut down the server
*************************** 25. row ***************************
Privilege: Super
Context: Server Admin
Comment: To use KILL thread, SET GLOBAL, CHANGE MASTER, etc.
*************************** 26. row ***************************
```

```
Privilege: Update
Context: Tables
Comment: To update existing rows
*************************** 27. row ***************************
Privilege: Usage
Context: Server Admin
Comment: No privileges - allow connect only
```

13.5.4.16. SHOW PROCESSLIST

```
SHOW [FULL] PROCESSLIST
```

SHOW PROCESSLIST **mysqladmin processlist** SUPER MySQL 13.5.5.3“KILL” FULL 100

TCP/IP *host_name*:*client_port*

“ too many connections” MySQL SUPER

SHOW PROCESSLIST

· Checking table

· Closing tables

· Connect Out

· Copying to tmp table on disk

tmp_table_size

· Creating tmp table

· deleting from main table

· deleting from reference tables

· Flushing tables

FLUSH TABLES

· FULLTEXT initialization

· Killed

KILL MySQL

· Locked

· Sending data

SELECT

· Sorting for group

GROUP BY

· Sorting for order

ORDER BY

· Opening tables

ALTE

· Removing duplicates

SELECT DISTINCT MySQL MySQL

· Reopen table

· Repair by sorting

· Repair with keycache

· Searching rows for update

UPDATE

· Sleeping

· System lock

m

· Upgrading lock

INSERT DELAYED

· Updating

· User Lock

GET_LOCK()

· Waiting for tables

FLUSH TABLES FLUSH TABLES *tbl_name*, ALTER TABLE, RENAME TABLE, REPAIR TABLE, ANALYZE TABLEOPTIMIZE TABLE

· waiting for handler insert

INSERT DELAYED

13.5.4.17. SHOW STATUS

```
SHOW [GLOBAL | SESSION] STATUS [LIKE 'pattern']
```

SHOW STATUS **mysqladmin extended-status**

5.3.4“”

```
mysql> SHOW STATUS;
+--------------------------+------------+
| Variable_name            | Value      |
+--------------------------+------------+
| Aborted_clients          | 0          |
| Aborted_connects         | 0          |
| Bytes_received           | 155372598  |
| Bytes_sent               | 1176560426 |
| Connections              | 30023      |
| Created_tmp_disk_tables  | 0          |
| Created_tmp_tables       | 8340       |
| Created_tmp_files        | 60         |
...                       ...          ...
```

```
| Open_tables              | 1          |
| Open_files               | 2          |
| Open_streams             | 0          |
| Opened_tables            | 44600      |
| Questions                | 2026873    |
...                        ...          ...
| Table_locks_immediate    | 1920382    |
| Table_locks_waited       | 0          |
| Threads_cached           | 0          |
| Threads_created          | 30022      |
| Threads_connected        | 1          |
| Threads_running          | 1          |
| Uptime                   | 80380      |
+--------------------------+------------+
```

LIKE

```
mysql> SHOW STATUS LIKE 'Key%';
+--------------------+----------+
| Variable_name      | Value    |
+--------------------+----------+
| Key_blocks_used    | 14955    |
| Key_read_requests  | 96854827 |
| Key_reads          | 162040   |
| Key_write_requests | 7589728  |
| Key_writes         | 3813196  |
+--------------------+----------+
```

GLOBAL MySQL SESSION SESSIONLOCALSESSION

GLOBALSESSION

13.5.4.18. SHOW TABLE STATUS

```
SHOW TABLE STATUS [FROM db_name] [LIKE 'pattern']
```

SHOW TABLE STATUSSHOW TABLE **mysqlshow --status *db_name***

NDB Cluster Avg_row_lengthData_length BLOB Comment number_of_replicas

SHOW TABLE STATUS

· Name

· Engine

MySQL 4.1.2 Type15

· Version

.frm

· Row_format

Fixed, Dynamic, Compressed, Redundant, Compact InnoDBRedundant Compact

· Rows

MyISAM

InnoDB 4050 SELECT COUNT(*)

INFORMATION_SCHEMA RowsNULL

· Avg_row_length

· Data_length

· Max_data_length

· Index_length

· Data_free

· Auto_increment

AUTO_INCREMENT

· Create_time

· Update_time

· Check_time

NULL

· Collation

· Checksum

· Create_options

CREATE TABLE

· Comment

MySQL

InnoDB

MEMORY (HEAP) Data_length, Max_data_lengthIndex_length

SHOW TABLE STATUSNULLNameComment

13.5.4.19. SHOW TABLES

```
SHOW [FULL] TABLES [FROM db_name] [LIKE 'pattern']
```

SHOW TABLESTEMPORARY **mysqlshow *db_name***

FULL SHOW FULL TABLES BASE TABLE VIEW

SHOW TABLES**mysqlshow db_name**

13.5.4.20. SHOW TRIGGERS

```
SHOW TRIGGERS [FROM db_name] [LIKE expr]
```

SHOW TRIGGERSMySQL

21.3“” ins_sum

```
mysql> SHOW TRIGGERS LIKE 'acc%';
+---------+--------+---------+-------------------------------+------
| Trigger | Event  | Table   | Statement                     | Timin
+---------+--------+---------+-------------------------------+------
```

```
| ins_sum | INSERT | account |  SET @sum = @sum + NEW.amount | BEFOR
+---------+--------+---------+-------------------------------+------
```

SHOW TRIGGERSLIKE expr

```
mysql> SHOW TRIGGERS LIKE 'ins%';
Empty set (0.01 sec)
```

· Trigger:

· Event: 'INSERT', 'UPDATE' 'DELETE'.

· Table:

· Statement: INFORMATION_SCHEMA ACTION_STATEMENT

· Timing: 'BEFORE"AFTER'

· Created: NULL

SHOW TRIGGERSSUPER

23.1.16“INFORMATION_SCHEMA TRIGGERS”

13.5.4.21. SHOW VARIABLES

```
SHOW [GLOBAL | SESSION] VARIABLES [LIKE 'pattern']
```

SHOW VARIABLESMySQL **mysqladmin variables**

GLOBAL MySQL SESSION SESSION

LOCALSESSION

mysqldSET 5.3.1“ **mysqld**” 13.5.3“SET

5.3.3“” 7.5.2“”

```
mysql> SHOW VARIABLES;
+---------------------------------+---------------------------------
| Variable_name                   | Value
+---------------------------------+---------------------------------
| auto_increment_increment        | 1
| auto_increment_offset           | 1
| automatic_sp_privileges         | ON
| back_log                        | 50
| basedir                         | /home/jon/bin/mysql-5.1/
| binlog_cache_size               | 32768
| bulk_insert_buffer_size         | 8388608
| character_set_client            | latin1
| character_set_connection        | latin1
...                               ...
| max_user_connections            | 0
| max_write_lock_count            | 4294967295
| multi_range_count               | 256
| myisam_data_pointer_size        | 6
| myisam_max_sort_file_size       | 2147483647
| myisam_recover_options          | OFF
| myisam_repair_threads           | 1
| myisam_sort_buffer_size         | 8388608
| ndb_autoincrement_prefetch_sz   | 32
| ndb_cache_check_time            | 0
| ndb_force_send                  | ON
...                               ...
```

```
| time_zone                       | SYSTEM
| timed_mutexes                   | OFF
| tmp_table_size                  | 33554432
| tmpdir                          |
| transaction_alloc_block_size    | 8192
| transaction_prealloc_size       | 4096
| tx_isolation                    | REPEATABLE-READ
| updatable_views_with_limit      | YES
| version                         | 5.1.2-alpha-log
| version_comment                 | Source distribution
| version_compile_machine         | i686
| version_compile_os              | suse-linux
| wait_timeout                    | 28800
+---------------------------------+---------------------------------
```

LIKE

```
mysql> SHOW VARIABLES LIKE 'have%';
+----------------------+----------+
| Variable_name        | Value    |
+----------------------+----------+
| have_archive         | YES      |
| have_bdb             | NO       |
| have_blackhole_engine | YES      |
| have_compress        | YES      |
| have_crypt           | YES      |
| have_csv             | YES      |
| have_example_engine  | NO       |
```

```
| have_federated_engine | NO       |
| have_geometry         | YES      |
| have_innodb           | YES      |
| have_isam             | NO       |
| have_ndbcluster       | DISABLED |
| have_openssl          | NO       |
| have_partition_engine | YES      |
| have_query_cache      | YES      |
| have_raid             | NO       |
| have_rtree_keys       | YES      |
| have_symlink          | YES      |
+-----------------------+----------+
```

13.5.4.22. SHOW WARNINGS

```
SHOW WARNINGS [LIMIT [offset,] row_count]
SHOW COUNT(*) WARNINGS
```

SHOW WARNINGS SHOW ERRORS 13.5.4.9 “SHOW ERRORS”

SHOW COUNT(*) WARNINGS warning_count

```
SHOW COUNT(*) WARNINGS;
SELECT @@warning_count;
```

max_error_count warning_countSHOW WARNINGS

LIMITSELECT 13.2.7“SELECT”

MySQL C APImysql_warning_count() 25.2.3.69 “mysql_warning_count()”

LOAD DATA INFILEINSERT, UPDATE, CREATE TABLEALTER TABLE DML

DROP TABLE

```
mysql> DROP TABLE IF EXISTS no_such_table;
mysql> SHOW WARNINGS;
+-------+------+-------------------------------+
| Level | Code | Message                       |
+-------+------+-------------------------------+
| Note  | 1051 | Unknown table 'no_such_table' |
+-------+------+-------------------------------+
```

CREATE TABLE INSERT

```
mysql> CREATE TABLE t1 (a TINYINT NOT NULL, b CHAR(4)) TYPE=MyISAM;
Query OK, 0 rows affected, 1 warning (0.00 sec)
mysql> SHOW WARNINGS\G
*************************** 1. row ***************************
  Level: Warning
   Code: 1287
Message: 'TYPE=storage_engine' is deprecated, use
         'ENGINE=storage_engine' instead
1 row in set (0.00 sec)

mysql> INSERT INTO t1 VALUES(10,'mysql'),(NULL,'test'),
    -> (300,'Open Source');
Query OK, 3 rows affected, 4 warnings (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 4
```

```
mysql> SHOW WARNINGS\G
*************************** 1. row ***************************
  Level: Warning
   Code: 1265
Message: Data truncated for column 'b' at row 1
*************************** 2. row ***************************
  Level: Warning
   Code: 1263
Message: Data truncated, NULL supplied to NOT NULL column 'a' at row
*************************** 3. row ***************************
  Level: Warning
   Code: 1264
Message: Data truncated, out of range for column 'a' at row 3
*************************** 4. row ***************************
  Level: Warning
   Code: 1265
Message: Data truncated for column 'b' at row 3
4 rows in set (0.00 sec)
```

max_error_count 64 max_error_count ALTER TABLE max_error_count1

```
mysql> SHOW VARIABLES LIKE 'max_error_count';
+-----------------+-------+
| Variable_name   | Value |
+-----------------+-------+
| max_error_count | 64    |
+-----------------+-------+
```

```
1 row in set (0.00 sec)

mysql> SET max_error_count=1;
Query OK, 0 rows affected (0.00 sec)

mysql> ALTER TABLE t1 MODIFY b CHAR;
Query OK, 3 rows affected, 3 warnings (0.00 sec)
Records: 3  Duplicates: 0  Warnings: 3

mysql> SELECT @@warning_count;
+-----------------+
| @@warning_count |
+-----------------+
|               3 |
+-----------------+
1 row in set (0.01 sec)

mysql> SHOW WARNINGS;
+---------+------+----------------------------------------+
| Level   | Code | Message                                |
+---------+------+----------------------------------------+
| Warning | 1263 | Data truncated for column 'b' at row 1 |
+---------+------+----------------------------------------+
1 row in set (0.00 sec)
```

max_error_count0 warning_count

SQL_NOTES0“”

13.5.5.

13.5.5.1. CACHE INDEX
13.5.5.2. FLUSH
13.5.5.3. KILL
13.5.5.4. LOAD INDEX INTO CACHE
13.5.5.5. RESET

13.5.5.1. CACHE INDEX

```
CACHE INDEX
  tbl_index_list [, tbl_index_list] ...
  IN key_cache_name


tbl_index_list:
  tbl_name [[INDEX|KEY] (index_name[, index_name] ...)]
```

CACHE INDEX MyISAM

t1, t2t3hot_cache

```
mysql> CACHE INDEX t1, t2, t3 IN hot_cache;
+---------+--------------------+----------+----------+
| Table   | Op                 | Msg_type | Msg_text |
+---------+--------------------+----------+----------+
| test.t1 | assign_to_keycache | status   | OK       |
| test.t2 | assign_to_keycache | status   | OK       |
| test.t3 | assign_to_keycache | status   | OK       |
+---------+--------------------+----------+----------+
```

CACHE INDEX

CACHE INDEX

```
mysql> SET GLOBAL keycache1.key_buffer_size=128*1024;
```

9.4.1“”

```
mysql> CACHE INDEX t1 IN non_existent_cache;
ERROR 1284 (HY000): Unknown key cache 'non_existent_cache'
```

13.5.5.2. FLUSH

```
FLUSH [LOCAL | NO_WRITE_TO_BINLOG] flush_option [, flush_option] ...
```

MySQL FLUSH FLUSHRELOAD

flush_option

· HOSTS

IPHost *host_name* is blocked MySQL“ max_connect_errors” MySQL A.2.5“hos t_name” max_connect_errors=999999999**mysqld**

· DES_KEY_FILE

--des-key-fileDES

· LOGS

10.3 mysqldSIGHUPSIGQUIT

--log-error FLUSH LOGS -old mysqld --log-error

· PRIVILEGES

mysql

· QUERY CACHE

RESET QUERY CACHE

· STATUS

1.7.1.3“”

· {TABLE | TABLES} [*tbl_name* [, *tbl_name*] ...]

· TABLES WITH READ LOCK

UNLOCK

· USER_RESOURCES

FLUSH NO_WRITE_TO_BINLOG LOCAL FLUS
FLUSH MASTER, FLUSH SLAVEFLUSH TABLES WITH READ LOCK

flush-hosts, flush-logs, flush-privileges, flush-statusflush-tablesmysqladmin

MySQL 5.1.2-alpha FLUSH FLUSH I.1“”

RESET 13.5.5.5“RESET”

13.5.5.3. KILL

```
KILL [CONNECTION | QUERY] thread_id
```

mysqld SHOW PROCESSLIST KILL *thread_id*

KILLCONNECTIONQUERY

· KILL CONNECTIONKILL *thread_id*

· KILL QUERY

PROCESS SUPER

mysqladmin processlistmysqladmin kill

KILLEmbedded MySQL Server

KILL

· SELECT, ORDER BYGROUP BY

· ALTER TABLE

· UPDATEDELETE

· GET_LOCK()NULL

· INSERT DELAYED

·

· "disk full"

· MyISAMREPAIR TABLEOPTIMIZE TABLE

13.5.5.4. LOAD INDEX INTO CACHE

```
LOAD INDEX INTO CACHE
  tbl_index_list [, tbl_index_list] ...


tbl_index_list:
  tbl_name
    [[INDEX|KEY] (index_name[, index_name] ...)]
    [IGNORE LEAVES]
```

LOAD INDEX INTO CACHE CACHE INDEX LOAD INDEX INTO CACHEMyISAM

IGNORE LEAVES

t1t2

```
mysql> LOAD INDEX INTO CACHE t1, t2 IGNORE LEAVES;
+---------+--------------+----------+----------+
| Table   | Op           | Msg_type | Msg_text |
+---------+--------------+----------+----------+
| test.t1 | preload_keys | status   | OK       |
| test.t2 | preload_keys | status   | OK       |
+---------+--------------+----------+----------+
```

t1 t2

LOAD INDEX INTO CACHE

13.5.5.5. RESET

```
RESET reset_option [, reset_option] ...
```

RESET FLUSH 13.5.5.2“FLUSH”

RESETRELOAD

reset_option

· MASTER

· QUERY CACHE

· SLAVE

13.6.

13.6.1. SQL
13.6.2. SQL

SQL

13.6.1. SQL

13.6.1.1. PURGE MASTER LOGS
13.6.1.2. RESET MASTER
13.6.1.3. SET SQL_LOG_BIN
13.6.1.4. SHOW BINLOG EVENTS
13.6.1.5. SHOW MASTER LOGS
13.6.1.6. SHOW MASTER STATUS
13.6.1.7. SHOW SLAVE HOSTS

SQL 13.6.2“SQL”

13.6.1.1. PURGE MASTER LOGS

```
PURGE {MASTER | BINARY} LOGS TO 'log_name'
PURGE {MASTER | BINARY} LOGS BEFORE 'date'
```

```
PURGE MASTER LOGS TO 'mysql-bin.010';
PURGE MASTER LOGS BEFORE '2003-04-02 22:46:26';
```

BEFOREdate'YYYY-MM-DD hh:mm:ss' MASTERBINARY

1. SHOW SLAVE STATUS

2. SHOW MASTER LOGS

3.

4.

5.

13.6.1.2. RESET MASTER

```
RESET MASTER
```

13.6.1.3. SET SQL_LOG_BIN

```
SET SQL_LOG_BIN = {0|1}
```

SUPER

13.6.1.4. SHOW BINLOG EVENTS

```
SHOW BINLOG EVENTS
   [IN 'log_name'] [FROM pos] [LIMIT [offset,] row_count]
```

'log_name'

LIMITSELECT 13.2.7“SELECT”

MySQL stdout LIMITSHOW BINLOG EVENTS mysqlbinlog 8.6“mysqlbinlog”

13.6.1.5. SHOW MASTER LOGS

```
SHOW MASTER LOGS
SHOW BINARY LOGS
```

13.6.1.1“PURGE MASTER LOGS”

```
mysql> SHOW BINARY LOGS;
+---------------+-----------+
| Log_name      | File_size |
+---------------+-----------+
| binlog.000015 |    724935 |
| binlog.000016 |    733481 |
+---------------+-----------+
```

SHOW BINARY LOGSSHOW MASTER LOGS

13.6.1.6. SHOW MASTER STATUS

```
SHOW MASTER STATUS
```

```
mysql > SHOW MASTER STATUS;
+--------------+----------+--------------+------------------+
| File         | Position | Binlog_Do_DB | Binlog_Ignore_DB |
+--------------+----------+--------------+------------------+
| mysql-bin.003 | 73       | test         | manual,mysql     |
+--------------+----------+--------------+------------------+
```

13.6.1.7. SHOW SLAVE HOSTS

```
SHOW SLAVE HOSTS
```

--report-host=*slave_name*

13.6.2. SQL

13.6.2.1. CHANGE MASTER TO

13.6.2.2. LOAD DATA FROM MASTER
13.6.2.3. LOAD TABLE *tbl_name* FROM MASTER
13.6.2.4. MASTER_POS_WAIT()
13.6.2.5. RESET SLAVE
13.6.2.6. SET GLOBAL SQL_SLAVE_SKIP_COUNTER
13.6.2.7. SHOW SLAVE STATUS
13.6.2.8. START SLAVE
13.6.2.9. STOP SLAVE

SQL 13.6.1“SQL”

13.6.2.1. CHANGE MASTER TO

```
  CHANGE MASTER TO master_def [, master_def] ...


master_def:
      MASTER_HOST = 'host_name'
    | MASTER_USER = 'user_name'
    | MASTER_PASSWORD = 'password'
    | MASTER_PORT = port_num
    | MASTER_CONNECT_RETRY = count
    | MASTER_LOG_FILE = 'master_log_name'
    | MASTER_LOG_POS = master_log_pos
    | RELAY_LOG_FILE = 'relay_log_name'
    | RELAY_LOG_POS = relay_log_pos
    | MASTER_SSL = {0|1}
    | MASTER_SSL_CA = 'ca_file_name'
    | MASTER_SSL_CAPATH = 'ca_directory_name'
    | MASTER_SSL_CERT = 'cert_file_name'
    | MASTER_SSL_KEY = 'key_file_name'
```

```
    | MASTER_SSL_CIPHER = 'cipher_list'
```

MASTER_USER, MASTER_PASSWORD, MASTER_SSL, MASTER_SSL_CA, MASTER_SSL_CAPATH, MASTER_SSL_CERT, MASTER_SSL_KEYMASTER_SSL_CIPHER

SSL SSL(MASTER_SSL, MASTER_SSL_CA, MASTER_SSL_CAPATH, MASTER_SSL_CERT, MASTER_SSL_KEYMASTER_SSL_CIPHER) master.info SSL

MySQL

```
mysql> STOP SLAVE; -- if replication was running

mysql> CHANGE MASTER TO MASTER_PASSWORD='new3cret';

mysql> START SLAVE; -- if you want to restart replication
```

MASTER_HOSTMASTER_PORTTCP/IP IP MASTER_HOST localhost MySQL Unix

MASTER_HOSTMASTER_PORT MASTER_LOG_FILE MASTER_LOG_POSMASTER_LOG_FILE="MASTER_LOG_POS=4

MASTER_LOG_FILEMASTER_LOG_POS I/O RELAY_LOG_FILERELAY_LOG_POSMSATER_LOG_FILE MASTER_LOG_POS CHANGE MASTERslave SQL thread SQLI/O

CHANGE MASTER RELAY_LOG_FILERELAY_LOG_POS relay_log_purge0

CHANGE MASTER TOmaster.inforelay-log.info

CHANGE MASTER CHANGE MASTER TO MASTER_LOG_FILE='*log_name_on_master*', MASTER_LOG_POS=*log_offset_on_master*

```
mysql> CHANGE MASTER TO
    ->     MASTER_HOST='master2.mycompany.com',
    ->     MASTER_USER='replication',
    ->     MASTER_PASSWORD='bigs3cret',
    ->     MASTER_PORT=3306,
    ->     MASTER_LOG_FILE='master2-bin.001',
    ->     MASTER_LOG_POS=4,
    ->     MASTER_CONNECT_RETRY=10;

mysql> CHANGE MASTER TO
    ->     RELAY_LOG_FILE='slave-relay-bin.006',
    ->     RELAY_LOG_POS=4025;
```

SQL_THREAD

relay_log_purge=0 --log-bin --replicate-same-server-id, --relay-log=myhost-bin --skip-slave-start options

```
mysql> CHANGE MASTER TO
    ->     RELAY_LOG_FILE='myhost-bin.153',
    ->     RELAY_LOG_POS=410,
    ->     MASTER_HOST='some_dummy_string';
mysql> START SLAVE SQL_THREAD;
```

STOP SLAVE master.inforelay-log.info

MASTER_HOST

13.6.2.2. LOAD DATA FROM MASTER

```
LOAD DATA FROM MASTER
```

MASTER_LOG_FILEMASTER_LOG_POS --replicate-*-do-*--replicate-*-ignore-* --replicate-rewrite-db --replicate-rewrite-db=db1->db3--replicate-rewrite-db=db2->db3

· MyISAM MyISAM

· `ERROR 1189 (08S01): Net error reading from master`

·

net_read_timeoutnet_write_timeout 5.3.3“”

LOAD DATA FROM MASTERmysql

LOAD DATA FROM MASTER RELOADSUPER SELECT SELECT LOAD DATA FROM MASTER LOAD DATA FROM MASTERSHOW DATABASES SHOW DATABASES 13.5.4.6“SHOW DATABASES ” LOAD DATA FROM MASTER

13.6.2.3. LOAD TABLE *tbl_name* FROM MASTER

```
LOAD TABLE tbl_name FROM MASTER
```

LOAD DATA FROM MASTERRELOADSUPER SELECT LOAD TABLE FROM MASTER

LOAD DATA FROM MASTER LOAD TABLE FROM MASTER MyISAM LOAD DATA FROM MASTER

13.6.2.4. MASTER_POS_WAIT()

```
SELECT MASTER_POS_WAIT('master_log_file', master_log_pos)
```

13.6.2.5. RESET SLAVE

```
RESET SLAVE
```

master.inforelay-log.info

SQL SLAVE

master.info

13.6.2.6. SET GLOBAL SQL_SLAVE_SKIP_COUNTER

```
SET GLOBAL SQL_SLAVE_SKIP_COUNTER = n
```

n

13.6.2.7. SHOW SLAVE STATUS

```
SHOW SLAVE STATUS
```

mysql \G

```
mysql> SHOW SLAVE STATUS\G
*************************** 1. row ***************************
       Slave_IO_State: Waiting for master to send event
          Master_Host: localhost
          Master_User: root
          Master_Port: 3306
        Connect_Retry: 3
      Master_Log_File: gbichot-bin.005
  Read_Master_Log_Pos: 79
       Relay_Log_File: gbichot-relay-bin.005
        Relay_Log_Pos: 548
```

```
Relay_Master_Log_File: gbichot-bin.005
     Slave_IO_Running: Yes
    Slave_SQL_Running: Yes
      Replicate_Do_DB:
  Replicate_Ignore_DB:
           Last_Errno: 0
           Last_Error:
         Skip_Counter: 0
  Exec_Master_Log_Pos: 79
      Relay_Log_Space: 552
      Until_Condition: None
       Until_Log_File:
        Until_Log_Pos: 0
   Master_SSL_Allowed: No
   Master_SSL_CA_File:
   Master_SSL_CA_Path:
      Master_SSL_Cert:
    Master_SSL_Cipher:
       Master_SSL_Key:
Seconds_Behind_Master: 8
```

SHOW SLAVE STATUS

· Slave_IO_State

SHOW PROCESSLISTState SHOW PROCESSLISTI/O 6.3 “” MySQL MySQL Last_Error

· Master_Host

· Master_User

· Master_Port

· Connect_Retry

--master-connect-retry

· Master_Log_File

I/O

· Read_Master_Log_Pos

I/O

· Relay_Log_File

SQL

· Relay_Log_Pos

SQL

· Relay_Master_Log_File

SQL

· Slave_IO_Running

I/O MySQL 4.1.145.0.12 I/O Slave_IO_RunningYES

· Slave_SQL_Running

SQL

· Replicate_Do_DB, Replicate_Ignore_DB

--replicate-do-db--replicate-ignore-db

· Replicate_Do_Table, Replicate_Ignore_Table, Replicate_Wild_Do_Table, Replicate_Wild_Ignore_Table

--replicate-do-table, --replicate-ignore-table, --replicate-wild-do-table--replicate-wild-ignore_table

· Last_Errno, Last_Error

0“” Last_Error

```
Last_Errno: 1051
Last_Error: error 'Unknown table 'z'' on query 'drop table z'
```

z DROP TABLE

· Skip_Counter

SQL_SLAVE_SKIP_COUNTER

· Exec_Master_Log_Pos

SQLRelay_Master_Log_File (Relay_Master_Log_File, Exec_Master_Log_Pos)(Relay_Log_File, Relay_Log_Pos)

· Relay_Log_Space

· Until_Condition, Until_Log_File, Until_Log_Pos

START SLAVEUNTIL

Until_Condition

o UNTIL

o Master

o Relay

Until_Log_FileUntil_Log_Pos SQL

· Master_SSL_Allowed, Master_SSL_CA_File, Master_SSL_CA_Path, Master_SSL_Cert, Master_SSL_Cipher, Master_SSL_Key

Master_SSL_Allowed

o SSL Yes

o SSL No

o SSL SSL Ignored

SSL--master-ca, --master-capath, --master-cert, --master-cipher--master-key

· Seconds_Behind_Master

“” SQL I/O I/O SQLI/O

I/O SQL SQLI/O Seconds_Behind_Master0I/O

I/O

“” I/Omaster-connect-retry NU

M1M0M1binlc

Seconds_Behind_Master M1 M1M0

13.6.2.8. START SLAVE

```
START SLAVE [thread_type [, thread_type] ... ]
START SLAVE [SQL_THREAD] UNTIL
    MASTER_LOG_FILE = 'log_name', MASTER_LOG_POS = log_pos
```

```
START SLAVE [SQL_THREAD] UNTIL
    RELAY_LOG_FILE = 'log_name', RELAY_LOG_POS = log_pos

thread_type: IO_THREAD | SQL_THREAD
```

START SLAVE I/O SQL START SLAVESUPER

START SLAVE—— START SLAVE SHOW SLAVE STATUS

IO_THREADSQL_THREAD

UNTIL SQL SQL SQL_THREAD SQL SQL UNTIL

UNTIL

UNTILSTOP SLAVE UNTILSTART SLAVE

UNTIL DROP TABLE UNTIL mysqlbinlogSHOW BINLOG EVENTS

UNTIL --skip-slave-start SQL

SHOW SLAVE STATUS UNTIL

MySQL SLAVE STARTMySQL 5.1

13.6.2.9. STOP SLAVE

```
STOP SLAVE [thread_type [, thread_type] ... ]

thread_type: IO_THREAD | SQL_THREAD
```

STOP SLAVESUPER

START SLAVE IO_THREADSQL_THREAD

MySQL　　SLAVE STOPMySQL 5.1

13.7. SQL

MySQL 5.1 MySQL 4.1/ MySQL C API C MySQL Connector/J Java MySQL Connector/NET C APIAPI 25.2.4“C API” C PHP 5.0mysqli

SQL API SQL

.

· SQL mysql

· SQL

SQL

.

.

· API

SQLSQL

```
PREPARE stmt_name FROM preparable_stmt;


EXECUTE stmt_name [USING @var_name [, @var_name] ...];


{DEALLOCATE | DROP} PREPARE stmt_name;
```

PREPARE stmt_name preparable_stmt SQL‘ ?’ ‘ ?’ SQL

EXECUTE USING USING

DEALLOCATE PREPARE

SQL CREATE TABLE, DELETE, DO, INSERT, REPLACE, SELECT, SET, UPDATESHOW

```
mysql> PREPARE stmt1 FROM 'SELECT SQRT(POW(?,2) + POW(?,2)) AS hypot
mysql> SET @a = 3;
mysql> SET @b = 4;
mysql> EXECUTE stmt1 USING @a, @b;
+------------+
| hypotenuse |
+------------+
|          5 |
+------------+
mysql> DEALLOCATE PREPARE stmt1;

mysql> SET @s = 'SELECT SQRT(POW(?,2) + POW(?,2)) AS hypotenuse';
mysql> PREPARE stmt2 FROM @s;
mysql> SET @a = 6;
mysql> SET @b = 8;
mysql> EXECUTE stmt2 USING @a, @b;
+------------+
```

```
| hypotenuse |
+------------+
|         10 |
+------------+
mysql> DEALLOCATE PREPARE stmt2;
```

SQL PREPAREPREPARE, EXECUTEDEALLOCATE PREPARE

SQLAPI mysql_stmt_prepare() C APIPREPARE, EXECUTE DEALLOCATE PREPARE

SQL

LIMIT 13.2.7“SELECT”

MySQLMySQL dev.mysql.com

14

14.1.
14.2.
14.3. MySQL
14.4.
14.5.
14.6.
14.7.
14.8.
14.9.

14.1.

MySQL 5.1 MySQL AB MySQL

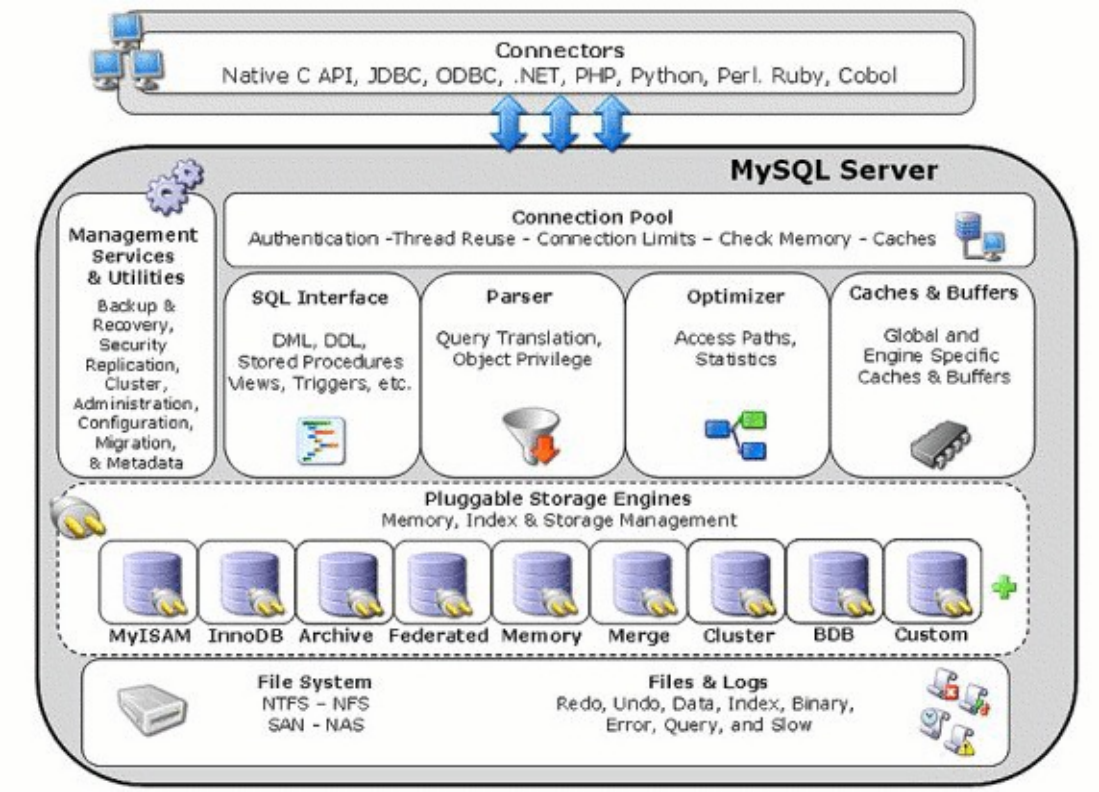
MySQL

14.2.

MySQL MySQL APIDBA

MySQL

14.1MySQL



DBAAPIMySQL 1 MySQLAPIAPI

14.3. MySQL

MySQLMySQL I/O MySQL

. “”

· ACID

· DDDL

.

· B-tree

· MySQL

· I/O

.

14.4.

MySQL

MySQL

14.2

Feature	MyISAM	BDB	Memory	InnoDB	Archive	NDB
Storage Limits	No	No	Yes	64TB	No	Yes
Transactions (commit, rollback, etc.)		✔		✔		
Locking granularity	Table	Page	Table	Row	Row	Row
MVCC/Snapshot Read				✔	✔	✔
Geospatial support	✔					
B-Tree indexes	✔	✔	✔	✔		✔
Hash indexes			✔	✔		✔
Full text search index	✔					
Clustered index				✔		
Data Caches			✔	✔		✔
Index Caches	✔		✔	✔		✔
Compressed data	✔				✔	
Encrypted data (via function)	✔	✔	✔	✔	✔	✔
Storage cost (space used)	Low	Low	N/A	High	Very Low	Low
Memory cost	Low	Low	Medium	High	Low	High
Bulk Insert Speed	High	High	High	Low	Very High	High
Cluster database support						✔
Replication support	✔	✔	✔	✔	✔	✔
Foreign key support				✔		
Backup/Point-in-time recovery	✔	✔	✔	✔	✔	✔
Query cache support	✔	✔	✔	✔	✔	✔
Update Statistics for Data Dictionary	✔	✔	✔	✔	✔	✔

· MyISAMMySQL Web STORAGE_ENGINE MySQL

· InnoDB ACID

· BDBInnoDB COMMITROLLBACK

· MemoryRAM

· MergeMySQL DBAMyISAM 1 VLDB

· Archive

· FederatedMySQL

· Cluster/NDBMySQL

· OtherCSV Blackhole Example

MySQL 14.4“”

14.5.

ALTER TABLE

ENGINE

```
CREATE TABLE engineTest(
id INT
) ENGINE = MyISAM;
```

ALTER TABLE

```
ALTER TABLE engineTest ENGINE = ARCHIVE;
```

14.6.

- InnoDBMVCC COMMITROLLBACK
- NDBMVCC COMMITROLLBACK
- BDB COMMITROLLBACK

14.7.

INSTALL PLUGINplugin mysql example

```
INSTALL PLUGIN ha_example SONAME 'ha_example.so';
```

.soMySQL installdir/lib

14.8.

UNINSTALL PLUGIN

```
UNINSTALL PLUGIN ha_example;
```

14.9.

pluginMySQL INSTALL PLUGINSUPER

MySQLMySQL dev.mysql.com

15

15.1. MyISAM

15.1.1. MyISAM

15.1.2.

15.1.3. MyISAM

15.1.4. MyISAM

15.2. InnoDB

15.2.1. InnoDB

15.2.2. InnoDB

15.2.3. InnoDB

15.2.4. InnoDB

15.2.5. InnoDB

15.2.6. InnoDB

15.2.7. InnoDB

15.2.8. InnoDB

15.2.9. InnoDB

15.2.10. InnoDB

15.2.11. InnoDB

15.2.12.

15.2.13.

15.2.14.I/O

15.2.15. InnoDB

15.2.16. InnoDB

15.2.17. InnoDB

15.3. MERGE

15.3.1. MERGE

15.4. MEMORY(HEAP)

15.5. BDB(BerkeleyDB)

15.5.1. BDB

15.5.2. BDB

15.5.3. BDB

15.5.4. BDB

15.5.5. BDB

15.5.6. BDB

15.5.7. BDB

15.6. EXAMPLE

15.7. FEDERATED

15.7.1. FEDERATED

15.7.2. FEDERATED

15.7.3. FEDERATED

15.7.4. FEDERATED

15.8. ARCHIVE

15.9. CSV

15.10.BLACKHOLE

MySQLMySQL

· MyISAMMyISAMMySQLMySQL

· MEMORY“”MERGEMyISAMMyISAMMEMORY
MERGE MySQL

MEMORYHEAP

· InnoDBBDBBDBMySQL-MaxInnoDB MySQL 5.1MySQL

· EXAMPLE“” MySQL

· NDB ClusterMySQL ClusterMySQL-Max 5.1Linux, Solaris,
OS X MySQLWindows

· ARCHIVE

· CSV

· BLACKHOLE

· FEDERATEDMySQL 5.1MySQLMySQI

14.4“”

NDB ClusterMySQLNDB Cluster 17 *MySQL Cluster*

ENGINE TYPE CREATE TABLEMy

```
CREATE TABLE t (i INT) ENGINE = INNODB;
```

```
CREATE TABLE t (i INT) TYPE = MEMORY;
```

TYPEMySQL 5.1ENGINE

ENGINETYPEMyISAM--default-storage-engine--default-table-typestorage_enginetable_type

MySQLMySQLWindowsInnoDBMyISAM 2.3.5.1“”

ALTER TABLE

```
ALTER TABLE t ENGINE = MYISAM;
```

```
ALTER TABLE t TYPE = BDB;
```

13.1.5“CREATE TABLE” 13.1.2“ALTER TABLE”

MySQLMySQLMySQLMyISAMMySQL
)

MyISAMMySQL

MySQL.frm.frm

(TST) (NTST)

· MySQL

· COMMITautocommit

· ROLLBACKautocommit

.

.

MySQL 13.4.1“START TRANSACTION, COMMIT ROLLBACK Syntax”

InnoDB 15.2.3“InnoDB”

.

.

.

autocommit

15.1. MyISAM

15.1.1. MyISAM

15.1.2.

15.1.3. MyISAM

15.1.4. MyISAM

MyISAM ISAMMySQL

MyISAM.frm.MYD (MYData).MYI (MYIndex)

MyISAMENGINE

```
CREATE TABLE t (i INT) ENGINE = MYISAM;
```

MySQLTYPEENGINETYPE = MYISAMMySQL
ENGINE

ENGINEMyISAM

myisamchkMyISAM 5.9.5.6“ **myisamchk**” **myisampack**MyISAM 8.2“myisampackMyISAM”

MyISAM

· 20IEEE

· 63

·

· MyISAM64 16

· 10002501024

· BLOBTEXT

· NULL0-1

·

· AUTO_INCREMENT

· AUTO_INCREMENMyISAMINSERTUPDATE AUTO_INCREMENT10%AUTO_INCREMENT AUTO_INCREMENTALTER TABLE **myisamch**

· INSERT

· DATA DIRECTORYINDEX DIRECTORYCREATE TABLE 13.1.5“CREATE TABLE”

· 10 “”

· MyISAM--myisam-recover **mysqld**MyISAM

· --update-state **myisamchk** **myisamchk --fast**

· **myisamchk --analyze**

· **myisampack**BLOBVARCHAR

MyISAM

· true VARCHARVARCHAR2

· VARCHAR

· VARCHARCHAR64KB

· UNIQUEUNIQUEUNIQUE

MyISAM http://forums.mysql.com/list.php?21

15.1.1. MyISAM

mysqld MyISAM

· --myisam-recover=*mode*

MyISAM

· --delay-key-write=ALL

MyISAM

MyISAMMySQL **myisamchk**

--delay-key-write--external-locking

5.3.1“ **mysqld**”

MyISAM

· bulk_insert_buffer_size

per thread

· (*OBSOLETE*) myisam_max_extra_sort_file_size

MySQL

· myisam_max_sort_file_size

· myisam_sort_buffer_size

5.3.3“”

--myisam-recover **mysqld**MyISAM0--skip-external-locking

·

.

.

.

--myisam-recoverFORCE

```
Error: Couldn't repair table: test.g00pages
```

FORCE

```
Warning: Found 344 of 354 rows when repairing ./test/g00pages
```

BACKUP *tbl_name-datetime*.BAK **cron**

15.1.2.

MyISAMB(key_length+4)/0.67,

VARCHAR

MyISAMPACK_KEYS=1

15.1.3. MyISAM

15.1.3.1.

15.1.3.2.

15.1.3.3.

MyISAM) **myisampack**

CREATEALTERBLOBTEXTROW_FORMATFIXEDDYNAMIC
CHARVARCHARFIXEDCHARDYNAMICVARCHAR

ALTER TABLEROW_FORMAT={COMPRESSED | DEFAULT}
“CREATE TABLE”

15.1.3.1.

MyISAMVARCHAR, BLOB, T

MyISAM on-disk

MySQLMyISAM **myisamchk**MyISAM

· CHAR

.

.

.

· OPTIMIZE TABLE **myisamchk -r**

.

15.1.3.2.

MyISAM VARCHAR, BLOBTEXTDynamic
ROW_FORMAT=DYNAMIC

OPTIMIZE TABLE**myisamchk**

· 4

· 0NULL

.

· OPTIMIZE

myisamchk -ei

.

.

```
.                  3
.                  + (number of columns + 7) / 8
.                  + (number of char columns)
.                  + (packed size of numeric columns)
.                  + (length of strings)
.                  + (number of NULL columns + 7) / 8
```


15.1.3.3.

myisampack

MySQL**myisampackmyisamchk**

· CD-ROM)

· 13 Huffman

o

-

-

- BIGINT8-128127TINYINT1

- ENUM

-

.

15.1.4. MyISAM

15.1.4.1. MyISAM

15.1.4.2.

MySQL

15.1.4.1. MyISAM

MyISAMSQL

· **mysqld**

.

.

· **myisamchk**

· MySQLMyISAM

.

· Incorrect key file for table: '...'. Try to repair

.

CHECK TABLE statementMyISAMREPAIR TABLE MyISAM **mysqld** **myisamchk** 13.5.2.3“CHECK TABLE” 13.5.2.6 “REPAIR TABLE” 5.9.5“myisamchk — MyISAM”

restarted
” E.1.6“”

15.1.4.2.

MyISAM(.MYI)CHECK TABLE **myisamchk**

```
clients are using or haven't closed the table properly
```

· MySQL

·

· FLUSH TABLE

·

·

· MyISAMLOCK TABLESFLUSH TABLES

· MySQLMySQL

· **myisamchk --recovermyisamchk --update-state mysqld**

· **mysqld**REPAIR TABLECHECK TABLECHECK TABLE REPAIR TABLE

5.12“MySQL”

15.2. InnoDB

15.2.1. InnoDB

15.2.2. InnoDB

15.2.3. InnoDB

15.2.4. InnoDB

15.2.5. InnoDB

15.2.6. InnoDB

15.2.7. InnoDB

15.2.8. InnoDBatabase

15.2.9. InnoDB

15.2.10. InnoDB

15.2.11. InnoDB

15.2.12.

15.2.13.

15.2.14.I/O

15.2.15. InnoDB

15.2.16. InnoDB

15.2.17. InnoDB

15.2.1. InnoDB

InnoDBMySQL ACIDInnoDBSELECTOracle InnoDB

InnoDBInnoDBFOREIGN KEYSQLInnoDBMySQL

InnoDBCPU

InnoDBMySQLInnoDBInnoDBMyISAMMyISAM
InnoDB 2GB

InnoDBMySQLWindows Essentials installerInnoDBWindowsMySQL

InnoDBInternetSlashdot.orgInnoDBMytrix, Inc.InnoDB1TBInnoDB
800/

InnoDBMySQLGNU GPL219916MySQL
http://www.mysql.com/company/legal/licensing/

InnoDB http://forums.mysql.com/list.php?22

15.2.2. InnoDB

InnoDBInnobase Oy

```
Web site: http://www.innodb.com/

Email: <sales@innodb.com>

Phone: +358-9-6969 3250 (office)

       +358-40-5617367 (mobile)


Innobase Oy Inc.

World Trade Center Helsinki

Aleksanterinkatu 17

P.O.Box 800

00101 Helsinki

Finland
```

15.2.3. InnoDB

InnoDBInnoDBskip-innodbMySQL

InnoDBInnoDB

InnoDBMySQLMySQLibdata110MBib_logfile0ib_logfile 15MB

InnoDBMySQL ACIDInnoDB fsync() “

fcntl() Linux

ATAPIhdparm -W0 /dev/ *hda*

InnoDB

InnoDBmy.cnf[mysqld]innodb_data_file_pathWindowsmy.ini
innodb_data_file_path

```
innodb_data_file_path=datafile_spec1[;datafile_spec2]...
```

```
[mysqld]
innodb_data_file_path=ibdata1:10M:autoextend
```

10MBibdata1MySQL

MGMBGB

ibdata150MBibdata 250MB

```
[mysqld]
innodb_data_file_path=ibdata1:50M;ibdata2:50M:autoextend
```

```
file_name:file_size[:autoextend[:max:max_file_size]]
```

autoextendinnodb_data_file_path

autoextendInnoDB8MB

15.2.7“InnoDB”

InnoDB2GBmaxibdata1500MB

```
[mysqld]
innodb_data_file_path=ibdata1:10M:autoextend:max:500M
```

InnoDBMySQLinnodb_data_home_diribdata1ibdata2
/ibdata InnoDB

```
[mysqld]
innodb_data_home_dir = /ibdata
innodb_data_file_path=ibdata1:50M;ibdata2:50M:autoextend
```

InnoDB/ibdataUnixDOSmkdir

innodb_data_home_dirInnoDBinnodb_data_home_dirmy.cnf
“ dot” ./MySQL

innodb_data_home_dirinnodb_data_file_path

```
[mysqld]
innodb_data_home_dir =
innodb_data_file_path=/ibdata/ibdata1:50M;/ibdata/ibdata2:50M:autoex
```

my.cnf 128MBmy.cnfmy.iniInnoDBautoextend

UnixWindowsInnoDBMySQLibdata1ib_logfile0ib_logfile 1InnoD
InnoDBib_arch_log_0000000000

```
[mysqld]
# You can write your other MySQL server options here
# ...
# Data files must be able to hold your data and indexes.
# Make sure that you have enough free disk space.
innodb_data_file_path = ibdata1:10M:autoextend
```

```
#
# Set buffer pool size to 50-80% of your computer's memory
set-variable = innodb_buffer_pool_size=70M
set-variable = innodb_additional_mem_pool_size=10M
#
# Set the log file size to about 25% of the buffer pool size
set-variable = innodb_log_file_size=20M
set-variable = innodb_log_buffer_size=8M
#
innodb_flush_log_at_trx_commit=1
```

MySQL

2GB10MB

InnoDBMySQLInnoDBWindows **mysqld-max** C:\mysql\bin

```
C:\> C:\mysql\bin\mysqld-max --console
```

InnoDB

15.2.5“InnoDB” InnoDB

Windows? Windows

· my.cnf

· my.cnfC

· my.iniWINDIRC:\WINDOWSC:\WINNTWindowsSETWINDIR

· `C:\> SET WINDIR`

· `windir=C:\WINNT`

· PCCmy.ini

· MySQLmy.iniMySQL 2.3.5.14“my.ini”

Unix Unix **mysqld**

· /etc/my.cnf

· $MYSQL_HOME/my.cnf

· defaults-extra-file

--defaults-extra-file

· ~/.my.cnf

MYSQL_HOMEmy.cnf

mysqld--defaults-option

```
mysqld --defaults-file=your_path_to_my_cnf
```

my.cnf Linux2GB60GB/, /dr2/dr3) my.cnfInnoDB

```
[mysqld]
# You can write your other MySQL server options here
# ...
innodb_data_home_dir =
#
# Data files must be able to hold your data and indexes
innodb_data_file_path = /ibdata/ibdata1:2000M;/dr2/ibdata/ibdata2:20
#
```

```
# Set buffer pool size to 50-80% of your computer's memory,
# but make sure on Linux x86 total memory usage is < 2GB
innodb_buffer_pool_size=1G
innodb_additional_mem_pool_size=20M
innodb_log_group_home_dir = /dr3/iblogs
#
innodb_log_files_in_group = 2
#
# Set the log file size to about 25% of the buffer pool size
innodb_log_file_size=250M
innodb_log_buffer_size=8M
#
innodb_flush_log_at_trx_commit=1
innodb_lock_wait_timeout=50
#
# Uncomment the next lines if you want to use them
#innodb_thread_concurrency=5
```

InnoDBInnoDBI/O 15.2.14.2“ ”

32GNU/Linux x86,glibc2GB

```
innodb_buffer_pool_size
+ key_buffer_size
+ max_connections*(sort_buffer_size+read_buffer_size+binlog_cache_si
+ max_connections*2MB
```

2MBMySQL AB256KBsort_buffer_size + read_

MySQL32Windows64GB 15.2.4“InnoDB”

innodb_buffer_pool_awe_mem_mb

mysqld

```
[mysqld]
skip-external-locking
max_connections=200
read_buffer_size=1M
sort_buffer_size=1M
#
# Set key_buffer to 5 - 50% of your RAM depending on how much
# you use MyISAM tables, but keep key_buffer_size + InnoDB
# buffer pool size < 80% of your RAM
key_buffer_size=value
```

15.2.4. InnoDB

InnoDB-- *opt_name=value*

· innodb_additional_mem_pool_size

InnoDBInnoDBInnoDBMySQL 1MB

· innodb_autoextend_increment

MB 8

· innodb_buffer_pool_awe_mem_mb

32WindowsAWEMB(32Windows32Windows“ AWE)”4GB
InnoDBAWE64000innodb_buffer_pool_size32
AWEinnodb_buffer_pool_size500MB

· innodb_buffer_pool_size

InnoDBI/O80%

· innodb_checksums

InnoDB --skip-innodb-checksums

· innodb_data_file_path

innodb_data_home_dirMGMBGB1024MB10MB
2GBinnodb_data_file_path10MBibdata14GB
”

· innodb_data_home_dir

InnoDB MySQLinnodb_data_file_path

· innodb_doublewrite

InnoDBdoublewriteinnodb_checksums --skip-
innodb-doublewrite

· innodb_fast_shutdown

0InnoDB1InnoDB 12
MySQL

· innodb_file_io_threads

InnoDBI/O 4WindowsI/OUnixInnoDB

· innodb_file_per_table

InnoDB.ibd 15.2.6.6“Per-Table”

· innodb_flush_log_at_trx_commit

innodb_flush_log_at_trx_commit 01 2
2 100%10
InnoDB
Unix **hdparm** 1

· innodb_flush_method

Unix fdatasync InnoDBfsync()O_DSYNCInnoDBO_SYNC fsync() O_DIRECTGNU/LinuxInnoDBO_DIRECT fsync()InnoDBfsync()fdatasync() O_DSYNCUnix

· innodb_force_recovery

16 15.2.8.1“” InnoDB

· innodb_lock_wait_timeout

InnoDBInnoDB InnoDBLOCK TABLES50

my.cnfinnodb_flush_log_at_trx_commit=1sync-binlog= 1

· innodb_locks_unsafe_for_binlog

InnoDB false

InnoDB *next-key locking*InnoDBInnoDB“gap” *R* *R*InnoDB 100

```
SELECT * FROM child WHERE id > 100 FOR UPDATE;
```

idid100SELECTInnoDB
InnoDBREAD COMMITTED

InnoDBUPDATEDELETEUPDATEUPDATE

```
CREATE TABLE A(A INT NOT NULL, B INT);
INSERT INTO A VALUES (1,2),(2,3),(3,2),(4,3),(5,2);
COMMIT;


SET AUTOCOMMIT = 0;
UPDATE A SET B = 5 WHERE B = 3;


SET AUTOCOMMIT = 0;
```

```
UPDATE A SET B = 4 WHERE B = 2;
```

21123223innodb_locks_unsafe_for_binlog2

1

```
x-lock(1,2)
unlock(1,2)
x-lock(2,3)
update(2,3) to (2,5)
x-lock(3,2)
unlock(3,2)
x-lock(4,3)
update(4,3) to (4,5)
x-lock(5,2)
unlock(5,2)
```

2

```
x-lock(1,2)
update(1,2) to (1,4)
x-lock(2,3) - 1
```

· innodb_log_arch_dir

innodb_log_group_home_dir

· innodb_log_archive

0MySQLInnoDB 0

· innodb_log_buffer_size

InnoDB1MB8MB 1MBI/O

· innodb_log_file_size

324GB 5MB1MB *N* *N*I/O

· innodb_log_files_in_group

InnoDB2

· innodb_log_group_home_dir

InnoDBinnodb_log_arch_dirInnoDB MySQL5MBib_logfile0
ib_logfile1

· innodb_max_dirty_pages_pct

010090InnoDBSUPER

```
SET GLOBAL innodb_max_dirty_pages_pct = value;
```

· innodb_max_purge_lag

INSERT, UPDATEDELETE 15.2.12“”

InnoDBUPDATEDELETE
INSERT, UPDATEDELETE ((*purge_lag*/innodb_max_purge_la
10

1100100MB

· innodb_mirrored_log_groups

1

· innodb_open_files

InnoDBInnoDB.ibd10 300

.ibdInnoDB--open-files-limit

· innodb_status_file

InnoDBSHOW INNODB STATUS<*datadir*>/innodb_status.<*pid*>

· innodb_support_xa

ON1InnoDBXA innodb_support_xaXAOFF0
InnoDB

· innodb_table_locks

InnoDBLOCK TABLESMySQLLOCK TABLE .. WRITE1LOCK TABLESInnoDBAUTOCOMMIT=1InnoDBmy.cnfWindows my.iniinnodb_table_locks= 0

· innodb_thread_concurrency

InnoDBInnoDBSHOW INNODB STATUS“ thrashing” 500500 2020

· innodb_status_file

InnoDBSHOW INNODB STATUS<*datadir*>/innodb_status.<*pid*>

15.2.5. InnoDB

15.2.5.1. InnoDB

MySQLInnoDBMySQLInnoDBMySQLInnoDB

InnoDBMySQL **mysqld** **mysqld_safe**Windows **mysqld**Unix **mysqld**Windows--console

InnoDBMySQLInnoDBInnoDB

```
InnoDB: The first specified datafile /home/heikki/data/ibdata1
did not exist:
InnoDB: a new database to be created!
InnoDB: Setting file /home/heikki/data/ibdata1 size to 134217728
```

```
InnoDB: Database physically writes the file full: wait...
InnoDB: datafile /home/heikki/data/ibdata2 did not exist:
new to be created
InnoDB: Setting file /home/heikki/data/ibdata2 size to 262144000
InnoDB: Database physically writes the file full: wait...
InnoDB: Log file /home/heikki/data/logs/ib_logfile0 did not exist:
new to be created
InnoDB: Setting log file /home/heikki/data/logs/ib_logfile0 size
to 5242880
InnoDB: Log file /home/heikki/data/logs/ib_logfile1 did not exist:
new to be created
InnoDB: Setting log file /home/heikki/data/logs/ib_logfile1 size
to 5242880
InnoDB: Doublewrite buffer not found: creating new
InnoDB: Doublewrite buffer created
InnoDB: Creating foreign key constraint system tables
InnoDB: Foreign key constraint system tables created
InnoDB: Started
mysqld: ready for connections
```

InnoDB **mysql**MySQLMySQL **mysqladmin shutdown**MySQL

```
010321 18:33:34  mysqld: Normal shutdown
010321 18:33:34  mysqld: Shutdown Complete
InnoDB: Starting shutdown...
InnoDB: Shutdown completed
```

ib_arch_log_0000000000InnoDBMySQL

```
InnoDB: Started
```

```
mysqld: ready for connections
```

innodb_file_per_tablemy.cnfInnoDBMySQL.ibd 15.2.6.6“Per-Table”

15.2.5.1. InnoDB

InnoDB

· InnoDBInnoDB

· **mysqld**

· **mysqld**my.cnfmy.ini

.

.

· innodb_data_home_dirinnodb_data_file_path

InnoDBInnoDBibdataib_logfilesInnoDBMySQL.frm(.ibdInnoDBMySQL

15.2.6. InnoDB

15.2.6.1. InnoDBAPI

15.2.6.2. MyISAMInnoDB

15.2.6.3. AUTO_INCREMENTInnoDB

15.2.6.4.

15.2.6.5. InnoDBMySQL

15.2.6.6. Per-Table

mysql testMySQLInnoDBSQLENGINE = InnoDBTYPE = InnoDB

```
CREATE TABLE customers (a INT, b CHAR (20), INDEX (a)) ENGINE=InnoDB
```

```
CREATE TABLE customers (a INT, b CHAR (20), INDEX (a)) TYPE=InnoDB;
```

SQLmy.cnfMySQLMySQLtestcustomers.frmInnoDB 'test/customers'customersInnoDB

InnoDBSHOW TABLE STATUS InnoDB SHOW TABLE STATUS Comment

```
SHOW TABLE STATUS FROM test LIKE 'customers'
```

SHOWInnoDBSQL

15.2.6.1. InnoDBAPI

MySQLSQLSQLSET ROLLBACK autocommitSTART TRANSACTIONCOMM ROLLBACK

```
shell> mysql test
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 5 to server version: 3.23.50-log
Type 'help;' or '\h' for help. Type '\c' to clear the buffer.
mysql> CREATE TABLE CUSTOMER (A INT, B CHAR (20), INDEX (A))
    -> ENGINE=InnoDB;
Query OK, 0 rows affected (0.00 sec)
mysql> BEGIN;
Query OK, 0 rows affected (0.00 sec)
mysql> INSERT INTO CUSTOMER VALUES (10, 'Heikki');
Query OK, 1 row affected (0.00 sec)
mysql> COMMIT;
Query OK, 0 rows affected (0.00 sec)
mysql> SET AUTOCOMMIT=0;
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> INSERT INTO CUSTOMER VALUES (15, 'John');
Query OK, 1 row affected (0.00 sec)
mysql> ROLLBACK;
Query OK, 0 rows affected (0.00 sec)
mysql> SELECT * FROM CUSTOMER;
+------+--------+
| A    | B      |
+------+--------+
|   10 | Heikki |
+------+--------+
1 row in set (0.00 sec)
mysql>
```

PHP, Perl DBI/DBD, JDBC, ODBC, MySQLCAPICOMMIT MySQLSQL SELECTINSERTAPI

15.2.6.2. MyISAMInnoDB

mysqluserhostMySQLInnoDBMyISAM

InnoDBdefault-table-type=innodbmy.cnfmy.ini[mysqld]

InnoDBMyISAMInnoDBInnoDBALTER ENGINE=INNODBInnoDBINSERT INTO ...

UNIQUESET UNIQUE_CHECKS=

```
INSERT INTO newtable SELECT * FROM oldtable
   WHERE yourkey > something AND yourkey <= somethingelse;
```

InnoDBI/O80%InnoDB

InnoDBMyISAMALTER TABLE InnoDBI/O
30

I/O

15.2.6.3. AUTO_INCREMENTInnoDB

AUTO_INCREMENTInnoDB

InnoDBai_colAUTO_INCREMENTTTInnoDB

```
SELECT MAX(ai_col) FROM T FOR UPDATE;
```

1 TSHOW TABLE STATUS

InnoDB

INSERTAUTO_INCREMENTNULL0InnoDB

InnoDB

InnoDBAUTO-INCSQL AUTO_INCREMENTAUTO-
INC

AUTO_INCREMENT

CREATE TABLEALTER TABLEInnoDBAUTO_INCREMENT =

15.2.6.4.

InnoDBInnoDB

```
[CONSTRAINT symbol] FOREIGN KEY [id] (index_col_name, ...)
    REFERENCES tbl_name (index_col_name, ...)
```

```
    [ON DELETE {RESTRICT | CASCADE | SET NULL | NO ACTION}]
    [ON UPDATE {RESTRICT | CASCADE | SET NULL | NO ACTION}]
```

· tablesInnoDB

.

.

· BLOBTEXT

· CONSTRAINT*symbol*InnoDB

InnoDBINSERTUPDATE InnoDBUPDATEDELETEFOREIGN KEYON UPDATEON DETETE *referential action*InnoDB

· CASCADE: ON DELETE CASCADEON ON UPDATE CASCADE

· SET NULL: NULLNOT NULLON ON UPDATE SET NULL

· NO ACTION: ANSI SQL-92NO ACTIONGruber, 2000:181 InnoDB

· RESTRICT: NO ACTIONRESTRICTON UPDATENO ACTIONMySQLNO

· SET DEFAULT: InnoDBON DELETE SET DEFAULTON UPDATE SET DEFAULT

InnoDB CASCADE

InnoDB

InnoDB

InnoDBSET NULL *NOT NULL*

MySQLCREATE TABLE1005errno
errno 150 SHOW INN

InnoDB NULL

SQL InnoDBRESTRICTInnoDB

InnoDB

SQL ON UPDATE CASCADEON UPDATE SET NULL
RESTRICTON UPDATE CASCADEON UPDATE
ON DELETE SET NULLON DELETE CASCADE 15

SQL MySQLSQLInnoDBUNIQUEFOREIGN KEYSQL
SQLInnoDB

```
CREATE TABLE parent(id INT NOT NULL,
                    PRIMARY KEY (id)
) TYPE=INNODB;
CREATE TABLE child(id INT, parent_id INT,
                   INDEX par_ind (parent_id),
                   FOREIGN KEY (parent_id) REFERENCES parent(id)
                     ON DELETE CASCADE
) TYPE=INNODB;
```

product_orderproduct customer

```
CREATE TABLE product (category INT NOT NULL, id INT NOT NULL,
                      price DECIMAL,
                      PRIMARY KEY(category, id)) TYPE=INNODB;
```

```
CREATE TABLE customer (id INT NOT NULL,
                       PRIMARY KEY (id)) TYPE=INNODB;
CREATE TABLE product_order (no INT NOT NULL AUTO_INCREMENT,
                       product_category INT NOT NULL,
                       product_id INT NOT NULL,
                       customer_id INT NOT NULL,
                       PRIMARY KEY(no),
                       INDEX (product_category, product_id),
                       FOREIGN KEY (product_category, product_id)
                         REFERENCES product(category, id)
                         ON UPDATE CASCADE ON DELETE RESTRICT,
                       INDEX (customer_id),
                       FOREIGN KEY (customer_id)
                         REFERENCES customer(id)) TYPE=INNODB;
```

InnoDBALTER TABLE

```
ALTER TABLE yourtablename
    ADD [CONSTRAINT symbol] FOREIGN KEY [id] (index_col_name, ...)
    REFERENCES tbl_name (index_col_name, ...)
    [ON DELETE {RESTRICT | CASCADE | SET NULL | NO ACTION}]
    [ON UPDATE {RESTRICT | CASCADE | SET NULL | NO ACTION}]
```

ALTER TABLE

InnoDBALTER TABLE

```
ALTER TABLE yourtablename DROP FOREIGN KEY fk_symbol;
```

FOREIGN KEYCONSTRAINT fk_symbolInnoDB
SHOW CREATE TABLE

```
mysql> SHOW CREATE TABLE ibtest11c\G
*************************** 1. row ***************************
       Table: ibtest11c
Create Table: CREATE TABLE `ibtest11c` (
  `A` int(11) NOT NULL auto_increment,
  `D` int(11) NOT NULL default '0',
  `B` varchar(200) NOT NULL default '',
  `C` varchar(175) default NULL,
  PRIMARY KEY  (`A`,`D`,`B`),
  KEY `B` (`B`,`C`),
  KEY `C` (`C`),
  CONSTRAINT `0_38775` FOREIGN KEY (`A`, `D`)
REFERENCES `ibtest11a` (`A`, `D`)
ON DELETE CASCADE ON UPDATE CASCADE,
  CONSTRAINT `0_38776` FOREIGN KEY (`B`, `C`)
REFERENCES `ibtest11a` (`B`, `C`)
ON DELETE CASCADE ON UPDATE CASCADE
) ENGINE=INNODB CHARSET=latin1
1 row in set (0.01 sec)

mysql> ALTER TABLE ibtest11c DROP FOREIGN KEY 0_38775;
```

InnoDB FOREIGN KEY ... REFERENCES ... `backticks) Inn
lower_case_table_names

InnoDBSHOW CREATE TABLE

```
SHOW CREATE TABLE tbl_name;
```

mysqldump

```
SHOW TABLE STATUS FROM db_name LIKE 'tbl_name';
```

Comment

InnoDBInnoDB

mysqldumpFOREIGN_KEY_CHECKS0

```
mysql> SET FOREIGN_KEY_CHECKS = 0;
mysql> SOURCE dump_file_name;
mysql> SET FOREIGN_KEY_CHECKS = 1;
```

FOREIGN_KEY_CHECKS0LOAD

InnoDBFOREIGN KEY SET FOREIGN_KEY_CHECKS=0

MySQL1005

15.2.6.5. InnoDBMySQL

MySQLMyISAMInnoDB InnoDBMyISAM

InnoDBInnoDB.frm 15.2.9“InnoDB”

InnoDB InnoDB

InnoDBLOAD TABLE FROM MASTERInnoDB

.

· LOAD TABLE *tbl_name* FROM MASTERALTER TYPE=MyISAMALTER TABLEInnoDB

MySQLMySQSQLSQL
SQL

15.2.6.6. Per-Table

InnoDB“”

InnoDB

my.cnf[mysqld]

```
[mysqld]
innodb_file_per_table
```

InnoDB *tbl_name*.ibdMyISAMMyISAM *tbl_name*.MYIInnoDB.ibd *tbl_name*.frm

my.cnfinnodb_file_per_tableInnoDB

innodb_file_per_table.ibd

InnoDB.ibdInnoDBibdataInnoDB

MyISAM.ibdInnoDBInnoDBID

MySQLRENAME TABLE.ibd

```
RENAME TABLE old_db_name.tbl_name TO new_db_name.tbl_name;
```

.ibdMySQL

1. ALTER TABLE
2. ```
   ALTER TABLE tbl_name DISCARD TABLESPACE;
   ```

.ibd

3. .ibd
4. ALTER TABLE:
5. ```
   ALTER TABLE tbl_name IMPORT TABLESPACE;
   ```

.ibd

· .ibd

· .ibd

· .ibd

· **mysqld**.ibd

.ibd

1. **mysqld**

2. SHOW INNODB STATUSInnoDBWaiting for server activity.ibd

.ibd **InnoDB**

1. **InnoDB**InnoDB

2. **mysqld**.ibd

15.2.7. InnoDB

InnoDB

InnoDBautoextendInnoDB8MB
innodb_autoextend_increment,MB8

MySQLmy.cnf innodb_data_file_path

autoextendmy.cnf1024 × 1024bytes (=
innodb_data_file_pathinnodb_data_file_path

ibdata1

```
innodb_data_home_dir =

innodb_data_file_path = /ibdata/ibdata1:10M:autoextend
```

988MB

```
innodb_data_home_dir =

innodb_data_file_path = /ibdata/ibdata1:988M;/disk2/ibdata2:50M:auto
```

InnoDB

1. **mysqldump**InnoDB
2.
3.
4.
5.
6.

InnoDBMySQLmy.cnfMySQL **mysqld**

15.2.8. InnoDB

15.2.8.1.

15.2.8.2.

InnoDBInnoDBInnoDB **InnoDB** **InnoDB**MySQL €390 **InnoDB**

MySQLInnoDB

1. MySQL
2. ibdata.ibd
3. ib_logfile
4. my.cnf
5. InnoDB.frm

InnoDBMySQL

mysqldump **mysqldump** --single-transaction

InnoDBMySQL point-in-time

```
mysqlbinlog yourhostname-bin.123 | mysql
```

MySQLInnoDBInnoDB **mysqld**

```
InnoDB: Database was not shut down normally.
InnoDB: Starting recovery from log files...
InnoDB: Starting log scan based on checkpoint at
InnoDB: log sequence number 0 13674004
InnoDB: Doing recovery: scanned up to log sequence number 0 13739520
InnoDB: Doing recovery: scanned up to log sequence number 0 13805056
InnoDB: Doing recovery: scanned up to log sequence number 0 13870592
InnoDB: Doing recovery: scanned up to log sequence number 0 13936128
...
InnoDB: Doing recovery: scanned up to log sequence number 0 20555264
InnoDB: Doing recovery: scanned up to log sequence number 0 20620800
InnoDB: Doing recovery: scanned up to log sequence number 0 20664692
InnoDB: 1 uncommitted transaction(s) which must be rolled back
InnoDB: Starting rollback of uncommitted transactions
InnoDB: Rolling back trx no 16745
InnoDB: Rolling back of trx no 16745 completed
InnoDB: Rollback of uncommitted transactions completed
InnoDB: Starting an apply batch of log records to the database...
InnoDB: Apply batch completed
InnoDB: Started
```

```
mysqld: ready for connections
```

CHECK TABLE SQLCHECK TABLE
innodb_tablespace_monitor

15.2.8.1.

SELECT INTO OUTFILESELECT * FROM
InnoDB InnoDB[mysqld]

```
[mysqld]
innodb_force_recovery = 4
```

innodb_force_recovery46B

· 1 (SRV_FORCE_IGNORE_CORRUPT)

SELECT * FROM *tbl_name*

· 2 (SRV_FORCE_NO_BACKGROUND)

· 3 (SRV_FORCE_NO_TRX_UNDO)

· 4 (SRV_FORCE_NO_IBUF_MERGE)

· 5 (SRV_FORCE_NO_UNDO_LOG_SCAN)

InnoDB

· 6 (SRV_FORCE_NO_LOG_REDO)

innodb_force_recovery 0InnoDBINSERT, UPDATEDELETE.

DROPCREATEALTER TABLE **mysqld** innodb_force_recovery3

15.2.8.2.

InnoDB“” InnoDB SQL

InnoDBInnoDB

InnoDB InnoDBInnoDBInnoDB InnoDB

I/O

15.2.9. InnoDB

Windows InnoDB UnixWindowsWindowsUnix my.cnf my.ini[mysqld]

```
[mysqld]
lower_case_table_names=1
```

MyISAMInnoDB 15.2.8“InnoDB” InnoDBFLOAT DOUBLE

autocommit

15.2.10. InnoDB

15.2.10.1. InnoDB

15.2.10.2. InnoDBAUTOCOMMIT

15.2.10.3. InnoDBTRANSACTION ISOLATION LEVEL

15.2.10.4.

15.2.10.5. SELECT ... FOR UPDATESELECT ... LOCK IN SHARE MODE

15.2.10.6. Next-Key

15.2.10.7. InnoDB

15.2.10.8. InnoDBSQL

15.2.10.9. MySQL

15.2.10.10.

15.2.10.11.

InnoDBInnoDBOracle InnoDBInnoDB

15.2.10.1. InnoDB

InnoDB locks:

· (*S*)tuple

· (*X*)

A tuple *t* *Bt* *B* ttuple *t*

A tuple *t*(*S*)

· *Bt* *X*

· *Bt S* *ABtS*

InnoDB *intention locks*InnoDB
InnoDB *T R*

· (*IS*) *T T*tuple*S*

· (*IX*) *T* tuple*X*

· *S* *IS*

· *X* *IX*

	X	IX	S	IS
X				
IX				
S				
IS				

LOCK TABLES ... WRITE *L*

AB

AA *S*

```
mysql> CREATE TABLE t (i INT) ENGINE = InnoDB;
Query OK, 0 rows affected (1.07 sec)

mysql> INSERT INTO t (i) VALUES(1);
Query OK, 1 row affected (0.09 sec)

mysql> START TRANSACTION;
```

```
Query OK, 0 rows affected (0.00 sec)


mysql> SELECT * FROM t WHERE i = 1 LOCK IN SHARE MODE;
+------+
| i    |
+------+
|    1 |
+------+
1 row in set (0.10 sec)
```

B

```
mysql> START TRANSACTION;
Query OK, 0 rows affected (0.00 sec)


mysql> DELETE FROM t WHERE i = 1;
```

X A *S* *X*

A

```
mysql> DELETE FROM t WHERE i = 1;
ERROR 1213 (40001): Deadlock found when trying to get lock;
try restarting transaction
```

A*X* B *X*A*S*B *X* A *SX*InnoDBAB
B

15.2.10.2. InnoDB AUTOCOMMIT

InnoDBSQLMySQL

SET AUTOCOMMIT = 0SQL COMMITROLLBACKInnoDB
COMMITROLLBACK

START TRANSACTIONBEGINCOMMITROLLBACK

15.2.10.3. InnoDBTRANSACTION ISOLATION LEVEL

SQL:1992 InnoDBREPEATABLE READMyS
--transaction-isolation my.inf[mysqld]globally

```
[mysqld]
transaction-isolation = {READ-UNCOMMITTED | READ-COMMITTED
                         | REPEATABLE-READ | SERIALIZABLE}
```

SET TRANSACTION

```
SET [SESSION | GLOBAL] TRANSACTION ISOLATION LEVEL
                       {READ UNCOMMITTED | READ COMMITTED
                        | REPEATABLE READ | SERIALIZABLE}
```

--transaction-isolationSET TRANSACTION

GLOBAL SUPERSESSION

```
SELECT @@global.tx_isolation;
SELECT @@tx_isolation;
```

InnoDBnext-keyInnoDBnext-key

InnoDB

· READ UNCOMMITTED

SELECT“” dirty read READ COMMITTED

· READ COMMITTED

OracleSELECT ... FOR UPDATESELECT ... LOCK IN SHARE MOD
UPDATEDELETEUPDATEDELETEInnoDBnext-key
MySQL“”

Oracle 15.2.10.4“”

· REPEATABLE READ

InnoDBSELECT ... FOR UPDATI
UPDATE DELETEnext-keynext-key

SELECTSELECT 15.2.10.4“”

· SERIALIZABLE

REPEATABLE READSELECT SELECT ... LOCK IN SHARE MODE

15.2.10.4.

InnoDB

REPEATABLE READ

InnoDBzaiREAD COMMITTEDREPEATABLE READ

DROP TABLEALTER TABLEDROP TABLEMySQLInnoDB
ALTER TABLE

15.2.10.5. SELECT ... FOR UPDATESELECT ... LOCK IN SHARE MODE

LOCK IN SHARE MODESELECT

```
SELECT * FROM parent WHERE NAME = 'Jones' LOCK IN SHARE MODE;
```

'Jones'

child_codes

LOCK IN SHARE MODE

(1) 1(2)FOR UPDATE

```
SELECT counter_field FROM child_codes FOR UPDATE;
```

```
UPDATE child_codes SET counter_field = counter_field + 1;
```

SELECT ... FOR UPDATESQL UPDATE

SELECT ... FOR UPDATEMySQL

```
UPDATE child_codes SET counter_field = LAST_INSERT_ID(counter_field
```

```
SELECT LAST_INSERT_ID();
```

SELECT

15.2.10.6. Next-Key

InnoDB *next-key locking*InnoDB

InnoDB“”R

```
SELECT * FROM child WHERE id > 100 FOR UPDATE;
```

idid100SELECT“”

InnoDBInnoDBid100

next-key next-key the next-key

15.2.10.7. InnoDB

REPEATABLE READSELECTInnoDB

SELECT

multi-versioned concurrency control

```
                User A                  User B

            SET AUTOCOMMIT=0;       SET AUTOCOMMIT=0;
time
|           SELECT * FROM t;
|           empty set
|                                   INSERT INTO t VALUES (1, 2);
|
v           SELECT * FROM t;
            empty set
                                    COMMIT;

            SELECT * FROM t;
            empty set

            COMMIT;

            SELECT * FROM t;
            ---------------------
            |    1    |    2    |
            ---------------------
            1 row in set
```

BAAB B

READ COMMITTED

```
SELECT * FROM t LOCK IN SHARE MODE;
```

15.2.10.8. InnoDBSQL

SQLUPDATEDELETEWHEREInnoDBWHERE
next-key

InnoDB

MySQL

· SELECT ... FROMSERIALIZABLE
next-key

· SELECT ... FROM ... LOCK IN SHARE MODEnext-key

· SELECT ... FROM ... FOR UPDATEnext-key

· INSERT INTO ... VALUES (...)next-key

· AUTO_INCREMENTInnoDBAUTO_INCREMENTInnoDB
AUTO-INCSQL 15

InnoDBAUTO_INCREMENT

· INSERT INTO T SELECT ... FROM S WHERE ... Tnext-key
SMySQLSnext-keyInnoDBSQL

· CREATE TABLE ... SELECT ... SELECT

· REPLACE next-key

· UPDATE ... WHERE ... next-key

· DELETE FROM ... WHERE ... next-key

· FOREIGN KEYInnoDB

· LOCK TABLES InnoDBMySQLinnodb_table_locks=1
AUTOCOMMIT=0InnoDB InnoDBMySQLInooDB
MySQL

15.2.10.9. MySQL

MySQLautocommitautocommitSQLMySQLSQL

autocommitMySQL

SQL/ 15.2.15“InnoDB”

COMMIT

· ALTER FUNCTION, ALTER PROCEDURE, ALTER TABLE, BEGIN, CREATE DATABASE, CREATE FUNCTION, CREATE INDEX, CREATE PROCEDURE, CREATE TABLE, DROP DATABASE, DROP FUNCTION, DROP INDEX, DROP PROCEDURE, DROP TABLE, LOAD MASTER DATA, LOCK TABLES, RENAME TABLE, SET AUTOCOMMIT=1, START TRANSACTION, TRUNCATE, UNLOCK TABLES.

· UNLOCK TABLES

· InnoDBCREATE TABLEROLLBACKCREATE TABLE

START TRANSACTION

15.2.10.10.

InnoDBInnoDB

innodb_table_locks=1 1InnoDBMySQLrow-levelInnoDB
MySQL LOCK TABLESInnoDBinnodb_lock_wait_timeout

InnoDSQL SQLInnoDBSQL

15.2.10.11.

InnoDB“”

· Use SHOW INNODB STATUS

.

.

· SELECT ... FOR UPDATE ... LOCK IN SHARE M
READ COMMITTED

.

· EXPLAIN SELECT,MySQL

· SELECTFOR UPDATELOCK
COMMITTED

· LOCK TABLESInnoDB)AUTOCOMMIT = 0 UNLOCK
TABLESt1t

```
· SET AUTOCOMMIT=0;
· LOCK TABLES t1 WRITE, t2 READ, ...;
· [do something with tables t1 and t2 here];
· COMMIT;
· UNLOCK TABLES;
```

· “ semaphore” InnoDBMySQL

· LOCK TABLESAUTOCOMMIT=1,MySQLInnoDB

15.2.11. InnoDB

15.2.11.1. SHOW INNODB STATUSInnoDB Monitors

· UnixWindowsCPU70% 80%.

· InnoDB167/167

· my.cnfinnodb_flush_log_at_trx_commit0 InnoDB

· InnoDB

· 8MB)

· NULLVARCHARCHARCHAR(*N*)*N* NULLI/O

row_format=compact MySQL 5.1 InnoDBUTF-8sjisCHAR(*N*) *N*

· GNU/LinuxUnixUnixfsync()InnoDBmy.cnf innodb_flush_methodO_DSYNCO_DSYNC

· Solaris 10x86_64AMD Opteron)InnoDBforcedirectioInnoI Solaris 10/x86_64 forcedirectio InnoDB

· InnoDBMySQLautocommitautocommit autocommitSET AUTOCOMMITCOMMIT

·
```
SET AUTOCOMMIT=0;
```
·
```
/* SQL import statements ... */
```
·
```
COMMIT;
```

mysqldump --optSET AUTOCOMMITCOMMITInnoDB

· InnoDBI/O 30 CPU 15.2.8.1“”

· DROP TABLECREATE TABLEDELETE

·

·
```
INSERT INTO yourtable VALUES (1,2), (5,5), ...;
```

InnoDB

· UNIQUE

·
```
SET UNIQUE_CHECKS=0;
```

I/OInnoDB

· FOREIGN KEY

· SET FOREIGN_KEY_CHECKS=0;

I/O

·

· [mysqld]

· query_cache_type = ON

· query_cache_size = 10M

15.2.11.1. SHOW INNODB STATUS InnoDB Monitors

InnoDBInnoDB MonitorsInnoDBSQLSHOW INNODB STATUSInnoDB MonitorSQL **mysql**S
“InnoDB”

```
mysql> SHOW INNODB STATUS\G
```

InnoDB Monitors **mysqld**InnoDB Windows --console

·

·

·

· I/O

·

· InnoDB

InnoDB Monitor **mysqld**SQL

```
CREATE TABLE innodb_monitor(a INT) ENGINE=INNODB;
```

```
DROP TABLE innodb_monitor;
```

CREATE TABLEMySQLSQLInnoDBinnodb_monitorInnoDB **InnoDB Monitor**, CREATE

innodb_lock_monitorinnodb_monitor innodb_tablespace_monitor innodb_table_monitorInnoDB

InnoDB Monitor

```
mysql> SHOW INNODB STATUS\G
*************************** 1. row ***************************
Status:
=====================================
030709 13:00:59 INNODB MONITOR OUTPUT
=====================================
Per second averages calculated from the last 18 seconds
----------
SEMAPHORES
----------
OS WAIT ARRAY INFO: reservation count 413452, signal count 378357
--Thread 32782 has waited at btr0sea.c line 1477 for 0.00 seconds th
X-lock on RW-latch at 41a28668 created in file btr0sea.c line 135
a writer (thread id 32782) has reserved it in mode wait exclusive
number of readers 1, waiters flag 1
Last time read locked in file btr0sea.c line 731
Last time write locked in file btr0sea.c line 1347
Mutex spin waits 0, rounds 0, OS waits 0
RW-shared spins 108462, OS waits 37964; RW-excl spins 681824, OS wai
```

```
------------------------
LATEST FOREIGN KEY ERROR
------------------------
030709 13:00:59 Transaction:
TRANSACTION 0 290328284, ACTIVE 0 sec, process no 3195, OS thread id
ting
15 lock struct(s), heap size 2496, undo log entries 9
MySQL thread id 25, query id 4668733 localhost heikki update
insert into ibtest11a (D, B, C) values (5, 'khDk' ,'khDk')
Foreign key constraint fails for table test/ibtest11a:
,
  CONSTRAINT `0_219242` FOREIGN KEY (`A`, `D`) REFERENCES `ibtest11b
 ON DELETE CASCADE ON UPDATE CASCADE
Trying to add in child table, in index PRIMARY tuple:
 0: len 4; hex 80000101; asc ....;; 1: len 4; hex 80000005; asc ....
 hex 6b68446b; asc khDk;; 3: len 6; hex 0000114e0edc; asc ...N..;; 4
 00000000c3e0a7; asc .......;; 5: len 4; hex 6b68446b; asc khDk;;
But in parent table test/ibtest11b, in index PRIMARY,
the closest match we can find is record:
RECORD: info bits 0 0: len 4; hex 8000015b; asc ...[;; 1: len 4; hex
sc ....;; 2: len 3; hex 6b6864; asc khd;; 3: len 6; hex 0000111ef3eb
;; 4: len 7; hex 800001001e0084; asc .......;; 5: len 3; hex 6b6864;
------------------------
LATEST DETECTED DEADLOCK
------------------------
030709 12:59:58
```

```
*** (1) TRANSACTION:
TRANSACTION 0 290252780, ACTIVE 1 sec, process no 3185, OS thread id
ting
LOCK WAIT 3 lock struct(s), heap size 320, undo log entries 146
MySQL thread id 21, query id 4553379 localhost heikki update
INSERT INTO alex1 VALUES(86, 86, 794,'aA35818','bb','c79166','d4766t
,'g84586','h794',date_format('2001-04-03 12:54:22','%Y-%m-%d %H:%i')
*** (1) WAITING FOR THIS LOCK TO BE GRANTED:
RECORD LOCKS space id 0 page no 48310 n bits 568 table test/alex1 in
trx id 0 290252780 lock mode S waiting
Record lock, heap no 324 RECORD: info bits 0 0: len 7; hex 616133353
a35818;; 1:
*** (2) TRANSACTION:
TRANSACTION 0 290251546, ACTIVE 2 sec, process no 3190, OS thread id
ting
130 lock struct(s), heap size 11584, undo log entries 437
MySQL thread id 23, query id 4554396 localhost heikki update
REPLACE INTO alex1 VALUES(NULL, 32, NULL,'aa3572','','c3572','d6012t
h396', NULL, NULL, 7.31,7.31,7.31,200)
*** (2) HOLDS THE LOCK(S):
RECORD LOCKS space id 0 page no 48310 n bits 568 table test/alex1 in
trx id 0 290251546 lock_mode X locks rec but not gap
Record lock, heap no 324 RECORD: info bits 0 0: len 7; hex 616133353
a35818;; 1:
*** (2) WAITING FOR THIS LOCK TO BE GRANTED:
RECORD LOCKS space id 0 page no 48310 n bits 568 table test/alex1 in
```

```
trx id 0 290251546 lock_mode X locks gap before rec insert intention
Record lock, heap no 82 RECORD: info bits 0 0: len 7; hex 6161333537
35720;; 1:
*** WE ROLL BACK TRANSACTION (1)
------------
TRANSACTIONS
------------
Trx id counter 0 290328385
Purge done for trx's n:o < 0 290315608 undo n:o < 0 17
Total number of lock structs in row lock hash table 70
LIST OF TRANSACTIONS FOR EACH SESSION:
---TRANSACTION 0 0, not started, process no 3491, OS thread id 42002
MySQL thread id 32, query id 4668737 localhost heikki
show innodb status
---TRANSACTION 0 290328384, ACTIVE 0 sec, process no 3205, OS thread
serting
1 lock struct(s), heap size 320
MySQL thread id 29, query id 4668736 localhost heikki update
insert into speedc values (1519229,1, 'hgjhjgghggjgjgjgjgjggjgjgjgjg
gghgggggghhjhghgggggghjhghghghghghhhhghghghjhhjghjghjkghjghjghjghjfhj
---TRANSACTION 0 290328383, ACTIVE 0 sec, process no 3180, OS thread
mmitting
1 lock struct(s), heap size 320, undo log entries 1
MySQL thread id 19, query id 4668734 localhost heikki update
insert into speedcm values (1603393,1, 'hgjhjgghggjgjgjgjgjggjgjgjgj
hgghgggggghhjhghgggggghjhghghghghghhhhghghghjhhjghjghjkghjghjghjghjfh
```

```
---TRANSACTION 0 290328327, ACTIVE 0 sec, process no 3200, OS thread
arting index read
LOCK WAIT 2 lock struct(s), heap size 320
MySQL thread id 27, query id 4668644 localhost heikki Searching rows
update ibtest11a set B = 'kHdkkkk' where A = 89572
------- TRX HAS BEEN WAITING 0 SEC FOR THIS LOCK TO BE GRANTED:
RECORD LOCKS space id 0 page no 65556 n bits 232 table test/ibtest11
ARY trx id 0 290328327 lock_mode X waiting
Record lock, heap no 1 RECORD: info bits 0 0: len 9; hex 73757072656
 supremum.;;
------------------
---TRANSACTION 0 290328284, ACTIVE 0 sec, process no 3195, OS thread
llback of SQL statement
ROLLING BACK 14 lock struct(s), heap size 2496, undo log entries 9
MySQL thread id 25, query id 4668733 localhost heikki update
insert into ibtest11a (D, B, C) values (5, 'khDk' ,'khDk')
---TRANSACTION 0 290327208, ACTIVE 1 sec, process no 3190, OS thread
58 lock struct(s), heap size 5504, undo log entries 159
MySQL thread id 23, query id 4668732 localhost heikki update
REPLACE INTO alex1 VALUES(86, 46, 538,'aa95666','bb','c95666','d9486
','g86814','h538',date_format('2001-04-03 12:54:22','%Y-%m-%d %H:%i'
---TRANSACTION 0 290323325, ACTIVE 3 sec, process no 3185, OS thread
serting
4 lock struct(s), heap size 1024, undo log entries 165
MySQL thread id 21, query id 4668735 localhost heikki update
INSERT INTO alex1 VALUES(NULL, 49, NULL,'aa42837','','c56319','d1719
```

'h321', NULL, NULL, 7.31,7.31,7.31,200)

FILE I/O

I/O thread 0 state: waiting for i/o request (insert buffer thread)

I/O thread 1 state: waiting for i/o request (log thread)

I/O thread 2 state: waiting for i/o request (read thread)

I/O thread 3 state: waiting for i/o request (write thread)

Pending normal aio reads: 0, aio writes: 0,

 ibuf aio reads: 0, log i/o's: 0, sync i/o's: 0

Pending flushes (fsync) log: 0; buffer pool: 0

151671 OS file reads, 94747 OS file writes, 8750 OS fsyncs

25.44 reads/s, 18494 avg bytes/read, 17.55 writes/s, 2.33 fsyncs/s

----

INSERT BUFFER AND ADAPTIVE HASH INDEX

Ibuf for space 0: size 1, free list len 19, seg size 21,

85004 inserts, 85004 merged recs, 26669 merges

Hash table size 207619, used cells 14461, node heap has 16 buffer(s)

1877.67 hash searches/s, 5121.10 non-hash searches/s

LOG

Log sequence number 18 1212842764

Log flushed up to   18 1212665295

Last checkpoint at 18 1135877290

```
0 pending log writes, 0 pending chkp writes
4341 log i/o's done, 1.22 log i/o's/second
----------------------
BUFFER POOL AND MEMORY
----------------------
Total memory allocated 84966343; in additional pool allocated 140262
Buffer pool size   3200
Free buffers       110
Database pages     3074
Modified db pages  2674
Pending reads 0
Pending writes: LRU 0, flush list 0, single page 0
Pages read 171380, created 51968, written 194688
28.72 reads/s, 20.72 creates/s, 47.55 writes/s
Buffer pool hit rate 999 / 1000
--------------
ROW OPERATIONS
--------------
0 queries inside InnoDB, 0 queries in queue
Main thread process no. 3004, id 7176, state: purging
Number of rows inserted 3738558, updated 127415, deleted 33707, read
1586.13 inserts/s, 50.89 updates/s, 28.44 deletes/s, 107.88 reads/s
---------------------------
END OF INNODB MONITOR OUTPUT
============================
1 row in set (0.05 sec)
```

· TRANSACTIONS

· SEMAPHORESrw-lockI/OInnoDB
innodb_thread_concurrency

· BUFFER POOL AND MEMORYI/O

· ROW OPERATIONS

InnoDBstderrstdout SHOW
innodb_status.*pidpid* IDMySQLInnoDB
innodb_status_file=1innodb_status. *pid*

15.2.12.

InnoDB, *rollback segment*Oracle

InnoDB67

InnoDB

InnoDB

, InnoDB

InnoDBSQL InnoDBInnoDBSQL

10MB10GB
innodb_max_purge_lag 15.2.4“InnoDB ”

15.2.13.

15.2.13.1.

15.2.13.2.

15.2.13.3.

15.2.13.4.

MySQL.frmMySQLInnoDBInnoDBMySQL.frmInnoDB
.frmInnoDB

InnoDB *clustered index*PRIMARY KEY

PRIMARY KEYMySQLNOT NULLUNIQUEInnoDBInnoDB
InnoDBIDID6ID

I/O

InnoDBInnoDB

InnoDBCHARVARCHAR

15.2.13.1.

InnoDBB16KBInnoDB

15/161/2 15/161/2InnoDB

15.2.13.2.

I/OInnoDB

InnoDBInnoDBInnoDB

I/O15

15.2.8.1“”

I/OI/O 15.2.12“”

15.2.13.3.

InnoDBInnoDB

BInnoDBBInnoDBB BInnoDB

InnoDB

15.2.13.4.

InnoDB

· InnoDB6row-level

· 6ID7

· 6ID

·

· 1282

· InnoDBCHAR(10)InnoDBVARCHARMySQLCHAR VARCHAR 13.1.5.1“”

· SQLNULL12SQLNULLNULL NULLNULL

15.2.14.I/O

15.2.14.1. I/O

15.2.14.2.

15.2.14.3.

15.2.14.4.

15.2.14.1. I/O

InnoDBI/OInnoDBI/Oread-ahead.

InnoDBread-ahead

· read-aheadInnoDB I/O

· read-aheadInnoDBI/O

InnoDB*doublewrite* fsync()Unix.

DoublewriteInnoDBdoublewrite doublewriteInnoDB InnoDBdoublewrite

15.2.14.2.

WindowsUnixnon-buffered I/O

innodb_data_file_path newrawInnoDB1MB1024x1024 1MB1,000,000

```
[mysqld]
innodb_data_home_dir=
innodb_data_file_path=/dev/hdd1:3Gnewraw;/dev/hdd2:2Gnewraw
```

InnoDBnewrawInnoDBInnoDB 3.23.44 newrawInnoDB

InnoDBnewraw

```
[mysqld]
innodb_data_home_dir=
innodb_data_file_path=/dev/hdd1:5Graw;/dev/hdd2:2Graw
```

InnoDB

Windows

```
[mysqld]
innodb_data_home_dir=
innodb_data_file_path=//./D::10Gnewraw
```

//./ Windows\\.\

MySQL

15.2.14.3.

InnoDBInnoDB

16KB64InnoDB“ rollback segment”

InnoDBB

InnoDB32InnoDBInnoDB4

InnoDB

SHOW TABLE STATUSInnoDBInnoDB

InnoDBB

15.2.14.4.

64

“” InnoDBB50%100%“ ”

```
SELECT COUNT(*) FROM t WHERE a_non_indexed_column <> 12345;
```

“”SQL 10MB/s50MB/s

“ null” ALTER TABLE

```
ALTER TABLE tbl_name ENGINE=INNODB
```

MySQL **mysqldump**

InnoDB

15.2.15. InnoDB

15.2.15.1. InnoDB

15.2.15.2.

InnoDBSQLSQL InnoDBInnoDB

· MySQLInnoDBSQL

· InnoDBInnoDBSQL

START TRANSACTIONBEGINSQLCOMMIT, ROLLBACKSQL

· IGNORESQL

· SQL

· MySQLInnoDBSQLSQL

ROLLBACK SQLSHOW

15.2.15.1. InnoDB

InnoDB

· 1005 (ER_CANT_CREATE_TABLE)

errno 150

· 1016 (ER_CANT_OPEN_FILE)

.frmInnoDBInnoDB 15.2.17.1“InnoDB ”

· 1114 (ER_RECORD_FILE_FULL)

InnoDB

· 1205 (ER_LOCK_WAIT_TIMEOUT)

· 1213 (ER_LOCK_DEADLOCK)

· 1216 (ER_NO_REFERENCED_ROW)

· 1217 (ER_ROW_IS_REFERENCED)

15.2.15.2.

MySQL **perror**

Linux Linux source code

· 1 (EPERM)

· 2 (ENOENT)

· 3 (ESRCH)

· 4 (EINTR)

· 5 (EIO)

I/O

· 6 (ENXIO)

· 7 (E2BIG)

Arg

· 8 (ENOEXEC)

Exec

· 9 (EBADF)

· 10 (ECHILD)

· 11 (EAGAIN)

· 12 (ENOMEM)

· 13 (EACCES)

· 14 (EFAULT)

· 15 (ENOTBLK)

· 16 (EBUSY)

· 17 (EEXIST)

- 18 (EXDEV)
- 19 (ENODEV)
- 20 (ENOTDIR)
- 21 (EISDIR)
- 22 (EINVAL)
- 23 (ENFILE)
- 24 (EMFILE)
- 25 (ENOTTY)

ioctl

- 26 (ETXTBSY)
- 27 (EFBIG)

- 28 (ENOSPC)
- 29 (ESPIPE)
- 30 (EROFS)
- 31 (EMLINK)

Windows Microsoft website

- 1 (ERROR_INVALID_FUNCTION)
- 2 (ERROR_FILE_NOT_FOUND)
- 3 (ERROR_PATH_NOT_FOUND)
- 4 (ERROR_TOO_MANY_OPEN_FILES)
- 5 (ERROR_ACCESS_DENIED)
- 6 (ERROR_INVALID_HANDLE)

- 7 (ERROR_ARENA_TRASHED)
- 8 (ERROR_NOT_ENOUGH_MEMORY)
- 9 (ERROR_INVALID_BLOCK)
- 10 (ERROR_BAD_ENVIRONMENT)
- 11 (ERROR_BAD_FORMAT)
- 12 (ERROR_INVALID_ACCESS)
- 13 (ERROR_INVALID_DATA)
- 14 (ERROR_OUTOFMEMORY)
- 15 (ERROR_INVALID_DRIVE)
- 16 (ERROR_CURRENT_DIRECTORY)
- 17 (ERROR_NOT_SAME_DEVICE)

- 18 (ERROR_NO_MORE_FILES)
- 19 (ERROR_WRITE_PROTECT)
- 20 (ERROR_BAD_UNIT)
- 21 (ERROR_NOT_READY)
- 22 (ERROR_BAD_COMMAND)
- 23 (ERROR_CRC)

().

- 24 (ERROR_BAD_LENGTH)
- 25 (ERROR_SEEK)
- 26 (ERROR_NOT_DOS_DISK)
- 27 (ERROR_SECTOR_NOT_FOUND)

· 28 (ERROR_OUT_OF_PAPER)

· 29 (ERROR_WRITE_FAULT)

· 30 (ERROR_READ_FAULT)

· 31 (ERROR_GEN_FAILURE)

· 32 (ERROR_SHARING_VIOLATION)

· 33 (ERROR_LOCK_VIOLATION)

· 34 (ERROR_WRONG_DISK)

%2 (: %3) %1.

· 36 (ERROR_SHARING_BUFFER_EXCEEDED)

· 38 (ERROR_HANDLE_EOF)

· 39 (ERROR_HANDLE_DISK_FULL)

· 87 (ERROR_INVALID_PARAMETER)

Windowsmy.cnfmy.iniinnodb_file_per_table
innodb_flush_method=unbufferedmy.cnfmy.ini

· 112 (ERROR_DISK_FULL)

· 123 (ERROR_INVALID_NAME)

· 1450 (ERROR_NO_SYSTEM_RESOURCES)

15.2.16. InnoDB

· 1000

· 3500MySQL1024

· VARCHAR, BLOBTEXT8000LONGBLOBLONGTEXT
4GB, BLOBTEXT4GBInnoDBVARCHARBLOBTEXT768

· InnoDB65535VARCHAR65535

```
· mysql> CREATE TABLE t (a VARCHAR(8000), b VARCHAR(1
·     -> c VARCHAR(10000), d VARCHAR(10000), e VARCHA
·     -> f VARCHAR(10000), g VARCHAR(10000));
· ERROR 1118 (42000): Row size too large. The maximum
· used table type, not counting BLOBs, is 65535. You
· columns to TEXT or BLOBs
```

· 2GB

· InnoDB4GB

· 10MB4,000,000,00064TB

· InnoDBFULLTEXT

· ANALYZE TABLE ANALYZE TABLE ANALYZE TABLE InnoDB

MySQL ANALYZE TABLE ANALYZE TABLE INDEX max_seeks_for_key MySQL

· WindowsInnoDBUnix WindowsWindowsUnix

· **:** MySQLMySQLMyISAM InnoDBMySQL **mysql_install_db**

· InnoDB SELECT COUNT(*) MySQLSHOW “InnoDB”

· AUTO_INCREMENTAUTO_INCREMENTMyISAM AUTO_INCREMENT

· MySQLInnoDBAUTO_INCREMENT

· AUTO_INCREMENTInnoDBBIGINT9223372036854775808 BIGINT UNSIGNED1BIGINT64100BIGINT30 MyISAMMySQL

· DELETE FROM *tbl_name*

· TRUNCATE *tbl_name*InnoDBDELETE FROM *tbl_name* AUTO_INCREMENT

· SHOW TABLE STATUSInnoDBSQL

· MySQL 5.1innodb_table_locks=1(1 MySQL LOCK TABLES MySQLInnoDBMySQLInnoDBinnodb_table_locks=0 InnoDB LOCK TABLES

· InnoDBAUTOCOMMIT=1InnoDBInnoDB

· MySQLLOCK TABLESCOMMITUNLOCK TABLES
LOCK TABLESInnoDB

· LOAD TABLE FROM MASTER InnoDB My

· InnoDB16KB8KB64KBuniv.iUNIV_PAGE_SIZE
UNIV_PAGE_SIZE_SHIFT

· MySQL 5.1

15.2.17. InnoDB

15.2.17.1. InnoDB

· MySQL *hostname*.errWindowsmysql.err

· MySQL **mysqld_safe**Windows **mysqld**Windows
--console

· InnoDB Monitorsinnodb_monitorInnoDB
innodb_lock_monitorinnodb_table_monitorInnoDB

· CHECK TABLE

15.2.17.1. InnoDB

MySQL.frmInnoDB.frm .frmInnoDB

CREATE TABLEInnoDBInnoDB.frm

```
InnoDB: Error: table test/parent already exists in InnoDB internal
InnoDB: data dictionary. Have you deleted the .frm file
InnoDB: and not used DROP TABLE? Have you used DROP DATABASE
InnoDB: for InnoDB tables in MySQL version <= 3.23.43?
InnoDB: See the Restrictions section of the InnoDB manual.
InnoDB: You can drop the orphaned table inside InnoDB by
```

```
InnoDB: creating an InnoDB table with the same name in another
InnoDB: database and moving the .frm file to the current database.
InnoDB: Then MySQL thinks the table exists, and DROP TABLE will
InnoDB: succeed.
```

DROP TABLE **mysql**--disable-auto-rehash **mysql**DROP TABLE **mysql**

“”MySQL.InnoDB

```
ERROR 1016: Can't open file: 'child2.InnoDB'. (errno: 1)
```

```
InnoDB: Cannot find table test/child2 from the internal data diction
InnoDB: of InnoDB though the .frm file for the table exists. Maybe y
InnoDB: have deleted and recreated InnoDB data files but have forgot
InnoDB: to delete the corresponding .frm files of InnoDB tables?
```

.frmInnoDB.frm

MySQL ALTER TABLEInnoDBinnodb_table_monitor#sql-... `(backticks)“#”SQLUnix"#"

15.3. MERGE

15.3.1. MERGE

MERGEMRG_MyISAMMyISAM“”
myisampack 8.2“myisampack — MyISAM”
AVG_ROW_LENGTH, MAX_ROWSPACK_KEYS

MERGEMySQL.frm.MRGMERGE

SELECT, DELETE, UPDATEINSERTMERGESELECT, UPD

DROP MERGEMERGE

MERGEUNION=(*list-of-tables*)MERGEUNION
INSERT_METHODFIRSTLASTINSERT_METHODNO
MERGE

MERGE

```
mysql> CREATE TABLE t1 (
    ->    a INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
    ->    message CHAR(20));
mysql> CREATE TABLE t2 (
    ->    a INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
    ->    message CHAR(20));
mysql> INSERT INTO t1 (message) VALUES ('Testing'),('table'),('t1');
mysql> INSERT INTO t2 (message) VALUES ('Testing'),('table'),('t2');
mysql> CREATE TABLE total (
    ->    a INT NOT NULL AUTO_INCREMENT,
    ->    message CHAR(20), INDEX(a))
    ->    TYPE=MERGE UNION=(t1,t2) INSERT_METHOD=LAST;
```

MERGENPRIMARY KEYMyISAMM

MERGE

```
mysql> SELECT * FROM total;
+---+---------+
| a | message |
+---+---------+
| 1 | Testing |
| 2 | table   |
| 3 | t1      |
| 1 | Testing |
| 2 | table   |
| 3 | t2      |
+---+---------+
```

MySQL .MRG

```
shell> cd /mysql-data-directory/current-database
shell> ls -1 t1 t2 > total.MRG
shell> mysqladmin flush-tables
```

MERGEMyISAM

· DROP MERGE

· ALTER TABLE *tbl_name* UNION=(...)

· .MRGMERGEFLUSH TABLE

MERGE

· **myisampack**MERGE

· MERGE

· MERGEMERGE

· MERGE

· MERGEMERGEMERGE

· MERGE

· MyISAMMyISAM

· MERGEMyISAM“” memcpy()

MERGE

· MERGEMyISAM

· MERGEMyISAMMERGEFULLTEXTMERGE FULLTEXTMERGE

· MERGEMyISAMMERGEMyISAM

· MERGE10MERGE(10*10)+10101010

· MERGE read-nextMERGE MI ref 7.2.1“EXPLAIN (SELECT)” eq_refref

15.3.1. MERGE

MERGE

· ALTER TABLE MERGE MyISAM

· REPLACE

· WHEREMERGEREPAIR TABLETRUNCATE OPTIMIZE TABLEANALYZE TABLEDROP TABLE, ALTER TABLE, DELETE FROMMERGEFLUSH TABLESMERGE

· MERGEUNIQUEINSERT, MyISAMINSERT_METHOD MySQL MyISAM

· MERGEMERGEMySQLMyISAMMERGE

· MERGE ALTER TABLEMERGEUNIQUEALTER MERGE ALTER TABLEUNIQUE

· Windows MERGEDROP TABLE MERGEMySQLWindows MERGEFLUSH TABLESMERGE

MERGE http://forums.mysql.com/list.php?93

15.4. MEMORY (HEAP)

MEMORYHEAPMEMORYHEAP

MEMORY.frm

MEMORYENGINE

```
CREATE TABLE t (i INT) ENGINE = MEMORY;
```

MEMORYMEMORY.frm

MEMORY

```
mysql> CREATE TABLE test ENGINE=MEMORY
    ->     SELECT ip,SUM(downloads) AS down
    ->     FROM log_table GROUP BY ip;
mysql> SELECT COUNT(ip),AVG(down) FROM test;
mysql> DROP TABLE test;
```

MEMORY

- MEMORY100%MEMORY
- MEMORY3216500
- MEMORYHASHBTREEUSING

```
·               CREATE TABLE lookup
·                   (id INT, INDEX USING HASH (id))
·                   ENGINE = MEMORY;
·               CREATE TABLE lookup
·                   (id INT, INDEX USING BTREE (id))
·                   ENGINE = MEMORY;
```

B7.4.5“MySQL”

· MEMORY

· MEMORYINSERT DELAYED 13.2.4.2“INSERT DELAYED”

· MEMORYcardinalityB

· MEMORY

· MEMORYBLOBTEXT

· MEMORYAUTO_INCREMENTNULL

· MEMORY TEMPORARY

· MEMORYMEMORYMEMORY

- tmp_table_size

- MEMORY max_heap_table_sizeMEMORYCREATE TABLEMAX_ROWS

· MEMORY

· MEMORYMEMORYDELETE FROMTRUNCATE TABLE DROP TABLE

· MySQLMEMORY--init-fileINSERT INTO ... SELECT LOAD DATA INFILE INFILE ”

· MEMORYMEMORYDELETE FROM --init-fileMEMORY

· MEMORY

```
·                SUM_OVER_ALL_BTREE_KEYS(max_length_of_key + sizeof(
·                + SUM_OVER_ALL_HASH_KEYS(sizeof(char*) * 2)
·                + ALIGN(length_of_row+1, sizeof(char*))
```

ALIGN()round-upcharsizeof(char*)324648

MEMORY http://forums.mysql.com/list.php?92

15.5. BDB (BerkeleyDB)

15.5.1. BDB

15.5.2. BDB

15.5.3. BDB

15.5.4. BDB

15.5.5. BDB

15.5.6. BDB

15.5.7. BDB

Sleepycat SoftwareMySQLBerkeley DBBDBBDBMySQL MySQL-Max

BDBCOMMITROLLBACKMySQL MySQLBDBBDBMySQL

MySQL ABSleepycatMySQL/BDBBerkeley

BDBSleepycatBDBBerkeley

Berkeley DBSleepycat http://www.sleepycat.com/

15.5.1. BDB

BDB

· Linux 2.x Intel

· Sun Solaris (SPARC and x86)

· FreeBSD 4.x/5.x (x86, sparc64)

· IBM AIX 4.3.x

· SCO OpenServer

· SCO UnixWare 7.1.x

· Windows NT/2000/XP

BDB

· Linux 2.x Alpha

· Linux 2.x AMD64

· Linux 2.x IA-64

· Linux 2.x s390

· Mac OS X

BDBMySQL **mysqld**BDB

```
bdb: architecture lacks fast mutexes: applications cannot be threade
Can't init databases
```

MySQLBDB--skip-bdb

15.5.2. BDB

Berkeley DBMySQL MySQL-Max BDB

MySQL--with-berkeley-db **configure**BDBMySQL 5.1

```
shell> ./configure --with-berkeley-db [other-options]
```

2.7“UnixMySQL”, 5.1.2“**mysqld-max**MySQL”, 2.8“MySQL”

15.5.3. BDB

mysqldBDB

· --bdb-home=*path*

BDB--datadir

· --bdb-lock-detect=*method*

BDB DEFAULT, OLDEST, RANDOMYOUNGEST

· --bdb-logdir=*path*

BDB

· --bdb-no-recover

Berkeley DB

· --bdb-no-sync

BDB--skip-sync-bdb-logs--sync-bdb-logs)

· --bdb-shared-data

Berkeley DBBerkeley DBDB_PRIVATE

· --bdb-tmpdir=*path*

BDB

· --skip-bdb

BDB

· --sync-bdb-logs

BDB--skip-sync-bdb-logs

5.3.1“ **mysqld**”

--skip-bdbMySQLBerkeley DBBDBBDBMySQL

MyISAM

BDB--bdb-no-recover **mysqld**BDB **mysqld** 2.9.2.3 “MySQL”

bdb_max_lock BDB10,000 **mysqld**

```
bdb: Lock table is out of available locks
Got error 12 from ...
```

binlog_cache_sizemax_binlog_cache_size 5.11.3“”

5.3.3“”

15.5.4. BDB

BDB.frm.db

BDBENGINETYPE

```
CREATE TABLE t (i INT) ENGINE = BDB;
CREATE TABLE t (i INT) TYPE = BDB;
```

BerkeleyDBENGINETYPEBDB“”

BDBautocommit

· autocommitBDB

· autocommitCOMMITROLLBACK

BEGIN WORKautocommitSET AUTOCOMMIT=0autocommit

13.4.1“START TRANSACTION, COMMITROLLBACK”

BDB

· BDB31161024

· MySQLBDBPRIMARY KEYMySQLPRIMARY KEY 5

SHOW CREATE TABLEDESCRIBE

· PRIMARY KEYPRIMARY KEYPRIMARY KEYPRIMARY KEY

InnoDBprimary keys

· BDBMySQLMyISAM

· MyISAMBDBB

· MyISAM BDBMyISAM

· BDBBDBMyISAM

· SELECT COUNT(*) FROM *tbl_name*BDB

· MySQLBDBDELETEROLLBACKMySQLMySQL 100% ANALYZE 13.5.2.1“ANALYZE TABLE” 13.5.2.5“OPTIMIZE TABLE”

· BDB

· LOCK TABLESBDBLOCK TAB

· BDB--bdb-logdirBDB

· BDBMySQLBDBFLUSH LOGSBerkeley DB

MySQL 5.9.1“”

BDB

· BDB

· BDB28MyISAMMyISAM

15.5.5. BDB

· BDBBDB256 **mysql**--no-auto-rehash

- SHOW TABLE STATUS BDB

```
mysql> SHOW TABLE STATUS LIKE 'bdbtest'\G
*************************** 1. row ***************
           Name: bdbtest
         Engine: BerkeleyDB
        Version: 10
     Row_format: Dynamic
           Rows: 154
 Avg_row_length: 0
    Data_length: 0
Max_data_length: 0
   Index_length: 0
      Data_free: 0
 Auto_increment: NULL
    Create_time: NULL
    Update_time: NULL
     Check_time: NULL
      Collation: latin1_swedish_ci
       Checksum: NULL
 Create_options:
        Comment:
```

15.5.6. BDB

BDB

· BDB.dbsymlinksBDB

· BDB **mysqldump**BDB.frm.dbBDBBDB **mysqld**BDB log.XXXXXXXXXX10

· NULLNULL

15.5.7. BDB

· **mysqld**BDB

```
· bdb:  Ignoring log file: .../log.XXXXXXXXXX:
· unsupported log version #
```

BDBlog.XXXXXXXXXX **mysqldmysqldump --opt**BDB

· autocommitBDBMySQL

```
· 001119 23:43:56  bdb:  Missing log fileid entry
· 001119 23:43:56  bdb:  txn_abort: Log undo failed f
·                        1 3644744: Invalid
```

BDBautocommit

15.6. EXAMPLE

EXAMPLEMySQL

EXAMPLE MySQLsql/examples

MySQL--with-example-storage-engine **configure**

EXAMPLE.frm

```
mysql> CREATE TABLE test (i INT) ENGINE = EXAMPLE;
Query OK, 0 rows affected (0.78 sec)

mysql> INSERT INTO test VALUES(1),(2),(3);
ERROR 1031 (HY000): Table storage engine for 'test' doesn't have thi

mysql> SELECT * FROM test;
Empty set (0.31 sec)
```

EXAMPLE

15.7. FEDERATED

15.7.1. FEDERATED

15.7.2. FEDERATED

15.7.3. FEDERATED

15.7.4. FEDERATED

FEDERATED

FEDERATEDMAXMySQL

FEDERATED MySQLsql

FEDERATED http://forums.mysql.com/list.php?105

15.7.1. FEDERATED

MySQL--with-federated-storage-engine **configure**

15.7.2. FEDERATED

FEDERATED.frm

userMyISAMMyISAMusers.MYD

MySQL FEDERATED.MYDMySQLAPI
SELECT * FROM *tbl_name* SQLmysql_fetch_row() C
SELECTFEDERATED

1. SQL
2. MySQLAPI

3. MySQLAPI SQL

4. -> MySQLAPI

5.

6. API ->

15.7.3. FEDERATED

FEDERATEDFEDERATED

FEDERATEDFEDERATED

```
CREATE TABLE test_table (
    id     int(20) NOT NULL auto_increment,
    name   varchar(32) NOT NULL default '',
    other  int(20) NOT NULL default '0',
    PRIMARY KEY  (id),
    KEY name (name),
    KEY other_key (other)
)
ENGINE=MyISAM
DEFAULT CHARSET=latin1;
```

ENGINEMyISAM

FEDERATED

```
CREATE TABLE federated_table (
    id     int(20) NOT NULL auto_increment,
    name   varchar(32) NOT NULL default '',
    other  int(20) NOT NULL default '0',
    PRIMARY KEY  (id),
```

```
    KEY name (name),
    KEY other_key (other)
)
ENGINE=FEDERATED
DEFAULT CHARSET=latin1
CONNECTION='mysql://root@remote_host:9306/federated/test_table';
```

: CONNECTION MySQLCOMMENT

ENGINEFEDERATEDCONNECTIONFEDERATED

FEDERATEDtest_table.frm

93069306

CONNECTION

scheme`://`*user_name*`[:`*password*`]@`*host_name*`[:`*port_num*`]/`*db_name*`/`*tbl_name*

mysql*scheme*

```
CONNECTION='mysql://username:password@hostname:port/database/tablena
CONNECTION='mysql://username@hostname/database/tablename'
CONNECTION='mysql://username:password@hostname/database/tablename'
```

CONNECTIONFEDERATED

FEDERATEDSHOW CREATE TABLESHOW TABLE STATUS INFORMATION_SCHEMATABLES

FEDERATED http://forums.mysql.com/list.php?105

15.7.4. FEDERATED

FEDERATED

· MySQLFEDERATED

· FEDERATEDFEDERATED

· FEDERATEDFEDERATED

·

· FEDERATED

· FEDERATEDSELECT, INSERT, UPDATE, DELETEALTER TABLE, DROP TABLE

· SELECT, INSERT, UPDATEDELETEHANDLER

· FEDERATED

FEDERATED

15.8. ARCHIVE

ARCHIVE

MySQL--with-archive-storage-engine **configure**

```
mysql> SHOW VARIABLES LIKE 'have_archive';
```

ARCHIVE.frm.ARZ.ARM.ARN

ARCHIVEINSERTSELECORDER BYBLOB
19.4.1“MySQL ” ARCHIVE

: ARCHIVE zlibOPTIMIZE TABLE OPTIMIZE TABLE
CHECK TABLE

· INSERTSELECT INSERT DELAYED 13.2.4.2
“INSERT DELAYED ”

· SELECT SELECT

SELECT SELECT SELECTSELECT
OPTIMIZE TABLEREPAIR TABLESHOW TABLE
STATUS 13.5.2.6“REPAIR TABLE” 13.5.2.5“OI
” 13.5.4.18 “SHOW TABLE STATUS ”

ARCHIVE http://forums.mysql.com/list.php?112

15.9. CSV

CSV

MySQL--with-csv-storage-engine **configure**

CSV.frm.CSVCSV

```
mysql> CREATE TABLE test(i INT, c CHAR(10)) ENGINE = CSV;
Query OK, 0 rows affected (0.12 sec)

mysql> INSERT INTO test VALUES(1,'record one'),(2,'record two');
Query OK, 2 rows affected (0.00 sec)
Records: 2  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM test;
+------+------------+
| i    | c          |
+------+------------+
|    1 | record one |
|    2 | record two |
+------+------------+
2 rows in set (0.00 sec)
```

test.CSV

```
"1","record one"
"2","record two"
```

CSV

15.10. BLACKHOLE

BLACKHOLE“”

```
mysql> CREATE TABLE test(i INT, c CHAR(10)) ENGINE = BLACKHOLE;
Query OK, 0 rows affected (0.03 sec)

mysql> INSERT INTO test VALUES(1,'record one'),(2,'record two');
Query OK, 2 rows affected (0.00 sec)
Records: 2  Duplicates: 0  Warnings: 0

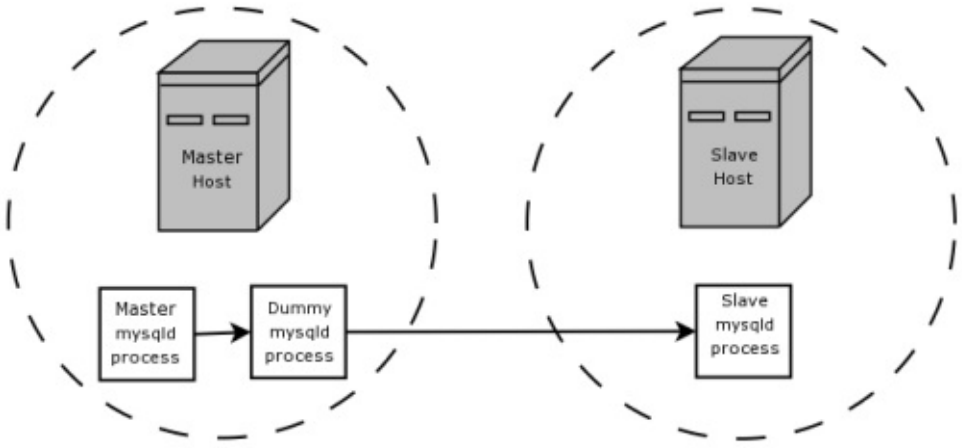
mysql> SELECT * FROM test;
Empty set (0.00 sec)
```

BLACKHOLE.frm

BLACKHOLE

MySQL--with-blackhole-storage-engine **configure**BLACKHOLEMySQ SHOW ENGINESSHOW VARIABLES LIKE 'have%'

BLACKHOLESQLBLACKHOLE



mysqld replicate-doreplicate-ignore 6.8“”

mysqld

BLACKHOLE

.

· BLACKHOLEBLACKHOLE

· BLACKHOLE“ no-op”

MySQLMySQL dev.mysql.com

16

16.1.
16.2.
16.3.
16.4. handlerton
16.5.
16.6.
16.7.
16.8.
16.9.
    16.9.1. store_lock()
    16.9.2. external_lock()
    16.9.3. rnd_init()
    16.9.4. info()
    16.9.5. extra()
    16.9.6. rnd_next()
16.10.
16.11. INSERT
16.12. UPDATE
16.13. DELETE
16.14. API
    16.14.1. bas_ext
    16.14.2. close
    16.14.3. create
    16.14.4. delete_row
    16.14.5. delete_table
    16.14.6. external_lock
    16.14.7. extra
    16.14.8. info
    16.14.9. open
    16.14.10. rnd_init
    16.14.11. rnd_next
    16.14.12. store_lock
    16.14.13. update_row

16.14.14. write_row

16.1.

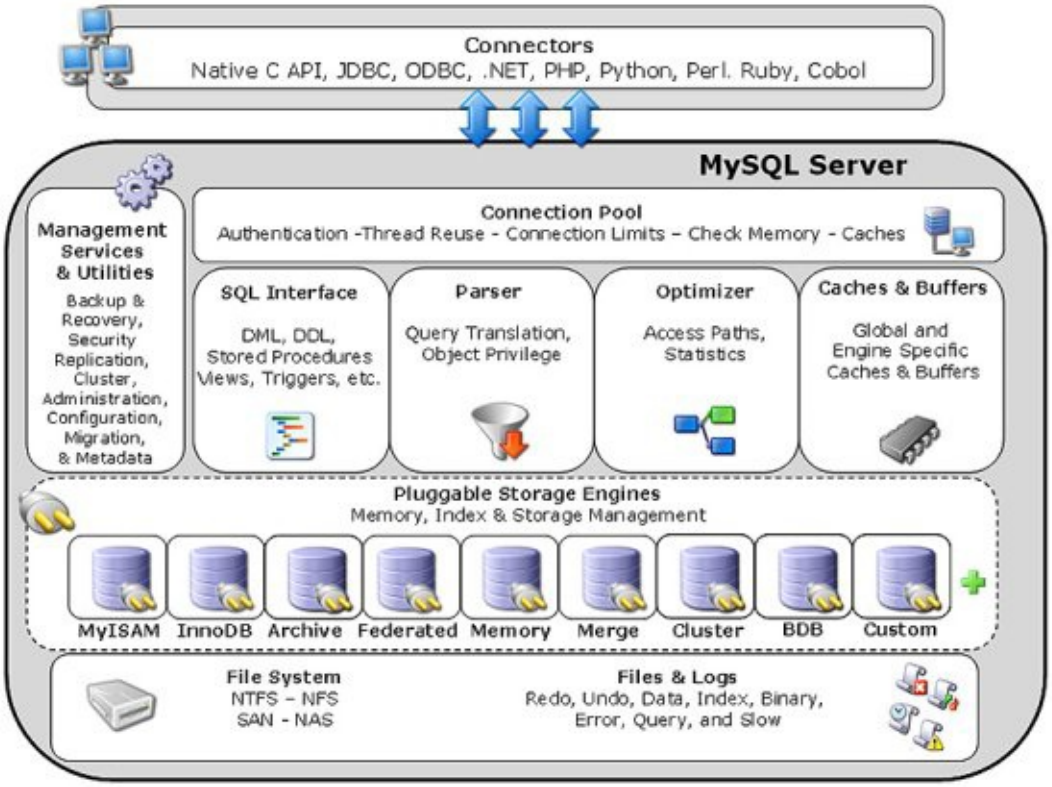
MySQL 5.1MySQL AB MySQL

MySQL 14

16.2.

MySQL

16.1MySQL



MySQL APIMySQL

1

1 3 3

MySQL

INSERTUPDATEDELETE

16.3.

EXAMPLE MySQL 5.1sql/examples/ha_example.ccha_example.h5.1 2.8.3“”

ha_example.ccha_example.h ha_foo.ccha_foo.h

EXAMPLE sed

```
sed s/EXAMPLE/FOO/g ha_example.h | sed s/example/foo/g ha_foo.h
sed s/EXAMPLE/FOO/g ha_example.cc | sed s/example/foo/g ha_foo.cc
```

16.4. handlerton

handlerton“”

EXAMPLE

```
handlerton example_hton= {
  "EXAMPLE",
  SHOW_OPTION_YES,
  "Example storage engine",
  DB_TYPE_EXAMPLE_DB,
  NULL,    /* Initialize */
  0,       /* slot */
  0,       /* savepoint size. */
  NULL,    /* close_connection */
  NULL,    /* savepoint */
  NULL,    /* rollback to savepoint */
  NULL,    /* release savepoint */
  NULL,    /* commit */
  NULL,    /* rollback */
  NULL,    /* prepare */
  NULL,    /* recover */
  NULL,    /* commit_by_xid */
  NULL,    /* rollback_by_xid */
  NULL,    /* create_cursor_read_view */
  NULL,    /* set_cursor_read_view */
  NULL,    /* close_cursor_read_view */
  example_create_handler,    /* Create a new handler */
```

```
  NULL,    /* Drop a database */
  NULL,    /* Panic call */
  NULL,    /* Release temporary latches */
  NULL,    /* Update Statistics */
  NULL,    /* Start Consistent Snapshot */
  NULL,    /* Flush logs */
  NULL,    /* Show status */
  NULL,    /* Replication Report Sent Binlog */
  HTON_CAN_RECREATE
};
```

handler.hhandlerton

```
typedef struct
  {
    const char *name;
    SHOW_COMP_OPTION state;
    const char *comment;
    enum db_type db_type;
    bool (*init)();
    uint slot;
    uint savepoint_offset;
    int  (*close_connection)(THD *thd);
    int  (*savepoint_set)(THD *thd, void *sv);
    int  (*savepoint_rollback)(THD *thd, void *sv);
    int  (*savepoint_release)(THD *thd, void *sv);
    int  (*commit)(THD *thd, bool all);
    int  (*rollback)(THD *thd, bool all);
```

```
    int  (*prepare)(THD *thd, bool all);
    int  (*recover)(XID *xid_list, uint len);
    int  (*commit_by_xid)(XID *xid);
    int  (*rollback_by_xid)(XID *xid);
    void *(*create_cursor_read_view)();
    void (*set_cursor_read_view)(void *);
    void (*close_cursor_read_view)(void *);
    handler *(*create)(TABLE *table);
    void (*drop_database)(char* path);
    int (*panic)(enum ha_panic_function flag);
    int (*release_temporary_latches)(THD *thd);
    int (*update_statistics)();
    int (*start_consistent_snapshot)(THD *thd);
    bool (*flush_logs)();
    bool (*show_status)(THD *thd, stat_print_fn *print, enum ha_stat
    int (*repl_report_sent_binlog)(THD *thd, char *log_file_name, my
    uint32 flags;
  } handlerton;
```

30handlerton 421

1. CREATE TABLE ... ENGINE = *FOO*;
2. SHOW STORAGE ENGINES
3. SHOW STORAGE ENGINES
4. MySQL handler.h 25
5.
6. thd thd->ha_data[*foo*_hton.slot] *foo*_init()MySQL

7. savepoint 0

savepoint savepoint *foo*_init savepoint

8.

9. savepoint

10.rollback_to_savepoint() savepoint

11.release_savepoint()

12.commit()

13.rollback()

14.XA XID

15.XA XID

16.XA XID

17.XA XID

18.

19.

20.

21.*MANDATORY*

22.

23.

24.InnoDB

25.SHOW STATUSInnoDB

26.InnoDB

27.

28.

29.InnoDB

30.Handlerton ALTER TABLE sql/handler.h

```
31.       #define HTON_NO_FLAGS                 0
32.       #define HTON_CLOSE_CURSORS_AT_COMMIT (1 << 0)
33.       #define HTON_ALTER_NOT_SUPPORTED     (1 << 1)
34.       #define HTON_CAN_RECREATE            (1 << 2)
35.       #define HTON_FLUSH_AFTER_RENAME      (1 << 3)
36.       #define HTON_NOT_USER_SELECTABLE     (1 << 4)
```

HTON_ALTER_NOT_SUPPORTEDFEDERATED AFTER TABLE

HTON_FLUSH_AFTER_RENAME FLUSH LOGS

HTON_NOT_USER_SELECTABLE

16.5.

1

handlerton 1CSV

```
static handler* tina_create_handler(TABLE *table);
```

21handlerton

MyISAM

```
static handler *myisam_create_handler(TABLE *table)
  {
    return new ha_myisam(table);
  }
```

FEDERATED1

```
ha_federated::ha_federated(TABLE *table_arg)
  :handler(&federated_hton, table_arg),
  mysql(0), stored_result(0), scan_flag(0),
  ref_length(sizeof(MYSQL_ROW_OFFSET)), current_position(0)
  {}
```

EXAMPLE

```
ha_example::ha_example(TABLE *table_arg)
  :handler(&example_hton, table_arg)
  {}
```

FEDERATED EXAMPLEhandler()

16.6.

MySQL

Null CSV

```
static const char *ha_tina_exts[] = {
  ".CSV",
  NullS
};
```

bas_ext()

```
const char **ha_tina::bas_ext() const
{
  return ha_tina_exts;
}
```

DROP TABLE MySQL

16.7.

1

create()

```
virtual int create(const char *name, TABLE *form, HA_CREATE_INFO *in
```

MySQL

*name *formst_table MySQL*tablename*.frm *tablename*.frm

*infoCREATE TABLE handler.h

```
typedef struct st_ha_create_information
  {
    CHARSET_INFO *table_charset, *default_table_charset;
    LEX_STRING connect_string;
    const char *comment,*password;
    const char *data_file_name, *index_file_name;
    const char *alias;
    ulonglong max_rows,min_rows;
    ulonglong auto_increment_value;
    ulong table_options;
    ulong avg_row_length;
    ulong raid_chunksize;
    ulong used_fields;
    SQL_LIST merge_list;
    enum db_type db_type;
    enum row_type row_type;
```

```
    uint null_bits;                         /* NULL bits at start of r
    uint options;                                                /* O
    uint raid_type,raid_chunks;
    uint merge_insert_method;
    uint extra_size;                        /* length of extra data se
    bool table_existed;                                     /* 1 in
    bool frm_only;                          /* 1 if no ha_create_table
    bool varchar;                           /* 1 if table has a VARCHA
  } HA_CREATE_INFO;
```

*form*info

CSV

```
int ha_tina::create(const char *name, TABLE *table_arg,
  HA_CREATE_INFO *create_info)
  {
    char name_buff[FN_REFLEN];
    File create_file;
    DBUG_ENTER("ha_tina::create");

    if ((create_file= my_create(fn_format(name_buff, name, "", ".CSV
          MY_REPLACE_EXT|MY_UNPACK_FILENAME),0,
          O_RDWR | O_TRUNC,MYF(MY_WME))) < 0)
    DBUG_RETURN(-1);

    my_close(create_file,MYF(0));

    DBUG_RETURN(0);
```

```
}
```

CSV*table_arg*create_info

my_createmy_closesrc/include/my_sys.h

16.8.

MySQLopen()

```
int open(const char *name, int mode, int test_if_locked);
```

1 2 handler.h

```
#define HA_OPEN_KEYFILE                1
#define HA_OPEN_RNDFILE                2
#define HA_GET_INDEX                4
#define HA_GET_INFO                  8     /* do a ha_info() after o
#define HA_READ_ONLY                16    /* File opened as readonly
#define HA_TRY_READ_ONLY            32    /* Try readonly if can't open
#define HA_WAIT_IF_LOCKED           64      /* Wait if locked on open *
#define HA_ABORT_IF_LOCKED     128       /* skip if locked on open.*
#define HA_BLOCK_LOCK               256   /* unlock when reading some
#define HA_OPEN_TEMPORARY           512
```

sql/examples/ha_tina.ccget_share()free_share()

16.9.

16.9.1. store_lock()
16.9.2. external_lock()
16.9.3. rnd_init()
16.9.4. info()
16.9.5. extra()
16.9.6. rnd_next()

SQL MySQL

CSV9

```
ha_tina::store_lock
ha_tina::external_lock
ha_tina::info
ha_tina::rnd_init
ha_tina::extra - ENUM HA_EXTRA_CACHE   Cache record in HA_rrnd()
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::rnd_next
ha_tina::extra - ENUM HA_EXTRA_NO_CACHE   End cacheing of records (d
ha_tina::external_lock
ha_tina::extra - ENUM HA_EXTRA_RESET   Reset database to after open
```

16.9.1. store_lock()

store_lock()

thr_lock.c mysqld MySQL MERGE

Berkeley DBWRITETL_WRITE_ALLOW_WRITE WRITES

store_lock()

MySQLTL_IGNORE mysqld

includes/thr_lock.h

```
enum thr_lock_type
{
        TL_IGNORE=-1,
                  TL_UNLOCK,                              /* UNLOCK
                  TL_READ,                                  /* Read
                  TL_READ_WITH_SHARED_LOCKS,
        TL_READ_HIGH_PRIORITY,      /* High prior. than TL_WRITE. A
        TL_READ_NO_INSERT,                /* READ, Don't allow conc
        TL_WRITE_ALLOW_WRITE,                  /*   Write lock, bu
        TL_WRITE_ALLOW_READ,        /*       Write lock, but allow
        TL_WRITE_CONCURRENT_INSERT, /* WRITE lock used by concurren
        TL_WRITE_DELAYED,                 /* Write used by INSERT D
        TL_WRITE_LOW_PRIORITY,            /* WRITE lock that has lo
        TL_WRITE,                         /* Normal WRITE lock */
        TL_WRITE_ONLY               /* Abort new lock request with
};


THR_LOCK_DATA **ha_tina::store_lock(THD *thd,
                                    THR_LOCK_DATA **to,
                                    enum thr_lock_type lock_type)
 {
   if (lock_type != TL_IGNORE && lock.type == TL_UNLOCK)
     lock.type=lock_type;
   *to++= &lock;
```

```
  return to;
}
```

16.9.2. external_lock()

external_lock()　LOCK TABLES

sql/ha_innodb.ccsql/ha_berkeley.cc　external_lock()　0EXAMPLE

```
int ha_example::external_lock(THD *thd, int lock_type)
{
  DBUG_ENTER("ha_example::external_lock");
  DBUG_RETURN(0);
}
```

16.9.3. rnd_init()

rnd_init()　rnd_init()

CSV

```
  int ha_tina::rnd_init(bool scan)
    {
      DBUG_ENTER("ha_tina::rnd_init");

      current_position= next_position= 0;
      records= 0;
      chain_ptr= chain;

      DBUG_RETURN(0);
    }
```

16.9.4. info()

info()

info()

info()　SHOW TABLE STATUS

sql/handler.h

```
ulonglong data_file_length;           /* Length off data file */
ulonglong max_data_file_length;       /* Length off data file */
ulonglong index_file_length;
ulonglong max_index_file_length;
ulonglong delete_length;              /* Free bytes */
ulonglong auto_increment_value;
ha_rows records;                      /* Records in table */
ha_rows deleted;                      /* Deleted records */
ulong raid_chunksize;
ulong mean_rec_length;          /* physical reclength */
time_t create_time;                   /* When table was created */
time_t check_time;
time_t update_time;
```

“ records” 01 2 2

16.9.5. extra()

extra()

0

```
int ha_tina::extra(enum ha_extra_function operation)
 {
   DBUG_ENTER("ha_tina::extra");
   DBUG_RETURN(0);
 }
```

16.9.6. rnd_next()

MySQLrnd_next() 1 HA_ERR_END_OF_FILE

rnd_next()*buf *buf MySQL

BLOB CREATE TABLE .frm TABLE

1"NULL bitmap" 6 bitmap1 916 bitmap2 NULLNULL1

NULL bitmap MySQL“ MySQL” sql/field.cc
VARCHAR1 BLOB blob BLOB BLOB

rnd_next() “” ha_tina.cc find_current_row()TABLE
CSV

CSV

```
int ha_tina::rnd_next(byte *buf)
 {
   DBUG_ENTER("ha_tina::rnd_next");

   statistic_increment(table->in_use->status_var.ha_read_rnd_next_co

   current_position= next_position;
   if (!share->mapped_file)
     DBUG_RETURN(HA_ERR_END_OF_FILE);
   if (HA_ERR_END_OF_FILE == find_current_row(buf) )
     DBUG_RETURN(HA_ERR_END_OF_FILE);

   records++;
   DBUG_RETURN(0);
 }
```

CSV find_current_row()

```
int ha_tina::find_current_row(byte *buf)
 {
```

```
byte *mapped_ptr= (byte *)share->mapped_file + current_position;
byte *end_ptr;
DBUG_ENTER("ha_tina::find_current_row");

/* EOF should be counted as new line */
if ((end_ptr=  find_eoln(share->mapped_file, current_position,
                         share->file_stat.st_size)) == 0)
  DBUG_RETURN(HA_ERR_END_OF_FILE);

for (Field **field=table->field ; *field ; field++)
{
  buffer.length(0);
  mapped_ptr++; // Increment past the first quote
  for(;mapped_ptr != end_ptr; mapped_ptr++)
  {
    // Need to convert line feeds!
    if (*mapped_ptr == '"' &&
        (((mapped_ptr[1] == ',') && (mapped_ptr[2] == '")) ||
         (mapped_ptr == end_ptr -1 )))
    {
      mapped_ptr += 2; // Move past the , and the "
      break;
    }
    if (*mapped_ptr == '\\' && mapped_ptr != (end_ptr - 1))
    {
      mapped_ptr++;
```

```
        if (*mapped_ptr == 'r')
          buffer.append('\r');
        else if (*mapped_ptr == 'n' )
          buffer.append('\n');
        else if ((*mapped_ptr == '\\') || (*mapped_ptr == '"'))
          buffer.append(*mapped_ptr);
        else  /* This could only happed with an externally created
        {
          buffer.append('\\');
          buffer.append(*mapped_ptr);
        }
      }
      else
        buffer.append(*mapped_ptr);
    }
    (*field)->store(buffer.ptr(), buffer.length(), system_charset_i
  }
  next_position= (end_ptr - share->mapped_file)+1;
  /* Maybe use \N for null? */
  memset(buf, 0, table->s->null_bytes); /* We do not implement null

  DBUG_RETURN(0);
}
```

16.10.

MySQL close()

CSV

```
int ha_tina::close(void)
 {
   DBUG_ENTER("ha_tina::close");
   DBUG_RETURN(free_share(share));
 }
```

16.11. INSERT

INSERT INSERT W

INSERTwrite_row()

```
int ha_foo::write_row(byte *buf)
```

*buf MySQL rnd_next()

MySQL CSV

```
int ha_tina::write_row(byte * buf)
 {
   int size;
   DBUG_ENTER("ha_tina::write_row");

   statistic_increment(table->in_use->status_var.ha_write_count, &LO

   if (table->timestamp_field_type & TIMESTAMP_AUTO_SET_ON_INSERT)
     table->timestamp_field->set_time();

   size= encode_quote(buf);

   if (my_write(share->data_file, buffer.ptr(), size, MYF(MY_WME | M
     DBUG_RETURN(-1);

   if (get_mmap(share, 0) > 0)
     DBUG_RETURN(-1);
   DBUG_RETURN(0);
```

```
}
```

16.12. UPDATE

UPDATEWHERE MySQLUPDATE update_row()

```
int ha_foo::update_row(const byte *old_data, byte *new_data)
```

*old_data *new_data MySQL

*old_data *new_data

update_row() CSV

```
int ha_tina::update_row(const byte * old_data, byte * new_data)
 {
   int size;
   DBUG_ENTER("ha_tina::update_row");

   statistic_increment(table->in_use->status_var.ha_read_rnd_next_co
                       &LOCK_status);

   if (table->timestamp_field_type & TIMESTAMP_AUTO_SET_ON_UPDATE)
     table->timestamp_field->set_time();

   size= encode_quote(new_data);

   if (chain_append())
     DBUG_RETURN(-1);

   if (my_write(share->data_file, buffer.ptr(), size, MYF(MY_WME | M
```

```
    DBUG_RETURN(-1);
  DBUG_RETURN(0);
}
```

16.13. DELETE

MySQLINSERTDELETE rnd_next() delete_row()

```
int ha_foo::delete_row(const byte *buf)
```

*buf

CSV

```
int ha_tina::delete_row(const byte * buf)
 {
   DBUG_ENTER("ha_tina::delete_row");
   statistic_increment(table->in_use->status_var.ha_delete_count,
                       &LOCK_status);

   if (chain_append())
     DBUG_RETURN(-1);

   --records;

   DBUG_RETURN(0);
 }
```

delete_count

16.14. API

16.14.1. bas_ext
16.14.2. close
16.14.3. create
16.14.4. delete_row
16.14.5. delete_table
16.14.6. external_lock
16.14.7. extra
16.14.8. info
16.14.9. open
16.14.10. rnd_init
16.14.11. rnd_next
16.14.12. store_lock
16.14.13. update_row
16.14.14. write_row

16.14.1. bas_ext

virtual const char ** **bas_ext** ( );

;

bas_ext MySQL Null

delete_table() MySQL

- Null CSV

```
   static const char *ha_tina_exts[] =
    {
      ".CSV",
      NullS
    };
```

```
static const char *ha_tina_exts[] =
 {
   ".CSV",
   NullS
 };

const char **ha_tina::bas_ext() const
 {
   return ha_tina_exts;
 }
```

```
static const char *ha_example_exts[] = {
   NullS
 };

const char **ha_example::bas_ext() const
 {
   return ha_example_exts;
 }
```

16.14.2. close

virtual int **close** (*void*);

void ;

close

sql_base.ccsql_select.cctable.cc sql_select.cc myisam sql_base.cc close_data_tables()

- void

CSV

```
int ha_example::close(void)
{
  DBUG_ENTER("ha_example::close");
  DBUG_RETURN(free_share(share));
}
```

16.14.3. create

virtual int **create** (*name*,
form,
info);

const char *	*name* ;
TABLE *	*form* ;
HA_CREATE_INFO *	*info* ;

create

create() create() .frm create_info

ha_create_table()handle.cc

- name
- form
- info

CSV

```
int ha_tina::create(const char *name, TABLE *table_arg,
                    HA_CREATE_INFO *create_info)
{
  char name_buff[FN_REFLEN];
```

```
  File create_file;
  DBUG_ENTER("ha_tina::create");

  if ((create_file= my_create(fn_format(name_buff, name, "", ".CSV",
                                        MY_REPLACE_EXT|MY_UNPACK_FIL
                              O_RDWR | O_TRUNC,MYF(MY_WME))) < 0)
    DBUG_RETURN(-1);

  my_close(create_file,MYF(0));

  DBUG_RETURN(0);
}
```

16.14.4. delete_row

virtual int **delete_row** (*buf*);

const byte * *buf* ;

delete_row

Buf rnd_next()

sql_acl.ccsql_udf.cc sql_delete.ccsql_insert.ccsql_select.cc sql_select REPLACE

- buf

```
{ return  HA_ERR_WRONG_COMMAND; }
```

16.14.5. delete_table

bas_ext()

virtual int **delete_table** (*name*);

const char * *name* ;

delete_table

delete_table()

handler.ccdelete_table()bas_ext()

delete_tableha_create_table()handler.cc table_flag HA_DROP_BEFORE_CREATE

- name:

· base_ext1ENOENT 0

· #: Error

16.14.6. external_lock

virtual int **external_lock** (*thd*,
lock_type);

THD * *thd* ;
int *lock_type* ;

external_lock

lock.cc“mysql”

ha_berkely.cc flock()

lock_external()unlock_external()lock.cc copy_data_between_tables()
sql_table.cc

- thd
- lock_type

```
{ return 0; }
```

16.14.7. extra

virtual int **extra** (*operation*);

enum ha_extra_function *operation* ;

extra

extra()MyISAM ha_innodb.cc

- operation

```
{ return 0; }
```

16.14.8. info

virtual void **info** (*uint*);

uint ;

info

::info() SHOW“ if (records > 2) records = 2”
2
data_file_lengthindex_file_lengthdelete_lengthcheck_time handler.h

filesort.cc ha_heap.cc item_sum.cc opt_sum.cc sql_delete.cc sql_delete.cc sql_derived.cc sql_select.cc sql_select.cc sql_select.cc sql_select.cc sql_select.cc sql_show.cc sql_show.cc sql_show.cc sql_show.cc sql_table.cc sql_union.cc sql_update.cc

- uint

CSV

```
void ha_tina::info(uint flag)
{
  DBUG_ENTER("ha_tina::info");
  /* This is a lie, but you don't want the optimizer to see zero or
  if (records < 2)
    records= 2;
  DBUG_VOID_RETURN;
}
```

16.14.9. open

virtual int **open** (*name*,
mode,
test_if_locked);

const char * *name* ;
int *mode* ;
uint *test_if_locked* ;

open

handler::ha_open()handler.cc ha_open()open()

open open

1 2 handler.h

```
#define HA_OPEN_KEYFILE                1
#define HA_OPEN_RNDFILE                2
#define HA_GET_INDEX              4
#define HA_GET_INFO                 8     /* do a ha_info()
#define HA_READ_ONLY              16    /* File opened as re
#define HA_TRY_READ_ONLY        32    /* Try readonly if can
#define HA_WAIT_IF_LOCKED       64      /* Wait if locked on
#define HA_ABORT_IF_LOCKED    128       /* skip if locked on
#define HA_BLOCK_LOCK             256   /* unlock when readi
#define HA_OPEN_TEMPORARY       512
```

sql/examples/ha_tina.ccget_share()free_share()

- name
- mode
- test_if_locked

CSV

```
int ha_tina::open(const char *name, int mode, uint test_if_l
{
DBUG_ENTER("ha_tina::open");

if (!(share= get_share(name, table)))
DBUG_RETURN(1);
thr_lock_data_init(&share->lock,&lock,NULL);
ref_length=sizeof(off_t);

DBUG_RETURN(0);
}
```

16.14.10. rnd_init

virtual int **rnd_init** (*scan*);

bool *scan* ;

rnd_init

rnd_init()

index_init() rnd_init() rnd_end() scan=1 2 rnd_init

2

filesort.cc, records.cc, sql_handler.cc, sql_select.cc, sql_table.cc, sql_update.cc

- scan

CSV

```
int ha_tina::rnd_init(bool scan)
{
  DBUG_ENTER("ha_tina::rnd_init");

  current_position= next_position= 0;
  records= 0;
  chain_ptr= chain;
  DBUG_RETURN(0);
}
```

16.14.11. rnd_next

virtual int **rnd_next** (*buf*);

byte * *buf* ;

rnd_next

HA_ERR_END_OF_FILEbuffbuf

filesort.cc, records.cc, sql_handler.cc, sql_select.cc, sql_table.cc, sql_update.cc

- buf

ARCHIVE

```
int ha_archive::rnd_next(byte *buf)
{
  int rc;
  DBUG_ENTER("ha_archive::rnd_next");

  if (share->crashed)
      DBUG_RETURN(HA_ERR_CRASHED_ON_USAGE);

  if (!scan_rows)
    DBUG_RETURN(HA_ERR_END_OF_FILE);
  scan_rows--;

  statistic_increment(table->in_use->status_var.ha_read_rnd_next_cou
                      &LOCK_status);
    current_position= gztell(archive);
  rc= get_row(archive, buf);

  if (rc != HA_ERR_END_OF_FILE)
    records++;

  DBUG_RETURN(rc);
}
```

16.14.12. store_lock

virtual THR_LOCK_DATA ** **store_lock** (*thd*,
to,
lock_type);

THD *	*thd* ;
THR_LOCK_DATA **	*to* ;
enum thr_lock_type	*lock_type* ;

store_lock

handler::store_lock()

updates/deletes/insertsWRITE SELECT...

thr_lock.c mysqld MySQL MERGE

Berkeley DBWRITETL_WRITE_ALLOW_WRITE WRITES

store_lock()

MySQLTL_IGNORE mysqld

get_lock_data()lock.cc

- thd

- to
- lock_type

ARCHIVE

```
/*
  Below is an example of how to setup row level locking.
*/
THR_LOCK_DATA **ha_archive::store_lock(THD *thd,
                                       THR_LOCK_DATA **to,
                                       enum thr_lock_type lock_type)
{
  if (lock_type == TL_WRITE_DELAYED)
    delayed_insert= TRUE;
  else
    delayed_insert= FALSE;

  if (lock_type != TL_IGNORE && lock.type == TL_UNLOCK)
  {
    /*
      Here is where we get into the guts of a row level lock.
      If TL_UNLOCK is set
      If we are not doing a LOCK TABLE or DISCARD/IMPORT
      TABLESPACE, then allow multiple writers
    */

    if ((lock_type >= TL_WRITE_CONCURRENT_INSERT &&
         lock_type <= TL_WRITE) && !thd->in_lock_tables
        && !thd->tablespace_op)
      lock_type = TL_WRITE_ALLOW_WRITE;

    /*
      In queries of type INSERT INTO t1 SELECT ... FROM t2 ...
      MySQL would use the lock TL_READ_NO_INSERT on t2, and that
      would conflict with TL_WRITE_ALLOW_WRITE, blocking all inserts
      to t2. Convert the lock to a normal read lock to allow
      concurrent inserts to t2.
    */
```

```
    if (lock_type == TL_READ_NO_INSERT && !thd->in_lock_tables)
      lock_type = TL_READ;

    lock.type=lock_type;
  }

  *to++= &lock;

  return to;
}
```

16.14.13. update_row

virtual int **update_row** (*old_data*,
new_data);

const byte * *old_data* ;
byte * *new_data* ;

update_row

old_data new_data

ORDER BY

new_dataauto_increament if (table->timestamp_field_type & TIMESTAMP_AUTO_SET_ON_UPDATE) table->timestamp_field->set_time(); if (table->next_number_field && record == table->record[0]) update_auto_increment();

sql_select.cc, sql_acl.cc, sql_update.ccsql_insert.cc

- old_data
- new_data

```
{ return  HA_ERR_WRONG_COMMAND; }
```

16.14.14. write_row

virtual int **write_row** (*buf*);

byte * *buf* ;

write_row

write_row() extra() buf table->s->reclength

for (Field **field=table->field ; *field ; field++) { ... }

BLOB

```
for (ptr= table->s->blob_field, end= ptr + table->s->blob_fields ; p
  {
        char *data_ptr;
        uint32 size= ((Field_blob*)table->field[*ptr])->get_length()
        ((Field_blob*)table->field[*ptr])->get_ptr(&data_ptr);
        ...
  }
```

ha_tina.ccha_berkeley.cc ha_berkeley“”

update_row()auto_increments write_row()

item_sum.ccitem_sum.ccsql_acl.ccsql_insert.ccsql_insert.ccsql_select.ccsql_tabl
sql_update.cc

- buf

```
        { return  HA_ERR_WRONG_COMMAND; }
```

MySQLMySQL dev.mysql.com

17MySQL

17.1. MySQL
17.2. MySQL
17.3.
    17.3.1.
    17.3.2.
    17.3.3.
    17.3.4.
    17.3.5.
    17.3.6.
17.4. MySQL
    17.4.1. MySQL
    17.4.2.
    17.4.3. MySQL
    17.4.4.
17.5. MySQL
    17.5.1. MySQLMySQL
    17.5.2. **ndbd**
    17.5.3. **ndb_mgmd**“”
    17.5.4. **ndb_mgm**“”
    17.5.5. MySQL
17.6. MySQL
    17.6.1. MySQL
    17.6.2. “”
    17.6.3. MySQL
    17.6.4.
    17.6.5. MySQL
17.7. MySQL
    17.7.1. MySQLSCI
    17.7.2.
17.8. MySQL
17.9. MySQL
    17.9.1. MySQL 5.0MySQL
    17.9.2. MySQLMySQL 5.1

17.10. MySQL
17.11. MySQL

MySQLMySQL NDB 1MySQL MySQL 5.1 LinuxRPM MySQL mysql-servermysql-max RPM

MySQLLinuxMac OS XSolaris FreeBSDMySQL MySQL AB MySQLMySQL Windows

MySQL MySQL MySQL ABhttp://www.mysql.com/products/cluster/

MySQL AB

· MySQL.

· MySQL.

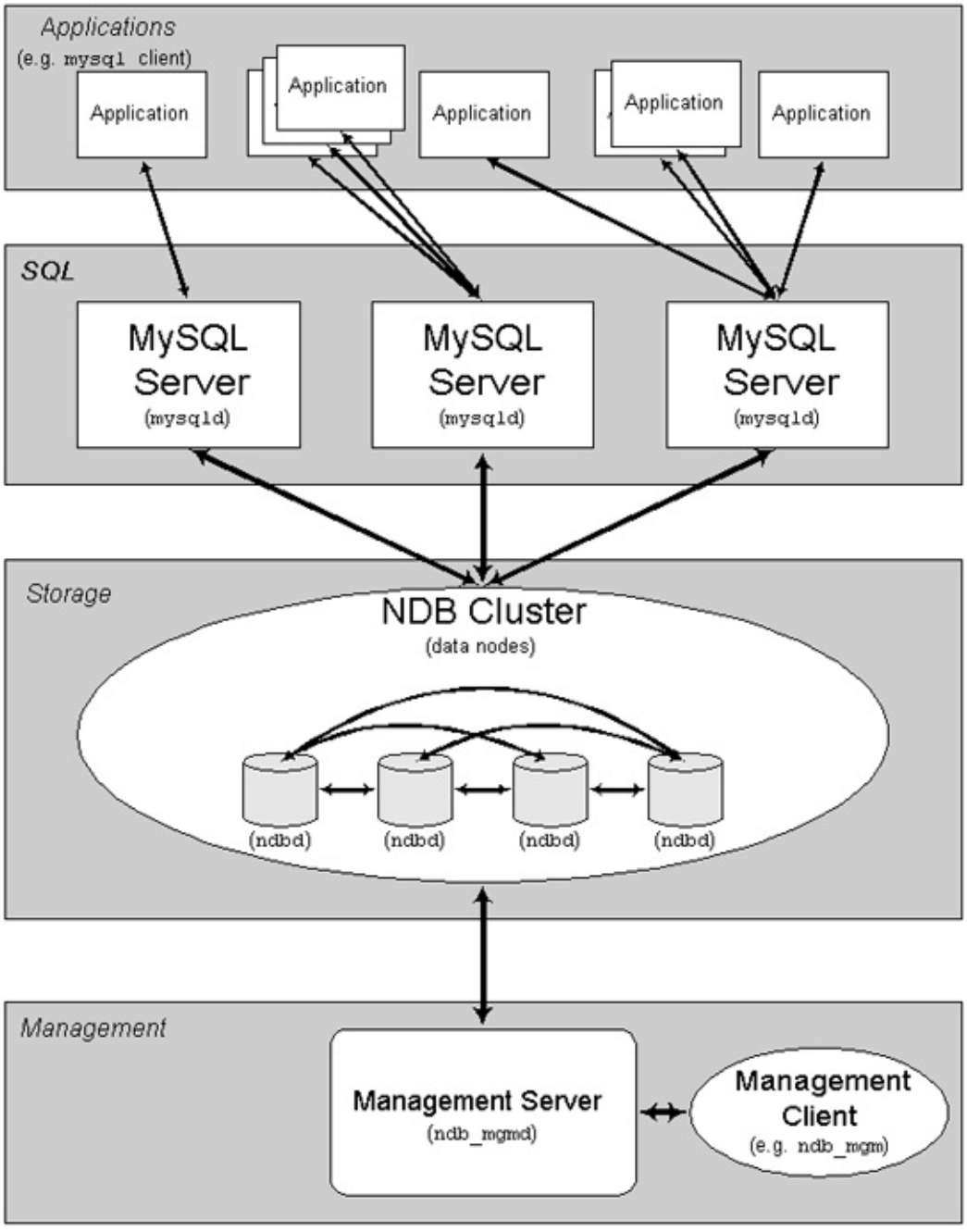
17.10“MySQL” MySQL MySQL.

17.1. MySQL

MySQL“”

MySQLMySQLNDB“” NDB “ MySQL” MySQLNDB

MySQL MySQL NDB



MySQL NDB MySQL 1 MySQL

MySQL

MySQL MySQL

17.2. MySQL

NDB“”

NDB MySQLNDB

NDBMySQLMySQL

MySQLMySQL MySQL 1

“” MySQL

MySQL

· (MGM) MySQL MGM**ndb_mgmd**

· 4 **ndbd**

· **SQL** MySQL NDBMySQL SQL**mysqld –ndbcluster** ndbclustermy.cnf**mysqld**

MySQL 1

(MGM)

· **MySQL** MySQL MySQL PHPPerlCC++JavaPythonRubyMySQLMySQL

.

17.3.

17.3.1.
17.3.2.
17.3.3.
17.3.4.
17.3.5.
17.3.6.

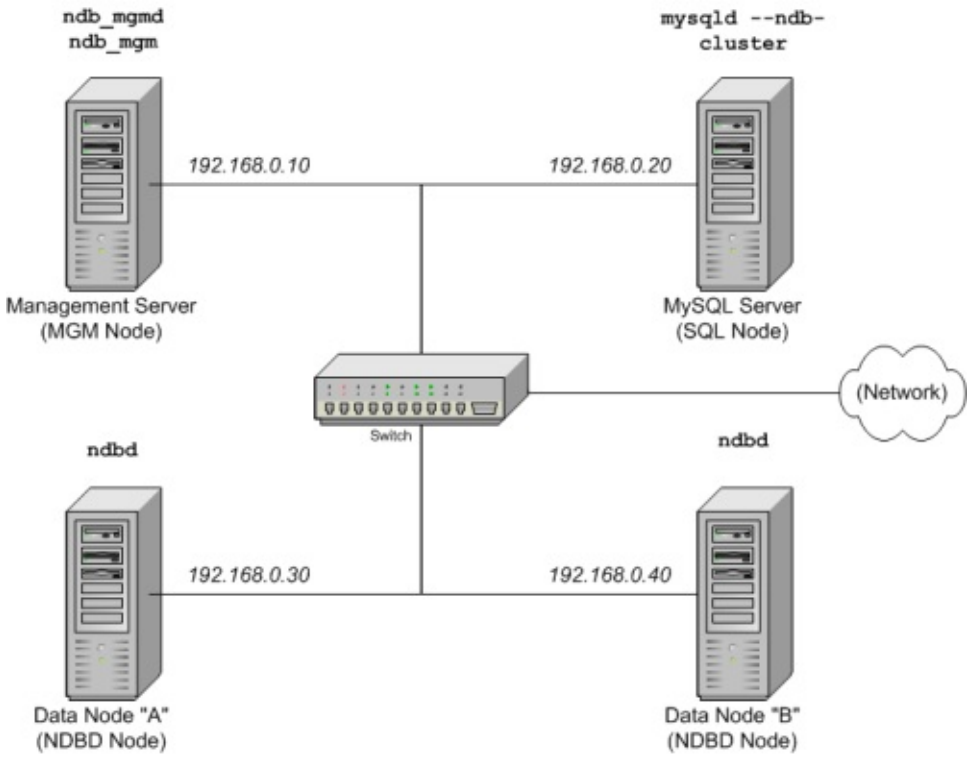
MySQL 17.4“MySQL” MySQL

MySQL

1. 4

	IP
(MGM)	192.168.0.10
MySQL(SQL)	192.168.0.20
(NDBD)"A"	192.168.0.30
(NDBD)"B"	192.168.0.40

2.

3. 

4. IP DNS IP /etc/hosts

5. IntelPCPCLinux TCP/IP

6. 100 Mbps1 4 4100M 1G MySQL100 Mbps

MySQL100 Mbps InternetMySQL

7. MySQL AB 256 MB RAM NDB

Linux SolarisMac OS X

MySQL 17.3.1“”

17.3.1.

MySQL RAM MySQL CPUCPU

MySQL Mac OS XSolaris Linux“ ” MySQL MySQL-max 5.1 MySQL-maxMySQL Linux-max Solaris

Mac OS X MySQL http://dev.mysql.com/downloads/

TCP/IP 1100 Mbps MySQL

· MySQL MySQLWeb DMZ

· MySQL MySQL

MySQLSCI MySQL 17.7“MySQL”

17.3.2.

SQLMySQL MySQL-max MySQL MGM **ndb_mgmd** **ndb_mgm**

MySQL AB 2.8.3“” MySQLmysql-max-5.1.2-alpha-pc-linux-gnu-i686.tar.gz/var/tmp

3264Linux RPMRPM-maxNDB -server-max RPMMySQL 2.4“LinuxMySQL” RPM 17.3.3“”

SQL

SQL

1. /etc/passwd/etc/group mysqlmysql mysql1mysql

```
2.          groupadd mysql
3.          useradd -g mysql mysql
```

4. mysql-maxsymlink MySQL

```
5.          cd /var/tmp
6.          tar -xzvf -C /usr/local/bin mysql-max-5.1.2-alpha-pc-li
7.          ln -s /usr/local/bin/mysql-max-5.1.2-alpha-pc-linux-gnu
```

8. mysql

```
9.          cd mysql
10.     scripts/mysql_install_db --user=mysql
```

11.MySQL

```
12.     chown -R root .
13.     chown -R mysql data
14.     chgrp -R mysql .
```

/usr/local/mysql/data 17.3.3“”

15.MySQL

```
16.     cp support-files/mysql.server /etc/rc.d/init.d/
17.     chmod +x /etc/rc.d/init.d/mysql.server
18.     chkconfig --add mysql.server
```

Red Hat**chkconfig** Debian**update-rc.d**

SQL

MGM **mysqld** MGM -max /var/tmp **sudo**, **su root**
ndb_mgmd

1. /var/tmp **ndb_mgmndb_mgmd** /usr/local/bin

```
2.          cd /var/tmp
3.          tar -zxvf mysql-max-5.1.2-alpha-pc-linux-gnu-i686.tar.g
```

4.

```
5.          cd /usr/local/bin
6.          chmod +x ndb_mgm*
```

17.3.3“”

17.3.3.

4 4MySQL 4 /1

· SQl1my.cnf **connectstring** MGM MySQL NDB

17.4.4.2“MySQL ”

· config.ini SQL

SQL

my.cnf /etc

```
vi /etc/my.cnf
```

SQL my.cnf

```
# Options for mysqld process:
[MYSQLD]
ndbcluster                      # run NDB engine
ndb-connectstring=192.168.0.10  # location of MGM node

# Options for ndbd process:
[MYSQL_CLUSTER]
ndb-connectstring=192.168.0.10  # location of MGM node
```

“ A”“ B” SQL

MGM

```
mkdir /var/lib/mysql-cluster
cd /var/lib/mysql-cluster
```

```
vi config.ini
```

vi

config.ini

```
# Options affecting ndbd processes on all data nodes:
[NDBD DEFAULT]
NoOfReplicas=2    # Number of replicas
DataMemory=80M    # How much memory to allocate for data storage
IndexMemory=18M   # How much memory to allocate for index storage
                  # For DataMemory and IndexMemory, we have used the
                  # default values. Since the "world" database takes
                  # only about 500KB, this should be more than enoug
                  # this example Cluster setup.

# TCP/IP options:
[TCP DEFAULT]
portnumber=2202   # This the default; however, you can use any
                  # port that is free for all the hosts in cluster
                  # Note: It is recommended beginning with MySQL 5.0
                  # you do not specify the portnumber at all and sim
                  # the default value to be used instead

# Management process options:
[NDB_MGMD]
hostname=192.168.0.10           # Hostname or IP address of MGM node
datadir=/var/lib/mysql-cluster  # Directory for MGM node logfiles
```

```
# Options for data node "A":
[NDBD]
                                # (one [NDBD] section per data node)
hostname=192.168.0.30           # Hostname or IP address
datadir=/usr/local/mysql/data   # Directory for this data node's dat

# Options for data node "B":
[NDBD]
hostname=192.168.0.40           # Hostname or IP address
datadir=/usr/local/mysql/data   # Directory for this data node's dat

# SQL node options:
[MYSQLD]
hostname=192.168.0.20           # Hostname or IP address
                                # (additional mysqld connections can
                                # specified for this node for variou
                                # purposes such as running ndb_resto
```

"world"http://dev.mysql.com/doc/“”

17.3.4“”

MySQL 17.4.4“” 17.4“MySQL” MySQL 17.6.5.4“”

11862202MySQL 5.0.3

17.3.4.

1. shellMGM

2. shell> **ndb_mgmd -f /var/lib/mysql-cluster/config.ini**

“ -f”“--config-file” **ndb_mgmd** 17.5.3“ **ndb_mgmd**“” ”

3. NDBD

4. shell> **ndbd --initial**

ndbd **ndbd**“ --initial” **ndbd**

5. RPMSQLMySQL /etc/init.dSQLMySQL“ -max” RPM -maxRPM

ndb_mgm

```
shell> ndb_mgm
-- NDB Cluster -- Management Client --
ndb_mgm> SHOW
Connected to Management Server at: localhost:1186
Cluster Configuration
---------------------
[ndbd(NDB)]     2 node(s)
id=2    @192.168.0.30  (Version: 5.1.2-alpha, Nodegroup: 0, Master)
id=3    @192.168.0.40  (Version: 5.1.2-alpha, Nodegroup: 0)

[ndb_mgmd(MGM)] 1 node(s)
id=1    @192.168.0.10  (Version: 5.1.2-alpha)

[mysqld(SQL)]   1 node(s)
id=4   (Version: 5.1.2-alpha)
```

MySQL

MySQL‘ [mysqld(API)]’ SQL

MySQL 17.3.5“”

17.3.5.

MySQL MySQL

· ENGINE=NDBENGINE=NDBCLUSTER ALTER TABLE NDB
mysqldump SQL ENGINE TYPE MySQL M

· shell> **mysqldump --add-drop-table world City > city**

city_table.sql INSERT

```
DROP TABLE IF EXISTS City;
CREATE TABLE City (
ID int(11) NOT NULL auto_increment,
Name char(35) NOT NULL default '',
CountryCode char(3) NOT NULL default '',
District char(20) NOT NULL default '',
Population int(11) NOT NULL default '0',
PRIMARY KEY  (ID)
) ENGINE=MyISAM;

INSERT INTO City VALUES (1,'Kabul','AFG','Kabol',1780000);
INSERT INTO City VALUES (2,'Qandahar','AFG','Qandahar',237500);
INSERT INTO City VALUES (3,'Herat','AFG','Herat',186800);
# (remaining INSERT statements omitted)
```

MySQLNDB“”

```
DROP TABLE IF EXISTS City;
```

```
CREATE TABLE City (
ID int(11) NOT NULL auto_increment,
Name char(35) NOT NULL default '',
CountryCode char(3) NOT NULL default '',
District char(20) NOT NULL default '',
Population int(11) NOT NULL default '0',
PRIMARY KEY  (ID)
) ENGINE=NDBCLUSTER;

INSERT INTO City VALUES (1,'Kabul','AFG','Kabol',1780000);
INSERT INTO City VALUES (2,'Qandahar','AFG','Qandahar',237500);
INSERT INTO City VALUES (3,'Herat','AFG','Herat',186800);
# (etc.)
```

ALTER TABLE

SQL“ world” **mysql**city_table.sql

```
shell> mysql world < city_table.sql
```

SQL IP**192.168.0.20**

SQL /usr/local/mysql/data

```
shell> cd /usr/local/mysql/data
shell> mysql world < world.sql
```

SQLmysql

MySQL 5.1 NDB [17.8“MySQL”](#) world SQL **CREATE DATABASE world** MySQL 5.0.2 **CREATE SCHEMA world** **FLUSH TABLES**

SQL**SELECT**MySQL MySQL

```
shell> mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 1 to server version: 5.1.2-alpha

’  help;’’ \h’’       \c’

mysql>
```

MySQLENGINE=

```
mysql> USE world;
mysql> ALTER TABLE City ENGINE=NDBCLUSTER;
mysql> ALTER TABLE Country ENGINE=NDBCLUSTER;
mysql> ALTER TABLE CountryLanguage ENGINE=NDBCLUSTER;
```

MySQL MySQL 5.7“MySQL”

MySQL MySQL SQL

SELECT MySQL

```
mysql> USE world;
mysql> SELECT Name, Population FROM City ORDER BY Population DESC LI
+-----------+------------+
|         |    |
+-----------+------------+
|         |   10500000 |
|         |    9981619 |
|        |    9968485 |
```

```
|          |    9696300 |
|         |    9604900 |
+-----------+------------+
5 rows in set (0.34 sec)

mysql> \q
Bye

shell>
```

MySQLAPI SQL MGM PHP 5mysqli Web

```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
  "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
  <meta http-equiv="Content-Type"
        content="text/html; charset=iso-8859-1">
  <title>SIMPLE mysqli SELECT</title>
</head>
<body>
<?php
  # connect to SQL node:
  $link = new mysqli('192.168.0.20', 'root', '', 'world');
  # parameters for mysqli constructor are:
  #   host, user, password, database

  if( mysqli_connect_errno() )
```

```
    die("Connect failed: " . mysqli_connect_error());

  $query = "SELECT Name, Population
            FROM City
            ORDER BY Population DESC
            LIMIT 5";

  # if no errors...
  if( $result = $link->query($query) )
  {
?>
<table border="1" width="40%" cellpadding="4" cellspacing ="1">
  <tbody>
  <tr>
    <th width="10%">City</th>
    <th>Population</th>
  </tr>
<?
    # then display the results...
    while($row = $result->fetch_object())
      printf(<tr>\n  <td align=\"center\">%s</td><td>%d</td>\n</tr>\
              $row->Name, $row->Population);
?>
  </tbody
</table>
<?
```

```
  # ...and verify the number of rows that were retrieved
    printf("<p>Affected rows: %d</p>\n", $link->affected_rows);
  }
  else
    # otherwise, tell us what went wrong
    echo mysqli_error();

  # free the result set and the mysqli connection object
  $result->close();
  $link->close();
?>
</body>
</html>
```

WebSQLIP

MySQL C APIPerl-DBIPython-mysqlMySQL AB MySQL

· *NDB* NDB

17.3.6.

MGM Shell

```
shell> ndb_mgm -e shutdown
```

ndb_mgmndb_mgmdndbd **mysqladmin shutdown** SQL“ -e” shell**ndb_mgm** 4.3.1“”

· 192.168.0.10

· shell> **ndb_mgmd -f /var/lib/mysql-cluster/config.in**

· 192.168.0.30192.168.0.40

· shell> **ndbd**

NDBD“ --initial”

· SQL192.168.0.20

· shell> **mysqld &**

17.6.5.2“”

ndb_restore 17.6.5.3“”

MySQL 17.4“MySQL”

17.4. MySQL

17.4.1. MySQL
17.4.2.
17.4.3. MySQL
17.4.4.

MySQLMySQL MySQL NDB NDB

NDB NDBmy.cnf

MySQL MGM MGM my.cnfMySQL NDB MGM

17.4.1. MySQL

LinuxMac OS XSolarisNDB Windows win32

tarballMySQL 5.1 BitKeeper **configure**“ --with-ndbcluster” **BUILD/compile-pentium-max** OpenSSL OpenSSL “ **compile-pentium-max**” 2.8.3“”

17.4.2.

MySQL MySQLMySQL 2MySQL

my.cnf MySQL

17.4.3. MySQL

MySQL

/var/lib/mysql-cluster

```
shell> mkdir /var/lib/mysql-cluster
```

config.ini HostNameDataDir

```
# file "config.ini" - showing minimal setup consisting of 1 data nod
# 1 management server, and 3 MySQL servers.
# The empty default sections are not required, and are shown only fo
# the sake of completeness.
# Data nodes must provide a hostname but MySQL Servers are not requi
# to do so.
# If you don't know the hostname for your machine, use localhost.
# The DataDir parameter also has a default value, but it is recommen
# set it explicitly.
# Note: DB, API, and MGM are aliases for NDBD, MYSQLD, and NDB_MGMD
# respectively. DB and API are deprecated and should not be used in
# installations.
[NDBD DEFAULT]
NoOfReplicas= 1

[MYSQLD DEFAULT]
[NDB_MGMD DEFAULT]
[TCP DEFAULT]

[NDB_MGMD]
HostName= myhost.example.com

[NDBD]
HostName= myhost.example.com
DataDir= /var/lib/mysql-cluster
```

```
[MYSQLD]
[MYSQLD]
[MYSQLD]
```

```
shell> cd /var/lib/mysql-cluster
shell> ndb_mgmd
```

ndbdDB DB**ndbd**“ —initial”

```
shell> ndbd --initial
```

ndbd

```
shell> ndbd
```

--initial

ndbd1186

tarballMySQL**ndb_mgmdndbd** /usr/local/mysql/bin

MySQL /var/lib/mysql/usr/local/mysql/data my.cnfNDB

```
[mysqld]
ndbcluster
```

MySQL

```
shell> mysqld_safe --user=mysql &
```

MySQL mysql .err

```
shell> mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 1 to server version: 5.1.2-alpha-Max
```

```
’  help;’’ \h’’       \c’

mysql> SHOW ENGINES\G

...
*************************** 12. row ***************************
Engine: NDBCLUSTER
Support: YES
Comment: Clustered, fault-tolerant, memory-based tables
*************************** 13. row ***************************
Engine: NDB
Support: YES
Comment: Alias for NDBCLUSTER
...
```

MySQL

```
shell> mysql
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 1 to server version: 5.1.2-alpha-Max

’  help;’’ \h’’       \c’

mysql> USE test;
Database changed

mysql> CREATE TABLE ctest (i INT) ENGINE=NDBCLUSTER;
```

```
Query OK, 0 rows affected (0.09 sec)

mysql> SHOW CREATE TABLE ctest \G
*************************** 1. row ***************************
       Table: ctest
Create Table: CREATE TABLE `ctest` (
  `i` int(11) default NULL
) ENGINE=ndbcluster DEFAULT CHARSET=latin1
1 row in set (0.00 sec)

shell> ndb_mgm
```

SHOW

```
NDB> SHOW
Cluster Configuration
---------------------
[ndbd(NDB)]     1 node(s)
id=2    @127.0.0.1  (Version: 3.5.3, Nodegroup: 0, Master)

[ndb_mgmd(MGM)] 1 node(s)
id=1    @127.0.0.1  (Version: 3.5.3)

[mysqld(API)]   3 node(s)
id=3    @127.0.0.1  (Version: 3.5.3)
id=4 (not connected, accepting connect from any host)
id=5 (not connected, accepting connect from any host)
```

MySQL ENGINE=NDBCLUSTERENGINE=NDB

17.4.4.

17.4.4.1. MySQL
17.4.4.2. MySQL
17.4.4.3. MySQL
17.4.4.4. MySQL
17.4.4.5. MySQL
17.4.4.6. MySQLSQL
17.4.4.7. MySQLTCP/IP
17.4.4.8. MySQLTCP/IP
17.4.4.9. MySQL
17.4.4.10. MySQLSCI

MySQL

· my.cnfMySQL MySQL

· config.iniMySQL config.ini

17.4.4.1. MySQL

MySQL my.cnf config.ini

```
# my.cnf
# example additions to my.cnf for MySQL Cluster
# (valid in MySQL 5.1)

# enable ndbcluster storage engine, and provide connectstring for
# management server host (default port is 1186)
[mysqld]
ndbcluster
```

```
ndb-connectstring=ndb_mgmd.mysql.com



# provide connectstring for management server host (default port: 11
[ndbd]
connect-string=ndb_mgmd.mysql.com

# provide connectstring for management server host (default port: 11
[ndb_mgm]
connect-string=ndb_mgmd.mysql.com

# provide location of cluster configuration file
[ndb_mgmd]
config-file=/etc/config.ini
```

17.4.4.2“MySQL ”

```
# my.cnf
# example additions to my.cnf for MySQL Cluster
# (will work on all versions)

# enable ndbcluster storage engine, and provide connectstring for ma
# server host to the default port 1186
[mysqld]
ndbcluster
ndb-connectstring=ndb_mgmd.mysql.com:1186
```

my.cnf[mysql_cluster]

```
# cluster-specific settings
```

```
[mysql_cluster]
ndb-connectstring=ndb_mgmd.mysql.com:1186
```

INI config.ini**ndb_mgmd** **ndb_mgmd**--config-file=[<*path*>] <*filename*> **ndb_mgmd**config.ini

config.ini DEFAULT [NDBD] DataMemory [NDBD DEFAULT]

INI“ :”“ =” ID

1 22MySQL

```
# file "config.ini" - 2 data nodes and 2 SQL nodes
# This file is placed in the startup directory of ndb_mgmd (the mana
# server)
# The first MySQL Server can be started from any host. The second ca
# only on the host mysqld_5.mysql.com

[NDBD DEFAULT]
NoOfReplicas= 2
DataDir= /var/lib/mysql-cluster

[NDB_MGMD]
Hostname= ndb_mgmd.mysql.com
DataDir= /var/lib/mysql-cluster

[NDBD]
HostName= ndbd_2.mysql.com

[NDBD]
```

```
HostName= ndbd_3.mysql.com

[MYSQLD]
[MYSQLD]
HostName= mysqld_5.mysql.com
```

6

· [COMPUTER]

· [NDBD]

· [MYSQLD]MySQL

· [MGM][NDB_MGMD]

· [TCP]TCP/IP TCP/IP

· [SHM]“ --with-ndb-shm” MySQL 5.1-Max

config.ini

DEFAULT

17.4.4.2. MySQL

MySQL**ndb_mgmd** MySQL1

```
<connectstring> :=
    [<nodeid-specification>,]<host-specification>[,<host-specificati

<nodeid-specification> := node_id

<host-specification> := host[:port]
```

node_id1 config.ini *port*Unix *host*Internet

```
example 1 (long):    "nodeid=2,myhost1:1100,myhost2:1100,192.168.0.3
example 2 (short):   "myhost1"
```

localhost:1186 <port>1186 IANA http://www.iana.org/assignments/port-numbers

<host-specification>

.

· my.cnf[mysql_cluster]

.

1. NDB_CONNECTSTRING connectstring
2. connectstring Ndb.cfg

my.cnf

17.4.4.3. MySQL

[COMPUTER]

· [COMPUTER]Id

· [COMPUTER]HostName

IP

17.4.4.4. MySQL

[NDB_MGMD] [MGM] ExecuteOnComputerHostName localhost

· [NDB_MGMD]Id

163 ID

· [NDB_MGMD]ExecuteOnComputer

[COMPUTER]

· [NDB_MGMD]PortNumber

· [NDB_MGMD]LogDestination

CONSOLESYSLOGFILE

o CONSOLEstdout

o CONSOLE

o SYSLOGsyslog
authauthprivcrondaemonftpkernlprmailnewssysloguseruucplocal0local1local2
local7

SYSLOG:facility=syslog

o FILE

§ filename

§ maxsize .x x

§ maxfiles

o FILE:filename=cluster.log,maxsize=1000000,maxf

CONSOLE;SYSLOG:facility=local0;FILE:filename=/var/log/mgmd

FILEFILE:filename=ndb_*node_id*_cluster.log,maxsize=1000000,maxfiles=6
node_idID

· [NDB_MGMD]ArbitrationRank

MGMSQL ArbitrationRank

o 0

o 1

o 2

ArbitrationRank1 SQL0

· [NDB_MGMD]ArbitrationDelay

0

· [NDB_MGMD]DataDir

17.4.4.5. MySQL

[NDBD]

· ExecuteOnComputerHostName.

· NoOfReplicas

[NDBD DEFAULT]

[NDBD DEFAULT] [NDBD] HostNameIdExecuteOnComputer[NDBD]

Id ID Id

kMG 10241024*10241024*1024*1024 100k100 * 1024 =

102400

· [NBDB]Id

ID 163 ID

· [NDBD]ExecuteOnComputer

COMPUTER

· [NDBD]HostName

ExecuteOnComputer localhost ExecuteOnComputer

· (*OBSOLETE*) [NDBD]ServerPort

TCP

· [NDBD]NoOfReplicas

[NDBD DEFAULT]

1ID ID 4 NoOfReplicas2ID2345123 245

ID SHOW

NoOfReplicas 4

· [NDBD]DataDir

pid

· [NDBD]FileSystemPath

REDO UNDO DataDir **ndbd**

MySQl/var/lib/mysql-cluster1 ID ID2ndb_2_fs

· [NDBD]BackupDataDir

*FileSystemPath/*BACKUP

DataMemoryIndexMemory DataMemoryIndexMemory

· [NDBD]DataMemory

DataMemory VARCHAR 16 12832KB
1 8052

DataMemory 10 IndexMemory DataMemory

DataMemory32KB NoOfReplicas 1

DataMemoryUNDO DataMemory

o

o

o

DataMemory80MB1MB RAM 32 24GB64
64 **ndbd** CPU

· [NDBD]IndexMemory

MySQL tuple

25 32 8

```
CREATE TABLE example (
  a INT NOT NULL,
```

```
  b INT NOT NULL,
  c INT NOT NULL,
  PRIMARY KEY(a),
  UNIQUE(b)
) ENGINE=NDBCLUSTER;
```

12 4 12 ab 10 291 ba 29 128

100 58MB 64 MB

IndexMemoryDataMemory 42 2 2*DataMemory

DataMemoryIndexMemory

DataMemoryIndexMemory

IndexMemory18MB1MB

MaxNoOfConcurrentTransactions MaxNoOfConcurrentOperations

MaxNoOfConcurrentOperations

· [NDBD]MaxNoOfConcurrentTransactions

1

MySQL 1 MySQL

4096.

· [NDBD]MaxNoOfConcurrentOperations

4

1

32768.

1 2

8 8 MaxNoOfConcurrentOperations

1KB

· [NDBD]MaxNoOfLocalOperations

1.1 * MaxNoOfConcurrentOperations

· [NDBD]MaxNoOfConcurrentIndexOperations

8192 DBA

· [NDBD]MaxNoOfFiredTriggers

MaxNoOfFiredTriggers4000 DBA

· [NDBD]TransactionBufferMemory

ZATTRBUF_FILESIZE ndb/src/kernel/blocks/Dbtc/Dbtc.hpp 4000*128500KB ZDATABUF_FILESIZE Dbtc.hpp 62.5KB Dbtc

Dblqh ndb/src/kernel/blocks/Dblqh/Dblqh.hpp ZATTRINBUF_FILESIZE10000*1281250KB ZDATABUF_FILE_SIZE 10000*16 156KB

TransactionBufferMemory1MB

· [NDBD]MaxNoOfConcurrentScans

1 2

MaxNoOfConcurrentScans256500

· [NDBD]MaxNoOfLocalScans

· [NDBD]BatchSizePerLocalScan

64SQLScanBatchSize

· [NDBD]LongMessageBuffer

Checkpointing

· [NDBD]NoOfFragmentLogFiles

REDO REDO 11“”“”

REDO

88 416MB 512MB REDO64MB NoOfFragmentLogFiles300 REDO

checkpointing jeapo rdising 410

· [NDBD]MaxNoOfSavedMessages

25

“”

· [NDBD]MaxNoOfAttributes

100032 200

MaxNoOfAttributes ALTER TABLE ALTER TABLE 3 100 MaxNoOfAttributes300 MaxNoOfAttributes ALTER TABLE MaxNoOfAttributes

· [NDBD]MaxNoOfTables

BLOB BLOB

1288160020KB

· [NDBD]MaxNoOfOrderedIndexes

1 1 11

12810KB

· [NDBD]MaxNoOfUniqueHashIndexes

1 1 USING HASH

6415KB

· [NDBD]MaxNoOfTriggers

768.

· [NDBD]MaxNoOfIndexes

MySQL 5.1 MaxNoOfOrderedIndexesMaxNoOfUniqueHashIndexes

1

128.

“ 1”“ Y”“”“ 0”“ N”“”

· [NDBD]LockPagesInMainMemory

SolarisLinux

· [NDBD]StopOnError

NDBD

· [NDBD]Diskless

MySQL“”“”“”“” **ndbd**

“”

“ Diskless”“ 1”“ Y”

· [NDBD]RestartOnErrorInsert

· [NDBD]TimeBetweenWatchDogCheck

“”“”“”

40004

· [NDBD]StartPartialTimeout

3000030 0

· [NDBD]StartPartitionedTimeout

StartPartialTimeout

6000060

· [NDBD]StartFailureTimeout

60000(60 GB 1015 6000001000000

· [NDBD]HeartbeatIntervalDbDb

“”

15001.5 5000 1000

· [NDBD]HeartbeatIntervalDbApi

MySQLSQL MySQL SQL MySQL 3 HeartbeatIntervalDbDb

15001.5 MySQL

· [NDBD]TimeBetweenLocalCheckpoints

TimeBetweenLocalCheckpoints6

· [NDBD]TimeBetweenGlobalCheckpoints

2000 milliseconds.

· [NDBD]TimeBetweenInactiveTransactionAbortCheck

10001

· [NDBD]TransactionInactiveTimeout

0

· [NDBD]TransactionDeadlockDetectionTimeout

1. “”

2.

3.

12001.2

· [NDBD]NoOfDiskPagesToDiskAfterRestartTUP

NoOfDiskPagesToDiskAfterRestartTUP20 1.6MB UNDO
UNDO NoOfDiskPagesToDiskAfterRestartACC IndexMemory

NoOfFragmentLogFilesDataMemoryIndexMemory

40 3.2MB

· [NDBD]NoOfDiskPagesToDiskAfterRestartACC

NoOfDiskPagesToDiskAfterRestartTUP

201.6MB

· [NDBD]NoOfDiskPagesToDiskDuringRestartTUP

NoOfDiskPagesToDiskAfterRestartTUP
NoOfDiskPagesToDiskAfterRestartACC

403.2MB

· [NDBD]NoOfDiskPagesToDiskDuringRestartACC

NoOfDiskPagesToDiskAfterRestartTUP
NoOfDiskPagesToDiskAfterRestartACC 1008KB80KB/

20 (1.6MB

· [NDBD]ArbitrationTimeout

10001

· [NDBD]UndoIndexBuffer

NDB REDO UNDO UNDO

UNDO NDBUNDO

2MB1MB NDB677“ UNDO”

· [NDBD]UndoDataBuffer

UNDOUNDO

UNDO 16MB

1MB

“” NDB891“ UNDO”

· [NDBD]RedoBuffer

N

8MB1MB

NDB1221“REDO”

16 015 15 0

0

· [NDBD]LogLevelStartup

1.

· [NDBD]LogLevelShutdown

0.

· [NDBD]LogLevelStatistic

0.

· [NDBD]LogLevelCheckpoint

0.

· [NDBD]LogLevelNodeRestart

0.

· [NDBD]LogLevelConnection

0.

· [NDBD]LogLevelError

0.

· [NDBD]LogLevelInfo

0.

· [NDBD]BackupDataBufferSize

2MB

· [NDBD]BackupLogBufferSize

2MB

· [NDBD]BackupMemory

BackupDataBufferSizeBackupLogBufferSize

2MB + 2MB = 4MB

· [NDBD]BackupWriteSize

32KB.

17.4.4.6. MySQLSQL

config.ini[MYSQLD] MySQLSQL SQL

· [MYSQLD]Id

163 ID

· [MYSQLD]ExecuteOnComputer

[COMPUTER]

· [MYSQLD]ArbitrationRank

MGMSQL 0 1 2 ArbitrationRank1 SQL ArbitrationRank0

· [MYSQLD]ArbitrationDelay

0

· [MYSQLD]BatchByteSize

40 MySQL

32KB

· [MYSQLD]BatchSize

64992

· [MYSQLD]MaxScanBatchSize

256KB16MB

17.4.4.7. MySQLTCP/IP

MySQL TCP/IP MySQL 17.4.4.8“MySQL TCP/IP”)

NodeId1NodeId2

[TCP DEFAULT]

· [TCP]*NodeId1* , [TCP]*NodeId2*

TCPID

· [TCP]SendBufferMemory

TCP 64KB 256KB

· [TCP]SendSignalId

“ Y” ID

· [TCP]Checksum

Y/N1/0

· [TCP]PortNumber

· [TCP]ReceiveBufferMemory

TCP/IP 64KB

17.4.4.8. MySQLTCP/IP

config.ini[TCP]IP

4 1 SQL LAN172.23.72.*

```
# Management Server
[NDB_MGMD]
Id=1
HostName=172.23.72.20

# SQL Node
[MYSQLD]
Id=2
HostName=172.23.72.21

# Data Nodes
[NDBD]
Id=3
HostName=172.23.72.22

[NDBD]
Id=4
```

```
HostName=172.23.72.23


# TCP/IP Connections
[TCP]
NodeId1=3
NodeId2=4
HostName1=1.1.0.1
HostName2=1.1.0.2
```

Hub

17.4.4.9. MySQL

MySQL 1 MySQL --with-ndb-shm-max NodeId1NodeId2ShmKey

SHM

· [SHM]NodeId1, [SHM]NodeId2

IDNodeId1NodeId2

· [SHM]ShmKey

ID

· [SHM]ShmSize

SHM gai ShmSize 1MB

· [SHM]SendSignalId

ID“ Y” ID

· [SHM]Checksum

Y/N

17.4.4.10. MySQLSCI

--with-ndb-sci=*/your/path/to/SCI*MySQL-Max MySQLSCI *path*

SCI

ndbdSVI SCIndbd ndbdCPUSCI ndbd1CPU1CPU

· [SCI]NodeId1, [SCI]NodeId2

IDNodeId1NodeId2

· [SCI]Host1SciId0

1SCIID NodeId1

· [SCI]Host1SciId1

SCISCI ID12SCI

· [SCI]Host2SciId0

2SCIID NodeId2

· [SCI]Host2SciId1

SCI 22SCI

· [SCI]SharedBufferSize

SCI1 1 MB ndbd

· [SCI]SendLimit

SCI SCI 8kB 64KB 16kB 8KB

· [SCI]SendSignalId

“ Y” ID

· [SCI]Checksum

T Checksum

17.5. MySQL

17.5.1. MySQLMySQL
17.5.2. **ndbd**
17.5.3. **ndb_mgmd**“”
17.5.4. **ndb_mgm**“”
17.5.5. MySQL

MySQL 4

17.5.1. MySQLMySQL

mysqldMySQL MySQL **mysqld**NDB -max
http://dev.mysql.com/downloads/

mysqld NDB NDB

· **mysqld**“— ndbcluster”

· my.cnf[mysqld]ndbcluster1

NDB MySQLmysqlSHOW ENGINESNDBCLUSTERYESNO
NDBMySQl DISABLED

MySQL3

· MySQLID

· MGM IP

·

ID

mysqldndb-connectstring **mysqld** my.cnf IP

ndb_mgmd.mysql.com 1186

```
shell> mysqld --ndb-connectstring=ndb_mgmd.mysql.com:1186
```

17.4.4.2“MySQL ”

MySQL **mysqld**SQL

17.5.2. ndbd

ndbdNDB

MySQL **ndbd**

Ndbd DataDir *node_id*ID ndb_2_error.logID2

· ndb_*node_id*_error.logndbd 1

```
· Date/Time: Saturday 30 July 2004 - 00:20:01
· Type of error: error
· Message: Internal program error (failed ndbrequire)
· Fault ID: 2341
· Problem data: DbtupFixAlloc.cpp
· Object of reference: DBTUP (Line: 173)
· ProgramName: NDB Kernel
· ProcessID: 14909
· TraceFile: ndb_2_trace.log.2
· ***EOM***
```

1 ndb_*node_id*_trace.log.next

· ndb_*node_id*_trace.log.*trace_id* MySQL

trace_id

· ndb_*node_id*_trace.log.next

· ndb_*node_id*_out.logndbd ndbd

· ndb_*node_id*.pidndbdID ID

· ndb_*node_id*_signal.logndbd ndbd

NFS pid-file

ndbd ID

```
shell> ndbd --connect-string="nodeid=2;host=ndb_mgmd.mysql.com:1186"
```

17.4.4.2“MySQL ”

ndbd 1“ angel process” ndbd Unixkillndbd ndbd

1 I/O ndbd ndbd2CPUCPU ndbd

17.5.3. ndb_mgmd“”

1 ID

ndb_mgmd DataDir *node_id*ID

· config.ini 17.4“MySQL”

· ndb_*node_id*_cluster.log 17.6“MySQL”

1MB ndb_*node_id*_cluster.log.*seq_idseq_id* 123 4

· ndb_*node_id*_out.logstdoutstderr

· ndb_*node_id*.pidPID

17.5.4. ndb_mgm“”

localhost1186

```
shell> ndb_mgm localhost 1186
```

ndb_mgm [17.5.5.4“ndb_mgm ”17.6.2“”]

17.5.5. MySQL

17.5.5.1. mysqldMySQL
17.5.5.2. ndbd
17.5.5.3. ndb_mgmd
17.5.5.4. ndb_mgm

MySQL **mysqld** MySQL MySQL 4.1 **mysqld** -?

· -?, --usage, --help

· -V, --version

ndbd MySQL MySQL MySQL MySQL

· -c *connect_string*, --connect-string

connect_string

```
shell> ndbd --connect-string="nodeid=2;host=ndb_mgmd.mysql.com:1186"
```

· --debug[=*options*]

mysqld

· -e, --execute

shell

```
shell> ndb_mgm -e show
```

```
shell> ndb_mgm --execute="SHOW"
```

```
NDB> SHOW;
```

“ -e”**mysql** 4.3.1“”

17.5.5.1. mysqldMySQL

· --ndbcluster

NDB NDB NDB MySQL NDB

· --skip-ndbcluster

NDB NDB “—ndbcluster” NDB

· --ndb-connectstring=*connect_string*

NDB

17.5.5.2. ndbd

17.5.5“MySQL”

· -d, --daemon

ndbddaemon

· --nodaemon

ndbddaemon ndbd

· --initial

ndbd ndbd

ndbd—initial REDO

o

o ndbd

o

· --nostart

ndbd **ndbd**

17.5.5.3. ndb_mgmd

17.5.5“MySQL”

· -f *filename*, --config-file=*filename*, (**OBSOLETE**): -c *filename*

config.ini

· -d, --daemon

ndb_mgmd

· --nodaemon

17.5.5.4. ndb_mgm

17.5.5“MySQL”

· [*host_name* [*port_num*]]

· --try-reconnect=*number*

5 number

17.6. MySQL

17.6.1. MySQL
17.6.2. “”
17.6.3. MySQL
17.6.4.
17.6.5. MySQL

MySQL MySQL 17.4“MySQL” 17.5“MySQL”

MySQL

MySQL 1 2 DataDirndb_*node_id*_cluster.log *node_id*ID **ndbd** Unix

17.6.1. MySQL

. “ --initial”

.

.

.

ndbd

1. ID
2.
3.
4.

· **0**

“ --initial”

· **1**

“”

· **2**

· **3**

· **4**

redo NoOfFragmentLogFiles

o

o undo

o redo

redo

· **5**

SYSTAB_0NDB$EVENTS

o

o

o INSERT

o

· **6**

· **7**

· **8**

· **9**

· **10**

API

· **11**

17.6.2. “”

ndb_mgm

*node_id*IDALL

· HELP

· SHOW

· *node_id* START

node_id

· *node_id* STOP

node_id

· *node_id* RESTART [-N] [-I]

node_id

· *node_id* STATUS

node_id

· ENTER SINGLE USER MODE *node_id*

ID“*node_id*” MySQL

· EXIT SINGLE USER MODE

SQL **mysqld**

· QUIT

· SHUTDOWN

SQL

17.6.3. MySQL

17.6.3.1.
17.6.3.2.

MySQL

MySQL **cluster lognode logscluster log** **node logs**

syslog

1

· *Category* STARTUP, SHUTDOWN, STATISTICS, CHECKPOINT, NODERESTART, CONNECTION, ERROR,INFO

· *Priority* 115“ 1”“”“ 15”“”

· *Severity Level* ALERT, CRITICAL, ERROR, WARNING, INFO, DEBUG

17.6.3.1.

· CLUSTERLOG ON

· CLUSTERLOG OFF

· CLUSTERLOG INFO

· *node_id* CLUSTERLOG *category=threshold*

thresholdcategory

· CLUSTERLOG FILTER *severity_level*

severity_level

STARTUP	**7**
SHUTDOWN	**7**
STATISTICS	**7**
CHECKPOINT	**7**
NODERESTART	**7**
CONNECTION	**7**
ERROR	**15**
INFO	**7**

3STARTUP STARTUP3 33

Unixsyslog LOG_EMERGLOG_NOTICE

1	ALERT	
2	CRITICAL	
3	ERROR	
4	WARNING	
5	INFO	
6	DEBUG	NDB

17.6.3.2.

datetime [*string*] *severity – message*

```
09:19:30 2005-07-24 [NDB] INFO -- Node 4 Start phase 4 completed
```

CONNECTION

DB	8	INFO	
DB	8	INFO	
	8	INFO	SQL
	8	INFO	SQL

CHECKPOINT

GCP = LCP =

calc keep GCI LCP	0	ALERT	LCP
	11	INFO	LCP
	10	INFO	GCP
	9	INFO	GCPREDO
	8	INFO	LCP
	7	INFO	LCP

undo	7	INFO	UNDO

STARTUP

STTORRY	15	INFO	
Undo	15	INFO	
REDO	10	INFO	GCI*X*GCI *Y*
	10	INFO	*X*MB *Y*MB *Z*
	8	INFO	
DB	8	INFO	
DBX	4	INFO	
	3	INFO	ID
DB	1	INFO	NDB

DB	1	INFO	NDB
DB	1	INFO	
DB	1	INFO	

NODERESTART

	8	ALERT	
X	8	ALERT	
	2	ALERT	8 · 1/2 · · · · *X* · *X* · ·

	10	INFO	
	8	INFO	
	8	INFO	
	8	INFO	
	8	INFO	
GCP	7	INFO	
GCP	7	INFO	
LCP	7	INFO	
LCP = *X*	7	INFO	
	6	INFO	7 · [state=*X*] · *X* [ticket=*Y*] · *X* [ticket=*Y*] · *X* [ticket=*Y*]

			· *X* – [state=*Y*] · *X* – [state=*Y*] · *X* <error msg> [state=*Y*]

STATISTICS

	9	INFO	
	9	INFO	*X*
#	9	INFO	*X*
	8	INFO	
	8	INFO	
	7	INFO	
	5	INFO	80%90%100%

ERROR

1

8	ALERT	*X*
2	ERROR	
8	WARNING	
8	WARNING	*X#Y*
2	WARNING	

INFO

12	INFO	*X*
11	INFO	MB
2	INFO	

17.6.4.

1MySQLSQL MySQL

SQL **ALL STATUS**

```
NDB> ENTER SINGLE USER MODE 5
```

ID5SQL

MySQL

EXIT SINGLE USER MODE MySQL SQLMySQL

```
NDB> EXIT SINGLE USER MODE
```

-

1.

2. **EXIT SINGLE USER MODE**

3.

.

17.6.5. MySQL

17.6.5.1.
17.6.5.2.
17.6.5.3.
17.6.5.4.
17.6.5.5.

17.6.5.1.

- **Metadata**
- **Table records**
- **Transaction log**

- BACKUP-*backup_id*.*node_id*.ctl

- BACKUP-*backup_id*-0.*node_id*.data

- BACKUP-*backup_id*.*node_id*.log

*backup_id*ID*node_id*ID

17.6.5.2.

17.6.5.4“”

1. (**ndb_mgm**)
2. START BACKUP
3. “”

4. “ *backup_id*” *backup_id*ID ID

5. “ *backup_id*”

1.

2. ABORT BACKUP *backup_id**backup_id*ID“ *backup_id*”

3. “ *backup_id*”

4. “ *backup_id*XYZ”

shell

```
shell> ndb_mgm -e "ABORT BACKUP backup_id"
```

ID*backup_id*

17.6.5.3.

ndb_restore

ndb_mgm -e SHOW“ -c *connectstring*” MGM 17.4.4.2 “MySQL ”

ID12 ID23 4 **ndb_restore**

17.6.5.4.

4

· BackupDataBufferSize

· BackupLogBufferSize

· BackupMemory

· BackupWriteSize

17.4“MySQL”

17.6.5.5.

NDB“ hot” MySQL100“ hot”

17.7. MySQL

17.7.1. MySQLSCI
17.7.2.

1996NDB NDB

MySQL TCP/IP MySQL

ndbd“”

TCP/IP DolphinSCI

17.7.1. MySQLSCI

TCP/IP SCI 2004101SCI2.3.0

SCI SCI

MySQLSCI MySQL Linux 2.42.6SCI Linux 2.4 SCI

SCI

1. SCI
2. SCI
3. 12
4. MySQLshellSCI

SCI

SCI

1. SCIDIS

2. SCI

DIS_GPL_2_5_0_SEP_10_2004.tar.gz
SCI_SOCKET_2_3_0_OKT_01_2004.tar.gz
http://www.dolphinics.no/support/downloads.html

SCIDIS Linux/x86

```
shell> tar xzf DIS_GPL_2_5_0_SEP_10_2004.tar.gz
shell> cd DIS_GPL_2_5_0_SEP_10_2004/src/
shell> tar xzf ../../SCI_SOCKET_2_3_0_OKT_01_2004.tar.gz
shell> cd ../adm/bin/Linux_pkgs
shell> ./make_PSB_66_release
```

64 64Opteron CPU **make_PSB_66_X86_64_release** **make_PSB_66_release**Itanium **make_PSB_66_IA64_release**X86-64Intel EM64T

zipped tar DIS-<*operating-system*>-*time-date* /opt/DIS

```
shell> cp DIS_Linux_2.4.20-8_181004.tar.gz /opt/
shell> cd /opt
shell> tar xzf DIS_Linux_2.4.20-8_181004.tar.gz
shell> mv DIS_Linux_2.4.20-8_181004 DIS
```

SCISCIID

.

· 1SCI 1

· 23

ID

ID40 4812…

SCI 1SCI8 1 ID 1ID64460 64ID68124 ID 4525088

23 1 42 643 1024 Dolphin

23 SCI SCI100 SCI MySQlSCI

2D/3D 100

2 16 1 322 2“” MySQL

SCIID/opt/DIS/sbin “-c 1”SCI 1 1“ -a 0”0“68”ID

```
shell> ./sciconfig -c 1 -a 0 -n 68
```

SCI /opt/DIS/sbin

```
shell> ./sciconfig -c 1 -gsn
```

SCI“ -c 2” 1 ID

SCIID IP SCIID SCI /etc/sci/scisock.conf SCISCIIP

```
#host           #nodeId
alpha           8
beta            12
192.168.10.20   16
```

/etc/sci/scisock_opt.conf

```
#-key                       -type        -values
EnablePortsByDefault                yes
```

```
EnablePort                  tcp          2200
DisablePort                 tcp          2201
EnablePortRange             tcp          2202 2219
DisablePortRange            tcp          2220 2231
```

SCI

```
shell> cd DIS/sbin/
shell> ./drv-install add PSB66
shell> ./scisocket-install add
```

SCI

```
shell> cd /opt/DIS/sbin/
shell> ./status.sh
```

SCI **ksocketconfig**

```
shell> cd /opt/DIS/util
shell> ./ksocketconfig -f
```

SCI **latency_bench** SCI **latency_bench** LD_PRELOAD

```
shell> cd /opt/DIS/bin/socket
shell> ./latency_bench -server
```

latency_bench“ -client”

```
shell> cd /opt/DIS/bin/socket
```

```
shell> ./latency_bench -client server_hostname
```

SCI MySQLSCISCI [17.4.4.10“MySQLSCI”]

MySQL SCI **ndbdmysqldndb_mgmd** LD_PRELOADSCI

bash shell**ndbd**

```
bash-shell> export LD_PRELOAD=/opt/DIS/lib/libkscisock.so
bash-shell> ndbd
```

tcsh

```
tcsh-shell> setenv LD_PRELOAD=/opt/DIS/lib/libkscisock.so
tcsh-shell> ndbd
```

MySQLSCI

17.7.2.

ndbd MySQL

.

.

.

ndbd ndbd MySQL SQL

.

MySQLSQL

testReadPerf 1

TCP/IPSCI 20 2KB 34 2KB SCI 2CPU AMD MP1900+

Access type:	TCP/IP sockets	SCI Socket
Serial pk access:	400 microseconds	160 microseconds
Batched pk access:	28 microseconds	22 microseconds
Serial uk access:	500 microseconds	250 microseconds
Batched uk access:	70 microseconds	36 microseconds
Indexed eq-bound:	1250 microseconds	750 microseconds
Index range:	24 microseconds	12 microseconds

SCISCI TCP/IP

SCITCP/IP100 SCI SCI 1 **mysqld** SCI

TCP/IP SCI100 ndbdCPU

SCISCI ndbd CPUndbd SCI SCI ndbd Linux 2.6 CPU SCI ndbd1070

Myrinet Infiniband VIA SCIMySQL MySQLTCP/IPSCI

17.8. MySQL

5.1.xMySQL MyISAMInnoDB MySQL 5.1 MySQLhttp://bugs.mysql.com“” MyAQL 5.1“ 5.1”

MySQL 5.0

.

o

o GeometryWKTWKB

.

o

o 17.4.4“”

§ DataMemoryIndexMemory

§ MaxNoOfConcurrentOperations TRUNCATE TABLEALTER TABLE

§ MaxNoOfOrderedIndexes

o NDB 31 122 NDB122

o 1VARCHAR MyISAM NDB VARCHAR CHAR

o 1792

o 128

o 8K*BLOB*

o 32

.

o MyISAM

o MyISAM

.

o NDB MyISAMInnoDB

o USE INDEXFORCE INDEX

o USING HASH NULL

o MySQL

.

o READ_COMMITTEDInnoDB READ_COMMITTEDREAD_COMMITTEDREPEATABLE_READ SERIALIZABLE 17.6.5.5“”

o

· **MySQL** MyISAMInnoDB

o MySQL ALTER TABLE

o MySQL MySQL

o MySQLMySQL autodiscovery autodiscovery *db_name* 1MySQL MySQLMySQLCREATE DATABASE *db_name* MySQL 5.0.2 CREATE SCHEMA *db_name*; MySQL

· **MySQL** MyISAMInnoDB

o big-endianlittle-endian PPCx86 **mysql** SQL

o ALTER TABLECREATE INDEX NDB “ ALTER TABLE *tbl_name* ENGINE=NDBCLUSTER;” NDB FLUSH TABLES

-
-
  - ID ID
  -
  - Bug #13070
- SQL SQL
- 48
- MySQL63MySQLSQL

  MySQL http://bugs.mysql.com/MySQL 5.1

17.9. MySQL

17.9.1. MySQL 5.0MySQL
17.9.2. MySQLMySQL 5.1

MySQL 5.1MySQL MySQL 5.0 MySQL MySQL 5.2

MySQL 5.05.1 NDB

MySQLMySQL 5.1 MySQL 5.1 17.9.2“MySQLMySQL 5.1 ”

17.9.1. MySQL 5.0MySQL

MySQL 5.0.3-beta

.

· SELECT * FROM t1 WHERE non_indexed_attribute = 1;

pushdown=On; command”“ --engine-condition-pushdown” MySQL **mysqld**

EXPLAIN

· **IndexMemory** MySQL 5.1 25 25

· **MySQL** 5.13“MySQL”

.

· SELECT * FROM t1 WHERE *primary_key* IN (1,2,3,4,5,6,

MySQL 23 10 1

· MySQL 4.1 1600 BLOBMySQL 5.0 203202005

MySQL 5.0.6 beta

17.9.2. MySQLMySQL 5.1

MySQL 5.1 5.1

MySQL 5.1

1. **MySQLMySQL** MySQL 1MySQLMySQL

2. RAM

3. VARCHAR(255)260 MySQL 5.1 5

4. MySQLWHERE KEYHASHRANGELIST

BLOBTEXT 8K 32768 128 8K 14000 MySQL 5.1 8K

17.10. MySQL

.

MySQL1 InnoDB MySQL

MySQL MySQL

MySQL 5.1 MySQLMySQL

.

MySQL TCP/IP 100MB GB

SCI SCI 17.7“MySQL”

.

3 MySQL 41 1SQL 2 2 1

.

MySQL 1

1. **MGM** **ndb_mgmd** MGMMySQL**ndb_mgm**

2. NDBndbd

3. **SQL** “ **--ndb-cluster**” MySQL**mysqld**

.

MySQL 5.1 LinuxMac OS XSolarisMySQL Windows MySQL MySQL

FreeBSD alpha *MySQL AB*

· *MySQL*

NDB CPU 64CPU32 TCP/IP SCI

· *MySQLTCP/IPInternet1*

MySQL SQL MySQL

MySQL 100MBGBLAN

.

(My)SQL

o

o

o

o SQLMySQL

.

1. MySQL **SHOW ERRORSSHOW WARNINGS**MySQL Query Browser

2. shell **perror --ndb *error_code***

· *MySQL*

NDB MySQL 5.1 READ_COMMITTED

.

NDBMySQL

MySQL MyISAMInnoDBNDB

· *“NDB”*

“ **N**etwork **D**ata**b**ase”

· *MySQL*

5.1MySQL-max SHOW VARIABLES LIKE 'have_%';SHOW ENGINES;NDB 5.1.2“mysq **ld-maxMy**SQL”

Linux NDBMySQLRPM NDB RPM MySQL 5.1NDB RPM .tar.gz“-max” LinuxRPM -max NDB M MySQL 5.1 RPM http://dev.mysql.com/downloads/mysql/5.1

· *RAM*

“” RAM 1GB 1 2GB

RAM

```
(SizeofDatabase * NumberOfReplicas * 1.1 ) / NumberOfDataNodes
```

o NDB 21-25 IndexMemory

o 10 DataMemory

o 1 USING HASH USING HASH MySQL 5.1 31-35

USING HASHMySQL CPU

MySQL NDB USING HASH

DataMemory/IndexMemory80 80 90

```
1114  'my_cluster_table'
```

RAM*NDB*

RAM 3GBRAM1GB RAM1GB

· *UPS*

· *FULLTEXT*

FULLTEXTNDB MyISAM

.

Pentium CPURAM**ndb_mgmdndb_mgm**

.

MGMSQL

o

o

o “ —initial”

o

MySQL MySQL“”

.

MySQLNDB

o

o FULLTEXT 19 *MySQL*

o

o 12831 122

o 8KBBLOB RAM

o NDB MyISAM

o

17.8“MySQL”

· *MySQL*

MySQL MySQL NDB ENGINE=NDB ENGINE=NDBCLUSTER ALTER TABLENDB 17.8“MySQL”

.

TCP/IPSHM SCI SHMSCI 1GB SCI 17.7“MySQL”

· “ *arbitrator*”

1“”“”

50“”

MySQL ArbitrationRank 17.4.4.4“MySQL”

· *MySQL*

MySQLMySQL MySQL 19 *MySQL* NDB MySQL ENGINE=NDBCLUSTER VARCHAR(255)256 MySQL

17.8“MySQL”

· *MySQL*

1. **ndb_mgmd**

2. **ndbd**

3. **mysqld_safe --user=mysql &**MySQLSQL

shell MGM**ndb_mgm**

.

MGM shell

```
shell> ndb_mgm -e shutdown
```

ndb_mgmndb_mgmndbd SQLMySQL **mysqladmin shutdown**

17.6.2“” 17.3.6“”

· *1*

1MGM 1MGM 1 MGM

.

endianMySQL

· *SQL*

· *MySQL*

DNSDHCP“ 99.999” IP

17.11. MySQL

MySQL MySQL

.

1

NDB

MySQL

MySQL

NDB“” MySQL

.

.

.

.

o **LCP**

LCP LCP

o **GCP**

GCP redo

.

MySQL

.

MySQL MySQL“” MySQL

o MGM

o SQLMySQL

MySQL SQL MySQL API SQL

o

1 MySQL“”“”

MySQL“”“ DB”“ ” SQL“”“ API”

.

.

MySQL 1

.

.

.

.

.

NDB“”“” MySQL

.

NDB 4

.

MySQL

o TCP/IP

InternetHTTPFTP

o TCP/IP

o SCI

SCI MySQLSCI 17.7.1“MySQLSCI” SCI dolphinics.com

o SHM

UnixSHM SHM shmop(2)Unix

MySQLSQL MySQL TCP/IPUnix Windows MySQL API

· **NDB**

Network **D**ata**b**ase MySQL NDBMySQLSQL ACID

.

MySQL

.

.

“” MySQL

.

MySQL

- **ndbd**:

- **ndb_mgmd**:

- **ndb_mgm**:

1

- **ndb_waiter**:

- **ndb_restore**:

17.5“MySQL”

.

MySQL [17.6.3“MySQL”]

o

o

MySQLMySQL [dev.mysql.com]

18

18.1. MySQL
18.2.
18.2.1. RANGE
18.2.2. LIST
18.2.3. HASH
18.2.4. KEY
18.2.5.
18.2.6. MySQLNULL
18.3.
18.3.1. RANGELIST
18.3.2. HASHKEY
18.3.3.
18.3.4.

MySQL 5.1. 18.1“MySQL” MySQL 5.1 18.2“” 18.2.5“” 18.3“” 18.3.3“”

MySQL 5.1pre-alpha not production-ready ((, DATA DIRECTORYINDEX DIRECTORYBug #13520)).

- MySQL

  MySQLMySQL MySQL

-

- Mikael Ronström's Blog

  MySQLMikael Ronström MySQL MySQL

- PlanetMySQL

  MySQL MySQL MySQL MySQL

MySQL 5.1 BitKeeper --with- MySQL 2.8“MySQL”
MySQL 5.1 MySQL

18.1. MySQL

MySQL 5.1.

SQL SQL MySQLInnoDB MySQL (7.6.1 “”)

MySQL HASH HASH MyS(

13.1.5“CREATE TABLE”

5.1 -max --with-partition MySQL 5.1-max MySQL (my.cnf)SHOW VARIABLESMySQL

```
mysql> SHOW VARIABLES LIKE '%partition%';


+-----------------------+-------+

| Variable_name         | Value |

+-----------------------+-------+

| have_partition_engine | YES   |

+-----------------------+-------+

1 row in set (0.00 sec)
```

SHOW VARIABLES have_partition_engineYESMySQL SHOW ENGINES SHOW VARIABLES

MySQL MySQL MySQL 5.1 MyISAMInnoDB MySQL

[STORAGE] ENGINE [STORAGE] ENGINE CREATE TABLE HASH6 InnoDB

```
CREATE TABLE ti (id INT, amount DECIMAL(7,2), tr_date DATE)

    ENGINE=INNODB
```

```
PARTITION BY HASH(MONTH(tr_date))
PARTITIONS 6;
```

PARTITION [STORAGE] ENGINE MySQL 5.1

MySQL

CREATE TABLEPARTITIONDATA DIRECTORY INDEX DIRECTORY MAX_ROWSMIN_ROWS 18.3 “” Bug #13250 5.1

.

.

MySQL

· WHERE

· SUM() COUNT()
as order_total FROM sales GROUP BY salesperson_id”“”

.

MySQL 5.1

18.2.

18.2.1. RANGE
18.2.2. LIST
18.2.3. HASH
18.2.4. KEY
18.2.5.
18.2.6. MySQLNULL

MySQL 5.1

· **RANGE** 18.2.1“RANGE”

· **LIST** RANGE LIST 18.2.2“ LIST”

· **HASH** MySQL 18.2.3“HASH”

· **KEY** HASH KEY MySQL 18.2.4“KEY”

0 4 0, 1, 2, 3RANGELIST HASH 0 KEY MySQL

MySQL

```
mysql> CREATE TABLE t2 (val INT)
    -> PARTITION BY LIST(val)(
    ->     PARTITION mypart VALUES IN (1,3,5),
    ->     PARTITION MyPart VALUES IN (2,4,6)
    -> );
  1488 (HY000):
```

MySQLmypartMyPart

13.1.5“CREATE TABLE”

18.2.1. RANGE

RANGE VALUES LESS THAN 20 20120

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT NOT NULL,
    store_id INT NOT NULL
)
```

store_id PARTITION BY RANGE4 :

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT NOT NULL,
    store_id INT NOT NULL
)
PARTITION BY RANGE (store_id) (
    PARTITION p0 VALUES LESS THAN (6),
    PARTITION p1 VALUES LESS THAN (11),
    PARTITION p2 VALUES LESS THAN (16),
    PARTITION p3 VALUES LESS THAN (21)
)
```

15P0 610P1 PARTITION BY RANGE CJava “ switch ... case”

(72, 'Michael', 'Widenius', '1998-06-25', NULL, 13) p2 21 store_id20 CREATE TABLE“ catchall” VA

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT NOT NULL,
    store_id INT NOT NULL
)
PARTITION BY RANGE (store_id) (
    PARTITION p0 VALUES LESS THAN (6),
    PARTITION p1 VALUES LESS THAN (11),
    PARTITION p2 VALUES LESS THAN (16),
    PARTITION p3 VALUES LESS THAN MAXVALUE
)
```

MAXVALUE store_id 16 p3 25, 30, ALTER TABLE 21-25, 26-30, 18.3“”)

job_code —— 2

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
```

```
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT NOT NULL,
    store_id INT NOT NULL
)
PARTITION BY RANGE (job_code) (
    PARTITION p0 VALUES LESS THAN (100),
    PARTITION p1 VALUES LESS THAN (1000),
    PARTITION p2 VALUES LESS THAN (10000)
)
```

, p0 p1 p2

VALUES LESS THAN MySQL LESS THAN (
separated, job_code,store_idNOT NULL

DATE YEAR(separated) CREATE TABLE

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT,
    store_id INT
)
PARTITION BY RANGE (YEAR(separated)) (
    PARTITION p0 VALUES LESS THAN (1991),
    PARTITION p1 VALUES LESS THAN (1996),
```

```
    PARTITION p2 VALUES LESS THAN (2001),
    PARTITION p3 VALUES LESS THAN MAXVALUE
)
```

1991p0 19911995p1 19962000p2 2000p3

RANGE

. “” “ ALTER TABLE employees DROP PARTITION p0” 1991 (13.1.2“ALTER TABLE” 18.3“” “ DELETE FROM employees WHERE YEAR(separated) <= 1990” DELETE

.

. “ SELECT COUNT(*) FROM employees WHERE YEAR(separated) = 2000 GROUP BY store_id” MySQLp2 WHERE MySQL 5.1

18.2.2. LIST

MySQLLISTRANGE RANGE LIST RANGE LIST “ PARTITION BY LIST(*expr*)” “*expr*” “ VALUES IN (*value_list*)”“ *value_list*”

MySQL 5.1 LIST

RANGE LIST LIST 13.1.5“CREATE TABLE”

“ CREATE TABLE”

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
```

```
    job_code INT,
    store_id INT
)
```

18.2.1“RANGE”

20 4

ID
3, 5, 6, 9, 17
1, 2, 10, 11, 19, 20
4, 12, 13, 14, 18
7, 8, 15, 16

“ CREATE TABLE”

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT,
    store_id INT
)
```

```
PARTITION BY LIST(store_id)
    PARTITION pNorth VALUES IN (3,5,6,9,17),
    PARTITION pEast VALUES IN (1,2,10,11,19,20),
    PARTITION pWest VALUES IN (4,12,13,14,18),
    PARTITION pCentral VALUES IN (7,8,15,16)
)
```

“

DELETE “ DELETE query DELETE FROM empl store_id IN (4,12,13,14,18)”

“ INSERT” LIST

```
INSERT INTO employees VALUES
    (224, 'Linus', 'Torvalds', '2002-05-01', '2004-10-12', 42, 21);
```

“ store_id”21pNorth, pEast, pWest,pCentral LIST“VALUES LESS THAN MAXVALUE”

LISTRANGE HASHKEY 18.2.5“”

18.2.3. HASH

18.2.3.1. LINEAR HASH

HASH RANGELIST HASH MySQL

HASH CREATE TABLE “ PARTITION BY HASH (*expr*)”“ *expr*” MySQL “ PARTITIONS *num*” *num*

“ store_id” 4

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
```

```
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT,
    store_id INT
)
PARTITION BY HASH(store_id)
PARTITIONS 4
```

PARTITIONS 1 NDB Cluster MAX_ROWS 17 *MySQL*

“ PARTITIONS”

“*expr*” SQL

```
CREATE TABLE employees (
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT,
    store_id INT
)
PARTITION BY HASH(YEAR(hired))
PARTITIONS 4
```

“*expr*” MySQL

“”

“date_col” DATETO_DAYS(date_col)“date_col”

“date_col”YEAR(date_col)TO_DAYS(date_col)“date_col”
YEAR(date_col)YEAR(date_col) date
YEAR(date_col)

INT“int_col”“POW(5-int_col,3) + 6”“int_col”
“int_col”“int_col”56“1”“int_col”67“
7”

“ y=*n*x n

“ pruning”

“ PARTITION BY HASH” MySQL“ *expr*” N “ *N* = MOD(*expr*, *num*)” t1 4

```
CREATE TABLE t1 (col1 INT, col2 CHAR(5), col3 DATE)
    PARTITION BY HASH( YEAR(col3) )
    PARTITIONS 4
```

col3'2005-09-15't1

```
MOD(YEAR('2005-09-01'),4)
=  MOD(2005,4)
=  1
```

MySQL 5.1 “ *linear hashing* ” 18.2.3.1“LINEAR HASH”

HASH*column_list*

18.2.3.1. LINEAR HASH

MySQL 2powers-of-two

“ PARTITION BY” “ LINEAR”

```
CREATE TABLE employees (
```

```
    id INT NOT NULL,
    fname VARCHAR(30),
    lname VARCHAR(30),
    hired DATE NOT NULL DEFAULT '1970-01-01',
    separated DATE NOT NULL DEFAULT '9999-12-31',
    job_code INT,
    store_id INT
)
PARTITION BY LINEAR HASH(YEAR(hired))
PARTITIONS 4
```

expr, *num* NN

1. *num*. 2 *V*

2. *V* = POWER(2, CEILING(LOG(2, *num*)))

num13LOG(2,13)3.7004397181411 CEILING(3.7004397181411)4*V* = POWER(2,4), 16

3. *N* = *F*(*column_list*) & (*V* - 1).

4. *N* >= *num*:

· *V* = CEIL(*V* / 2)

· *N* = *N* & (*V* - 1)

t14

```
CREATE TABLE t1 (col1 INT, col2 CHAR(5), col3 DATE)
    PARTITION BY LINEAR HASH( YEAR(col3) )
    PARTITIONS 6;
```

t1 col3'2003-04-14'col3'1998-10-19'

```
V = POWER(2, CEILING(LOG(2,7))) = 8
N = YEAR('2003-04-14') & (8 - 1)
   = 2003 & 7
   = 3

(3 >= 6    FALSE:        #3    )

V = 8
N = YEAR('1998-10-19') & (8-1)
  = 1998 & 7
  = 6

(6 >= 4    TRUE:         )

N = 6 & CEILING(5 / 2)
  = 6 & 3
  = 2

(2 >= 4    FALSE:        #2   )
```

1000 HASH

18.2.4. KEY

KEYHASH HASH KEY MySQL MySQL ClusterMD5 PASSWORD()

“CREATE TABLE ... PARTITION BY KEY”HASH KEYHASHKEY

KEY

```
CREATE TABLE tk (
    col1 INT NOT NULL,
    col2 CHAR(5),
    col3 DATE
)
PARTITION BY LINEAR KEY (col1)
PARTITIONS 3;
```

KEYLINEARHASH 2powers-of-two 18.2.3.1“LINEAR HASH ”

18.2.5.

CREATE TABLE

```
CREATE TABLE ts (id INT, purchased DATE)
    PARTITION BY RANGE(YEAR(purchased))
    SUBPARTITION BY HASH(TO_DAYS(purchased))
    SUBPARTITIONS 2
    (
        PARTITION p0 VALUES LESS THAN (1990),
        PARTITION p1 VALUES LESS THAN (2000),
        PARTITION p2 VALUES LESS THAN MAXVALUE
    )
```

ts 3RANGE 3——p0, p1, p2 ——2 3 * 2 = 6 PARTITION BY RANGE 2“purchased”1990

MySQL 5.1 RANGELIST HASH KEY *composite partitioning*

SUBPARTITION

```
CREATE TABLE ts (id INT, purchased DATE)
```

```
PARTITION BY RANGE(YEAR(purchased))
SUBPARTITION BY HASH(TO_DAYS(purchased))
(
    PARTITION p0 VALUES LESS THAN (1990)
    (
        SUBPARTITION s0,
        SUBPARTITION s1
    ),
    PARTITION p1 VALUES LESS THAN (2000)
    (
        SUBPARTITION s2,
        SUBPARTITION s3
    ),
    PARTITION p2 VALUES LESS THAN MAXVALUE
    (
        SUBPARTITION s4,
        SUBPARTITION s5
    )
);
```

·

· SUBPARTITION

```
·               CREATE TABLE ts (id INT, purchased DATE)
·                   PARTITION BY RANGE(YEAR(purchased))
·                   SUBPARTITION BY HASH(TO_DAYS(purchased))
·                   (
```

```
·                       PARTITION p0 VALUES LESS THAN (1990)
·                       (
·                           SUBPARTITION s0,
·                           SUBPARTITION s1
·                       ),
·                       PARTITION p1 VALUES LESS THAN (2000),
·                       PARTITION p2 VALUES LESS THAN MAXVALUE
·                       (
·                           SUBPARTITION s2,
·                           SUBPARTITION s3
·                       )
·                   )
```

SUBPARTITIONS 2

· SUBPARTITION ()

· CREATE TABLE

```
·               CREATE TABLE ts (id INT, purchased DATE)
·                   PARTITION BY RANGE(YEAR(purchased))
·                   SUBPARTITION BY HASH(TO_DAYS(purchased))
·                   (
·                       PARTITION p0 VALUES LESS THAN (1990)
·                       (
·                           SUBPARTITION s0,
·                           SUBPARTITION s1
·                       ),
·                       PARTITION p1 VALUES LESS THAN (2000)
·                       (
```

```
.                           SUBPARTITION s0,
.                           SUBPARTITION s1
.                       ),
.                       PARTITION p2 VALUES LESS THAN MAXVALUE
.                       (
.                           SUBPARTITION s0,
.                           SUBPARTITION s1
.                       )
.                   )
```

6 /disk0 /disk1 /disk2

```
CREATE TABLE ts (id INT, purchased DATE)
    PARTITION BY RANGE(YEAR(purchased))
    SUBPARTITION BY HASH(TO_DAYS(purchased))
    (
        PARTITION p0 VALUES LESS THAN (1990)
        (
            SUBPARTITION s0
                DATA DIRECTORY = '/disk0/data'
                INDEX DIRECTORY = '/disk0/idx',
            SUBPARTITION s1
                DATA DIRECTORY = '/disk1/data'
                INDEX DIRECTORY = '/disk1/idx'
        ),
        PARTITION p1 VALUES LESS THAN (2000)
        (
            SUBPARTITION s0
```

```
            DATA DIRECTORY = '/disk2/data'
            INDEX DIRECTORY = '/disk2/idx',
        SUBPARTITION s1
            DATA DIRECTORY = '/disk3/data'
            INDEX DIRECTORY = '/disk3/idx'
    ),
    PARTITION p2 VALUES LESS THAN MAXVALUE
    (
        SUBPARTITION s0
            DATA DIRECTORY = '/disk4/data'
            INDEX DIRECTORY = '/disk4/idx',
        SUBPARTITION s1
            DATA DIRECTORY = '/disk5/data'
            INDEX DIRECTORY = '/disk5/idx'
    )
)
```

RANGE

```
CREATE TABLE ts (id INT, purchased DATE)
    PARTITION BY RANGE(YEAR(purchased))
    SUBPARTITION BY HASH(TO_DAYS(purchased))
    (
        PARTITION p0 VALUES LESS THAN (1990)
        (
            SUBPARTITION s0a
                DATA DIRECTORY = '/disk0'
                INDEX DIRECTORY = '/disk1',
```

```
            SUBPARTITION s0b
                DATA DIRECTORY = '/disk2'
                INDEX DIRECTORY = '/disk3'
        ),
        PARTITION p1 VALUES LESS THAN (2000)
        (
            SUBPARTITION s1a
                DATA DIRECTORY = '/disk4/data'
                INDEX DIRECTORY = '/disk4/idx',
            SUBPARTITION s1b
                DATA DIRECTORY = '/disk5/data'
                INDEX DIRECTORY = '/disk5/idx'
        ),
        PARTITION p2 VALUES LESS THAN MAXVALUE
        (
            SUBPARTITION s2a,
            SUBPARTITION s2b
        )
    )
```

· 1990 p0s0a s0b

o s0a /disk0

o s0a /disk1

o s0b /disk2

o s0b /disk3

· 19901999 p11990 2/disk4/disk5 4

o p1s1a/disk4 — /disk4/data /disk4/idx

o p1s1b/disk5 — /disk5/data /disk5/idx

· 2000 p2RANGE

2000“ ALTER TABLE ... REORGANIZE PARTITION” 18.3“”

18.2.6. MySQLNULL

MySQL NULL MySQL NULL0“ NOT NULL”

MySQL NULL

RANGELIST NULLNULL0

```
mysql> CREATE TABLE tnlist (
    ->     id INT,
    ->     name VARCHAR(5)
    -> )
    -> PARTITION BY LIST(id) (
    ->     PARTITION p1 VALUES IN (0),
    ->     PARTITION p2 VALUES IN (1)
    -> );
Query OK, 0 rows affected (0.09 sec)

mysql> CREATE TABLE tnrange (
    ->     id INT,
    ->     name VARCHAR(5)
    -> )
```

```
    -> PARTITION BY RANGE(id) (
    ->     PARTITION p1 VALUES LESS THAN (1),
    ->     PARTITION p2 VALUES LESS THAN MAXVALUE
    -> );
Query OK, 0 rows affected (0.09 sec)

mysql> INSERT INTO tnlist VALUES (NULL, 'bob');
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO tnrange VALUES (NULL, 'jim');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM tnlist;
+------+------+
| id   | name |
+------+------+
| NULL | bob  |
+------+------+
1 row in set (0.00 sec)

mysql> SELECT * FROM tnrange;
+------+------+
| id   | name |
+------+------+
| NULL | jim  |
+------+------+
```

```
1 row in set (0.00 sec)
```

id“ NOT NULL” Null SELECT p1

```
mysql> ALTER TABLE tnlist DROP PARTITION p1;
Query OK, 0 rows affected (0.16 sec)

mysql> ALTER TABLE tnrange DROP PARTITION p1;
Query OK, 0 rows affected (0.16 sec)

mysql> SELECT * FROM tnlist;
Empty set (0.00 sec)

mysql> SELECT * FROM tnrange;
Empty set (0.00 sec)
```

HASHKEY NULL0HASH tnhash

```
CREATE TABLE tnhash (
    id INT,
    name VARCHAR(5)
)
PARTITION BY HASH(id)
PARTITIONS 2
```

Linux MySQL RPM /var/lib/mysql/test.MYD **bash** shell

```
/var/lib/mysql/test> ls *.MYD -l
-rw-rw----  1 mysql mysql 0 2005-11-04 18:41 tnhash_p0.MYD
-rw-rw----  1 mysql mysql 0 2005-11-04 18:41 tnhash_p1.MYD
```

0 tnhash idNULL

```
mysql> INSERT INTO tnhash VALUES (NULL, 'sam');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM tnhash;
+------+------+
| id   | name |
+------+------+
| NULL | sam  |
+------+------+
1 row in set (0.01 sec)
```

N,NULL MOD *N* NULL0shell(**bash**) p0

```
var/lib/mysql/test> ls *.MYD -l
-rw-rw----  1 mysql mysql 20 2005-11-04 18:44 tnhash_p0.MYD
-rw-rw----  1 mysql mysql  0 2005-11-04 18:41 tnhash_p1.MYD
```

INSERTtnhash_p0.MYD

```
CREATE TABLE tndate (
    id INT,
    dt DATE
)
PARTITION BY RANGE( YEAR(dt) ) (
    PARTITION p0 VALUES LESS THAN (1990),
    PARTITION p1 VALUES LESS THAN (2000),
    PARTITION p2 VALUES LESS THAN MAXVALUE
)
```

MySQL YEAR(NULL)NULL dtNULL 0p0

18.3.

18.3.1. RANGELIST
18.3.2. HASHKEY
18.3.3.
18.3.4.

MySQL 5.1
”)

· RANGELIST 18.3.1“RANGELIST”

· HASHKEY 18.3.2“HASHKEY ”

· MySQL 5.1 18.3.4“”

· 18.3.3“”

MySQL 5.1

5.1MySQL “ ALTER TABLE ... PARTITION BY ...” MySQL 5.1

“ *partition_options*” ALTER TABLE CREATE TABLE PARTITION BY CREATE TABLERANGE

```
CREATE TABLE trb3 (id INT, name VARCHAR(50), purchased DATE)
    PARTITION BY RANGE(YEAR(purchased))
    (
        PARTITION p0 VALUES LESS THAN (1990),
        PARTITION p1 VALUES LESS THAN (1995),
        PARTITION p2 VALUES LESS THAN (2000),
        PARTITION p3 VALUES LESS THAN (2005)
    )
```

id KEY

```
ALTER TABLE trb3 PARTITION BY KEY(id) PARTITIONS 2
```

“ CREATE TABLE trb3 PARTITION BY KEY(id) PARTITIONS 2”

18.3.1. RANGELIST

RANGELIST HASHKEY 18.3.2“HASHKEY ”RANGE LIST

RANGELIST DROP PARTITIONALTER TABLE CREATE TABLE INSERTRANGE 10

```
mysql> CREATE TABLE tr (id INT, name VARCHAR(50), purchased DATE)
    ->     PARTITION BY RANGE(YEAR(purchased))
    ->     (
    ->         PARTITION p0 VALUES LESS THAN (1990),
    ->         PARTITION p1 VALUES LESS THAN (1995),
    ->         PARTITION p2 VALUES LESS THAN (2000),
    ->         PARTITION p3 VALUES LESS THAN (2005)
    ->     );
Query OK, 0 rows affected (0.01 sec)


mysql> INSERT INTO tr VALUES
    ->     (1, 'desk organiser', '2003-10-15'),
    ->     (2, 'CD player', '1993-11-05'),
    ->     (3, 'TV set', '1996-03-10'),
    ->     (4, 'bookcase', '1982-01-10'),
    ->     (5, 'exercise bike', '2004-05-09'),
    ->     (6, 'sofa', '1987-06-05'),
```

```
    ->     (7, 'popcorn maker', '2001-11-22'),
    ->     (8, 'aquarium', '1992-08-04'),
    ->     (9, 'study desk', '1984-09-16'),
    ->     (10, 'lava lamp', '1998-12-25');
Query OK, 10 rows affected (0.01 sec)
```

p2

```
mysql> SELECT * FROM tr
    -> WHERE purchased BETWEEN '1995-01-01' AND '1999-12-31';
+------+-----------+------------+
| id   | name      | purchased  |
+------+-----------+------------+
|    3 | TV set    | 1996-03-10 |
|   10 | lava lamp | 1998-12-25 |
+------+-----------+------------+
2 rows in set (0.00 sec)
```

p2

```
mysql> ALTER TABLE tr DROP PARTITION p2;
Query OK, 0 rows affected (0.03 sec)
```

SELECT

```
mysql> SELECT * FROM tr WHERE purchased
    -> BETWEEN '1995-01-01' AND '1999-12-31';
Empty set (0.00 sec)
```

TRUNCATE TABLE 13.2.9“TRUNCATE”

“ ALTER TABLE ... REORGANIZE PARTITION” 13.1.2“ALTER TABLE” REORGANIZE PARTITION

SHOW CREATE TABLE

```
mysql> SHOW CREATE TABLE tr\G
*************************** 1. row ***************************
       Table: tr
Create Table: CREATE TABLE `tr` (
  `id` int(11) default NULL,
  `name` varchar(50) default NULL,
  `purchased` date default NULL
) ENGINE=MyISAM DEFAULT CHARSET=latin1
PARTITION BY RANGE (YEAR(purchased)) (
  PARTITION p0 VALUES LESS THAN (1990) ENGINE = MyISAM,
  PARTITION p1 VALUES LESS THAN (1995) ENGINE = MyISAM,
  PARTITION p3 VALUES LESS THAN (2005) ENGINE = MyISAM
)
1 row in set (0.01 sec)
```

'1995-01-01' '2004-12-31' p3

```
mysql> INSERT INTO tr VALUES (11, 'pencil holder', '1995-07-12');
Query OK, 1 row affected (0.00 sec)

mysql> SELECT * FROM tr WHERE purchased
    -> BETWEEN '1995-01-01' AND '2004-12-31';
+------+---------------+------------+
| id   | name          | purchased  |
+------+---------------+------------+
|   11 | pencil holder | 1995-07-12 |
|    1 | desk organiser | 2003-10-15 |
```

```
|    5 | exercise bike  | 2004-05-09 |
|    7 | popcorn maker  | 2001-11-22 |
+------+----------------+------------+
4 rows in set (0.00 sec)

mysql> ALTER TABLE tr DROP PARTITION p3;
Query OK, 0 rows affected (0.03 sec)

mysql> SELECT * FROM tr WHERE purchased
    -> BETWEEN '1995-01-01' AND '2004-12-31';
Empty set (0.00 sec)
```

“ ALTER TABLE ... DROP PARTITION” DELETE

LISTRANGE“ ALTER TABLE ... DROP PARTITION”
([18.2.2“LIST”]

RANGELIST“ ALTER TABLE ... ADD PARTITION” RANGE

```
CREATE TABLE members (
    id INT,
    fname VARCHAR(25),
    lname VARCHAR(25),
    dob DATE
)
PARTITION BY RANGE(YEAR(dob)) (
    PARTITION p0 VALUES LESS THAN (1970),
    PARTITION p1 VALUES LESS THAN (1980),
    PARTITION p2 VALUES LESS THAN (1990)
```

```
);
```

16 2005 1990 19901999

```
ALTER TABLE ADD PARTITION (PARTITION p3 VALUES LESS THAN (2000));
```

RANGE ADD PARTITION

```
mysql> ALTER TABLE members ADD PARTITION (PARTITION p3 VALUES LESS T
  1463 (HY000):       VALUES LESS THAN
```

LIST

```
CREATE TABLE tt (
    id INT,
    data INT
)
PARTITION BY LIST(data) (
    PARTITION p0 VALUES IN (5, 10, 15),
    PARTITION p1 VALUES IN (6, 12, 18)
)
```

71421

```
ALTER TABLE tt ADD PARTITION (PARTITION p2 VALUES IN (7, 14, 21))
```

LIST

```
mysql> ALTER TABLE tt ADD PARTITION (PARTITION np VALUES IN (4, 8, 1
  1465 (HY000): LIST
```

12p1tt12 p1npp1 p1——“ CREATE TABLE ... SELECT ...”

MySQL

```
mysql> SHOW CREATE TABLE members\G
```

```
*************************** 1. row ***************************
       Table: members
Create Table: CREATE TABLE `members` (
  `id` int(11) default NULL,
  `fname` varchar(25) default NULL,
  `lname` varchar(25) default NULL,
  `dob` date default NULL
) ENGINE=MyISAM DEFAULT CHARSET=latin1
PARTITION BY RANGE (YEAR(dob)) (
  PARTITION p0 VALUES LESS THAN (1970) ENGINE = MyISAM,
  PARTITION p1 VALUES LESS THAN (1980) ENGINE = MyISAM,
  PARTITION p2 VALUES LESS THAN (1990) ENGINE = MyISAM.
  PARTITION p3 VALUES LESS THAN (2000) ENGINE = MyISAM
)
```

1960“ ALTER TABLE ... ADD PARTITION” ALTER TABLE

```
ALTER TABLE members REORGANIZE PARTITION p0 INTO (
    PARTITION s0 VALUES LESS THAN (1960),
    PARTITION s1 VALUES LESS THAN (1970)
)
```

p0s0s1“ PARTITION ... VALUES ...” p0 s0YEAR(dob)1960 s1YEAR(dob)19601970

REORGANIZE PARTITION

```
ALTER TABLE members REORGANIZE PARTITION s0,s1 INTO (
    PARTITION p0 VALUES LESS THAN (1970)
)
```

“ REOGANIZE PARTITION” MySQL s0s1p0

“REORGANIZE PARTITION”

```
ALTER TABLE tbl_name REORGANIZE PARTITION partition_list INTO (parti
```

tbl_name *partition_list* *partition_definitions* “ CREATE TABLE”*partition_definitions* (13.1.5“CREATE TABLE”)

```
ALTER TABLE members REORGANIZE PARTITION p0,p1,p2,p3 INTO (
    PARTITION m0 VALUES LESS THAN (1980),
    PARTITION m1 VALUES LESS THAN (2000)
)
```

LIST REORGANIZE PARTITION LISTtt

```
ALTER TABLE tt ADD PARTITION (PARTITION np VALUES IN (4, 8));
ALTER TABLE tt REORGANIZE PARTITION p1,np INTO (
    PARTITION p1 VALUES IN (6, 18),
    PARTITION np VALUES in (4, 8, 12)
)
```

“ ALTER TABLE ... REORGANIZE PARTITION” RANGELIST

· PARTITIONCREATE TABLEPARTITION

RANGE LIST

· *partition_definitions* *partition_list*

p1p219801999

· RANGE RANGE

“ ALTER TABLE members REORGANIZE PARTITION p0,p2 INTO ...” p01970 p219901999 19901999

· REORGANIZE PARTITION RANGEHASH “ALTER TABLE ... PARTITION BY ....”

```
· ALTER TABLE members
· PARTITION BY HASH(YEAR(dob))
· PARTITIONS 8
```

MySQL 5.1“ ALTER TABLE ... PARTITION BY ...” ——“CREATE TABLE ... SELECT ...”

18.3.2. HASHKEY

HASHKEY RANGELIST HASHKEY RANGELIST 18.3.1 “RANGELIST”

RANGELIST HASHKEY“ ALTER TABLE ... COALESCE PARTITION” HASHKEY 12

```
CREATE TABLE clients (
    id INT,
    fname VARCHAR(30),
    lname VARCHAR(30),
    signed DATE
)
PARTITION BY HASH( MONTH(signed) )
PARTITIONS 12
```

126ALTER TABLE

```
mysql> ALTER TABLE clients COALESCE PARTITION 6
Query OK, 0 rows affected (0.02 sec)
```

HASHKEYLINEAR HASHLINEAR KEY COALESCE LINEAR KEY

```
mysql> CREATE TABLE clients_lk (
```

```
    ->     id INT,
    ->     fname VARCHAR(30),
    ->     lname VARCHAR(30),
    ->     signed DATE
    -> )
    -> PARTITION BY LINEAR KEY(signed)
    -> PARTITIONS 12
Query OK, 0 rows affected (0.03 sec)

mysql> ALTER TABLE clients_lk COALESCE PARTITION 6
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0
```

COALESCE

```
mysql> ALTER TABLE clients COALESCE PARTITION 18;
  1478 (HY000):            DROP TABLE
```

1218“ ALTER TABLE ... ADD PARTITION”,

```
ALTER TABLE clients ADD PARTITION PARTITIONS 18
```

“ALTER TABLE ... REORGANIZE PARTITION”HASHHASH

18.3.3.

MySQL 5.1 5.1 (“” MySQL5.1

MySQL 5.1 MySQLCHECK TABLEOPTIMIZE TABLEANALYZE TABLEREPAIR TABLE ALTER TABLE

. :

```
ALTER TABLE t1 REBUILD PARTITION (p0, p1)
```

· VARCHARBLOBTEXT“ ALTER TABLE ... OPTIMIZE PARTITION”

```
ALTER TABLE t1 OPTIMIZE PARTITION (p0, p1)
```

“ OPTIMIZE PARTITION”CHECK PARTITIONANALYZE PARTITION REPAIR PARTITION

.

```
ALTER TABLE t1 ANALYZE PARTITION (p3)
```

.

```
ALTER TABLE t1 REPAIR PARTITION (p0,p1);
```

· CHECK TABLE

```
ALTER TABLE trb3 CHECK PARTITION (p1)
```

t1p1“ ALTER TABLE ... REPAIR PARTITION”

mysqlcheckmyisamchk MYI 8.7“mysqlcheck” pre-alpha

18.3.4.

MySQL 5.1

SHOW CREATE TABLEPARTITION BY

```
mysql> SHOW CREATE TABLE trb3\G
*************************** 1. row ***************************
       Table: trb3
Create Table: CREATE TABLE `trb3` (
  `id` int(11) default NULL,
  `name` varchar(50) default NULL,
  `purchased` date default NULL
) ENGINE=MyISAM DEFAULT CHARSET=latin1
PARTITION BY RANGE (YEAR(purchased)) (
  PARTITION p0 VALUES LESS THAN (1990) ENGINE = MyISAM,
  PARTITION p1 VALUES LESS THAN (1995) ENGINE = MyISAM,
  PARTITION p2 VALUES LESS THAN (2000) ENGINE = MyISAM,
  PARTITION p3 VALUES LESS THAN (2005) ENGINE = MyISAM
)
1 row in set (0.00 sec)
```

HASHKEY PARTITIONS (Bug #14327)

SHOW TABLE STATUS Engine'PARTITION' (13.5.4.18 “SHOW TABLE STATUS” SHOW PARTITION STATUS)

SHOW

· SHOW PARTITIONS

SHOW TABLESSHOW DATABASES Partitions_in_*tbl_name* *tbl_name* SHOW TABLES SHOW TABLES SHOW PARTITIONS“” FROM MySQL

· SHOW PARTITION STATUS

SHOW TABLE STATUS

INFORMATION_SCHEMA

MySQLMySQL dev.mysql.com

19MySQL

19.1.
19.2. OpenGIS
    19.2.1. Geometry
    19.2.2. Geometry
    19.2.3. Point
    19.2.4. Curve
    19.2.5. LineString
    19.2.6. Surface
    19.2.7. Polygon
    19.2.8. GeometryCollection
    19.2.9. MultiPoint
    19.2.10. MultiCurve
    19.2.11. MultiLineString
    19.2.12. MultiSurface
    19.2.13. MultiPolygon
19.3.
    19.3.1. (WKT)
    19.3.2. (WKB)
19.4. MySQL
    19.4.1. MySQL
    19.4.2.
    19.4.3.
    19.4.4.
    19.4.5.
19.5.
    19.5.1. Geometry
    19.5.2. Geometry
    19.5.3. GeometryGeometry
    19.5.4.
    19.5.5. MBR
    19.5.6.
19.6.
    19.6.1.

19.6.2.
19.7. MySQL
19.7.1. GIS

MySQL MyISAMInnoDBNDBBDBARCHIVE ARCHIVE ARCHIVE

· OpenGIS

·

· MySQL

·

· MySQLOpenGIS

MySQL GIS

19.1.

OpenGISOGC MySQL OGC250 OGC
http://www.opengis.org/

1997 OpenGISOGC*SQLOpenGIS*® SQL RDBMS OpenGIS
http://www.opengis.org/docs/99-049.pdf

MySQLOGC**GeometrySQL** SQL SQL

.

.

.

19.2. OpenGIS

19.2.1. Geometry
19.2.2. Geometry
19.2.3. Point
19.2.4. Curve
19.2.5. LineString
19.2.6. Surface
19.2.7. Polygon
19.2.8. GeometryCollection
19.2.9. MultiPoint
19.2.10. MultiCurve
19.2.11. MultiLineString
19.2.12. MultiSurface
19.2.13. MultiPolygon

OGC**SQL** OpenGIS

.

.

19.2.1. Geometry

· Geometry

o Point

o Curve

§ LineString

· Line

· LinearRing

o Surface

§ Polygon

o GeometryCollection

§ MultiPoint

§ MultiCurve

· MultiLineString

§ MultiSurface

· MultiPolygon

Geometry Geometry2012

GeometryPointCurveSurfaceGeometryCollection

· Point0

· Curve1LineStringLineLinearRing

· Surface2 Polygon

· GeometryCollection0 12 MultiPointMultiLineStringMultiPolygon PointsLineStringsPolygons MultiCurveMultiSurface CurvesSurfaces

GeometryCurveSurfaceMultiCurveMultiSurface

PointLineStringPolygonGeometryCollectionMultiPointMultiLineString MultiPolygon

19.2.2. Geometry

Geometry Geometry

Geometry

Geometry

· **type** geometry

· **SRID**ID

MySQL SRIDgeometry

· **coordinates** 8 XY

SRID

· **interior** **boundary** **exterior**

exterior interior boundary

· **MBR** X,Y

· ((MINX MINY, MAXX MINY, MAXX MAXY, MINX MAXY, MINX

· LineStringMultiPointMultiLineString

· LineStringMultiPoint

· Null 0

· **dimension** −1012

o −1

o 0

o 100

o 20

Point0LineString1Polygon2MultiPointMultiLineStringMultiPolygon

19.2.3. Point

Point

Point

· Point1

· Point1

Point

· X-

· Y-

· Point0

· Point

19.2.4. Curve

Curve 1 Curve Curve

Curve

· Curve

· Curve1

· Curve

· Curve

· Curve

· Curve

· CurveLinearRing

19.2.5. LineString

LineStringCurve

LineString

· LineString

· LineString

LineString

· LineString

· LineStringLine

· LineStringLinearRing

19.2.6. Surface

Surface2 Polygon.

Surface

· Surface2

· OpenGIS Surface“patch” 0

· Surface

19.2.7. Polygon

PolygonSurface0 Polygon1

Polygon

· Polygon

Polygon

· PolygonLinearRing LineString

· Polygon PolygonPoint

· Polygon

· Polygon

· Polygon Polygon

Polygon

19.2.8. GeometryCollection

GeometryCollection1

GeometryCollection GeometryCollection GeometryCollection

· MultiPointPoint

·

·

19.2.9. MultiPoint

MultiPointPoint

MultiPoint

· MultiPoint

· MultiPoint

MultiPoint

· MultiPoint0

· Point MultiPoint

· MultiPoint

19.2.10. MultiCurve

MultiCurveCurve MultiCurve

MultiCurve

· MultiCurve1

· MultiCurve

· MultiCurve“ 2” MultiCurve MultiCurve

· MultiCurve

· MultiCurve

19.2.11. MultiLineString

MultiLineString LineStringMultiCurve

MultiLineString

· MultiLineString

19.2.12. MultiSurface

MultiSurfaceSurface MultiSurface MultiPolygon

MultiSurface

· 2MultiSurface

· 2MultiSurface

19.2.13. MultiPolygon

MultiPolygonPolygon

MultiPolygon

· MultiPolygon

MultiPolygon

· MultiPolygon2Polygon

· MultiPolygon2Polygon 2Polugon

· MultiPolygon MultiPolygon

· 1PolygonMultiPolygon MultiPolygonMultiPolygonPolygon

MultiPolygon

· MultiPolygon2

· MultiPolygonPolygonLineString

· MultiPolygonCurve1Polygon

· PolygonCurveMultiPolygon

19.3.

19.3.1. (WKT)
19.3.2. (WKB)

· (WKT)

· (WKB)

MySQLWKTWKB

19.3.1. (WKT)

GeometryWKT ASCII

WKT

· Point

· POINT(15 20)

· 4LineString

· LINESTRING(0 0, 10 10, 20 25, 50 60)

· 11Polygon

· POLYGON((0 0,10 0,10 10,0 10,0 0),(5 5,7 5,7 7,5 7,

· PointMultiPoint

· MULTIPOINT(0 0, 20 20, 60 60)

· 2LineStringMultiLineString

· MULTILINESTRING((10 10, 20 20), (15 15, 30 15))

· 2PolygonMultiPolygon

· MULTIPOLYGON(((0 0,10 0,10 10,0 10,0 0)),((5 5,7 5,

· 2Point1LineStringGeometryCollection

· GEOMETRYCOLLECTION(POINT(10 10), POINT(30 30), LINE

OGC Backus-Naur WKT

19.3.2. (WKB)

WKBOpenGIS ISO “SQL/MM Part 3: Spatial”

WKB WKBBLOB

WKB1 4 8IEEE 754 18

POINT(1 1)WKB21 2

```
01010000000000000000F03F000000000000F03F
```

```
Byte order : 01
WKB type   : 01000000
X          : 000000000000F03F
Y          : 000000000000F03F
```

· Byte order01little-endianbig-endian little-endianbig-endianNDR XDR

· “WKB type” WKB 17 PointLineStringPolygonMultiPointMultiLineStringMultiPolygon GeometryCollection

· PointXY

WKB OpenGIS

19.4. MySQL

19.4.1. MySQL
19.4.2.
19.4.3.
19.4.4.
19.4.5.

MySQL

19.4.1. MySQL

MySQLOpenGIS

· GEOMETRY

· POINT

· LINESTRING

· POLYGON

GEOMETRY POINTLINESTRINGPOLYGON

· MULTIPOINT

· MULTILINESTRING

· MULTIPOLYGON

· GEOMETRYCOLLECTION

GEOMETRYCOLLECTION
MULTIPOINTMULTILINESTRINGMULTIPOLYGON
GEOMETRYCOLLECTION

19.4.2.

19.4.2.1. WKTGeometry
19.4.2.2. WKBGeometry
19.4.2.3. MySQL

OpenGISWKTWKB MySQL

19.4.2.1. WKTGeometry

MySQLWKT IDSRID

GeomFromText()WKT1

- GeomCollFromText(*wkt*[,*srid*]) , GeometryCollectionFromText(*wkt*[,*srid*])

  WKTSRIDGEOMETRYCOLLECTION

- GeomFromText(*wkt*[,*srid*]) , GeometryFromText(*wkt*[,*srid*])

  WKTSRID

- LineFromText(*wkt*[,*srid*]) , LineStringFromText(*wkt*[,*srid*])

  WKTSRIDLINESTRING

- MLineFromText(*wkt*[,*srid*]) , MultiLineStringFromText(*wkt*[,*srid*])

  WKTSRIDMULTILINESTRING

- MPointFromText(*wkt*[,*srid*]) , MultiPointFromText(*wkt*[,*srid*])

  WKTSRIDMULTIPOINT

- MPolyFromText(*wkt*[,*srid*]) , MultiPolygonFromText(*wkt*[,*srid*])

  WKTSRIDMULTIPOLYGON

- PointFromText(*wkt*[,*srid*])

WKTSRIDPOINT

- PolyFromText(*wkt*[,*srid*]) , PolygonFromText(*wkt*[,*srid*])

  WKTSRIDPOLYGON

OpenGISPolygonMultiPolygon LineStringWKT MySQL

- BdMPolyFromText(*wkt*,*srid*)

  LineStringWKT MultiLineStringMultiPolygon

- BdPolyFromText(*wkt*,*srid*)

  LineStringWKT MultiLineStringPolygon

19.4.2.2. WKBGeometry

MySQL WKT IDSRIDBLOB

GeomFromWKB()WKB1

- GeomCollFromWKB(*wkb*[,*srid*]) , GeometryCollectionFromWKB(*wkb*[,*srid*])

  WKBSRIDGEOMETRYCOLLECTION

- GeomFromWKB(*wkb*[,*srid*]) , GeometryFromWKB(*wkb*[,*srid*])

  WKBSRID

- LineFromWKB(*wkb*[,*srid*]) , LineStringFromWKB(*wkb*[,*srid*])

  WKBSRIDLINESTRING

- MLineFromWKB(*wkb*[,*srid*]) , MultiLineStringFromWKB(*wkb*[,*srid*])

  WKBSRIDMULTILINESTRING

- MPointFromWKB(*wkb*[,*srid*]) , MultiPointFromWKB(*wkb*[,*srid*])

WKBSRIDMULTIPOINT

- MPolyFromWKB(*wkb*[,*srid*]) , MultiPolygonFromWKB(*wkb*[,*srid*])

  WKBSRIDMULTIPOLYGON

- PointFromWKB(*wkb*[,*srid*])

  WKBSRIDPOINT

- PolyFromWKB(*wkb*[,*srid*]) , PolygonFromWKB(*wkb*[,*srid*])

  WKBSRIDPOLYGON

OpenGISPolygonMultiPolygon LineStringWKB MySQL

- BdMPolyFromWKB(*wkb*,*srid*)

  LineStringWKB MultiLineStringMultiPolygon

- BdPolyFromWKB(*wkb*,*srid*)

  LineStringWKB MultiLineStringPolygon

19.4.2.3. MySQL

MySQL

MySQLWKB OpenGISMySQL SRIDBLOB GeomFromWKB()1

- GeometryCollection(*g1*,*g2*,...)

  WKB GeometryCollectionWKB NULL

- LineString(*pt1*,*pt2*,...)

  WKB PointWKB LineStringWKB PointNULLPoint2NULL

- MultiLineString(*ls1*,*ls2*,...)

WKB LineStringWKB MultiLineStringWKB LineStringNULL

- MultiPoint(*pt1*,*pt2*,...)

  WKB PointWKB MultiPoint WKB PointNULL

- MultiPolygon(*poly1*,*poly2*,...)

  WKB PolygonWKB MultiPolygon WKB PolygonNULL

- Point(*x*,*y*)

  WKB Point

- Polygon(*ls1*,*ls2*,...)

  WKB LineStringWKB Polygon LinearRingWKB LineStringNULL

19.4.3.

MySQL CREATE TABLEALTER TABLE MyISAM

· CREATE TABLE

```
· mysql> CREATE TABLE geom (g GEOMETRY);
· Query OK, 0 rows affected (0.02 sec)
```

· ALTER TABLE

```
· mysql> ALTER TABLE geom ADD pt POINT;
· Query OK, 0 rows affected (0.00 sec)
· Records: 0  Duplicates: 0  Warnings: 0
· mysql> ALTER TABLE geom DROP pt;
· Query OK, 0 rows affected (0.00 sec)
· Records: 0  Duplicates: 0  Warnings: 0
```

19.4.4.

WKTWKB WKT

INSERT

```
INSERT INTO geom VALUES (GeomFromText('POINT(1 1)'));

SET @g = 'POINT(1 1)';
INSERT INTO geom VALUES (GeomFromText(@g));
```

INSERT

```
SET @g = GeomFromText('POINT(1 1)');
INSERT INTO geom VALUES (@g);

SET @g = 'LINESTRING(0 0,1 1,2 2)';
INSERT INTO geom VALUES (GeomFromText(@g));

SET @g = 'POLYGON((0 0,10 0,10 10,0 10,0 0),(5 5,7 5,7 7,5 7, 5 5))'
INSERT INTO geom VALUES (GeomFromText(@g));

SET @g =
'GEOMETRYCOLLECTION(POINT(1 1),LINESTRING(0 0,1 1,2 2,3 3,4 4))';
INSERT INTO geom VALUES (GeomFromText(@g));
```

GeomFromText()

```
SET @g = 'POINT(1 1)';
INSERT INTO geom VALUES (PointFromText(@g));

SET @g = 'LINESTRING(0 0,1 1,2 2)';
```

```
INSERT INTO geom VALUES (LineStringFromText(@g));

SET @g = 'POLYGON((0 0,10 0,10 10,0 10,0 0),(5 5,7 5,7 7,5 7, 5 5))'
INSERT INTO geom VALUES (PolygonFromText(@g));

SET @g =
'GEOMETRYCOLLECTION(POINT(1 1),LINESTRING(0 0,1 1,2 2,3 3,4 4))';
INSERT INTO geom VALUES (GeomCollFromText(@g));
```

WKB WKB

· POINT(1 1)

·
```
mysql> INSERT INTO geom VALUES
    -> (GeomFromWKB(0x010100000000000000000F03F000
```

· ODBCWKB BLOB

·
```
INSERT INTO geom VALUES (GeomFromWKB(?))
```

C mysql_real_escape_string() 25.2.3.52 “mysql_real_escape_string()”

19.4.5.

19.4.5.1.
19.4.5.2. WKT
19.4.5.3.

WKTWKB

19.4.5.1.

```
CREATE TABLE geom2 (g GEOMETRY) SELECT g FROM geom;
```

19.4.5.2. WKT

AsText()WKT

```
SELECT AsText(g) FROM geom;
```

19.4.5.3.

AsBinary()WKBBLOB

```
SELECT AsBinary(g) FROM geom;
```

19.5.

19.5.1. Geometry
19.5.2. Geometry
19.5.3. GeometryGeometry
19.5.4.
19.5.5. MBR
19.5.6.

MySQL

.

.

.

· GeometryGeometry

· SQL **mysqlMySQLCC**

· MySQLAPI

19.5.1. Geometry

MySQLWKTWKB

- AsBinary(*g*)

  WKB

  ```
  SELECT AsBinary(g) FROM geom;
  ```

- AsText(*g*)

  WKT

```
mysql> SET @g = 'LineString(1 1,2 2,3 3)';
mysql> SELECT AsText(GeomFromText(@g));
+--------------------------+
| AsText(GeomFromText(@g)) |
+--------------------------+
| LINESTRING(1 1,2 2,3 3)  |
+--------------------------+
```

- GeomFromText(*wkt*[,*srid*])

  WKT PointFromText()LineFromText()19.4.2.1“WK Geometry”

- GeomFromWKB(*wkb*[,*srid*])

  WKB PointFromWKB()LineFromWKB()19.4.2.2“ Geometry”

19.5.2. Geometry

19.5.2.1.
19.5.2.2. Point

19.5.2.3. LineString
19.5.2.4. MultiLineString
19.5.2.5. Polygon
19.5.2.6. MultiPolygon
19.5.2.7. GeometryCollection

19.5.2.1.

- Dimension(*g*)

  g -1012 19.2.2“Geometry”

```
mysql> SELECT Dimension(GeomFromText('LineString(1 1,2 2)'));
+-----------------------------------------------+
```

```
| Dimension(GeomFromText('LineString(1 1,2 2)')) |
+------------------------------------------------+
|                                              1 |
+------------------------------------------------+
```

- Envelope(*g*)

  gMBR Polygon

  polygon

```
POLYGON((MINX MINY, MAXX MINY, MAXX MAXY, MINX MAXY, MINX MINY))
```

```
mysql> SELECT AsText(Envelope(GeomFromText('LineString(1 1,2 2)'
+-----------------------------------------------------------+
| AsText(Envelope(GeomFromText('LineString(1 1,2 2)'))) |
+-----------------------------------------------------------+
| POLYGON((1 1,2 1,2 2,1 2,1 1))                            |
+-----------------------------------------------------------+
```

- GeometryType(*g*)

  g

```
mysql> SELECT GeometryType(GeomFromText('POINT(1 1)'));
+-----------------------------------------+
| GeometryType(GeomFromText('POINT(1 1)')) |
+-----------------------------------------+
| POINT                                   |
+-----------------------------------------+
```

- SRID(*g*)

  gID

  MySQL SRID

```
mysql> SELECT SRID(GeomFromText('LineString(1 1,2 2)',101));
+-----------------------------------------------+
| SRID(GeomFromText('LineString(1 1,2 2)',101)) |
+-----------------------------------------------+
|                                           101 |
+-----------------------------------------------+
```

OpenGIS MySQL

- Boundary(*g*)

  g

- IsEmpty(*g*)

  g 1 0NULL-1

- IsSimple(*g*)

g1

19.5.2.2. Point

PointXY

- X(*p*)

  pX

```
mysql> SELECT X(GeomFromText('Point(56.7 53.34)'));
+-------------------------------------+
| X(GeomFromText('Point(56.7 53.34)')) |
+-------------------------------------+
|                                56.7 |
+-------------------------------------+
```

- Y(*p*)

  pY

```
mysql> SELECT Y(GeomFromText('Point(56.7 53.34)'));
+-------------------------------------+
| Y(GeomFromText('Point(56.7 53.34)')) |
+-------------------------------------+
|                               53.34 |
+-------------------------------------+
```

19.5.2.3. LineString

LineStringPoint LineString

- EndPoint(*ls*)

  LineString1sPoint

```
mysql> SET @ls = 'LineString(1 1,2 2,3 3)';
mysql> SELECT AsText(EndPoint(GeomFromText(@ls)));
+--------------------------------------+
| AsText(EndPoint(GeomFromText(@ls))) |
+--------------------------------------+
| POINT(3 3)                           |
+--------------------------------------+
```

- GLength(*ls*)

  LineString1s

```
mysql> SET @ls = 'LineString(1 1,2 2,3 3)';
mysql> SELECT GLength(GeomFromText(@ls));
+----------------------------+
| GLength(GeomFromText(@ls)) |
+----------------------------+
|           2.8284271247462 |
+----------------------------+
```

- NumPoints(*ls*)

  LineString1s

```
mysql> SET @ls = 'LineString(1 1,2 2,3 3)';
mysql> SELECT NumPoints(GeomFromText(@ls));
+-----------------------------+
| NumPoints(GeomFromText(@ls)) |
+-----------------------------+
|                           3 |
+-----------------------------+
```

- PointN(*ls*,*n*)

  LineString1s*n* 1

```
mysql> SET @ls = 'LineString(1 1,2 2,3 3)';
```

```
mysql> SELECT AsText(PointN(GeomFromText(@ls),2));
+-------------------------------------+
| AsText(PointN(GeomFromText(@ls),2)) |
+-------------------------------------+
| POINT(2 2)                          |
+-------------------------------------+
```

- StartPoint(*ls*)

  LineString1sPoint

```
mysql> SET @ls = 'LineString(1 1,2 2,3 3)';
mysql> SELECT AsText(StartPoint(GeomFromText(@ls)));
+---------------------------------------+
| AsText(StartPoint(GeomFromText(@ls))) |
+---------------------------------------+
| POINT(1 1)                            |
+---------------------------------------+
```

OpenGIS MySQL

- IsRing(*ls*)

  LineString*ls* StartPoint()EndPoint() 1 1ls 0NULL-1

19.5.2.4. MultiLineString

- GLength(*mls*)

  MultiLineStringm1s *mls*

```
mysql> SET @mls = 'MultiLineString((1 1,2 2,3 3),(4 4,5 5))';
mysql> SELECT GLength(GeomFromText(@mls));
+-----------------------------+
| GLength(GeomFromText(@mls)) |
+-----------------------------+
|             4.2426406871193 |
+-----------------------------+
```

- IsClosed(*mls*)

  MultiLineStringm1s StartPoint()EndPoint()m1sLineString1mls 0 NULL-1

```
mysql> SET @mls = 'MultiLineString((1 1,2 2,3 3),(4 4,5 5))';
mysql> SELECT IsClosed(GeomFromText(@mls));
+-----------------------------+
| IsClosed(GeomFromText(@mls)) |
+-----------------------------+
|                            0 |
+-----------------------------+
```

19.5.2.5. Polygon

- Area(*poly*)

  Polygon*poly*

```
mysql> SET @poly = 'Polygon((0 0,0 3,3 0,0 0),(1 1,1 2,2 1,1 1))
mysql> SELECT Area(GeomFromText(@poly));
+---------------------------+
| Area(GeomFromText(@poly)) |
+---------------------------+
|                         4 |
+---------------------------+
```

- ExteriorRing(*poly*)

  LineStringPolygon*poly*

```
mysql> SET @poly =
    -> 'Polygon((0 0,0 3,3 3,3 0,0 0),(1 1,1 2,2 2,2 1,1 1))';
mysql> SELECT AsText(ExteriorRing(GeomFromText(@poly)));
+-------------------------------------------+
| AsText(ExteriorRing(GeomFromText(@poly))) |
+-------------------------------------------+
| LINESTRING(0 0,0 3,3 3,3 0,0 0)           |
+-------------------------------------------+
```

- InteriorRingN(*poly*,*n*)

  LineStringPolygon*poly*n 1

```
mysql> SET @poly =
    -> 'Polygon((0 0,0 3,3 3,3 0,0 0),(1 1,1 2,2 2,2 1,1 1))';
mysql> SELECT AsText(InteriorRingN(GeomFromText(@poly),1));
+---------------------------------------------+
| AsText(InteriorRingN(GeomFromText(@poly),1)) |
+---------------------------------------------+
| LINESTRING(1 1,1 2,2 2,2 1,1 1)             |
```

```
+-------------------------------------------+
```

- NumInteriorRings(*poly*)

  Polygon*poly*

```
mysql> SET @poly =
    -> 'Polygon((0 0,0 3,3 3,3 0,0 0),(1 1,1 2,2 2,2 1,1 1))';
mysql> SELECT NumInteriorRings(GeomFromText(@poly));
+--------------------------------------+
| NumInteriorRings(GeomFromText(@poly)) |
+--------------------------------------+
|                                    1 |
+--------------------------------------+
```

19.5.2.6. MultiPolygon

- Area(*mpoly*)

  MultiPolygon*mpoly*

```
mysql> SET @mpoly =
    -> 'MultiPolygon(((0 0,0 3,3 3,3 0,0 0),(1 1,1 2,2 2,2 1,1 1
mysql> SELECT Area(GeomFromText(@mpoly));
+----------------------------+
| Area(GeomFromText(@mpoly)) |
+----------------------------+
|                          8 |
+----------------------------+
```

OpenGIS MySQL

- Centroid(*mpoly*)

  Point MultiPolygon*mpoly* MultiPolygon

- PointOnSurface(*mpoly*)

  Point MultiPolygon*mpoly*

19.5.2.7. GeometryCollection

- GeometryN(*gc*,*n*)

GeometryCollection*gc*n 1

```
mysql> SET @gc = 'GeometryCollection(Point(1 1),LineString(2 2,
mysql> SELECT AsText(GeometryN(GeomFromText(@gc),1));
+---------------------------------------+
| AsText(GeometryN(GeomFromText(@gc),1)) |
+---------------------------------------+
| POINT(1 1)                            |
+---------------------------------------+
```

- NumGeometries(*gc*)

  GeometryCollection*gc*

```
mysql> SET @gc = 'GeometryCollection(Point(1 1),LineString(2 2,
mysql> SELECT NumGeometries(GeomFromText(@gc));
+----------------------------------+
| NumGeometries(GeomFromText(@gc)) |
+----------------------------------+
|                                2 |
+----------------------------------+
```

19.5.3. GeometryGeometry

19.5.3.1. GeometryGeometry
19.5.3.2.

19.5.3.1. GeometryGeometry

19.5.2“Geometry”

- Envelope(*g*)
- StartPoint(*ls*)
- EndPoint(*ls*)
- PointN(*ls*,*n*)
- ExteriorRing(*poly*)
- InteriorRingN(*poly*,*n*)

- GeometryN(*gc*,*n*)

19.5.3.2.

OpenGIS

MySQL

- Buffer(*g*,*d*)

  gd

- ConvexHull(*g*)

  g

- Difference(*g1*,*g2*)

  g1g2

- Intersection(*g1*,*g2*)

  g1g2

- SymDifference(*g1*,*g2*)

  g1g2

- Union(*g1*,*g2*)

  g1g2

19.5.4.

2

19.5.5. MBR

MySQLg1g2

- MBRContains(*g1*,*g2*)

  10*g1g2*

```
mysql> SET @g1 = GeomFromText('Polygon((0 0,0 3,3 3,3 0,0 0))');
mysql> SET @g2 = GeomFromText('Point(1 1)');
mysql> SELECT MBRContains(@g1,@g2), MBRContains(@g2,@g1);
----------------------+----------------------+
| MBRContains(@g1,@g2) | MBRContains(@g2,@g1) |
+----------------------+----------------------+
|                    1 |                    0 |
+----------------------+----------------------+
```

- MBRDisjoint(*g1*,*g2*)

  10*g1g2*

- MBREqual(*g1*,*g2*)

  10*g1g2*

- MBRIntersects(*g1*,*g2*)

  10*g1g2*

- MBROverlaps(*g1*,*g2*)

  10*g1g2*

- MBRTouches(*g1*,*g2*)

  10*g1g2*

- MBRWithin(*g1*,*g2*)

  10*g1g2*

```
mysql> SET @g1 = GeomFromText('Polygon((0 0,0 3,3 3,3 0,0 0))');
mysql> SET @g2 = GeomFromText('Polygon((0 0,0 5,5 5,5 0,0 0))');
mysql> SELECT MBRWithin(@g1,@g2), MBRWithin(@g2,@g1);
+--------------------+--------------------+
| MBRWithin(@g1,@g2) | MBRWithin(@g2,@g1) |
+--------------------+--------------------+
|                  1 |                  0 |
```

```
+--------------------+--------------------+
```

19.5.6.

OpenGIS MySQL MBR Distance()Related()

MBR

2g1g2

- Contains(*g1*,*g2*)

  10*g1g2*

- Crosses(*g1*,*g2*)

  g1g21 g1PolygonMultiPolygonNULL g2Poi
  0

  “”2

  o 2

  o

  o 1

- Disjoint(*g1*,*g2*)

  10*g1g2*

- Distance(*g1*,*g2*)

  22

- Equals(*g1*,*g2*)

  10*g1g2*

- Intersects(*g1*,*g2*)

10*g1g2*

- Overlaps(*g1*,*g2*)

  10*g1g2*　　2“”

- Related(*g1*,*g2*,*pattern_matrix*)

  10*pattern_matrixg1g2*　　NULL-1

- Touches(*g1*,*g2*)

  10*g1g2*　　1

- Within(*g1*,*g2*)

  10*g1g2*

19.6.

19.6.1.
19.6.2.

2

· Point

·

MySQL**2R-Trees** MBR MBR linestringMBRlinestring
MBR

POINT

19.6.1.

MySQL SPATIAL NOT NULL

· CREATE TABLE

· mysql> **CREATE TABLE geom (g GEOMETRY NOT NULL, SPAT**

· ALTER TABLE

· mysql> **ALTER TABLE geom ADD SPATIAL INDEX(g);**

· CREATE INDEX

· mysql> **CREATE SPATIAL INDEX sp_index ON geom (g);**

MyISAM SPATIAL INDEXR-tree SPATIAL INDEXB-tree B-tree

ALTER TABLEDROP INDEX

· ALTER TABLE

· mysql> **ALTER TABLE geom DROP INDEX g;**

· DROP INDEX

· mysql> **DROP INDEX sp_index ON geom;**

geom32000 GEOMETRYg IDAUTO_INCREMENT

```
mysql> DESCRIBE geom;
+-------+----------+------+-----+---------+----------------+
| Field | Type     | Null | Key | Default | Extra          |
+-------+----------+------+-----+---------+----------------+
| fid   | int(11)  |      | PRI | NULL    | auto_increment |
| g     | geometry |      |     |         |                |
+-------+----------+------+-----+---------+----------------+
2 rows in set (0.00 sec)

mysql> SELECT COUNT(*) FROM geom;
+----------+
| count(*) |
+----------+
|    32376 |
+----------+
1 row in set (0.00 sec)
```

g

```
mysql> ALTER TABLE geom ADD SPATIAL INDEX(g);
Query OK, 32376 rows affected (4.05 sec)
Records: 32376  Duplicates: 0  Warnings: 0
```

19.6.2.

WHEREMBRContains()MBRWithin()

```
mysql> SELECT fid,AsText(g) FROM geom WHERE
mysql> MBRContains(GeomFromText('Polygon((30000 15000,31000 15000,31
+-----+-------------------------------------------------------------
| fid | AsText(g)
+-----+-------------------------------------------------------------
|  21 | LINESTRING(30350.4 15828.8,30350.6 15845,30333.8 15845,30333
|  22 | LINESTRING(30350.6 15871.4,30350.6 15887.8,30334 15887.8,303
|  23 | LINESTRING(30350.6 15914.2,30350.6 15930.4,30334 15930.4,303
|  24 | LINESTRING(30290.2 15823,30290.2 15839.4,30273.4 15839.4,302
|  25 | LINESTRING(30291.4 15866.2,30291.6 15882.4,30274.8 15882.4,3
|  26 | LINESTRING(30291.6 15918.2,30291.6 15934.4,30275 15934.4,302
| 249 | LINESTRING(30337.8 15938.6,30337.8 15946.8,30320.4 15946.8,3
|   1 | LINESTRING(30250.4 15129.2,30248.8 15138.4,30238.2 15136.4,3
|   2 | LINESTRING(30220.2 15122.8,30217.2 15137.8,30207.6 15136,302
```

```
|   3 | LINESTRING(30179 15114.4,30176.6 15129.4,30167 15128,30169 1
|   4 | LINESTRING(30155.2 15121.4,30140.4 15118.6,30142 15109,30157
|   5 | LINESTRING(30192.4 15085,30177.6 15082.2,30179.2 15072.4,301
|   6 | LINESTRING(30244 15087,30229 15086.2,30229.4 15076.4,30244.6
|   7 | LINESTRING(30200.6 15059.4,30185.6 15058.6,30186 15048.8,302
|  10 | LINESTRING(30179.6 15017.8,30181 15002.8,30190.8 15003.6,301
|  11 | LINESTRING(30154.2 15000.4,30168.6 15004.8,30166 15014.2,301
|  13 | LINESTRING(30105 15065.8,30108.4 15050.8,30118 15053,30114.6
| 154 | LINESTRING(30276.2 15143.8,30261.4 15141,30263 15131.4,30278
| 155 | LINESTRING(30269.8 15084,30269.4 15093.4,30258.6 15093,30259
| 157 | LINESTRING(30128.2 15011,30113.2 15010.2,30113.6 15000.4,301
+-----+-----------------------------------------------------------
20 rows in set (0.00 sec)
```

EXPLAINID

```
mysql> EXPLAIN SELECT fid,AsText(g) FROM geom WHERE
mysql> MBRContains(GeomFromText('Polygon((30000 15000,31000 15000,31
+-------------+-------+-------+---------------+------+---------+----
| select_type | table | type  | possible_keys | key  | key_len | ref
+-------------+-------+-------+---------------+------+---------+----
| SIMPLE      | geom  | range | g             | g    |      32 | NUL
+-------------+-------+-------+---------------+------+---------+----
1 row in set (0.00 sec)
```

```
mysql> EXPLAIN SELECT fid,AsText(g) FROM g IGNORE INDEX (g) WHERE
mysql> MBRContains(GeomFromText('Polygon((30000 15000,31000 15000,31
+-------------+-------+------+---------------+------+---------+-----
| select_type | table | type | possible_keys | key  | key_len | ref
+-------------+-------+------+---------------+------+---------+-----
| SIMPLE      | geom  | ALL  | NULL          | NULL |    NULL | NULL
+-------------+-------+------+---------------+------+---------+-----
1 row in set (0.00 sec)
```

SELECT

```
mysql> SELECT fid,AsText(g) FROM geom IGNORE INDEX (g) WHERE
mysql> MBRContains(GeomFromText('Polygon((30000 15000,31000 15000,31
+-----+-----------------------------------------------------------
| fid | AsText(g)
+-----+-----------------------------------------------------------
|   1 | LINESTRING(30250.4 15129.2,30248.8 15138.4,30238.2 15136.4,3
|   2 | LINESTRING(30220.2 15122.8,30217.2 15137.8,30207.6 15136,302
|   3 | LINESTRING(30179 15114.4,30176.6 15129.4,30167 15128,30169 1
|   4 | LINESTRING(30155.2 15121.4,30140.4 15118.6,30142 15109,30157
|   5 | LINESTRING(30192.4 15085,30177.6 15082.2,30179.2 15072.4,301
```

```
|   6 | LINESTRING(30244 15087,30229 15086.2,30229.4 15076.4,30244.6
|   7 | LINESTRING(30200.6 15059.4,30185.6 15058.6,30186 15048.8,302
|  10 | LINESTRING(30179.6 15017.8,30181 15002.8,30190.8 15003.6,301
|  11 | LINESTRING(30154.2 15000.4,30168.6 15004.8,30166 15014.2,301
|  13 | LINESTRING(30105 15065.8,30108.4 15050.8,30118 15053,30114.6
|  21 | LINESTRING(30350.4 15828.8,30350.6 15845,30333.8 15845,30333
|  22 | LINESTRING(30350.6 15871.4,30350.6 15887.8,30334 15887.8,303
|  23 | LINESTRING(30350.6 15914.2,30350.6 15930.4,30334 15930.4,303
|  24 | LINESTRING(30290.2 15823,30290.2 15839.4,30273.4 15839.4,302
|  25 | LINESTRING(30291.4 15866.2,30291.6 15882.4,30274.8 15882.4,3
|  26 | LINESTRING(30291.6 15918.2,30291.6 15934.4,30275 15934.4,302
| 154 | LINESTRING(30276.2 15143.8,30261.4 15141,30263 15131.4,30278
| 155 | LINESTRING(30269.8 15084,30269.4 15093.4,30258.6 15093,30259
| 157 | LINESTRING(30128.2 15011,30113.2 15010.2,30113.6 15000.4,301
| 249 | LINESTRING(30337.8 15938.6,30337.8 15946.8,30320.4 15946.8,3
+-----+-----------------------------------------------------------
20 rows in set (0.46 sec)
```

0.000.46

19.5.4“”

19.7. MySQL

19.7.1. GIS

19.7.1. GIS

- OpenGIS GEOMETRY_COLUMNS 1
- LineStringMultiLineStringOpenGISLength()MySQLGLength()

  1SQLLength()

MySQLMySQL dev.mysql.com

20

20.1. _____

20.2. _____

20.2.1. CREATE PROCEDURECREATE FUNCTION

20.2.2. ALTER PROCEDUREALTER FUNCTION

20.2.3. DROP PROCEDUREDROP FUNCTION

20.2.4. SHOW CREATE PROCEDURESHOW CREATE FUNCTION

20.2.5. SHOW PROCEDURE STATUSSHOW FUNCTION STATUS

20.2.6. CALL

20.2.7. BEGIN ... END

20.2.8. DECLARE

20.2.9. _____

20.2.10.

20.2.11. ___

20.2.12. _____

20.3. _____

20.4. _____

MySQL 5.1 SQL

.

.

MySQLSQL:2003 IBMDB2

MySQL I,

20.4“ ”

20.1.

mysqlprocMySQL 5.1MySQL 5.1 proc

MySQL 5.1

· CREATE ROUTINE

· ALTER ROUTINE

· EXECUTE SQL SECURITY DEFINER

20.2.

20.2.1. CREATE PROCEDURECREATE FUNCTION

20.2.2. ALTER PROCEDUREALTER FUNCTION

20.2.3. DROP PROCEDUREDROP FUNCTION

20.2.4. SHOW CREATE PROCEDURESHOW CREATE FUNCTION

20.2.5. SHOW PROCEDURE STATUSSHOW FUNCTION STATUS

20.2.6. CALL

20.2.7. BEGIN ... END

20.2.8. DECLARE

20.2.9.

20.2.10.

20.2.11.

20.2.12.

CREATE PROCEDURECREATE FUNCTIONCALL

MySQL 5.1

· USE *db_name* USE

· test

·

MySQL SELECT SELECTMySQL MySQL 4.1

20.2.1. CREATE PROCEDURECREATE FUNCTION

```
CREATE PROCEDURE sp_name ([proc_parameter[,...]])
    [characteristic ...] routine_body

CREATE FUNCTION sp_name ([func_parameter[,...]])
    RETURNS type
    [characteristic ...] routine_body

    proc_parameter:
    [ IN | OUT | INOUT ] param_name type

    func_parameter:
    param_name type

type:
    Any valid MySQL data type

characteristic:
    LANGUAGE SQL
  | [NOT] DETERMINISTIC
  | { CONTAINS SQL | NO SQL | READS SQL DATA | MODIFIES SQL DATA }
  | SQL SECURITY { DEFINER | INVOKER }
  | COMMENT 'string'

routine_body:
```

Valid SQL procedure statement or statements

MySQL 5.1 CREATE ROUTINEALTER ROUTINEEX
SUPER 20.4“”

SQL SQL

() IN OUTINOUT

: IN, OUT, INOUT PROCEDUREFUNCTIONIN

RETURNSFUNCTION RETURN value

routine_body SQL 20.2.7“BEGIN ... END ” 20.2.8 “DECLARE ”20.2.12“ ”

CREATE FUNCTIONMySQLUDF 27.2“ MySQL” UDF
UDF UDF

SQLPHPPHP

“”“”DETERMINISTICNOT DETERMINISTICNOT
DETERMINISTIC

NOW() RAND()NOW() RAND()

DETERMINISTIC MySQL 20.4“ ”

CONTAINS SQLNO SQLSQLREADS SQL DATA
MODIFIES SQL DATA CONTAINS SQL

SQL SECURITY DEFINERSQL:2003 MySQL 5.1
EXECUTESQL SECURITY

MySQLsql_modeMySQL

COMMENTMySQL SHOW CREATE PROCEDURE SHOW
CREATE FUNCTION

MySQLDDLCREATEDROPMySQL SQL COMMIT
SQLSQLDBMS

LOAD DATA INFILE

INTO SELECTSHOW EXPLAIN
NotER_SP_NO_RETSET_IN_FUNC
ER_SP_BADSELECT)

OUT **mysql**delimiter ;// ; **mysql**

```
mysql> delimiter //


mysql> CREATE PROCEDURE simpleproc (OUT param1 INT)
    -> BEGIN
    ->   SELECT COUNT(*) INTO param1 FROM t;
    -> END
    -> //
Query OK, 0 rows affected (0.00 sec)


mysql> delimiter ;


mysql> CALL simpleproc(@a);
Query OK, 0 rows affected (0.00 sec)


mysql> SELECT @a;
+------+
| @a   |
+------+
| 3    |
```

```
+------+
1 row in set (0.00 sec)
```

delimiter(‘\’)MySQL

SQL

```
mysql> delimiter //

mysql> CREATE FUNCTION hello (s CHAR(20)) RETURNS CHAR(50)
    -> RETURN CONCAT('Hello, ',s,'!');
    -> //
Query OK, 0 rows affected (0.00 sec)

mysql> delimiter ;

mysql> SELECT hello('world');
+----------------+
| hello('world') |
+----------------+
| Hello, world!  |
+----------------+
1 row in set (0.00 sec)
```

RETURNRETURNSENUMSETRETURNSETENUM

20.2.2. ALTER PROCEDUREALTER FUNCTION

```
ALTER {PROCEDURE | FUNCTION} sp_name [characteristic ...]
```

```
characteristic:
    { CONTAINS SQL | NO SQL | READS SQL DATA | MODIFIES SQL DATA }
  | SQL SECURITY { DEFINER | INVOKER }
  | COMMENT 'string'
```

MySQL 5.1ALTER ROUTINE

ALTER PROCEDUREALTER FUNCTION

20.2.3. DROP PROCEDUREDROP FUNCTION

```
DROP {PROCEDURE | FUNCTION} [IF EXISTS] sp_name
```

MySQL 5

IF EXISTS MySQLSHOW

20.2.4. SHOW CREATE PROCEDURESHOW CREATE FUNCTION

```
SHOW CREATE {PROCEDURE | FUNCTION} sp_name
```

MySQLSHOW CREATE TABLE

```
mysql> SHOW CREATE FUNCTION test.hello\G
*************************** 1. row ***************************
       Function: hello
       sql_mode:
Create Function: CREATE FUNCTION `test`.`hello`(s CHAR(20)) RETURNS
RETURN CONCAT('Hello, ',s,'!')
```

20.2.5. SHOW PROCEDURE STATUSSHOW FUNCTION STATUS

```
SHOW {PROCEDURE | FUNCTION} STATUS [LIKE 'pattern']
```

MySQL

```
mysql> SHOW FUNCTION STATUS LIKE 'hello'\G
*************************** 1. row ***************************
           Db: test
         Name: hello
         Type: FUNCTION
      Definer: testuser@localhost
     Modified: 2004-08-03 15:29:37
      Created: 2004-08-03 15:29:37
Security_type: DEFINER
      Comment:
```

INFORMATION_SCHEMAROUTINES 23.1.14 “INFORMATION_SCHEMA ROUTINES ”

20.2.6. CALL

```
CALL sp_name([parameter[,...]])
```

CALLCREATE PROCEDURE

CALL OUTINOUT“” SQLROW_COUNT()Cthe mysql_affected_rows() C API

20.2.7. BEGIN ... END

```
[begin_label:] BEGIN
    [statement_list]
END [end_label]
```

BEGIN ... END *statement_list* *statement_list*

begin_label, *end_label*,,

[NOT] ATOMICBEGIN

;delimiter;//;

20.2.8. DECLARE

DECLARE 20.2.9“ ”) 20.2.10“ ”) 20.2.11“ ”)SIGNALRESIGNAL

DECLAREBEGIN ... END

20.2.9.

20.2.9.1. DECLARE

20.2.9.2. SET

20.2.9.3. SELECT ... INTO

20.2.9.1. DECLARE

```
DECLARE var_name[,...] type [DEFAULT value]
```

DEFAULTDEFAULTNULL

BEGIN ... END

20.2.9.2. SET

```
SET var_name = expr [, var_name = expr] ...
```

SETSET

SETSETSET a=x, b=y, ...

20.2.9.3. SELECT ... INTO

```
SELECT col_name[,...] INTO var_name[,...] table_expr
```

SELECT

```
SELECT id,data INTO x,y FROM test.t1 LIMIT 1;
```

MySQL 5.1 9.3“ ”

: SQLSELECT ... INTOSQL MySQLxname
variable xname *column*

```
CREATE PROCEDURE sp1 (x VARCHAR(5))
  BEGIN
    DECLARE xname VARCHAR(5) DEFAULT 'bob';
    DECLARE newname VARCHAR(5);
    DECLARE xid INT;

    SELECT xname,id INTO newname,xid
      FROM table1 WHERE xname = xname;
    SELECT newname;
  END;
```

table.xnamenewname‘bob’

I.1“ ”

20.2.10.

20.2.10.1. DECLARE

20.2.10.2. DECLARE

20.2.10.1. DECLARE

```
DECLARE condition_name CONDITION FOR condition_value

condition_value:
    SQLSTATE [VALUE] sqlstate_value
  | mysql_error_code
```

DECLARE HANDLER [20.2.10.2“DECLARE ”]

SQLSTATEMySQL

20.2.10.2. DECLARE

```
DECLARE handler_type HANDLER FOR condition_value[,...] sp_statement

handler_type:
    CONTINUE
  | EXIT
  | UNDO

condition_value:
    SQLSTATE [VALUE] sqlstate_value
  | condition_name
  | SQLWARNING
  | NOT FOUND
  | SQLEXCEPTION
  | mysql_error_code
```

CONTINUE EXITBEGIN...ENDUNDO

· SQLWARNING01SQLSTATE

· NOT FOUND02SQLSTATE

· SQLEXCEPTIONSQLWARNINGNOT FOUNDSQLSTAT

SQLSTATEMySQL

:

```
mysql> CREATE TABLE test.t (s1 int,primary key (s1));
Query OK, 0 rows affected (0.00 sec)

mysql> delimiter //

mysql> CREATE PROCEDURE handlerdemo ()
    -> BEGIN
    ->   DECLARE CONTINUE HANDLER FOR SQLSTATE '23000' SET @x2 = 1;
    ->   SET @x = 1;
    ->   INSERT INTO test.t VALUES (1);
    ->   SET @x = 2;
    ->   INSERT INTO test.t VALUES (1);
    ->   SET @x = 3;
    -> END;
    -> //
Query OK, 0 rows affected (0.00 sec)

mysql> CALL handlerdemo()//
Query OK, 0 rows affected (0.00 sec)
```

```
mysql> SELECT @x//
    +------+
    | @x   |
    +------+
    | 3    |
    +------+
    1 row in set (0.00 sec)
```

@x3MySQLDECLARE CONTINUE H
'23000' SET @x2 = 1; INSERTPRIMARY KEY,MySQL (EXIT)
SELECT @x2

20.2.11.

20.2.11.1.

20.2.11.2. OPEN

20.2.11.3. FETCH

20.2.11.4. CLOSE

SQL

```
CREATE PROCEDURE curdemo()
BEGIN
  DECLARE done INT DEFAULT 0;
  DECLARE a CHAR(16);
  DECLARE b,c INT;
```

```
  DECLARE cur1 CURSOR FOR SELECT id,data FROM test.t1;
  DECLARE cur2 CURSOR FOR SELECT i FROM test.t2;
  DECLARE CONTINUE HANDLER FOR SQLSTATE '02000' SET done = 1;

  OPEN cur1;
  OPEN cur2;

  REPEAT
    FETCH cur1 INTO a, b;
    FETCH cur2 INTO c;
    IF NOT done THEN
       IF b < c THEN
          INSERT INTO test.t3 VALUES (a,b);
       ELSE
          INSERT INTO test.t3 VALUES (a,c);
       END IF;
    END IF;
  UNTIL done END REPEAT;

  CLOSE cur1;
  CLOSE cur2;
END
```

20.2.11.1.

```
DECLARE cursor_name CURSOR FOR select_statement
```

SELECTINTO

20.2.11.2. OPEN

```
OPEN cursor_name
```

20.2.11.3. FETCH

```
FETCH cursor_name INTO var_name [, var_name] ...
```

20.2.11.4. CLOSE

```
CLOSE cursor_name
```

20.2.12.

20.2.12.1. IF

20.2.12.2. CASE

20.2.12.3. LOOP

20.2.12.4. LEAVE

20.2.12.5. ITERATE

20.2.12.6. REPEAT

20.2.12.7. WHILE

IF, CASE, LOOP, WHILE, ITERATE, LEAVE

BEGIN ... END

FOR

20.2.12.1. IF

```
IF search_condition THEN statement_list
    [ELSEIF search_condition THEN statement_list] ...
    [ELSE statement_list]
END IF
```

IF *search_condition*SQL *search_condition*ELSE *statement_list*

IF() IF [12.2“ ”]

20.2.12.2. CASE

```
CASE case_value
    WHEN when_value THEN statement_list
    [WHEN when_value THEN statement_list] ...
    [ELSE statement_list]
END CASE
```

Or:

```
CASE
    WHEN search_condition THEN statement_list
    [WHEN search_condition THEN statement_list] ...
    [ELSE statement_list]
END CASE
```

CASE *search_condition* SQLELSE

CASE12.2“ ” SQL CASECASECASEELSE CASEEND

20.2.12.3. LOOP

```
[begin_label:] LOOP
    statement_list
END LOOP [end_label]
```

LOOP LEAVE

LOOP *begin_label* *end_label*

20.2.12.4. LEAVE

```
LEAVE label
```

BEGIN ... END

20.2.12.5. ITERATE

```
ITERATE label
```

ITERATELOOP, REPEAT, WHILEITERATE “”

```
CREATE PROCEDURE doiterate(p1 INT)
BEGIN
  label1: LOOP
    SET p1 = p1 + 1;
    IF p1 < 10 THEN ITERATE label1; END IF;
    LEAVE label1;
  END LOOP label1;
  SET @x = p1;
```

```
END
```

20.2.12.6. REPEAT

```
[begin_label:] REPEAT
    statement_list
UNTIL search_condition
END REPEAT [end_label]
```

REPEAT *search_condition*

REPEAT *begin_label* *end_label*

```
mysql> delimiter //

mysql> CREATE PROCEDURE dorepeat(p1 INT)
    -> BEGIN
    ->   SET @x = 0;
    ->   REPEAT SET @x = @x + 1; UNTIL @x > p1 END REPEAT;
    -> END
    -> //
Query OK, 0 rows affected (0.00 sec)

mysql> CALL dorepeat(1000)//
Query OK, 0 rows affected (0.00 sec)

mysql> SELECT @x//
+------+
| @x   |
```

```
+------+
| 1001 |
+------+
1 row in set (0.00 sec)
```

20.2.12.7. WHILE

```
[begin_label:] WHILE search_condition DO
    statement_list
END WHILE [end_label]
```

WHILE *search_condition*

WHILE *begin_label* *end_label*

```
CREATE PROCEDURE dowhile()
BEGIN
  DECLARE v1 INT DEFAULT 5;

  WHILE v1 > 0 DO
    ...
    SET v1 = v1 - 1;
  END WHILE;
END
```

20.3.

- MySQL 5.1

  MySQL 20.4“ ”

-

  DDLALTER

-

  MySQLDML

-

  point-in-timeMySQL

  - SUPER
  - DBAlog_bin_trust_routine_creators1CREATE

-

  log_bin_trust_routine_creators0

  DML

  DMLDML

- MySQL point-in-time

  point-in-time

- MySQL

MySQL

-
-

-

MySQL 5.1MySQL

-

DMLAFTEREMPMySQLEMPAFTER

1. EMPINSERT
2. EMPAFTER
3. INSERT
4. INSERTEMP
5. EMPAFTER

20.4.

MySQL 5.1

SQL

· 6.2“ ”

· 5.9.2.2“ ”

MySQL

--log-bin 5.11.3“ ”

· CREATE PROCEDURE, CREATE FUNCTION, ALTER PROCEDURE, ALTER FUNCTION CALL, DROP PROCEDURE, DROP

CREATE ROUTINE, SQLID12

```
mysql> delimiter //
mysql> CREATE PROCEDURE mysp ()
    -> BEGIN
    ->   IF @@server_id=2 THEN DROP DATABASE accounting; END IF;
    -> END;
    -> //
mysql> delimiter ;
mysql> CALL mysp();
```

CREATE PROCEDURECALLSQLaccounting

MySQL 5.1 CREATE ROUTINESUPER

PROCEDUREALTER FUNCTIONALTER ROUTINESUPERSUPER

```
ERROR 1419 (HY000): You do not have the SUPER privilege and
binary logging is enabled (you *might* want to use the less safe
log_bin_trust_routine_creators variable)
```

SUPERCREATE ROUTINESUPER
log_bin_trust_routine_creators 10

```
mysql> SET GLOBAL log_bin_trust_routine_creators = 1;
```

--log-bin-trust-routine-creators

log_bin_trust_routine_creators SUPER

.

o

-

MySQL

- DETERMINISTICNOT DETERMINISTICNOT DETERMINISTICDETERMINISTIC

NOW() RAND() NOW()RAND()

- CONTAINS SQL, NO SQL, READS SQL DATA, MODIFIES SQL NO SQL READS SQL DATA i CONTAINS SQL

CREATE PROCEDURE CREATE FUNCTION DETERMINIST NO SQLREADS SQL DATA

```
ERROR 1418 (HY000): This routine has none of DETERMINISTIC, NO SQL,
or READS SQL DATA in its declaration and binary logging is enabled
(you *might* want to use the less safe log_bin_trust_routine_creator
variable)
```

log_bin_trust_routine_creators 1,

“” MySQL

· CALL

```
· ERROR 1417 (HY000): A routine failed and has neithe
· READS SQL DATA in its declaration and binary loggin
· non-transactional tables were updated, the binary l
· changes
```

.MyISAMable

INSERT, DELETE, UPDATEIGNORE

· SELECTmyfunc()

```
· CREATE FUNCTION myfunc () RETURNS INT
· BEGIN
·   INSERT INTO t (i) VALUES(1);
·   RETURN 0;
· END;
```

tmyfunc()t, SELECT

```
SELECT myfunc();
```

DODO

·

```
· CREATE PROCEDURE mysp INSERT INTO t VALUES(1);
· CALL mysp;
```

CREATE PROCEDURE CALLINSERT

· --replicate-*-tableCALL “”

CREATE TR

SUPERlog_bin_trust_routine_creators 0CREATE TRIGGER

SQLMySQL SQL

MySQLMySQL dev.mysql.com

21

21.1. CREATE TRIGGER
21.2. DROP TRIGGER
21.3.

MySQL 5.1 11INSERT

```
mysql> CREATE TABLE account (acct_num INT, amount DECIMAL(10,2));
mysql> CREATE TRIGGER ins_sum BEFORE INSERT ON account
    -> FOR EACH ROW SET @sum = @sum + NEW.amount;
```

I

20.4“”

21.1. CREATE TRIGGER

```
CREATE TRIGGER trigger_name trigger_time trigger_event
    ON tbl_name FOR EACH ROW trigger_stmt
```

tbl_name *tbl_name* TEMPORARY

trigger_time BEFOREAFTER

trigger_event *trigger_event*

· INSERT INSERTLOAD DATAREPLACE

· UPDATE UPDATE

· DELETE DELETEREPLACE

*trigger_event*SQL INSERTBEFOREINSERT LOAD DATA

INSERT INTO .. ON DUPLICATE UPDATE ... BEFORE INSERT AFTER INSERT BEFORE UPDATEAFTER UPDATE

BEFORE UPDATE 1BEFORE UPDATE1BEFORE INSERT 1BEFORE UPDATE1AFTER UPDATE

trigger_stmt BEGIN ... END 20.2.7“BEGIN ... END”

MySQL 5.1 testref

```
CREATE TABLE test1(a1 INT);
CREATE TABLE test2(a2 INT);
CREATE TABLE test3(a3 INT NOT NULL AUTO_INCREMENT PRIMARY KEY);
CREATE TABLE test4(
  a4 INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
```

```
  b4 INT DEFAULT 0
);

DELIMITER |

CREATE TRIGGER testref BEFORE INSERT ON test1
  FOR EACH ROW BEGIN
    INSERT INTO test2 SET a2 = NEW.a1;
    DELETE FROM test3 WHERE a3 = NEW.a1;
    UPDATE test4 SET b4 = b4 + 1 WHERE a4 = NEW.a1;
  END
|

DELIMITER ;

INSERT INTO test3 (a3) VALUES
  (NULL), (NULL), (NULL), (NULL), (NULL),
  (NULL), (NULL), (NULL), (NULL), (NULL);

INSERT INTO test4 (a4) VALUES
  (0), (0), (0), (0), (0), (0), (0), (0), (0), (0);
```

test1

```
mysql> INSERT INTO test1 VALUES
    -> (1), (3), (1), (7), (1), (8), (4), (4);
Query OK, 8 rows affected (0.01 sec)
Records: 8  Duplicates: 0  Warnings: 0
```

4

```
mysql> SELECT * FROM test1;
+------+
| a1   |
+------+
|    1 |
|    3 |
|    1 |
|    7 |
|    1 |
|    8 |
|    4 |
|    4 |
+------+
8 rows in set (0.00 sec)

mysql> SELECT * FROM test2;
+------+
| a2   |
+------+
|    1 |
|    3 |
|    1 |
|    7 |
|    1 |
|    8 |
```

```
|    4 |
|    4 |
+------+
8 rows in set (0.00 sec)

mysql> SELECT * FROM test3;
+----+
| a3 |
+----+
|  2 |
|  5 |
|  6 |
|  9 |
| 10 |
+----+
5 rows in set (0.00 sec)

mysql> SELECT * FROM test4;
+----+------+
| a4 | b4   |
+----+------+
|  1 |    3 |
|  2 |    0 |
|  3 |    1 |
|  4 |    2 |
|  5 |    0 |
```

```
|  6 |    0 |
|  7 |    1 |
|  8 |    1 |
|  9 |    0 |
| 10 |    0 |
+----+------+
10 rows in set (0.00 sec)
```

OLDNEW OLD.*col_name* 1 NEW.*col_name*11

OLDNEW SELECT SETNEW UPDATE

CREATE TRIGGERSUPER

21.2. DROP TRIGGER

```
DROP TRIGGER [schema_name.]trigger_name
```

schema_name schema

MySQL 5.0.10MySQL5.0.10 MySQL 5.1 DROP TRIGGER 2.10.1“5.0”

DROP TRIGGERSUPER

21.3.

MySQL 5.1

INSERTDELETEUPDATE

CREATE TRIGGERDROP TRIGGER 21.1“CREATE TRIGGER ” 21.2“DROP TRIGGER”

1 INSERT

1 1

```
mysql> CREATE TABLE account (acct_num INT, amount DECIMAL(10,2));
mysql> CREATE TRIGGER ins_sum BEFORE INSERT ON account
    -> FOR EACH ROW SET @sum = @sum + NEW.amount;
```

CREATE TRIGGER ins_sum

· BEFORE AFTER

· INSERT INSERT DELETEUPDATE

· FOR EACH ROW SET amount NEW.amount“amount”

0INSERT

```
mysql> SET @sum = 0;
mysql> INSERT INTO account VALUES(137,14.98),(141,1937.50),(97,-100.
mysql> SELECT @sum AS 'Total amount inserted';
+----------------------+
| Total amount inserted |
+----------------------+
```

```
| 1852.48                |
+------------------------+
```

INSERT @sum14.98 + 1937.50 – 1001852.48

DROP TRIGGER

```
mysql> DROP TRIGGER test.ins_sum;
```

1

1 2 2BEFORE INSERT2AFTER UPDATE FOR EACH ROWBEGIN ... END

· CALLSQL

· START TRANSACTIONCOMMITROLLBACK

OLDNEW OLDNEW INSERT NEW.*col_name* DELETE OLD.*col_name* UPDATE OLD.*col_name* NEW.*col_name*

OLD NEW SELECT BEFORE UPDATE “SET NEW.*col_name = value*”

BEFORE AUTO_INCREMENTNEW0

OLDNEWMySQL

BEGIN ... END BEGIN mysql“ ;” 1UPDATE 0100 BEFORE

```
mysql> delimiter //
mysql> CREATE TRIGGER upd_check BEFORE UPDATE ON account
    -> FOR EACH ROW
    -> BEGIN
    ->     IF NEW.amount < 0 THEN
```

```
    ->         SET NEW.amount = 0;
    ->     ELSEIF NEW.amount > 100 THEN
    ->         SET NEW.amount = 100;
    ->     END IF;
    -> END;//
mysql> delimiter ;
```

CALL

MySQL

· BEFORE

· BEFORE AFTER

· BEFOREAFTER

·

MySQLMySQL dev.mysql.com

22

22.1. ALTER VIEW
22.2. CREATE VIEW
22.3. DROP VIEW
22.4. SHOW CREATE VIEW

5.1MySQL

· CREATE VIEWALTER VIEW

· DROP VIEW

· SHOW CREATE VIEW

I

MySQL 5.1 2.10.2“”

22.1. ALTER VIEW

```
ALTER [ALGORITHM = {UNDEFINED | MERGE | TEMPTABLE}]
    VIEW view_name [(column_list)]
    AS select_statement
    [WITH [CASCADED | LOCAL] CHECK OPTION]
```

CREATE VIEW22.2“CREATE VIEW” CREATE VIEWDROP SELECT

22.2. CREATE VIEW

```
CREATE [OR REPLACE] [ALGORITHM = {UNDEFINED | MERGE | TEMPTABLE}]
    VIEW view_name [(column_list)]
    AS select_statement
    [WITH [CASCADED | LOCAL] CHECK OPTION]
```

OR REPLACE *select_statement*SELECT

CREATE VIEW SELECT SELECT SELECT OR REPLACE DROP

db_name.view_name

```
mysql> CREATE VIEW test.v AS SELECT * FROM t;
```

SELECT *column_list* ID*column_list*SELECT

SELECT

SELECT

SELECT UNION SELECT

```
mysql> CREATE TABLE t (qty INT, price INT);
mysql> INSERT INTO t VALUES(3, 50);
mysql> CREATE VIEW v AS SELECT qty, price, qty*price AS value FROM t
mysql> SELECT * FROM v;
+------+-------+-------+
| qty  | price | value |
+------+-------+-------+
|    3 |    50 |   150 |
```

```
+------+-------+-------+
```

· SELECTFROM

· SELECT

· SELECT

.

.

· TEMPORARY TEMPORARY

.

.

ORDER BY ORDER BY

LIMIT LIMITLIMIT SELECTALLDISTINCT SQL_SMALL_RESULT INTOFOR UPDATELOCK IN SHARE MODE PROCEDURE

```
mysql> CREATE VIEW v AS SELECT CHARSET(CHAR(65)), COLLATION(CHAR(65)
Query OK, 0 rows affected (0.00 sec)

mysql> SET NAMES 'latin1';
Query OK, 0 rows affected (0.00 sec)

mysql> SELECT * FROM v;
+------------------+--------------------+
| CHARSET(CHAR(65)) | COLLATION(CHAR(65)) |
```

```
+-------------------+---------------------+
| latin1            | latin1_swedish_ci   |
+-------------------+---------------------+
1 row in set (0.00 sec)

mysql> SET NAMES 'utf8';
Query OK, 0 rows affected (0.00 sec)

mysql> SELECT * FROM v;
+-------------------+---------------------+
| CHARSET(CHAR(65)) | COLLATION(CHAR(65)) |
+-------------------+---------------------+
| utf8              | utf8_general_ci     |
+-------------------+---------------------+
1 row in set (0.00 sec)
```

ALGORITHMSQLMySQL ALGORITHM MERGETEMPTABLE UNDEFINEDALGORITHM UNDEFINED MySQL

MERGE

TEMPTABLE

UNDEFINEDMySQL MERGETEMPTABLEMERGE

TEMPTABLE1 MERGE

UNDEFINED

· CREATE VIEWALGORITHM

· CREATE VIEW1ALGORITHM = UNDEFINED

· ALGORITHM = MERGE MySQL UNDEFINED

MERGE MERGE 1v_merge

```
CREATE ALGORITHM = MERGE VIEW v_merge (vc1, vc2) AS
SELECT c1, c2 FROM t WHERE c3 > 100;
```

1

```
SELECT * FROM v_merge;
```

MySQL

· v_merget

· *vc1vc2c1c2

· WHERE

```
SELECT c1, c2 FROM t WHERE c3 > 100;
```

2

```
SELECT * FROM v_merge WHERE vc1 < 100;
```

vc1 < 100c1 < 100ANDWHEREWHERE

```
SELECT c1, c2 FROM t WHERE (c3 > 100) AND (c1 < 100);
```

WHERE

```
WHERE (select WHERE) AND (view WHERE)
```

MERGE

· SUM(), MIN(), MAX(), COUNT()

· DISTINCT

· GROUP BY

· HAVING

· UNIONUNION ALL

·

UPDATEDELETEINSERT

· SUM(), MIN(), MAX(), COUNT()

· DISTINCT

· GROUP BY

· HAVING

· UNIONUNION ALL

·

· Join

· FROM

· WHERE FROM

·

· ALGORITHM = TEMPTABLE

INSERT

·

·

·

· 3.14159

· col1 + 3

- UPPER(col2)
- col3 / col4
- (*subquery*)

```
CREATE VIEW v AS SELECT col1, 1 AS col2 FROM t;
```

col2 col2

```
UPDATE v SET col1 = 0;
```

```
UPDATE v SET col2 = 0;
```

MERGE UNION SET UNION ALL

INSERT DELETE

WITH CHECK OPTION *select_statement*WHERE“”

WITH CHECK OPTION LOCALCASCADED LOCALCHECK OPTION CASCADED CASCADED

```
mysql> CREATE TABLE t1 (a INT);
mysql> CREATE VIEW v1 AS SELECT * FROM t1 WHERE a < 2
    -> WITH CHECK OPTION;
mysql> CREATE VIEW v2 AS SELECT * FROM v1 WHERE a > 0
    -> WITH LOCAL CHECK OPTION;
mysql> CREATE VIEW v3 AS SELECT * FROM v1 WHERE a > 0
    -> WITH CASCADED CHECK OPTION;
```

v2v3v1v2LOCAL v2 v3CASCADED

```
ql> INSERT INTO v2 VALUES (2);
```

```
Query OK, 1 row affected (0.00 sec)

mysql> INSERT INTO v3 VALUES (2);

ERROR 1369 (HY000): CHECK OPTION failed 'test.v3'
```

updatable_views_with_limit 5.3.3“”

INFORMATION_SCHEMA1VIEWS 23.1.15 “INFORMATION_SCHEMA VIEWS”

22.3. DROP VIEW

```
DROP VIEW [IF EXISTS]
    view_name [, view_name] ...
    [RESTRICT | CASCADE]
```

DROP VIEW1 DROP

IF EXISTS NOTE13.5.4.22“SHOW WARNINGS”

RESTRICTCASCADE

22.4. SHOW CREATE VIEW

```
SHOW CREATE VIEW view_name
```

1CREATE VIEW

```
mysql> SHOW CREATE VIEW v;
+------+-----------------------------------------------------+
| View | Create View                                         |
+------+-----------------------------------------------------+
| v    | CREATE VIEW `test`.`v` AS select 1 AS `a`,2 AS `b` |
+------+-----------------------------------------------------+
```

MySQLMySQL dev.mysql.com

23INFORMATION_SCHEMA

23.1. INFORMATION_SCHEMA
- 23.1.1. INFORMATION_SCHEMA SCHEMATA
- 23.1.2. INFORMATION_SCHEMA TABLES
- 23.1.3. INFORMATION_SCHEMA COLUMNS
- 23.1.4. INFORMATION_SCHEMA STATISTICS
- 23.1.5. INFORMATION_SCHEMA USER_PRIVILEGES
- 23.1.6. INFORMATION_SCHEMA SCHEMA_PRIVILEGES
- 23.1.7. INFORMATION_SCHEMA TABLE_PRIVILEGES
- 23.1.8. INFORMATION_SCHEMA COLUMN_PRIVILEGES
- 23.1.9. INFORMATION_SCHEMA CHARACTER_SETS
- 23.1.10. INFORMATION_SCHEMA COLLATIONS
- 23.1.11. INFORMATION_SCHEMA COLLATION_CHARACTER_SET_APPLICABILITY
- 23.1.12. INFORMATION_SCHEMA TABLE_CONSTRAINTS
- 23.1.13. INFORMATION_SCHEMA KEY_COLUMN_USAGE
- 23.1.14. INFORMATION_SCHEMA ROUTINES
- 23.1.15. INFORMATION_SCHEMA VIEWS
- 23.1.16. INFORMATION_SCHEMA TRIGGERS
- 23.1.17. INFORMATION_SCHEMA

23.2. SHOW

INFORMATION_SCHEMA

“”“”

```
mysql> SELECT table_name, table_type, engine
-> FROM information_schema.tables
-> WHERE table_schema = 'db5'
-> ORDER BY table_name DESC;
```

table_name	table_type	
v56	VIEW	NULL
v3	VIEW	NULL
v2	VIEW	NULL
v	VIEW	NULL
tables	BASE TABLE	MyISAM
t7	BASE TABLE	MyISAM
t3	BASE TABLE	MyISAM
t2	BASE TABLE	MyISAM
t	BASE TABLE	MyISAM
pk	BASE TABLE	InnoDB
loop	BASE TABLE	MyISAM
kurs	BASE TABLE	MyISAM
k	BASE TABLE	MyISAM
into	BASE TABLE	MyISAM
goto	BASE TABLE	MyISAM

fk2	BASE TABLE	InnoDB
fk	BASE TABLE	InnoDB

170.01

db5

INFORMATION_SCHEMAMySQL INFORMATION_SCHEMA

MySQL

SELECT

SELECT ... FROM INFORMATION_SCHEMAMySQLSHOW SHOW DATABASESSHOW TABLESSHOWSELECT“

· Codd

· SELECT

.

.

· DBMS

SHOWMySQLSHOWSHOWMySQL
23.2“SHOW ”

MySQL INFORMATION_SCHEMA“ANSI/ISO SQL:200311 ” SQL:2003F021“”

SQL2000MySQLMySQL INFORMATION_SCHEMA.TABLES

DBMSsyscat INFORMATION_SCHEMA

INFORMATION_SCHEMAINFORMATION_SCHEMA USE INFORMATION_SCHEMASELECT

SHOWSELCET

23.1. INFORMATION_SCHEMA

23.1.1. INFORMATION_SCHEMA SCHEMATA
23.1.2. INFORMATION_SCHEMA TABLES
23.1.3. INFORMATION_SCHEMA COLUMNS
23.1.4. INFORMATION_SCHEMA STATISTICS
23.1.5. INFORMATION_SCHEMA USER_PRIVILEGES
23.1.6. INFORMATION_SCHEMA SCHEMA_PRIVILEGES
23.1.7. INFORMATION_SCHEMA TABLE_PRIVILEGES
23.1.8. INFORMATION_SCHEMA COLUMN_PRIVILEGES
23.1.9. INFORMATION_SCHEMA CHARACTER_SETS
23.1.10. INFORMATION_SCHEMA COLLATIONS
23.1.11. INFORMATION_SCHEMA COLLATION_CHARACTER_SET_APPLICABILITY
23.1.12. INFORMATION_SCHEMA TABLE_CONSTRAINTS
23.1.13. INFORMATION_SCHEMA KEY_COLUMN_USAGE
23.1.14. INFORMATION_SCHEMA ROUTINES
23.1.15. INFORMATION_SCHEMA VIEWS
23.1.16. INFORMATION_SCHEMA TRIGGERS
23.1.17. INFORMATION_SCHEMA

INFORMATION_SCHEMA

· “”SQL

· “SHOW”SHOW

· “”

DB2SQLOracle“SQL”TABLES COLLATION TABLE_COLLATION http://www.dbazine.com/gulutzan5.shtml

TABLES.TABLE_NAMEVARCHAR(*N*) CHARACTER SET utf8N 64

INFORMATION_SCHEMASELECTSHOW

23.1.1. INFORMATION_SCHEMA SCHEMATA

SCHEMATA

	SHOW	
CATALOG_NAME	-	NULL
SCHEMA_NAME		Database
DEFAULT_CHARACTER_SET_NAME		
DEFAULT_COLLATION_NAME		
SQL_PATH		NULL

SQL_PATHNULL

```
SELECT SCHEMA_NAME AS `Database
FROM INFORMATION_SCHEMA.SCHEMATA
[WHERE SCHEMA_NAME LIKE 'wild']

SHOW DATABASES
[LIKE 'wild']
```

23.1.2. INFORMATION_SCHEMA TABLES

TABLES

	SHOW	
TABLE_CATALOG		NULL
TABLE_SCHEMA	Table_...	
TABLE_NAME	Table_...	
TABLE_TYPE		
ENGINE	Engine	MySQL
VERSION	Version	MySQL
ROW_FORMAT	Row_format	MySQL
TABLE_ROWS	Rows	MySQL
AVG_ROW_LENGTH	Avg_row_length	MySQL
DATA_LENGTH	Data_length	MySQL
MAX_DATA_LENGTH	Max_data_length	MySQL

INDEX_LENGTH	Index_length	MySQL
DATA_FREE	Data_free	MySQL
AUTO_INCREMENT	Auto_increment	MySQL
CREATE_TIME	Create_time	MySQL
UPDATE_TIME	Update_time	MySQL
CHECK_TIME	Check_time	MySQL
TABLE_COLLATION	Collation	MySQL
CHECKSUM	Checksum	MySQL
CREATE_OPTIONS	Create_options	MySQL
TABLE_COMMENT	Comment	MySQL

· TABLE_SCHEMATABLE_NAMESHOWTable_in_db1

· TABLE_TYPE BASE TABLE VIEW TABLE_TYPE = TEMPORARY

· INFORMATION_SCHEMATABLE_ROWSNULL InnoDBSQL

· TABLE_COLLATION

```
SELECT table_name FROM INFORMATION_SCHEMA.TABLES
  [WHERE table_schema = 'db_name']
  [WHERE|AND table_name LIKE 'wild']

SHOW TABLES
  [FROM db_name]
  [LIKE 'wild']
```

23.1.3. INFORMATION_SCHEMA COLUMNS

COLUMNS

	SHOW	
TABLE_CATALOG		NULL
TABLE_SCHEMA		
TABLE_NAME		
COLUMN_NAME	Field	
ORDINAL_POSITION		
COLUMN_DEFAULT	Default	

IS_NULLABLE	Null	
DATA_TYPE	Type	
CHARACTER_MAXIMUM_LENGTH	Type	
CHARACTER_OCTET_LENGTH		
NUMERIC_PRECISION	Type	
NUMERIC_SCALE	Type	
CHARACTER_SET_NAME		
COLLATION_NAME	Collation	
COLUMN_TYPE	Type	MySQL
COLUMN_KEY	Key	MySQL
EXTRA	Extra	MySQL
COLUMN_COMMENT	Comment	MySQL

· SHOW COLUMNS

· ORDINAL_POSITION ORDER BY ORDINAL_POSITION ORDINAL_POSITION SHOWSELECT

· CHARACTER_OCTET_LENGTH CHARACTER_MAXIMUM_LENGTH

· CHARACTER_SET_NAMECollation“ SHOW FULL COLUMNS FROM t” Collation latin1_swedish_ci1latin1 .

```
SELECT COLUMN_NAME, DATA_TYPE, IS_NULLABLE, COLUMN_DEFAULT
  FROM INFORMATION_SCHEMA.COLUMNS
  WHERE table_name = 'tbl_name'
  [AND table_schema = 'db_name']
  [AND column_name LIKE 'wild']

SHOW COLUMNS
  FROM tbl_name
  [FROM db_name]
  [LIKE wild]
```

23.1.4. INFORMATION_SCHEMA STATISTICS

STATISTICS

	SHOW	
TABLE_CATALOG		NULL

TABLE_SCHEMA		
TABLE_NAME	Table	
NON_UNIQUE	Non_unique	
INDEX_SCHEMA		
INDEX_NAME	Key_name	
SEQ_IN_INDEX	Seq_in_index	
COLUMN_NAME	Column_name	
COLLATION	Collation	
CARDINALITY	Cardinality	
SUB_PART	Sub_part	MySQL
PACKED	Packed	MySQL
NULLABLE	Null	MySQL
INDEX_TYPE	Index_type	MySQL

COMMENT	Comment	MySQL

· SQL2000 sp_statisticsCATALOGQUALIFIERSCHEMA OWNER

SHOW INDEX

```
SELECT * FROM INFORMATION_SCHEMA.STATISTICS
  WHERE table_name = 'tbl_name'
  [AND table_schema = 'db_name']

SHOW INDEX
  FROM tbl_name
  [FROM db_name]
```

23.1.5. INFORMATION_SCHEMA USER_PRIVILEGES

USER_PRIVILEGES mysql.user

	SHOW	
GRANTEE		“user'@'host”
TABLE_CATALOG		NULL
PRIVILEGE_TYPE		

IS_GRANTABLE		

· mysql.user

23.1.6. INFORMATION_SCHEMA SCHEMA_PRIVILEGES

SCHEMA_PRIVILEGES mysql.db

	SHOW	
GRANTEE		“user'@'host”
TABLE_CATALOG		NULL
TABLE_SCHEMA		
PRIVILEGE_TYPE		
IS_GRANTABLE		

· mysql.db

23.1.7. INFORMATION_SCHEMA TABLE_PRIVILEGES

TABLE_PRIVILEGES mysql.tables_priv

	SHOW	
GRANTEE		“user'@'host”
TABLE_CATALOG		NULL
TABLE_SCHEMA		
TABLE_NAME		
PRIVILEGE_TYPE		
IS_GRANTABLE		

```
SELECT ... FROM INFORMATION_SCHEMA.TABLE_PRIVILEGES
```

```
SHOW GRANTS ...
```

PRIVILEGE_TYPE
SELECTINSERTUPDATEREFERENCESALTERINDEXDROP
CREATE VIEW

23.1.8. INFORMATION_SCHEMA COLUMN_PRIVILEGES

COLUMN_PRIVILEGES mysql.columns_priv

	SHOW	

GRANTEE		“user'@'host”
TABLE_CATALOG		NULL
TABLE_SCHEMA		
TABLE_NAME		
COLUMN_NAME		
PRIVILEGE_TYPE		
IS_GRANTABLE		

· SHOW FULL COLUMNSselectinsertupdate references COLUMN_PRIVILEGES

· PRIVILEGE_TYPE SELECT, INSERT, UPDATE, REFERENCES.

· GRANT OPTION IS_GRANTABLEYES IS_GRANTABLENO GRANT OPTION

```
SELECT ... FROM INFORMATION_SCHEMA.COLUMN_PRIVILEGES
```

```
SHOW GRANTS ...
```

23.1.9. INFORMATION_SCHEMA CHARACTER_SETS

CHARACTER_SETS

	SHOW	
CHARACTER_SET_NAME	Charset	
DEFAULT_COLLATE_NAME	Default collation	
DESCRIPION	Description	MySQL
MAXLEN	Maxlen	MySQL

· SHOW CHARACTER SETDescriptionMaxlen

```
SELECT * FROM INFORMATION_SCHEMA.CHARACTER_SETS
  [WHERE name LIKE 'wild']

SHOW CHARACTER SET
  [LIKE 'wild']
```

23.1.10. INFORMATION_SCHEMA COLLATIONS

COLLATIONS

	SHOW	
COLLATION_NAME	Collation	

· 5 SHOW COLLATIONCharset IdDefaultCompiledSortlen

```
SELECT COLLATION_NAME FROM INFORMATION_SCHEMA.COLLATIONS
  [WHERE collation_name LIKE 'wild']

SHOW COLLATION
  [LIKE 'wild']
```

23.1.11. INFORMATION_SCHEMA COLLATION_CHARACTER_SET_APPLICABILITY

COLLATION_CHARACTER_SET_APPLICABILITY SHOW COLLATION

	SHOW	
COLLATION_NAME	Collation	
CHARACTER_SET_NAME	Charset	

23.1.12. INFORMATION_SCHEMA TABLE_CONSTRAINTS

TABLE_CONSTRAINTS

	SHOW	
CONSTRAINT_CATALOG		NULL
CONSTRAINT_SCHEMA		
CONSTRAINT_NAME		
TABLE_SCHEMA		
TABLE_NAME		
CONSTRAINT_TYPE		

· CONSTRAINT_TYPEUNIQUE PRIMARY KEY FOREIGN KEY

· Non_unique0UNIQUE PRIMARY KEYSHOW INDEXKey_name

· CONSTRAINT_TYPE UNIQUEPRIMARY KEYFOREIGN KEYCHECKCHARENUM CHECKCHECK

23.1.13. INFORMATION_SCHEMA KEY_COLUMN_USAGE

KEY_COLUMN_USAGE

	SHOW	

CONSTRAINT_CATALOG		NULL
CONSTRAINT_SCHEMA		
CONSTRAINT_NAME		
TABLE_CATALOG		
TABLE_SCHEMA		
TABLE_NAME		
COLUMN_NAME		
ORDINAL_POSITION		
POSITION_IN_UNIQUE_CONSTRAINT		
REFERENCED_TABLE_SCHEMA		
REFERENCED_TABLE_NAME		
REFERENCED_COLUMN_NAME		

.

· ORDINAL_POSITION 1

. “”“” POSITION_IN_UNIQUE_CONSTRAINTNULL “”

t1t3

```
CREATE TABLE t1
(
s1 INT,
s2 INT,
s3 INT,
PRIMARY KEY(s3)
) ENGINE=InnoDB;


CREATE TABLE t3
(
s1 INT,
s2 INT,
s3 INT,
KEY(s1),
CONSTRAINT CO FOREIGN KEY (s2) REFERENCES t1(s3)
) ENGINE=InnoDB;
```

KEY_COLUMN_USAGE

o CONSTRAINT_NAME='PRIMARY', TABLE_NAME='t1', COLUMN_NAME='s3', ORDINAL_POSITION=1, POSITION_IN_UNIQUE_CONSTRAINT=NULL

o CONSTRAINT_NAME='CO', TABLE_NAME='t3',

COLUMN_NAME='s2', ORDINAL_POSITION=1,
POSITION_IN_UNIQUE_CONSTRAINT=1

23.1.14. INFORMATION_SCHEMA ROUTINES

ROUTINES ROUTINESUDF

“ mysql.proc name” INFORMATION_SCHEMA.ROUTINESmysql.proc

	mysql.proc	
SPECIFIC_NAME	specific_name	
ROUTINE_CATALOG		NULL
ROUTINE_SCHEMA	db	
ROUTINE_NAME	name	
ROUTINE_TYPE	type	{PROCEDURE|FUNCTION}
DTD_IDENTIFIER		
ROUTINE_BODY		SQL
ROUTINE_DEFINITION	body	
EXTERNAL_NAME		NULL

EXTERNAL_LANGUAGE	language	NULL
PARAMETER_STYLE		SQL
IS_DETERMINISTIC	is_deterministic	
SQL_DATA_ACCESS	sql_data_access	
SQL_PATH		NULL
SECURITY_TYPE	security_type	
CREATED	created	
LAST_ALTERED	modified	
SQL_MODE	sql_mode	MySQL
ROUTINE_COMMENT	comment	MySQL
DEFINER	definer	MySQL

· MySQLEXTERNAL_LANGUAGE

o mysql.proc.language='SQL'EXTERNAL_LANGUAGENULL

o EXTERNAL_LANGUAGEmysql.proc.language NULL

23.1.15. INFORMATION_SCHEMA VIEWS

VIEWS

	SHOW	
TABLE_CATALOG		NULL
TABLE_SCHEMA		
TABLE_NAME		
VIEW_DEFINITION		
CHECK_OPTION		
IS_UPDATABLE		
DEFINER		
SECURITY_TYPE		

· SHOW VIEWVIEWS

· VIEW_DEFINITIONSHOW CREATE VIEWCreate Table

CHECK OPTION

```
·                 CREATE VIEW v AS
·                   SELECT s2,s1 FROM t
·                   WHERE s1 > 5
·                   ORDER BY s1
·                   WITH CHECK OPTION;
```

```
SELECT s2,s1 FROM t WHERE s1 > 5 ORDER BY s1
```

· CHECK_OPTIONNONE

· IS_UPDATABLEYES IS_UPDATABLENO

· DEFINERSECURITY_TYPEDEFINERINVOKER

23.1.16. INFORMATION_SCHEMA TRIGGERS

TRIGGERS

SUPER

	SHOW	
TRIGGER_CATALOG		NULL
TRIGGER_SCHEMA		
TRIGGER_NAME	Trigger	
EVENT_MANIPULATION	Event	

EVENT_OBJECT_CATALOG		NULL
EVENT_OBJECT_SCHEMA		
EVENT_OBJECT_TABLE	Table	
ACTION_ORDER		0
ACTION_CONDITION		NULL
ACTION_STATEMENT	Statement	
ACTION_ORIENTATION		ROW
ACTION_TIMING	Timing	
ACTION_REFERENCE_OLD_TABLE		NULL
ACTION_REFERENCE_NEW_TABLE		NULL
ACTION_REFERENCE_OLD_ROW		OLD
ACTION_REFERENCE_NEW_ROW		NEW
CREATED		NULL (0)

SQL_MODE		

· TRIGGER_SCHEMATRIGGER_NAME

· EVENT_MANIPULATION INSERTDELETEUPDATE

· 21 EVENT_OBJECT_SCHEMAEVENT_OBJECT_TABLE

· ACTION_ORDER0 EVENT_MANIPULATION ACTION_TIMING1

· ACTION_STATEMENT SHOW TRIGGERSStatement UTF-8

· ACTION_ORIENTATION“ ROW”

· ACTION_TIMING “BEFORE”“AFTER”

· ACTION_REFERENCE_OLD_ROW ACTION_REFERENCE_NEW_ROWACTION_REFERENCE_OLD_ROW “ OLD”ACTION_REFERENCE_NEW_ROW“ NEW”

· SQL_MODESQLSQL sql_mode 5.3.2“SQL”

· NULL TRIGGER_CATALOGEVENT_OBJECT_CATALOGACTION_COND CREATED

21.3“” ins_sum

```
mysql> SELECT * FROM INFORMATION_SCHEMA.TRIGGERS\G
*************************** 1. row ***************************
 TRIGGER_CATALOG: NULL
TRIGGER_SCHEMA: test
```

```
 TRIGGER_NAME: ins_sum
  EVENT_MANIPULATION: INSERT
EVENT_OBJECT_CATALOG: NULL
 EVENT_OBJECT_SCHEMA: test
  EVENT_OBJECT_TABLE: account
 ACTION_ORDER: 0
ACTION_CONDITION: NULL
ACTION_STATEMENT:  SET @sum = @sum + NEW.amount
  ACTION_ORIENTATION: ROW
 ACTION_TIMING: BEFORE
ACTION_REFERENCE_OLD_TABLE: NULL
ACTION_REFERENCE_NEW_TABLE: NULL
  ACTION_REFERENCE_OLD_ROW: OLD
  ACTION_REFERENCE_NEW_ROW: NEW
CREATED: NULL
1 row in set (1.54 sec)
```

13.5.4.20“SHOW TRIGGERS”

23.1.17. INFORMATION_SCHEMA

INFORMATION_SCHEMA
INFORMATION_SCHEMA.PARAMETERS
INFORMATION_SCHEMA.REFERENTIAL_CONSTRAINTS

23.2. SHOW

SHOWINFORMATION_SCHEMA

· SHOWINFORMATION_SCHEMA

· SHOWWHERE

INFORMATION_SCHEMA SHOW DATABASES SHOW TABLESINFORMATION_SCHEMA

```
mysql> SHOW TABLES FROM INFORMATION_SCHEMA;
+---------------------------------------+
| Tables_in_information_schema|
+---------------------------------------+
| SCHEMATA|
| TABLES|
| COLUMNS |
| CHARACTER_SETS |
| COLLATIONS  |
| COLLATION_CHARACTER_SET_APPLICABILITY |
| ROUTINES|
| STATISTICS  |
| VIEWS |
| TRIGGERS|
| USER_PRIVILEGES|
| SCHEMA_PRIVILEGES  |
| TABLE_PRIVILEGES|
| COLUMN_PRIVILEGES  |
```

```
| TABLE_CONSTRAINTS  |
| KEY_COLUMN_USAGE|
+-------------------------------------+
```

SHOW COLUMNSDESCRIBEINFORMATION_SCHEMA

SHOWWHERE

```
SHOW CHARACTER SET
SHOW COLLATION
SHOW COLUMNS
SHOW DATABASES
SHOW FUNCTION STATUS
SHOW KEYS
SHOW OPEN TABLES
SHOW PROCEDURE STATUS
SHOW STATUS
SHOW TABLE STATUS
SHOW TABLES
SHOW VARIABLES
```

WHERESHOW SHOW COLLATION

SHOW CHARACTER SET

```
mysql> SHOW CHARACTER SET;
```

Charset			
big5	Big5 Traditional Chinese	big5_chinese_ci	2
dec8	DEC West European	dec8_swedish_ci	1

cp850	DOS West European	cp850_general_ci	1
hp8	HP West European	hp8_english_ci	1
koi8r	KOI8-R Relcom Russian	koi8r_general_ci	1
latin1	cp1252 West European	latin1_swedish_ci	1
latin2	ISO 8859-2 Central European	latin2_general_ci	1

SHOW CHARACTER SETWHERE “ japa

mysql> **SHOW CHARACTER SET WHERE `Default collation` LIKE '%japanese%**

Charset			
ujis	EUC-JP Japanese	ujis_japanese_ci	3
sjis	Shift-JIS Japanese	sjis_japanese_ci	2
cp932	SJIS for Windows Japanese	cp932_japanese_ci	2
eucjpms	UJIS for Windows Japanese	eucjpms_japanese_ci	3

mysql> **SHOW CHARACTER SET WHERE Maxlen > 1;**

Charset			
big5	Big5 Traditional Chinese	big5_chinese_ci	2

ujis	EUC-JP Japanese	ujis_japanese_ci	3
sjis	Shift-JIS Japanese	sjis_japanese_ci	2
euckr	EUC-KR Korean	euckr_korean_ci	2
gb2312	GB2312 Simplified Chinese	gb2312_chinese_ci	2
gbk	GBK Simplified Chinese	gbk_chinese_ci	2
utf8	UTF-8 Unicode	utf8_general_ci	3
ucs2	UCS-2 Unicode	ucs2_general_ci	2
cp932	SJIS for Windows Japanese	cp932_japanese_ci	2
eucjpms	UJIS for Windows Japanese	eucjpms_japanese_ci	3

24

24.1.
24.2. DECIMAL
24.3.
24.4.
24.5.

MySQL 5.1

· SQL 5.3.2“SQL”

· MySQL

· .0001 1000011

· ROUND() C

· UnixWindows

· 0 0 NULL sql_mode 5.3.2 “SQL”

MySQL 5.1SQL

MySQL 5.1

24.1.

DECIMAL

1.23.4-5-6.78+9.10

1.2E31.2E-3-1.2E3-1.2E-3

2.34 2.34E0

DECIMAL MySQL DECIMAL NUMERICDECFIXED

FLOATDOUBLE MySQL FLOATDOUBLEDOUBLE PRECISION REAL

24.2. DECIMAL

MySQL 5.1DECIMAL

.

.

.

· DECIMAL MySQL

MySQL

DECIMALDECIMAL(*M*,*D*)MySQL 5.1

· *M* 165 MySQL 1254

· *D* 030*M*

M65 DECIMAL65 65 MySQL 254

MySQL 5.1 DECIMAL 94 94 4 DECIMAL(18,9)9 4 DECIMAL(20,10)10 94 11

0	0
1	1
2	1

3	2
4	2
5	3
6	3
7	4
8	4
9	4

MySQL MySQL 5.1 DECIMAL“ +”“ 0”+0003.1DECIMAL(5,1) 3.1

MySQL 5.1 DECIMAL DECIMAL(3,0)-999999DECIMAL(*M*,*D*) *M –D* MySQL“ +”

SQL NUMERIC(*M*,*D*)*M* DECIMAL(*M*,*D*)*M* MySQL DECIMAL(*M*,*D*)NUMERIC(*M*,*D*) *M*

DECIMAL *MySQL 5.0*

24.3.

SQL DECIMAL INSERT INSERT

.

· DECIMAL 65“” 1.0/3.0.333... (1.0/3.0)*3.01.0

· BIGINT64

SQL sql_mode 1.8.2“SQL” STRICT_ALL_TABLES STRICT_TRANS_TABLES RROR_FOR_DIVISION_BY_ZERO TRADITIONAL ERROR_FOR_DIVISION_BY_ZERO

```
mysql> SET SQL_MODE='TRADITIONAL';
```

DECIMAL

.

.

0NULL ERROR_FOR_DIVISION_BY_ZERO SQL MySQL0

.

· 0

0 ERROR_FOR_DIVISION_BY_ZERO

```
INSERT INTO t SET i = 1/0;
```

ERROR_FOR_DIVISION_BY_ZERO

sql_mode	
" (Default)	iNULL
strict	iNULL
ERROR_FOR_DIVISION_BY_ZERO	iNULL
strict,ERROR_FOR_DIVISION_BY_ZERO	

.

.

24.4.

ROUND() DECIMAL

ROUND()

· ROUND()“” .5 0 .5

· C ROUND()“”

```
mysql> SELECT ROUND(2.5), ROUND(25E-1);
+------------+--------------+
| ROUND(2.5) | ROUND(25E-1) |
+------------+--------------+
| 3          |            2 |
+------------+--------------+
```

DECIMAL “”

```
mysql> CREATE TABLE t (d DECIMAL(10,0));
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO t VALUES(2.5),(2.5E0);
Query OK, 2 rows affected, 2 warnings (0.00 sec)
Records: 2  Duplicates: 0  Warnings: 2

mysql> SELECT d FROM t;
+------+
| d    |
+------+
| 3    |
| 3    |
+------+
```

24.5.

MySQL 5.1

1

```
mysql> SELECT .1 + .2 = .3;
+--------------+
| .1 + .2 = .3 |
+--------------+
|            1 |
+--------------+


mysql> SELECT .1E0 + .2E0 = .3E0;
+--------------------+
| .1E0 + .2E0 = .3E0 |
+--------------------+
|                  0 |
+--------------------+
```

1 .00011000

```
CREATE PROCEDURE p ()
BEGIN
  DECLARE i INT DEFAULT 0;
  DECLARE d DECIMAL(10,4) DEFAULT 0;
  DECLARE f FLOAT DEFAULT 0;
  WHILE i < 10000 DO
    SET d = d + .0001;
```

```
    SET f = f + .0001E0;
    SET i = i + 1;
  END WHILE;
  SELECT d, f;
END;
```

df1decimal

```
+--------+------------------+
| d      | f                |
+--------+------------------+
| 1.0000 | 0.99999999999991 |
+--------+------------------+
```

2SQL S1S2*X1X2S1 + S2*

```
mysql> SELECT .01 * .01;
+-----------+
| .01 * .01 |
+-----------+
| 0.0001    |
+-----------+
```

3

MySQL 5.1 ROUND() C

MySQL 5.1 DECIMAL “” 0.5 0

```
mysql> SELECT ROUND(2.5), ROUND(-2.5);
+------------+-------------+
| ROUND(2.5) | ROUND(-2.5) |
+------------+-------------+
```

```
| 3          | -3          |
+------------+-------------+
```

C “”

```
mysql> SELECT ROUND(2.5E0), ROUND(-2.5E0);
+--------------+---------------+
| ROUND(2.5E0) | ROUND(-2.5E0) |
+--------------+---------------+
|            2 |            -2 |
+--------------+---------------+
```

4

MySQL

```
mysql> SET SQL_MODE='';
Query OK, 0 rows affected (0.00 sec)

mysql> CREATE TABLE t (i TINYINT);
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO t SET i = 128;
Query OK, 1 row affected, 1 warning (0.01 sec)

mysql> SELECT i FROM t;
+------+
| i    |
+------+
|  127 |
```

```
+------+
1 row in set (0.00 sec)

mysql> SET SQL_MODE='TRADITIONAL';
Query OK, 0 rows affected (0.00 sec)

mysql> CREATE TABLE t (i TINYINT);
Query OK, 0 rows affected (0.01 sec)

mysql> SET sql_mode='STRICT_ALL_TABLES';
Query OK, 0 rows affected (0.10 sec)

mysql> INSERT INTO t SET i = 128;
ERROR 1264 (22003): Out of range value adjusted for column 'i' at ro

mysql> SELECT i FROM t;
Empty set (0.00 sec)
```

5ERROR_FOR_DIVISION_BY_ZERO 0 NULL

0NULL

```
mysql> SET SQL_MODE='';
Query OK, 0 rows affected (0.00 sec)

mysql> CREATE TABLE t (i TINYINT);
Query OK, 0 rows affected (0.01 sec)
```

```
mysql> INSERT INTO t SET i = 1 / 0;
Query OK, 1 row affected (0.06 sec)

mysql> SELECT i FROM t;
+------+
| i    |
+------+
| NULL |
+------+
1 row in set (0.01 sec)
```

SQL 0

```
mysql> SET SQL_MODE='TRADITIONAL';
Query OK, 0 rows affected (0.00 sec)

mysql> CREATE TABLE t (i TINYINT);
Query OK, 0 rows affected (0.00 sec)

mysql> SET sql_mode='STRICT_ALL_TABLES,ERROR_FOR_DIVISION_BY_ZERO';
Query OK, 0 rows affected (0.00 sec)

mysql> INSERT INTO t SET i = 1 / 0;
ERROR 1365 (22012): Division by 0

mysql> SELECT i FROM t;
Empty set (0.01 sec)
```

```
mysql> SELECT VERSION();
+-----------------+
| VERSION()       |
+-----------------+
| 4.0.25-standard |
+-----------------+
1 row in set (0.00 sec)


mysql> CREATE TABLE t SELECT 2.5 AS a, 25E-1 AS b;

mysql> DESCRIBE t;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| a     | double(3,1) |      |     | 0.0     |       |
| b     | double      |      |     | 0       |       |
+-------+-------------+------+-----+---------+-------+
```

MySQL 5.1 DECIMAL

```
mysql> SELECT VERSION();
+-----------------+
| VERSION()       |
+-----------------+
| 5.1.2-alpha-log |
+-----------------+
1 row in set (0.00 sec)
```

```
mysql> CREATE TABLE t SELECT 2.5 AS a, 25E-1 AS b;

mysql> DESCRIBE t;
+-------+--------------+------+-----+---------+-------+
| Field | Type         | Null | Key | Default | Extra |
+-------+--------------+------+-----+---------+-------+
| a     | decimal(2,1) | NO   |     | 0.0     |       |
| b     | double       | NO   |     | 0       |       |
+-------+--------------+------+-----+---------+-------+
```

7

```
mysql> CREATE TABLE t (i INT, d DECIMAL, f FLOAT);
mysql> INSERT INTO t VALUES(1,1,1);
mysql> CREATE TABLE y SELECT AVG(i), AVG(d), AVG(f) FROM t;
```

MySQL 4.04.1 MySQL

```
mysql> DESCRIBE y;
+--------+--------------+------+-----+---------+-------+
| Field  | Type         | Null | Key | Default | Extra |
+--------+--------------+------+-----+---------+-------+
| AVG(i) | double(17,4) | YES  |     | NULL    |       |
| AVG(d) | double(17,4) | YES  |     | NULL    |       |
| AVG(f) | double       | YES  |     | NULL    |       |
+--------+--------------+------+-----+---------+-------+
```

double

MySQL 5.1

```
mysql> DESCRIBE y;
+--------+---------------+------+-----+---------+-------+
| Field  | Type          | Null | Key | Default | Extra |
+--------+---------------+------+-----+---------+-------+
| AVG(i) | decimal(14,4) | YES  |     | NULL    |       |
| AVG(d) | decimal(14,4) | YES  |     | NULL    |       |
| AVG(f) | double        | YES  |     | NULL    |       |
+--------+---------------+------+-----+---------+-------+
```

double

MySQLMySQL dev.mysql.com

25API

25.1. libmysqldMySQL
    25.1.1. MySQL
    25.1.2. libmysqld
    25.1.3. MySQL
    25.1.4.
    25.1.5. (TODO)
    25.1.6.
    25.1.7.
25.2. MySQL C API
    25.2.1. C API
    25.2.2. C API
    25.2.3. C API
    25.2.4. C API
    25.2.5. C API
    25.2.6. C API
    25.2.7. C API
    25.2.8. C API
    25.2.9. C API
    25.2.10. C API
    25.2.11. C API
    25.2.12. C API
    25.2.13. C API
    25.2.14.
    25.2.15.
25.3. MySQL PHP API
    25.3.1. MySQLPHP
25.4. MySQL Perl API
25.5. MySQL C++ API
    25.5.1. Borland C++
25.6. MySQL Python API
25.7. MySQL Tcl API
25.8. MySQL Eiffel Wrapper
25.9. MySQL

25.9.1. msql2mysqlmSQLMySQL
25.9.2. mysql_config

MySQLAPI C APIMySQLAPI

25.1. libmysqldMySQL

25.1.1. MySQL
25.1.2. libmysqld
25.1.3. MySQL
25.1.4.
25.1.5. (TODO)
25.1.6.
25.1.7.

25.1.1. MySQL

MySQLMySQL

MySQLC/C++ C/C+

APIMySQL

mysql_server_init()	MySQL main()
mysql_server_end()	
mysql_thread_init()	MySQL
mysql_thread_end()	pthread_exit()

libmysqld.alibmysqlclient.a

libmysqlclient.amysql_server_*xxx*()

“mysql_server_init()”

control”

25.1.2. libmysqld

libmysqld “--with-embedded-server”MySQL 2.8.2“ ”

libmysqldpthreadMySQL “ **mysql_config --libmysqld-libs**”

CMySQLGNU C gcc

```
gcc mysql_test.c -o mysql_test -lz \
`/usr/local/mysql/bin/mysql_config --include --libmysqld-libs`
```

gccC “ -o”
lz” “**mysql_config**” backticks

25.1.3. MySQL

· ISAM

· UDF

·

· RAID

· “”“”

·

· TCP/IP

“ mysql_embed.h”MySQL

25.1.4.

mysqld mysql_server_init()my.cnf C“ --defaults-file” mysql_server_init()2 mysql_server_init() 25.2.12.1 “mysql_server_init()”

MySQL [server] MySQL [mysqld] MySQL[embedded] [ApplicationName_SERVER] 4.3.2“”

25.1.5. (TODO)

· MySQL

·

· stderr1

· InnoDB InnoDB [libmysqd_server]“--skip-innodb” **mysql_server_init()**

25.1.6.

LinuxFreeBSD 1 2 1 2 GNUmake

1

test1_libmysqld.c

```
#include <stdio.h>
#include <stdlib.h>
#include <stdarg.h>
#include "mysql.h"

MYSQL *mysql;
MYSQL_RES *results;
```

```
MYSQL_ROW record;

static char *server_options[] = { "mysql_test", "--defaults-file=my.
int num_elements = sizeof(server_options)/ sizeof(char *);

static char *server_groups[] = { "libmysqld_server", "libmysqld_clie

int main(void)
{
   mysql_server_init(num_elements, server_options, server_groups);
   mysql = mysql_init(NULL);
   mysql_options(mysql, MYSQL_READ_DEFAULT_GROUP, "libmysqld_client"
   mysql_options(mysql, MYSQL_OPT_USE_EMBEDDED_CONNECTION, NULL);

   mysql_real_connect(mysql, NULL,NULL,NULL, "database1", 0,NULL,0);

   mysql_query(mysql, "SELECT column1, column2 FROM table1");

   results = mysql_store_result(mysql);

   while((record = mysql_fetch_row(results))) {
      printf("%s - %s \n", record[0], record[1]);
   }

   mysql_free_result(results);
   mysql_close(mysql);
```

```
   mysql_server_end();

   return 0;
}
```

```
gcc test1_libmysqld.c -o test1_libmysqld -lz \
 `/usr/local/mysql/bin/mysql_config --include --libmysqld-libs`
```

2

MySQLtest2_libmysqld test2_libmysqld.cGNUmakefile test2_libmysqldGNU make

test2_libmysqld.c

```
/*
 * A simple example client, using the embedded MySQL server library
*/

#include <mysql.h>
#include <stdarg.h>
#include <stdio.h>
#include <stdlib.h>

MYSQL *db_connect(const char *dbname);
void db_disconnect(MYSQL *db);
void db_do_query(MYSQL *db, const char *query);

const char *server_groups[] = {
```

```
  "test2_libmysqld_SERVER", "embedded", "server", NULL
};

int
main(int argc, char **argv)
{
  MYSQL *one, *two;

  /* mysql_server_init() must be called before any other mysql
   * functions.
   *
   * You can use mysql_server_init(0, NULL, NULL), and it
   * initializes the server using groups = {
   *   "server", "embedded", NULL
   *  }.
   *
   * In your $HOME/.my.cnf file, you probably want to put:

[test2_libmysqld_SERVER]
language = /path/to/source/of/mysql/sql/share/english

   * You could, of course, modify argc and argv before passing
   * them to this function.  Or you could create new ones in any
   * way you like.  But all of the arguments in argv (except for
   * argv[0], which is the program name) should be valid options
   * for the MySQL server.
```

```
   *
   * If you link this client against the normal mysqlclient
   * library, this function is just a stub that does nothing.
   */
  mysql_server_init(argc, argv, (char **)server_groups);

  one = db_connect("test");
  two = db_connect(NULL);

  db_do_query(one, "SHOW TABLE STATUS");
  db_do_query(two, "SHOW DATABASES");

  mysql_close(two);
  mysql_close(one);

  /* This must be called after all other mysql functions */
  mysql_server_end();

  exit(EXIT_SUCCESS);
}

static void
die(MYSQL *db, char *fmt, ...)
{
  va_list ap;
  va_start(ap, fmt);
```

```
  vfprintf(stderr, fmt, ap);
  va_end(ap);
  (void)putc('\n', stderr);
  if (db)
    db_disconnect(db);
  exit(EXIT_FAILURE);
}

MYSQL *
db_connect(const char *dbname)
{
  MYSQL *db = mysql_init(NULL);
  if (!db)
    die(db, "mysql_init failed: no memory");
  /*
   * Notice that the client and server use separate group names.
   * This is critical, because the server does not accept the
   * client's options, and vice versa.
   */
  mysql_options(db, MYSQL_READ_DEFAULT_GROUP, "test2_libmysqld_CLIEN
  if (!mysql_real_connect(db, NULL, NULL, NULL, dbname, 0, NULL, 0))
    die(db, "mysql_real_connect failed: %s", mysql_error(db));

  return db;
}
```

```
void
db_disconnect(MYSQL *db)
{
  mysql_close(db);
}

void
db_do_query(MYSQL *db, const char *query)
{
  if (mysql_query(db, query) != 0)
    goto err;

  if (mysql_field_count(db) > 0)
  {
    MYSQL_RES   *res;
    MYSQL_ROW    row, end_row;
    int num_fields;

    if (!(res = mysql_store_result(db)))
      goto err;
    num_fields = mysql_num_fields(res);
    while ((row = mysql_fetch_row(res)))
    {
      (void)fputs(">> ", stdout);
      for (end_row = row + num_fields; row < end_row; ++row)
        (void)printf("%s\t", row ? (char*)*row : "NULL");
```

```
      (void)fputc('\n', stdout);
    }
    (void)fputc('\n', stdout);
    mysql_free_result(res);
  }
  else
    (void)printf("Affected rows: %lld\n", mysql_affected_rows(db));

  return;

err:
  die(db, "db_do_query failed: %s [%s]", mysql_error(db), query);
}
```

GNUmakefile

```
# This assumes the MySQL software is installed in /usr/local/mysql
inc      := /usr/local/mysql/include/mysql
lib      := /usr/local/mysql/lib

# If you have not installed the MySQL software yet, try this instead
#inc      := $(HOME)/mysql-5.1/include
#lib      := $(HOME)/mysql-5.1/libmysqld

CC       := gcc
CPPFLAGS := -I$(inc) -D_THREAD_SAFE -D_REENTRANT
CFLAGS   := -g -W -Wall
LDFLAGS  := -static
```

```
# You can change -lmysqld to -lmysqlclient to use the
# client/server library
LDLIBS    = -L$(lib) -lmysqld -lz -lm -lcrypt

ifneq (,$(shell grep FreeBSD /COPYRIGHT 2>/dev/null))
# FreeBSD
LDFLAGS += -pthread
else
# Assume Linux
LDLIBS += -lpthread
endif

# This works for simple one-file test programs
sources := $(wildcard *.c)
objects := $(patsubst %c,%o,$(sources))
targets := $(basename $(sources))

all: $(targets)

clean:
        rm -f $(targets) $(objects) *.core
```

25.1.7.

GPL MySQL ABMySQL
http://www.mysql.com/company/legal/licensing/

25.2. MySQL C API

25.2.1. C API
25.2.2. C API
25.2.3. C API
25.2.4. C API
25.2.5. C API
25.2.6. C API
25.2.7. C API
25.2.8. C API
25.2.9. C API
25.2.10. C API
25.2.11. C API
25.2.12. C API
25.2.13. C API
25.2.14.
25.2.15.

C APIMySQL mysqlclient C

MySQLC C API MySQL

API Connector/JConnector/NETmysqlclientMySQL
8

16KB 16MB

1SQL - 1 - BLOB16MB 16MB
16MB1MB max_allowed_packet 7.5.2“”

MySQLnet_buffer_length

25.2.15“” “”“”“” MySQL 25.1“libmysqld
MySQL”

25.2.1. C API

- MYSQL

1 MySQL MYSQL

- MYSQL_RES

  SELECT, SHOW, DESCRIBE, EXPLAIN“”

- MYSQL_ROW

  1“” Null Null mysql_fetch_row()

- MYSQL_FIELD

- MYSQL_FIELD_OFFSET

  MySQL“” mysql_field_seek() 0

- my_ulonglong

  mysql_affected_rows()mysql_num_rows()mysql_insert_id() (

  my_ulonglong %lu

```
printf ("Number of rows: %lu\n", (unsigned long) mysql_num_rows(
```

MYSQL_FIELD

· char * name

Null AS

· char * org_name

Null

· char * table

· char * org_table

Null

· char * db

Null db

· char * catalog

catalog "def"

· char * def

Null mysql_list_fields()

· unsigned long length

· unsigned long max_length

m

· unsigned int name_length

· unsigned int org_name_length

org_name

· unsigned int table_length

· unsigned int org_table_length

org_table

· unsigned int db_length

db

· unsigned int catalog_length

catalog

· unsigned int def_length

def

· unsigned int flags

“” 0

NOT_NULL_FLAG	NULL
PRI_KEY_FLAG	
UNIQUE_KEY_FLAG	
MULTIPLE_KEY_FLAG	
UNSIGNED_FLAG	UNSIGNED
ZEROFILL_FLAG	ZEROFILL
BINARY_FLAG	BINARY

AUTO_INCREMENT_FLAG	AUTO_INCREMENT
ENUM_FLAG	ENUM
SET_FLAG	SET
BLOB_FLAG	BLOBTEXT
TIMESTAMP_FLAG	TIMESTAMP

BLOB_FLAGENUM_FLAGSET_FLAGTIMESTAMP_FLAG
MYSQL_TYPE_BLOBMYSQL_TYPE_ENUMMYSQL_TYPE_SET
MYSQL_TYPE_TIMESTAMPfield->type

```
if (field->flags & NOT_NULL_FLAG)
    printf("Field can't be null\n");
```

IS_NOT_NULL(flags)	NOT NULL“”
IS_PRI_KEY(flags)	“”
IS_BLOB(flags)	BLOBTEXT“” field->type

· unsigned int decimals

· unsigned int charset_nr

· enum enum_field_types type

MYSQL_TYPE_

MYSQL_TYPE_TINY	TINYINT
MYSQL_TYPE_SHORT	SMALLINT
MYSQL_TYPE_LONG	INTEGER
MYSQL_TYPE_INT24	MEDIUMINT
MYSQL_TYPE_LONGLONG	BIGINT
MYSQL_TYPE_DECIMAL	DECIMALNUMERIC
MYSQL_TYPE_NEWDECIMAL	DECIMALNUMERIC
MYSQL_TYPE_FLOAT	FLOAT

MYSQL_TYPE_DOUBLE	DOUBLEREAL
MYSQL_TYPE_BIT	BIT
MYSQL_TYPE_TIMESTAMP	TIMESTAMP
MYSQL_TYPE_DATE	DATE
MYSQL_TYPE_TIME	TIME
MYSQL_TYPE_DATETIME	DATETIME
MYSQL_TYPE_YEAR	YEAR
MYSQL_TYPE_STRING	CHAR
MYSQL_TYPE_VAR_STRING	VARCHAR
MYSQL_TYPE_BLOB	BLOBTEXT max_length
MYSQL_TYPE_SET	SET
MYSQL_TYPE_ENUM	ENUM
MYSQL_TYPE_GEOMETRY	Spatial

MYSQL_TYPE_NULL	NULL-type
MYSQL_TYPE_CHAR	MYSQL_TYPE_TINY

IS_NUM() IS_NUM()“”

```
if (IS_NUM(field->type))
    printf("Field is numeric\n");
```

25.2.2. C API

C API [25.2.3“C API”]

mysql_affected_rows()	UPDATEDELETEINSERT
mysql_autocommit()	autocommit ON/OFF
mysql_change_user()	
mysql_charset_name()	
mysql_close()	
mysql_commit()	
mysql_connect()	MySQL mysql_real_connect()

mysql_create_db()	SQLCREATE DATABASE
mysql_data_seek()	
mysql_debug()	DBUG_PUSH
mysql_drop_db()	SQLDROP DATABASE
mysql_dump_debug_info()	
mysql_eof()	mysql_errno()mysql_error()
mysql_errno()	MySQL
mysql_error()	MySQL
mysql_escape_string()	SQL
mysql_fetch_field()	
mysql_fetch_field_direct()	
mysql_fetch_fields()	
mysql_fetch_lengths()	

mysql_fetch_row()	
mysql_field_seek()	
mysql_field_count()	
mysql_field_tell()	mysql_fetch_field()
mysql_free_result()	
mysql_get_client_info()	
mysql_get_client_version()	
mysql_get_host_info()	
mysql_get_server_version()	
mysql_get_proto_info()	
mysql_get_server_info()	
mysql_info()	
mysql_init()	MYSQL

mysql_insert_id()	AUTO_INCREMENTID
mysql_kill()	
mysql_library_end()	MySQL C API
mysql_library_init()	MySQL C API
mysql_list_dbs()	
mysql_list_fields()	
mysql_list_processes()	
mysql_list_tables()	
mysql_more_results()	
mysql_next_result()	/
mysql_num_fields()	
mysql_num_rows()	
mysql_options()	mysql_connect()

mysql_ping()	
mysql_query()	“ Null” SQL
mysql_real_connect()	MySQL
mysql_real_escape_string()	SQL
mysql_real_query()	SQL
mysql_refresh()	
mysql_reload()	
mysql_rollback()	
mysql_row_seek()	mysql_row_tell()
mysql_row_tell()	
mysql_select_db()	
mysql_server_end()	
mysql_server_init()	

mysql_set_server_option()	
mysql_sqlstate()	SQLSTATE
mysql_shutdown()	
mysql_stat()	
mysql_store_result()	
mysql_thread_id()	ID
mysql_thread_safe()	1
mysql_use_result()	
mysql_warning_count()	SQL

MySQL

1. mysql_library_init()MySQL mysqlclient C mysqld“ -libmysqlclient”“ -libmysqld”

2. mysql_init() mysql_real_connect()

3. SQL

4. mysql_close()MySQL

5. mysql_library_end()MySQL

mysql_library_init()mysql_library_end() MySQL mysql_library_end()

mysql_library_init()mysql_library_end()#define mysql_server_init() mysql_server_end() mysqlclientmysqld MySQL MySQL mysql_server_init()mysql_server_end()

mysql_library_init() mysql_init()

mysql_init() mysql_real_connect() 5.0.3API mysql_real_connect()MYSQL1 0“ 1” MySQL 5.0.13 mysql_options()MYSQL_OPT_RECONNECT mysql_close()

mysql_query()mysql_real_query()SQL mysql_query() Null mysql_real_query() Null mysql_real_query()

SELECT INSERTUPDATEDELETE mysql_affected_rows()

SELECT SELECTSHOWDESCRIBEEXPLAINSELECT

mysql_store_result() mysql_use_result()“”

mysql_fetch_row() mysql_store_result()mysql_fetch_row() mysql_use_result()mysql_fetch_row() mysql_fetch_lengths()

mysql_free_result()

mysql_store_result()

mysql_store_result()1 mysql_data_seek()mysql_row_seek() mysql_num_rows() mysql_store_result()

mysql_use_result()1 mysql_use_result()

API SELECT mysql_query()mysql_real_query() mysql_store_result() SELECT mysql_field_count() mysql_field_count()0 INSERTUPDATEDELETE mysql_field_count()0 SELECT mysql_field_count()

mysql_store_result()mysql_use_result() mysql_fetch_field() mysql_fetch_field_direct() mysql_field_seek() mysql_fetch_field() mysql_fetch_fields()

MySQLmysql_errno()mysql_error()

25.2.3. C API

25.2.3.1. mysql_affected_rows()
25.2.3.2. mysql_autocommit()
25.2.3.3. mysql_change_user()
25.2.3.4. mysql_character_set_name()
25.2.3.5. mysql_close()
25.2.3.6. mysql_commit()
25.2.3.7. mysql_connect()
25.2.3.8. mysql_create_db()
25.2.3.9. mysql_data_seek()
25.2.3.10. mysql_debug()
25.2.3.11. mysql_drop_db()
25.2.3.12. mysql_dump_debug_info()
25.2.3.13. mysql_eof()
25.2.3.14. mysql_errno()
25.2.3.15. mysql_error()
25.2.3.16. mysql_escape_string()
25.2.3.17. mysql_fetch_field()
25.2.3.18. mysql_fetch_field_direct()
25.2.3.19. mysql_fetch_fields()
25.2.3.20. mysql_fetch_lengths()
25.2.3.21. mysql_fetch_row()
25.2.3.22. mysql_field_count()
25.2.3.23. mysql_field_seek()
25.2.3.24. mysql_field_tell()
25.2.3.25. mysql_free_result()
25.2.3.26. mysql_get_character_set_info()
25.2.3.27. mysql_get_client_info()
25.2.3.28. mysql_get_client_version()
25.2.3.29. mysql_get_host_info()
25.2.3.30. mysql_get_proto_info()
25.2.3.31. mysql_get_server_info()

25.2.3.32. mysql_get_server_version()
25.2.3.33. mysql_hex_string()
25.2.3.34. mysql_info()
25.2.3.35. mysql_init()
25.2.3.36. mysql_insert_id()
25.2.3.37. mysql_kill()
25.2.3.38. mysql_library_end()
25.2.3.39. mysql_library_init()
25.2.3.40. mysql_list_dbs()
25.2.3.41. mysql_list_fields()
25.2.3.42. mysql_list_processes()
25.2.3.43. mysql_list_tables()
25.2.3.44. mysql_more_results()
25.2.3.45. mysql_next_result()
25.2.3.46. mysql_num_fields()
25.2.3.47. mysql_num_rows()
25.2.3.48. mysql_options()
25.2.3.49. mysql_ping()
25.2.3.50. mysql_query()
25.2.3.51. mysql_real_connect()
25.2.3.52. mysql_real_escape_string()
25.2.3.53. mysql_real_query()
25.2.3.54. mysql_refresh()
25.2.3.55. mysql_reload()
25.2.3.56. mysql_rollback()
25.2.3.57. mysql_row_seek()
25.2.3.58. mysql_row_tell()
25.2.3.59. mysql_select_db()
25.2.3.60. mysql_set_character_set()
25.2.3.61. mysql_set_server_option()
25.2.3.62. mysql_shutdown()
25.2.3.63. mysql_sqlstate()
25.2.3.64. mysql_ssl_set()
25.2.3.65. mysql_stat()
25.2.3.66. mysql_store_result()
25.2.3.67. mysql_thread_id()
25.2.3.68. mysql_use_result()
25.2.3.69. mysql_warning_count()

C NULLNULLMySQL Null

Null NULL 0 0 0 0

```
if (result)                  /* correct */
    ... error ...

if (result < 0)              /* incorrect */
    ... error ...

if (result == -1)            /* incorrect */
    ... error ...
```

“” mysql_errno() mysql_error()

25.2.3.1. mysql_affected_rows()

my_ulonglong mysql_affected_rows(MYSQL *mysql)

UPDATE DELETE INSERT UPDATEDELETEINSERT mysql_query() SELECT mysql_affected_rows()mysql_num_rows()

0“ 0” UPDATE WHERE“ -1” SELECT mysql_store_result()mysql_affected_rows()mysql_affected_rows() “(my_ulonglong)-1”“(my_ulonglong)~0”“ -1”

```
mysql_query(&mysql,"UPDATE products SET cost=cost*1.25 WHERE group=1
```

```
printf("%ld products updated",(long) mysql_affected_rows(&mysql));
```

mysqldCLIENT_FOUND_ROWSUPDATE mysql_affected_rows()WHERE

REPLACE mysql_affected_rows()2 1

“ INSERT ... ON DUPLICATE KEY UPDATE” mysql_affected_rows()1 2

25.2.3.2. mysql_autocommit()

my_bool mysql_autocommit(MYSQL *mysql, my_bool mode)

“ 1” autocommit“ 0” autocommit

0 0

25.2.3.3. mysql_change_user()

my_bool mysql_change_user(MYSQL *mysql, const char *user, const char *password, const char *db)

dbmysql

mysql_change_user()

dbNULL

ROLLBACK

0 0

mysql_real_connect()

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

· ER_UNKNOWN_COM_ERROR

MySQL

· ER_ACCESS_DENIED_ERROR

· ER_BAD_DB_ERROR

· ER_DBACCESS_DENIED_ERROR

· ER_WRONG_DB_NAME

```
if (mysql_change_user(&mysql, "user", "password", "new_database"))
{
   fprintf(stderr, "Failed to change user.  Error: %s\n",
           mysql_error(&mysql));
}
```

25.2.3.4. mysql_character_set_name()

const char *mysql_character_set_name(MYSQL *mysql)

25.2.3.5. mysql_close()

void mysql_close(MYSQL *mysql)

mysql_init()mysql_connect() mysql_close()mysql

25.2.3.6. mysql_commit()

my_bool mysql_commit(MYSQL *mysql)

completion_type completion_type2 mysql_close()

0 0

25.2.3.7. mysql_connect()

MYSQL *mysql_connect(MYSQL *mysql, const char *host, const char *user, const char *passwd)

mysql_real_connect()

mysql_connect()MySQL API mysql_connect() mysql_get_client_info()

mysql_real_connect() NULL C API mysql_close() mysql_errno()mysql_error() MYSQL

mysql_real_connect()

mysql_real_connect()

25.2.3.8. mysql_create_db()

int mysql_create_db(MYSQL *mysql, const char *db)

db

mysql_query()SQL CREATE DATABASE

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

```
if(mysql_create_db(&mysql, "my_database"))
{
```

```
   fprintf(stderr, "Failed to create new database.  Error: %s\n",
           mysql_error(&mysql));
}
```

25.2.3.9. mysql_data_seek()

void mysql_data_seek(MYSQL_RES *result, my_ulonglong offset)

0mysql_num_rows(result)-1

so mysql_data_seek()mysql_store_result() mysql_use_result()

25.2.3.10. mysql_debug()

void mysql_debug(const char *debug)

DBUG_PUSHmysql_debug()Fred Fish E.1“MySQL” E.2 “MySQL”

/tmp/client.trace1

```
mysql_debug("d:t:O,/tmp/client.trace");
```

25.2.3.11. mysql_drop_db()

int mysql_drop_db(MYSQL *mysql, const char *db)

db

mysql_query()SQL DROP DATABASE

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

```
if(mysql_drop_db(&mysql, "my_database"))
```

```
  fprintf(stderr, "Failed to drop the database: Error: %s\n",
          mysql_error(&mysql));
```

25.2.3.12. mysql_dump_debug_info()

int mysql_dump_debug_info(MYSQL *mysql)

SUPER

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.13. mysql_eof()

my_bool mysql_eof(MYSQL_RES *result)

mysql_errno()mysql_error()

mysql_eof()1

mysql_store_result() 1 mysql_fetch_row()NULL mysql_eof() mysql_store_result() mysql_eof()“”

mysql_use_result() mysql_fetch_row() mysql_fetch_row() NULL mysql_eof() mysql_eof()0 0

mysql_eof()MySQLmysql_errno()mysql_error() mysql_eof()
mysql_eof()

0 0

mysql_eof()

```
mysql_query(&mysql,"SELECT * FROM some_table");

result = mysql_use_result(&mysql);

while((row = mysql_fetch_row(result)))

{

    // do something with data

}

if(!mysql_eof(result))  // mysql_fetch_row() failed due to an error

{

    fprintf(stderr, "Error: %s\n", mysql_error(&mysql));

}
```

MySQL

```
mysql_query(&mysql,"SELECT * FROM some_table");
result = mysql_use_result(&mysql);
while((row = mysql_fetch_row(result)))
{
    // do something with data
}
if(mysql_errno(&mysql))  // mysql_fetch_row() failed due to an error
{
    fprintf(stderr, "Error: %s\n", mysql_error(&mysql));
}
```

25.2.3.14. mysql_errno()

unsigned int mysql_errno(MYSQL *mysql)

mysql mysql_errno()API“ 0” MySQL errmsg.h B

mysql_fetch_row() mysql_errno()

mysql_errno()

mysql_*xxx*() “0”

25.2.3.15. mysql_error()

const char *mysql_error(MYSQL *mysql)

mysql API mysql_error() Null mysql_error()

mysql_error()

mysql_errno()

```
if(mysql_errno(&mysql))
{
    // an error occurred
}
```

```
if(mysql_error(&mysql)[0] != '\0')
{
    // an error occurred
}
```

MySQL 5.10.2“”

Null

25.2.3.16. mysql_escape_string()

mysql_real_escape_string()

mysql_real_escape_string() mysql_real_escape_string()1
mysql_escape_string()

25.2.3.17. mysql_fetch_field()

MYSQL_FIELD *mysql_fetch_field(MYSQL_RES *result)

MYSQL_FIELD mysql_fetch_field()NULL

SELECT mysql_fetch_field()1 mysql_field_seek()mysql_fetch_field()

mysql_query()SELECTmysql_store_result()mysql_fetch_field()BLOB MySQLBlob8KB 8KBMySQLBLOB field->max_length

MYSQL_FIELD NULL

```
MYSQL_FIELD *field;

while((field = mysql_fetch_field(result)))
{
    printf("field name %s\n", field->name);
}
```

25.2.3.18. mysql_fetch_field_direct()

MYSQL_FIELD *mysql_fetch_field_direct(MYSQL_RES *result, unsigned int fieldnr)

1fieldnrMYSQL_FIELD Fieldnr0mysql_num_fields(result)-1

MYSQL_FIELD

```
unsigned int num_fields;
unsigned int i;
MYSQL_FIELD *field;

num_fields = mysql_num_fields(result);
for(i = 0; i < num_fields; i++)
{
    field = mysql_fetch_field_direct(result, i);
    printf("Field %u is %s\n", i, field->name);
}
```

25.2.3.19. mysql_fetch_fields()

MYSQL_FIELD *mysql_fetch_fields(MYSQL_RES *result)

MYSQL_FIELD 1

MYSQL_FIELD

```
unsigned int num_fields;
unsigned int i;
MYSQL_FIELD *fields;

num_fields = mysql_num_fields(result);
fields = mysql_fetch_fields(result);
for(i = 0; i < num_fields; i++)
{
   printf("Field %u is %s\n", i, fields[i].name);
}
```

25.2.3.20. mysql_fetch_lengths()

unsigned long *mysql_fetch_lengths(MYSQL_RES *result)

strlen() Null strlen() NULL 0 mysql_fetch_row()

NULL NULL

mysql_fetch_lengths() mysql_fetch_row() NULL

```
MYSQL_ROW row;
unsigned long *lengths;
unsigned int num_fields;
```

```
unsigned int i;


row = mysql_fetch_row(result);
if (row)
{
    num_fields = mysql_num_fields(result);
    lengths = mysql_fetch_lengths(result);
    for(i = 0; i < num_fields; i++)
    {
         printf("Column %u is %lu bytes in length.\n", i, lengths[i]
    }
}
```

25.2.3.21. mysql_fetch_row()

MYSQL_ROW mysql_fetch_row(MYSQL_RES *result)

mysql_store_result() mysql_fetch_row()NULLmysql_use_result() mysql_fetch_row()NULL

mysql_num_fields(result) mysql_fetch_row() row[0] row[mysql_num_fields(result)-1] NULLNULL

mysql_fetch_lengths() NULL 0 NULLNULL

MYSQL_ROW NULL

mysql_fetch_row()

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

```
MYSQL_ROW row;
unsigned int num_fields;
unsigned int i;

num_fields = mysql_num_fields(result);
while ((row = mysql_fetch_row(result)))
{
   unsigned long *lengths;
   lengths = mysql_fetch_lengths(result);
   for(i = 0; i < num_fields; i++)
   {
       printf("[%.*s] ", (int) lengths[i], row[i] ? row[i] : "NULL")
   }
   printf("\n");
}
```

25.2.3.22. mysql_field_count()

unsigned int mysql_field_count(MYSQL *mysql)

mysql_store_result()NULL mysql_field_count()
mysql_store_result() SELECT SELECT

25.2.13.1“mysql_query()mysql_store_result()NULL ”.

```
MYSQL_RES *result;
unsigned int num_fields;
unsigned int num_rows;

if (mysql_query(&mysql,query_string))
{
    // error
}
else // query succeeded, process any data returned by it
{
    result = mysql_store_result(&mysql);
    if (result)  // there are rows
    {
        num_fields = mysql_num_fields(result);
        // retrieve rows, then call mysql_free_result(result)
    }
    else  // mysql_store_result() returned nothing; should it have?
```

```
    {
        if(mysql_field_count(&mysql) == 0)
        {
            // query does not return data
            // (it was not a SELECT)
            num_rows = mysql_affected_rows(&mysql);
        }
        else // mysql_store_result() should have returned data
        {
            fprintf(stderr, "Error: %s\n", mysql_error(&mysql));
        }
    }
}
```

mysql_errno(&mysql)mysql_field_count(&mysql) SELECT mysql_store_result() mysql_field_count()

25.2.3.23. mysql_field_seek()

MYSQL_FIELD_OFFSET mysql_field_seek(MYSQL_RES *result, MYSQL_FIELD_OFFSET offset)

mysql_fetch_field()

0

25.2.3.24. mysql_field_tell()

MYSQL_FIELD_OFFSET mysql_field_tell(MYSQL_RES *result)

mysql_fetch_field() mysql_field_seek()

25.2.3.25. mysql_free_result()

void mysql_free_result(MYSQL_RES *result)

mysql_store_result()mysql_use_result()mysql_list_dbs() mysql_free_result()

25.2.3.26. mysql_get_character_set_info()

void mysql_get_character_set_info(MYSQL *mysql, MY_CHARSET_INFO *cs)

mysql_set_character_set()

MySQL 5.0.10

```
if (!mysql_set_character_set(&mysql, "utf8"))
{
    MY_CHARSET_INFO cs;
    mysql_get_character_set_info(&mysql, &cs);
    printf("character set information:\n");
    printf("character set name: %s\n", cs.name);
    printf("collation name: %s\n", cs.csname);
    printf("comment: %s\n", cs.comment);
    printf("directory: %s\n", cs.dir);
    printf("multi byte character min. length: %d\n", cs.mbminlen);
    printf("multi byte character max. length: %d\n", cs.mbmaxlen);
}
```

25.2.3.27. mysql_get_client_info()

char *mysql_get_client_info(void)

MySQL

25.2.3.28. mysql_get_client_version()

unsigned long mysql_get_client_version(void)

XYYZZX YY ZZ 401024.1.2

MySQL

25.2.3.29. mysql_get_host_info()

char *mysql_get_host_info(MYSQL *mysql)

25.2.3.30. mysql_get_proto_info()

unsigned int mysql_get_proto_info(MYSQL *mysql)

25.2.3.31. mysql_get_server_info()

char *mysql_get_server_info(MYSQL *mysql)

25.2.3.32. mysql_get_server_version()

unsigned long mysql_get_server_version(MYSQL *mysql)

MySQL

```
major_version*10000 + minor_version *100 + sub_version
```

5.0.12500012

25.2.3.33. mysql_hex_string()

unsigned long mysql_hex_string(char *to, const char *from, unsigned long length)

SQLSQL 9.1.1“”

2 1Null

“from”“ long”“ to” length*2+1 mysql_hex_string() “to”Null Null

0x*value*X'*value*'SQL 0xX'...'

```
char query[1000],*end;

end = strmov(query,"INSERT INTO test_table values(");
end = strmov(end,"0x");
end += mysql_hex_string(end,"What's this",11);
end = strmov(end,",0x");
end += mysql_hex_string(end,"binary data: \0\r\n",16);
```

```
*end++ = ')';

if (mysql_real_query(&mysql,query,(unsigned int) (end - query)))
{
   fprintf(stderr, "Failed to insert row, Error: %s\n",
           mysql_error(&mysql));
}
```

strmov()mysqlclient strcpy()1Null

“ to” Null

25.2.3.34. mysql_info()

char *mysql_info(MYSQL *mysql)

mysql_info()NULL

· INSERT INTO ... SELECT ...

100 0 0

· INSERT INTO ... VALUES (...),(...),(...)...

3 0 0

· LOAD DATA INFILE ...

1 0 0 0

· ALTER TABLE

3 0 0

· UPDATE

40 40 0

mysql_info()INSERT ... VALUESNULL INSERT ... VALUES

NULL

25.2.3.35. mysql_init()

MYSQL *mysql_init(MYSQL *mysql)

mysql_real_connect()MYSQL mysqlNULL
mysql_init() mysql_close()

MYSQL* NULL

NULL

25.2.3.36. mysql_insert_id()

my_ulonglong mysql_insert_id(MYSQL *mysql)

INSERTUPDATEAUTO_INCREMENT AUTO_INCREMENTINSERT

mysql_insert_id()

· AUTO_INCREMENTINSERT NULL0

· INSERT mysql_insert_id()1AUTO_INCREMENT AUTO_INCREMENT1

· LAST_INSERT_ID(*expr*)AUTO_INCREMENTINSERT

· LAST_INSERT_ID(*expr*)AUTO_INCREMENTINSERT

· mysql_insert_id()SELECT

· mysql_insert_id()

AUTO_INCREMENTmysql_insert_id()0 mysql_insert_id()

mysql_insert_id()

12.9.3“”

SQL LAST_INSERT_ID()AUTO_INCREMENT AUTO_INCREMENT LAST_INSERT_ID()

LAST_INSERT_ID()mysql_insert_id() LAST_INSERT_ID() mysql_insert_id()AUTO_INCREMENT

25.2.3.37. mysql_kill()

int mysql_kill(MYSQL *mysql, unsigned long pid)

pid

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.38. mysql_library_end()

void mysql_library_end(void)

mysql_server_end()

25.2.2“C API”

25.2.3.39. mysql_library_init()

int mysql_library_init(int argc, char **argv, char **groups)

mysql_server_init()

25.2.2“C API”

25.2.3.40. mysql_list_dbs()

MYSQL_RES *mysql_list_dbs(MYSQL *mysql, const char *wild)

“ %”“ _” NULL mysql_list_dbs()SHOW database [LIKE wild]

mysql_free_result()

MYSQL_RES NULL

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.41. mysql_list_fields()

MYSQL_RES *mysql_list_fields(MYSQL *mysql, const char *table, const char *wild)

“ %”“ _” NULL mysql_list_fields()SHOW COLUMNS FROM *tbl_name* [LIKE *wild*]

SHOW COLUMNS FROM *tbl_name*mysql_list_fields()

mysql_free_result()

MYSQL_RES NULL

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.42. mysql_list_processes()

MYSQL_RES *mysql_list_processes(MYSQL *mysql)

mysqladmin processlistSHOW PROCESSLIST

mysql_free_result()

MYSQL_RES NULL

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.43. mysql_list_tables()

MYSQL_RES *mysql_list_tables(MYSQL *mysql, const char *wild)

“ %”“ _” NULL mysql_list_tables()HOW tables [LIKE *wild*]

mysql_free_result()

MYSQL_RES NULL

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.44. mysql_more_results()

my_bool mysql_more_results(MYSQL *mysql)

“” mysql_next_result()

“”1 “”0

mysql_next_result()

25.2.9“C API” 25.2.3.45“mysql_next_result()”

25.2.3.45. mysql_next_result()

int mysql_next_result(MYSQL *mysql)

mysql_next_result()

mysql_free_result()

mysql_next_result() mysql_real_query()mysql_query() mysql_store_result()mysql_warning_count()mysql_affected_rows()

mysql_next_result()

25.2.9“C API”

0	
-1	
>0	

· CR_COMMANDS_OUT_OF_SYNC

mysql_use_result()

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.46. mysql_num_fields()

unsigned int mysql_num_fields(MYSQL_RES *result)

MYSQL* mysql_field_count(MYSQL *mysql)

mysql_store_result()mysql_use_result()NULL mysql_field_count()mysql_store_result() SELECT SELECT

25.2.13.1“mysql_query()mysql_store_result()NULL ”

```
MYSQL_RES *result;
unsigned int num_fields;
```

```
unsigned int num_rows;


if (mysql_query(&mysql,query_string))
{
    // error
}
else // query succeeded, process any data returned by it
{
    result = mysql_store_result(&mysql);
    if (result)  // there are rows
    {
        num_fields = mysql_num_fields(result);
        // retrieve rows, then call mysql_free_result(result)
    }
    else  // mysql_store_result() returned nothing; should it have?
    {
        if (mysql_errno(&mysql))
        {
           fprintf(stderr, "Error: %s\n", mysql_error(&mysql));
        }
        else if (mysql_field_count(&mysql) == 0)
        {
            // query does not return data
            // (it was not a SELECT)
            num_rows = mysql_affected_rows(&mysql);
        }
```

```
    }
}
```

“ mysql_field_count(&mysql) is = 0” mysql_errno(&mysql)

25.2.3.47. mysql_num_rows()

my_ulonglong mysql_num_rows(MYSQL_RES *result)

mysql_num_rows()mysql_store_result()mysql_use_result()
mysql_store_result()mysql_num_rows()mysql_use_result()mysql_num_rows()

25.2.3.48. mysql_options()

int mysql_options(MYSQL *mysql, enum mysql_option option, const char *arg)

mysql_init() mysql_connect()mysql_real_connect()mysql_options()

Arg arg

MYSQL_INIT_COMMAND	char *	MySQL
MYSQL_OPT_COMPRESS		
MYSQL_OPT_CONNECT_TIMEOUT	unsigned int *	
MYSQL_OPT_GUESS_CONNECTION		libmysqld “’ MYSQL_OPT_ MYSQL_OPT_ libmysqlclie
MYSQL_OPT_LOCAL_INFILE		“ unsigned
MYSQL_OPT_NAMED_PIPE		NTMySQL
MYSQL_OPT_PROTOCOL	unsigned int *	mysql.hmys
MYSQL_OPT_READ_TIMEOUT	unsigned int *	WindowsTC
MYSQL_OPT_RECONNECT	my_bool *	MySQL
MYSQL_OPT_SET_CLIENT_IP	char *	libmysqld lil libmysqlclient

MYSQL_OPT_USE_EMBEDDED_CONNECTION		libmysqld
MYSQL_OPT_USE_REMOTE_CONNECTION		libmysqld
MYSQL_OPT_USE_RESULT		
MYSQL_OPT_WRITE_TIMEOUT	unsigned int *	WindowsT(
MYSQL_READ_DEFAULT_FILE	char *	my.cnf
MYSQL_READ_DEFAULT_GROUP	char *	my.cnfMYSQL
MYSQL_REPORT_DATA_TRUNCATION	my_bool *	MYSQL_BIND
MYSQL_SECURE_AUTH	my_bool*	MySQL 4.1
MYSQL_SET_CHARSET_DIR	char*	
MYSQL_SET_CHARSET_NAME	char*	
MYSQL_SHARED_MEMORY_BASE_NAME	char*	mysqld“ -s

MYSQL_READ_DEFAULT_FILEMYSQL_READ_DEFAULT_GROUP

connect-timeout	Linux
compress	
database	
debug	
disable-local-infile	LOAD DATA LOCAL
host	
init-command	MySQL
interactive-timeout	CLIENT_INTERACTIVEmysql_real_connect()25.2.3.51 “mysql_real_connect()”
local-infile[=(0|1)]	!= 0LOAD DATA LOCAL
max_allowed_packet	
multi-results	

multi-statements	1“ ;”
password	
pipe	NTMySQL
protocol={TCP | SOCKET | PIPE | MEMORY}	
port	
return-found-rows	mysql_info() UPDATE
shared-memory-base-name=*name*	"MYSQL"
socket	
user	

“ timeout” “connect-timeout” MySQL 5.1.2-alpha
“ timeout”

4.3.2“”

0 0

```
MYSQL mysql;

mysql_init(&mysql);
mysql_options(&mysql,MYSQL_OPT_COMPRESS,0);
mysql_options(&mysql,MYSQL_READ_DEFAULT_GROUP,"odbc");
if (!mysql_real_connect(&mysql,"host","user","passwd","database",0,N
{
    fprintf(stderr, "Failed to connect to database: Error: %s\n",
          mysql_error(&mysql));
}
```

my.cnfobdc

25.2.3.49. mysql_ping()

int mysql_ping(MYSQL *mysql)

0 0 0MySQL

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_UNKNOWN_ERROR

25.2.3.50. mysql_query()

int mysql_query(MYSQL *mysql, const char *query)

“ Null” SQL 1SQL‘ ;’“ \g” 25.2.9“C API”

mysql_query() mysql_real_query()‘ \0’mysql_query()

mysql_field_count() 25.2.3.22“mysql_field_count()”

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.51. mysql_real_connect()

MYSQL *mysql_real_connect(MYSQL *mysql, const char *host, const char *user, const char *passwd, const char *db, unsigned int port, const char *unix_socket, unsigned long client_flag)

mysql_real_connect()MySQL MySQLAPI mysql_real_connect()

· 1MYSQL mysql_real_connect() mysql_init()MYSQL mysql_options() 25.2.3.48“mysql_options()”

· “host” IP“ host” NULL"localhost" UnixWindows TCP/IP

· “user”MySQLID“ user”NULL"" UNIX Windows ODBC 26.1.9.2“WindowsMyODBC DSN”

· “passwd” “ passwd”NULL 1 MySQL

mysql_real_connect() API

· “db” dbNULL

· “ port”0TCP/IP“ host”

· unix_socketNULL“ host”

· client_flag0

CLIENT_COMPRESS	

CLIENT_FOUND_ROWS	
CLIENT_IGNORE_SPACE	
CLIENT_INTERACTIVE	interactive_timeout wait_timeout wait_timeoutinteractive_timeout
CLIENT_LOCAL_FILES	LOAD DATA LOCAL
CLIENT_MULTI_STATEMENTS	‘ ;’
CLIENT_MULTI_RESULTS	
CLIENT_NO_SCHEMA	*db_name.tbl_name.col_name* ODBC ODBC
CLIENT_ODBC	ODBC **mysqld**ODBC
CLIENT_SSL	SSL

mysql_real_connect() mysql_real_connect() MYSQL_READ_DEFAULT_FILEMYSQL_READ_DEFAULT_GROUP mysql_options() mysql_real_connect()“ ”

· hostNULL("")

· userNULL

· passwdNULL mysql_real_connect() MySQL

· dbNULL

· port“0”

· unix_socketNULL

MYSQL* NULL 1

· CR_CONN_HOST_ERROR

MySQL

· CR_CONNECTION_ERROR

MySQL

· CR_IPSOCK_ERROR

IP

· CR_OUT_OF_MEMORY

· CR_SOCKET_CREATE_ERROR

Unix

· CR_UNKNOWN_HOST

IP

· CR_VERSION_ERROR

“

· CR_NAMEDPIPEOPEN_ERROR

Windows

· CR_NAMEDPIPEWAIT_ERROR

Windows

· CR_NAMEDPIPESETSTATE_ERROR

Windows

· CR_SERVER_LOST

connect_timeout > 0connect_timeout init-command

```
MYSQL mysql;

mysql_init(&mysql);
mysql_options(&mysql,MYSQL_READ_DEFAULT_GROUP,"your_prog_name");
if (!mysql_real_connect(&mysql,"host","user","passwd","database",0,N
{
    fprintf(stderr, "Failed to connect to database: Error: %s\n",
          mysql_error(&mysql));
}
```

mysql_options()MySQLmy.cnf[client][your_prog_name] MySQL

mysql_real_connect()MYSQL 5.0.3API“ 1”“ 0” “ 1” MySQL 5.0.13 mysql_options() MYSQL_OPT_RECONNECT

25.2.3.52. mysql_real_escape_string()

unsigned long mysql_real_escape_string(MYSQL *mysql, char *to, const char *from, unsigned long length)

mysql

SQLSQL 9.1.1“”

“ from” SQL“ to” 1NULL NUL (ASCII 0)‘ \n’‘ \r’‘ \’‘ ’‘ "’ Control-Z 9.1“” MySQL

“from”“ long”“ to” length*2+1 2 Null mysql_real_escape_string() “to” Null Null

mysql_set_character_set() SET NAMES (SET CHARACTER SET)
mysql_set_character_set()SET NAMESmysql_real_escape_string() SET NAMES

```
char query[1000],*end;

end = strmov(query,"INSERT INTO test_table values(");
*end++ = '\'';
end += mysql_real_escape_string(&mysql, end,"What's this",11);
*end++ = '\'';
*end++ = ',';
*end++ = '\'';
end += mysql_real_escape_string(&mysql, end,"binary data: \0\r\n",16
*end++ = '\'';
*end++ = ')';
```

```
if (mysql_real_query(&mysql,query,(unsigned int) (end - query)))
{
   fprintf(stderr, "Failed to insert row, Error: %s\n",
           mysql_error(&mysql));
}
```

strmov()mysqlclient strcpy() 1Null

“ to” Null

25.2.3.53. mysql_real_query()

int mysql_real_query(MYSQL *mysql, const char *query, unsigned long length)

“ query” SQL“ long” 1SQL ‘ ;’“ \g” 25.2.9“ C API”

mysql_real_query()mysql_query() ‘\0’ mysql_real_query() mysql_query() strlen()

mysql_field_count()25.2.3.22“mysql_field_count()”

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.54. mysql_refresh()

int mysql_refresh(MYSQL *mysql, unsigned int options)

RELOAD

“options”“ Or”

· REFRESH_GRANT

FLUSH PRIVILEGES

· REFRESH_LOG

FLUSH LOGS

· REFRESH_TABLES

FLUSH TABLES

· REFRESH_HOSTS

FLUSH HOSTS

· REFRESH_STATUS

FLUSH STATUS

· REFRESH_THREADS

· REFRESH_SLAVE

RESET SLAVE

· REFRESH_MASTER

RESE

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.55. mysql_reload()

int mysql_reload(MYSQL *mysql)

MySQL RELOAD

mysql_query()SQL FLUSH PRIVILEGES

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.56. mysql_rollback()

my_bool mysql_rollback(MYSQL *mysql)

completion_type completion_type“2” mysql_close()

0 0

25.2.3.57. mysql_row_seek()

MYSQL_ROW_OFFSET mysql_row_seek(MYSQL_RES *result,
MYSQL_ROW_OFFSET offset)

“ offset” mysql_row_tell()mysql_row_seek()
mysql_data_seek()

mysql_row_seek()mysql_store_result() mysql_use_result()

mysql_row_seek()

25.2.3.58. mysql_row_tell()

MYSQL_ROW_OFFSET mysql_row_tell(MYSQL_RES *result)

mysql_fetch_row() mysql_row_seek()

mysql_store_result() mysql_use_result()mysql_row_tell()

25.2.3.59. mysql_select_db()

int mysql_select_db(MYSQL *mysql, const char *db)

dbmysql

mysql_select_db()

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.60. mysql_set_character_set()

int mysql_set_character_set(MYSQL *mysql, char *csname)

csname1 SET NAMES mysql->charset mysql_real_escape_string()

MySQL 5.0.7

0 0

```
MYSQL mysql;

mysql_init(&mysql);
if (!mysql_real_connect(&mysql,"host","user","passwd","database",0,N
{
    fprintf(stderr, "Failed to connect to database: Error: %s\n",
          mysql_error(&mysql));
}

if (!mysql_set_charset_name(&mysql, "utf8"))
{
    printf("New client character set: %s\n", mysql_character_set_nam
}
```

25.2.3.61. mysql_set_server_option()

int mysql_set_server_option(MYSQL *mysql, enum enum_mysql_set_option option)

MYSQL_OPTION_MULTI_STATEMENTS_ON	

MYSQL_OPTION_MULTI_STATEMENTS_OFF	

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· ER_UNKNOWN_COM_ERROR

mysql_set_server_option() 4.1.1

25.2.3.62. mysql_shutdown()

int mysql_shutdown(MYSQL *mysql, enum enum_shutdown_level shutdown_level)

SHUTDOWN MySQL 5.11 shutdown_level SHUTDOWN_DEFAULT libmysqlclientmysql_shutdown() libmysqlclient

5.5“MySQL”

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.63. mysql_sqlstate()

const char *mysql_sqlstate(MYSQL *mysql)

Null SQLSTATE 5 '00000' ANSI SQLODBC B

MySQLSQLSTATE 'HY000'

SQLSTATE Null

25.2.3.14“mysql_errno()” 25.2.3.15“mysql_error()” 25.2.7.26 “mysql_stmt_sqlstate()”

25.2.3.64. mysql_ssl_set()

int mysql_ssl_set(MYSQL *mysql, const char *key, const char *cert, const char *ca, const char *capath, const char *cipher)

mysql_ssl_set()SSL mysql_real_connect()

OpenSSL mysql_ssl_set()

Mysqlmysql_init()

· keykey

· cert

· ca

· capath pemSSL CA

· cipher SSL

SSL NULL

0SSL mysql_real_connect()

25.2.3.65. mysql_stat()

char *mysql_stat(MYSQL *mysql)

mysqladmin status

NULL

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.66. mysql_store_result()

MYSQL_RES *mysql_store_result(MYSQL *mysql)

SELECTSHOWDESCRIBEEXPLAINCHECK TABLE mysql_store_result() mysql_use_result()

mysql_store_result()mysql_use_result()mysql_store_result() mysql_store_result()0

mysql_field_count() 25.2.3.22“mysql_field_count()”

mysql_store_result() 1MYSQL_RES

mysql_store_result()Null INSERT

mysql_store_result()Null mysql_error() mysql_errno()0 mysql_field_count()0

mysql_store_result()Null mysql_num_rows()

mysql_fetch_row() mysql_row_seek()mysql_row_tell()

mysql_free_result()

25.2.13.1“mysql_query()mysql_store_result()NULL ”.

MYSQL_RES NULL

mysql_store_result()mysql_error()mysql_errno()

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.67. mysql_thread_id()

unsigned long mysql_thread_id(MYSQL *mysql)

IDmysql_kill()

mysql_ping() ID ID

ID

25.2.3.68. mysql_use_result()

MYSQL_RES *mysql_use_result(MYSQL *mysql)

SELECTSHOWDESCRIBEEXPLAIN mysql_store_result()
mysql_use_result()

mysql_use_result() mysql_store_result() mysql_fetch_row()
mysql_store_result() max_allowed_packet

“ ^S” mysql_use_result()

mysql_use_result() mysql_fetch_row()NULL C API

mysql_use_result()
mysql_data_seek()mysql_row_seek()mysql_row_tell()mysql_num_rows()
mysql_affected_rows() mysql_use_result()
mysql_num_rows()

mysql_free_result()

libmysqld mysql_free_result()

MYSQL_RES NULL

mysql_use_result()mysql_error()mysql_errno()

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.3.69. mysql_warning_count()

unsigned int mysql_warning_count(MYSQL *mysql)

SQL

25.2.4. C API

MySQL mysql_stmt_init()MYSQL_STMT

CREATE TABLEDELETEDOINSERTREPLACESELECTSETUPDATE SHOW MySQL 5.1

25.2.5. C API

MYSQL_STMTMYSQL_BIND 3MYSQL_TIME

· MYSQL_STMT

mysql_stmt_init() MYSQL_STMT mysql_stmt_close() MYSQL_STMT MYSQL_STMT

· MYSQL_BIND

mysql_stmt_bind_result() with mysql_stmt_fetch() MYSQL_BIND

o enum enum_field_types buffer_type

buffer_type buffer_type

o void *buffer

unsigned MYSQL_TIME

o unsigned long buffer_length

*buffer C buffer_lengthmysql_stmt_bind_param()*buffer mysql_stmt_bind_result()

o unsigned long *length

unsigned long *buffer “length”C “length”unsigned long *buffer mysql_stmt_execute() mysql_stmt_fetch()“length”

“length” buffer_type

o my_bool *is_null

my_bool NULL“”Null“” *is_null“” NULL NULL “”

“is_null”

§ NULLMYSQL_TYPE_NULL

§ NOT NULLis_null = (my_bool*) 0

§ is_nullmy_bool NULLNOT NULL

o my_bool is_unsigned

MYSQL_TYPE_TINYMYSQL_TYPE_SHORTMYSQL_TYPE_LONG MYSQL_TYPE_LONGLONG “is_unsigned”“” “”

o my_bool error

MYSQL_REPORT_DATA_TRUNCATIONmysql_options() mysql_stmt_fetch()MYSQL_DATA_TRUNCATED MYSQL_BIND “” 1

MYSQL_BIND 0 MYSQL_BIND

```
MYSQL_BIND    bind[3];

memset(bind, 0, sizeof(bind));
```

· MYSQL_TIME

DATETIMEDATETIMETIMESTAMP MYSQL_BINDbuffer_type bufferMYSQL_TIME

MYSQL_TIME

- unsigned int year
- unsigned int month
- unsigned int day
- unsigned int hour
- unsigned int minute
- unsigned int second
- my_bool neg
- unsigned long second_part

MYSQL_TIMEDATEDATETIMETIMESTAMP TIMEDATETIME TIMESTAMP 25.2.10“C API”

MYSQL_BINDbuffer_type buffer_typeSQL C

buffer_type	**SQL**	**C**
MYSQL_TYPE_TINY	TINYINT	char
MYSQL_TYPE_SHORT	SMALLINT	short int
MYSQL_TYPE_LONG	INT	int
MYSQL_TYPE_LONGLONG	BIGINT	long long
MYSQL_TYPE_FLOAT	FLOAT	float
MYSQL_TYPE_DOUBLE	DOUBLE	double
MYSQL_TYPE_TIME	TIME	MYSQL
MYSQL_TYPE_DATE	DATE	MYSQL
MYSQL_TYPE_DATETIME	DATETIME	MYSQL
MYSQL_TYPE_TIMESTAMP	TIMESTAMP	MYSQL
MYSQL_TYPE_STRING	CHAR	
MYSQL_TYPE_VAR_STRING	VARCHAR	

MYSQL_TYPE_TINY_BLOB	TINYBLOB/TINYTEXT	
MYSQL_TYPE_BLOB	BLOB/TEXT	
MYSQL_TYPE_MEDIUM_BLOB	MEDIUMBLOB/MEDIUMTEXT	
MYSQL_TYPE_LONG_BLOB	LONGBLOB/LONGTEXT	

25.2.6. C API

25.2.7“C API”

mysql_stmt_affected_rows()	UPDATEDELETEINSERT
mysql_stmt_attr_get()	
mysql_stmt_attr_set()	
mysql_stmt_bind_param()	SQL
mysql_stmt_bind_result()	
mysql_stmt_close()	

mysql_stmt_data_seek()	
mysql_stmt_errno()	
mysql_stmt_error()	
mysql_stmt_execute()	
mysql_stmt_fetch()	
mysql_stmt_fetch_column()	
mysql_stmt_field_count()	
mysql_stmt_free_result()	
mysql_stmt_init()	MYSQL_STMT
mysql_stmt_insert_id()	AUTO_INCREMENT ID
mysql_stmt_num_rows()	
mysql_stmt_param_count()	SQL
mysql_stmt_param_metadata()	

mysql_stmt_prepare()	SQL
mysql_stmt_reset()	
mysql_stmt_result_metadata()	
mysql_stmt_row_seek()	mysql_stmt_row_tell()
mysql_stmt_row_tell()	
mysql_stmt_send_long_data()	
mysql_stmt_sqlstate()	SQLSTATE
mysql_stmt_store_result()	

mysql_stmt_init() mysql_stmt_prepare mysql_stmt_bind_param() mysql_stmt_execute() mysql_stmt_bind_param() mysql_stmt_execute()

SELECT mysql_stmt_prepare()mysql_stmt_result_metadata()MYSQL_RES

mysql_stmt_bind_result() mysql_stmt_fetch()

mysql_stmt_send_long_data() 25.2.7.25 “mysql_stmt_send_long_data()”

mysql_stmt_close()

mysql_stmt_result_metadata()SELECT mysql_free_result()

1. msyql_stmt_init() mysql_stmt_prepare()SQL
2. mysql_stmt_result_metadata()
3. mysql_stmt_bind_param()
4. mysql_stmt_execute()
5. mysql_stmt_bind_result()
6. mysql_stmt_fetch()
7. 36

mysql_stmt_prepare() MySQL

· IDOK

· ID

mysql_stmt_execute() MySQL

.

· ID OK

mysql_stmt_fetch() MySQL

.

mysql_stmt_errno()mysql_stmt_error()mysql_stmt_sqlstate() SQLSTATE

mysql_stmt_prepare()mysql_stmt_execute() C API“”“”

1. mysql_stmt_prepare()"SELECT ?"
2. mysql_stmt_bind_param()“3”
3. mysql_stmt_execute()

```
Prepare  [1] SELECT ?
Execute  [1] SELECT 3
```

“”“” [*n*]ID *N* *n*1“ ?”“”

MySQL 4.1.10“” [*n*] MySQL 4.1.10“”

25.2.7. C API

25.2.7.1. mysql_stmt_affected_rows()
25.2.7.2. mysql_stmt_attr_get()
25.2.7.3. mysql_stmt_attr_set()
25.2.7.4. mysql_stmt_bind_param()
25.2.7.5. mysql_stmt_bind_result()
25.2.7.6. mysql_stmt_close()
25.2.7.7. mysql_stmt_data_seek()
25.2.7.8. mysql_stmt_errno()
25.2.7.9. mysql_stmt_error()
25.2.7.10. mysql_stmt_execute()
25.2.7.11. mysql_stmt_fetch()
25.2.7.12. mysql_stmt_fetch_column()
25.2.7.13. mysql_stmt_field_count()
25.2.7.14. mysql_stmt_free_result()
25.2.7.15. mysql_stmt_init()
25.2.7.16. mysql_stmt_insert_id()
25.2.7.17. mysql_stmt_num_rows()
25.2.7.18. mysql_stmt_param_count()
25.2.7.19. mysql_stmt_param_metadata()
25.2.7.20. mysql_stmt_prepare()

25.2.7.21. mysql_stmt_reset()
25.2.7.22. mysql_stmt_result_metadata()
25.2.7.23. mysql_stmt_row_seek()
25.2.7.24. mysql_stmt_row_tell()
25.2.7.25. mysql_stmt_send_long_data()
25.2.7.26. mysql_stmt_sqlstate()
25.2.7.27. mysql_stmt_store_result()

MYSQL_STMTmysql_stmt_

MYSQL_STMT mysql_stmt_init()

25.2.7.1. mysql_stmt_affected_rows()

my_ulonglong mysql_stmt_affected_rows(MYSQL_STMT *stmt)

UPDATEDELETEINSERT mysql_stmt_execute() SELECT mysql_stmt_affected_rows()mysql_num_rows()

0 UPDATE“ 0” WHERE “-1” SELECT mysql_stmt_store_result()mysql_stmt_affected_rows() mysql_stmt_affected_rows()“ (my_ulonglong)-1” “(my_ulonglong)~0” “ -1”

25.2.3.1“mysql_affected_rows()”

mysql_stmt_affected_rows() 25.2.7.10“mysql_stmt_execute()”

25.2.7.2. mysql_stmt_attr_get()

int mysql_stmt_attr_get(MYSQL_STMT *stmt, enum enum_stmt_attr_type option, void *arg)

“option” “arg” “option”“ arg”

25.2.7.3“mysql_stmt_attr_set()”

OK0 0

25.2.7.3. mysql_stmt_attr_set()

int mysql_stmt_attr_set(MYSQL_STMT *stmt, enum enum_stmt_attr_type option, const void *arg)

“option” “arg” “option”“ arg”

STMT_ATTR_UPDATE_MAX_LENGTH	my_bool *	1mysql_stmt_store_result(>max_length

STMT_ATTR_CURSOR_TYPE	unsigned long *	mysql_stmt_execute() CURSOR_TYPE_NO_CU CURSOR_TYPE_READ_
STMT_ATTR_PREFETCH_ROWS	unsigned long *	*arg1unsigned long

CURSOR_TYPE_READ_ONLYSTMT_ATTR_CURSOR_TYPE
mysql_stmt_execute() mysql_stmt_execute()
mysql_stmt_reset() mysql_stmt_free_result()

mysql_stmt_store_result()

MySQL 5.0.2STMT_ATTR_CURSOR_TYPE MySQL 5.0.6
STMT_ATTR_PREFETCH_ROWS

OK0 0

1 5

```
MYSQL_STMT *stmt;

int rc;

unsigned long type;

unsigned long prefetch_rows = 5;


stmt = mysql_stmt_init(mysql);
```

```
type = (unsigned long) CURSOR_TYPE_READ_ONLY;
rc = mysql_stmt_attr_set(stmt, STMT_ATTR_CURSOR_TYPE, (void*) &type)
/* ... check return value ... */
rc = mysql_stmt_attr_set(stmt, STMT_ATTR_PREFETCH_ROWS,
                                        (void*) &prefetch_rows);
/* ... check return value ... */
```

25.2.7.4. mysql_stmt_bind_param()

my_bool mysql_stmt_bind_param(MYSQL_STMT *stmt, MYSQL_BIND *bind)

mysql_stmt_bind_param()SQL mysql_stmt_prepare()MYSQL_BIND “bind”MYSQL_BIND “?” 1

```
INSERT INTO mytbl VALUES(?,?,?)
```

MYSQL_BIND3

```
MYSQL_BIND bind[3];
```

25.2.5“C API” MYSQL_BIND

0 0

· CR_INVALID_BUFFER_USE

“ bind”

· CR_UNSUPPORTED_PARAM_TYPE

buffer_type

· CR_OUT_OF_MEMORY

· CR_UNKNOWN_ERROR

mysql_stmt_bind_param() 25.2.7.10“mysql_stmt_execute()”

25.2.7.5. mysql_stmt_bind_result()

my_bool mysql_stmt_bind_result(MYSQL_STMT *stmt, MYSQL_BIND *bind)

mysql_stmt_bind_result() mysql_stmt_fetch() MySQL

mysql_stmt_fetch() “bind”MYSQL_BIND MYSQL_BIND mysql_stmt_fetch()

mysql_stmt_fetch() mysql_stmt_fetch() mysql_stmt_fetch()

mysql_stmt_bind_result() 25.2.5“C API” MYSQL_BIND

0 0

· CR_UNSUPPORTED_PARAM_TYPE

buffer_type

· CR_OUT_OF_MEMORY

· CR_UNKNOWN_ERROR

mysql_stmt_bind_result() 25.2.7.11“mysql_stmt_fetch()”

25.2.7.6. mysql_stmt_close()

my_bool mysql_stmt_close(MYSQL_STMT *)

mysql_stmt_close()“stmt”

0 0

· CR_SERVER_GONE_ERROR

MySQL

· CR_UNKNOWN_ERROR

mysql_stmt_close() 25.2.7.10“mysql_stmt_execute()”

25.2.7.7. mysql_stmt_data_seek()

void mysql_stmt_data_seek(MYSQL_STMT *stmt, my_ulonglong offset)

0mysql_stmt_num_rows(stmt)-1

mysql_stmt_data_seek()mysql_stmt_store_result()

25.2.7.8. mysql_stmt_errno()

unsigned int mysql_stmt_errno(MYSQL_STMT *stmt)

stmt mysql_stmt_errno()API “0” MySQL errmsg.h mysqld_error.h B

0

25.2.7.9. mysql_stmt_error()

const char *mysql_stmt_error(MYSQL_STMT *stmt)

stmt mysql_stmt_error()Null API ("")

```
if (mysql_stmt_errno(stmt))
{
  // an error occurred
}

if (mysql_stmt_error(stmt)[0])
{
  // an error occurred
}
```

MySQL

25.2.7.10. mysql_stmt_execute()

int mysql_stmt_execute(MYSQL_STMT *stmt)

mysql_stmt_execute()

UPDATEDELETEINSERTmysql_stmt_affected_rows() SELECT mysql_stmt_fetch() 25.2.7.11“mysql_stmt_fetch()”

mysql_stmt_attr_set()mysql_stmt_execute() mysql_stmt_execute()

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

mysql_stmt_init()mysql_stmt_prepare()mysql_stmt_param_count()mysql_stmt_t
mysql_stmt_affected_rows() mysql

```
#define STRING_SIZE 50

#define DROP_SAMPLE_TABLE "DROP TABLE IF EXISTS test_table"
#define CREATE_SAMPLE_TABLE "CREATE TABLE test_table(col1 INT,\
                                                    col2 VARCHAR(40),\
                                                    col3 SMALLINT,\
```

```
                                                    col4 TIMESTAMP)"
#define INSERT_SAMPLE "INSERT INTO test_table(col1,col2,col3) VALUES

MYSQL_STMT    *stmt;
MYSQL_BIND    bind[3];
my_ulonglong  affected_rows;
int           param_count;
short         small_data;
int           int_data;
char          str_data[STRING_SIZE];
unsigned long str_length;
my_bool       is_null;

if (mysql_query(mysql, DROP_SAMPLE_TABLE))
{
  fprintf(stderr, " DROP TABLE failed\n");
  fprintf(stderr, " %s\n", mysql_error(mysql));
  exit(0);
}

if (mysql_query(mysql, CREATE_SAMPLE_TABLE))
{
  fprintf(stderr, " CREATE TABLE failed\n");
  fprintf(stderr, " %s\n", mysql_error(mysql));
  exit(0);
}
```

```
/* Prepare an INSERT query with 3 parameters */
/* (the TIMESTAMP column is not named; the server */
/*  sets it to the current date and time) */
stmt = mysql_stmt_init(mysql);
if (!stmt)
{
  fprintf(stderr, " mysql_stmt_init(), out of memory\n");
  exit(0);
}
if (mysql_stmt_prepare(stmt, INSERT_SAMPLE, strlen(INSERT_SAMPLE)))
{
  fprintf(stderr, " mysql_stmt_prepare(), INSERT failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}
fprintf(stdout, " prepare, INSERT successful\n");

/* Get the parameter count from the statement */
param_count= mysql_stmt_param_count(stmt);
fprintf(stdout, " total parameters in INSERT: %d\n", param_count);

if (param_count != 3) /* validate parameter count */
{
  fprintf(stderr, " invalid parameter count returned by MySQL\n");
  exit(0);
```

```
}

/* Bind the data for all 3 parameters */

memset(bind, 0, sizeof(bind));

/* INTEGER PARAM */
/* This is a number type, so there is no need to specify buffer_leng
bind[0].buffer_type= MYSQL_TYPE_LONG;
bind[0].buffer= (char *)&int_data;
bind[0].is_null= 0;
bind[0].length= 0;

/* STRING PARAM */
bind[1].buffer_type= MYSQL_TYPE_STRING;
bind[1].buffer= (char *)str_data;
bind[1].buffer_length= STRING_SIZE;
bind[1].is_null= 0;
bind[1].length= &str_length;

/* SMALLINT PARAM */
bind[2].buffer_type= MYSQL_TYPE_SHORT;
bind[2].buffer= (char *)&small_data;
bind[2].is_null= &is_null;
bind[2].length= 0;
```

```
/* Bind the buffers */
if (mysql_stmt_bind_param(stmt, bind))
{
  fprintf(stderr, " mysql_stmt_bind_param() failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Specify the data values for the first row */
int_data= 10;             /* integer */
strncpy(str_data, "MySQL", STRING_SIZE); /* string  */
str_length= strlen(str_data);

/* INSERT SMALLINT data as NULL */
is_null= 1;

/* Execute the INSERT statement - 1*/
if (mysql_stmt_execute(stmt))
{
  fprintf(stderr, " mysql_stmt_execute(), 1 failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Get the total number of affected rows */
affected_rows= mysql_stmt_affected_rows(stmt);
```

```
fprintf(stdout, " total affected rows(insert 1): %lu\n",
                (unsigned long) affected_rows);

if (affected_rows != 1) /* validate affected rows */
{
  fprintf(stderr, " invalid affected rows by MySQL\n");
  exit(0);
}

/* Specify data values for second row, then re-execute the statement
int_data= 1000;
strncpy(str_data, "The most popular Open Source database", STRING_SI
str_length= strlen(str_data);
small_data= 1000;         /* smallint */
is_null= 0;               /* reset */

/* Execute the INSERT statement - 2*/
if (mysql_stmt_execute(stmt))
{
  fprintf(stderr, " mysql_stmt_execute, 2 failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Get the total rows affected */
affected_rows= mysql_stmt_affected_rows(stmt);
```

```
fprintf(stdout, " total affected rows(insert 2): %lu\n",
                (unsigned long) affected_rows);

if (affected_rows != 1) /* validate affected rows */
{
  fprintf(stderr, " invalid affected rows by MySQL\n");
  exit(0);
}

/* Close the statement */
if (mysql_stmt_close(stmt))
{
  fprintf(stderr, " failed while closing the statement\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}
```

tests/mysql_client_test.cMySQL BitKeeper

25.2.7.11. mysql_stmt_fetch()

int mysql_stmt_fetch(MYSQL_STMT *stmt)

mysql_stmt_fetch() mysql_stmt_execute() mysql_stmt_execute() mysql_stmt_store_result()

mysql_stmt_bind_result() mysql_stmt_fetch()

mysql_stmt_fetch()

NULL MYSQL_BIND*is_nullTRUE (1) *buffer*length data_length

MYSQL_TYPE_TINY	1
MYSQL_TYPE_SHORT	2
MYSQL_TYPE_LONG	4
MYSQL_TYPE_LONGLONG	8
MYSQL_TYPE_FLOAT	4
MYSQL_TYPE_DOUBLE	8
MYSQL_TYPE_TIME	sizeof(MYSQL_TIME)
MYSQL_TYPE_DATE	sizeof(MYSQL_TIME)
MYSQL_TYPE_DATETIME	sizeof(MYSQL_TIME)
MYSQL_TYPE_STRING	data length
MYSQL_TYPE_BLOB	data_length

0	
1	mysql_stmt_errno()mysql_stmt_error()
MYSQL_NO_DATA	
MYSQL_DATA_TRUNCATED	

MYSQL_DATA_TRUNCATEDmysql_options() MYSQL_BIND

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

· CR_UNSUPPORTED_PARAM_TYPE

MYSQL_TYPE_DATEMYSQL_TYPE_TIMEMYSQL_TYPE_DATETIME MYSQL_TYPE_TIMESTAMPDATETIMEDATETIMETIMESTAMP

· mysql_stmt_bind_result()

mysql_stmt_result_metadata()mysql_stmt_bind_result()mysql_stmt_fetch() 25.2.7.10“mysql_stmt_execute()” mysql

```
#define STRING_SIZE 50


#define SELECT_SAMPLE "SELECT col1, col2, col3, col4 FROM test_table


MYSQL_STMT    *stmt;
MYSQL_BIND    bind[4];
MYSQL_RES     *prepare_meta_result;
MYSQL_TIME    ts;
unsigned long length[4];
int           param_count, column_count, row_count;
short         small_data;
int           int_data;
char          str_data[STRING_SIZE];
my_bool       is_null[4];


/* Prepare a SELECT query to fetch data from test_table */
stmt = mysql_stmt_init(mysql);
if (!stmt)
```

```
{
  fprintf(stderr, " mysql_stmt_init(), out of memory\n");
  exit(0);
}
if (mysql_stmt_prepare(stmt, SELECT_SAMPLE, strlen(SELECT_SAMPLE)))
{
  fprintf(stderr, " mysql_stmt_prepare(), SELECT failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}
fprintf(stdout, " prepare, SELECT successful\n");

/* Get the parameter count from the statement */
param_count= mysql_stmt_param_count(stmt);
fprintf(stdout, " total parameters in SELECT: %d\n", param_count);

if (param_count != 0) /* validate parameter count */
{
  fprintf(stderr, " invalid parameter count returned by MySQL\n");
  exit(0);
}

/* Fetch result set meta information */
prepare_meta_result = mysql_stmt_result_metadata(stmt);
if (!prepare_meta_result)
{
```

```
  fprintf(stderr,
          " mysql_stmt_result_metadata(), returned no meta informatio
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Get total columns in the query */
column_count= mysql_num_fields(prepare_meta_result);
fprintf(stdout, " total columns in SELECT statement: %d\n", column_c

if (column_count != 4) /* validate column count */
{
  fprintf(stderr, " invalid column count returned by MySQL\n");
  exit(0);
}

/* Execute the SELECT query */
if (mysql_stmt_execute(stmt))
{
  fprintf(stderr, " mysql_stmt_execute(), failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Bind the result buffers for all 4 columns before fetching them */
```

```
memset(bind, 0, sizeof(bind));

/* INTEGER COLUMN */
bind[0].buffer_type= MYSQL_TYPE_LONG;
bind[0].buffer= (char *)&int_data;
bind[0].is_null= &is_null[0];
bind[0].length= &length[0];

/* STRING COLUMN */
bind[1].buffer_type= MYSQL_TYPE_STRING;
bind[1].buffer= (char *)str_data;
bind[1].buffer_length= STRING_SIZE;
bind[1].is_null= &is_null[1];
bind[1].length= &length[1];

/* SMALLINT COLUMN */
bind[2].buffer_type= MYSQL_TYPE_SHORT;
bind[2].buffer= (char *)&small_data;
bind[2].is_null= &is_null[2];
bind[2].length= &length[2];

/* TIMESTAMP COLUMN */
bind[3].buffer_type= MYSQL_TYPE_TIMESTAMP;
bind[3].buffer= (char *)&ts;
bind[3].is_null= &is_null[3];
bind[3].length= &length[3];
```

```
/* Bind the result buffers */
if (mysql_stmt_bind_result(stmt, bind))
{
  fprintf(stderr, " mysql_stmt_bind_result() failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Now buffer all results to client */
if (mysql_stmt_store_result(stmt))
{
  fprintf(stderr, " mysql_stmt_store_result() failed\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}

/* Fetch all rows */
row_count= 0;
fprintf(stdout, "Fetching results ...\n");
while (!mysql_stmt_fetch(stmt))
{
  row_count++;
  fprintf(stdout, "  row %d\n", row_count);

  /* column 1 */
```

```
fprintf(stdout, "   column1 (integer)  : ");
if (is_null[0])
  fprintf(stdout, " NULL\n");
else
  fprintf(stdout, " %d(%ld)\n", int_data, length[0]);

/* column 2 */
fprintf(stdout, "   column2 (string)   : ");
if (is_null[1])
  fprintf(stdout, " NULL\n");
else
  fprintf(stdout, " %s(%ld)\n", str_data, length[1]);

/* column 3 */
fprintf(stdout, "   column3 (smallint) : ");
if (is_null[2])
  fprintf(stdout, " NULL\n");
else
  fprintf(stdout, " %d(%ld)\n", small_data, length[2]);

/* column 4 */
fprintf(stdout, "   column4 (timestamp): ");
if (is_null[3])
  fprintf(stdout, " NULL\n");
else
  fprintf(stdout, " %04d-%02d-%02d %02d:%02d:%02d (%ld)\n",
```

```
                    ts.year, ts.month, ts.day,
                    ts.hour, ts.minute, ts.second,
                    length[3]);
  fprintf(stdout, "\n");
}

/* Validate rows fetched */
fprintf(stdout, " total rows fetched: %d\n", row_count);
if (row_count != 2)
{
  fprintf(stderr, " MySQL failed to return all rows\n");
  exit(0);
}

/* Free the prepared result metadata */
mysql_free_result(prepare_meta_result);



/* Close the statement */
if (mysql_stmt_close(stmt))
{
  fprintf(stderr, " failed while closing the statement\n");
  fprintf(stderr, " %s\n", mysql_stmt_error(stmt));
  exit(0);
}
```

25.2.7.12. mysql_stmt_fetch_column()

int mysql_stmt_fetch_column(MYSQL_STMT *stmt, MYSQL_BIND *bind, unsigned int column, unsigned long offset)

1“ bind” mysql_stmt_bind_result() “column” 10“offset” 0

0 0

· CR_INVALID_PARAMETER_NO

Invalid column number.

· CR_NO_DATA

25.2.7.13. mysql_stmt_field_count()

unsigned int mysql_stmt_field_count(MYSQL_STMT *stmt)

INSERTDELETE 0

mysql_stmt_prepare() mysql_stmt_field_count()

25.2.7.14. mysql_stmt_free_result()

my_bool mysql_stmt_free_result(MYSQL_STMT *stmt)

mysql_stmt_free_result()

0 0

25.2.7.15. mysql_stmt_init()

MYSQL_STMT *mysql_stmt_init(MYSQL *mysql)

MYSQL_STMT mysql_stmt_close(MYSQL_STMT *)

MYSQL_STMT NULL

· CR_OUT_OF_MEMORY

25.2.7.16. mysql_stmt_insert_id()

my_ulonglong mysql_stmt_insert_id(MYSQL_STMT *stmt)

INSERTUPDATEAUTO_INCREMENT AUTO_INCREMENTINSERT

25.2.3.36“mysql_insert_id()”

AUTO_INCREMENT LAST_INSERT_ID(*expr*) AUTO_INCREMENT

25.2.7.17. mysql_stmt_num_rows()

my_ulonglong mysql_stmt_num_rows(MYSQL_STMT *stmt)

mysql_stmt_num_rows()mysql_stmt_store_result()

mysql_stmt_store_result()mysql_stmt_num_rows()

25.2.7.18. mysql_stmt_param_count()

unsigned long mysql_stmt_param_count(MYSQL_STMT *stmt)

mysql_stmt_param_count() 25.2.7.10“mysql_stmt_execute()”

25.2.7.19. mysql_stmt_param_metadata()

MYSQL_RES *mysql_stmt_param_metadata(MYSQL_STMT *stmt)

25.2.7.20. mysql_stmt_prepare()

int mysql_stmt_prepare(MYSQL_STMT *stmt, const char *query, unsigned long length)

mysql_stmt_init() SQL“ length” 1SQL (‘;’)\g

“ ?” SQL SQL

SQL INSERTVALUES() WHERE ID “ =” DML DDL

mysql_stmt_bind_param()

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

mysql_stmt_prepare()0 mysql_stmt_error()

mysql_stmt_prepare() 25.2.7.10“mysql_stmt_execute()”

25.2.7.21. mysql_stmt_reset()

my_bool mysql_stmt_reset(MYSQL_STMT *stmt)

mysql_stmt_send_long_data()

mysql_stmt_prepare()

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.7.22. mysql_stmt_result_metadata()

MYSQL_RES *mysql_stmt_result_metadata(MYSQL_STMT *stmt)

mysql_stmt_prepare() mysql_stmt_result_metadata() MYSQL_RES API

· mysql_num_fields()

· mysql_fetch_field()

· mysql_fetch_field_direct()

· mysql_fetch_fields()

· mysql_field_count()

· mysql_field_seek()

· mysql_field_tell()

· mysql_free_result()

mysql_free_result()mysql_store_result()

mysql_stmt_result_metadata() mysql_stmt_fetch()

MYSQL_RES NULL

· CR_OUT_OF_MEMORY

· CR_UNKNOWN_ERROR

mysql_stmt_result_metadata() 25.2.7.11“mysql_stmt_fetch()”

25.2.7.23. mysql_stmt_row_seek()

MYSQL_ROW_OFFSET mysql_stmt_row_seek(MYSQL_STMT *stmt, MYSQL_ROW_OFFSET offset)

“ offset” mysql_stmt_row_tell()mysql_stmt_row_seek() mysql_stmt_data_seek()

mysql_stmt_row_seek()mysql_stmt_store_result()

mysql_stmt_row_seek()

25.2.7.24. mysql_stmt_row_tell()

MYSQL_ROW_OFFSET mysql_stmt_row_tell(MYSQL_STMT *stmt)

mysql_stmt_fetch() mysql_stmt_row_seek()

mysql_stmt_store_result()mysql_stmt_row_tell()

25.2.7.25. mysql_stmt_send_long_data()

my_bool mysql_stmt_send_long_data(MYSQL_STMT *stmt, unsigned int parameter_number, const char *data, unsigned long length)

“parameter_number” 0 “data” “length”

mysql_stmt_execute()mysql_stmt_reset() mysql_stmt_send_long_data()
mysql_stmt_execute()

mysql_stmt_reset()25.2.7.21“mysql_stmt_reset()”

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_SERVER_GONE_ERROR

MySQL

· CR_OUT_OF_MEMORY

· CR_UNKNOWN_ERROR

TEXT“ MySQL” text_column mysql

```
#define INSERT_QUERY "INSERT INTO test_long_data(text_column) VALUES

MYSQL_BIND bind[1];
long       length;

smtt = mysql_stmt_init(mysql);
if (!stmt)
{
  fprintf(stderr, " mysql_stmt_init(), out of memory\n");
  exit(0);
}
```

```
if (mysql_stmt_prepare(stmt, INSERT_QUERY, strlen(INSERT_QUERY)))
{
  fprintf(stderr, "\n mysql_stmt_prepare(), INSERT failed");
  fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
  exit(0);
}
 memset(bind, 0, sizeof(bind));
 bind[0].buffer_type= MYSQL_TYPE_STRING;
 bind[0].length= &length;
 bind[0].is_null= 0;

/* Bind the buffers */
if (mysql_stmt_bind_param(stmt, bind))
{
  fprintf(stderr, "\n param bind failed");
  fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
  exit(0);
}

 /* Supply data in chunks to server */
 if (!mysql_stmt_send_long_data(stmt,0,"MySQL",5))
{
  fprintf(stderr, "\n send_long_data failed");
  fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
  exit(0);
}
```

```
 /* Supply the next piece of data */
 if (mysql_stmt_send_long_data(stmt,0," - The most popular Open Sour
{
  fprintf(stderr, "\n send_long_data failed");
  fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
  exit(0);
}

 /* Now, execute the query */
 if (mysql_stmt_execute(stmt))
{
  fprintf(stderr, "\n mysql_stmt_execute failed");
  fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
  exit(0);
}
```

25.2.7.26. mysql_stmt_sqlstate()

const char *mysql_stmt_sqlstate(MYSQL_STMT *stmt)

stmt mysql_stmt_sqlstate()Null APISQLSTATE 5 "00000"“ ” ANSI SQLODBC B

MySQLSQLSTATE "HY000"

SQLSTATE Null

25.2.7.27. mysql_stmt_store_result()

int mysql_stmt_store_result(MYSQL_STMT *stmt)

SELECTSHOWDESCRIBEEXPLAIN mysql_stmt_store_result() mysql_stmt_fetch()

mysql_stmt_store_result() mysql_stmt_result_metadata()NULL 25.2.7.22“mysql_stmt_result_metadata()”

mysql_stmt_store_result() MySQLMYSQL_FIELD->max_length mysql_stmt_store_result() max_lengthmax_length mysql_stmt_attr_set(MYSQL_STMT, STMT_ATTR_UPDATE_MAX_LENGTH, &flag) 25.2.7.3 “mysql_stmt_attr_set()”

0 0

· CR_COMMANDS_OUT_OF_SYNC

· CR_OUT_OF_MEMORY

· CR_SERVER_GONE_ERROR

MySQL

· CR_SERVER_LOST

· CR_UNKNOWN_ERROR

25.2.8. C API

· TIMETIMESTAMPDATETIME DATE_FORMAT()

· MySQL0 ZEROFILL MIN(number-with-zerofill)

·

· 5.13.1“”

25.2.9. C API

MySQL 5.1 CLIENT_MULTI_STATEMENTSmysql_real_connect() mysql_set_server_option(MYSQL_OPTION_MULTI_STATEMENTS_ON)

mysql_query()mysql_real_query()1 mysql_more_results() mysql_next_result()

```
/* Connect to server with option CLIENT_MULTI_STATEMENTS */
mysql_real_connect(..., CLIENT_MULTI_STATEMENTS);

/* Now execute multiple queries */
mysql_query(mysql,"DROP TABLE IF EXISTS test_table;\
                   CREATE TABLE test_table(id INT);\
                   INSERT INTO test_table VALUES(10);\
                   UPDATE test_table SET id=20 WHERE id=10;\
                   SELECT * FROM test_table;\
                   DROP TABLE test_table");
do
{
```

```
  /* Process all results */
  ...
  printf("total affected rows: %lld", mysql_affected_rows(mysql));
  ...
  if (!(result= mysql_store_result(mysql)))
  {
     printf(stderr, "Got fatal error processing query\n");
     exit(1);
  }
  process_result_set(result); /* client function */
  mysql_free_result(result);
} while (!mysql_next_result(mysql));
```

mysql_query()mysql_real_query()

25.2.10. C API

MYSQL_TIMEDATETIMEDATETIMETIMESTAMP [25.2.5“C API ”]

mysql_stmt_prepare() mysql_stmt_execute()

1. MYSQL_BIND buffer_type DATETIMEDATETIME TIMESTAMP buffer_type MYSQL_TYPE_DATEMYSQL_TYPE_TIMEMYSQL_TYPE_DATETIME MYSQL_TYPE_TIMESTAMP

2. MYSQL_BINDMYSQL_TIME

3. MYSQL_TIME

mysql_stmt_bind_param() mysql_stmt_execute()

buffer_type MYSQL_TIME mysql_stmt_execute()

mysql_bind_results()

DATETIMETIMESTAMPmysql

```
  MYSQL_TIME  ts;
  MYSQL_BIND  bind[3];
  MYSQL_STMT  *stmt;

  strmov(query, "INSERT INTO test_table(date_field, time_field,
                                        timestamp_field) VALUES(?,?,

  stmt = mysql_stmt_init(mysql);
  if (!stmt)
  {
    fprintf(stderr, " mysql_stmt_init(), out of memory\n");
    exit(0);
  }
  if (mysql_stmt_prepare(mysql, query, strlen(query)))
  {
    fprintf(stderr, "\n mysql_stmt_prepare(), INSERT failed");
    fprintf(stderr, "\n %s", mysql_stmt_error(stmt));
    exit(0);
  }

  /* set up input buffers for all 3 parameters */
  bind[0].buffer_type= MYSQL_TYPE_DATE;
  bind[0].buffer= (char *)&ts;
  bind[0].is_null= 0;
  bind[0].length= 0;
  ...
  bind[1]= bind[2]= bind[0];
  ...

  mysql_stmt_bind_param(stmt, bind);

  /* supply the data to be sent in the ts structure */
  ts.year= 2002;
  ts.month= 02;
  ts.day= 03;

  ts.hour= 10;
  ts.minute= 45;
  ts.second= 20;

  mysql_stmt_execute(stmt);
  ..
```

25.2.11. C API

25.2.11.1. my_init()
25.2.11.2. mysql_thread_init()
25.2.11.3. mysql_thread_end()
25.2.11.4. mysql_thread_safe()

25.2.15“”

25.2.11.1. my_init()

void my_init(void)

MySQL MySQL mysql_thread_init()

mysql_init()mysql_library_init()mysql_server_init()mysql_connect()

25.2.11.2. mysql_thread_init()

my_bool mysql_thread_init(void)

my_init()mysql_connect()

0 0

25.2.11.3. mysql_thread_end()

void mysql_thread_end(void)

pthread_exit()mysql_thread_init()

25.2.11.4. mysql_thread_safe()

unsigned int mysql_thread_safe(void)

25.2.12. C API

25.2.12.1. mysql_server_init()
25.2.12.2. mysql_server_end()

MySQL mysql_server_init()mysql_server_end() 25.1“libmysqld MySQL”

“ -lmysqlclient”“ -lmysqld” mysql_library_init() mysql_library_end() mysql_server_init()mysql_server_end()#define libmysqlclientlibmysqldMySQL C API 25.2.2“C API”

25.2.12.1. mysql_server_init()

int mysql_server_init(int argc, char **argv, char **groups)

MySQL mysysInnoDB mysql_init()mysql_server_init() MySQLDBUG my_init()

main() argcargv argv1 argc0mysql_server_init() argvgroups

argc

“groups” Null“ groups” 4.3.2“” groupsNULL [server] [embedded]

```
#include <mysql.h>
#include <stdlib.h>

static char *server_args[] = {
  "this_program",       /* this string is not used */
  "--datadir=.",
  "--key_buffer_size=32M"
};
static char *server_groups[] = {
  "embedded",
  "server",
  "this_program_SERVER",
  (char *)NULL
};

int main(void) {
  if (mysql_server_init(sizeof(server_args) / sizeof(char *),
```

```
                        server_args, server_groups))
    exit(1);

  /* Use any MySQL API functions here */

  mysql_server_end();

  return EXIT_SUCCESS;
}
```

OK0　　1

25.2.12.2. mysql_server_end()

void mysql_server_end(void)

MySQL

25.2.13. C API

25.2.13.1. mysql_query()mysql_store_result()NULL
25.2.13.2. What Results You Can Get from a Query
25.2.13.3. ID
25.2.13.4. C API

25.2.13.1. mysql_query()mysql_store_result()NULL

mysql_query() mysql_store_result()NULL

· malloc()

·

· INSERTUPDATEDELETE

mysql_field_count() mysql_field_count()0 INSERTDELETE mysql_field_count()0 mysql_field_count()

mysql_error()mysql_errno()

25.2.13.2. What Results You Can Get from a Query

· INSERTUPDATEDELETE mysql_affected_rows()

TRUNCATE TABLE

· mysql_num_rows() mysql_store_result()mysql_store_result() mysql_num_rows()mysql_use_result()mysql_fetch_row() mysql_num_rows()

· mysql_insert_id()IDAUTO_INCREMENT25.2.3.36 “mysql_insert_id()”

· LOAD DATA INFILE ...INSERT INTO ... SELECT ...UPDATE mysql_info() mysql_info() mysql_info()NULL

25.2.13.3. ID

AUTO_INCREMENT mysql_insert_id()

CAUTO_INCREMENT AUTO_INCREMENTINSERT

```
if ((result = mysql_store_result(&mysql)) == 0 &&
    mysql_field_count(&mysql) == 0 &&
```

```
    mysql_insert_id(&mysql) != 0)
{
    used_id = mysql_insert_id(&mysql);
}
```

25.2.3.36“mysql_insert_id()”

AUTO_INCREMENT mysql_query()SELECT LAST_INSERT_ID()

LAST_INSERT_ID()ID non-magic Null0 AUTO_INCREMENT

ID2 SQL

```
INSERT INTO foo (auto,text)
    VALUES(NULL,'text');              # generate ID by inserting NUL
INSERT INTO foo2 (id,text)
    VALUES(LAST_INSERT_ID(),'text');  # use ID in second table
```

mysql_insert_id()AUTO_INCREMENT NULL0
LAST_INSERT_ID()AUTO_INCREMENT NULL0
LAST_INSERT_ID()

25.2.13.4. C API

C API

```
gcc -g -o client test.o -L/usr/local/lib/mysql -lmysqlclient -lsocke
```

```
Undefined        first referenced
 symbol          in file
floor            /usr/local/lib/mysql/libmysqlclient.a(password.o)
ld: fatal: Symbol referencing errors. No output written to client
```

/“ -lm”

25.2.14.

MySQL MySQL“ -lmysqlclient -lz”“ -L” /usr/local/mysql/libsr/local/mysql/lib -lmysqlclient –lz

MySQL“ -I” -I/usr/local/mysql/include

UnixMySQL **mysql_config** 25.9.2“mysql_config”

MySQL

```
CFG=/usr/local/mysql/bin/mysql_config
sh -c "gcc -o progname `$CFG --cflags` progname.c `$CFG --libs`"
```

“ sh –c”shell**mysql_config**1

25.2.15.

net.c SIGPIPE

MySQLmysql_server_init()mysql_init()mysql_connect()SIGPIPESIGPIPE mysql_server_init()

http://www.mysql.com/ Windows

MySQL“ -lmysys”“ -lmystrings”“-ldbug” net_serv.o

mysqlclient_r 25.2“MySQL C API” net_serv.oMySQL

thr_alarm.c mysys my_init()25.2.11“C API”

mysql_real_connect() mysql_real_connect() mysql_connect()mysql_connect() mysql_real_connect()

mysql_real_connect()

```
shell> ./configure --enable-thread-safe-client
```

libmysqlclient_r gethostbyname_r()

· MySQL mysql_query()mysql_store_result()

· mysql_store_result()

· mysql_use_result mysql_store_result()

· mysql_query()mysql_store_result() mysql_store_result()

· POSIX pthread_mutex_lock()pthread_mutex_unlock()

1MySQL MySQL

mysql_init()mysql_connect() MySQL

mysql_init()mysql_connect() MySQL

1. mysql_real_connect()MySQL my_init()
2. MySQL mysql_thread_init()
3. pthread_exit()mysql_thread_end() MySQL

libmysqlclient_r link/compile

25.3. MySQL PHP API

25.3.1. MySQLPHP

PHP HTML Web MySQLPHP Apache Web

PHPMySQL API

· mysqlPHP45MySQL 4.1MySQL MySQL 5.1 MySQL 5.1 MySQL“ **--old-passwords**” A.2.3“” PHP http://php.net/mysql

· mysqli“ MySQL, Improved” PHP 5MySQL 4.1.1 MySQL 5.1 API http://php.net/mysqli mysqli http://www.zend.com/php5/articles/php5-mysqli.php

PHPPHP

25.3.1. MySQLPHP

· PHP php.ini 30 RAM 8MB16MB

· …mysql_connect() PHPMySQLMySQLPHPMySQLPHPPHP

· 'uncompress' “ -lmysqlclient”“ -lz”

· MySQL 4.1.1mysql MySQL 4.0PHP 5mysqli “--old-passwords”MySQL A.2.3“”

25.4. MySQL Perl API

Perl DBI DBI DBIDBI DBD MySQLDBD::mysql

Perl DBIPerl mysqlperl mysqlperl

Perl DBI 2.13“Perl”

DBI

· DBIDBD::mysql perldoc

· shell> **perldoc DBI**

· shell> **perldoc DBI::FAQ**

· shell> **perldoc DBD::mysql**

pod2manpod2html

· Perl DBI DBI http://dbi.perl.org/1DBI MySQL AB1 DBD::mysql 1.7.1.1 “MySQL”

· DBI*Perl DBI*Alligator DescartesTim BunceO'Reilly & Associates, 2000 DBIhttp://dbi.perl.org/

MySQLDBI *WebMySQLPerl*Paul DuBois, New Riders, 2001 http://www.kitebird.com/mysql-perl/

25.5. MySQL C++ API

25.5.1. Borland C++

MySQL++C++MySQL APIWarren Young
http://www.mysql.com/products/mysql++/

25.5.1. Borland C++

Borland C++ 5.02MySQL WindowsWindowsMicrosoft VC++ Borlan

Borland C++1 VC++ Borland C++libmysql.dll VC++
Nullmysql_init()MYSQL

25.6. MySQL Python API

MySQLdbPythonMySQL　　Python DB API2.0
http://sourceforge.net/projects/mysql-python/

25.7. MySQL Tcl API

MySQLtclAPITclMySQL　　http://www.xdobry.de/mysqltcl/

25.8. MySQL Eiffel Wrapper

Eiffel MySQLMySQL Eiffel Michael Ravits
http://efsa.sourceforge.net/archive/ravits/mysql.htm

25.9. MySQL

25.9.1. msql2mysqlmSQLMySQL
25.9.2. mysql_config

MySQL

· msql2mysql

1shell mSQLMySQL

· mysql_config

1shell MySQL

25.9.1. msql2mysqlmSQLMySQL

MySQL C APImSQLAPI C API mSQL MySQL

msql2mysqlmSQL C APIMySQL **msql2mysql** **msql2mysql**

```
shell> cp client-prog.c client-prog.c.orig
shell> msql2mysql client-prog.c
client-prog.c converted
```

client-prog.c

msql2mysqlreplace 8.14“replace”

25.9.2. mysql_config

mysql_config MySQLMySQL

mysql_config

· --cflags

libmysqlclient

· --include

MySQL“ —cflags”

· --libmysqld-libs, ---embedded

MySQL

· --libs

MySQL

· --libs_r

MySQL

· --port

TCP/IP MySQL

· --socket

Unix MySQL

· --version

MySQL

mysql_config

```
shell> mysql_config
Usage: /usr/local/mysql/bin/mysql_config [options]
Options:
  --cflags         [-I/usr/local/mysql/include/mysql -mcpu=pentiumpr
  --include        [-I/usr/local/mysql/include/mysql]
  --libs           [-L/usr/local/mysql/lib/mysql -lmysqlclient -lz
                    -lcrypt -lnsl -lm -L/usr/lib -lssl -lcrypto]
```

```
  --libs_r          [-L/usr/local/mysql/lib/mysql -lmysqlclient_r
                     -lpthread -lz -lcrypt -lnsl -lm -lpthread]
  --socket          [/tmp/mysql.sock]
  --port            [3306]
  --version         [4.0.16]
  --libmysqld-libs [-L/usr/local/mysql/lib/mysql -lmysqld -lpthread
                     -lcrypt -lnsl -lm -lpthread -lrt]
```

mysql_config MySQL **mysql_config**

```
shell> CFG=/usr/local/mysql/bin/mysql_config
shell> sh -c "gcc -o progname `$CFG --cflags` progname.c `$CFG --lib
```

mysql_config (``) shell

MySQLMySQL dev.mysql.com

26

26.1. MySQL Connector/ODBC
- 26.1.1. MyODBC
- 26.1.2. ODBCMyODBC
- 26.1.3. MyODBC
- 26.1.4. WindowsMyODBC
- 26.1.5. IUnixMyODBC
- 26.1.6. WindowsMyODBC
- 26.1.7. UnixMyODBC
- 26.1.8. BitKeeperMyODBC
- 26.1.9. MyODBC
- 26.1.10. MyODBC
- 26.1.11. MyODBCMicrosoft Access
- 26.1.12. MyODBCMicrosoft VBAASP
- 26.1.13. MyODBCODBC
- 26.1.14. MyODBC
- 26.1.15. MyODBC
- 26.1.16. MyODBC API
- 26.1.17. MyODBC
- 26.1.18. MyODBC
- 26.1.19. MyODBCVBADODAORDO
- 26.1.20. MyODBCMicrosoft.NET
- 26.1.21.

26.2. MySQL Connector/NET
- 26.2.1.
- 26.2.2. MySQL Connector/NET
- 26.2.3. Connector/NET
- 26.2.4. MySQL Connector/NET
- 26.2.5. MySQL Connector/NET

26.3. MySQL Connector/J
- 26.3.1. JDBC
- 26.3.2. Connector/J
- 26.3.3. JDBC
- 26.3.4. J2EEJava Connector/J

26.3.5. Connector/J
26.3.6. Changelog
26.4. MySQL Connector/MXJ
26.4.1.
26.4.2.
26.4.3. Junit
26.4.4. Junit
26.4.5. JDBC
26.4.6. Java
26.4.7. MysqldResource API
26.4.8. JMX(custom)
26.4.9. JMX (JBoss)
26.4.10.

MySQLMySQL

26.1. MySQL Connector/ODBC

26.1.1. MyODBC
26.1.2. ODBCMyODBC
26.1.3. MyODBC
26.1.4. WindowsMyODBC
26.1.5. IUnixMyODBC
26.1.6. WindowsMyODBC
26.1.7. UnixMyODBC
26.1.8. BitKeeperMyODBC
26.1.9. MyODBC
26.1.10. MyODBC
26.1.11. MyODBCMicrosoft Access
26.1.12. MyODBCMicrosoft VBAASP
26.1.13. MyODBCODBC
26.1.14. MyODBC
26.1.15. MyODBC
26.1.16. MyODBC API
26.1.17. MyODBC
26.1.18. MyODBC
26.1.19. MyODBCVBADODAORDO
26.1.20. MyODBCMicrosoft.NET
26.1.21.

MySQL Connector/ODBCMyODBCMySQLODBCMyODBC Connector/ODBCMySQLODBC 3.5xMyOI MyODBCMyODBC

MyODBC 3.51MyODBC

MySQL ODBCODBCODBC http://www.microsoft.com/data/

CDBMSMySQLMySQL

myodbc@lists.mysql.com

26.1.1. MyODBC

26.1.1.1. ODBC
26.1.1.2. Connector/ODBC
26.1.1.3. MyODBC 2.50
26.1.1.4. MyODBC 2.50
26.1.1.5. MyODBC
26.1.1.6.
26.1.1.7. MyODBC
26.1.1.8. MyODBC
26.1.1.9. MyODBC
26.1.1.10. MyODBC

26.1.1.1. ODBC

ODBCODBCAPISQLSQL
ODBC

ODBC http://www.microsoft.com/data/

26.1.1.2. Connector/ODBC

Connector/ODBCMySQL ODBCMySQL ABMyODBC

26.1.1.3. MyODBC 2.50

MyODBC 2.50MySQL AB32ODBCODBC 2.50012ODBC
MySQL

26.1.1.4. MyODBC 2.50

MyODBC 3.5132ODBCMySQL ODBC 3.51MyODBC
ODBC 3.5x1API +2MySQLODBC

26.1.1.5. MyODBC

MySQL ABGPLMySQL ABMyODBC
http://dev.mysql.com/downloads/

MyODBC http://www.mysql.com/products/myodbc/

http://www.mysql.com/company/legal/licensing/

26.1.1.6.

MyODBCMySQL

- Windows 95, 98, Me, NT, 2000, XP2003
- Unix
  - AIX
  - Amiga
  - BSDI
  - DEC
  - FreeBSD
  - HP-UX 10, 11
  - Linux
  - Mac OS X Server
  - Mac OS X
  - NetBSD
  - OpenBSD
  - OS/2
  - SGI Irix
  - Solaris
  - SunOS

- SCO OpenServer
- SCO UnixWare
- Tru64 Unix

MySQL

26.1.1.7. MyODBC

MySQL ABMyODBC my

MySQL http://lists.mysql.com/

MySQLODBC

26.1.1.8. MyODBC

MySQL http://forums.mysql.com

26.1.1.9. MyODBC

MyODBC ODBCMyODBCODBC ADMIN ODBC”

MyODBC myodbc.log“>mysql_real_query”

mysqladmndemoMyODBCMySQL

40MyODBC 1.7.1.1“MySQL” MyODBCODBC

tarzipMyODBCODBCREADME ftp://ftp.mysql.com/pub/mysql/upload/MySQL AB

SQLSQLODBC

26.1.1.10. MyODBC

myodbc@lists.m

26.1.2. ODBCMyODBC

26.1.2.1. ODBC
26.1.2.2. MyODBC
26.1.2.3. ODBC
26.1.2.4. MySQL ODBC

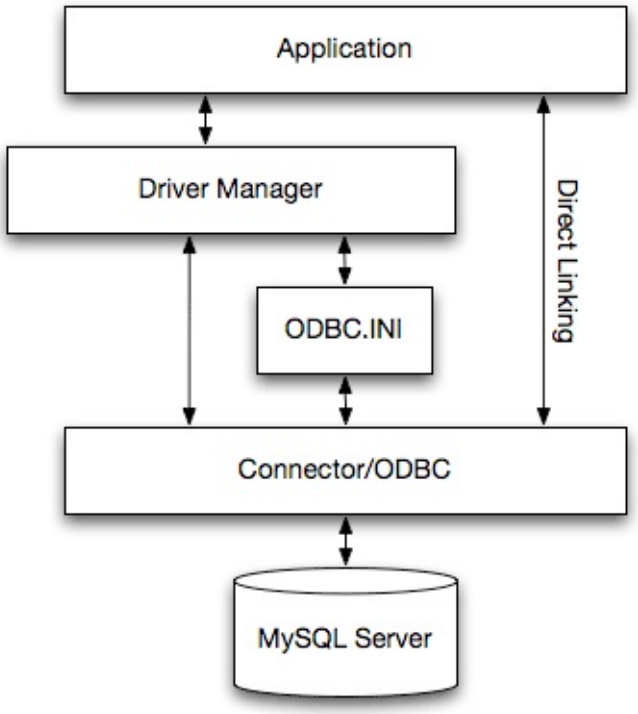
26.1.2.1. ODBC

ODBCAPIAPICLIX/OpenISO/IECSQL

26.1.16“MyODBC API”MyODBCODBCODBC
http://www.microsoft.com/data/

26.1.2.2. MyODBC

MyODBC5



.

ODBC APIMySQLODBCDSN

OBDC

- o MySQL
- o SQL
- o
- o
- o SQL
- o MySQL

SQLOBDCSQL

.

o DSN

o

o ODBC

· **MyODBC**

MyODBCODBC APIODBCSQLMySQLMySQL

· **ODBC.INI**

ODBC.INIODBCDSN 26.1.9“MyODBC”

· **MySQL**

MySQLMySQL

o DBMS

o RDBMS

o

26.1.2.3. ODBC

ODBCODBC

· DSN

·

· ODBC

· Microsoft Windows ODBCodbc32.dll http://www.microsoft.com/data/

· unixODBC Unixlibodbc.so http://www.unixodbc.org

· iODBC ODBC Unixlibiodbc.so http://www.iodbc.org

2.1.2UnixODBCMyODBC 3.51

26.1.2.4. MySQL ODBC

MySQL ABODBC APIMySQLODBC MyODBC (MyODBC
ODBC 3.51(MyODBC 3.51)

MyODBC

26.1.3. MyODBC

MyODBCWindows 9x, Me, NT, 2000, XP2003Unix

MyODBC http://dev.mysql.com/downloads/connector/odbc/2.50.x
LGPL3.51.xGPL

MyODBCOLEDBOLEDB

WindowsMyODBCUnixColdFusionODBCUnixMyODBC

UnixMyODBC1ODBCMyODBCUnix ODBC

· ODBCMySQLWindowsUnixWindowsMyODBC

· WindowsUnixMySQLGRANT

· ODBC DSN

1. Windows
2. ODBC32
3. “DSN”
4. “”
5. “”MySQL“”

6. MySQL 26.1.9.2“WindowsMyODBC DSN”

· ODBCDSNODBC

MySQL

26.1.4. WindowsMyODBC

WindowsMyODBC http://dev.my
MyODBC-*VERSION*.exe

WindowsMyODBC 2.50

C:\WINDOWS\SYSTEM\MFC30.DLL

```
WindowsODBC
```

ODBCWindowsMicrosoftODBCODBC“”MyODBC
“”WindowsF8“”MyODBC

26.1.5. IUnixMyODBC

26.1.5.1. RPMMyODBC
26.1.5.2. TarballMyODBC

26.1.5.1. RPMMyODBC

RPMLinuxMyODBCMyODBCRPM **su root**RPM

```
shell> su root
shell> rpm -ivh MyODBC-3.51.01.i386-1.rpm
```

```
shell> su root
shell> rpm -Uvh MyODBC-3.51.01.i386-1.rpm
```

MySQLlibmysqlclient “-nodeps”MySQL LD_LIBRARY_PATH

/usr/local/lib/usr/share/doc/MyODBC 26.1.9.3“UnixMyODBC DSN”

rpm

```
shell> su root
shell> rpm -e MyODBC
```

26.1.5.2. TarballMyODBC

tarball.tar.gz

```
shell> su root
shell> gunzip MyODBC-3.51.01-i686-pc-linux.tar.gz
shell> tar xvf MyODBC-3.51.01-i686-pc-linux.tar
shell> cd MyODBC-3.51.01-i686-pc-linux
```

INSTALL-BINARY

```
shell> cp libmyodbc* /usr/local/lib
shell> cp odbc.ini /usr/local/etc
shell> export ODBCINI=/usr/local/etc/odbc.ini
```

26.1.9.3“UnixMyODBC DSN” MyODBCDSN INSTALL-BINARY

26.1.6. WindowsMyODBC

26.1.6.1.
26.1.6.2. MyODBC 3.51
26.1.6.3.
26.1.6.4. MyODBC 2.50

26.1.6.1.

· MDAC, Microsoft Data Access SDK http://www.microsoft.com/data/

· MySQLMySQL 4.0.0MySQL 4.0
http://dev.mysql.com/downloads/

26.1.6.2. MyODBC 3.51

MyODBC 3.51 **nmake**Makefiles MakefileDLLMakefile_deb

1. myodbc3-src
2. `C:\> cd myodbc3-src`
3. Makefile MySQL
4. `C:\> nmake -f Makefile`
5. `C:\> nmake -f Makefile install`

nmake -f Makefile Release

nmake -f Makefile installDLLmyodbc3.dll, myodbc3.lib

6. Makefile_DebugMakefile
7. `C:\> nmake -f Makefile_debug`
8. `C:\> nmake -f Makefile_debug install`
9.
10. `C:\> nmake -f Makefile clean`
11. `C:\> nmake -f Makefile install`

· MakefilesMySQL MYSQL_LIB_PATHMYSQL_INCLUDE_PATH
C:\mysql\includeDLL C:\mysql\lib\optC:\mysql\lib\debu

· **nmake** http://msdn.microsoft.com/library/default.asp?url=/library/en-

us/dv_vcce4/html/evgrfRunningNMAKE.asp

· BitKeeperWindows MakefilesWin_Makefile*

26.1.6.3.

```
C:\> cd samples
C:\> nmake -f Makefile all
```

26.1.6.4. MyODBC 2.50

MyODBC 2.50VCMicrosoft Visual Studio 6.0

26.1.7. UnixMyODBC

26.1.7.1.
26.1.7.2.
26.1.7.3.
26.1.7.4.
26.1.7.5.
26.1.7.6.
26.1.7.7.
26.1.7.8.
26.1.7.9.
26.1.7.10. UnixMyODBC
26.1.7.11. Mac OS X
26.1.7.12. HP-UX
26.1.7.13. AIX

26.1.7.1.

· MySQLMySQL 4.0.0MySQL 4.0
http://dev.mysql.com/downloads/

· “ --enable-thread-safe-client”MySQLLibmysqlclient

· Unix ODBC

o iodbc 3.0 http://www.iodbc.org

o unixodbc Alpha 3 http://www.unixodbc.org

· MySQL latin1 big5 czech
mysql *SHAREDIR* /usr/local/mysql/share/mysql/charsetsMySQL

26.1.7.2.

configureMyODBC“ **configure**”“ **configure**”

```
shell> ./configure --help
```

“ **configure**”

1. MyODBC“ --with-mysql-path=*DIR*”MySQL“ *DIR*”MySQL

“ *DIR*/bin/mysql_config”MySQL

2. ODBCiodbcunixobc

· iodbciodbc/usr/local “--with-iodbc=*DIR*”“ *DIR*”iodbc

iodbc*DIR*/include “--with-iodbc-includes=*INCDIR*”

DIR/lib“ --with-iodbc-libs=*LIBDIR*”

· unixODBC “--with-unixODBC=*DIR*” **configure**unixODBC iodbc“ *DIR*”unixODBC

unixODBC*DIR*/include*DIR*/lib “--with-unixODBC-includes=*INCDIR*”“ --with-unixODBC-libs=*LIBDIR*”

3. “ /usr/local”MyODBC“ /usr/local/odbc/lib”“ --prefix=/usr/local/odbc”

```
shell> ./configure --prefix=/usr/local \
          --with-iodbc=/usr/local \
          --with-mysql-path=/usr/local/mysql
```

26.1.7.3.

MySQL libmysqlclient_r.solibmysqlclient_r.a **c**

```
--enable-thread-safe
```

```
--disable-thread-safe
```

mysql libmysqlclient_r.solibmyodbc3_r.so

config.logLIBS

```
LIBS="-lpthread" ./configure ..
```

26.1.7.4.

```
--enable-shared[=yes/no]
--disable-shared
--enable-static[=yes/no]
--disable-static
```

26.1.7.5.

“ --without-debug”

“ **configure**”“ --with-del

26.1.7.6.

BK

“ --without-docs”

```
--with-docs
```

26.1.7.7.

“ **make**”

```
shell> make
```

myodbc@lists.mysql.com

26.1.7.8.

MySQL“ .so”

MySQL

```
--without-server --enable-shared
```

“ **configure**”“ --enable-shared” “ **configure**”

“ --disable-shared”“ .so”

```
shell> cd MyODBC-3.51.01
shell> make
shell> cd driver
shell> CC=/usr/bin/gcc \
     $CC -bundle -flat_namespace -undefined error \
         -o .libs/libmyodbc3-3.51.01.so \
         catalog.o connect.o cursor.o dll.o error.o execute.o \
         handle.o info.o misc.o myodbc3.o options.o prepare.o \
         results.o transact.o utility.o \
         -L/usr/local/mysql/lib/mysql/ \
         -L/usr/local/iodbc/lib/ \
         -lz -lc -lmysqlclient -liodbcinst
```

unixODBCiODBC“ -liodbcinst”“-lodbcinst”

libmyodbc3-3.51.01.so “.libs” MyODBC/usr/local/lib “--prefix”“lib”

```
shell> cd .libs
```

```
shell> cp libmyodbc3-3.51.01.so /usr/local/lib

shell> cd /usr/local/lib

shell> ln -s libmyodbc3-3.51.01.so libmyodbc3.so
```

```
shell> CC=/usr/bin/gcc \
     $CC -bundle -flat_namespace -undefined error
      -o .libs/libmyodbc3_r-3.51.01.so
      catalog.o connect.o cursor.o dll.o error.o execute.o
      handle.o info.o misc.o myodbc3.o options.o prepare.o
      results.o transact.o utility.o
      -L/usr/local/mysql/lib/mysql/
      -L/usr/local/iodbc/lib/
      -lz -lc -lmysqlclient_r -liodbcinst
```

26.1.7.9.

```
shell> make install
```

MyODBC 3.51

· libmyodbc3.so

· libmyodbc3-3.51.01.so3.51.01

· libmyodbc3.a

MyODBC 3.51

· libmyodbc3_r.so

· libmyodbc3-3_r.51.01.so

· libmyodbc3_r.a

MyODBC 2.5.0

· libmyodbc.so

· libmyodbc-2.50.39.so2.50.39

· libmyodbc.a

INSTALL Sun“make”GNU

26.1.7.10. UnixMyODBC

```
shell> make test
```

odbc.iniDSN 'myodbc3' ODBCINIodbc.ini MySQL o

/DSNUIDPASSWORD

26.1.7.11. Mac OS X

Mac OS X (Darwin) **configure**

```
shell> ./configure --prefix=/usr/local
           --with-unixODBC=/usr/local
           --with-mysql-path=/usr/local/mysql
           --disable-shared
           --enable-gui=no
           --host=powerpc-apple
```

unixODBCMySQL

Mac OS X“ --enable-shared”“.dylib” “ .so”

```
shell> make
shell> cd driver
shell> CC=/usr/bin/gcc \
```

```
     $CC -bundle -flat_namespace -undefined error
         -o .libs/libmyodbc3-3.51.01.so *.o
         -L/usr/local/mysql/lib/
         -L/usr/local/iodbc/lib
         -liodbcinst -lmysqlclient -lz -lc


shell> CC=/usr/bin/gcc \
     $CC -bundle -flat_namespace -undefined error
     -o .libs/libmyodbc3-3.51.01.so *.o
     -L/usr/local/mysql/lib/
     -L/usr/local/iodbc/lib
     -liodbcinst -lmysqlclienti_r -lz -lc -lpthread
```

unixODBCiODBC“ -liodbcinst”“-lodbcinst”

AppleGCC **ccgccgcc3**

$prefix/lib symlinklibmyodbc3.so

```
shell> otool -LD .libs/libmyodbc3-3.51.01.so
```

26.1.7.12. HP-UX

HP-UX 10.x11.x **configure**

cc

```
shell> CC="cc" \
     CFLAGS="+z" \
     LDFLAGS="-Wl,+b:-Wl,+s" \
     ./configure --prefix=/usr/local
```

```
            --with-unixodbc=/usr/local
            --with-mysql-path=/usr/local/mysql/lib/mysql
            --enable-shared
            --enable-thread-safe
```

gcc

```
shell> CC="gcc" \
     LDFLAGS="-Wl,+b:-Wl,+s" \
     ./configure --prefix=/usr/local
            --with-unixodbc=/usr/local
            --with-mysql-path=/usr/local/mysql
            --enable-shared
            --enable-thread-safe
```

“ **chatr .libs/libmyodbc3.sl**” SHLIB_PATHMySQL “ **--** disable-shared”“ **configure**”

26.1.7.13. AIX

AIX **configure**

```
shell> ./configure --prefix=/usr/local
            --with-unixodbc=/usr/local
            --with-mysql-path=/usr/local/mysql
            --disable-shared
            --enable-thread-safe
```

26.1.8. BitKeeperMyODBC

1. 2.8.3“” BitKeeper

2. BitKeeperMyODBC

3.
```
shell> bk clone bk://mysql.bkbits.net/myodbc3 myodbc-3.
```

myodbc-3.51/myodbc3/ HTTPHTTPBitKeeper http_proxy

```
shell> export http_proxy="http://your.proxy.server:8080/"
```

http://bk://

```
shell> bk clone http://mysql.bkbits.net/myodbc3 myodbc-3.51
```

4. GNU autoconf 2.52 automake 1.4libtool 1.4m4

5.
```
shell> cd myodbc-3.51
```

6.
```
shell> bk -r edit
```

7.
```
shell> aclocal; autoheader; autoconf;  automake;
```

8.
```
shell> ./configure  # Add your favorite options here
```

9.
```
shell> make
```

INSTALL WindowsWindows Makefiles W Makefile_debug 26.1.6“WindowsMyODBC”

10. **make install**MyODBC 3.51

11.**make** myodbc@lists.mysql.com

12.**bk clone** **bk pull**

13.“ **bk sccstool**” myodbc@lists.mysql.com

“

14.BitKeeper**bk helptool**

http://mysql.bkbits.net:8080/myodbc3

26.1.9. MyODBC

26.1.9.1.
26.1.9.2. WindowsMyODBC DSN
26.1.9.3. UnixMyODBC DSN
26.1.9.4.
26.1.9.5. DSN
26.1.9.6. AB
26.1.9.7. ODBC
26.1.9.8. MyODBC
26.1.9.9. MyODBC

MyODBCDSNODBC

26.1.9.1.

“”MySQLMySQL

MySQLMySQLWindows
ODBCMicrosoft ODBC

WindowsWindowsDSN

Windows“”“”“”“”Microsoft
NTODBC“”“”“”

DSN“” aWindc

26.1.9.2. WindowsMyODBC DSN

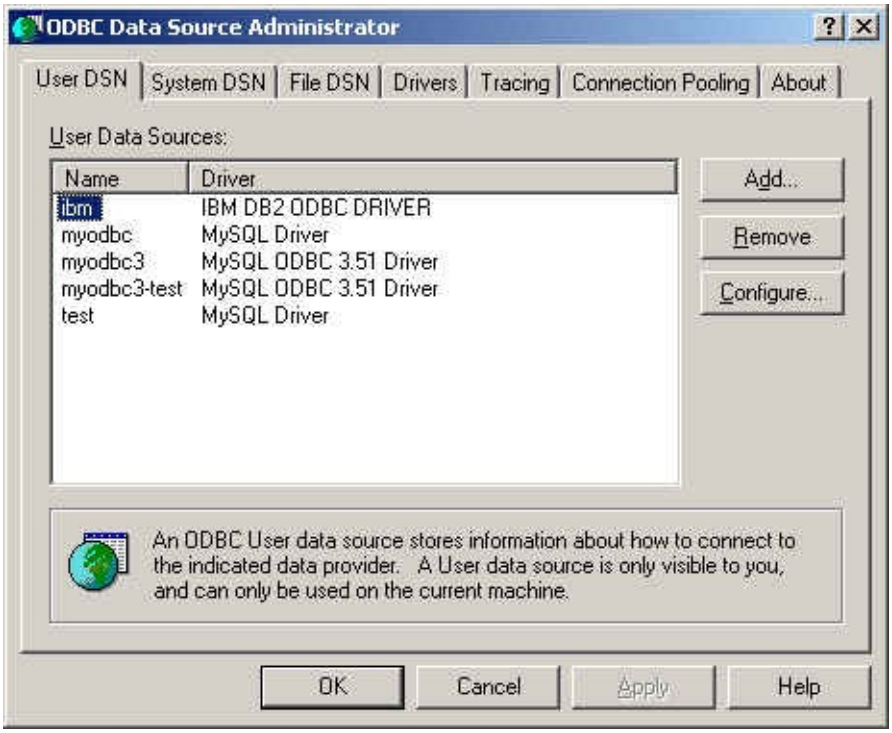
WindowsMyODBC ODBCODBC ODBC

ODBC

1. “”“”“”“”

2. Microsoft Windows 2000“”“”ODBCWindows ODBCODBC

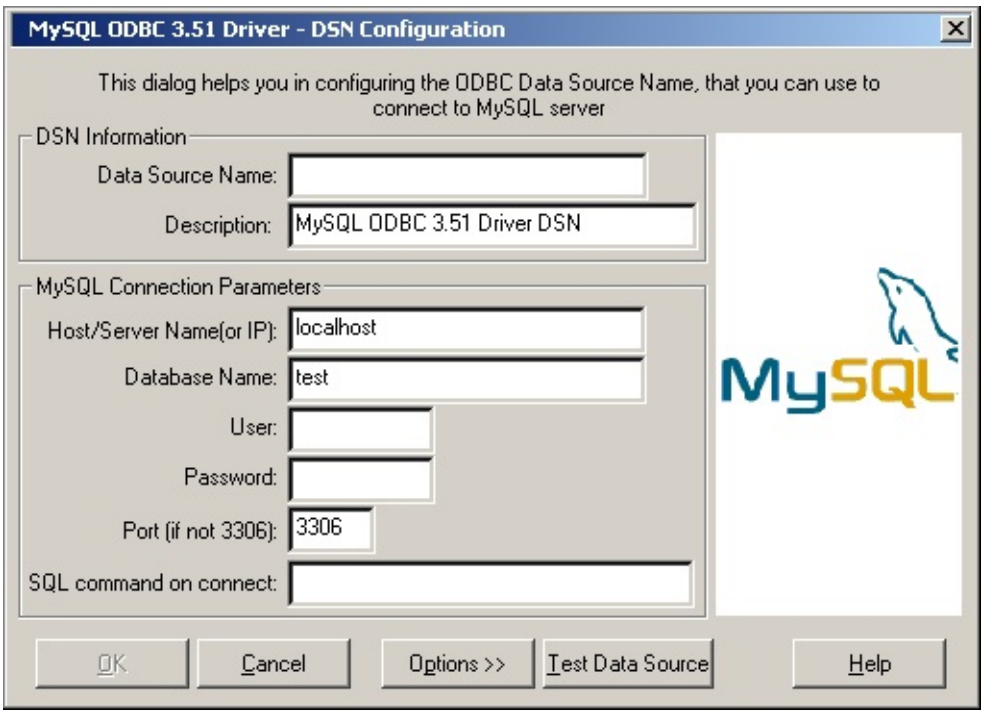
ODBC



“”ODBC

Windows

1. ODBC
2. ODBC“”“”
3. MySQL ODBC 3.51 “”“ MySQL ODBC 3.51-DSN



4. “”

5. “”DSn

6. “””””IPMySQL localhost

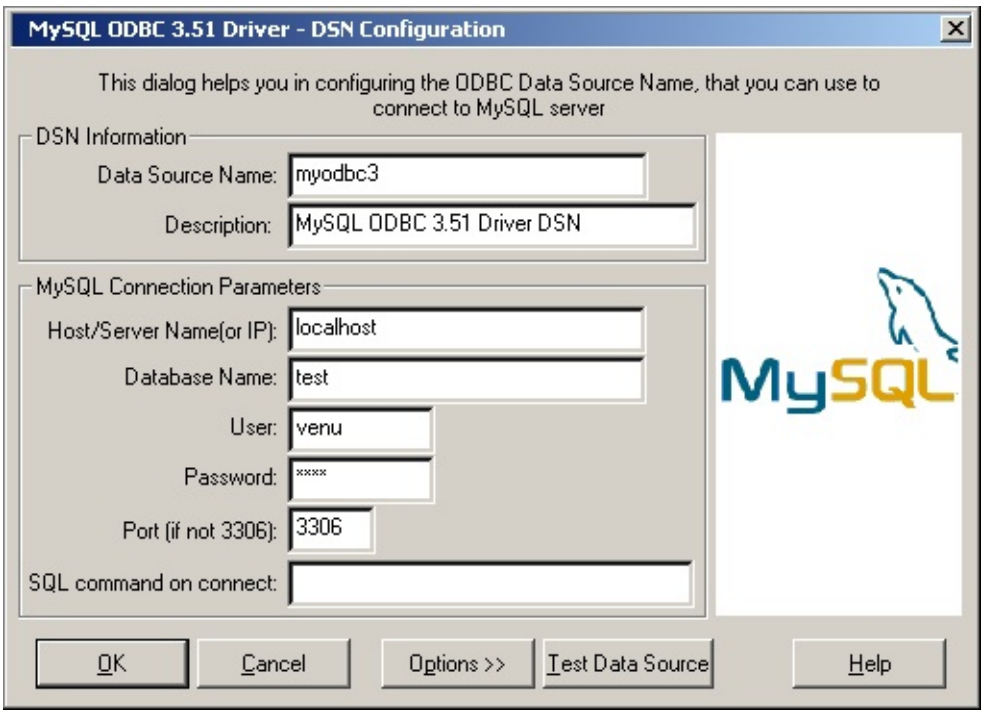
7. “”MySQL

8. “”MySQLID

9. “”

10.“”

11.“SQL”SQL

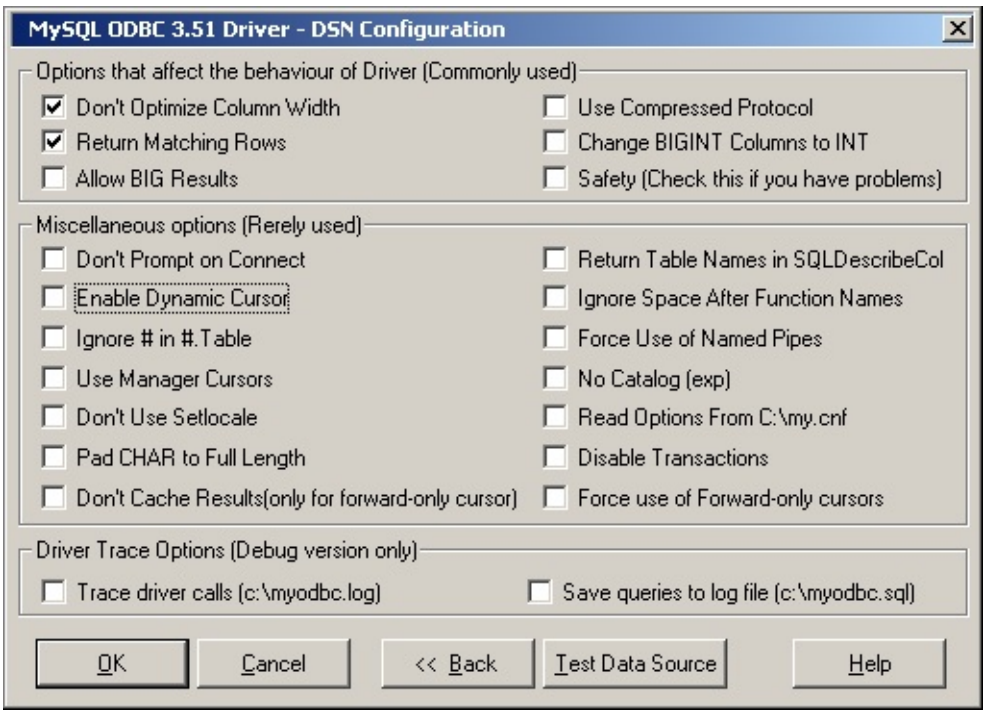


“OK”

“OK”“”ODBC

“”MyODBC

DNS“”



“”DLL

Windows

1. ODBC“DSN”
2. MySQL“”“ MySQL ODBC 3.51-DSN ”
3. “OK”

ODBC

26.1.9.3. UnixMyODBC DSN

Unixodbc.iniDSN 1odbc.inimyodbcmyodbc3 MyODBC 2.50 MyODBC 3.51DSN

;

```
;  odbc.iniMyODBCMyODBC 3.51
;
[ODBC Data Sources]
```

```
myodbc      = MyODBC 2.50 Driver DSN
myodbc3     = MyODBC 3.51 Driver DSN

[myodbc]
Driver       = /usr/local/lib/libmyodbc.so
Description  = MyODBC 2.50 Driver DSN
SERVER       = localhost
PORT         =
USER         = root
Password     =
Database     = test
OPTION       = 3
SOCKET       =

[myodbc3]
Driver       = /usr/local/lib/libmyodbc3.so
Description  = MyODBC 3.51 Driver DSN
SERVER       = localhost
PORT         =
USER         = root
Password     =
Database     = test
OPTION       = 3
SOCKET       =

[Default]
Driver       = /usr/local/lib/libmyodbc3.so
Description  = MyODBC 3.51 Driver DSN
SERVER       = localhost
PORT         =
USER         = root
Password     =
Database     = test
OPTION       = 3
SOCKET       =
```

26.1.9.4“”

unixODBCDSN

· ODBCConfig GUI tool(HOWTO: ODBCConfig)

· odbcinst

unixODBC

```
Data source name not found and no default driver specified
```

ODBCINIODBCSYSINIodbc.ini odbc.ini“ /usr/local/etc”

```
export ODBCINI=/usr/local/etc/odbc.ini

export ODBCSYSINI=/usr/local/etc
```

26.1.9.4.

ODBC.INI[Data Source Name]SQLDriverConnect() InConnectionStringMyODBC

user	ODBC (on Windows)	MySQL
server	localhost	MySQL
database		
option	0	MyODBC
port	3306	TCP/IP
stmt		MySQL
password		
socket		UnixWindows

MyODBC100% ODBCWindowsMyODBC

1	MyODBC
2	MyODBCMySQL“”MySQL3.21.14
4	c:\myodbc.logMYSQL_DEBUG=d:t:O,c::\myodbc.log AUTOEXEC.BAT Unix /tmp/myodbc.log
8	
16	
32	MyODBC 2.50
64	db_name.tbl_name.col_name
128	ODBC
256	
512	CHAR
1024	SQLDescribeCol()

2048	
4096	“(”PowerBuilder
8192	NT**mysqld**
16384	LONGLONGINTLONGLONG
32768	SQLTablesTable_qualifierTable_owner
65536	my.cnf[client][odbc]
131072	…
262144	
524288	c:\myodbc.sql(/tmp/myodbc.sql)
1048576	“ mysql_use_result()”
2097152	

1248

myodbc3.dll MyODBC 3.51 myodbc3
myodbc3.dll DLLMyODBC
3.51.06DLL

MyODBC 2.50　myodbc.dllmyodbcd.dll

Microsoft Access	3
Microsoft Visual Basic	3
	2049
	4
	524288
	524292
	3145731

26.1.9.5. DSN

DRIVER　SQLDriverConnectMySQLDSN-LessMyODBC

MyODBC 2.50

```
ConnectionString = "DRIVER={MySQL};\
                    SERVER=localhost;\
                    DATABASE=test;\
```

```
                    USER=venu;\
                    PASSWORD=venu;\
                    OPTION=3;"
```

MyODBC 3.51

```
ConnectionString = "DRIVER={MySQL ODBC 3.51 Driver};\
                    SERVER=localhost;\
                    DATABASE=test;\
                    USER=venu;\
                    PASSWORD=venu;\
                    OPTION=3;"


ConnectionString = "DRIVER={MySQL ODBC 3.51 Driver};"
                    "SERVER=localhost;"
                    "DATABASE=test;"
                    "USER=venu;"
                    "PASSWORD=venu;"
                    "OPTION=3;"
```

26.1.9.4“”

26.1.9.6. AB

myusermypasswordBA

A

1. MySQL
2. GRANTmyusermyuserB
3.
```
GRANT ALL ON *.* to 'myuser'@'B' IDENTIFIED BY 'mypas
```

4. GRANTmyusermypasswordB AMySQL 5.8“MySQL ”

B

1. MyODBC DSN

```
2.          DSN             = remote_test
3.          SERVER or HOST  = A (or IP address of system A)
4.          DATABASE        = test (The default database or an appro
5.          USER            = myuser
6.          PASSWORD        = mypassword
```

DSN-less 26.1.9.5“DSN”

7. PingBAAInternet

8. DSN=remote_testMyODBC myodbc@lists.mysql.com

http://www.phphelp.com/tutorial/using-myodbc-to-connect-to-a-remote-database.html.

26.1.9.7. ODBC

MyODBC ODBCMyODBCODBC ADMIN

ODBC

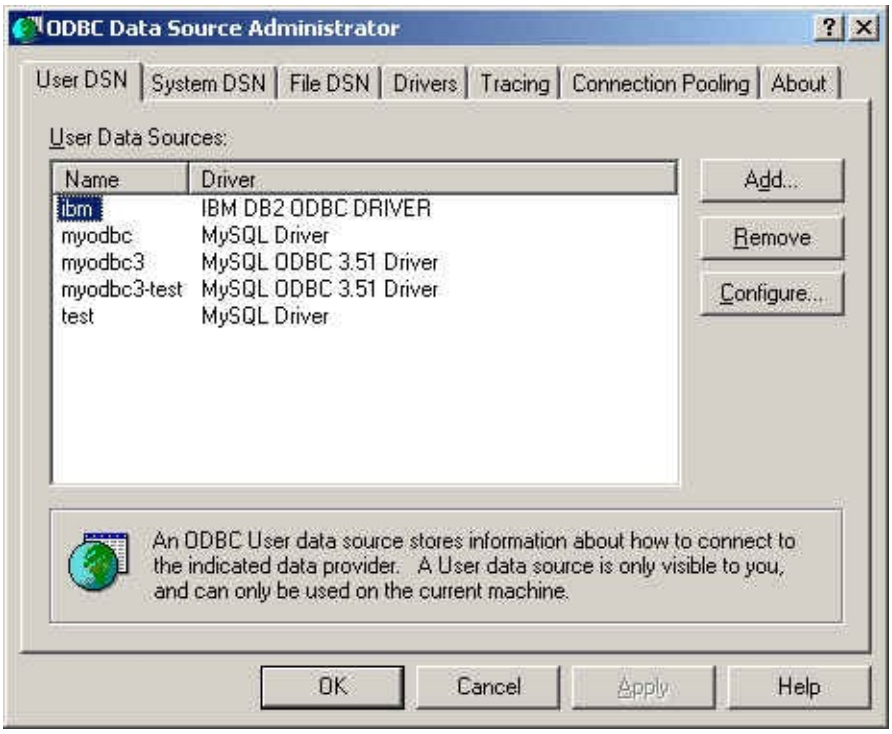
· ODBC

1. “”“”“”“”

2. Microsoft Windows 2000XP2003“”“”“”ODBC

Microsoft Windows“”32 ODBCODBC

3. ODBC



4. “”ODBC

· WindowsUnix

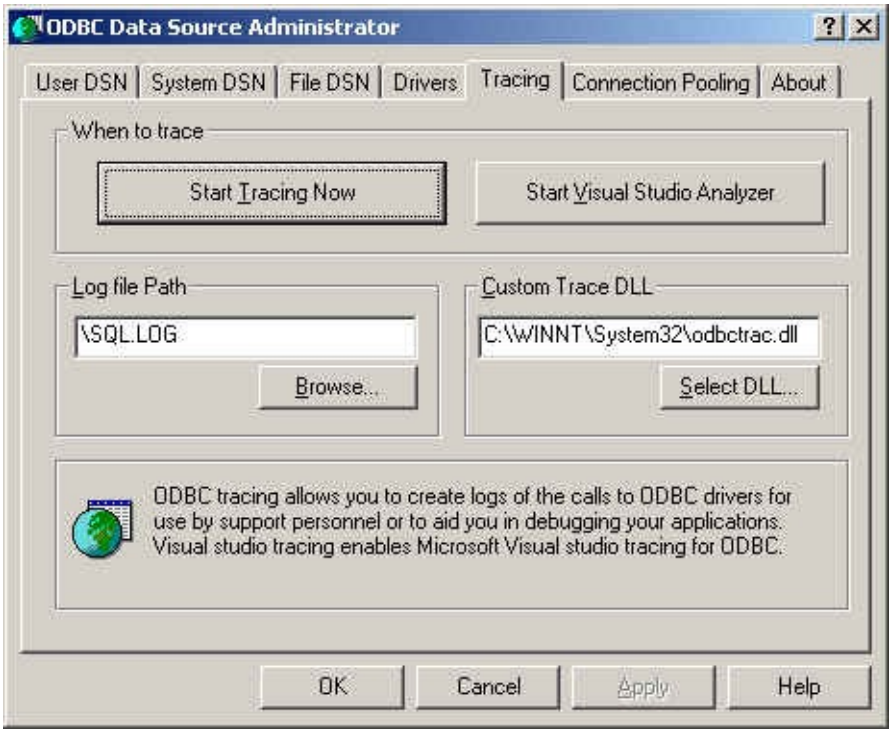
Windows

1. “ODBC”“”ODBC

2. “”ODBC

3. ODBCODBC

4. “”ODBC



Unix

5. Unix ODBC.INI

TraceFileodbc.iniTrace

```
TraceFile  = /tmp/odbc.trace
Trace      = 1
```

TraceFile TraceON OFF“1”“Yes”ON“0”“No”OFF unixODBC**ODBCConfig**HOWTO-ODBCConfigunixODBC

MyODBC

6. DLLMyODBC 3.51 myodbc3d.dllmyodbc3.dll MyODBC 2.50 myodbcd.dll

MyODBC 3.51myodbc3d.dllmyodbcd.dll myodbc3.dll myodbc.dll C:\windows\system32C:\winnt\system32 myodbc.dll myodbc3d.dll myodbcd.dllDLL

7. “MyODBC”“ MyODBC” C:\myodbc.log

myodbcd.dll LinuxDSN-Less“ OPTION=4”

8. MyODBC

myodbc@lists.mysql.com support@mysql.comMySQL AB

- MyODBC
- ODBC
- MySQL
- ODBC
- MyODBCMyODBC
-

MyODBC http://lists.mysql.com/

26.1.9.8. MyODBC

MyODBC

- MS Access 95, 97, 2000, and 2002
- C++-Builder, Borland Builder 4
- Centura Team Developer (formerly Gupta SQL/Windows)
- ColdFusion (on Solaris and NT with service pack 5), How-to: MySQL and Coldfusion. Troubleshooting Data Sources and Database Connectivity for UnixPlatforms.
- Crystal Reports
- DataJunction
- Delphi

- ERwin
- MS Excel
- iHTML
- FileMaker Pro
- FoxPro
- Notes 4.5/4.6
- MS Visio Enterprise 2000
- Vision
- Visual Objects
- Visual Interdev
- SBSS
- Perl DBD-ODBC
- Paradox
- Powerbuilder
- Powerdesigner 32-bit
- MS Visual C++
- Visual Basic
- ODBC.NET through CSharp(C#), VB and C++
- Data Architect(http://thekompany.com/products/dataarchitect/)
- SQLExpress for Xbase++(http://www.SQLExpress.net)
- Open Office (http://www.openoffice.org) How-to: MySQL + OpenOffice.

How-to: OpenOffice + MyODBC + unixODBC.

- Star Office (http://wwws.sun.com/software/star/staroffice/6.0/index.html)
- G2-ODBC bridge (http://www.gensym.com)
- Sambar Server (http://www.sambarserver.info) How-to: MyODBC + SambarServer + MySQL.

MyODBC myodbc@lists.mysql.com

26.1.9.9. MyODBC

MyODBC

.

· Access

Access

o Access 20002.6Microsoft MDAC http://www.microsoft.com/data/AccessMySQLMyODBC 2.50.33MySQL 3.23.x,

Microsoft Jet 4.0 Service Pack 5 (SP5) http://support.microsoft.com/default.aspx?scid=kb;EN-US;q239114Access “ #DELETED#”

MySQL 3.22MDACMyODBC 2.50.322.5

o Access“MyODBC”Access 2.0“

o

o 1“ #DELETED#”

o DOUBLE Access“ #DELETED#”

o MyODBCBIGINT“ #DELETED”

§ 1TIMESTAMP

§ “ODBC DSN”“BIGINTINT”

§ Access

“ #DELETED#”

o TIMESTAMP

o AccessMySQLSQLAccess“ Query|SQLSpecific|Pass-Through”

o NTAccess BLOBOLE OBJECTSOLE MEMOALTER TABLEBLOBTEXT

o AccessDATE DATETIME

o AccessBYTE AccessTINYINTTINYINT UNSIGNED127

· ADO

ADO APIMyODBCMySQL RecordCountCursorLocation adUseServer “-1” adUseClientVB

```
Dim myconn As New ADODB.Connection
Dim myrs As New Recordset
Dim mySQL As String
Dim myrows As Long

myconn.Open "DSN=MyODBCsample"
mySQL = "SELECT * from user"
myrs.Source = mySQL
```

```
Set myrs.ActiveConnection = myconn
myrs.CursorLocation = adUseClient
myrs.Open
myrows = myrs.RecordCount


myrs.Close
myconn.Close
```

SELECT COUNT(*)

· ASP

“”

· BDE

“”

· Borland Builder 4

ActiveOpen Active“SELECT * FROM ...”

· ColdFusionUnix

ColdFusion

LinuxColdFusionMySQLunixODBCMyODBCAllaireMyODBC 2.50.26MySQL 3.22.27LinuxColdFusion
http://dev.mysql.com/downloads/connector/odbc/MyODBC

ColdFusion 4.5.1“ColdFusion”MySQLColdFusion MySQLODBCMyODBC

Contribmydsn-*xxx*.zip ColdfusionMyODBCDSN

· DataJunction

VARCHARENUMENUM MySQL

· Excel

o CONCAT()

o
```
SELECT CONCAT(rise_time), CONCAT(set_time)
  FROM sunrise_sunset;
```

Excel97

CONCAT()ODBC“”CONCAT()ODBCExcel

Excel1ODBC

· Word

MySQLWord/ExcelMyODBC“Microsoft”

1

o **mysql**

o ODBC1DSN“my”

o Word

o 1

o “”

o “”

o “”“ Ms Query”

o “ Ms Query”“ my DSN”1

o

o

o 1

o 1

o “ Microsoft Word”

o “”

o “”

o OKWord

· odbcadmin

ODBC

· Delphi

BDE 3.2MySQL“”

DelphiMyODBCODBCBDEBDE“BDE”“Delphi
Page”Bryan Brunton <bryan@flesherfab.com>

```
fReg:= TRegistry.Create;
fReg.OpenKey('\Software\ODBC\ODBC.INI\DocumentsFab', True);
fReg.WriteString('Database', 'Documents');
fReg.WriteString('Description', ' ');
fReg.WriteString('Driver', 'C:\WINNT\System32\myodbc.dll');
fReg.WriteString('Flag', '1');
fReg.WriteString('Password', '');
fReg.WriteString('Port', ' ');
fReg.WriteString('Server', 'xmark');
fReg.WriteString('User', 'winuser');
fReg.OpenKey('\Software\ODBC\ODBC.INI\ODBC Data Sources', True);
fReg.WriteString('DocumentsFab', 'MySQL');
```

```
fReg.CloseKey;
fReg.Free;

Memo1.Lines.Add('DATABASE NAME=');
Memo1.Lines.Add('USER NAME=');
Memo1.Lines.Add('ODBC DSN=DocumentsFab');
Memo1.Lines.Add('OPEN MODE=READ/WRITE');
Memo1.Lines.Add('BATCH COUNT=200');
Memo1.Lines.Add('LANGDRIVER=');
Memo1.Lines.Add('MAX ROWS=-1');
Memo1.Lines.Add('SCHEMA CACHE DIR=');
Memo1.Lines.Add('SCHEMA CACHE SIZE=8');
Memo1.Lines.Add('SCHEMA CACHE TIME=-1');
Memo1.Lines.Add('SQLPASSTHRU MODE=SHARED AUTOCOMMIT');
Memo1.Lines.Add('SQLQRYMODE=');
Memo1.Lines.Add('ENABLE SCHEMA CACHE=FALSE');
Memo1.Lines.Add('ENABLE BCD=FALSE');
Memo1.Lines.Add('ROWSET SIZE=20');
Memo1.Lines.Add('BLOBS TO CACHE=64');
Memo1.Lines.Add('BLOB SIZE=32');

AliasEditor.Add('DocumentsFab','MySQL',Memo1.Lines);
```

· C++ Builder

BDE 3.0BDEPRIMARY

· Vision

“”

· Visual Basic

ADOVisual Basic SHOW PROCESSLIS
OPTION=16384 MyODBC“ BIGINTINT”“”

· VisualInterDev

BIGINT “[Microsoft][ODBC Driver Manager] ”MyODBC“ BIGI

· Visual Objects

“”

· MS Visio Enterprise 2000

MyODBC2.50.37MS Vision Enterprise 2000MySQL
VisioVisioMyODBCMySQL

26.1.10. MyODBC

26.1.10.1. MyODBC DSN
26.1.10.2.
26.1.10.3. INFOODBC

MyODBC

26.1.10.1. MyODBC DSN

MS(Q260558) ctl3d32.dll

26.1.10.2.

5.7.8“ ”

26.1.10.3. INFOODBC

http://support.microsoft.com/default.aspx?s

26.1.11. MyODBCMicrosoft Access

26.1.11.1. Microsoft AccessMyODBCMySQL
26.1.11.2. AccessMySQL
26.1.11.3. MySQLAccess
26.1.11.4.
26.1.11.5. “#DELETED#”
26.1.11.6.
26.1.11.7. Access 97
26.1.11.8. Access“”
26.1.11.9. AccessODBC
26.1.11.10. AccessMyODBC
26.1.11.11. MyODBCAccess
26.1.11.12. ODBCQueryTimeout
26.1.11.13. INFOAccessMySQL/

MyODBCMicrosoft Access

26.1.11.1. Microsoft AccessMyODBCMySQL

Microsoft AccessMyODBCPC

1. Access 20002.6Microsoft MDAC
   http://www.microsoft.com/data/AccessMySQLMyODBC
2.50.33MySQL 3.23.x,

Microsoft Jet 4.0 Service Pack 5 (SP5)
   http://support.microsoft.com/default.aspx?scid=kb;EN-US;q239114Access
“ #DELETED#”

MySQL 3.22MDACMyODBC 2.50.322.5

2. MySQL http://dev.mysql.com/downloads/

3. MyODBC 3.512.50 http://dev.mysql.com/downloads/connector/odbc/

4. Access“MyODBC”

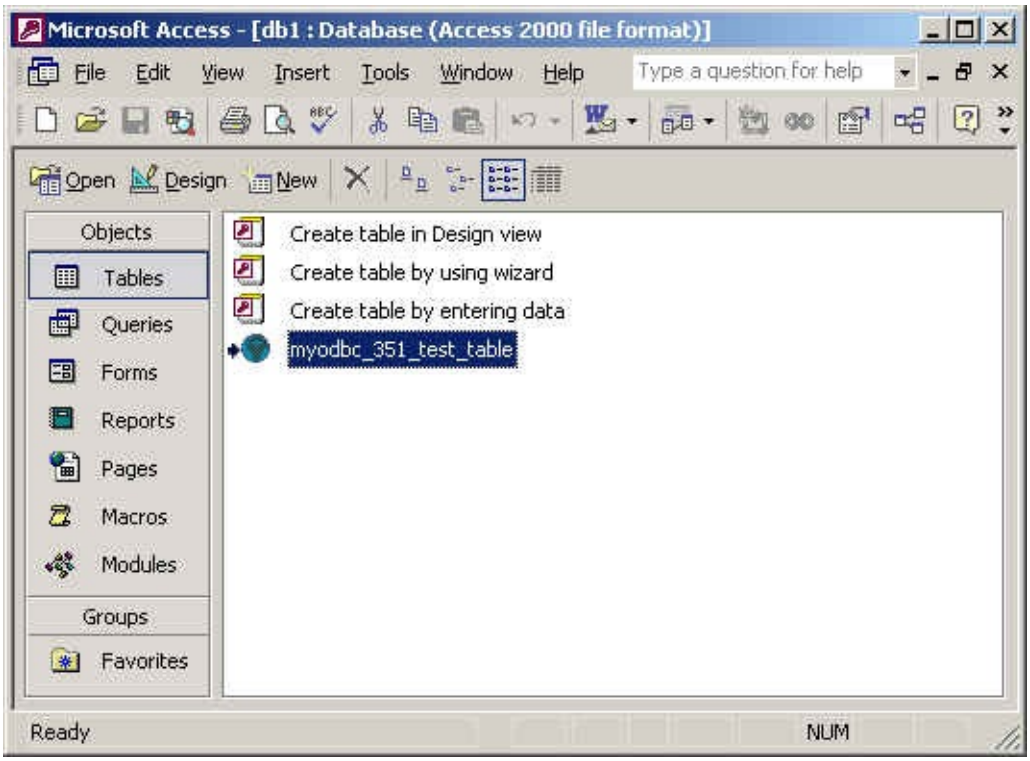
5. MyODBCAccessMySQL

26.1.11.2. AccessMySQL

MyODBCMySQL

AccessMySQL

1. AccessAccess“”



2. “”“”

3. “ ”“” “ODBC()”

4. “”OK

5. “”ODBC“”“”MyODBCMyODBC
MyODBC 26.1.9.2“WindowsMyODBC DSN”

Microsoft AccessMySQL

26.1.11.3. MySQLAccess

MyODBCMySQL

MySQLAccess

1. “”

2. “”“”“”“”“”“”“”

3. “”“”“”“” ODBC Databases ()”“”
“”ODBC“”“”MyODBCMyODBC
MyODBCMyODBC 3.51 26.1.9.2“WindowsMyO

4. IDOK

5. Microsoft AccessODBCMySQL

6. OK1Microsoft

26.1.11.4.

“”

1.

2. “”“”Access 2000“”“”

3.

4. OK

Microsoft Access“<table name

1.

2. “”“”Access 2000“”“”

3. “”

4. OK

5. “<table name>”“”OK

26.1.11.5. “#DELETED#”

Access“ #DELETED#”

· Access 20002.6Microsoft MDAC http://www.microsoft.com/data/AccessMySQLMyODBC 2.50.33MySQL 3.23.x,

Microsoft Jet 4.0 Service Pack 5 (SP5) http://support.microsoft.com/default.aspx?scid=kb;EN-US;q239114Access “ #DELETED#”

MySQL 3.22MDACMyODBC 2.50.322.5

· Access“MyODBC”Access 2.0“

·

· 1“ #DELETED#”

· DOUBLE Access“ #DELETED#”

· MyODBCBIGINT“ #DELETED”

o 1TIMESTAMP

o “ODBC DSN”“ BIGINTINT”

o Access

“ #DELETED#”

26.1.11.6.

“DSN”“”“ (

26.1.11.7. Access 97

Access 97Access 20002002MyODBCMyODBC

26.1.11.8. Access“”

· 1

· 1

· DOUBLE

ODBC1ODBC AD
ODBC”

26.1.11.9. AccessODBC

“AccessODBC
” http://support.microsoft.com/support/kb/articles/Q124/9/01.asp?LN=EN-US&SD=gn&FR=0%3CP%3E

26.1.11.10. AccessMyODBC

· _____

· ODBCDirect _____

· SQL _____

26.1.11.11. MyODBCAccess

AccessODBC

· 2

· BIG8

10 OPTION=10

26.1.11.12. ODBCQueryTimeout

“ODBC QueryTimeout” http://support.microsoft.com/default.ascid=kb%3Ben-us%3B153756

26.1.11.13. INFOAccessMySQL/

26.1.12. MyODBCMicrosoft VBAASP

26.1.12.1. SELECT COUNT(*) FROM tbl_na *me*
26.1.12.2. AppendChunk()GetChunk() ADO“”
26.1.12.3. ADOSQL
26.1.12.4. Visual BasicBlob
26.1.12.5. Visual BasicMySQL
26.1.12.6. VBADODAORDO
26.1.12.7. ASPMySQLMyODBC
26.1.12.8. INFOActiveXADO

Microsoft Visual Basic(ADO, DAO & RDO)ASPMyODBC

26.1.12.1. SELECT COUNT(*) FROM tbl_na *me*

COUNT(*)1BIGINT ADO“ BIGINTINT”16384

26.1.12.2. AppendChunk()GetChunk() ADO“”

adUseServerADO GetChunk()AppendChunk()adUseClient

http://www.dwam.net/iishelp/ado/docs/adomth02_4.htm

26.1.12.3. ADOSQL

ADO RecordsAffected http://msdn.microsoft.com/library/durl=/library/en-us/ado270/htm/mdmthcnnexecute.asp

26.1.12.4. Visual BasicBlob

Mike Hillyer m.hillyer@telusplanet.netADOMyODBCBlob MySQL BLOBVisual Basic 6

26.1.12.5. Visual BasicMySQL

Mike Hillyer m.hillyer@telusplanet.net Visual basicMySQL

26.1.12.6. VBADODAORDO

ADODAORDOVB

· ADO 26.1.19“MyODBCVBADODAORDO”

· DAO 26.1.19“MyODBCVBADODAORDO”

· RDO 26.1.19“MyODBCVBADODAORDO”

ADO/DAO/RDO myodbc@lists.mysql.com

26.1.12.7. ASPMySQLMyODBC

MyODBCASPMySQL

· MyODBCASPMySQL

· ASP and MySQL at DWAM.NT

http://support.microsoft.com/default.aspx?scid=/Support/ActiveServer/faq/data/adofaq.aspASP

26.1.12.8. INFOActiveXADO

ActiveXADO

26.1.13. MyODBCODBC

26.1.13.1. MySQLMS-Word/Excel
26.1.13.2. MyODBCMS DTSMySQL
26.1.13.3. SolarisMySQL+MyODBC+unixODBC+ColdFusion

MyODBCODBCMicrosoft WordExcelColdFusion

26.1.13.1. MySQLMS-Word/Excel

MySQLWord/ExcelMyODBC“Microsoft”

1

· **mysql**

· ODBC1DSN“my”

· Word

· 1

. “”

. “”

· “”“ Ms Query”

· “ Ms Query”“ my DSN”1

·

·

· 1

· 1

· “ Microsoft Word”

· “”

· “”

· OKWord

26.1.13.2. MyODBCMS DTSMySQL

TEXTVARCHARAccess 97MyODBC3.51.02

26.1.13.3. SolarisMySQL+MyODBC+unixODBC+ColdFusion

MySQL ColdFusion unixODBC MyODBCSolaris

26.1.14. MyODBC

26.1.14.1. ODBCAUTO_INCREMENT
26.1.14.2. MyODBC
26.1.14.3.
26.1.14.4.
26.1.14.5. MyODBC 3.51MyODBC 2.50
26.1.14.6. MyODBC.NETMySQL
26.1.14.7. MyODBC

MyODBC

26.1.14.1. ODBCAUTO_INCREMENT

INSERTIDODBC“auto”

```
INSERT INTO tbl (auto,text) VALUES(NULL,'text');
SELECT LAST_INSERT_ID();
```

ID

```
INSERT INTO tbl (auto,text) VALUES(NULL,'text');
INSERT INTO tbl2 (id,text) VALUES(LAST_INSERT_ID(),'text');
```

25.2.13.3“ID”

ODBCDelphiAccess

```
SELECT * FROM tbl WHERE auto IS NULL;
```

26.1.14.2. MyODBC

MyODBC 3.51

“

26.1.14.3.

MySQL

InnoDBBDB 4.0MySQL InnoDBBDBMySQL-Max BDB

InnoDBBDBDSN “”

26.1.14.4.

MyODBC 2.50SQLSetCursorNameMyODBC

26.1.14.5. MyODBC 3.51MyODBC 2.50

MyODBC 3.51MyODBC 2.50

26.1.14.6. MyODBC.NETMySQL

odbc.net MyODBCMySQLVC.NETVB.NETMySQL

· 26.1.20.1“ODBC.NET: CSHARP(C#)”

· 26.1.20.2“ODBC.NET: VB”

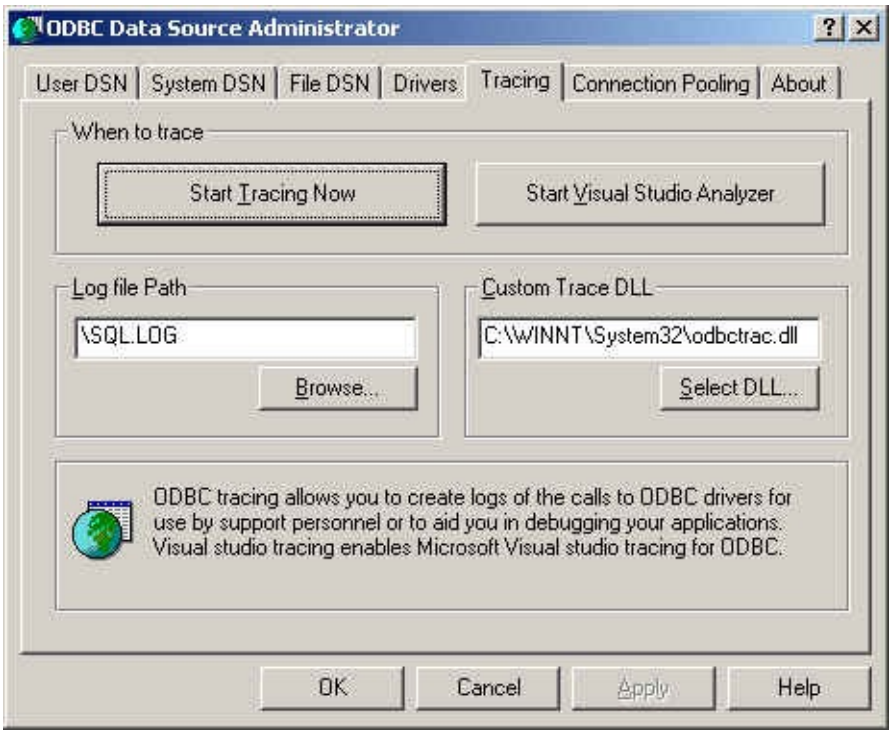
VenuMyODBC .NETMySQL MySQL .NET

MyODBCODBC.NET0SQL_NO_DATA
http://support.microsoft.com/default.aspx?scid=kb;EN-US;q319243

26.1.14.7. MyODBC

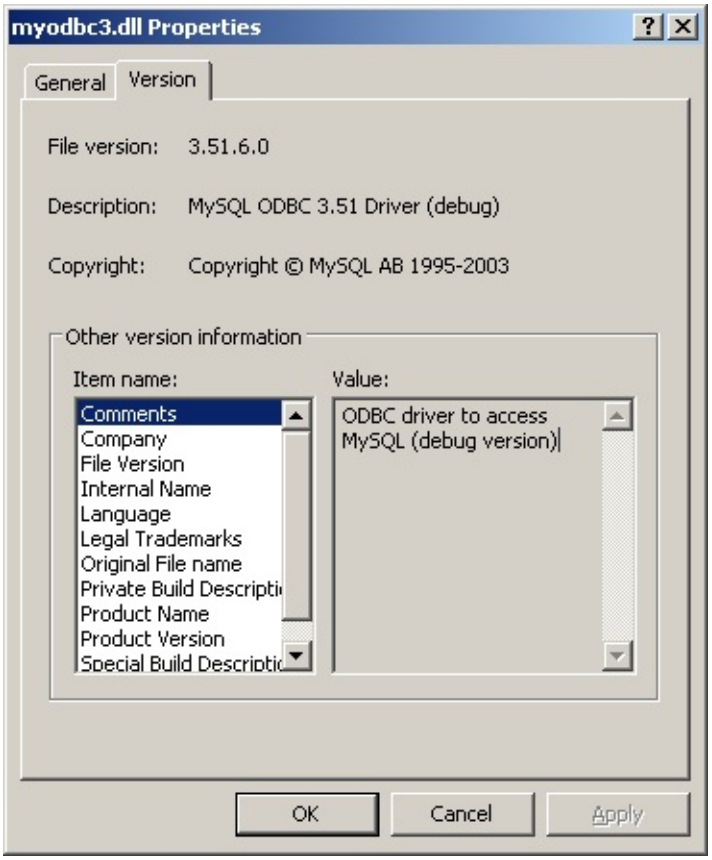
MyODBCODBC

· “ODBC”

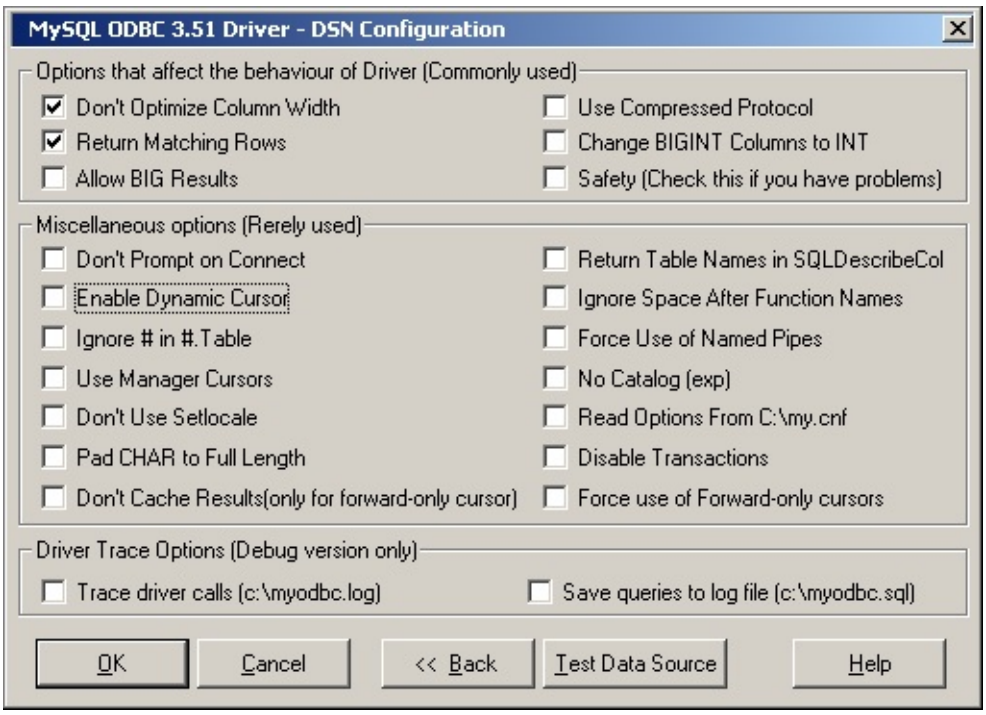


“ODBC”“”“”“”“”“”

· DLLDLLDLL“”“”DLL



· “”“”OPTION=4,524288



26.1.15. MyODBC

MyODBCMySQL

· MyODBC DSN

· MySQL

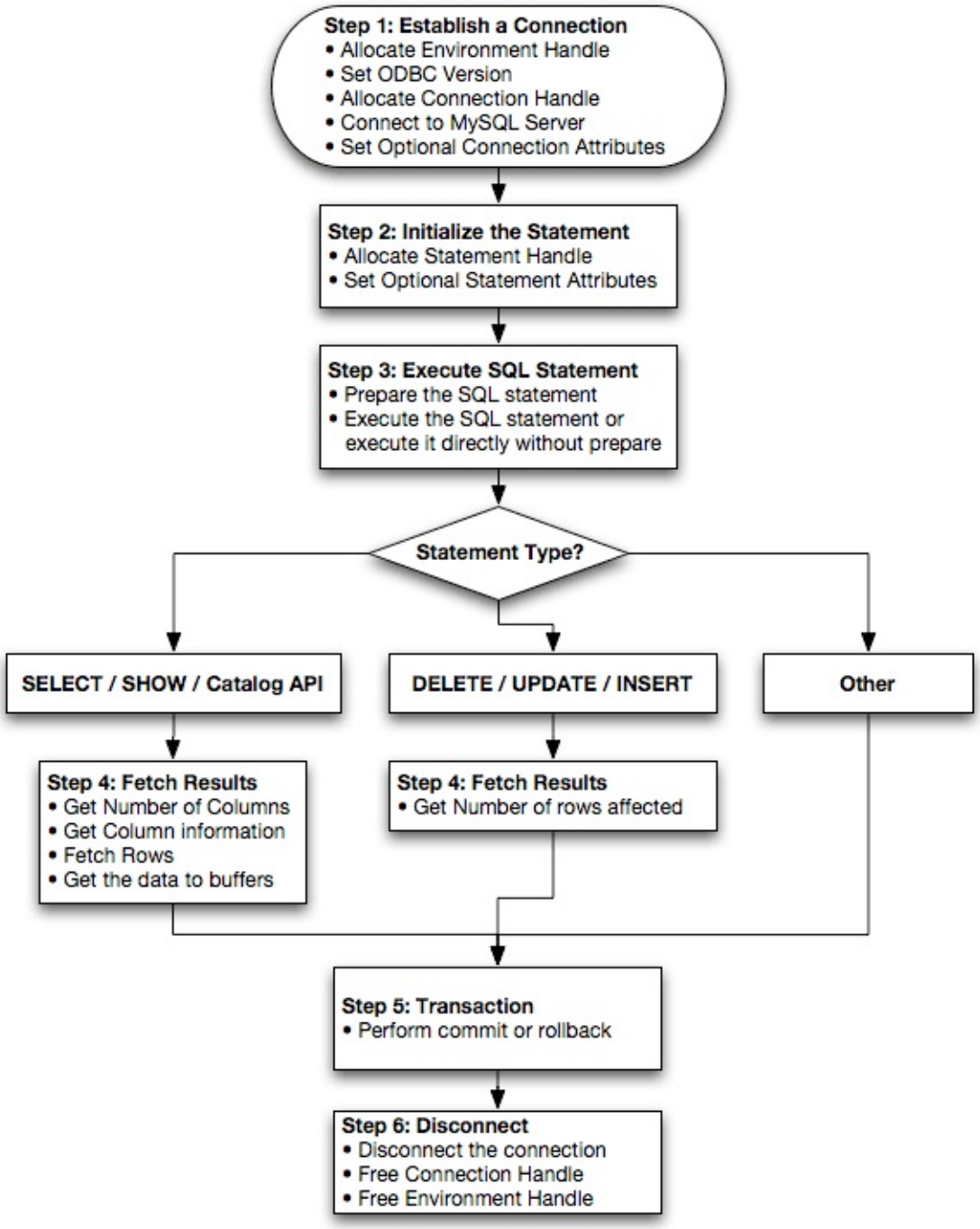
·

· SQL

·

·

·



26.1.16. MyODBC API

ODBC

ODBC APIODBC http://msdn.microsoft.com/library/en-us/odbc/htm/odbcabout_this_manual.asp

SQLGetInfoMyODBC SQLGetFunctions

MyODBC 3.51

MyODBC API

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLAllocHandle	No	Yes	ISO 92	
SQLConnect	Yes	Yes	ISO 92	ID
SQLDriverConnect	Yes	Yes	ODBC	
SQLAllocEnv	Yes	Yes	Deprecated	
SQLAllocConnect	Yes	Yes	Deprecated	

	MyODBC	**MyODBC**		
	2.50	**3.51**		

SQLDataSources	No	No	ISO 92	
SQLDrivers	No	No	ODBC	
SQLGetInfo	Yes	Yes	ISO 92	
SQLGetFunctions	Yes	Yes	ISO 92	
SQLGetTypeInfo	Yes	Yes	ISO 92	

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLSetConnectAttr	No	Yes	ISO 92	
SQLGetConnectAttr	No	Yes	ISO 92	
SQLSetConnectOption	Yes	Yes	Deprecated	
SQLGetConnectOption	Yes	Yes	Deprecated	
SQLSetEnvAttr	No	Yes	ISO 92	

SQLGetEnvAttr	No	Yes	ISO 92	
SQLSetStmtAttr	No	Yes	ISO 92	
SQLGetStmtAttr	No	Yes	ISO 92	
SQLSetStmtOption	Yes	Yes	Deprecated	
SQLGetStmtOption	Yes	Yes	Deprecated	

SQL

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLAllocStmt	Yes	Yes	Deprecated	
SQLPrepare	Yes	Yes	ISO 92	SQL
SQLBindParameter	Yes	Yes	ODBC	SQL
SQLGetCursorName	Yes	Yes	ISO 92	
SQLSetCursorName	Yes	Yes	ISO 92	

SQLSetScrollOptions	Yes	Yes	ODBC	

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLExecute	Yes	Yes	ISO 92	
SQLExecDirect	Yes	Yes	ISO 92	
SQLNativeSql	Yes	Yes	ODBC	SQL
SQLDescribeParam	Yes	Yes	ODBC	
SQLNumParams	Yes	Yes	ISO 92	
SQLParamData	Yes	Yes	ISO 92	SQLPutData
SQLPutData	Yes	Yes	ISO 92	

	MyODBC	**MyODBC**		

	2.50	**3.51**		
SQLRowCount	Yes	Yes	ISO 92	
SQLNumResultCols	Yes	Yes	ISO 92	
SQLDescribeCol	Yes	Yes	ISO 92	
SQLColAttribute	No	Yes	ISO 92	1
SQLColAttributes	Yes	Yes	Deprecated	1
SQLFetch	Yes	Yes	ISO 92	
SQLFetchScroll	No	Yes	ISO 92	
SQLExtendedFetch	Yes	Yes	Deprecated	
SQLSetPos	Yes	Yes	ODBC	
SQLBulkOperations	No	Yes	ODBC	

	MyODBC	**MyODBC**		

	2.50	**3.51**		
SQLError	Yes	Yes	Deprecated	
SQLGetDiagField	Yes	Yes	ISO 92	
SQLGetDiagRec	Yes	Yes	ISO 92	

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLColumnPrivileges	Yes	Yes	ODBC	
SQLColumns	Yes	Yes	X/Open	
SQLForeignKeys	Yes	Yes	ODBC	
SQLPrimaryKeys	Yes	Yes	ODBC	1
SQLSpecialColumns	Yes	Yes	X/Open	1
SQLStatistics	Yes	Yes	ISO 92	

SQLTablePrivileges	Yes	Yes	ODBC	
SQLTables	Yes	Yes	X/Open	

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLTransact	Yes	Yes	Deprecated	
SQLEndTran	No	Yes	ISO 92	

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLFreeStmt	Yes	Yes	ISO 92	
SQLCloseCursor	Yes	Yes	ISO 92	
SQLCancel	Yes	Yes	ISO 92	SQL

	MyODBC	**MyODBC**		
	2.50	**3.51**		
SQLDisconnect	Yes	Yes	ISO 92	
SQLFreeHandle	No	Yes	ISO 92	
SQLFreeConnect	Yes	Yes	Deprecated	
SQLFreeEnv	Yes	Yes	Deprecated	

26.1.17. MyODBC

SQLC

	SQL	**C**
bit	SQL_BIT	SQL_C_BIT
tinyint	SQL_TINYINT	SQL_C_STINYINT
tinyint unsigned	SQL_TINYINT	SQL_C_UTINYINT
bigint	SQL_BIGINT	SQL_C_SBIGINT

bigint unsigned	SQL_BIGINT	SQL_C_UBIGINT
long varbinary	SQL_LONGVARBINARY	SQL_C_BINARY
blob	SQL_LONGVARBINARY	SQL_C_BINARY
longblob	SQL_LONGVARBINARY	SQL_C_BINARY
tinyblob	SQL_LONGVARBINARY	SQL_C_BINARY
mediumblob	SQL_LONGVARBINARY	SQL_C_BINARY
long varchar	SQL_LONGVARCHAR	SQL_C_CHAR
text	SQL_LONGVARCHAR	SQL_C_CHAR
mediumtext	SQL_LONGVARCHAR	SQL_C_CHAR
char	SQL_CHAR	SQL_C_CHAR
numeric	SQL_NUMERIC	SQL_C_CHAR
decimal	SQL_DECIMAL	SQL_C_CHAR
integer	SQL_INTEGER	SQL_C_SLONG

integer unsigned	SQL_INTEGER	SQL_C_ULONG
int	SQL_INTEGER	SQL_C_SLONG
int unsigned	SQL_INTEGER	SQL_C_ULONG
mediumint	SQL_INTEGER	SQL_C_SLONG
mediumint unsigned	SQL_INTEGER	SQL_C_ULONG
smallint	SQL_SMALLINT	SQL_C_SSHORT
smallint unsigned	SQL_SMALLINT	SQL_C_USHORT
real	SQL_FLOAT	SQL_C_DOUBLE
double	SQL_FLOAT	SQL_C_DOUBLE
float	SQL_REAL	SQL_C_FLOAT
double precision	SQL_DOUBLE	SQL_C_DOUBLE
date	SQL_DATE	SQL_C_DATE
time	SQL_TIME	SQL_C_TIME

year	SQL_SMALLINT	SQL_C_SHORT
datetime	SQL_TIMESTAMP	SQL_C_TIMESTAMP
timestamp	SQL_TIMESTAMP	SQL_C_TIMESTAMP
text	SQL_VARCHAR	SQL_C_CHAR
varchar	SQL_VARCHAR	SQL_C_CHAR
enum	SQL_VARCHAR	SQL_C_CHAR
set	SQL_VARCHAR	SQL_C_CHAR
bit	SQL_CHAR	SQL_C_CHAR
bool	SQL_CHAR	SQL_C_CHAR

26.1.18. MyODBC

	SQLSTATE 2	**SQLSTATE 3**	
500	01000	01000	

501	01004	01004	
502	01S02	01S02	
503	01S03	01S03	
504	01S04	01S04	1
505	01S06	01S06	1
506	07001	07002	SQLBindParameter
507	07005	07005	
508	07009	07009	
509	08002	08002	
510	08003	08003	
511	24000	24000	
512	25000	25000	
513	25S01	25S01	

514	34000	34000	
515	S1000	HY000	
516	S1001	HY001	
517	S1002	HY002	
518	S1003	HY003	
519	S1004	HY004	SQL
520	S1009	HY009	
521	S1010	HY010	
522	S1011	HY011	
523	S1012	HY012	
524	S1013	HY013	
525	S1015	HY015	
526	S1024	HY024	

527	S1090	HY090	
528	S1091	HY091	
529	S1092	HY092	
530	S1093	HY093	
531	S1095	HY095	
532	S1106	HY106	
533	S1117	HY117	
534	S1109	HY109	
535	S1C00	HYC00	
0	21S01	21S01	
0	23000	23000	
0	42000	42000	
0	42S02	42S02	

0	42S12	42S12	
0	42S21	42S21	
0	42S22	42S22	
0	08S01	08S01	

26.1.19. MyODBCVBADODAORDO

26.1.19.1. ADO: rs.addNew, rs.deleters.update
26.1.19.2. DAO: rs.addNew, rs.update
26.1.19.3. RDO: rs.addNewrs.update

MySQL ODBC 3.51ADODAORDO

26.1.19.1. ADO: rs.addNew, rs.deleters.update

ADOActiveX my_adors.addNew rs.deleters.update

```
Private Sub myodbc_ado_Click()


Dim conn As ADODB.Connection

Dim rs As ADODB.Recordset

Dim fld As ADODB.Field

Dim sql As String


'connect to MySQL server using MySQL ODBC 3.51 DriverMySQL ODBC 3.51

Set conn = New ADODB.Connection

conn.ConnectionString = "DRIVER={MySQL ODBC 3.51 Driver};"_
```

```
                        & "SERVER=localhost;"_
                        & " DATABASE=test;"_
                        & "UID=venu;PWD=venu; OPTION=3"

conn.Open

'create table
conn.Execute "DROP TABLE IF EXISTS my_ado"
conn.Execute "CREATE TABLE my_ado(id int not null primary key, name
                                & "txt text, dt date, tm time, ts tim

'direct insert
conn.Execute "INSERT INTO my_ado(id,name,txt) values(1,100,'venu')"
conn.Execute "INSERT INTO my_ado(id,name,txt) values(2,200,'MySQL')"
conn.Execute "INSERT INTO my_ado(id,name,txt) values(3,300,'Delete')

Set rs = New ADODB.Recordset
rs.CursorLocation = adUseServer

'fetch the initial table ..…
rs.Open "SELECT * FROM my_ado", conn
  Debug.Print rs.RecordCount
  rs.MoveFirst
  Debug.Print String(50, "-") & "Initial my_ado Result Set " & Strin
  For Each fld In rs.Fields
    Debug.Print fld.Name,
```

```
    Next
    Debug.Print

    Do Until rs.EOF
    For Each fld In rs.Fields
    Debug.Print fld.Value,
    Next
    rs.MoveNext
    Debug.Print
  Loop
rs.Close

'rs insertrs
rs.Open "select * from my_ado", conn, adOpenDynamic, adLockOptimisti
rs.AddNew
rs!Name = "Monty"
rs!txt = "Insert row"
rs.Update
rs.Close

'rs updaters
rs.Open "SELECT * FROM my_ado"
rs!Name = "update"
rs!txt = "updated-row"
rs.Update
rs.Close
```

```
'rs update second time..rs   2…
rs.Open "SELECT * FROM my_ado"
rs!Name = "update"
rs!txt = "updated-second-time"
rs.Update
rs.Close

'rs deleters
rs.Open "SELECT * FROM my_ado"
rs.MoveNext
rs.MoveNext
rs.Delete
rs.Close

'fetch the updated table ..…
rs.Open "SELECT * FROM my_ado", conn
  Debug.Print rs.RecordCount
  rs.MoveFirst
  Debug.Print String(50, "-") & "Updated my_ado Result Set " & Strin
  For Each fld In rs.Fields
    Debug.Print fld.Name,
    Next
    Debug.Print

    Do Until rs.EOF
```

```
    For Each fld In rs.Fields
    Debug.Print fld.Value,
    Next
    rs.MoveNext
    Debug.Print
  Loop
rs.Close
conn.Close
End Sub
```

26.1.19.2. DAO: rs.addNew, rs.update

DAO my_daors.addNew rs.update

```
Private Sub myodbc_dao_Click()

Dim ws As Workspace
Dim conn As Connection
Dim queryDef As queryDef
Dim str As String

'connect to MySQL server using MySQL ODBC 3.51 DriverMySQL ODBC 3.51
Set ws = DBEngine.CreateWorkspace("", "venu", "venu", dbUseODBC)
str = "odbc;DRIVER={MySQL ODBC 3.51 Driver};"_
                      & "SERVER=localhost;"_
                      & " DATABASE=test;"_
                      & "UID=venu;PWD=venu; OPTION=3"
Set conn = ws.OpenConnection("test", dbDriverNoPrompt, False, str)
```

```
'Create table my_dao    my_dao
Set queryDef = conn.CreateQueryDef("", "drop table if exists my_dao"
queryDef.Execute

Set queryDef = conn.CreateQueryDef("", "create table my_dao(Id INT A
                                                    & "Ts TIMES
queryDef.Execute

'Insert new records using rs.addNew   rs.addNew
Set rs = conn.OpenRecordset("my_dao")
Dim i As Integer

  For i = 10 To 15
  rs.AddNew
  rs!Name = "insert record" & i
  rs!Id2 = i
  rs.Update
  Next i
           rs.Close

'rs update..rs
Set rs = conn.OpenRecordset("my_dao")
rs.Edit
rs!Name = "updated-string"
rs.Update
rs.Close
```

```
'fetch the table back...…
Set rs = conn.OpenRecordset("my_dao", dbOpenDynamic)
str = "Results:"
rs.MoveFirst
While Not rs.EOF
str = " " & rs!Id & " , " & rs!Name & ", " & rs!Ts & ", " & rs!Id2
Debug.Print "DATA:" & str
rs.MoveNext
Wend

'rs Scrollingrs
rs.MoveFirst
str = " FIRST ROW: " & rs!Id & " , " & rs!Name & ", " & rs!Ts & ", "
Debug.Print str

rs.MoveLast
str = " LAST ROW: " & rs!Id & " , " & rs!Name & ", " & rs!Ts & ", "
Debug.Print str

rs.MovePrevious
str = " LAST-1 ROW: " & rs!Id & " , " & rs!Name & ", " & rs!Ts & ",
Debug.Print str

'free all resources
rs.Close
```

```
queryDef.Close
conn.Close
ws.Close

End Sub
```

26.1.19.3. RDO: rs.addNewrs.update

RDO my_rdors.addNew rs.update

```
Dim rs As rdoResultset
  Dim cn As New rdoConnection
  Dim cl As rdoColumn
  Dim SQL As String

  'cn.Connect = "DSN=test;"
  cn.Connect = "DRIVER={MySQL ODBC 3.51 Driver};"_
                      & "SERVER=localhost;"_
                      & " DATABASE=test;"_
                      & "UID=venu;PWD=venu; OPTION=3"

  cn.CursorDriver = rdUseOdbc
  cn.EstablishConnection rdDriverPrompt


  'drop table my_rdo    my_rdo
  SQL = "drop table if exists my_rdo"
  cn.Execute SQL, rdExecDirect
```

```
'create table my_rdo    my_rdo
SQL = "create table my_rdo(id int, name varchar(20))"
cn.Execute SQL, rdExecDirect

'insert – direct
SQL = "insert into my_rdo values (100,'venu')"
cn.Execute SQL, rdExecDirect

SQL = "insert into my_rdo values (200,'MySQL')"
cn.Execute SQL, rdExecDirect

'rs insertrs
SQL = "select * from my_rdo"
Set rs = cn.OpenResultset(SQL, rdOpenStatic, rdConcurRowVer, rdExe
rs.AddNew
rs!id = 300
rs!Name = "Insert1"
rs.Update
rs.Close

'rs insertrs
SQL = "select * from my_rdo"
Set rs = cn.OpenResultset(SQL, rdOpenStatic, rdConcurRowVer, rdExe
rs.AddNew
rs!id = 400
rs!Name = "Insert 2"
```

```
rs.Update
rs.Close

'rs updaters
SQL = "select * from my_rdo"
Set rs = cn.OpenResultset(SQL, rdOpenStatic, rdConcurRowVer, rdExe
rs.Edit
rs!id = 999
rs!Name = "updated"
rs.Update
rs.Close

'fetch back...
SQL = "select * from my_rdo"
Set rs = cn.OpenResultset(SQL, rdOpenStatic, rdConcurRowVer, rdExe
Do Until rs.EOF
For Each cl In rs.rdoColumns
            Debug.Print cl.Value,
  Next
  rs.MoveNext
  Debug.Print
          Loop
Debug.Print "Row count="; rs.RowCount

'close
rs.Close
```

```
  cn.Close


End Sub
```

26.1.20. MyODBCMicrosoft.NET

26.1.20.1. ODBC.NET: CSHARP(C#)
26.1.20.2. ODBC.NET: VB

MyODBCODBC.NET

26.1.20.1. ODBC.NET: CSHARP(C#)

my_odbc_netC#

```
/**
* @sample    : mycon.cs
* @purpose   : Demo sample for ODBC.NET using MyODBC
* @author    : Venu, <venu@mysql.com>
*
* (C) Copyright MySQL AB, 1995-2004
*
**/

/* build command
*
*  csc /t:exe
*      /out:mycon.exe mycon.cs
*      /r:Microsoft.Data.Odbc.dll
*/

using Console = System.Console;
using Microsoft.Data.Odbc;

namespace myodbc3
{
class mycon
{
  static void Main(string[] args)
  {
    try
    {
      //Connection string for MyODBC 2.50
      /*string MyConString = "DRIVER={MySQL};" +
```

```
                    "SERVER=localhost;" +
                    "DATABASE=test;" +
                    "UID=venu;" +
                    "PASSWORD=venu;" +
                    "OPTION=3";
*/
//Connection string for MyODBC 3.51
string MyConString = "DRIVER={MySQL ODBC 3.51 Driver};" +
                    "SERVER=localhost;" +
                    "DATABASE=test;" +
                    "UID=venu;" +
                    "PASSWORD=venu;" +
                    "OPTION=3";

//Connect to MySQL using MyODBC
OdbcConnection MyConnection = new OdbcConnection(MyConString);
MyConnection.Open();

Console.WriteLine("\n !!! success, connected successfully !!!\

//Display connection information
Console.WriteLine("Connection Information:");
Console.WriteLine("\tConnection String:" + MyConnection.Connec
Console.WriteLine("\tConnection Timeout:" + MyConnection.Conne
Console.WriteLine("\tDatabase:" + MyConnection.Database);
Console.WriteLine("\tDataSource:" + MyConnection.DataSource);
Console.WriteLine("\tDriver:" + MyConnection.Driver);
Console.WriteLine("\tServerVersion:" + MyConnection.ServerVers

//Create a sample table
OdbcCommand MyCommand = new OdbcCommand("DROP TABLE IF EXISTS
MyCommand.ExecuteNonQuery();
MyCommand.CommandText = "CREATE TABLE my_odbc_net(id int, name
MyCommand.ExecuteNonQuery();

//Insert
MyCommand.CommandText = "INSERT INTO my_odbc_net VALUES(10,'ve
Console.WriteLine("INSERT, Total rows affected:" + MyCommand.E

//Insert
MyCommand.CommandText = "INSERT INTO my_odbc_net VALUES(20,'my
Console.WriteLine("INSERT, Total rows affected:" + MyCommand.E

//Insert
MyCommand.CommandText = "INSERT INTO my_odbc_net VALUES(20,'my
Console.WriteLine("INSERT, Total rows affected:" + MyCommand.E

//Update
MyCommand.CommandText = "UPDATE my_odbc_net SET id=999 WHERE i
```

```
      Console.WriteLine("Update, Total rows affected:" + MyCommand.E

      //COUNT(*)
      MyCommand.CommandText = "SELECT COUNT(*) as TRows FROM my_odbc
      Console.WriteLine("Total Rows:" + MyCommand.ExecuteScalar());

      //Fetch
      MyCommand.CommandText = "SELECT * FROM my_odbc_net";
      OdbcDataReader MyDataReader;
      MyDataReader =  MyCommand.ExecuteReader();
      while (MyDataReader.Read())
      {
       if(string.Compare(MyConnection.Driver,"myodbc3.dll") == 0) {
         Console.WriteLine("Data:" + MyDataReader.GetInt32(0) + " "
                                   MyDataReader.GetString(1) + " "
                                   MyDataReader.GetInt64(2)); //Su
       }
       else {
         Console.WriteLine("Data:" + MyDataReader.GetInt32(0) + " "
                                   MyDataReader.GetString(1) + " "
                                   MyDataReader.GetInt32(2)); //BI
       }
      }

      //Close all resources
      MyDataReader.Close();
      MyConnection.Close();
    }
    catch (OdbcException MyOdbcException)//Catch any ODBC exception
    {
      for (int i=0; i < MyOdbcException.Errors.Count; i++)
      {
        Console.Write("ERROR #" + i + "\n" +
          "Message: " + MyOdbcException.Errors[i].Message + "\n" +
          "Native: " + MyOdbcException.Errors[i].NativeError.ToStrin
          "Source: " + MyOdbcException.Errors[i].Source + "\n" +
          "SQL: " + MyOdbcException.Errors[i].SQLState + "\n");
      }
    }
  }
}
}
```

26.1.20.2. ODBC.NET: VB

my_vb_netVB

```
' @sample    : myvb.vb
```

```
' @purpose   : Demo sample for ODBC.NET using MyODBC
' @author    : Venu, <venu@mysql.com>
'
' (C) Copyright MySQL AB, 1995-2004
'
'


'
' build command
'
' vbc /target:exe
'     /out:myvb.exe
'     /r:Microsoft.Data.Odbc.dll
'     /r:System.dll
'     /r:System.Data.dll
'

Imports Microsoft.Data.Odbc
Imports System

Module myvb
  Sub Main()
      Try

          'MyODBC 3.51 connection string
          Dim MyConString As String = "DRIVER={MySQL ODBC 3.51 Drive
                      "SERVER=localhost;" & _
                      "DATABASE=test;" & _
                      "UID=venu;" & _
                      "PASSWORD=venu;" & _
                      "OPTION=3;"

          'Connection
          Dim MyConnection As New OdbcConnection(MyConString)
          MyConnection.Open()

          Console.WriteLine ("Connection State::" & MyConnection.Sta

          'Drop
          Console.WriteLine ("Dropping table")
          Dim MyCommand As New OdbcCommand()
          MyCommand.Connection = MyConnection
          MyCommand.CommandText = "DROP TABLE IF EXISTS my_vb_net"
          MyCommand.ExecuteNonQuery()

          'Create
          Console.WriteLine ("Creating....")
          MyCommand.CommandText = "CREATE TABLE my_vb_net(id int, na
          MyCommand.ExecuteNonQuery()
```

```
        'Insert
        MyCommand.CommandText = "INSERT INTO my_vb_net VALUES(10,'
        Console.WriteLine("INSERT, Total rows affected:" & MyComma

        'Insert
        MyCommand.CommandText = "INSERT INTO my_vb_net VALUES(20,'
        Console.WriteLine("INSERT, Total rows affected:" & MyComma

        'Insert
        MyCommand.CommandText = "INSERT INTO my_vb_net VALUES(20,'
        Console.WriteLine("INSERT, Total rows affected:" & MyComma

        'Insert
        MyCommand.CommandText = "INSERT INTO my_vb_net(id) VALUES(
        Console.WriteLine("INSERT, Total rows affected:" & MyComma

        'Update
        MyCommand.CommandText = "UPDATE my_vb_net SET id=999 WHERE
        Console.WriteLine("Update, Total rows affected:" & MyComma

        'COUNT(*)
        MyCommand.CommandText = "SELECT COUNT(*) as TRows FROM my_
        Console.WriteLine("Total Rows:" & MyCommand.ExecuteScalar(

        'Select
        Console.WriteLine ("Select * FROM my_vb_net")
        MyCommand.CommandText = "SELECT * FROM my_vb_net"
        Dim MyDataReader As OdbcDataReader
        MyDataReader = MyCommand.ExecuteReader
        While MyDataReader.Read
            If MyDataReader("name") Is DBNull.Value Then
                Console.WriteLine ("id = " & CStr(MyDataReader("id
                  "NULL")
            Else
                Console.WriteLine ("id = " & CStr(MyDataReader("id
                                        CStr(MyDataReader("name")))
            End If
        End While

    'Catch ODBC Exception
    Catch MyOdbcException As OdbcException
        Dim i As Integer
        Console.WriteLine (MyOdbcException.ToString)

    'Catch program exception
    Catch MyException As Exception
        Console.WriteLine (MyException.ToString)
End Try
```

```
  End Sub
End Module
```

26.1.21.

MySQL ABMyODBCMyODBC 3.51

- Micheal (Monty) Widenius
- Venu Anuganti
- Peter Harvey

26.2. MySQL Connector/NET

26.2.1.
26.2.2. MySQL Connector/NET
26.2.3. Connector/NET
26.2.4. MySQL Connector/NET
26.2.5. MySQL Connector/NET

26.2.1.

MySQL Connector/NETMySQL.NETADO.NETADO.NET aware.NETMySQL Connector

MySQL Connector/NET

· MySQL 5.0

· MySQL 4.1Unicode

· 2GBBLOB

·

· CP/IPWindows

· CP/IPUnix

· NovellMono

· MySQL

MySQL Connector/NETMySQL

http://forums.mysql.comhttp://lists.mysql.comMySQL Co MySQL AB http://www.mysql.com/support/

MySQL Connector/NETMySQL Documentation.chm

26.2.2. MySQL Connector/NET

MySQL Connector/NET.NET.NETMicrosoft
Linux http://www.mono-project.com

MySQL Connector/NETWindows Installer (.msi)WindowsMySQL
Connector/NETMSI mysql-connector-net-*version*.zip "*ve*
MySQL Connector/NET

MySQL
Connector/NET http://dev.mysql.com/downloads/connector/net/1.0.html

Windows XPWindows Installer Microsoft

MySQL Connector/NETMSI""

ZIP mysql-connector-net-*version*-noinstall.zipZIP

MySQL Connector/NET" C:\Program Files\MySQL\MySQL Connector
Net *X.X.X*"" *X.X.X*"MySQL Connector/NETMySQL Connector/

26.2.3. Connector/NET

26.2.3.1. MySqlCommand
26.2.3.2. MySqlCommandBuilder
26.2.3.3. MySqlConnection
26.2.3.4. MySqlDataAdapter
26.2.3.5. MySqlDataReader
26.2.3.6. MySqlException
26.2.3.7. MySqlHelper
26.2.3.8. MySqlTransaction

MySQL Connector/NET

MySQL Connector/NET

· MySqlCommandMySQLSQL

· MySqlCommandBuilderDataSetMySQL

· MySqlConnectionMySQL

· MySqlDataAdapterMySQL

· MySqlDataReaderMySQL“”

· MySqlExceptionMySQL

· MySqlHelper

· MySqlTransactionMySQLSQL

MySQL Connector/NET
Documentation.chm

26.2.3.1. MySqlCommand

26.2.3.1.1.
26.2.3.1.2.
26.2.3.1.3.

MySqlCommandMySQLSQL

“@”SQLMySQL“?”SQL“old syntax=yes”SQL

26.2.3.1.1.

· CommandTextSQL

· CommandTimeout

· CommandTypeCommandText StoredProcedureTableDirectText

· ConnectionMySqlCommandMySqlConnection

· IsPrepared“”“”

- ParametersMySqlParameterCollection
- TransactionMySqlTransactionMySqlCommand
- UpdatedRowSourceDbDataAdapterUpdateDataRow

26.2.3.1.2.

- CancelMySqlCommand
- CloneMySqlCommandCommandTextConnectionTransaction

- CreateParameterMySqlParameter
- DisposeMySqlCommand
- ExecuteNonQuerySQL
- ExecuteReaderCommandTextConnectionMySqlDataReader
- ExecuteScalar11
- PrepareMySQL1

26.2.3.1.3.

26.2.3.1.3.1. VB.NET
26.2.3.1.3.2. C#

1MySqlCommand1MySqlConnectionMySqlConnection
MySqlCommandExecuteNonQueryExecuteNonQuery111
SQL INSERT

26.2.3.1.3.1. VB.NET

VB.NETMySqlCommand

```
Public Sub InsertRow(myConnectionString As String)
```

```
    ' If the connection string is null, use a default.
    If myConnectionString = "" Then
        myConnectionString = "Database=Test;Data Source=localhost;Us
    End If
    Dim myConnection As New MySqlConnection(myConnectionString)
    Dim myInsertQuery As String = "INSERT INTO Orders (id, customerI
    Dim myCommand As New MySqlCommand(myInsertQuery)
    myCommand.Connection = myConnection
    myConnection.Open()
    myCommand.ExecuteNonQuery()
    myCommand.Connection.Close()
End Sub
```

26.2.3.1.3.2. C#

C#MySqlCommand

```
public void InsertRow(string myConnectionString)
{
    // If the connection string is null, use a default.
    if(myConnectionString == "")
    {
        myConnectionString = "Database=Test;Data Source=localhost;Us
    }
    MySqlConnection myConnection = new MySqlConnection(myConnectionS
    string myInsertQuery = "INSERT INTO Orders (id, customerId, amou
    MySqlCommand myCommand = new MySqlCommand(myInsertQuery);
    myCommand.Connection = myConnection;
    myConnection.Open();
    myCommand.ExecuteNonQuery();
    myCommand.Connection.Close();
}
```

26.2.3.2. MySqlCommandBuilder

26.2.3.2.1.
26.2.3.2.2.
26.2.3.2.3.

MySqlDataAdapterSQLDataSetMySQLMySqlDataAdapter
SelectCommandMySqlCommandBuilderSQL
MySqlCommandBuilderSQL

DataAdapterMySqlCommandBuilderOnRowUpdating1
MySqlDataAdapterMySqlCommandBuilder

INSERTUPDATEDELETEMySqlCommandBuilderSelectCommand SelectCommandRefreshSchema

SelectCommand1InvalidOperation

MySqlCommandBuilderSelectCommandConnectionCommandTimeout Transaction1SelectCommandRefreshSchema InsertCommandUpdateCommandDeleteCommand

DisposeMySqlCommandBuilderMySqlDataAdapter

26.2.3.2.1.

· DataAdapterMySqlCommandBuilderRowUpdatingRowUpdating MySqlDataAdapterMySqlCommandBuilderMySqlDataAdapter MySqlCommandBuilder

· QuotePrefix, QuoteSuffixMySQLSQLQuotePrefix QuoteSuffixMySqlCommandBuilderSQL

26.2.3.2.2.

· DeriveParametersMySqlCommandMySqlCommandMySQL

· GetDeleteCommandMySqlCommand

· GetInsertCommandMySqlCommand

· GetUpdateCommandMySqlCommand

· RefreshSchemaINSERTUPDATEDELETE

26.2.3.2.3.

26.2.3.2.3.1. VB.NET

[26.2.3.2.3.2. C#]

MySqlCommandMySqlDataAdapterMySqlConnection1DataSet1
1SQL SELECT11MySqlCommandBuilder

26.2.3.2.3.1. VB.NET

VB.NETMySqlCommandBuilder

```
  Public Shared Function SelectRows(myConnection As String, mySelect
        Dim myConn As New MySqlConnection(myConnection)
        Dim myDataAdapter As New MySqlDataAdapter()
        myDataAdapter.SelectCommand = New MySqlCommand(mySelectQuery
        Dim cb As SqlCommandBuilder = New MySqlCommandBuilder(myData

        myConn.Open()

        Dim ds As DataSet = New DataSet
        myDataAdapter.Fill(ds, myTableName)

        ' Code to modify data in DataSet here

        ' Without the MySqlCommandBuilder this line would fail.
        myDataAdapter.Update(ds, myTableName)

        myConn.Close()
    End Function 'SelectRows
```

26.2.3.2.3.2. C#

C#MySqlCommandBuilder

```
    public static DataSet SelectRows(string myConnection, string myS
    {
      MySqlConnection myConn = new MySqlConnection(myConnection);
      MySqlDataAdapter myDataAdapter = new MySqlDataAdapter();
      myDataAdapter.SelectCommand = new MySqlCommand(mySelectQuery,
      MySqlCommandBuilder cb = new MySqlCommandBuilder(myDataAdapter

      myConn.Open();

      DataSet ds = new DataSet();
      myDataAdapter.Fill(ds, myTableName);

      //code to modify data in DataSet here
```

```
      //Without the MySqlCommandBuilder this line would fail
      myDataAdapter.Update(ds, myTableName);

      myConn.Close();

      return ds;
    }
```

26.2.3.3. MySqlConnection

26.2.3.3.1.
26.2.3.3.2.
26.2.3.3.3.

MySqlConnectionMySQLMySqlConnectionMySqlConnection

MySqlConnectionCloseDispose

26.2.3.3.1.

- ConnectionStringMySQL
- ConnectionTimeout
- Database
- DataSourceMySQL
- ServerThreadID
- ServerVersionMySQL
- State
- UseConnection

26.2.3.3.2.

- BeginTransaction
- ChangeDatabaseMySqlConnection
- Close
- CreateCommandMySqlConnectionMySqlCommand
- DisposeMySqlConnection
- OpenConnectionString
- PingMySQLPing

26.2.3.3.3.

26.2.3.3.3.1. VB.NET
26.2.3.3.3.2. C#

1MySqlCommand1MySqlConnectionMySqlConnection
MySqlCommandExecuteNonQueryExecuteNonQuery111
SQL INSERT

26.2.3.3.3.1. VB.NET

VB.NETMySqlConnection

```
Public Sub InsertRow(myConnectionString As String)
    ' If the connection string is null, use a default.
    If myConnectionString = "" Then
        myConnectionString = "Database=Test;Data Source=localhost;Us
    End If
    Dim myConnection As New MySqlConnection(myConnectionString)
    Dim myInsertQuery As String = "INSERT INTO Orders (id, customerI
    Dim myCommand As New MySqlCommand(myInsertQuery)
    myCommand.Connection = myConnection
    myConnection.Open()
    myCommand.ExecuteNonQuery()
    myCommand.Connection.Close()
End Sub
```

26.2.3.3.3.2. C#

C#MySqlConnection

```
public void InsertRow(string myConnectionString)
{
    // If the connection string is null, use a default.
    if(myConnectionString == "")
    {
        myConnectionString = "Database=Test;Data Source=localhost;Us
    }
    MySqlConnection myConnection = new MySqlConnection(myConnectionS
    string myInsertQuery = "INSERT INTO Orders (id, customerId, amou
    MySqlCommand myCommand = new MySqlCommand(myInsertQuery);
    myCommand.Connection = myConnection;
    myConnection.Open();
    myCommand.ExecuteNonQuery();
    myCommand.Connection.Close();
}
```

26.2.3.4. MySqlDataAdapter

26.2.3.4.1.
26.2.3.4.2.
26.2.3.4.3.

MySQLDataAdapterDataSetMySQLMySQLDataAdapterFill
UpdateFillDataSetUpdateDataSetSQL

MySQLDataAdapterDataSetMissingSchemaAction
AddWithKeyFillSchemaMySQLDataAdapterDataSet

MySQLDataAdapterMySqlConnectionMySqlCommandMySQL

MySQLDataAdapterSelectCommandInsertCommandDeleteCommand
UpdateCommandTableMappings

26.2.3.4.1.

· AcceptChangesDuringFillDataRowDataTableDataRow AcceptChanges

· ContinueUpdateOnError

· DeleteCommandSQL

· InsertCommandSQL

· MissingMappingAction

· MissingSchemaActionDataSet

· SelectCommandSQL

· TableMappingsDataTable

· UpdateCommandSQL

26.2.3.4.2.

· FillDataSetDataSet“Table”DataTable

· FillSchema“Table”DataTableDataSetSchemaType

· GetFillParametersSQL SELECT

· UpdateDataSetINSERTUPDATEDELETE

26.2.3.4.3.

26.2.3.4.3.1. VB.NET
26.2.3.4.3.2. C#

1MySqlCommand1MySqlConnectionMySqlConnection MySqlCommandExecuteNonQueryExecuteNonQuery111 SQL INSERT

26.2.3.4.3.1. VB.NET

VB.NETMySqlDataAdapter

```
Public Function SelectRows(dataSet As DataSet, connection As String,
    Dim conn As New MySqlConnection(connection)
    Dim adapter As New MySqlDataAdapter()
    adapter.SelectCommand = new MySqlCommand(query, conn)
    adapter.Fill(dataset)
    Return dataset
End Function
```

26.2.3.4.3.2. C#

C#MySqlDataAdapter

```
public DataSet SelectRows(DataSet dataset,string connection,string q
{
    MySqlConnection conn = new MySqlConnection(connection);
    MySqlDataAdapter adapter = new MySqlDataAdapter();
    adapter.SelectCommand = new MySqlCommand(query, conn);
    adapter.Fill(dataset);
    return dataset;
}
```

26.2.3.5. MySqlDataReader

26.2.3.5.1.
26.2.3.5.2.
26.2.3.5.3.

MySqlDataReaderMySQL“”

MySQLDataReaderMySqlCommandExecuteReader

MySqlDataReaderMySqlConnectionMySqlDataReader
MySqlConnectionMySqlDataReader“Close”

MySqlDataReaderIsClosedRecordsAffectedMySqlDataReader
RecordsAffectedRecordsAffected“Close”

MySqlDataReaderGetValueGetValue

26.2.3.5.1.

- Depth0
- FieldCount
- HasRowsMySqlDataReader1
- IsClosed
- ItemC#MySqlDataReader
- RecordsAffectedSQL

26.2.3.5.2.

- CloseMySqlDataReader
- GetBoolean
- GetByte
- GetBytes
- GetChar
- GetChars
- GetDataTypeName
- GetDateTimeDateTime
- GetDecimalDateTime
- GetDouble
- GetFieldType
- GetFloat

- GetGuidGUID
- GetInt1616
- GetInt3232
- GetInt6464
- GetMySqlDateTimeMySqlDateTime
- GetName
- GetOrdinal
- GetSchemaTableMySqlDataReaderDataTable
- GetStringString
- GetTimeSpanTimeSpan
- GetUInt1616
- GetUInt3232
- GetUInt6464
- GetValue
- GetValues
- IsDBNull
- NextResultSQL
- ReadMySqlDataReader

26.2.3.5.3.

26.2.3.5.3.1. VB.NET
26.2.3.5.3.2. C#

1MySqlConnection1MySqlCommand1MySqlDataReader MySqlDataReaderMySqlConnection

26.2.3.5.3.1. VB.NET

VB.NETMySqlDataReader

```
Public Sub ReadMyData(myConnString As String)
    Dim mySelectQuery As String = "SELECT OrderID, CustomerID FROM C
    Dim myConnection As New MySqlConnection(myConnString)
    Dim myCommand As New MySqlCommand(mySelectQuery, myConnection)
    myConnection.Open()
    Dim myReader As MySqlDataReader
    myReader = myCommand.ExecuteReader()
    ' Always call Read before accessing data.
    While myReader.Read()
        Console.WriteLine((myReader.GetInt32(0) & ", " & myReader.Ge
    End While
    ' always call Close when done reading.
    myReader.Close()
    ' Close the connection when done with it.
    myConnection.Close()
End Sub 'ReadMyData
```

26.2.3.5.3.2. C#

C#MySqlDataReader

```
public void ReadMyData(string myConnString) {
    string mySelectQuery = "SELECT OrderID, CustomerID FROM Orders";
    MySqlConnection myConnection = new MySqlConnection(myConnString)
    MySqlCommand myCommand = new MySqlCommand(mySelectQuery,myConnec
    myConnection.Open();
    MySqlDataReader myReader;
    myReader = myCommand.ExecuteReader();
    // Always call Read before accessing data.
    while (myReader.Read()) {
       Console.WriteLine(myReader.GetInt32(0) + ", " + myReader.GetS
    }
    // always call Close when done reading.
    myReader.Close();
    // Close the connection when done with it.
    myConnection.Close();
 }
```

26.2.3.6. MySqlException

26.2.3.6.1. ___
26.2.3.6.2. ___
26.2.3.6.3. ___

MySql

MySqlDataReaderMySqlConnection

26.2.3.6.1.

- HelpLink
- InnerException
- IsFatal“”“”
- Message
- Number
- Source
- StackTrace
- TargetSite

26.2.3.6.2.

MySqlException

26.2.3.6.3.

26.2.3.6.3.1. VB.NET
26.2.3.6.3.2. C#

MySqlException

26.2.3.6.3.1. VB.NET

VB.NETMySqlException

```
Public Sub ShowException()
     Dim mySelectQuery As String = "SELECT column1 FROM table1"
     Dim myConnection As New MySqlConnection ("Data Source=localhost
     Dim myCommand As New MySqlCommand(mySelectQuery, myConnection)

     Try
         myCommand.Connection.Open()
     Catch e As MySqlException
        MessageBox.Show( e.Message )
     End Try
 End Sub
```

26.2.3.6.3.2. C#

C#MySqlException

```
public void ShowException()
{
   string mySelectQuery = "SELECT column1 FROM table1";
   MySqlConnection myConnection =
      new MySqlConnection("Data Source=localhost;Database=Sample;");
   MySqlCommand myCommand = new MySqlCommand(mySelectQuery,myConnect

   try
   {
      myCommand.Connection.Open();
   }
   catch (MySqlException e)
   {
        MessageBox.Show( e.Message );
   }
}
```

26.2.3.7. MySqlHelper

26.2.3.7.1.
26.2.3.7.2.

Provider

26.2.3.7.1.

MySqlHelper

26.2.3.7.2.

· ExecuteDataRowSQL11MySqlConnection

· ExecuteDatasetSQLDataSet1MySqlConnection

· ExecuteNonQueryMySQLMySqlConnection
MySqlConnection

· ExecuteReaderOverloadedMySQL

· ExecuteScalarMySQL

· UpdateDataSetDataSet

26.2.3.8. MySqlTransaction

26.2.3.8.1.
26.2.3.8.2.
26.2.3.8.3.

MySQLSQL

26.2.3.8.1.

· ConnectionMySqlConnectionVisual

· IsolationLevelIsolationLevel

26.2.3.8.2.

- Commit
- Rollback

26.2.3.8.3.

26.2.3.8.3.1. VB.NET
26.2.3.8.3.2. C#

1MySqlConnection1MySqlTransactionBeginTransactionCommit
Rollback

26.2.3.8.3.1. VB.NET

VB.NETMySqlTransaction

```
Public Sub RunTransaction(myConnString As String)
    Dim myConnection As New MySqlConnection(myConnString)
    myConnection.Open()

    Dim myCommand As MySqlCommand = myConnection.CreateCommand()
    Dim myTrans As MySqlTransaction

    ' Start a local transaction
    myTrans = myConnection.BeginTransaction()
    ' Must assign both transaction object and connection
    ' to Command object for a pending local transaction
    myCommand.Connection = myConnection
    myCommand.Transaction = myTrans

    Try
      myCommand.CommandText = "Insert into Region (RegionID, RegionD
      myCommand.ExecuteNonQuery()
      myCommand.CommandText = "Insert into Region (RegionID, RegionD
      myCommand.ExecuteNonQuery()
      myTrans.Commit()
      Console.WriteLine("Both records are written to database.")
    Catch e As Exception
      Try
        myTrans.Rollback()
      Catch ex As MySqlException
        If Not myTrans.Connection Is Nothing Then
          Console.WriteLine("An exception of type " & ex.GetType().T
                            " was encountered while attempting to ro
        End If
      End Try
```

```
      Console.WriteLine("An exception of type " & e.GetType().ToStri
                        "was encountered while inserting the data.")
      Console.WriteLine("Neither record was written to database.")
    Finally
      myConnection.Close()
    End Try
End Sub 'RunTransaction
```

26.2.3.8.3.2. C#

C#MySqlTransaction

```
public void RunTransaction(string myConnString)
 {
    MySqlConnection myConnection = new MySqlConnection(myConnString)
    myConnection.Open();

    MySqlCommand myCommand = myConnection.CreateCommand();
    MySqlTransaction myTrans;

    // Start a local transaction
    myTrans = myConnection.BeginTransaction();
    // Must assign both transaction object and connection
    // to Command object for a pending local transaction
    myCommand.Connection = myConnection;
    myCommand.Transaction = myTrans;

    try
    {
      myCommand.CommandText = "Insert into Region (RegionID, RegionD
      myCommand.ExecuteNonQuery();
      myCommand.CommandText = "Insert into Region (RegionID, RegionD
      myCommand.ExecuteNonQuery();
      myTrans.Commit();
      Console.WriteLine("Both records are written to database.");
    }
    catch(Exception e)
    {
      try
      {
        myTrans.Rollback();
      }
      catch (MySqlException ex)
      {
        if (myTrans.Connection != null)
        {
```

```
          Console.WriteLine("An exception of type " + ex.GetType() +
                            " was encountered while attempting to ro
        }
      }

      Console.WriteLine("An exception of type " + e.GetType() +
                        " was encountered while inserting the data."
      Console.WriteLine("Neither record was written to database.");
    }
    finally
    {
      myConnection.Close();
    }
}
```

26.2.4. MySQL Connector/NET

26.2.4.1.
26.2.4.2. MySQL Connector/NETMySQL
26.2.4.3. MySQL Connector/NET
26.2.4.4. MySQL Connector/NET
26.2.4.5. Connector/NETBLOB
26.2.4.6. Crystal ReportsMySQL Connector/NET
26.2.4.7. MySQL Connector/NET

26.2.4.1.

Connector/NETBLOBCrystal

26.2.4.2. MySQL Connector/NETMySQL

26.2.4.2.1.
26.2.4.2.2.
26.2.4.2.3.
26.2.4.2.4.

26.2.4.2.1.

.NETMySQL MySqlConnection

MySqlHelper MySqlConnectionHelper

MySqlConnectionMySQL

26.2.4.2.2.

MySqlConnection1

1

```
Server=127.0.0.1;Uid=root;Pwd=12345;Database=test;
```

MySqlConnection “root”“12345”127.0.0.1MySQL

API

· ServerMySQLH ost, Data Source, DataSource, Address, Addr Network Address

· UidMySQL User Id, UsernameUser name

· PwdMySQL

· Database mysqlInitial Catalog

· PortMySQL 3306 “-1 ”

26.2.4.2.3.

MySQL

MySqlConnection

[VB]

```
Dim conn As New MySql.Data.MySqlClient.MySqlConnection
Dim myConnectionString as String

myConnectionString = "server=127.0.0.1;" _
            & "uid=root;" _
            & "pwd=12345;" _
```

```
            & "database=test;"

Try
  conn.ConnectionString = myConnectionString
  conn.Open()

Catch ex As MySql.Data.MySqlClient.MySqlException
  MessageBox.Show(ex.Message)
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
string myConnectionString;

myConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    conn = new MySql.Data.MySqlClient.MySqlConnection();
    conn.ConnectionString = myConnectionString;
    conn.Open();
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show(ex.Message);
}
```

MySqlConnection

[VB]

```
Dim myConnectionString as String

myConnectionString = "server=127.0.0.1;" _
              & "uid=root;" _
              & "pwd=12345;" _
              & "database=test;"

Try
    Dim conn As New MySql.Data.MySqlClient.MySqlConnection(myConnect
    conn.Open()
Catch ex As MySql.Data.MySqlClient.MySqlException
   MessageBox.Show(ex.Message)
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
string myConnectionString;

myConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    conn = new MySql.Data.MySqlClient.MySqlConnection(myConnectionSt
    conn.Open();
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show(ex.Message);
}
```

MySQL Connector/NETMySQL

26.2.4.2.4.

.NET MySqlConnection1MySqlException

· Message

· NumberMySQL

· 0:

· 1045:

[VB]

```
Dim myConnectionString as String

myConnectionString = "server=127.0.0.1;" _
          & "uid=root;" _
          & "pwd=12345;" _
          & "database=test;"
```

```
Try
    Dim conn As New MySql.Data.MySqlClient.MySqlConnection(myConnect
    conn.Open()
Catch ex As MySql.Data.MySqlClient.MySqlException
    Select Case ex.Number
        Case 0
            MessageBox.Show("Cannot connect to server. Contact admin
        Case 1045
            MessageBox.Show("Invalid username/password, please try a
    End Select
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
string myConnectionString;

myConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    conn = new MySql.Data.MySqlClient.MySqlConnection(myConnectionSt
    conn.Open();
}
    catch (MySql.Data.MySqlClient.MySqlException ex)
{
    switch (ex.Number)
    {
        case 0:
            MessageBox.Show("Cannot connect to server.  Contact admi
        case 1045:
            MessageBox.Show("Invalid username/password, please try a
    }
}
```

26.2.4.3. MySQL Connector/NET

26.2.4.3.1.
26.2.4.3.2. MySQL Connector/NET

26.2.4.3.1.

MySQL 4.1MySQL Connector/NET

1

26.2.4.3.2. MySQL Connector/NET

1 .CommandText

MySqlCommand.Prepare

.ExecuteNonQuery().ExecuteScalar().ExecuteReader

.CommandText

[VB]

```
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand

conn.ConnectionString = strConnection

Try
   conn.Open()
   cmd.Connection = conn

   cmd.CommandText = "INSERT INTO myTable VALUES(NULL, ?number, ?tex
   cmd.Prepare()

   cmd.Parameters.Add("?number", 1)
   cmd.Parameters.Add("?text", "One")

   For i = 1 To 1000
```

```
        cmd.Parameters("?number").Value = i
        cmd.Parameters("?text").Value = "A string value"

        cmd.ExecuteNonQuery()
     Next
Catch ex As MySqlException
    MessageBox.Show("Error " & ex.Number & " has occurred: " & ex.Me
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();

conn.ConnectionString = strConnection;

try
{
    conn.Open();
    cmd.Connection = conn;

    cmd.CommandText = "INSERT INTO myTable VALUES(NULL, ?number, ?te
    cmd.Prepare();
```

```
    cmd.Parameters.Add("?number", 1);
    cmd.Parameters.Add("?text", "One");

    for (int i=1; i <= 1000; i++)
    {
        cmd.Parameters["?number"].Value = i;
        cmd.Parameters["?text"].Value = "A string value";

        cmd.ExecuteNonQuery();
    }
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show("Error " + ex.Number + " has occurred: " + ex.Me
        "Error", MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

26.2.4.4. MySQL Connector/NET

26.2.4.4.1.
26.2.4.4.2. MySQL Connector/NET
26.2.4.4.3. MySQL Connector/NET

26.2.4.4.1.

MySQL5MySQLSQL 2003

SQL

.

.

MySQL Connector/NETMySqlCommand MySqlCommand.Parameters MySQL

MySQL

MySQL Connector/NETSamples1 MySQL Connector/NET

26.2.4.4.2. MySQL Connector/NET

MySQL **mysql** MySQL Query Browser GUI MySqlCommand.ExecuteNonQuery

[VB]

```
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=test"

Try
    conn.Open()
    cmd.Connection = conn

    cmd.CommandText = "CREATE PROCEDURE add_emp(" _
        & "IN fname VARCHAR(20), IN lname VARCHAR(20), IN bday DATET
        & "BEGIN INSERT INTO emp(first_name, last_name, birthdate) "
        & "VALUES(fname, lname, DATE(bday)); SET empno = LAST_INSERT

    cmd.ExecuteNonQuery()
Catch ex As MySqlException
    MessageBox.Show("Error " & ex.Number & " has occurred: " & ex.Me
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;
```

```
conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    conn.Open();
    cmd.Connection = conn;

    cmd.CommandText = "CREATE PROCEDURE add_emp(" +
        "IN fname VARCHAR(20), IN lname VARCHAR(20), IN bday DATETIM
        "BEGIN INSERT INTO emp(first_name, last_name, birthdate) " +
        "VALUES(fname, lname, DATE(bday)); SET empno = LAST_INSERT_I

    cmd.ExecuteNonQuery();
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
MessageBox.Show("Error " + ex.Number + " has occurred: " + ex.Messag
    "Error", MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

GUIMySQL Connector/NET

26.2.4.4.3. MySQL Connector/NET

MySQL Connector/NET1 MySqlCommand.CommandText .CommandTypeCommandType.StoredProcedure

1MySqlCommand INOUT

MySqlCommand.ExecuteNonQuery()

[VB]

```
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=test"

Try
    conn.Open()
```

```
    cmd.Connection = conn

    cmd.CommandText = "add_emp"
    cmd.CommandType = CommandType.StoredProcedure

    cmd.Parameters.Add("?lname", 'Jones')
    cmd.Parameters("?lname").Direction = ParameterDirection.Input

    cmd.Parameters.Add("?fname", 'Tom')
    cmd.Parameters("?fname").Direction = ParameterDirection.Input

    cmd.Parameters.Add("?bday", #12/13/1977 2:17:36 PM#)
    cmd.Parameters("?bday").Direction = ParameterDirection.Input

    cmd.Parameters.Add("?empno", MySqlDbType.Int32)
    cmd.Parameters("?empno").Direction = ParameterDirection.Output

    cmd.ExecuteNonQuery()

    MessageBox.Show(cmd.Parameters("?empno").Value)
Catch ex As MySqlException
    MessageBox.Show("Error " & ex.Number & " has occurred: " & ex.Me
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    conn.Open();
    cmd.Connection = conn;

    cmd.CommandText = "add_emp";
    cmd.CommandType = CommandType.StoredProcedure;

    cmd.Parameters.Add("?lname", "Jones");
    cmd.Parameters("?lname").Direction = ParameterDirection.Input;

    cmd.Parameters.Add("?fname", "Tom");
    cmd.Parameters("?fname").Direction = ParameterDirection.Input;
```

```
    cmd.Parameters.Add("?bday", DateTime.Parse("12/13/1977 2:17:36 P
    cmd.Parameters("?bday").Direction = ParameterDirection.Input;

    cmd.Parameters.Add("?empno", MySqlDbType.Int32);
    cmd.Parameters("?empno").Direction = ParameterDirection.Output;

    cmd.ExecuteNonQuery();

    MessageBox.Show(cmd.Parameters("?empno").Value);
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show("Error " + ex.Number + " has occurred: " + ex.Me
      "Error", MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

MySqlConnector.Parameters.Value

26.2.4.5. Connector/NETBLOB

26.2.4.5.1.
26.2.4.5.2. MySQL
26.2.4.5.3.
26.2.4.5.4. BLOB

26.2.4.5.1.

MySQL1BLOBMySQL4BLOB
LONGBLOB

Connector/NETBLOBConnector/NETBLOB

MySQL Connector/NET Samples1

26.2.4.5.2. MySQL

BLOBMySQL141AUTO_INCREMENTUNSIGNED
SMALLINT1VARCHAR1UNSIGNED
MEDIUMBLOB

```
CREATE TABLE file(

file_id SMALLINT UNSIGNED AUTO_INCREMENT NOT NULL PRIMARY KEY,
```

```
file_name VARCHAR(64) NOT NULL,

file_size MEDIUMINT UNSIGNED NOT NULL,

file MEDIUMBLOB NOT NULL);
```

max_allowed_packetMySQL1MB1MB1MB

“MySQL”max_allowed_packet“”“”“”“”
“”“MySQL”“”my.cnf1
max_allowed_packet=xxMMySQLSET max_allowed_packet=xxM

max_allowed_packetBLOB

26.2.4.5.3.

INSERT

FileStream1

[VB]

```
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand

Dim SQL As String

Dim FileSize As UInt32
Dim rawData() As Byte
Dim fs As FileStream

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=test"

Try
    fs = New FileStream("c:\image.png", FileMode.Open, FileAccess.Re
    FileSize = fs.Length

    rawData = New Byte(FileSize) {}
    fs.Read(rawData, 0, FileSize)
    fs.Close()

    conn.Open()
```

```
    SQL = "INSERT INTO file VALUES(NULL, ?FileName, ?FileSize, ?File

    cmd.Connection = conn
    cmd.CommandText = SQL
    cmd.Parameters.Add("?FileName", strFileName)
    cmd.Parameters.Add("?FileSize", FileSize)
    cmd.Parameters.Add("?File", rawData)

    cmd.ExecuteNonQuery()

    MessageBox.Show("File Inserted into database successfully!", _
    "Success!", MessageBoxButtons.OK, MessageBoxIcon.Asterisk)

    conn.Close()
Catch ex As Exception
    MessageBox.Show("There was an error: " & ex.Message, "Error", _
        MessageBoxButtons.OK, MessageBoxIcon.Error)
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();

string SQL;
UInt32 FileSize;
byte[] rawData;
FileStream fs;

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    fs = new FileStream(@"c:\image.png", FileMode.Open, FileAccess.R
    FileSize = fs.Length;

    rawData = new byte[FileSize];
    fs.Read(rawData, 0, FileSize);
    fs.Close();

    conn.Open();

    SQL = "INSERT INTO file VALUES(NULL, ?FileName, ?FileSize, ?File
```

```
    cmd.Connection = conn;
    cmd.CommandText = SQL;
    cmd.Parameters.Add("?FileName", strFileName);
    cmd.Parameters.Add("?FileSize", FileSize);
    cmd.Parameters.Add("?File", rawData);

    cmd.ExecuteNonQuery();

    MessageBox.Show("File Inserted into database successfully!",
        "Success!", MessageBoxButtons.OK, MessageBoxIcon.Asterisk);

    conn.Close();
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show("Error " + ex.Number + " has occurred: " + ex.Me
        "Error", MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

FileStream“Read”FileStream “Length”

MySqlCommandExecuteNonQueryBLOB

26.2.4.5.4. BLOB

MySqlDataReader

1 FileStream

[VB]

```
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand
Dim myData As MySqlDataReader
Dim SQL As String
Dim rawData() As Byte
Dim FileSize As UInt32
Dim fs As FileStream

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=test"

SQL = "SELECT file_name, file_size, file FROM file"
```

```
Try
    conn.Open()

    cmd.Connection = conn
    cmd.CommandText = SQL

    myData = cmd.ExecuteReader

    If Not myData.HasRows Then Throw New Exception("There are no BLO

    myData.Read()

    FileSize = myData.GetUInt32(myData.GetOrdinal("file_size"))
    rawData = New Byte(FileSize) {}

    myData.GetBytes(myData.GetOrdinal("file"), 0, rawData, 0, FileSi

    fs = New FileStream("C:\newfile.png", FileMode.OpenOrCreate, Fil
    fs.Write(rawData, 0, FileSize)
    fs.Close()

    MessageBox.Show("File successfully written to disk!", "Success!"

    myData.Close()
    conn.Close()
Catch ex As Exception
    MessageBox.Show("There was an error: " & ex.Message, "Error", Me
End Try
```

[C#]

```
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;
MySql.Data.MySqlClient.MySqlDataReader myData;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();

string SQL;
UInt32 FileSize;
byte[] rawData;
FileStream fs;

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

SQL = "SELECT file_name, file_size, file FROM file";
```

```
try
{
    conn.Open();

    cmd.Connection = conn;
    cmd.CommandText = SQL;

    myData = cmd.ExecuteReader();

    if (! myData.HasRows)
        throw new Exception("There are no BLOBs to save");

    myData.Read();

    FileSize = myData.GetUInt32(myData.GetOrdinal("file_size"));
    rawData = new byte[FileSize];

    myData.GetBytes(myData.GetOrdinal("file"), 0, rawData, 0, FileSi

    fs = new FileStream(@"C:\newfile.png", FileMode.OpenOrCreate, Fi
    fs.Write(rawData, 0, FileSize);
    fs.Close();

    MessageBox.Show("File successfully written to disk!",
        "Success!", MessageBoxButtons.OK, MessageBoxIcon.Asterisk);

    myData.Close();
    conn.Close();
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show("Error " + ex.Number + " has occurred: " + ex.Me
        "Error", MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

MySqlDataReader MySqlDataReaderGetBytesB

MySqlDataReader GetOrdinal SELECT GetOrdinal

26.2.4.6. Crystal ReportsMySQL Connector/NET

26.2.4.6.1.
26.2.4.6.2.
26.2.4.6.3.
26.2.4.6.4.

26.2.4.6.1.

Crystal ReportsWindowsCrystal

MySQL　Connector/NETSamplesCrystalDemo

26.2.4.6.2.

Crystal ReportsMySQL

1Connector/ODBCADO

2VB.NETXMLXML

[VB]

```
Dim myData As New DataSet
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand
Dim myAdapter As New MySqlDataAdapter

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=world"

Try
    conn.Open()
    cmd.CommandText = "SELECT city.name AS cityName, city.population
        & "country.name, country.population, country.continent " _
        & "FROM country, city ORDER BY country.continent, country.na
    cmd.Connection = conn

    myAdapter.SelectCommand = cmd
    myAdapter.Fill(myData)

    myData.WriteXml("C:\dataset.xml", XmlWriteMode.WriteSchema)
Catch ex As Exception
    MessageBox.Show(ex.Message, "Report could not be created", Messa
End Try
```

[C#]

```
DataSet myData = new DataSet();
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;
MySql.Data.MySqlClient.MySqlDataAdapter myAdapter;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();
myAdapter = new MySql.Data.MySqlClient.MySqlDataAdapter();

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
  "pwd=12345;database=test;";

try
{
  cmd.CommandText = "SELECT city.name AS cityName, city.population A
  "country.name, country.population, country.continent " +
  "FROM country, city ORDER BY country.continent, country.name";
  cmd.Connection = conn;

  myAdapter.SelectCommand = cmd;
  myAdapter.Fill(myData);

  myData.WriteXml(@"C:\dataset.xml", XmlWriteMode.WriteSchema);
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
  MessageBox.Show(ex.Message, "Report could not be created",
  MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

XMLADO.NET XML

Connector/ODBC dev.mysql.com

26.2.4.6.3.

Crystal

Connector/ODBCOLE DB
ODBC (RDO)ADO.NET

“”“Report Options...”“Save Data With

26.2.4.6.4.

crViewer

- CrytalDecisions.CrystalReports.Engine
- CrystalDecisions.ReportSource
- CrystalDecisions.Shared
- CrystalDecisions.Windows.Forms

“ myViewer”1crViewer

[VB]

```
Imports CrystalDecisions.CrystalReports.Engine
Imports System.Data
Imports MySql.Data.MySqlClient

Dim myReport As New ReportDocument
Dim myData As New DataSet
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand
Dim myAdapter As New MySqlDataAdapter

conn.ConnectionString = _
    "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=test"

Try
    conn.Open()

    cmd.CommandText = "SELECT city.name AS cityName, city.population
        & "country.name, country.population, country.continent " _
        & "FROM country, city ORDER BY country.continent, country.na
    cmd.Connection = conn

    myAdapter.SelectCommand = cmd
    myAdapter.Fill(myData)

    myReport.Load(".\world_report.rpt")
```

```
    myReport.SetDataSource(myData)
    myViewer.ReportSource = myReport
Catch ex As Exception
    MessageBox.Show(ex.Message, "Report could not be created", Messa
End Try
```

[C#]

```
using CrystalDecisions.CrystalReports.Engine;
using System.Data;
using MySql.Data.MySqlClient;

ReportDocument myReport = new ReportDocument();
DataSet myData = new DataSet();
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;
MySql.Data.MySqlClient.MySqlDataAdapter myAdapter;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();
myAdapter = new MySql.Data.MySqlClient.MySqlDataAdapter();

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    cmd.CommandText = "SELECT city.name AS cityName, city.population
        "country.name, country.population, country.continent " +
        "FROM country, city ORDER BY country.continent, country.name
    cmd.Connection = conn;

    myAdapter.SelectCommand = cmd;
    myAdapter.Fill(myData);

    myReport.Load(@".\world_report.rpt");
    myReport.SetDataSource(myData);
    myViewer.ReportSource = myReport;
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show(ex.Message, "Report could not be created",
        MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

ReportDocumentReportDocumentcrViewer
ReportSource

Connector/ODBC

Connector/ODBC

MySqlCommandSELECTSELECTSQL“Show
“Crystal Reports”

```
SELECT `country`.`Name`, `country`.`Continent`, `country`.`Populatio

FROM `world`.`country` `country` LEFT OUTER JOIN `world`.`city` `cit

ORDER BY `country`.`Continent`, `country`.`Name`, `city`.`Name`
```

SELECT

[VB]

```
Imports CrystalDecisions.CrystalReports.Engine
Imports System.Data
Imports MySql.Data.MySqlClient

Dim myReport As New ReportDocument
Dim myData As New DataSet
Dim conn As New MySqlConnection
Dim cmd As New MySqlCommand
Dim myAdapter As New MySqlDataAdapter

conn.ConnectionString = "server=127.0.0.1;" _
    & "uid=root;" _
    & "pwd=12345;" _
    & "database=world"

Try
    conn.Open()
    cmd.CommandText = "SELECT name, population, countrycode FROM cit
        & "SELECT name, population, code, continent FROM country ORD
    cmd.Connection = conn

    myAdapter.SelectCommand = cmd
    myAdapter.Fill(myData)

    myReport.Load(".\world_report.rpt")
    myReport.Database.Tables(0).SetDataSource(myData.Tables(0))
    myReport.Database.Tables(1).SetDataSource(myData.Tables(1))
    myViewer.ReportSource = myReport
Catch ex As Exception
    MessageBox.Show(ex.Message, "Report could not be created", Messa
```

```
End Try
```

[C#]

```
using CrystalDecisions.CrystalReports.Engine;
using System.Data;
using MySql.Data.MySqlClient;

ReportDocument myReport = new ReportDocument();
DataSet myData = new DataSet();
MySql.Data.MySqlClient.MySqlConnection conn;
MySql.Data.MySqlClient.MySqlCommand cmd;
MySql.Data.MySqlClient.MySqlDataAdapter myAdapter;

conn = new MySql.Data.MySqlClient.MySqlConnection();
cmd = new MySql.Data.MySqlClient.MySqlCommand();
myAdapter = new MySql.Data.MySqlClient.MySqlDataAdapter();

conn.ConnectionString = "server=127.0.0.1;uid=root;" +
    "pwd=12345;database=test;";

try
{
    cmd.CommandText = "SELECT name, population, countrycode FROM cit
        "BY countrycode, name; SELECT name, population, code, contin
        "country ORDER BY continent, name";
    cmd.Connection = conn;

    myAdapter.SelectCommand = cmd;
    myAdapter.Fill(myData);

    myReport.Load(@".\world_report.rpt");
    myReport.Database.Tables(0).SetDataSource(myData.Tables(0));
    myReport.Database.Tables(1).SetDataSource(myData.Tables(1));
    myViewer.ReportSource = myReport;
}
catch (MySql.Data.MySqlClient.MySqlException ex)
{
    MessageBox.Show(ex.Message, "Report could not be created",
        MessageBoxButtons.OK, MessageBoxIcon.Error);
}
```

SELECTSetDataSource

Crystal Reports

26.2.4.7. MySQL Connector/NET

26.2.4.7.1.
26.2.4.7.2.
26.2.4.7.3.
26.2.4.7.4.
26.2.4.7.5. NULL

26.2.4.7.1.

MySQL.NETMySQL.NET“

MySQL Connector/NET

26.2.4.7.2.

MySQL.NET

MySqlDataAdapterFill.NET DataSet
System.ArgumentOutOfRangeException

26.2.4.7.3.

.NET DateTimeDateTime

MySQL 5.0.2SQLSQL
mode.html

26.2.4.7.4.

.NETtongguo MySqlDat

MySqlDateTimeMySQLMySQL Connector/N
MySQL Connector/NET MySqlDateTime

MySQL Connector/NETMySqlDateTime

```
Allow Zero Datetime=True
```

MySqlDateTime

1. 0000-00-00

2. ToStringMySQL 2005-02-23 08:50:25.NET DateTime ToString

3. MySqlDateTimeNULL.NET DateTimeNULLNULL MySQLDateTimeDateTime

26.2.4.7.5. NULL

.NET DateTimeNULL DateTimeNULL

MySqlDataReader.IsDBNull NULL

[VB]

```
If Not myReader.IsDBNull(myReader.GetOrdinal("mytime")) Then
    myTime = myReader.GetDateTime(myReader.GetOrdinal("mytime"))
Else
    myTime = DateTime.MinValue
End If
```

[C#]

```
if (! myReader.IsDBNull(myReader.GetOrdinal("mytime")))
    myTime = myReader.GetDateTime(myReader.GetOrdinal("mytime"));
else
    myTime = DateTime.MinValue;
```

NULL

26.2.5. MySQL Connector/NET

26.2.5.1. 2.0.0
26.2.5.2. 1.0.7
26.2.5.3. 1.0.6

26.2.5.4. 1.0.5
26.2.5.5. 1.0.4 1-20-05
26.2.5.6. 1.0.3-gamma 12-10-04
26.2.5.7. 1.0.2-gamma 04-11-15
26.2.5.8. 1.0.1-beta2 04-10-27
26.2.5.9. 1.0.0 04-09-01
26.2.5.10. 0.9.0 04-08-30
26.2.5.11. 0.76
26.2.5.12. 0.75
26.2.5.13. 0.74
26.2.5.14. 0.71
26.2.5.15. 0.70
26.2.5.16. 0.68
26.2.5.17. 0.65
26.2.5.18. 0.60
26.2.5.19. 0.50

26.2.5.1. 2.0.0

· Connection.Database (Bug #11450)

· “” (Bug #11490)

26.2.5.2. 1.0.7

· “@” ANSI_QUOTES (Bug #13753)

· (Bug #13541)

· Ping()ConnectionState (Bug #13658)

26.2.5.3. 1.0.6

· Nant(Bug #12978)

· 1NULL (Bug #13276)

· ()%<>/ (Bug #13036)

· MySQL Connector/NET 1.0.5MySQL Connector/NET #12835)

· MonoMySQL Connector/NET 1.0.5 (Bug #13345)

26.2.5.4. 1.0.5

· MySQL Connector/NET1 (Bug #12628)

· MySQL Connector/NET (Bug #11294)

· cp1250 (Bug #11621)

· .NET (Bug #10637)

· (Bug #11550, Bug #10486, Bug #10152)

· (Bug #11542)

· “” (Bug #11490)

· MySqlCommandBuilder (Bug #8382)

· MySQL Connector/NET (WL#8228)

· Connection.Database (Bug #11450)

· TIMESTAMP (Bug #7951)

· (Bug #9722)

· MySqlConnection.clone (Bug #10281)

· MySQL Connector/NET (Bug #10644)

· MySQL Connector/NETMySQL 4.1.14. (Bug #12771)

· MySqlConnectionConnectionString (Bug #12551, Bug #8724)

26.2.5.5. 1.0.4 1-20-05

- Bug #7243[]
-
- Bug #7258MySqlCommand.ConnectionIDbConnection []
- Bug #7345MySqlAdapter.Fill[]
- Bug #7478MySqlCommand[]
- Bug #7612NULLMySqlDataReader.GetString(index)Null[]
- Bug #7755MySqlReader.GetInt32[]
- Bug #7704GetBytes[]
- Bug #7724“ \222”EscapeString[]
- Blob
-
- Bug #7436… []
- API

26.2.5.6. 1.0.3-gamma 12-10-04

- MySQL
- SHOW COLLATIONID
- 200 (Bug #6547)
- GAC“”
- Bug #6863MySqlCommandInt64[]
-
- Bug #6770MySqlDataReader.GetChar(int i)IndexOutOfRange[]

·

· Bug #6983[]

· Null

· Bug #6902[]

· Bug #6668[]

· Bug #7032MySqlDateTime []

· Bug #7133inout[]

· Bug #6831MySQL 4.0[]

· Bug #7132DateTimeSystem.InvalidCastException[]

· Bug #6879DATE_ADD-functionInvalidCast[]

· Bug #66341[]

· MySqlConnectionServerThreadID

· MySqlConnectionPing

· MySql.Data.Tests.dll

26.2.5.7. 1.0.2-gamma 04-11-15

· MySqlBinary

· (Bug #6329)

·

· MySqlParameterparameterName(Bug #6428)

· “0000-00-00”(Bug #6429)

· “Illegal mix of collations”

· charset

· #HY000“Illegal mix of collations”(latin1_swedish_ci,IMPLICIT) (utf8_general_ (Bug #6322)

· TableEditor CSVB

· UCS-2Charset-map(Bug #6541)

·

· Long(Bug #5453)

· (Bug #6649)

·

26.2.5.8. 1.0.1-beta2 04-10-27

· MySqlParameter(string, object)BUG #5602

· BUG #5458longtextGetChars

· BUG #5474mysqlcommand.parameters

· BUG #5469DbTypeNullReferenceException

· CMD_QUIT

· BUG #5392MySqlCommand“?”

· ConnectionInternal1

· 4.1.2CP1252Latin1

· BUG #53881NULLDataReaderNULL

·

·

·

· PacketWriterPacket

· CompressedStreamNativeDriver

·

· NullMySqlParameterCollection.Add()(Bu

· MySqlCommand()(Bug #5613)

· “;”(Bug #5876)

· DbType(Bug #5897)

· YEARSystem.OverflowException(Bug #6036)

·

· (double, numeric, single, decimal)(Bug #5900)

· IsNullable(Bug #5796)

·

· Min Pool Size

· MySqlDataReader“show tables from ...” …(Bug #5256)

· SequentialAccess

· 10MySqlDateTimesubseq.recordsIsZero(Bug #6006)

· (Bug #5288)

·

· Method TokenizeSql()(Bug #6217)

· resxNET Connector(Bug #6216)

- DBNull (Bug #5798)
- “”(Bug #5496)
- PacketReaderEnsureCapacity
- GetBoolean(Bug #6227)
- GetString(index)DataReaderBLOBIndexOutOfBounds(Bug #6230)

26.2.5.9. 1.0.0 04-09-01

- BUG# 3889Thai
-
-
- 11.0.0
- COPYING.rtf
- XML
- ByteFX

26.2.5.10. 0.9.0 04-08-30

-
- SerializeBinaryPacketWriter
- PacketWriter
-
-
- SingleRow

- GetBytes
- LoggerSQLblob“”
- “”
- BUG# 5214
- bug# 5051GetSchema
- GetSchemaIsUnique“”
- MySqlDataReader GetXXXMySqlValue
- BUG# 5097DataReaderNULL
- ALOAD DATA LOCAL INFILE
- replacetext custom nant
- CommandBuilderTest
- CommandBuilderLast One Wins
-
- GetBool1, true, "true""yes"trueWL# 2024
- "old syntax"“@”
- Bug #4658MySqlCommandBuilder
- Bug #4864“Persist Security Info”ByteFX.MySqlClient
- FLOSS
- MySql.Types
- MySqlFieldMySqlField41
- .Types

- enum intInt32shortInt16bigintInt64
- UInt16UInt32UInt64
-
- authauthreset
- PoolingTests.csUserReset
- COM_CHANGE_USER
- SingleResultSet
- unicode
- utf-8ucs-2
- Bug #4520bytefx .net mysql
- “hours > 24”
- Bug #4505ByteFx.Data.MySqlClient.MySqlParameter
- TestQuoting
- Bug #4486multi-wordmysqlcommandbuilder
- TokenizeSql
-
- bug# 4324MySqlDataReader.GetBytes
- DataReaderGetBytes()
- InternalConnection.ConfigureHashtable
- []CharSetMap
- SQLcarriageCRInSQL

- Driver.ctormaxPacketSize
- bug #4442MySqlDbType
- LongLongLong
- bug# 4071“use pipe”
- “use pipe”“pipe name”“pipe”
-
- ServerStatusFlags enum
- ServerStatus enumServerStatusFlags
- BUG #4386
- bug #4074
- Packet.ReadLenIntegerReadPackedLongpacket.ReadPackedInteger2
34
- syntax.csSQL
- bug# 4149“00:00:00”Null
- TestSuite
-
- nant
- BUG #3917GenerateSchema
- bug #3915GetValues0
-
- MySQL 4.1

- MySQL 5.0
- MySqlInternalConnectionInternalConnection
- SQL
-
- bug #3888DataAdapterRowUpdating
-
- 4.1
- open/auth
-
-
- MySql.Data.MySqlClient
- MySql.Data.dll
- GPL
- MySqlClient.build Nant
- mono
- notusednant
-
-
- MySql 4.1.1
- 4.04.1.04.1.1auth
- MySQL.Data.MySQLClientMySql.Data.MySqlClient

· CharSetMappingints

· MySQL.Data.MySQLClient

· UC2004auth

· datareaderGetXXXLuca

· parameter.csTimeSpantimespanmysqlGianluca g.colombo@alfi.it

· TimeStampDataAdatperMIchael

· MySqlHelper.csPatrick Kristiansen

26.2.5.11. 0.76

·

· MySqlClient.Design

· Version.isAtLeast

· DBConnectionStringMySqlConnectionString

· SqlCommandEditorDataAdapterPreviewDialog

· Long

· CompressedStream

· ConnectionStringMySqlClient.Design

· packet.csReadLenInteger

· MySqlConnectionString

· ConnectionInternalPING

· resource/

- field.cs
- driver.Send
-
- “”
- StreamCreatorKevin Case
- connectstring
- Pro
- command.cs
- 1
- Chris Cline
- GUID
- Mark Reay

26.2.5.12. 0.75

- EnumPhilipp Sumi
- Year
-
- TimeSpan
- ctor
- XML
-
- ConnectionStringSqlClient

- MySqlException
-
-
- ConnectionString
- MultiHostStreamMySqlStreamCommon/StreamCreator
- “Use Pipe”
- Platform
- IsAlive
- Platform.csStreamCreator.cs
- Field.cs4.1
- Common.VersionCommon.DBVersion
- field.csbeni27@gmx.net
- MySqlErrorGeert Veenstra

26.2.5.13. 0.74

- UnixMohammad DAMT [md@mt.web.id]
- Thread.Sleep
-
- parameter.cs
-
- ;-)
- ConnectionSTringmarco p (pomarc)

· UserIdJeff Neeley

· Ryan Gregg

·

· MultiHostStreamDan Guisinger

·

· 0.73

· MySqlDataStreamThread.Sleep(0)Todd

· idlepoolsMinPoolSize

· MySqlPoolCreateNewPooledConnection MySqlStream.ReadBytesReadByteTicksPer SecondM Peddlesden

· Matthew J. Peddlesden

· Thread.Sleep(1)CPUSean McGinnis

· ExecuteReaderNullLloyd Dupont

· NullNaucki

· max_allowed_packetTry Catch

· Steve

· ExecuteNonQuery

· InternalConnection@@session.max_allowed_packet @@max_allowed_packetMiguel

· XML

· SQLRory

- unpeeking
- Sami Vaaraniemi
- MySqlPoolSteve M. Brown
- ParameterCollection.AddSqlClientJoshua Mouch
- ConnectionSTringNOYESNaucki
- InternalConnection
- Persist Security Info
- security.csversion.cs
- Parameter.csDateTimeBurkhard Perkens-Golomb
- cast
- DataReaderKeith Murray
- Command.ExecuteReaderSQLNullBurkhard Golomb
- ExecuteScalar
- LOCAL DATA INFILE
-
- Mysql 4.14.1
- Adam M. (adammil)
- blobAdam M.
- Pent
- ctorParameterCollection.AddSqlClientJoshua

· Connection.CreateCommandMySqlCommand

· Abraham Guyt

· Joshua Mouch

· BlobSean McGinnis

· DataReaderMessageBox.showJoshua Mouch

· split sql :-))

26.2.5.14. 0.71

· MySqlStreamPeter Belbin

· HasRowsNash Pherson

· 256Joshua Kessler

· “;”SQLShane Krueger

· 1Shane Krueger

· MySqlExceptionMathias Hasselmann

26.2.5.15. 0.70

·

·

· 0.70

· MySqlClientTests

· Peter Belbin

·

- 50
- Mono 0-24
-
-
- Burkhard Perkens-Golomb
- CommandBehavior.SingleRowDataReader
- sqlTheo Spears
- doublesingledecimalsql“.”[]
- MySqlStream
- DataReader[smishra]
- SqlClientDataReaders
- DBNull.Value
-
- MySqlException-o
-
- NextResult1“”
- MySQL
- 32bitInt6416bitInt32
- MySqlParameterctorsrccol
- MySqlDataReader
- MySqlClientMySqlClient/Tests

·

· INIT_DBMySqlPool

· CommandBuilder

· Command

·

· CoonectionPooling“min pool size”“max pool size

·

· MySQL

· ctor

· Value

· CamelMySQLMySqlPgSQLPgSql

· PgSql

· MySQLDbTypeDbTypeMySQLDbType

· MySQLParameter.csObjectToString

· ParameterCollectionAdd(..)Add(name, value)

· ParameterCollectionIndexOfContains@

· Command.ConvertSQLToBytesMySQL

· DataReaderBlobField.csGetBytes

· MySQLCommandCommandText

· CommandBuilderParameter@

· Field.csMySQLFieldType enumMySQLDbType enum

- DesignerVS.Net
- ConnectionString
- 3MySQLParameterctor
- MySQLParameterparamName@Null
- MySQLParameterTypeConverterctor

26.2.5.16. 0.68

.

- DbParametersEditorSqlClient
- Command

.

- ä
- Provider
- UID
- DBNull.Valuenull
- DBNull.ValueCommandBuilder
- auto_insertCommandBuilder
- typeofSystem.Types

26.2.5.17. 0.65

- MySQLCommandBuilder

.

- GetSchemaTablexsdMono
- Mono
- TIME
- Timestamp
- SqlClient

26.2.5.18. 0.60

- SharpZipLibwww.icsharpcode.net
- Windows
- Timestamp
- DataReaderIenumerableDataGrid

26.2.5.19. 0.50

.

- ADO.Net
- TIMESTAMPDATETIME

26.3. MySQL Connector/J

26.3.1. JDBC
26.3.2. Connector/J
26.3.3. JDBC
26.3.4. J2EEJava Connector/J
26.3.5. Connector/J
26.3.6. Changelog

JDBCMySQLJavaMySQL Connector/J

MySQL Connector/JJDBC-3.0“4”Java3.0JDBCMySQLMySQL

JDBCJDBC Connector/J

JDBCJDBC“”JDBC HibernateSpringJDBCIbatis SQL Maps JDBC

JDBCJDBC

· JDBCSunJDBC

· JDBCSunJGuru

26.3.1. JDBC

26.3.1.1. DriverManagerMySQL
26.3.1.2. SQL
26.3.1.3. CallableStatements
26.3.1.4. AUTO_INCREMENT

JDBC

26.3.1.1. DriverManagerMySQL

JDBCDriverManager

DriverManagerJDBCjava.sql.DriverClass.forName()MySQL Connector/Jcom.mysql.jdbc.Driver

Javamain()MySQL Connector/J

```
import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.SQLException;


// Notice, do not import com.mysql.jdbc.*

// or you will have problems!        com.mysql.jdbc.*   //


public class LoadDriver {

    public static void main(String[] args) {

        try {

            // The newInstance() call is a work around for some

            // broken Java implementations


            Class.forName("com.mysql.jdbc.Driver").newInstance();

        } catch (Exception ex) {

            // handle the error

        }

}
```

DriverManagerDriverManager.getConnection()

26.1DriverManager

DriverManagergetConnection()JDKAPI

```
import java.sql.Connection;
```

```
import java.sql.DriverManager;
import java.sql.SQLException;

    ... try {
            Connection conn = DriverManager.getConnection("jdbc:mysq

            // Do something with the Connection

           ....
        } catch (SQLException ex) {
            // handle any errors
            System.out.println("SQLException: " + ex.getMessage());
            System.out.println("SQLState: " + ex.getSQLState());
            System.out.println("VendorError: " + ex.getErrorCode());
        }
```

PreparedStatements

26.3.1.2. SQL

SQLResultSet

DriverManager.getConnection()DataSource.getConnection()
createStatement()

SQLexecuteQuery(String)SELECT

executeUpdate(String SQL)

SQLSELECTUPDATE/INSERTexecute(String SC
“”SQLUPDATE/INSERT/DELETE“”SELECTgetResultSet()
UPDATE/INSERT/DELETEgetUpdateCount()

26.2java.sql.StatementSELECT

```
// assume conn is an already created JDBC connection
Statement stmt = null;
ResultSet rs = null;

try {
    stmt = conn.createStatement();
    rs = stmt.executeQuery("SELECT foo FROM bar");

    // or alternatively, if you don't know ahead of time that
    // the query will be a SELECT...

    if (stmt.execute("SELECT foo FROM bar")) {
        rs = stmt.getResultSet();
    }

    // Now do something with the ResultSet ....
} finally {
    // it is a good idea to release
    // resources in a finally{} block
    // in reverse-order of their creation
    // if they are no-longer needed

    if (rs != null) {
        try {
            rs.close();
        } catch (SQLException sqlEx) { // ignore }

        rs = null;
    }

    if (stmt != null) {
        try {
            stmt.close();
        } catch (SQLException sqlEx) { // ignore }

        stmt = null;
    }
}
```

26.3.1.3. CallableStatements

MySQL5.0Connector/J 3.1.1 java.sql.CallableStatement getParameterMetaData()

MySQL“ ”MySQL

JDBCCallableStatement Connector/J

11 inOutParaminputParamResultSet

26.3.

```
CREATE PROCEDURE demoSp(IN inputParam VARCHAR(255), INOUT inOutParam
BEGIN
    DECLARE z INT;
    SET z = inOutParam + 1;
    SET inOutParam = z;

    SELECT inputParam;

    SELECT CONCAT('zyxw', inputParam);
END
```

Connector/JdemoSp

1. Connection.prepareCall()

JDBC

26.4. Connection.prepareCall()

```
  java.sql.CallableStatement

...

    //
    // Prepare a call to the stored procedure 'demoSp'
    // with two parameters
```

```
    //
    // Notice the use of JDBC-escape syntax ({call ...})
    //

    CallableStatement cStmt = conn.prepareCall("{call demoSp(?, ?)}"




    cStmt.setString(1, "abcdefg");
```

Connection.prepareCall() CallableStatement
Connection.prepareCall()

2.

OUTINOUT JDBCCallableStatementregisterOutputParameter()

26.5.

```
  java.sql.Types


...
    //
    // Connector/J supports both named and indexed
    // output parameters. You can register output
    // parameters using either method, as well
    // as retrieve output parameters using either
    // method, regardless of what method was
    // used to register them.
```

```
//
// The following examples show how to use
// the various methods of registering
// output parameters (you should of course
// use only one registration per parameter).
//

//
// Registers the second parameter as output
//

cStmt.registerOutParameter(2);

//
// Registers the second parameter as output, and
// uses the type 'INTEGER' for values returned from
// getObject()
//

cStmt.registerOutParameter(2, Types.INTEGER);

//
// Registers the named parameter 'inOutParam'
//

cStmt.registerOutParameter("inOutParam");
```

```
    //
    // Registers the named parameter 'inOutParam', and
    // uses the type 'INTEGER' for values returned from
    // getObject()
    //

    cStmt.registerOutParameter("inOutParam", Types.INTEGER);

...
```

3.

PreparedStatement CallableStatement

26.6. CallableStatement

```
...

    //
    // Set a parameter by index
    //

    cStmt.setString(1, "abcdefg");

    //
    // Alternatively, set a parameter using
    // the parameter name
    //
```

```
    cStmt.setString("inputParameter", "abcdefg");

    //
    // Set the 'in/out' parameter using an index
    //

    cStmt.setInt(2, 1);

    //
    // Alternatively, set the 'in/out' parameter
    // by name
    //

    cStmt.setInt("inOutParam", 1);

...
```

4. CallableStatement

CallableStatementexecuteUpdate()executeQuery()execute() execute()

26.7.

```
...

    boolean hadResults = cStmt.execute();

    //
    // Process all returned result sets
```

```
    //

    while (hadResults) {
        ResultSet rs = cStmt.getResultSet();

        // process result set
        ...

        hadResults = cStmt.getMoreResults();
    }

    //
    // Retrieve output parameters
    //
    // Connector/J supports both index-based and
    // name-based retrieval
    //

    int outputValue = cStmt.getInt(1); // index-based

    outputValue = cStmt.getInt("inOutParam"); // name-based

...
```

26.3.1.4. AUTO_INCREMENT

JDBC API 3.0“”IDMySQLJDBCMySQL AUTO_INCREMENT“INSERT”“SELECT LAST_INSERT_

MySQL“SELECT”AUTO_INCREMENT
AUTO_INCREMENTJDBC-3.0“getGeneratedKeys()”
AUTO_INCREMENTJDBC-3.02“SELECT
“insertRow()”AUTO_INCREMENT

26.8. Statement.getGeneratedKeys()AUTO_INCREMENT

```
Statement stmt = null;
ResultSet rs = null;

try {

 //
 // Create a Statement instance that we can use for
 // 'normal' result sets assuming you have a
 // Connection 'conn' to a MySQL database already
 // available

 stmt = conn.createStatement(java.sql.ResultSet.TYPE_FORWARD_ONLY
                             java.sql.ResultSet.CONCUR_UPDATABLE)

 //
 // Issue the DDL queries for the table for this example
 //

 stmt.executeUpdate("DROP TABLE IF EXISTS autoIncTutorial");
 stmt.executeUpdate(
         "CREATE TABLE autoIncTutorial ("
         + "priKey INT NOT NULL AUTO_INCREMENT, "
         + "dataField VARCHAR(64), PRIMARY KEY (priKey))");

 //
 // Insert one row that will generate an AUTO INCREMENT
 // key in the 'priKey' field
 //

 stmt.executeUpdate(
         "INSERT INTO autoIncTutorial (dataField) "
         + "values ('Can I Get the Auto Increment Field?')",
         Statement.RETURN_GENERATED_KEYS);

 //
 // Example of using Statement.getGeneratedKeys()
 // to retrieve the value of an auto-increment
 // value
 //

 int autoIncKeyFromApi = -1;
```

```
    rs = stmt.getGeneratedKeys();

    if (rs.next()) {
        autoIncKeyFromApi = rs.getInt(1);
    } else {

        // throw an exception from here
    }

    rs.close();

    rs = null;

    System.out.println("Key returned from getGeneratedKeys():"
        + autoIncKeyFromApi);
} finally {

    if (rs != null) {
        try {
            rs.close();
        } catch (SQLException ex) {
            // ignore
        }
    }

    if (stmt != null) {
        try {
            stmt.close();
        } catch (SQLException ex) {
            // ignore
        }
    }
}
```

26.9. SELECT LAST_INSERT_ID()AUTO_INCREMENT

```
   Statement stmt = null;
   ResultSet rs = null;

   try {

    //
    // Create a Statement instance that we can use for
    // 'normal' result sets.

    stmt = conn.createStatement();

    //
```

```
    // Issue the DDL queries for the table for this example
    //

    stmt.executeUpdate("DROP TABLE IF EXISTS autoIncTutorial");
    stmt.executeUpdate(
            "CREATE TABLE autoIncTutorial ("
            + "priKey INT NOT NULL AUTO_INCREMENT, "
            + "dataField VARCHAR(64), PRIMARY KEY (priKey))");

    //
    // Insert one row that will generate an AUTO INCREMENT
    // key in the 'priKey' field
    //

    stmt.executeUpdate(
            "INSERT INTO autoIncTutorial (dataField) "
            + "values ('Can I Get the Auto Increment Field?')");

    //
    // Use the MySQL LAST_INSERT_ID()
    // function to do the same thing as getGeneratedKeys()
    //

    int autoIncKeyFromFunc = -1;
    rs = stmt.executeQuery("SELECT LAST_INSERT_ID()");

    if (rs.next()) {
        autoIncKeyFromFunc = rs.getInt(1);
    } else {
        // throw an exception from here
    }

    rs.close();

    System.out.println("Key returned from " + "'SELECT LAST_INSERT_I
        + autoIncKeyFromFunc);

} finally {

    if (rs != null) {
        try {
            rs.close();
        } catch (SQLException ex) {
            // ignore
        }
    }

    if (stmt != null) {
        try {
            stmt.close();
```

```
        } catch (SQLException ex) {
            // ignore
        }
    }
}
```

26.10. ResultSetsAUTO_INCREMENT

```
   Statement stmt = null;
   ResultSet rs = null;

   try {

    //
    // Create a Statement instance that we can use for
    // 'normal' result sets as well as an 'updatable'
    // one, assuming you have a Connection 'conn' to
    // a MySQL database already available
    //

    stmt = conn.createStatement(java.sql.ResultSet.TYPE_FORWARD_ONLY
                                java.sql.ResultSet.CONCUR_UPDATABLE)

    //
    // Issue the DDL queries for the table for this example
    //

    stmt.executeUpdate("DROP TABLE IF EXISTS autoIncTutorial");
    stmt.executeUpdate(
            "CREATE TABLE autoIncTutorial ("
            + "priKey INT NOT NULL AUTO_INCREMENT, "
            + "dataField VARCHAR(64), PRIMARY KEY (priKey))");

    //
    // Example of retrieving an AUTO INCREMENT key
    // from an updatable result set
    //

    rs = stmt.executeQuery("SELECT priKey, dataField "
       + "FROM autoIncTutorial");

    rs.moveToInsertRow();

    rs.updateString("dataField", "AUTO INCREMENT here?");
    rs.insertRow();

    //
    // the driver adds rows at the end
```

```
    //

    rs.last();

    //
    // We should now be on the row we just inserted
    //

    int autoIncKeyFromRS = rs.getInt("priKey");

    rs.close();

    rs = null;

    System.out.println("Key returned for inserted row: "
        + autoIncKeyFromRS);

} finally {

    if (rs != null) {
        try {
            rs.close();
        } catch (SQLException ex) {
            // ignore
        }
    }

    if (stmt != null) {
        try {
            stmt.close();
        } catch (SQLException ex) {
            // ignore
        }
    }
}
```

getGeneratedKeys(): “SELECT LAST_INSERT_ID():”1 1 “SELECT LAST_INSERT_ID()” “getGeneratedKeys()”

26.3.2. Connector/J

26.3.2.1.
26.3.2.2.

Connector/J

26.3.2.1.

26.3.2.1.1. Java
26.3.2.1.2. MySQL
26.3.2.1.3. CLASSPATH

26.3.2.1.1. Java

MySQL Connector/JJava-2 JVMsJDK-1.2.xJDK-1.3.xJDK-1.4.xJDK-1.5.xJDK-1.4.xMySQL Connector/JJD

java.sql.SavepointConnector/J 3.1.01.4JDK-Xverify:none java.sql.Savepointsavepoint

1.4.xJVMConnector/J 3.1.0

26.3.2.1.2. MySQL

MySQL Connector/JMySQLMySQL

MySQL4.1MySQL Connector/J 3.1Unico

3.0Connector/JMySQL4.1UnicodeConnector/J

26.3.2.1.3. CLASSPATH

MySQL Connector/J.zip.tar.gz“”.jar java-[version]-bin.jar Connector/J 3.1.8“”“ mys java-[version]-bin-g.jar”

Connector/J 3.1.9.classJAR

“”MySQL AB“”Aspect/JConnector/J src/lib/aspectjrt.jar

GUI.zipWinZip.tar.gz“tar”GNU tar.tar.gz

mysql-connector-java-[version]-bin.jarCLASSPATHJVMJava
“-cp”

JDBC DriverManager“com.mysql.jdbc.Driver”“java.sql.Driver”

26.11. UnixCLASSPATH

Unix“csh”

```
$ setenv CLASSPATH /path/to/mysql-connector-java-[version]-bin.jar:$
```

shellJavaMySQL

TomcatJbossMySQL Connector/JCLASSPATI
Connector/J”J2EEJDBC

JSPJ2EE.jarwebappWEB-INF/libJ2EE

J2EEcom.mysql.jdbc.jdbc2.optionalMysqlDataSource
MysqlConnectionPoolDataSourceMysqlDataSource“Set”

- user
- password
- serverName
- databaseName
- port

26.3.2.2.

26.3.2.2.1. MySQL Connector/J 3.03.1
26.3.2.2.2. MySQL4.1JDBC

MySQL AB

Connector/JJDBCMySQL

26.3.2.2.1. MySQL Connector/J 3.03.1

Connector/J 3.1Connector/J 3.0MySQL-4.1UnicodeSQl

· UnicodeMySQL“”“”

· Connector/J 3.1MySQL4.1.0

3.1.7 Connection.prepareStatement()SQL JDBC URI “ emulateUnsupportedPstmts=false”

4.1.0MySQL

useServerPrepStmts=false

· 0Datetimes0000-00-00 ...JavaConnector/J

Connector/J 3.1JDBCSQL“ “exception”“S1009”SQLState SQLException“convertToNull”NULL“round”“0001-01-01”

Connector/J 3.1.7“ noDatetimeStringSync=true”“” ResultSet.getString()0

· SQLStateConnector/J 3.1MySQLSQL:1999 SQLState Connector/J 3.0“”X/OpenMySQL-4.1.0SQLStatesMySQL

useSqlStateCodes=false

· BLOBResultSet.getString()[]BLOBBLOB java.lang.Strings

BLOBMySQLTEXTjava.sql.Clob

· Connector/J 3.1.8“”“ mysql-connector-java-[version]-bin-g.jar”“”jar“mysql-connector-java-[version]-bin.jar”

Connector/J 3.1.9.classJAR

“”MySQL AB“”Aspect/JConnector/J

src/lib/aspectjrt.jar

26.3.2.2.2. MySQL4.1JDBC

· *UTF-8*4.1MySQL *UTF-8*JDBClatin1

MySQL-4.1MySQL4.1UnicodeURL

useOldUTF8Behavior=true

· Connector/J 3.1MySQL4.1.04.1.0MySQL

useServerPrepStmts=false

26.3.3. JDBC

26.3.3.1. Driver/DatasourceURLConnector/J
26.3.3.2. JDBC API
26.3.3.3. JavaJDBCMySQL
26.3.3.4. Unicode
26.3.3.5. SSL
26.3.3.6. ReplicationConnection

26.3.3.1. Driver/DatasourceURLConnector/J

MySQL Connector/Jjava.sql.Driver
“com.mysql.jdbc.Driver”“org.gjt.mm.mysql.Driver”MM.MySQL
MySQL Connector/J

MySQL Connector/JJDBC URL“[,]”

```
jdbc:mysql://[host][,failoverhost...][:port]/[database][?propertyNam
```

“127.0.0.1”“3306”MySQL

```
jdbc:mysql://[host:port],[host:port].../[database][?propertyName1][=
```

“”“setCatalog()”SQL“SELECT
dbname.tablename.colname FROM dbname.tablename...”GUI

MySQL Connector/J“”autoCommit(true)/
autoCommit“”

URL“autoReconnect”“”1

URL“autoReconnect”“”1queriesBeforeRetryMaster
1

MySQL

Connector/JMySQLDataSourceConnection

Configuration

· java.sql.DataSourceMySQLset*()java.sql.DataSource

o com.mysql.jdbc.jdbc2.optional.MysqlDataSource

o com.mysql.jdbc.jdbc2.optional.MysqlConnectionPoolDataSource

· DriverManager.getConnection()Driver.connect()java.util.Properties

· URLJDBC URLjava.sql.DriverManager.getConnection()
java.sql.Driver.connect()javax.sql.DataSourcesetURL()MySQL

JDBC URLXMLXML“&”“&”XML

26.1.

Connection/Authentication	

user	
password	
socketFactory	“com.mysql.jdbc.SocketFactory”
connectTimeout	0JDK-1.4“0”
socketTimeout	0
useConfigs	URL“,”“”
interactiveClient	CLIENT_INTERACTIVEINTERACTIV WAIT_TIMEOUTMySQL
propertiesTransform	com.mysql.jdbc.ConnectionPropertiesTra
useCompression	zlib ‘
High Availability and Clustering	
autoReconnect	SQLExceptionsMySQL“wait_timeout”8
autoReconnectForPools	“”

failOverReadOnly	autoReconnect“”
reconnectAtTxEnd	autoReconnect“”
roundRobinLoadBalance	autoReconnectfailoverReadonly“”
queriesBeforeRetryMaster	“queriesBeforeRetryMaster”“secondsBefo “50”
secondsBeforeRetryMaster	“queriesBeforeRetryMaster”“secondsBefo 30
enableDeprecatedAutoreconnect	3.23.3“”
Security	
allowMultiQueries	“;”“”
useSSL	SSL“”
requireSSL	SSLuseSSL=true “”
allowUrlInLocalInfile	“LOAD DATA LOCAL INFII
paranoid	“”

Performance Extensions	
metadataCacheSize	cacheResultSetMetaData“”cacheResultSe
prepStmtCacheSize	
prepStmtCacheSqlLimit	SQL
maintainTimeStats	
blobSendChunkSize	ServerPreparedStatementsBLOB/CLOB
cacheCallableStmts	CallableStatements
cachePrepStmts	PreparedStatements
cacheResultSetMetadata	StatementsPreparedStatementsResultSetM “”
cacheServerConfiguration	URL“HOW VARI
dontTrackOpenResources	JDBCclose()“”
dynamicCalendars	
	MySQL-4.1Connection.setAutoCommit(b

elideSetAutoCommits	autocommit=n”
holdResultsOpenOverStatementClose	JDBCStatement.close()
locatorFetchBufferSize	“emulateLocators”“”getBinaryInputStrea
useFastIntParsing	“String->Integer”
useLocalSessionState	autocommitConnection.setAutoCommit() Connection.setTransactionIsolation()
useNewIO	java.nio.* interfaces“”
useReadAheadInput	
Debuging/Profiling /	
logger	com.mysql.jdbc.log.Logcom.mysql.jdbc.l “com.mysql.jdbc.log.StandardLogger”ST
profileSQL	/“”
reportMetricsIntervalMillis	“gatherPerfMetrics”
maxQuerySizeToLog	

packetDebugBufferSize	“enablePacketDebug”“”
slowQueryThresholdMillis	“logSlowQueries”“”
useUsageAdvisor	“”DBCMySQL
autoGenerateTestcaseScript	SQLSTDERR
dumpQueriesOnException	SQLExceptions
enablePacketDebug	“packetDebugBufferSize”
explainSlowQueries	“logSlowQueries”“EXPLAIN”WARN
logSlowQueries	“slowQueryThresholdMillis”
traceProtocol	
Miscellaneous	
useUnicode	Unicode
characterEncoding	“useUnicode”“”
characterSetResults	

connectionCollation	“set collatior
sessionVariables	“”“SET SESSION
allowNanAndInf	PreparedStatement.setDouble()NaN+/-
autoDeserialize	BLOB
capitalizeTypeNames	DatabaseMetaData
clobberStreamingResults	“”
continueBatchOnError	
createDatabaseIfNotExist	URL
emptyStringsConvertToZero	“0”
emulateLocators	N/A
emulateUnsupportedPstmts	
ignoreNonTxTables	“”
jdbcCompliantTruncation	MySQL 4.1.0JD

maxRows	0
noDatetimeStringSync	ResultSet.getDatetimeType().toString().ec
nullCatalogMeansCurrent	DatabaseMetadataMethods“”“Null”
nullNamePatternMatchesAll	*patternDatabaseMetaDatanull“”JDBC
pedantic	JDBC
relaxAutoCommit	MySQLcommit()rollback()setAutoComm
retainStatementAfterResultSetClose	ResultSet.close()
rollbackOnPooledClose	rollback()
runningCTS13	SunJDBCtestsuite 1.3
serverTimezone	/Java
strictFloatingPoint	
strictUpdates	“”
tinyInt1isBit	TINYINT(1)BITBIT ->

transformedBitIsBoolean	TINYINT(1)MySQL-5.0BOOLEANBIT
ultraDevHack	UltraDevprepareCall()prepareCall()Prepa “”
useHostsInPrivileges	DatabaseMetaData.getColumn/TablePrivi “”
useOldUTF8Behavior	4.0UTF-8
useOnlyServerErrorMessages	“”SQLState
useServerPrepStmts	“”
useSqlStateCodes	SQL“”X/Open/SQL“”
useStreamLengthsInPrepStmts	PreparedStatement/ResultSet.setXXXStre
useTimezone	“”
useUnbufferedInput	BufferedInputStream
yearIsDateType	JDBCMySQL“YEAR”java.sql.DateSHOl
	0DATETIMEMySQL

zeroDateTimeBehavior	“exception”“round”“convertToNull”

“socketFactory”NamedPipeSocketFactoryWindows NT/2000/X Connector/JMySQLnamedPipePath \\.\pi NamedPipeSocketFactoryJDBC url

URLNamedPipeSocketFactory

socketFactory=com.mysql.jdbc.NamedPipeSocketFactory

MySQLJDBCTCP/IP3050

com.mysql.jdbc.NamedPipeSocketFactory
com.mysql.jdbc.StandardSocketFactory

26.3.3.2. JDBC API

MySQL Connector/JSun JDBCJDBC

MySQL Connector/J

· Blob

Blob“”“”DatabaseMetaData.locatorsUpdateCopies()
PreparedStatement.setBlob()ResultSet.updateBlob()

Connector/J version 3.1.0JDBC URL“emulateLocators=true”Blob BlobSELECTBlobSELECT11SELECTBlobBlob getInputStream(), getBytes(),

· CallableStatement

Connector/J 3.1.1 CallableStatementMySQL 5.0 CallableStatementgetParameterMetaData()

· Clob

Clob“”“”DatabaseMetaData.locatorsUpdateCopies()
PreparedStatement.setClob()JDBC APIResult

· Connection

MM.MySQL“isClosed()”PingJDBC“closed()”“”
“SELECT 1”

· DatabaseMetaData

getImported/ExportedKeys()getCrossReference()“InnoDB”
“SHO W CREATE TABLE”

· Driver

· PreparedStatement

PreparedStatementsMySQLgetParameterMetaData()getMetaData()
SQL

3.1.0MySQL Connector/J“”

“large”setBinaryStream()setAsciiStream()setUnicodeStream()
setBlob()setClob()“large”“large”clearParameters()

o “large”“out-of-band”

o JDBC

o “large”“large”“large”“large”setBinaryStream()
setAsciiStream()setUnicodeStream()setBlob()setClob()

“large”clearParameters()

· ResultSet

ResultSetsMySQLResultSetsJVM“”

```
stmt = conn.createStatement(java.sql.ResultSet.TYPE_FORWARD_ONLY,
                java.sql.ResultSet.CONCUR_READ_ONLY);
stmt.setFetchSize(Integer.MIN_VALUE);
```

Integer.MIN_VALUE“”

MyISAMInnoDB

“”“”

· ResultSetMetaData

MySQL4.0“isAutoIncrement()”

· Statement

3.2.1JDBC5.0.3“setFetchSize()”

MySQLSQLJDBC“setCursorName()”

26.3.3.3. JavaJDBCMySQL

MySQL Connector/JMySQLJava

MySQLjava.lang.StringJava

Connector/J 3.1.0JDBCJDBCDataTruncation
“jdbcCompliantTruncation”“”

26.2.

MySQL	Java

CHAR, VARCHAR, BLOB, TEXT, ENUM, and SET	java.lang.String, java.io.InputStream, java.io.Reader, java.sql.Blob, java.sql.Clob
FLOAT, REAL, DOUBLE PRECISION, NUMERIC, DECIMAL, TINYINT, SMALLINT, MEDIUMINT, INTEGER, BIGINT	java.lang.String, java.lang.Short, java.lang.Integer, java.lang.Long, java.lang.Double, java.math.BigDecimal MySQLJava
DATE, TIME, DATETIME, TIMESTAMP	java.lang.String, java.sql.Date, java.sql.Timestamp

MySQLJavaResultSet.getObject() JDBC

26.3. ResultSet.getObject()MySQLJava

MySQL	Java
BIT(1) (new in MySQL-5.0)	java.lang.Boolean
BIT(> 1) (new in MySQL-5.0)	byte[]
TINYINT	java.lang.Boolean“tinyInt1isBit”“” “ 1” java.lang.Integer

BOOL , BOOLEAN	TINYINTTINYINT(1)
SMALLINT[(M)] [UNSIGNED]	java.lang.Integer UNSIGNED
MEDIUMINT[(M)] [UNSIGNED]	java.lang.Integer UNSIGNED
INT,INTEGER[(M)] [UNSIGNED]	java.lang.IntegerUNSIGNEDjava.lang.Long
BIGINT[(M)] [UNSIGNED]	java.lang.LongUNSIGNEDjava.math.BigInteger
FLOAT[(M,D)]	java.lang.Float
DOUBLE[(M,B)]	java.lang.Double
DECIMAL[(M[,D])]	java.math.BigDecimal
DATE	java.sql.Date
DATETIME	java.sql.Timestamp
TIMESTAMP[(M)]	java.sql.Timestamp
TIME	java.sql.Time

YEAR[(2|4)]	java.sql.Date 212
CHAR(M)	java.lang.String BINARY []
VARCHAR(M) [BINARY]	java.lang.String BINARY []
BINARY(M)	byte[]
VARBINARY(M)	byte[]
TINYBLOB	byte[]
TINYTEXT	java.lang.String
BLOB	byte[]
TEXT	java.lang.String
MEDIUMBLOB	byte[]
MEDIUMTEXT	java.lang.String
LONGBLOB	byte[]

LONGTEXT	java.lang.String
ENUM('value1','value2',...)	java.lang.String
SET('value1','value2',...)	java.lang.String

26.3.3.4. Unicode

JDBCJava Unicode Statement.executeQuery() setBytes() setBinaryStream()setAsiiStream()setUnicodeStream()setBlob() PreparedStatementCallableStatement

MySQL4.1Connector/J

MySQL4.1Connector/J

“ *character_set*”4.1.0“ *character_set_server*”4.1.0 MySQL

URL“ *characterEncoding*”

JavaMySQLJava

26.4. MySQLJava

MySQL	Java
usa7	US-ASCII
big5	Big5
gbk	GBK
sjis	SJIS
gb2312	EUC_CN
ujis	EUC_JP
euc_kr	EUC_KR

latin1	ISO8859_1
latin1_de	ISO8859_1
german1	ISO8859_1
danish	ISO8859_1
latin2	ISO8859_2
czech	ISO8859_2
hungarian	ISO8859_2
croat	ISO8859_2
greek	ISO8859_7
hebrew	ISO8859_8
latin5	ISO8859_9
latvian	ISO8859_13
latvian1	ISO8859_13
estonia	ISO8859_13
dos	Cp437
pclatin2	Cp852
cp866	Cp866
koi8_ru	KOI8_R
tis620	TIS620
win1250	Cp1250
win1250ch	Cp1250
win1251	Cp1251
cp1251	Cp1251
win1251ukr	Cp1251
cp1257	Cp1257
macroman	MacRoman
macce	MacCentralEurope
utf8	UTF-8
ucs2	UnicodeBig

Connector/J“set names”

“UTF-8”utf8“ *characterEncoding*”JDBC “UTF-8”

26.3.3.5. SSL

MySQL Connector/JSSLJDBCSSL3550

SSL

· JSSEJavaJDKJDK-1.4.1SSLJSSEJDKJDK-1.2.xJDK-1.3.xJSSE
http://developer.java.sun.com/developer/bugParade/bugs/4273544.html

· SSLMySQLMySQL-4.0.4
http://www.mysql.com/doc/en/Secure_connections.html

.

MySQLCAJava truststoreMySQL“SSL”1MySQLCA

Java“keytool”truststoreCA“cacert.pem”“keytool”JDK JRE“bin”

```
shell> keytool -import -alias mysqlServerCACert -file cacert.pem -ke
```

Keytool

```
Enter keystore password:  *********
Owner: EMAILADDRESS=walrus@example.com, CN=Walrus, O=MySQL AB, L=Ore
-State, C=RU
Issuer: EMAILADDRESS=walrus@example.com, CN=Walrus, O=MySQL AB, L=Or
e-State, C=RU
Serial number: 0
```

```
Valid from: Fri Aug 02 16:55:53 CDT 2002 until: Sat Aug 02 16:55:53
Certificate fingerprints:
         MD5:  61:91:A0:F2:03:07:61:7A:81:38:66:DA:19:C4:8D:AB
         SHA1: 25:77:41:05:D5:AD:99:8C:14:8C:CA:68:9C:2F:B8:89:C3:34
Trust this certificate? [no]:  yes
Certificate was added to keystore
```

MySQL

```
 shell> keytool -genkey -keyalg rsa -alias mysqlClientCertificate -k
```

Keytool“keystore”

```
Enter keystore password:  *********
What is your first and last name?
  [Unknown]:  Matthews
What is the name of your organizational unit?
  [Unknown]:  Software Development
What is the name of your organization?
  [Unknown]:  MySQL AB
What is the name of your City or Locality?
  [Unknown]:  Flossmoor
What is the name of your State or Province?
  [Unknown]:  IL
What is the two-letter country code for this unit?
  [Unknown]:  US
Is <CN=Matthews, OU=Software Development, O=MySQL AB,
 L=Flossmoor, ST=IL, C=US> correct?
```

```
  [no]:  y


<mysqlClientCertificate>
        keystore
```

JSSEkeystoretruststoreJVMkeystore“path_to_keystore_file” truststore“path_to_truststore_file”

```
-Djavax.net.ssl.keyStore=path_to_keystore_file
-Djavax.net.ssl.keyStorePassword=*********
-Djavax.net.ssl.trustStore=path_to_truststore_file
-Djavax.net.ssl.trustStorePassword=*********
```

MySQL Connector/J“useSSL”“”URL“useSSL=true” DriverManager.getConnection()java.util.Properties“useSSL”“”

JSSESSL

```
...
 *** ClientHello, v3.1
 RandomCookie:  GMT: 1018531834 bytes = { 199, 148, 180, 215, 74, 12
 Session ID:  {}
 Cipher Suites:  { 0, 5, 0, 4, 0, 9, 0, 10, 0, 18, 0, 19, 0, 3, 0, 1
 Compression Methods:  { 0 }
 ***
 [write] MD5 and SHA1 hashes:  len = 59
 0000: 01 00 00 37 03 01 3D B6   90 FA C7 94 B4 D7 4A 0C  ...7..=...
 0010: 36 F4 00 A8 37 67 D7 40   10 8A E1 BE 84 99 02 D9  6...7g.@..
 0020: DB EF CA 13 79 4E 00 00   10 00 05 00 04 00 09 00  ....yN....
 0030: 0A 00 12 00 13 00 03 00   11 01 00                 .........
 main, WRITE:  SSL v3.1 Handshake, length = 59
```

```
main, READ:  SSL v3.1 Handshake, length = 74
*** ServerHello, v3.1
RandomCookie:  GMT: 1018577560 bytes = { 116, 50, 4, 103, 25, 100,
Session ID:  {163, 227, 84, 53, 81, 127, 252, 254, 178, 179, 68, 63
Cipher Suite:  { 0, 5 }
Compression Method: 0
***
%% Created:  [Session-1, SSL_RSA_WITH_RC4_128_SHA]
** SSL_RSA_WITH_RC4_128_SHA
[read] MD5 and SHA1 hashes:  len = 74
0000: 02 00 00 46 03 01 3D B6   43 98 74 32 04 67 19 64  ...F..=.C.
0010: 3A CA 4F B9 B2 64 D7 42   FE 15 53 BB BE 2A AA 03  :.O..d.B..
0020: 84 6E 52 94 A0 5C 20 A3   E3 54 35 51 7F FC FE B2  .nR..\ ..T
0030: B3 44 3F B6 9E 1E 0B 96   4F AA 4C FF 5C 0F E2 18  .D?.....O.
0040: 11 B1 DB 9E B1 BB 8F 00   05 00                    ..........
main, READ:  SSL v3.1 Handshake, length = 1712
...
```

JSSESTDOUT-Djavax.net.debug=allkeystorestruststoresSSL
SSL

26.3.3.6. ReplicationConnection

Connector/J 3.1.71 Connection.getReadOnly()

Connection.setReadOnly(true) “”per-vm11
MySQL Connection.setReadOnly(false) MyS

JDBC“ com.mysql.jdbc.ReplicationDriver”MySQL
ReplicationDriverjava.sql.DriverManagerDriverManager MySQL JDBC

ReplicationDriver

```
import java.sql.Connection;
import java.sql.ResultSet;
import java.util.Properties;

import com.mysql.jdbc.ReplicationDriver;

public class ReplicationDriverDemo {

    public static void main(String[] args) throws Exception {
        ReplicationDriver driver = new ReplicationDriver();

        Properties props = new Properties();

        // We want this for failover on the slaves
        props.put("autoReconnect", "true");

        // We want to load balance between the slaves
        props.put("roundRobinLoadBalance", "true");

        props.put("user", "foo");
        props.put("password", "bar");

        //
        // Looks like a normal MySQL JDBC url, with a comma-separate
```

```
// of hosts, the first being the 'master', the rest being an
// of slaves that the driver will load balance against
//

Connection conn =
    driver.connect("jdbc:mysql://master,slave1,slave2,slave3
        props);

//
// Perform read/write work on the master
// by setting the read-only flag to "false"
//

conn.setReadOnly(false);
conn.setAutoCommit(false);
conn.createStatement().executeUpdate("UPDATE some_table ....
conn.commit();

//
// Now, do a query from a slave, the driver automatically pi
// from the list
//

conn.setReadOnly(true);

ResultSet rs = conn.createStatement().executeQuery("SELECT a
```

```
        .......
    }
}
```

26.3.4. J2EEJava Connector/J

26.3.4.1. J2EE
26.3.4.2. TomcatConnector/J
26.3.4.3. JBossConnector/J

Connector/J

26.3.4.1. J2EE

26.3.4.1.1.

Connector/JJ2EE

26.3.4.1.1.

JDBC1

JDBCMySQL

“”JDBCDriverManager.getConnection()

Java

.

MySQLJDBCIDBC“”

.

JDBCJDBC

.

MySQLCPUMySQL

SunJDBC-2.0“”JDBCMySQL

JavaJNDIJ2E

26.12. J2EE

```
import java.sql.Connection;
import java.sql.SQLException;
import java.sql.Statement;

import javax.naming.InitialContext;
import javax.sql.DataSource;


public class MyServletJspOrEjb {

    public void doSomething() throws Exception {
        /*
         * Create a JNDI Initial context to be able to
         *  lookup  the DataSource
         *
         * In production-level code, this should be cached as
         * an instance or static variable, as it can
         * be quite expensive to create a JNDI context.
         *
         * Note: This code only works when you are using servlets
         * or EJBs in a J2EE application server. If you are
         * using connection pooling in standalone Java code, you
         * will have to create/configure datasources using whatever
         * mechanisms your particular connection pooling library
         * provides.
         */

        InitialContext ctx = new InitialContext();

         /*
          * Lookup the DataSource, which will be backed by a pool
          * that the application server provides. DataSource instanc
          * are also a good candidate for caching as an instance
          * variable, as JNDI lookups can be expensive as well.
          */
```

```
DataSource ds = (DataSource)ctx.lookup("java:comp/env/jdbc/M

/*
 * The following code is what would actually be in your
 * Servlet, JSP or EJB 'service' method...where you need
 * to work with a JDBC connection.
 */

Connection conn = null;
Statement stmt = null;

try {
    conn = ds.getConnection();

    /*
     * Now, use normal JDBC programming to work with
     * MySQL, making sure to close each resource when you're
     * finished with it, which allows the connection pool
     * resources to be recovered as quickly as possible
     */

    stmt = conn.createStatement();
    stmt.execute("SOME SQL QUERY");

    stmt.close();
    stmt = null;

    conn.close();
    conn = null;
} finally {
    /*
     * close any jdbc instances here that weren't
     * explicitly closed during normal code path, so
     * that we don't 'leak' resources...
     */

    if (stmt != null) {
        try {
            stmt.close();
        } catch (sqlexception sqlex) {
            // ignore -- as we can't do anything about it he
        }

        stmt = null;
    }

    if (conn != null) {
        try {
            conn.close();
```

```
                } catch (sqlexception sqlex) {
                    // ignore -- as we can't do anything about it he
                }

                conn = null;
            }
        }
    }
}
```

JNDI InitialContextJDBC

MySQL

“”SunJava
Tomcat600

Apache JmeterThe Grinder

“”

26.3.4.2. TomcatConnector/J

Tomcat-5.x http://jakarta.apache.org/tomcat/tomcat-5.0-doc/jndi-datasource-examples-howto.html

Connector/J in $CATALINA_HOME/common/lib.jar

WebContext $CATALINA_HOME/conf/server.xml JNDI DataSource

```
<Context ....>

  ...

  <Resource name="jdbc/MySQLDB"
              auth="Container"
              type="javax.sql.DataSource"/>

  <!-- The name you used above, must match _exactly_ here!
```

```
     The connection pool will be bound into JNDI with the name
     "java:/comp/env/jdbc/MySQLDB"
-->

<ResourceParams name="jdbc/MySQLDB">
  <parameter>
    <name>factory</name>
    <value>org.apache.commons.dbcp.BasicDataSourceFactory</value>
  </parameter>

  <!-- Don't set this any higher than max_connections on your
       MySQL server, usually this should be a 10 or a few 10's
       of connections, not hundreds or thousands -->

  <parameter>
    <name>maxActive</name>
    <value>10</value>
  </parameter>

  <!-- You don't want to many idle connections hanging around
       if you can avoid it, only enough to soak up a spike in
       the load -->

  <parameter>
    <name>maxIdle</name>
    <value>5</value>
  </parameter>

  <!-- Don't use autoReconnect=true, it's going away eventually
       and it's a crutch for older connection pools that couldn't
       test connections. You need to decide if your application is
       supposed to deal with SQLExceptions (hint, it should), and
       how much of a performance penalty you're willing to pay
       to ensure 'freshness' of the connection -->

  <parameter>
    <name>validationQuery</name>
    <value>SELECT 1</value>
  </parameter>

 <!-- The most conservative approach is to test connections
      before they're given to your application. For most applicati
      this is okay, the query used above is very small and takes
      no real server resources to process, other than the time use
      to traverse the network.

      If you have a high-load application you'll need to rely on
      something else. -->
```

```
 <parameter>
   <name>testOnBorrow</name>
   <value>true</value>
 </parameter>

<!-- Otherwise, or in addition to testOnBorrow, you can test
     while connections are sitting idle -->

 <parameter>
   <name>testWhileIdle</name>
   <value>true</value>
 </parameter>

 <!-- You have to set this value, otherwise even though
      you've asked connections to be tested while idle,
      the idle evicter thread will never run -->

 <parameter>
   <name>timeBetweenEvictionRunsMillis</name>
   <value>10000</value>
 </parameter>

 <!-- Don't allow connections to hang out idle too long,
      never longer than what wait_timeout is set to on the
      server...A few minutes or even fraction of a minute
      is sometimes okay here, it depends on your application
      and how much spikey load it will see -->

 <parameter>
   <name>minEvictableIdleTimeMillis</name>
   <value>60000</value>
 </parameter>

 <!-- Username and password used when connecting to MySQL -->

 <parameter>
  <name>username</name>
  <value>someuser</value>
 </parameter>

 <parameter>
  <name>password</name>
  <value>somepass</value>
 </parameter>

 <!-- Class name for the Connector/J driver -->

 <parameter>
    <name>driverClassName</name>
```

```
       <value>com.mysql.jdbc.Driver</value>
    </parameter>

    <!-- The JDBC connection url for connecting to MySQL, notice
         that if you want to pass any other MySQL-specific parameter
         you should pass them here in the URL, setting them using th
         parameter tags above will have no effect, you will also
         need to use &amp; to separate parameter values as the
         ampersand is a reserved character in XML -->

    <parameter>
      <name>url</name>
      <value>jdbc:mysql://localhost:3306/test</value>
    </parameter>

  </ResourceParams>
</Context>
```

TomcatTomcatXML

```
Error: java.sql.SQLException: Cannot load JDBC driver class 'null '
state: null
```

26.3.4.3. JBossConnector/J

JBoss-4.xJDBCConnector/J.jarlib“”“deploy”
“-ds.xml”JbossJDBC

```
<datasources>
    <local-tx-datasource>
        <!-- This connection pool will be bound into JNDI with the n
             "java:/MySQLDB" -->

        <jndi-name>MySQLDB</jndi-name>
        <connection-url>jdbc:mysql://localhost:3306/dbname</connecti
        <driver-class>com.mysql.jdbc.Driver</driver-class>
        <user-name>user</user-name>
        <password>pass</password>

        <min-pool-size>5</min-pool-size>

        <!-- Don't set this any higher than max_connections on your
         MySQL server, usually this should be a 10 or a few 10's
         of connections, not hundreds or thousands -->

        <max-pool-size>20</max-pool-size>
```

```
        <!-- Don't allow connections to hang out idle too long,
         never longer than what wait_timeout is set to on the
         server...A few minutes is usually okay here,
         it depends on your application
         and how much spikey load it will see -->

        <idle-timeout-minutes>5</idle-timeout-minutes>

        <!-- If you're using Connector/J 3.1.8 or newer, you can use
             our implementation of these to increase the robustness
             of the connection pool. -->

        <exception-sorter-class-name>com.mysql.jdbc.integration.jbos
        <valid-connection-checker-class-name>com.mysql.jdbc.integrat

    </local-tx-datasource>
</datasources>
```

26.3.5. Connector/J

26.3.5.1.
26.3.5.2.

Connector/J

26.3.5.1.

MySQL Connector/J “”

27.3.5.1.1:

MySQL Connector/J

```
SQLException: Server configuration denies access to data source

SQLState: 08001

VendorError: 0
```

MySQL

MySQL Connector/JTCP/IPMySQLJavaUnix Connector/JMySQLMySQL

mysql

```
GRANT ALL PRIVILEGES ON [dbname].* to
                '[user]'@'[hostname]' identified by
                '[password]'
```

[dbname][user]MySQL Connector/J[hostnar RedHat Linux[hostname]“localhost.localdomain”FLUSH PRIVILEGES

“--host”“localhost”mysql “localhost” mysqlUnix “localhost”“127.0.0.1”

“GRANT”MySQL

MySQL

27.3.5.1.2:

SQLException“”

1CLASSPATH“”URLMySQL

27.3.5.1.3:

JavaMySQL Connector/J

```
SQLException: host:3306MySQL

MySQL


(java.security.AccessControlException)

SQLState: 08S01

VendorError: 0
```

AppletMySQL“--skip-networking”MySQL

AppletWebWebApplet.classMySQLJavaWeb

MySQL Connector/JTCP/IPMySQLJavaUnixMySQL“--skip-networking”TCP/IPMySQL

MySQL“--skip-networking”MySQLDebian Lin
/etc/mysql/my.cnf/etc/my.cnfmy.cnfMySQl“data”MySQL
MySQL AB/etc/my.cnf[datadir]/my.cnfMySQLJavaMySQL
3306 MySQLTCP/IP

27.3.5.1.4:

I

8MySQL“autoReconnect”MySQL

SQLException1MySQL
APIDOCSjava.sql.SQLException.getSQLState()“08S01”MySQL

simplistic

26.13.

```
public void doBusinessOp() throws SQLException {
        Connection conn = null;
        Statement stmt = null;
        ResultSet rs = null;

        //
        // How many times do you want to retry the transaction
        // (or at least _getting_ a connection)?
        //
        int retryCount = 5;

        boolean transactionCompleted = false;

        do {
            try {
                conn = getConnection(); // assume getting this from
                                        // javax.sql.DataSource, or
                                        // java.sql.DriverManager

                conn.setAutoCommit(false);

                //
                // Okay, at this point, the 'retry-ability' of the
                // transaction really depends on your application lo
                // whether or not you're using autocommit (in this c
                // not), and whether you're using transacational sto
                // engines
                //
                // For this example, we'll assume that it's _not_ sa
                // to retry the entire transaction, so we set retry
                // to 0 at this point
                //
                // If you were using exclusively transaction-safe ta
                // or your application could recover from a connecti
                // bad in the middle of an operation, then you would
                // touch 'retryCount' here, and just let the loop re
                // until retryCount == 0.
                //
                retryCount = 0;

                stmt = conn.createStatement();

                String query = "SELECT foo FROM bar ORDER BY baz";

                rs = stmt.executeQuery(query);

                while (rs.next()) {
                }

                rs.close();
```

```
            rs = null;

            stmt.close();
            stmt = null;

            conn.commit();
            conn.close();
            conn = null;

            transactionCompleted = true;
        } catch (SQLException sqlEx) {

            //
            // The two SQL states that are 'retry-able' are 08S0
            // for a communications error, and 41000 for deadloc
            //
            // Only retry if the error was due to a stale connec
            // communications problem or deadlock
            //

            String sqlState = sqlEx.getSQLState();

            if ("08S01".equals(sqlState) || "41000".equals(sqlSt
                retryCount--;
            } else {
                retryCount = 0;
            }
        } finally {
            if (rs != null) {
                try {
                    rs.close();
                } catch (SQLException sqlEx) {
                    // You'd probably want to log this . . .
                }
            }

            if (stmt != null) {
                try {
                    stmt.close();
                } catch (SQLException sqlEx) {
                    // You'd probably want to log this as well .
                }
            }

            if (conn != null) {
                try {
                    //
                    // If we got here, and conn is not null, the
                    // transaction should be rolled back, as not
                    // all work has been done
```

```
                        try {
                            conn.rollback();
                        } finally {
                            conn.close();
                        }
                    } catch (SQLException sqlEx) {
                        //
                        // If we got an exception here, something
                        // pretty serious is going on, so we better
                        // pass it up the stack, rather than just
                        // logging it. . .

                        throw sqlEx;
                    }
                }
            }
        } while (!transactionCompleted && (retryCount > 0));
    }
```

27.3.5.1.5:

JDBC-2.0

MySQLIDMySQL Connector/J1JDBC

26.3.5.2.

http://bugs.mysql.com/1

MySQL security@mysql.com

1

1 http://bugs.mysql.com/

MySQL

MySQL

aConnector/JMySQLbConnector/JJVMMySQL

99“”

1

Connector/J com.mysql.jdbc.util.BaseBugReport Connector/J1 com.mysql.jdbc.util.BaseBugReportsetUp() tearDown()runTest()

setUp()

runTest ()“setUp”

tearDown() setUp()

getConnection ()MySQLJDBC

· getConnection()getUrl()JDBC URL

· getNewConnection()1

· getConnection(String url)URL

· getConnection(String url, Properties props)URL

“jdbc:mysql:///test”JDBC URL getUrl()

assertTrue(boolean expression)assertTrue(String failureMessage, boolean expression)

main ()run

```
public static void main(String[] args) throws Exception {
      new MyBugReport().run();
 }
```

http://bugs.mysql.com/

26.3.6. Changelog

```
# Changelog
# $Id: CHANGES,v 1.38.4.206 2005/05/12 15:25:54 mmatthews Exp $

05-17-05   3.2.1-alpha

    - AutoreconnectautoReconnect=true
      “enableDeprecatedAutoreconnect=true”autoReconnectConnector/J 3

    - “init_connect”autocommit

    - 5.0.xStatement.setFetchSize( > 0)“cursors”

    - ServerPreparedStatementsBLOB/CLOB“”“blobSendChunkSize”1MB

    - sqlNO_BACKSLASH_ESCAPES

12-23-04   3.2.0-alpha

    -DatabaseMetaData.supportsCatalogIn*()

    -ServerPreparedStatementsMySQL 5.0“cursor”“”
```

- where

10-07-05 3.1.11-stable

- BUG#11629“utf8”“!”

-“;””plain”

- BUG#11663testcase

- BUG#11552 BUG#11552

-svn repo

- BUG#11797

-GEOMETRY

- BUG#11879ReplicationConnection“”

- BUG#12218

- BUG#10630Statement.getWarnings()NPE

-PreparedStatement.ParseInfo()SQLchar[]

- BUG#12104Geometry

- BUG#11614StringUtils.getBytes()“_characters_”

- BUG#11798Pstmt.setObject(...., Types.BOOLEAN)

- BUG#11976maxPerformance.properties“elideSetAutoCommits”

- BUG#11575WindowDBMD.storesLower/Mixed/UpperIdentifiers()

- BUG#11190ResultSet.moveToCurrentRow()ResultSet.moveToInsertR

- BUG#11115.setBytes()VARBINARY

- BUG#12229explainSlowQueries

- BUG#11498

-“_all_”.clearParameters()“_individual_ stream”

-Field*BufferMysqlIOInteger.MAX_VALUE

-DBMD.supportsCorrelatedQueries()4.1“”supportsGroupByUnrelated()

- BUG#12541DatabaseMetaData.getIndexInfo()catalogDatabaseMetaD

- getBestRowIdentifier()
- getColumns()
- getCrossReference()
- getExportedKeys()
- getImportedKeys()
- getIndexInfo()
- getPrimaryKeys()
- getProcedures() (and thus indirectly getProcedureColumns())
- getTables()

“catalog”

-NullcatalogJDBC URL“nullCatalogMeansCurrent=true”

-“”catalogJDBC

-catalogAPI

-jdbc2.optional“”Connection.clientPrepare()ConnectionPoolDataSourc

-Connection.isMasterConnection()1

- BUG#12753URL“=””sessionVariables=....”

- BUG#11781DatabaseMetaData

-“sendBlobChunkSize”“max_allowed_packet”max_allowed_packet“sendB

-CallableStatement.clearParameters()INOUT/OUTPUTINPUT

- BUG#12417Connection.prepareCall()Windows

- BUG#127524.0.xCp1251win1251

- BUG#12970DatabaseMetaData.getColumns()java.sql.Types.OTHERBI

-ServerPreparedStatement.getBinding()NullPointerException

- BUG#13277Statement.getGeneratedKeys()ResultSetMetaDataNullPo

-5.0FieldResultSetMetaData.getColumnClassName()ResultSet.getObje

-NullPointerExceptionNULLDatabaseMetaDataMethods“catalog”byte[]J

-5.0VAR[BINARY|CHAR] [BINARY]

-MysqlIO.sendFileToServer()LOAD DATA INFILE

- BUG#13374ResultSet.getStatement()NULLJDBC 4.0“retainStatemen

- BUG#13453URL“&”“=”JDBCapplication/x-www-form-urlencodedjava.

“%”“%25”“application/x-www-form-urlencoded”“%”

-“sessionVariables”“@”

- BUG#130434.1.0“gatherPerfMetrics”NullPointerException

06-23-05 3.1.10-stable

-MysqlIO.changeDatabaseTo()

-PreparedStatement.getParameterMetadata()ParameterMetadataCallab

06-22-05 3.1.9-stable

-

-Windows-31JCP932CP932MS932 javaSJISMySQL-5.0.3MySQL-4.1.12/13CP

- BUG#9064com.mysql.jdbc.PreparedStatement.ParseInfotoCharArra

- Bug#10144serverPrepare()ServerPreparedStatement

-jar

-“createDatabaseIfNotExist”””URL

- BUG#10156ResultSet.getInt()SMALLINTUNSIGNEDUNSIGNED TINYINTR

- BUG#10155

-enableStreamingResults()com.mysql.jdbc.jdbc2.optional.Statement

-ServerPreparedStatement.asSql()

-JDBC2

-com.mysql.jdbc.log.LogUtils

- DatabaseMetaData.supportsMultipleOpenResults()“”DBMD

- BUG#10310 {?=CALL(...)}DatabaseMetaData.getP

- BUG#10485ResultSet.getString()YEAR(2)SQLExceptionYEARjava.sq
“yearIsDateType”“”SHORT

-“tinyInt1isBit=true”“transformedBitIsBoolean”“”TINYINT(1)Types.

- BUG#10496cp932eucjpms“characterSetResults”SQLException

-“src”“./build”“./dist”

-/“autoGenerateTestcaseScript”””STDERR.sql

- BUG#10850“0”

-“cachePrepStmts=true”“prepStmtCacheSize”

-OutOfMemoryErrorsOOM“”OOM

-COM_RESET_STMT

-MySQL-5.0.7“LIMIT ?[,?]”

- BUG#11115ResultSet.getBytes()VARBINARY

-Connection.setCatalog()“useLocalSessionState””catalogcatalog“U

-“useConfigs”1

* maxPerformance
* solarisMaxPerformanceSolaris
* 3-0-CompatConnector/J 3.0.x

-“"maintainTimeStats”””””

- BUG#11259autoReconnectping

- BUG#11360Connector/JSQLException

-PreparedStatement.setClob()Null

- BUG#11411 JBoss

-“usage advisor”””

04-14-05 3.1.8-stable

-DatabaseMetaData.getTables()

-5.0.3MySQLDECIMAL

-ResultSet.getTime()NullNPE -Connection

-BlobFromLocatorID

-“sessionVariables”

-“autoReconnect=true”ping()

- BUG#9040PreparedStatement.addBatch()BINARY

- BUG#8800DBMD.supportsMixedCase*Identifiers()

- BUG#9206characterSetResults“UTF-8”

- BUG#9236 BUG#8868CHAR(n) CHARACTER SET BINARYRSMD.getColum

- BUG#8792“/”DBMD.supportsResultSetConcurrency()“”

- BUG#8803DBMD.getBestRowIdentifier()“DATA_TYPE”ArrayIndexOutO

-char/varchar('')“emptyStringsConvertToZero”“”3.0“”3.2“”

- BUG#9320PreparedStatement.getMetaData()

-Connection.canHandleAsPreparedStatement()“”LIMIT

-build.xmllog4jlog4j

-c3p0 http://c3p0.sf.net/“COM_PING”c3p0“connectionTeste

-LIMIT

- BUG#9319/

-ResultSetStatementJDBC

- BUG#9682DECIMAL“,”

- PreparedStatement.setObject(int, Object, int type, int scale)B

- BUG#9704.close()dStatement.getMoreResults()NPE

-SELECT

-URL“logger”“com.mysql.jdbc.logger”

Log4jJDK1.4STDERR

- BUG#9778DBMD.getTables()

-ResultSet.getBoolean()“-1”””

-.jarManifest.MF

-Field.isOpaqueBinary()CHAR(n)CHARACTER SET BINARY

- BUG#9917JDBCDBMDcatalogNull“nullCatalogMeansCurrent”””C/J 3.

- BUG#9769JDBCDBMD“%”Null“nullNamePatternMatchesAll”””C/J 3.2.

02-18-05 3.1.7-stable

- BUG#7686Timestamp“_binary”UpdatableResultSet.refreshRow()

- BUG#7715Timestamps

-sql_mode

-“holdResultsOpenOverStatementClose”””statement.close()Kevin Bur

- BUG#7952

-4.1.10MySQL-4.1

-configureClientCharset()useOldUTF8Behavior=true

-“dontUnpackBinaryResults”

- BUG#8096

-ServerPreparedStatement.serverPrepare()/

- Connection.prepareStatement()SQL

-CallableStatement“_binary”

-*BINARYbyte[]

-PreparedStatement.setObject(n, "true", Types.BIT)“True”

-prepareStatement()

-ResultSet.get(..., cal)PreparedStatement.set(...., cal)GMT

-“dontTrackOpenResources”””JDBC

- BUG#8428ResultSet.getString()“noDatetimeStringSync”””””

-“usage advisor”ResultSet.realClose()NPE

- BUG#8487PreparedStatements

-NULLResultSet.getNativeConvertToString()String.valueOf()String.

- BUG#8484ResultSet.getBigDecimal()BigDecimal.setScale()””

-“useLocalSessionState”””JDBCjava.sql.Connectionautocommit

-enableStreamingResults()Statement.setFetchSize()“Statement.setF

-MySQL-5.0.3BITBIT(1-8)JDBCBITjava.lang.Boolean“< 9 bits”)bitfie

12-23-04 3.1.6-stable

-SocketInputStream.read()“LIMIT n”Statement.setMaxRows()SocketIn

- BUG#7026DBMD.getProcedures()catalog

12-02-04 3.1.5-gamma

-toUpperCase()dtoLowerCase()dLocale.ENGLISHStringUtils.indexOfIg

- BUG#5235“zeroDateTimeBehavior”ResultSet.getObject()0

-“Wrong arguments to mysql_stmt_execute()”

-“.”

- BUG#5706ResultSet.getNativeString()

-Connection.releaseSavepoint()

-ServerPreparedStatements“dynamicCalendars=true”

-“dontUnpackBinaryResults”””usecase/jvm

- BUG#5729UNSIGNED BIGINT

- BUG#6225ServerSidePreparedStatement

-ResultSetThrowable()

-EscapeProcessor.escapeSQL()StringBuffer

-“null-safe-equals”

- BUG#65370DecimalSUM()DOUBLE0BigDecimal“0”

-DBMDDatabaseMetaData.getIdentifierQuoteString()

-LOAD DATA LOCAL INFILE“max_allowed_packet”1MB

- BUG#6399ResultSetMetaData.getColumnDisplaySize()

-“autoDeserialize”””BLOBjava.lang.Objects

-Field.isOpaqueBinary()“CHAR(n) CHARACTER SET BINARY”ResultSet.g

-java.io.BufferedInputStream“useReadAheadInput=false”

- BUG#6348IPV6IPV6 IPsocket.connect()1

09-04-04 3.1.4-beta

- BUG#4510Connector/j 3.1.3 betaBuffer.readInt() -> Buffer.rea

-DatabaseMetaData.getTables()getTableTypes()VIEWMySQL5.0.x

- BUG#4642ServerPreparedStatement.execute*()ArrayIndexOutOfBou

-“useFastIntParsing=false”JDK

-“useOnlyServerErrorMessages”SQLState“”“”

- BUG#4689NullResultSet.wasNull()

-“enablePacketDebug=true”

- BUG#4482ResultSet.getObject()

-MysqlPooledConnection.close()NPE

- BUG#5012DECIMALServerPreparedStatements

- BUG#50324.1.xResultSet.getObject()getObject()

-“LOAD DATA LOCAL INFILE”URLJava“allowUrlInLocalInfile”“”

-ResultSet.get*()SQLException“jdbcCompliantTruncation”“”JDBC

-“”“exception”“S1009”SQLStateSQLException“convertToNull”NULL“rou

-ServerPreparedStatement“”MysqlIO.clearInputStream()ArrayIndexOu

-com.mysql.jdbc.Message

07-07-04 3.1.3-beta

-CallableStatementsMangle

-CallableStatementsINPUT

- BUG#4119null

-SQLSQL“useSqlStateCodes”“”

-“enablePacketDebug”

-MySQLcom.mysql.jdbc.MysqlErrorNumbersSQLStates

-

- BUG#4311mediumint

-“useTimezone=true”MySQL-4.1.3

-“bigint unsigned”ResultSet.getObject()“bigint unsigned”BigDecim

06-09-04 3.1.2-alpha

char(), varchar()

-“cacheCallableStmts”

-

-CallableStatement.setOutputParameters()NullPointerException

-MysqlIO.changeUser()

-nio

-ServerPreparedStatement.toString()SQL

-“gatherPerformanceMetrics”/

-.close()ServerPreparedStatements

-“logSlowQueries”“slowQueriesThresholdMillis”””

-registerOutParameter()prepareCall()

-4.1.0

-

-4.1.2

- BUG#3539getProcedures()

- BUG#3540getProcedureColumns()

- BUG#3520DBMD.getSQLStateType()

-“connectionCollation”“set collation_connection=...”

-MySQL-5.0.0DatabaseMetaData.getProcedures()5.0.15.0.0“show proc

- BUG#3804getWarnings()SQLWarningDataTruncation

-5.0.05.0.1“4.1.2+”

02-14-04 3.1.1-alpha

-UpdatableResultSets

-MySQLJVMASCII

-“”

-BlobClobInputStreamsReaders

-MySQL-4.1Statement.getWarnings()“SHOW WARNINGS”

-TYPE_FORWARD_ONLYJDBC

-

-DriverPropertyInfoConnectionDataSource

-NIONIO“useNIO=true”

-SAVEPOINTsMySQL >= 4.0.144.1.1

-“mysql_change_user()...””com.mysql.jdbc.Connection”changeUser()

-

-

-JDBC

-ConnectionProperties“”profileSql“profileSQL”

-Buffer.readLenByteArray()0

-.execute*()PreparedStatement.setBlob()

-EscapeProcessor0

-UpdatableResultSet

-UpdatableResultSet

-useFastDates

-JNDI RefsURL

-5.0.0MySQLDatabaseMetaDatasupportsStoredProcedures()

-Connection.prepareCall()

-1.4JDKDateTimeValueCalendar.getTimeInMillis()IllegalAccessError

- BUG#1673“%”DatabaseMetaData.getColumns()

-MySQL“FLOAT”java.sql.Types.REAL3.0

-RSMD.isCaseSensitive()

-16M

-CallableStatement

MySQL-5.0.x

-ServerPreparedStatement.setTimestamp()NullPointerExceptionServe

-build.xml//JVM

-ServerPreparedStatementsNPE

-

-CommunicationsException.getMessage()

- BUG#2359NULLNullPointerExceptions

-Connection.prepareCall()DatabaseMetaData.getProcedures()getProc

-clearParameters()COM_RESET_STMTServerPreparedStatement“long bin

-3.0.getMetaData()

-TimeUtil.fastDate/TimeCreate()off-by-1900

- BUG#2502getTables()

-

- BUG#2606“YEAR”

-

- BUG#2623

-3.0

-ConnectionPropertiesConnectionProperties

- BUG#2671NULL

-

-DocBook

02-18-03 3.1.0-alpha

-“requireSSL”

-“useServerPrepStmts”””””4.1””4.1DML

-Connection.close()JDBC

06-23-05 3.0.17-ga

- BUG#5874useTimeZone='true'Timestamp/Time

- BUG#7081DatabaseMetaData.getIndexInfo()“”

-“MYSQL_TYPE_VARCHAR”

-“useOldUTF8Behavoior”MySQL-4.1“utf-8”JDBCMySQL-4.0.x

- BUG#7316getConnection()

- BUG#7033SQLPreparedStatementsBig5

- BUG#6966

- BUG#7061PreparedStatement.fixDecimalExponent()“+”MySQL

- BUG#7686Timestamp“_binary”UpdatableResultSet.refreshRow()

-Connector/J 3.1SQLState“useSqlStateCodes=true”“”Connector/J 3.1

- BUG#7061PreparedStatement.fixDecimalExponent()“+”MySQL

- {fn convert(..., type)}SQLODBC

-configureClientCharset()useOldUTF8Behavior=true

-20

- BUG#7607MS932SHIFT_JISWindows_31Jsjis
- BUG#6549#7607sjisCP943
- BUG#8064
- BUG#8812DBMD.getIndexInfo()NON_UNIQUE
- BUG#9098DATE/TIME/TIMESTAMP/TIMESTAMPCURRENT_*“”Updatable
- BUG#8629“EUCKR”“SET NAMES euc_kr”MySQL-4.1

-DatabaseMetaData.supportsSelectForUpdate()

-Windows-31JCP934MS932PreparedStatement.setBytes()

-“EUC_JP_Solaris”“eucjpms”MySQL3.1eucjpms5.0.3

11-15-04 3.0.16-ga

-MySQL-4.1Connection.changeUser()

-ResultSetMetaData.isReadOnly()MySQL-4.1“”

- BUG#5664ResultSet.updateByte()ArrayOutOfBoundsException

-DatabaseMetaData.getTypes()NUMERIC

- BUG#6198Buffer.readString(string)“off-by-one”

-“tinyInt1isBit”TINYINT(1) -> BIT/BooleanJDBC“”

-4.1.1“character_set_results”

-useUnbufferedInput“”

- BUG#6231ResultSet.getTimestamp()TIME

09-04-04 3.0.15-production

- BUG#4010GBKStringUtils.escapeEasternUnicodeByteStream

- BUG#4334autoReconnect“#”SocketFactory connect()String hostin

-MysqlConnectionPoolDataSourcerollback()/“rollbackOnPooledClose”

-checkRowPos()

- BUG#4742DBMD.getTypeInfo()“DOUBLE”

-FLOSS

- BUG#4808PooledConnection.close()NPE

- BUG#4138BUG#4860DBMD.getColumns()JDBCRSMD.getColumnType()RSM

-“Production”-“GA”

- BUG#4880RSMD.getPrecision()0TINYBLOBBLOBMEDIUMBLOBLONGBLOBBL

- BUG#5022“.close()”Field[]

- BUG#5069ResultSet.getMetaData()SQLException.close()checkClos

-4.1.x

-MySQL-4.1.xPreparedStatement.setBytes()set*Stream()“_binary”

05-28-04 3.0.14-production

-URL

05-27-04 3.0.13-production

- BUG#3848MySQLDatasource

- BUG#3920MysqlConnectionPoolDataSource“No Database Selected”

- BUG#3873PreparedStatement.getGeneratedKeys()1

05-18-04 3.0.12-production

-TYPE_NAMEDatabaseMetaData.getColumns()

-“failOverReadOnly”

-3.1“change user”“reset server state”MysqlConnectionPoolDataSour

-MySQL-4.1SJIS/GBK/BIG5

-MysqlDataSourceMysqlConnectionPool“url”

-“23000”SQLState

-3.1

-getGeneratedKeys() BUG#2957

-java.util.DatePreparedStatement.setObject()Timestamp

-setBytes()/setBinary/CharacterStream()BLOB/CLOB BUG#26

-“SHOW COLLATION”MySQL-4.1.0

-“binary”“US-ASCII”4.1.2DATETIME

-“SET character_set_results”

->= 4.1.0MySQL“SET NAMES”charsetnr

-ResultSetMetaDatagetColumnCharacterEncoding()getColumnCharacter

->= 4.1.0MySQLcharacter_set_results

- BUG#3511StringUtils.escapeSJISByteStream()

-StringUtils.escapeSJISByteStream()escapeEasternUnicodeByteStrea

- BUG#3554URLMalformedURL exception

-characterEncodingMySQLJava

-JVMMySQL

-junit.textui.TestRunnerAntEclipse

- BUG#3557UpdatableResultSetmoveToInsertRow()

- BUG#3570*BLOBs *TEXT

- BUG#3520DBMD.getSQLStateType()

-PreparedStatement.setString()

- StringRegressionTest 4.1-unicode

02-19-04 3.0.11-stable

-“characterEncoding”“utf8”“utf-8”“SET NAMES utf8”Java“utf-8”

-AutoReconnect BUG#2447

-1 BUG#2578

-“useUnbufferedInput”JVM http://developer.ja

-lower_case_table_names“on/off”“1”“2”“3”

-ResultSetMetaData.getColumnClassName()TINYINTSMALLINT“java.lang

-ResultSetMetaData.getColumnClassName()FLOAT“java.lang.Double”

-ResultSetMetaData.getColumnClassName()BINARYVARBINARYLONGVARBIN

-ConnectionPoolDataSource

01-13-04 3.0.10-stable

-PreparedStatement“”ID BUG#1511

-PacketTooLargeException“Friendlier” BUG#1534

-3.1checkUpdatability()UpdatableResultSets

-Statement.setMaxRows()ArrayIndexOutOfBounds BUG#1695

- BUG#1576BLOB

-Statement.getGeneratedKeys()REPLACE

- BUG#1630ResultSet.updateFoo()NPE

-4.1.1auth

- BUG#1731DatabaseMetaData.getImported/Exported/CrossReference

- BUG#1775DatabaseMetaData.getSystemFunction()“VResultsSion”

- BUG#1592

-MySQL LONGTEXTDatabaseMetaData.getColumns()Types.LONGVARCHAR

-TINYINTSMALLINTResultSet.getObject()Java“Integer” B

-“alwaysClearStream”

-“Server Configuration Denies Access to DataSource”

-Autoreconnectcatalog

-ResultSet.updateClob()

-CHAR/VARCHARResultSetMetaData.isCaseSensitive()

- BUG#1933“maxRows”

- BUG#1925DBMD.extractForeignKeyFromCreateTable()

- BUG#1914 {fn convert ... }

- BUG#19581ArrayIndexOutOfBounds

- BUG#2006SELECTResultSet.findColumn()1JDBC

-PreparedStatement.setTimestamp()

-SingleByteCharsetConverter

-“cachePrepStmts”“prepStmtCacheSize”“prepStmtCacheSqlLimit”

-PreparedStatements

-LOAD DATA LOCAL INFILE“file.encoding”

-SQLStates

-MySQL-4.1.0“ko18_ru”“ko18r”

-Buffer.writeString()“ \0”

-“connect w/ JDK-1.4.0”“danish”

-SQLError“41000”SQLStates

-“maxRows”0

10-07-03 3.0.9-stable

-ResultSetPreparedStatementDate

-Buffer.readString()

-ResultSet.previous()1bugs.mysql.com

-setMaxRows()LIMITPreparedStatement

- BUG#661refreshRow

-DatabaseMetaDataInnoDB BUG#517BUG#664Parwinder S

-3.14.1SQL

-UpdatableResultSetgetXXX() BUG#675

-moveToInsertRow()UpdatableResultSetinsertRow BU

-NULLDatabaseMetaData.getColumns()NULL

-TYPE_FORWARD_ONLYCONCUR_READ_ONLY

-MySQL

-SQLExceptionsRowDataDynamic

-useTimezone==trueTZ BUG#774

- BUG#848

-“”

-ResultSet.getXXX()

-I/O

-PooledConnection.getConnection() BUG

-+/- INFMySQLNaN0setDouble/setFloat()+/- INFNaN

- BUG#879SJISGBK“ \”” \”

-””100yield()CPU

- BUG#1099DatabaseMetaData.getColumns()“set”

-Statement.setMaxRows()

-CLOB.truncate() BUG#1130

-CLOB.setChracterStream(), BUG#1131

-databaseNameportNumberserverNameMysqlDataSourceFactory

- BUG#1247127ResultSet.get/setString

-3.14.11auth.

-com.mysql.jdbc.util.BaseBugReport

-“clobberStreamingResults”””””clobber”””

05-23-03 3.0.8-stable

-Driver.getPropertyInfo()URL

-Statement.getGeneratedKeys()INSERTS

-“LOAD DATA [LOCAL] INFILE”JVM

-Connection.cleanup()

-Ant“compile-core”“compile-driver”

-Statement.executeUpdate()getGeneratedKeys()getUpdateCount()

-Unicode0xFFFFArrayOutOfBoundsException Bug #378

-“REPLACE”

-

-

-

-

-SJISNaoto Sato

-EscapeProcessor

-Statement.close()

04-08-03 3.0.7-stable

-MysqlPooledConnection.close()

-PreparedStatement.setClob()StringIndexOutOfBoundsException

- 4.1

-Driver.connect()Driver.acceptsUrl()

-IOExceptions

-ResultSetMetaData.getColumnTypeName()“YEAR”

-DBMD.getPrimaryKeys()“pri”

-SQLExceptions

-Connection.setProfileSql(boolean)

-MySQL-4.1/

-“max_allowed_packet”“LOAD DATA LOCAL INFILE”

-GBKBig50x5c ('\')

-DATEResultSet.getTimestamp()

-alignPacketSize()MAX_ALLOWED_PACKETJVM

-autoReconnectingConnection.isReadOnly()

02-18-03 3.0.6-stable

-ResultSetMetaDatacatalog""Sun CachedRowSetNullPointerExceptions

-DBMD.getTypeInfo()DBMD.getColumns()TEXT/BLOB

-“ignoreNonTxTables”””“non transactional tables”

-SQLExceptions

-Statement.setMaxRows()“LIMIT”

-/.executeQuery()INSERT

-ResultSet

-ResultSetMetaData.isWritable()

-DBMD.nullsAreSortedAtStartNULL“”4.0.24.0.10“”

-Blob.setBytes()BlobResultSetPreparedStatementMySQL“”

-Connector/J 3.14.1

01-22-03 3.0.5-gamma

-Buffer.fastSkipLenString()ArrayIndexOutOfBounds

-Connection.getTypeMap()TypeMapMySQLIBM WebSphere 5.0

-DBMD.getColumns()LONGTEXT

-MySQLConnection.getTransactionIsolation()TX_ISOLATION

-DatabaseMetaData.getColumns()getPrimaryKeys()getIndexInfo()getB

-PreparedStatementssetBinaryStream()

-ResultSet.isBeforeFirst()

-“”

01-06-03 3.0.4-gamma

-Connection.setCatalogID

-PreparedStatementID

-setByte()PreparedStatementsbyte[]

-MysqlIOPreparedStatements

-“strictUpdates””SELECT“”

-4.0.8

-PreparedStatement.executeBatch()

12-17-02 3.0.3-dev

-SingleByteCharConvertercharsToByte

-SingleByteCharConverter

-Fields.java

-Connection.nativeSQL()

-“-- recognize '--'”testsuite.EscapeProcessingTest

-DBMD.getImported/ExportedKeys()

-ResultSetMetaData.getPrecision()

-ResultSetMetaData.getColumnTypeName()TEXTBLOBBLOBTEXT

-4.1Buffer.isLastDataPacket()

-CLIENT_LONG_FLAGisAutoIncrement()

-ResultSetMetaData.isAutoIncrement()Field.isAutoIncrement()

-DatabaseMetaData“lower_case_table_names”

-MySQL-4.1

-/UpdatableResultSetMySQL-4.1

-“continueBatchOnError””Statement/PreparedStatement.executeBatc

-createStatementprepareStatementsetTransactionIsolationsetAutoCo

-

-“LOAD DATA LOCAL INFILE ...””allowLoadLocalInfile”README

-“?”“ \0”

- NamedPipeSocketFactoryWindowsREADME

11-08-02 3.0.2-dev

-PreparedStatements

-ResultSet.setFetchDirection(FETCH_UNKNOWN)

-Statement.setFetchSize()

-ResultSet.getLong()

-ResultSet.updateBlob()

-UpdatableResultSetResultSet

-”””UnsupportedEncodingException”

-ASCII

-“useHostsInPrivileges”””“DBMD.getColumn/TablePrivileges””@hostn

-DBMDNULLJDBCMySQL

-SSLREADME

-autoCommit

-“SHOW CREATE TABLE”DatabaseMetaDataDELETE

-SJIS“0x5c”

-Clob.getSubString()1

-Clob.truncate()

-Clob.setString()

-Clob.setAsciiStream()

-Clob.setCharacterStream()

-com.mysql.jdbc.MiniAdmin“shutdown”MySQLJavaMySQL

-“connectTimeout”JDK-1.4

-autoCommit(false)autoReconnect

-“queriesBeforeRetryMaster”50

-DBMD.supportsResultSetConcurrency()ResultSet.TYPE_SCROLL_INSENS

-ResultSet.isLast()“”

- PreparedStatementsetBinary/Ascii/Character Stream()“useStreamL

-EscapeProcessorConnectionDatabaseMetaData“Strings smarter”

09-21-02 3.0.1-dev

-ResultSet.getRow()1

-RowDataStatic.getAt()1

-ClobResultSet.getClob()PreparedStatemtent.setClob()PreparedStat

-URLsocketTimeout

- Connection.isClosed()“Ping”

-“getAutoCommit() == false”Connection.close()rollback()

-“”””””

-ResultSetMetaData.isSigned()TINYINTBIGINT

-

-ResultSet.getCharacterStream()

-DatabaseMetaData.getTableTypes()“LOCAL TEMPORARY”

- Java

07-31-02 3.0.0-dev

- !!! !!! GPLGPL mark@mysql.com

- JDBC-3.0Statement/PreparedStatement.getGeneratedKeys()ResultSe

-50-100

-...“com.mysql.jdbc.Driver”MySQL-AB

-PreparedStatement

-READMEDoron

-MySQL-4.0README

- JDBC

-DBMetaDataSF582086582086

-java.sql.Types.FLOATSF579573

- ResultSet.getTimestamp()DATESF559134

- ResultSet.getDate/Time/TimestampMySQLSF586058

- TestsuiteJunit www.junit.org

-JDK-1.2

-README

-

-MysqlIO

-Alex Twisleton-Wykeham-Fiennes

05-16-02 2.0.14

-

- PreparedStatement.close()SF553268

-ID“ —ansi”“--sql-mode=ANSI_QUOTES”“"”

- ResultSet.getDouble()JDK

- LogicalHandle.isClosed()

-SQLSTDERRJDBC url“profileSql=true”README

-relaxAutoCommit

04-24-02 2.0.13

-

-unicodeSF541088

-PrepStmtBlob

-DataSource(s)set/getPortNumber()SF548167

-MySQLXADataSourcesetURL()SF546019

-PreparedStatement.toString()SF534026

-ResultSetMetaData.getColumnClassName()

- JDBC-3.0Statement.getGeneratedKeys()JDK-1.4

- DBMetaData.getIndexInfo()PAGESSF542201

04-07-02 2.0.12

-

-ConnectionMysqlLogicalHandlegetIdleFor()

-520615520393

-DBMDgetTable/ColumnPrivileges()484502

-getTypeInfo()Al DavisKid Kalanon

-PreparedStatementBIT51870

-ResultSetgetRow()527165

-PreparedStatementResultSet

-PreparedStatement1538286528785

- ResultSet: NULL

- DataSourcessetUrl511614525565532816528767

-DatabaseMetaDataID518108

-YEAR533556

- ResultSet.insertRow()auto_incrementMySQL

-ResultSet.refreshRow()

-testsuite.Traversal afterLast()Igor Lastric

01-27-02 2.0.11

- DBMD.getImported/ExportedKeys()getCrossReference() DELETE_RUL

-Statement.java

-BLOB“Unexpected end of input stream”

01-24-02 2.0.10

-MysqlIO“Unexpected end of input stream”507456

-Websphere 4MysqlConnectionPoolDataSource“null-pointer-exceptio

01-13-02 2.0.9

- Antjar487669

-MysqlIO.readPacket()488663

-DatabaseMetaData.getExported/ImportedKeys()getCrossReference()

-

-DataSourceorg.gjt.mm.mysql.jdbc2.optionalPooledConnectionDataS

-Todd Lizambri

-486265

-DatabaseMetaData495101

-PreparedStatement.setTimestamp()1491577

-“||”VisualAge“||””||””--ansi”mysqld491680

-PreparedStatement488663

11-25-01 2.0.8

-Daniel Rall

- XADataSource/ConnectionPoolDataSource

- PreparedStatement.setAnyNumericType()“+”MySQL

- DatabaseMetaData.getPrimaryKeys()getBestRowIdentifier()Key_ty

10-24-01 2.0.7

- PreparedStatement.setCharacterStream()

-autoReconnect=truefinalizerGC

-MySQLResultSetMetaData.getPrecision()1

-NULLResultSet.getBlob()NULL

-useUnicode=truecharacterEncodingDmitry Vereshchagin

-Dmitry Vereshchagin

-DatabaseMetaData.supportsTransactions()supportsTransactionIsol

-SQLPreparedStatement

-ResultSet.isAfterLast()“”

-PreparedStatement.setTimestamp()Erik Olofsson

-URL“captializeTypeNames=true”WebObjectsAnjo Krank

-NULL

- PreparedStatement.setDouble()

-MySQL3.21.23PreparedStatement.setBoolean()1/0

06-16-01 2.0.6

-PreparedStatement

-ResultSet.java

06-13-01 2.0.5

- ResultSet.getBlob() ArrayIndex

-ResultSetMetaData.getColumnTypeNameTEXT/BLOB

-BLOBArrayIndexOutOfBounds

-Connection.setIsolationLevel()ISOLATION

-PreparedStatement.executeUpdate()NPE

-TIMESTAMP

-PreparedStatement.setObject()Byte

- ResultSet.getBoolean()“-1””

- ResultSet+/-Inf/inf

-NULLResultSet.insertRow()

- DataBaseMetaData.getCrossReference()ArrayIndexOOB

-getObject()TINYINT->ByteSMALLINT->Short

12-03-00 2.0.3

-JDBC2getBigDecimal()

-

--/+INF

-ASCII

-MAX_ALLOWED_PACKETBlob

-java.sql.Blob“1”

-“ultraDevHack”URL“”Macromedia UltraDev

04-06-00 2.0.1

-RSMD.isWritable()Moritz Maass

-

-getObject()TEXT

- DatabaseMetaData.getPrimaryKeys()key_seqBrian Slesinsky

-JDBCPreparedStatements

-JDBC-2.0Ron SmitsNick BrookCessar GarciaCarlos Martinez

-

02-21-00 2.0pre5

-

01-10-00 2.0pre4

-insertRow()Cesar Garcia

-JDBC-2.0JDBC-2.0JDKJohn Baker

-

- Statement.getUpdateCount()SQL-92

10-29-99

-Statement/PreparedStatement.getMoreResults()Noel J. Bergman

-PreparedStatement.setObject()ShortJeff Crowder

-/

-Autoreconnectping

-

08-17-99 2.0pre

-JDK-1.2JDK-1.1JDK-1.2JVM

-NULLTim Endres

-SQLExceptionsBlas Rodriguez Somoza

-Christian Motschke

07-04-99 1.2b

-doc/mm.doc/book1.html

-DBMDnull“%”

- DBMDgetXXX()

-ResultSet.getDate()getTime()getTimestamp()Alan Wilken

- EscapeProcessor“ \{ \}”“ { or }”Alik

-Juho Tikkala

-NULLResultSet.getObject()NULLBen Grosman

-MySQLResultSet.getObject()Chris Perdue

-DataInput/OutputIO12

-JVMJVM“ISO8859_1”

-“ISO8859_1”JVMFritz Elfert

-MysqlIO

-“ {}”

04-14-99 1.2a

-Javasoft JVM

-ResultSet.getBoolean()“y”“n”“1”“0”Tim Pizey

-ResultSet.getTimestamp()Richard Swift

- getByte()Ray Bellis

- DatabaseMetaData.getTypeInfo()DATEPaul Johnston

-“fn”EscapeProcessorlocomotive.orgPiyush Shah

-EscapeProcessorRyan Gustafson

-“jdbc:mysql://host:port”URLRichard Lobb

03-24-99 1.1i

-PreparedStatementsTimestamps

-RSMDRSNull

-jikesms!

03-08-99 1.1h

-“ {”“ }”Craig Coles

-DATETIMETIMESTAMPBETWEENCraig Longman

- MysqlIO.quit()Michael Brinkman

-Driver.getPropertyInfoNullPointerExceptionDave Potts

-MysqlDefs*textChris at Leverage

-PreparedStatementsetDoubleJ.S. Ferguson

-RSMDgetScale()getPrecision()James Klicman

-DECIMALNUMERICgetObject()Bert Hobbs

-NullDBMD.getTables()Richard Lobb

-“client not authorized”Hannes Wallnoefer

02-19-99 1.1g

-BlobUnicodeuseUnicode

-PreparedStatementsetXXXStreamMySQL

-getDriverPropertyInfo()

12-31-98 1.1f

-UnicodeJVMStringBufferString

-PreparedStatement.streamToString()Uwe Schaefer

- URLSQLNullPointerExceptions

- PreparedStatementsetObject()StringTime/DateRobert Currey

-Buffer.readInt()IO1.1dSamo Login

11-03-98 1.1b

-DatabaseMetaDataIBM VAJ-BuilderJac Kersing

-ResultSet.getBoolean()NULLBarry Lagerweij

-JDBC-2.0

-MysqlIOBuffer“”

9-29-98

-PreparedStatementsetXXX()setNull()Erik Ostrom

-Types.OTHERPreparedStatementsetObject()

- Util1readObject()

9-02-98 – 1.1

-MysqlIO.nextRow()“”Buffer.isLastDataPacket()

- Connection.getCatalog()Connection.setCatalog()

- Statement.setMaxRows()maxRowsURLStatement.setMaxRows()maxRows

-PingURL“autoReconnect=true”“maxReconnects=n”3“initialTimeout=n

8-24-98 1.0

- Buffer.javaBlob

-

-JDBCLPGL

8-14-98 -

- Buffer.readLenString()BLOB

-PreparedStatement.stringToStreamBLOB

-PreparedStatement.setDate()1Vincent Partington

-URL?user=...

8-04-98 0.9d

- ICETim EndresGNU GPLJavaorg.gjt.mmorg.gjt.mm.mysqlTim

-

-getTypeInfo()

- DatabaseMetaDataIDEJbuilder

-JavaDoc

-.zip.tar.gz

7-28-98 0.9

-getTypeInfo()JDBCConnection.rollback()SQLException

-PreparedStatementJDBC APIInputStreams

-ResultSet11

- DatabaseMetaData.getTables()DatabaseMetaData.getColumns()Data

-executeUpdate()AUTO_INCREMENTIDexecuteUpdate()SQLWarningsLAST_

AUTO_INCREMENTexecuteUpdate()clearWarnings()

7-06-98 0.8

-MysqlIOBufferClassLoaderIllegalAccessmm.mysql

Joe Ennis jce@mail.boone.com

7-01-98 0.7

-getColumns()DatabaseMetadata problems

Costin Manolache costin@tdiinc.com

5-21-98 0.6

-MysqlIO.javaResultSet.javaRichard Swift Richard.Swift@ka

-GWE15

- DatabaseMetaData

* getTables()
* getTableTypes()
* getColumns
* getCatalogs()

26.4. MySQL Connector/MXJ

26.4.1.
26.4.2.
26.4.3. Junit
26.4.4. Junit
26.4.5. JDBC
26.4.6. Java
26.4.7. MysqldResource API
26.4.8. JMX(custom)
26.4.9. JMX (JBoss)
26.4.10.

26.4.1.

MySQL Connector/MXJJavaMySQLConnector/MXJJavaJMX MbeanMySQLJDBCURLURLJava

MySQL Connector/MXJMySQLjava

JMX MbeanMySQL Connector/MXJJMX v1.2MbeanJboss4MbeanJMX API

JDBCJMX MbeanJboss

http://dev.mysql.com/downloads/connector/mxj/

java@lists.mysql.com

26.4.2.

- Linux, i386
- Windows NT, x86
- Windows 2000, x86

- Windows XP, x86
- Solaris 9, SPARC 32

26.4.3. Junit

Junit

“MysqldResource”MySQLi386LinuxOS
WindowsSolaris

1. JDK-1.4JREJSP

2. CLASSPATHMySQL Connector/J3.1
http://dev.mysql.com/downloads/connector/j/

3. JMX1.2.1javax.management

· JBoss - 4.0rc1

· Apache Tomcat - 5.0

· SunJMX1.2.1 http://java.sun.com/products/JavaManagement/

4. Junit 3.8.1 http://www.junit.org/

1. Ant1.5 http://ant.apache.org/

26.4.4. Junit

1. 3336MySQLMySQLMySQL3306“c-mxj_test_port”Java
MySQL

“c-mxj_test_silent”Java“”

2. Junit$CLASSPATH

· JUnit

· JMX

· Connector/J

· MySQL Connector/MXJ

3. connector-mxj.jarMySQL Connector/MXJ

4. `cd mysqldjmx`

5. `ant dist`

$TEMP/cmxj/stage/connector-mxj/connector-mxj.jarCLASSPATH

6. junit

7. `java junit.textui.TestRunner com.mysql.management.AllTe`

```
.....................................
.....................................
.........
Time: 259.438

OK (101 tests)
```

26.4.5. JDBC

MySQL Connector/J JDBC1JDBC“SocketFactory”MySQL

Connector/MXJ1SocketFactorySocketFactoryMySQLSocketFactory1
“shutdown”

JDBC“socketFactory”
“com.mysql.management.driverlaunched.ServerLauncherSocketFactory”

1System.outMySQL

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.ResultSet;
import java.sql.Statement;

import com.mysql.management.driverlaunched.ServerLauncherSocketFacto

public class ConnectorMXJTestExample {
    public static void main(String[] args) throws Exception {
        String hostColonPort = "localhost:3336";

        String driver = com.mysql.jdbc.Driver.class.getName();
        String url = "jdbc:mysql://" + hostColonPort + "/" + "?"
                + "socketFactory="
                + ServerLauncherSocketFactory.class.getName();
        String userName = "root";
        String password = "";

        Class.forName(driver);
        Connection conn = null;
        try {
            conn = DriverManager.getConnection(url, userName, passwo
            Statement stmt = conn.createStatement();
            ResultSet rs = stmt.executeQuery("SELECT VERSION()");
            rs.next();
            String version = rs.getString(1);
            rs.close();
            stmt.close();

            System.out.println("-----------------------");
            System.out.println(version);
            System.out.println("-----------------------");
        } finally {
            try {
                conn.close();
            } catch (Exception e) {
                e.printStackTrace();
            }
            ServerLauncherSocketFactory.shutdown(hostColonPort);
        }
```

```
    }
}
```

CLASSPATHconnector-mxj.jarConnector/J

```
java ConnectorMXJTestExample
```

MySQL“server”JDBC32

```
        String url = "jdbc:mysql://" + hostColonPort + "/"
                + "?"
                + "socketFactory="
                + ServerLauncherSocketFactory.class.getName();
                + "&"
                + "cacheServerConfiguration=true"
                + "&"
                + "useLocalSessionState=true"
                + "&"
                + "server.basedir=/opt/myapp/db"
                + "&"
                + "server.datadir=/mnt/bigdisk/myapp/data";
```

26.4.6. Java

1javaMySQLcom.mysql.management.MysqldResource
java.io.File“stdout”“stderr”

java.util.MapMySQLjava.util.Map

MysqldResourcejava.util.MapMySQLjavaMySQL

```
import com.mysql.management.MysqldResource;

 ...

    public void startMySQL() {
        File baseDir = new File(ourAppDir, "mysql");
        mysqldResource = new MysqldResource(baseDir);
        Map options = new HashMap();
        options.put("port", "3336");
        String threadName = "OurApp MySQL";
        mysqldResource.start(threadName, options);
```

```
    }

    public void stopMySQL() {
        if (mysqldResource != null) {
            mysqldResource.shutdown();
        }
        mysqldResource = null;
    }

    public java.sql.Connection getConnection() throws Exception {
        String db = "test";
        String url = "jdbc:mysql://localhost:3336/" + db;
        String userName = "root";
        String password = "";
        Class.forName(com.mysql.jdbc.Driver.class.getName());
        return DriverManager.getConnection(url, userName, password);
    }
```

26.4.7. MysqldResource API

· public MysqldResource(File baseDir, PrintStream out, PrintStream err);

MySQL“basedir”

· public MysqldResource(File baseDir);

MySQL“basedir”System.outSystem.err

· public MysqldResource();

Basedirjava.io.tempdirSystem.outSystem.err

MysqldResource API

· void start(String threadName, Map mysqldArgs);

MySQL“threadName”MySQL“map”

· void shutdown();

MysqldResourceMySQL

· Map getServerOptions();

MySQL

· boolean isRunning();

MySQL“”

· boolean isReadyForConnections();

“”

· void setKillDelay(int millis);

“Kill Delay”30“”

· void addCompletionListenser(Runnable listener);

“listener”

· String getVersion();

MySQL

· void setVersion(int MajorVersion, int minorVersion, int patchLevel);

1MySQL

26.4.8. JMX(custom)

JMXSUNJboss

JMXMysqldDynamicMBean com.mysql.manageme
JMX

1. MysqldDynamicMBean

2. com.sun.jdmk.comm.HtmlAdaptorServerJMXWeb

WebMySQL

1.

· JDK, JUnit, Connector/J, MySQL Connector/MXJ

· JMXSUN

· PATH, JAVA_HOME, ANT_HOME, CLASSPATH

2.

rebuild with the "sunri.present"

```
ant -Dsunri.present=true dist
```

re-run tests:

```
java junit.textui.TestRunner com.mysql.management.AllTestsSuite
```

3.

4. `java com.mysql.management.jmx.sunri.MysqldTestAgentSunHtmlAdap`

5.

6. `http://localhost:9092/`

7. MysqldAgent

8. “name=mysqld”

9. Mbean

10. startMysqld

11. “ Back to MBean View”Mbean

12. stopMysqld

13. Javajmx

26.4.9. JMX (JBoss)

MbeanJMXMbeanJboss

1. javav1.4.x

· JAVA_HOMEJboss JAVA_HOME

· JAVA_HOME/binPATHCLASSPATHjar

2. Jbossv4.0RC1

```
3.              http://www.jboss.org/index.html
4.              “Downloads”
5.              “jboss-4.0.zip”
6.              1
7.              unzip ~/dload/jboss-4.0.zip
8.              JBOSS_HOME
9.              Unix
10.         cd $JBOSS_HOME/bin
11.         chmod +x *.sh
```

12.connector-mxj.jar$JBOSS_HOME/server/default/lib

13.mysql-connector-java-3.1.4-beta-bin.jar
$JBOSS_HOME/server/default/lib

14.$JBOSS_HOME/server/default/deploymxjtest.war

15. index.jsp$JBOSS_HOME/server/default/deploy/mxjtest.war

16.$JBOSS_HOME/server/default/deploymysqld-service.xml

```
17.         <?xml version="1.0" encoding="UTF-8"?>
```

```
18.         <server>
19.          <mbean code="com.mysql.management.jmx.jboss.JBossMysqldD
20.             name="mysql:type=service,name=mysqld">
21.          <attribute name="datadir">/tmp/xxx_data_xxx</attribute>
22.          <attribute name="autostart">true</attribute>
23.          </mbean>
24.         </server>
```

25.jboss

· Unix **$JBOSS_HOME/bin/run.sh**

· Windows **%JBOSS_HOME%\bin\run.bat**

Jboss

26. JbossWeb http://localhost:8080/jmx-console

27.mysql bulleted mysqld

28.JMX MBean ViewMySQL

29. “autostart=true” InvokeMySQL“ Back to MBean View”Mbean

30. MySQLWeb http://localhost:8080/mxjtest/

```
SELECT 1
```

returned with a result of

```
1
```

31.$JBOSS_HOME/server/default/deploy/mxjtest.war/index.jspWeb MySQL

32. MySQLJbossMySQLMBean

MySQL

1.0.6-betaMbeanMySQLJbossJboss

26.4.10.

1. Connector/MXJconnector-mxj.jarCLASSPATH

2. JDBC "socketFactory=" + ServerLauncherSocketFactory.class.getName()

JBoss:

1. Connector/MXJ connector-mxj.jar$JBOSS_HOME/server/default/lib

2. Connector/J connector-mxj.jar$JBOSS_HOME/server/default/lib

3. $JBOSS_HOME/server/default/deployMbeanxml datadirautostart

4. WebJDBC String driver = "com.mysql.jdbc.Driver"; String url = "jdbc:mysql:///test?propertiesTransform="+ "com.mysql.management.jmx.ConnectorMXJPropertiesTransform"; String user = "root"; String password = ""; Class.forName(driver); Connection conn = DriverManager.getConnection(url, user, password);

datadir

MySQLMySQL dev.mysql.com

27MySQL

27.1. MySQL
- 27.1.1. MySQL
- 27.1.2. MySQL

27.2. MySQL
- 27.2.1.
- 27.2.2. CREATE FUNCTION/DROP FUNCTION
- 27.2.3.
- 27.2.4.

27.3. MySQL
- 27.3.1.
- 27.3.2.

27.1. MySQL

27.1.1. MySQL
27.1.2. MySQL

MySQLMySQL
1.7.1.1“MySQL” MySQL AB MySQLM

27.1.1. MySQL

MySQL

- TCP/IP SQL
- Windows NT pipe handlerpipe connect
- process_alarm()
- **mysqld**DUSE_ALARM_THREAD sig
- flush_time= *val*
-
- INSERT DELAYED
- master-host,

mysqladmin processlist INSERT DELAYED,

27.1.2. MySQL

27.1.2.1. MySQL
27.1.2.2. MySQL
27.1.2.3. MySQL

UnixMySQLUnixWindows

MySQLSQLOS/library100%MySQL

27.1.2.1. MySQL

(**mysqltest**)(**mysql-test-run**)root **r**
test/mysql-test-run cd root (/usr/local/mysql),
runMySQL

mysqld 9306 9307

mysql-test/mysql-test-run test_name.

--force **mysql-test-run**

27.1.2.2. MySQL

mysqltest

- mysql-test/t/*.test
- **mysql** MySQL
- SELECT, SHOW, EXPLAIN *@/path/to/res*
  test **mysqltest -r < t/test-case-name.test**
  od -c
- mysql-test/r test_name.result
  test_name.b.result
- --error error-number“,”
- source include/ma
  slave;connection
-

```
let $1=1000;
while ($1)
{
 # do your queries here
 dec $1;
```

```
}
```

- **sleep**1.3 **sleep 1.3;**
- mysql-test/t/test_name-slave.optmysql-test/t/test_name-master.opt
- MySQL ftp://ftp.mysql.com/pub/mysql/upload/

27.1.2.3. MySQL

MySQL

- **mysqlbu**
- **mysql-test-run** mysql-test/r .reject
- ```
  cd mysql-test
  mysql-test-run --local test-name
  ```

  --with-debug MySQL--debug **mysql-**var/tmp/master.trace ftp://ftp.mysql.com/pub/mysql/upload/ **mysqld**
- --force **mysql-test-run**
- MySQLMySQL
- Result length mismatch Result content mismatch MySQL

  .rejectdiffod -c
- mysql-test/var/log
- MySQL--gdb--debug **mysql-tes**

  MySQL-with-debug
  ```

27.2. MySQL

27.2.1.
27.2.2. CREATE FUNCTION/DROP FUNCTION
27.2.3.
27.2.4.

MySQL

- (UDF)CREATE FUNCTION
  “CREATE FUNCTION/DROP FUNCTION ”
- MySQL **mysqld**
-
- MySQLUDF.
- MySQLUDF UDF

SQL ABS() SOUNDEX()

SQL

UDFUDFMySQLUDF

UDFMySQLsql/udf_example.cc

27.2.1.

MySQL

- ÷
-
-

- MySQL
- NULL

27.2.2. CREATE FUNCTION/DROP FUNCTION

```
CREATE [AGGREGATE] FUNCTION function_name RETURNS {STRING|INTEGER|RE
       SONAME shared_library_name

DROP FUNCTION function_name
```

(UDF)ABS() CONCAT()MySQL

function_name SQLRETURNS

mysql INSERT mysql DELETECREATE FUNCTION
mysql.funcDROP FUNCTION
2.10.2“”

CREATE FUNCTIONDROP FUNCTION--skip-grant-tables
  UDFUDF

27.2.3“”UDFCC++ **mysqld**

AGGREGATEMySQLSUMCOUNT()AGGREGATE
mysql.functypemysql.func **mysql_**

27.2.3.

27.2.3.1. UDF
27.2.3.2. UDF
27.2.3.3. UDF
27.2.3.4. UDF
27.2.3.5.
27.2.3.6.

UDFCC++MySQL sql/udf_example.cc

UDF **mysqld**MySQL--with-mysqld-ldflags=-all-static
default_charset_infosql/udf_example.ccmetaphone-rdynamicman

dlopenUDF, with-mysqld-ldflags=-rdynamicMySQL

MySQL MySQL-Max

SQLC C++xxxSQLC/C++xxx()(SQLxxx()
C/C++

xxx()C/C++

- xxx() ()

  SQLC/C++

SQL	**C/C++**
STRING	char *
INTEGER	long long
REAL	double

- xxx_init() ()

  xxx()

  - xxx()
  - MySQL
  -
  -
  - REAL
  - NULL

- xxx_deinit()

  xxx()

SQLXXX()MySQLxxx_init()
xxx() xxx_deinit()

SUM()

- xxx_clear() 5.1

- xxx_add()

MySQL UDF

1. xxx_init()
2. GROUP BY
3. xxx_clear()
4. xxx_add()
5. xxx()
6. 3-
7. xxx_deinit() UDF.

xxx_init()xxx_deinit()

27.2.3.1. UDF

UDF 27.2.3“” MySQL

xxx()SQLxxx()CREATE

STRING

```
char *xxx(UDF_INIT *initid, UDF_ARGS *args,
          char *result, unsigned long *length,
          char *is_null, char *error);
```

INTEGER

```
long long xxx(UDF_INIT *initid, UDF_ARGS *args,
              char *is_null, char *error);
```

REAL

```
double xxx(UDF_INIT *initid, UDF_ARGS *args,
              char *is_null, char *error);
```

```
my_bool xxx_init(UDF_INIT *initid, UDF_ARGS *args, char *message);

void xxx_deinit(UDF_INIT *initid);
```

initid UDF_INIT UDF_INIT

- my_bool maybe_null

  xxx() NULLxxx_init()maybe_null 1 ma

- unsigned int decimals

  1.34, 1.

- unsigned int max_length

  max_length 2113initid->decimals

  max_length 65KB16MB

- char *ptr

  initid->ptr xxx_init()

  ```
  initid->ptr = allocated_memory;
  ```

  xxx() xxx_deinit() initid->ptr

27.2.3.2. UDF

UDF [27.2.3“”](#) MySQL

- xxx_reset()

  MySQLUDF_ARGS

  ```
  char *xxx_reset(UDF_INIT *initid, UDF_ARGS *args,
                  char *is_null, char *error);
  ```

  MySQL5.1UDFxxx_reset()xxx_clear()UDF xxx_reset() xxx_clear() xxx_reset()xxx_clear()UDF_ARGS

- xxx_clear()

  MySQLxxx_clear()

  ```
  char *xxx_clear(UDF_INIT *initid, char *is_null, char *error);
  ```

  xxx_clear()is_null CHAR(0)

  errorerror

  xxx_clear() MySQL 5.1

- xxx_add()

  UDF_ARGS.

  ```
  char *xxx_add(UDF_INIT *initid, UDF_ARGS *args,
                char *is_null, char *error);
  ```

UDFxxx() UDF 27.2.3.1“UDF’

UDFMySQL xxx()UDF_ARGS

xxx()UDF 27.2.3.4“UDF”

xxx_reset() xxx_add() UDFUDF_ARGS

is_nullerror xxx_reset(), xxx_clear(), xxx_add() xxx()xxx()N *errorerror

*is_null xxx_clear() *error

xxx()*is_null *error MySQL NULL

27.2.3.3. UDF

args UDF_ARGS

- unsigned int arg_count

```
if (args->arg_count != 2)
{
    strcpy(message,"XXX() requires two arguments");
    return 1;
}
```

- enum Item_result *arg_type

  STRING_RESULT,

  arg_type

```
if (args->arg_type[0] != STRING_RESULT ||
    args->arg_type[1] != INT_RESULT)
{
    strcpy(message,"XXX() requires a string and an integer");
    return 1;
}
```

  arg_typexxx()MySQLxxx_init()

```
args->arg_type[0] = STRING_RESULT;
args->arg_type[1] = INT_RESULT;
```

- char **args

  args->args iargs->args[i]
  4*7-2 SIN(3.14)

  args->args

  i

- STRING_RESULT args->args[i]
- INT_RESULTargs->args[i] long long

```
long long int_val;
int_val = *((long long*) args->args[i]);
```

- REAL_RESULTargs->args[i]

```
double    real_val;
real_val = *((double*) args->args[i]);
```

- unsigned long *lengths

  lengthslengths
  lengths

27.2.3.4. UDF

01xxx_init() mes

long long double xxx() *result *length

```
memcpy(result, "result string", 13);
*length = 13;
```

xxx() 255

255 malloc() xxx_init()
UDF_INIT ptr xxx() 27.2.3.1“UDF ”

NULL *is_null 1

```
*is_null = 1;
```

*error 1

```
*error = 1;
```

xxx() *error 1 XXX() NULL xxx()

27.2.3.5.

UDFMySQLUDFsql/udf_example.cc

UnixWindows

udf_example.cc

- metaphon() (metaphon)soundex
- myfunc_double()ASCII
- myfunc_int()
- sequence([const int]) 1
- lookup() IP
- reverse_lookup() IP'xxx.xxx.xxx.xxx'

```
shell> gcc -shared -o udf_example.so udf_example.cc
```

gccudf_example.so

```
shell> make udf_example.so
```

MySQLsql

```
shell> make udf_example.o
```

make-c -o udf_example.so-c

UDFMySQLudf_example.ccudf_example.so
/etc/ld.so.conf

FreeBSD **ld-elf.so.1** Linux **ld.so**Mac

LD_LIBRARY LD_LIBRARY_PATH UDFdlo
mysql.server mysqld_safe **mysqld**

ldconfiglib udf_example.so libudf_exam

Windows

1. BitKeeper source repository for MySQL 5.1 2.8.3“”
2. VC++Files/examples/udf_exampleudf_example.def, udf_example.dsw
3. sql udf_example.cc VC++Files/examples/udf_example udf_example.cpp
4. Visual Studio VC++ udf_example.dsw UDF

mysqld

```
mysql> CREATE FUNCTION metaphon RETURNS STRING SONAME 'udf_example.s
mysql> CREATE FUNCTION myfunc_double RETURNS REAL SONAME 'udf_exampl
mysql> CREATE FUNCTION myfunc_int RETURNS INTEGER SONAME 'udf_exampl
mysql> CREATE FUNCTION lookup RETURNS STRING SONAME 'udf_example.so'
mysql> CREATE FUNCTION reverse_lookup
    ->        RETURNS STRING SONAME 'udf_example.so';
mysql> CREATE AGGREGATE FUNCTION avgcost
    ->        RETURNS REAL SONAME 'udf_example.so';
```

DROP FUNCTION

```
mysql> DROP FUNCTION metaphon;
mysql> DROP FUNCTION myfunc_double;
mysql> DROP FUNCTION myfunc_int;
mysql> DROP FUNCTION lookup;
mysql> DROP FUNCTION reverse_lookup;
mysql> DROP FUNCTION avgcost;
```

CREATE FUNCTION DROP FUNCTION mysql func mysq
INSERT DELETE

CREATE FUNCTION DROP

mysqld

CREATE FUNCTIONDROP FUNCTION--skip-grant-tables
UDFUDF

27.2.3.6.

MySQL

INSERT CREATE FUNCTION DELETE DRO
mysql.func

xxx()xxx UDF xxx_init(),
xxx_add() **mysqld** xxxUDF--allow-suspicious-udfs
UDFUDF--allow-suspicious-udfs

UDF MySQLCREATE
UDF [27.2.3.5“”]

27.2.4.

MySQLMySQLMySQL

MySQL

1. lex.hsql_functions[]

2. lex.h SYM
   item_create.cc "ABS" create_f

   sql_yacc.yy
   sql_yacc.yy ATAN

3. item_func.hItem_num_func Item_str_func

4. item_func.cc

```
double   Item_func_newname::val()
longlong Item_func_newname::val_int()
String  *Item_func_newname::Str(String *str)
```

   Item_num_funcItem_str_func

5.

```
void Item_func_newname::fix_length_and_dec()
```

max_length max_length NULL maybe_nu
maybe_null NULLItem_func_mod::fix_length_and_dec

::val(), ::val_int()::str()NULLnull_value1,0

::str() :

- *str sql_string.h
- NULL::str() (char*) 0
-

27.3. MySQL

27.3.1.
27.3.2.

MySQLC++GROUP

mylua LUA **mysq**

27.3.1.

analyse([*max_elements*,[*max_memory*]])

sql/sql_analyse.cc

- *max_elements* (256) analyse analyse
- *max_memory* (8192) analyse i

```
SELECT ... FROM ... WHERE ... PROCEDURE ANALYSE([max_elements,[max_m
```

27.3.2.

- sql/sql_analyse.cc
- sql/procedure.h
- sql/procedure.cc
- sql/sql_select.cc

A

A.1.
A.2. MySQL
A.2.1.
A.2.2. [local] MySQL
A.2.3.
A.2.4.
A.2.5. hos *t_name*
A.2.6.
A.2.7.
A.2.8. MySQL
A.2.9.
A.2.10.
A.2.11.
A.2.12.
A.2.13.
A.2.14.
A.2.15. tbl_na *me*
A.2.16.
A.2.17.
A.3.
A.3.1. MySQL
A.3.2. MySQL
A.3.3.
A.4.
A.4.1.
A.4.2. MySQL
A.4.3. MySQL
A.4.4. MySQL
A.4.5. MySQL/tmp/mysql.sock
A.4.6.
A.5.
A.5.1.
A.5.2. DATE

A.5.3. NULL
A.5.4.
A.5.5.
A.5.6.
A.5.7.
A.5.8.
A.6.
A.7.
A.7.1. ALTER TABLE
A.7.2.
A.7.3. TEMPORARY TABLE
A.8. MySQL
A.8.1. MySQL

A.1.

· CPU

1. Caps Lock Caps Lock

2.

3. Ping

4. MySQL

5.

ECC

· kbd_mode –a

· /var/log/messages MySQL MySQL 5.11“MySQL”

· **topps** CPU

· **topdf**

·

MySQLMySQL +3.

MySQL“”

“”

·

- CPU **top**.
- **mysqld** **mysqladmin -u root pingmysqladmin -u root processlist**
- MySQL mysql

1.7.1.2“”

A.2. MySQL

A.2.1. _____
A.2.2. [local] MySQL _____
A.2.3. _____
A.2.4. _____
A.2.5. hos_____*t_name*
A.2.6. _____
A.2.7. _____
A.2.8. MySQL _____
A.2.9. _____
A.2.10. _____
A.2.11. _____
A.2.12. _____
A.2.13. _____
A.2.14. _____
A.2.15. tbl_na_*me*
A.2.16. _____
A.2.17. _____

MySQL MySQL

A.2.1.

MySQL 5.7.8

A.2.2. [local] MySQL

A.2.2.1. WindowsMySQL _____

UnixMySQL**mysqld** /tmp/mysql.sockUnix TCP/IP UnixTCP/IP localhostUnix

MySQLWindows 9xMe TCP/IP Windows NT2000XP2003 --enable-named-pipe MySQLmysqld MySQL TCP/IP“ .” Windows

(2002)“…” MySQL UnixTCP/IP

mysqld Unix**ps xa | grep mysqld**Windows 2.9.2.3“ MySQL”

mysqld Unix host_ipIP

```
shell> mysqladmin version
shell> mysqladmin variables
shell> mysqladmin -h `hostname` version variables
shell> mysqladmin -h `hostname` --port=3306 version
shell> mysqladmin -h host_ip version
shell> mysqladmin --protocol=socket --socket=/tmp/mysql.sock version
```

“ `”“‘” **mysqladmin** Windows“ `” -h TCP/IP-h 127.0.0.1

“ MySQL”

1. **Mysqld mysqld**
2. TCP/IPWindowsMySQL A.2.2.1“WindowsMySQL”
3. MIT-pthreads **mysqld**MIT-pthreads 2.1.1“MySQL” MIT-pthreadsUnix
4. shell> **mysqladmin -h `hostname` version**
5. **mysqld**Unix /tmp/mysql.sock /tmp**cron** **mysqladmin version** **mysqladmin**Unix **cron** mysql.sock A.4.5“MySQL /tmp/mysql.sock ”
6. --socket=/path/to/socket**mysqld** MySQL —socket mysql.sock
7. shell> **netstat -ln | grep mysql**

A.4.5“MySQL/tmp/mysql.sock ”

8. Linux1 MySQL **mysqld** killmysql_zap A.4.2 “MySQL”

9. Unix –socket**mysqld**

“ some_hostMySQL”

· “ telnet some_host 3306” 3306MySQL 1MySQL “ telnet::”

· Unix **mysqladmin -h localhost variables** TCP/IP port

· **mysqld**--skip-networking TCP/IP

· MySQL ZoneAlarmWindows XP MySQL

A.2.2.1. WindowsMySQL

TCP/IPWindowsMySQL“ MySQL” Windows

Windows5000 TCP TIME_WAIT120

TCP5000 TIME_WAITTCP

· TCP

· Windows

Windows Microsoft
http://support.microsoft.com/kb/256986/EN-US/

· Regedt32.exe

·

· HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Service

· “”“”

· Value Name: MaxUserPort

· Data Type: REG_DWORD

· Value: 65534

500065534 0x13885000

· “”“”

· Value Name: TcpTimedWaitDelay

· Data Type: REG_DWORD

· Value: 30

TCPTIME_WAIT 0300 0x78120

·

·

A.2.3.

MySQL 5.1 4.1 4.1

```
shell> mysql
```

MySQL

· 4.1.1

· 4.1 4.1

· 4.1 4.1 SET PASSWORDOLD_PASSWORD()

```
· mysql> SET PASSWORD FOR
· -> 'some_user'@'some_host' = OLD_PASSWORD('newp
```

UPDATEFLUSH PRIVILEGES

```
mysql> UPDATE mysql.user SET Password = OLD_PASSWORD('newpwd')
    -> WHERE Host = 'some_host' AND User = 'some_user';
mysql> FLUSH PRIVILEGES;
```

“ *newpwd*” MySQL

.

1. “ --old-passwords” **mysqld**
2. 4.1
3. `mysql> SELECT Host, User, Password FROM mysql.use`
4. `-> WHERE LENGTH(Password) > 16;`

HostUser OLD_PASSWORD()SET PASSWORDUPDATE

PHP mysqlMySQL 4.1.1 PHP MySQL 4.1mysql MySQL mysqli “MySQL”PHP 5 MySQL 4.1 MySQLMySQL mysqli http://php.net/mysqli

5.7.9“MySQL 4.1”

A.2.4.

“ —password”“-p” MySQL

```
shell> mysql -u user_name -p
Enter password:
```

“ Enter password:” 8 MySQL MySQL8

A.2.5. hos *t_name*

mysqld“ *host_name*”

`'host_name'`

```
'mysqladmin flush-hosts'
```

max_connect_errors max_connect_errors **mysqld** **mysqladmin flush-hosts** FLUSH HOSTS5.3.3“”

mysqld10

```
shell> mysqld_safe --max_connect_errors=10000 &
```

TCP/IP max_connect_errors

A.2.6.

mysqld“”

max_connections 100 **mysqld**

mysqldmax_connections+1 SUPER SUPER SHOW PROCESSLIST 13.5.4.16“SHOW PROCESSLIST”

MySQL LinuxSolaris500-1000 RAM MySQL ABLinux4000

A.2.7.

mysql **mysql**

```
mysql: Out of memory at line 42, 'malloc.c'
mysql: needed 8136 byte (8k), memory in use: 12481367 bytes (12189k)
  2008: MySQL client ran out of memory
```

“ --quick” **mysql** mysql_use_result() C API

A.2.8. MySQL

MySQL

CR_SERVER_GONE_ERROR	
CR_SERVER_LOST	

8 **mysqld** wait_timeout5.3.3“” .

1 mysql

MySQL

· db KILL**mysqladmin kill**

.

· TCP/IP mysql_options(..., MYSQL_OPT_READ_TIMEOUT,...) mysql_options(..., MYSQL_OPT_WRITE_TIMEOUT,...)

· MYSQL0

· Windows wait_timeout

Windows TCP/IP MySQL

MYSQL1MySQL

mysql_ping MyODBC **mysqld**wait_timeout

· **mysqld** BLOB max_allowed_packet 1MB A.2.9“”

· 4.0.84.0.816MB

· MySQL“ --skip-networking” MySQL

.

mysqladmin version **mysqld** A.4.2“MySQL”

“ --log-warnings=2”mysqld hostname.err5.11.1“”

1. MySQL A.4.2“MySQL”
2. **mysqld**CHECK TABLE E.1.6“”
3. MySQL wait_timeout **mysqladmin variables**
4. “ --log” **mysqld**

A.2.10“”

1.7.1.2“”

A.2.9.

MySQLSQL

MySQL 5.11GB

MySQL**mysqld**max_allowed_packet “” “MySQL”

max_allowed_packet

mysql max_allowed_packet16MB **mysql**

```
mysql> mysql --max_allowed_packet=32M
```

32MB

max_allowed_packet1MB BLOB 16MB

```
mysql> mysqld --max_allowed_packet=16M
```

max_allowed_packet16MB

```
[mysqld]
```

```
max_allowed_packet=16M
```

mysqldmysqld

BLOB **mysqld** **mysqld_safeulimit -d 256000mysqld**

A.2.10.

5.11.1“” “ --log-warnings”

```
010301 14:38:23  Aborted connection 854 to db: 'users' user: 'josh'
```

“ Aborted connections”

1. mysql_close()
2. wait_timeoutinteractive_timeout 5.3.3“”
3.

“ Aborted_clients”

“ Aborted_clients”

.

.

.

· connect_timeout 5.3.3“”

· Linux Linux FTP burst-pause-burst-pause --- Linux Hub/

.

· TCP/IP

· Hub

· max_allowed_packet**mysqld** A.2.9“”

A.2.8“MySQL”

A.2.11.

· 3.23MySQL“” tmp_table_size “ -O tmp_table_size=*val*” **mysqld** SQLSQL_BIG_TABLES13.5.3“SET ”

“ --big-tables” **mysqld**SQL_BIG_TABLES

MySQL 3.23“” tmp_table_sizeMyISAM

· InnoDB InnoDB InnoDB 15.2.7“InnoDB ”

· 2GBISAMMyISAM

· MyISAM MAX_ROWS MySQLmyisam_data_pointer_size 6 65536TB 5.3.3“”

/

```
SHOW TABLE STATUS FROM database LIKE 'tbl_name';
```

myisamchk -dv /path/to/table-index-file

ALTER TABLE

```
ALTER TABLE tbl_name MAX_ROWS=1000000000 AVG_ROW_LENGTH=nnn;
```

BLOBTEXTAVG_ROW_LENGTH MySQL

A.2.12.

MySQL

```
/    '\\sqla3fe_0.ism'
```

Windows Unix

“ --tmpdir” **mysqld**[mysqld] C:\temp

```
[mysqld]
tmpdir=C:/temp
```

C:\temp MySQL [4.3.2“”]

MySQLtmpdir

perror

```
shell> perror 28
```

```
28
```

A.2.13.

“”

mysql_use_result()mysql_free_result() mysql_use_result() mysql_store_result()

A.2.14.

mysqld

'*some_user*'@'*some_host*'

1. **mysqldmysqlshow mysql user**Password 16 /add_long_password

2. 8“ --old-protocol” **mysqld**“ --old-protocol” **mysqld**

3. PASSWORD() **mysql** PASSWORD()

```
4.          mysql> UPDATE user SET Password=PASSWORD('newpwd')
5.              -> WHERE User='some_user' AND Host='some_host';
```

A.2.15. tbl_na *me*

```
'tbl_name'
      'tbl_name' (errno: 2)
```

· MySQL

· Windows

SHOW TABLES13.5.4“SHOW”

A.2.16.

```
MySQL              charset_name
```

· “ --with-charset=*charset_name*”“ --with-extra-charsets=*charset_name*” **configure** 2.8.2“ ”

MySQL“ --with-extra-character-sets=complex” 5.10.1“”

· **mysqld**

1. 2.8.2“ ”

2. “ --character-sets-dir”

3.

A.2.17.

“ ERROR '...'(errno: 23)”“ ... (errno: 24)”MySQLerrno 23errno 24 MySQL**perror**

```
shell> perror 23
    23
shell> perror 24
    24
shell> perror 11
    11
```

mysqld **mysqld** **mysqld**

mysqld table_cache 64 max_connections 100

mysqld **mysqld_safe**“ --open-files-limit” MySQL 3.23.30 open_files_limit 5.3.3“” 1 4.3.2“” **mysqld** **mysqld_safe** 1**ulimit -n 256**‘#’ 256**mysqld**

“--open-files-limit”**ulimit** 1“” **mysqld_safemysqld** “ --user”

tcsh shell**ulimit** **tcsh** **shmysqld_safe**

A.3.

A.3.1. MySQL
A.3.2. MySQL
A.3.3.

A.3.1. MySQL

MySQL mysql_

```
/tmp/ccFKsdPa.o:    `main':
/tmp/ccFKsdPa.o(.text+0xb): `mysql_init'
/tmp/ccFKsdPa.o(.text+0x31): `mysql_real_connect'
/tmp/ccFKsdPa.o(.text+0x57): `mysql_real_connect'
/tmp/ccFKsdPa.o(.text+0x69): `mysql_error'
/tmp/ccFKsdPa.o(.text+0x9a): `mysql_close'
```

“ -Ldir_path -lmysqlclient” dir_path

```
shell> mysql_config --libs
```

mysql_config

-lz

connect

```
mf_format.o(.text+0x201): `__lxstat'
```

MySQL100 MySQL MySQL2.8“MySQL”

MySQL mysql_ mysqlclientlibmysqlclient.so

· libmysqlclient.soLD_LIBRARY_PATH

· libmysqlclient.soLD_LIBRARY

· libmysqlclient.so /libldconfig

“ -static” MySQL 2

A.3.2. MySQL

Windows Windows

Unix MySQL**mysqld** Unix **mysqld**Unix*user_name*

mysqladmin shutdown

user_name Unix

```
shell> chown -R user_name /path/to/mysql/datadir
```

user_name

MySQL chown –R

user_name MySQL 3.22 Unix**mysqld**--user=*user_name* **mysqld** Unix*user_name*

/etc/my.cnfmy.cnf[mysqld]

```
[mysqld]
user=user_name
```

Unix MySQL“ --user=root” **mysql** MySQL 2.9“”

A.3.3.

mysqldUMASK MySQL

```
ERROR: 'path/with/filename.frm' (Errcode: 13)
```

UMASK0660**mysqld_safe**

```
shell> UMASK=384  # = 600 in octal
shell> export UMASK
shell> mysqld_safe &
```

MySQL0700RAID UMASK_DIR UMASKUMASK_DIR

```
shell> UMASK_DIR=504  # = 770 in octal
shell> export UMASK_DIR
shell> mysqld_safe &
```

MySQL 3.23.25 0 MySQLUMASKUMASK_DIR

F

A.4.

A.4.1.
A.4.2. MySQL
A.4.3. MySQL
A.4.4. MySQL
A.4.5. MySQL/tmp/mysql.sock
A.4.6.

A.4.1.

MySQL 5.6.1“”

Windows Unix

Windows

MySQL Windows

-> -> ->

MySQL

1

```
SET PASSWORD FOR 'root'@'localhost' = PASSWORD('MyNewPassword');
```

C:\mysql-init.txt

DOS

-> -> cmd

MySQLC:\mysqlMySQL

DOS

```
C:\> C:\mysql\bin\mysqld-nt --init-file=C:\mysql-init.txt
```

“ --init-file” C:\mysql-init.txt

MySQLMySQL“ --defaults-file”

```
C:\> C:\Program Files\MySQL\MySQL Server 5.1\bin\mysqld-nt.exe
         --defaults-file="C:\Program Files\MySQL\MySQL Server 5.1\my
         --init-file=C:\mysql-init.txt
```

“ --defaults-file”

```
    ->    ->    ->
```

MySQL“” Path “--defaults-file”

MySQL Windows

Unix

Unix mysqld

ID.pid /var/lib/mysql//var/run/mysqld//usr/local/mysql/data/ .pid mysqld

.pid **mysqld**kill kill -9 MySQL

```
shell> kill `cat /mysql-data-directory/host_name.pid`
```

cat“ `”“’” catkill

1

```
SET PASSWORD FOR 'root'@'localhost' = PASSWORD('MyNewPassword');
```

~/mysql-init

“ --init-file=~/mysql-init” MySQL

```
shell> mysqld_safe --init-file=~/mysql-init &
```

init-file ~/mysql-init

mysql

mysqld“ --skip-grant-tables --user=root”Windows--user=root

mysqld

```
shell> mysql -u root
```

mysql

```
mysql> UPDATE mysql.user SET Password=PASSWORD('newpwd')
    -> WHERE User='root';
mysql> FLUSH PRIVILEGES;
```

“ *newpwd*”

A.4.2. MySQL

MySQL MySQL

mysqld **mysqladmin versionmysqld** **mysqld** 5.11.1 “”

mysqld resolve_stack_dumpE.1.4“” 100

SQL MySQLwrite()“ --delay-key-write” mysqld “ --f

MySQL

mysqld1 **mysqld**

mysqld

mysqld lockd“ --skip-external-locking”

mysqld

ALTER TABLE

mysqladmin shutdownmysqld **myisamchk --silent --force */*.MYI**
MyISAM **mysqld** 5

“ --log” **mysqld** 95% 1 5.11.2“” MySQL
1.7.1.3“”

E.1.6“”

mysql-testMySQL 27.1.2“MySQL” MySQL sql-bench
MySQLsql-bench

fork_big.pl

MySQL MySQL 1 **configure**“ --with-
debug”“ --with-debug=full” MySQL E.1“MySQL”

mysqld“ --skip-external-locking” lockd “--skip-external-locking”
mysqld 2**mysqld** **myisamchk**

mysqld **mysqladmin -u root processlist** **mysqld**
mysqladmin -u root processlist

mysqladmin -i 5 statusmysqladmin -i 5 -r status

gdb **mysqld**E.1.3“gdbm **ysqld**”

3backtrace **gdb** mysqldgdb

```
backtrace
info local
up
info local
up
info local
```

gdbinfo N NID

Perl MySQL

1.7.1.3“” MySQL

VARCHAR BLOBTEXT ALTER TABLEVARCHARCHAR MySQL

MySQL AB

RAM

A.4.3. MySQL

MySQL“”“”“”“”

MyISAM “row”“ record”“ event”

MySQL

mysqladmin kill1

“”

REPAIR TABLEOPTIMIZE TABLE LOAD DATA INFILEALTER TABLE MySQL ALTER TABLE

A.4.4. MySQL

MySQLTMPDIR TMPDIRMySQL /tmp/var/tmp/usr/tmp mysqld“ —tmpdir” 1

MySQL 5.1“ —tmpdir” Unix “:” WindowsNetWareOS/2 “;”

MySQL“ --tmpdir” LOAD DATA INFILE

MySQL **mysqld**

ORDER BYGROUP BY MySQL1

```
(length of what is sorted + sizeof(row pointer))
* number of matched rows
* 2
```

“row pointer” 4

SELECT MySQLSQL SQL_*

ALTER TABLE

A.4.5. MySQL/tmp/mysql.sock

Unix /tmp/mysql.sock Unix /tmp

Unix /tmp /tmp

```
shell> chmod +t /tmp
```

ls -ld /tmp “t”

Unix

/etc/my.cnf

```
[mysqld]
socket=/path/to/socket

[client]
socket=/path/to/socket
```

4.3.2“”

mysqld_safe“--socket”

MYSQL_UNIX_PORTUnix

MySQLUnix **configure**“ --with-unix-socket-path” 2.8.2“ ”

```
shell> mysqladmin --socket=/path/to/socket version
```

A.4.6.

SELECT NOW() GMT UNIX_TIMESTAMP()
mysqld_safemysql.server F

mysqld_safe“ --timezone=*timezone_name*” mysqld TZ

“--timezone” TZ

A.5.

A.5.1.
A.5.2. DATE
A.5.3. NULL
A.5.4.
A.5.5.
A.5.6.
A.5.7.
A.5.8.

A.5.1.

MySQL czech *col_name* LIKE 'a%' Aa latin1 COLLATE1latin1_general_cslatin1_bin

```
col_name COLLATE latin1_general_cs LIKE 'a%'

col_name LIKE 'a%' COLLATE latin1_general_cs

col_name COLLATE latin1_bin LIKE 'a%'

col_name LIKE 'a%' COLLATE latin1_bin
```

13.1.5“CREATE TABLE”

>=, >, =, <, <=, “”‘ E’, ‘e

A.5.2. DATE

DATE'YYYY-MM-DD'SQL UPDATESELECTWHERE

```
mysql> SELECT * FROM tbl_name WHERE date >= '2003-05-05';
```

MySQL TIMESTAMPDATEDATETIMEWHERE “”“” '2004-08-15"2004#08#15' M

<<==>=>BETWEENDATETIMEDATETIMETIMESTAMP MySQL “”

DATETIMEDATETIMETIMESTAMP

INSTRCMP()

'0000-00-00"0000-00-00' MyODBC'0000-00-00' MyODBC 2.50.12 NULLODBC

MySQL

```
mysql> INSERT INTO tbl_name (idate) VALUES (19970505);
mysql> INSERT INTO tbl_name (idate) VALUES ('19970505');
mysql> INSERT INTO tbl_name (idate) VALUES ('97-05-05');
mysql> INSERT INTO tbl_name (idate) VALUES ('1997.05.05');
mysql> INSERT INTO tbl_name (idate) VALUES ('1997 05 05');
mysql> INSERT INTO tbl_name (idate) VALUES ('0000-00-00');

mysql> SELECT idate FROM tbl_name WHERE idate >= '1997-05-05';
mysql> SELECT idate FROM tbl_name WHERE idate >= 19970505;
mysql> SELECT MOD(idate,100) FROM tbl_name WHERE idate >= 19970505;
mysql> SELECT idate FROM tbl_name WHERE idate >= '19970505';

mysql> SELECT idate FROM tbl_name WHERE STRCMP(idate,'20030505')=0;
```

STRCMP() idate'YYYY-MM-DD' '20030505"2003-05-05'

ALLOW_INVALID_DATES SQL MySQL MySQL131 112

MySQLWeb

NO_ZERO_IN_DATE SQL“”“” 0DATE

NO_ZERO_DATE SQL MySQL'0000-00-00'“” NULL

“ 0” DATE '0000-00-00'

MySQL IGNORE sql_mode "NO_ZERO_IN_DATE,NO_ZERO_DATE"

A.5.3. NULL

SQL NULL NULL"

```
mysql> INSERT INTO my_table (phone) VALUES (NULL);
mysql> INSERT INTO my_table (phone) VALUES ('');
```

phone 1NULL 2 1“” 2“”

NULL IS NULLIS NOT NULLIFNULL()

SQL NULL NULL“” NULLNULL NULL

```
mysql> SELECT NULL, 1+NULL, CONCAT('Invisible',NULL);
```

NULL expr = NULL expr = NULL“”

```
mysql> SELECT * FROM my_table WHERE phone = NULL;
```

NULL IS NULL NULL

```
mysql> SELECT * FROM my_table WHERE phone IS NULL;
mysql> SELECT * FROM my_table WHERE phone = '';
```

3.3.4.6“NULL”

MyISAMInnoDBBDBMEMORY NULL1 NOT NULLNULL

LOAD DATA INFILE " NULL \N“ NULL” 13.2.5 “LOAD DATA INFILE”

DISTINCTGROUP BYORDER BY NULL

ORDER BY NULL DESC NULL

COUNT()MIN()SUM()NULL COUNT(*) age NULL

```
mysql> SELECT COUNT(*), COUNT(age) FROM person;
```

MySQLNULL NULLTIMESTAMP NULLAUTO_INCREMENT

A.5.4.

GROUP BYORDER BYHAVING

```
SELECT SQRT(a*b) AS root FROM tbl_name GROUP BY root HAVING root > 0
SELECT id, COUNT(*) AS cnt FROM tbl_name GROUP BY id HAVING cnt > 0;
SELECT id AS 'Customer identity' FROM tbl_name;
```

SQLWHERE WHERE

```
SELECT id, COUNT(*) AS cnt FROM tbl_name WHERE cnt > 0 GROUP BY id;
```

WHEREGROUP BY HAVING

A.5.5.

ROLLBACK 1

ROLLBACK

mysqld **mysqld** MyISAM

```
SHOW TABLE STATUS LIKE 'tbl_name';
SHOW CREATE TABLE tbl_name;
```

13.5.4.18“SHOW TABLE STATUS 13.5.4.5“SHOW CREATE TABL
”

mysqld

```
SHOW ENGINES;
```

```
SHOW VARIABLES LIKE 'have_%';
```

InnoDB have_innodb

13.5.4.8“SHOW ENGINES” 13.5.4.21“SHOW VARIABLES”

A.5.6.

related_tableDELETE1MB max_allowed_packet DELETE related_column 1001000related_column DELETE related_column IN

A.5.7.

EXPLAIN 7.2.1“EXPLAINSELECT ”

WHERE

11 LIMIT 10

SELECT

FLOATDOUBLE (=) FLOATDOUBLE A.5.8 “”

“ mysql test < query.sql” **mysqldump --quick db_name *tbl_name_1* ... *tbl_name_n* > query.sql** SELECT

```
shell> mysqladmin create test2
shell> mysql test2 < query.sql
```

mysqlbugMySQL [1.7.1.1“The MySQL”]

A.5.8.

DOUBLEFLOAT MySQL64DECIMAL DECIMA

DOUBLE

```
mysql> CREATE TABLE t1 (i INT, d1 DOUBLE, d2 DOUBLE);
mysql> INSERT INTO t1 VALUES (1, 101.40, 21.40), (1, -80.00, 0.00),
    -> (2, 0.00, 0.00), (2, -13.20, 0.00), (2, 59.60, 46.40),
    -> (2, 30.40, 30.40), (3, 37.00, 7.40), (3, -29.60, 0.00),
    -> (4, 60.00, 15.40), (4, -10.60, 0.00), (4, -34.00, 0.00),
    -> (5, 33.00, 0.00), (5, -25.80, 0.00), (5, 0.00, 7.20),
    -> (6, 0.00, 0.00), (6, -51.40, 0.00);

mysql> SELECT i, SUM(d1) AS a, SUM(d2) AS b
    -> FROM t1 GROUP BY i HAVING a <> b;

+------+-------+------+
| i    | a     | b    |
+------+-------+------+
|    1 |  21.4 | 21.4 |
|    2 |  76.8 | 76.8 |
|    3 |   7.4 |  7.4 |
|    4 |  15.4 | 15.4 |
```

```
|    5 |   7.2 |  7.2 |
|    6 | -51.4 |    0 |
+------+-------+------+
```

5ab

d1d2DECIMALDOUBLESELECT1 1

A.6.

MySQL MySQL MySQL“”

MySQL“” MySQL

EXPLAINMySQL SELECTEXPLAIN

```
mysql> EXPLAIN SELECT * FROM t1, t2 WHERE t1.i = t2.i;
```

EXPLAIN 7.2.1“EXPLAINSELECT ”

ANALYZE TABLE *tbl_name* 13.5.2.1“ANALYZE TABLE”

FORCE INDEXMySQL 13.2.7“SELECT”

```
SELECT * FROM t1, t2 FORCE INDEX (index_for_column)
WHERE t1.col_name=t2.col_name;
```

USE INDEXIGNORE INDEX

STRAIGHT_JOIN13.2.7“SELECT”

“ --max-seeks-for-key=1000”**mysqld**“SET max_seeks_for_key=1000”
1000 5.3.3“”

A.7.

A.7.1. ALTER TABLE
A.7.2.
A.7.3. TEMPORARY TABLE

A.7.1. ALTER TABLE

ALTER TABLE ALTER TABLE 2 REPAIR TABLE

ALTER TABLE ALTER TABLEMySQL A-*xxx*B-*xxx*

```
Error on rename of './database/name.frm'
to './database/B-xxx.frm' (Errcode: 17)
```

MySQL A-B-

ALTER TABLE

- A-*xxx*
- A-*xxx*
- B-*xxx*
- A-*xxx*
- B-*xxx*

MySQL MySQLB-*xxx*

ALTER TABLEWindowsOS/2 LOCK TABLE ALTER TABLE InnoDB

A.7.2.

SQL 1 *col_name1col_name2col_name3* 2 *col_name1col_name3col_name2*

```
mysql> SELECT col_name1, col_name2, col_name3 FROM tbl_name;
mysql> SELECT col_name1, col_name3, col_name2 FROM tbl_name;
```

1.
2.

```
mysql> INSERT INTO new_table
    -> SELECT columns-in-new-order FROM old_table;
```

3. old_table
4.

```
mysql> ALTER TABLE new_table RENAME old_table;
```

SELECT * SELECT *

A.7.3. TEMPORARY TABLE

TEMPORARY

- TEMPORARYHEAPISAMMyISAMMERGEInnoDB
- TEMPORARY1

```
mysql> SELECT * FROM temp_table, temp_table AS t2;
```

```
1137         'temp_table'
```

- SHOW TABLESTEMPORARY
- RENAMETEMPORARY ALTER TABLE

```
mysql> ALTER TABLE orig_name RENAME new_name;
```

A.8. MySQL

A.8.1. MySQL

MySQL

2.12“” E

A.8.1. MySQL

- NULLALL/ANY/SOME NULLTRUEFALSEMySQL 5.1
- IN“ =”
- lower_case_table_names=2 MySQL DATABASE() MySQL
- FOREIGN KEY
- REPLACE REPLACELOAD DATAON DELETE CASCADE
- DISTINCT GROUP_CONCAT() DISTINCTORDER BY
- 1 11 DROP TABLE DROP TABLE
- $2^{63}2^{64}–1$
- FLUSH TABLES WITH READ LOCKCOMMIT
- BDBANALYZE TABLE **mysqld** MySQL

```
001207 22:07:56  bdb:  log_flush: LSN past current end-of-log
```

- BDB ALTER TABLE
- INSERT DELAYED ANALYZE TABLEOPTIMIZE TABLEREPAIR TABLE
- LOCK TABLE ...FLUSH TABLES ...
- BDB BDB “-A” mysql
-

- 0NULLAUTO_INCREMENTCREATE ... SELECTINSERT ...

SELECT

- DELETEON DELETE CASCADE
- REPLACE ... SELECTINSERT IGNORE ... SELECT

ORDER BY

ORDER BYINSERT ... SELECTSELECT AUTO_INCREMENT

-
- MySQLkey_buffer_size
- MySQL

mysqlbinlog|mysql

ORDER BY

MySQL ORDER BY

- “ --log-bin=*old_host_name*-bin” binlog 5.3.1“ **mysqld**”
- **Mysqlbinlog**LOAD DATA INFILE8.6“mysqlbinlog”
- RENAMETEMPORARY MERGE
- 255CHAR(255) 5.1
- SET CHARACTER SET
- LIKE ... ESCAPEESCAPE‘_’‘ %’
- 1DECIMAL +01.001.0001.00 GROUP BY
- MIT-pthreads MIT-pthreads 2.8.5 “MIT-pthreads”
- GROUP BYORDER BYDISTINCT BLOBTEXT BLOB max_sort_length max_sort_length1024
- BIGINTDOUBLE 64 BIGINT IFELT()BIGINTDOUBLE DOUBLE 639223372036854775807 long
- 1 255ENUMSET
- MIN()MAX() MySQLENUMSET
- **mysqld_safemysqldmysqld** 1 **mysqladmin refresh** stdoutstderr “ --log”**mysqld_safe***host_name*.err*host_name*.log**mysqladmin**

refresh

- UPDATE KEY21

```
mysql> UPDATE tbl_name SET KEY=KEY+1,KEY=KEY+1;
```

- 1

```
mysql> SELECT * FROM temp_table, temp_table AS t2;
```

```
1137          'temp_table'
```

- “” DISTINCT DISTINCT DISTINCT

```
SELECT DISTINCT mp3id FROM band_downloads
       WHERE userid = 9 ORDER BY id DESC;
```

```
SELECT DISTINCT band_downloads.mp3id
       FROM band_downloads,band_mp3
       WHERE band_downloads.userid = 9
       AND band_mp3.id = band_downloads.mp3id
       ORDER BY band_downloads.id DESC;
```

2 MySQL3.23.x2 ID

ORDER BY

- PROCEDURE PROCEDURE
- MERGE
- ALTER TABLEMERGEUNIQUE MERGE UNIQUE ALTER TABLEUNIQUE

B

B.1.
B.2.

MySQL

B.1.

· share/errmsg.txt“ %d”“%s”

· share/errmsg.txt include/mysqld_error.hinclude/mysqld_ername.h MySQL

· SQLSTATEshare/errmsg.txt include/sql_state.h MySQL

· 1000 SQLSTATE: HY000 (ER_HASHCHK)

hashchk

· 1001 SQLSTATE: HY000 (ER_NISAMCHK)

isamchk

· 1002 SQLSTATE: HY000 (ER_NO)

NO

· 1003 SQLSTATE: HY000 (ER_YES)

YES

· 1004 SQLSTATE: HY000 (ER_CANT_CREATE_FILE)

'%s' (errno: %d)

· 1005 SQLSTATE: HY000 (ER_CANT_CREATE_TABLE)

'%s' (errno: %d)

· 1006 SQLSTATE: HY000 (ER_CANT_CREATE_DB)

'%s' (errno: %d)

- 1007 SQLSTATE: HY000 (ER_DB_CREATE_EXISTS)

'%s'

- 1008 SQLSTATE: HY000 (ER_DB_DROP_EXISTS)

'%s'

- 1009 SQLSTATE: HY000 (ER_DB_DROP_DELETE)

'%s'errno: %d

- 1010 SQLSTATE: HY000 (ER_DB_DROP_RMDIR)

can't rmdir '%s', errno: %d

- 1011 SQLSTATE: HY000 (ER_CANT_DELETE_FILE)

'%s' (errno: %d)

- 1012 SQLSTATE: HY000 (ER_CANT_FIND_SYSTEM_REC)

- 1013 SQLSTATE: HY000 (ER_CANT_GET_STAT)

'%s'(errno: %d)

- 1014 SQLSTATE: HY000 (ER_CANT_GET_WD)

(errno: %d)

- 1015 SQLSTATE: HY000 (ER_CANT_LOCK)

(errno: %d)

- 1016 SQLSTATE: HY000 (ER_CANT_OPEN_FILE)

'%s' (errno: %d)

- 1017 SQLSTATE: HY000 (ER_FILE_NOT_FOUND)
  '%s' (errno: %d)
- 1018 SQLSTATE: HY000 (ER_CANT_READ_DIR)
  '%s' (errno: %d)
- 1019 SQLSTATE: HY000 (ER_CANT_SET_WD)
  '%s' (errno: %d)
- 1020 SQLSTATE: HY000 (ER_CHECKREAD)
  '%s'
- 1021 SQLSTATE: HY000 (ER_DISK_FULL)
  (%s)...
- 1022 SQLSTATE: 23000 (ER_DUP_KEY)
  '%s'
- 1023 SQLSTATE: HY000 (ER_ERROR_ON_CLOSE)
  '%s' (errno: %d)
- 1024 SQLSTATE: HY000 (ER_ERROR_ON_READ)
  '%s' (errno: %d)
- 1025 SQLSTATE: HY000 (ER_ERROR_ON_RENAME)
  '%s''%s' (errno: %d)
- 1026 SQLSTATE: HY000 (ER_ERROR_ON_WRITE)
  '%s' (errno: %d)
- 1027 SQLSTATE: HY000 (ER_FILE_USED)

'%s'

· 1028 SQLSTATE: HY000 (ER_FILSORT_ABORT)

· 1029 SQLSTATE: HY000 (ER_FORM_NOT_FOUND)

'%s''%s'

· 1030 SQLSTATE: HY000 (ER_GET_ERRNO)

%d

· 1031 SQLSTATE: HY000 (ER_ILLEGAL_HA)

'%s'

· 1032 SQLSTATE: HY000 (ER_KEY_NOT_FOUND)

'%s'

· 1033 SQLSTATE: HY000 (ER_NOT_FORM_FILE)

'%s'

· 1034 SQLSTATE: HY000 (ER_NOT_KEYFILE)

'%s'

· 1035 SQLSTATE: HY000 (ER_OLD_KEYFILE)

'%s'

· 1036 SQLSTATE: HY000 (ER_OPEN_AS_READONLY)

'%s'

· 1037 SQLSTATE: HY001 (ER_OUTOFMEMORY)

%d

· 1038 SQLSTATE: HY001 (ER_OUT_OF_SORTMEMORY)

· 1039 SQLSTATE: HY000 (ER_UNEXPECTED_EOF)
'%s'EOF (errno: %d)

· 1040 SQLSTATE: 08004 (ER_CON_COUNT_ERROR)

· 1041 SQLSTATE: HY000 (ER_OUT_OF_RESOURCES)
mysqld 'ulimit'mysqld

· 1042 SQLSTATE: 08S01 (ER_BAD_HOST_ERROR)

· 1043 SQLSTATE: 08S01 (ER_HANDSHAKE_ERROR)

· 1044 SQLSTATE: 42000 (ER_DBACCESS_DENIED_ERROR)
'%s'@'%s''%s'

· 1045 SQLSTATE: 28000 (ER_ACCESS_DENIED_ERROR)
'%s'@'%s' %s

· 1046 SQLSTATE: 3D000 (ER_NO_DB_ERROR)

· 1047 SQLSTATE: 08S01 (ER_UNKNOWN_COM_ERROR)

· 1048 SQLSTATE: 23000 (ER_BAD_NULL_ERROR)

'%s'

· 1049 SQLSTATE: 42000 (ER_BAD_DB_ERROR)

'%s'

· 1050 SQLSTATE: 42S01 (ER_TABLE_EXISTS_ERROR)

'%s'

· 1051 SQLSTATE: 42S02 (ER_BAD_TABLE_ERROR)

'%s'

· 1052 SQLSTATE: 23000 (ER_NON_UNIQ_ERROR)

%s'%s'

· 1053 SQLSTATE: 08S01 (ER_SERVER_SHUTDOWN)

· 1054 SQLSTATE: 42S22 (ER_BAD_FIELD_ERROR)

'%s''%s'

· 1055 SQLSTATE: 42000 (ER_WRONG_FIELD_WITH_GROUP)

'%s'GROUP BY

· 1056 SQLSTATE: 42000 (ER_WRONG_GROUP_FIELD)

'%s'

· 1057 SQLSTATE: 42000 (ER_WRONG_SUM_SELECT)

sum

· 1058 SQLSTATE: 21S01 (ER_WRONG_VALUE_COUNT)

- 1059 SQLSTATE: 42000 (ER_TOO_LONG_IDENT)
  ID'%s'
- 1060 SQLSTATE: 42S21 (ER_DUP_FIELDNAME)
  '%s'
- 1061 SQLSTATE: 42000 (ER_DUP_KEYNAME)
  '%s'
- 1062 SQLSTATE: 23000 (ER_DUP_ENTRY)
  %d'%s'
- 1063 SQLSTATE: 42000 (ER_WRONG_FIELD_SPEC)
  '%s'
- 1064 SQLSTATE: 42000 (ER_PARSE_ERROR)
  %d %s'%s'
- 1065 SQLSTATE: 42000 (ER_EMPTY_QUERY)

- 1066 SQLSTATE: 42000 (ER_NONUNIQ_TABLE)
  / '%s'
- 1067 SQLSTATE: 42000 (ER_INVALID_DEFAULT)
  '%s'
- 1068 SQLSTATE: 42000 (ER_MULTIPLE_PRI_KEY)

- 1069 SQLSTATE: 42000 (ER_TOO_MANY_KEYS)

%d

· 1070 SQLSTATE: 42000 (ER_TOO_MANY_KEY_PARTS)

%d

· 1071 SQLSTATE: 42000 (ER_TOO_LONG_KEY)

%d

· 1072 SQLSTATE: 42000 (ER_KEY_COLUMN_DOES_NOT_EXITS)

'%s'

· 1073 SQLSTATE: 42000 (ER_BLOB_USED_AS_KEY)

BLOB'%s'

· 1074 SQLSTATE: 42000 (ER_TOO_BIG_FIELDLENGTH)

'%s' (max = %d)BLOBTEXT

· 1075 SQLSTATE: 42000 (ER_WRONG_AUTO_KEY)

1auto

· 1076 SQLSTATE: HY000 (ER_READY)

%s '%s' '%s' %d

· 1077 SQLSTATE: HY000 (ER_NORMAL_SHUTDOWN)

%s

· 1078 SQLSTATE: HY000 (ER_GOT_SIGNAL)

%s%d

· 1079 SQLSTATE: HY000 (ER_SHUTDOWN_COMPLETE)

%s

· 1080 SQLSTATE: 08S01 (ER_FORCING_CLOSE)

%s%ld '%s'

· 1081 SQLSTATE: 08S01 (ER_IPSOCK_ERROR)

IP

· 1082 SQLSTATE: 42S12 (ER_NO_SUCH_INDEX)

'%s'CREATE INDEX

· 1083 SQLSTATE: 42000 (ER_WRONG_FIELD_TERMINATORS)

· 1084 SQLSTATE: 42000 (ER_BLOBS_AND_NO_TERMINATED)

BLOB 'fields terminated by'

· 1085 SQLSTATE: HY000 (ER_TEXTFILE_NOT_READABLE)

'%s'

· 1086 SQLSTATE: HY000 (ER_FILE_EXISTS_ERROR)

'%s'

· 1087 SQLSTATE: HY000 (ER_LOAD_INFO)

%ld %ld %ld %ld

· 1088 SQLSTATE: HY000 (ER_ALTER_INFO)

%ld %ld

· 1089 SQLSTATE: HY000 (ER_WRONG_SUB_KEY)

· 1090 SQLSTATE: 42000 (ER_CANT_REMOVE_ALL_FIELDS)

ALTER TABLE DROP TABLE

· 1091 SQLSTATE: 42000 (ER_CANT_DROP_FIELD_OR_KEY)

'%s'/

· 1092 SQLSTATE: HY000 (ER_INSERT_INFO)

%ld %ld %ld

· 1093 SQLSTATE: HY000 (ER_UPDATE_TABLE_USED)

FROM'%s'

· 1094 SQLSTATE: HY000 (ER_NO_SUCH_THREAD)

ID%lu

· 1095 SQLSTATE: HY000 (ER_KILL_DENIED_ERROR)

%lu

· 1096 SQLSTATE: HY000 (ER_NO_TABLES_USED)

· 1097 SQLSTATE: HY000 (ER_TOO_BIG_SET)

%sSET

· 1098 SQLSTATE: HY000 (ER_NO_UNIQUE_LOGFILE)

%s.(1-999)

· 1099 SQLSTATE: HY000
(ER_TABLE_NOT_LOCKED_FOR_WRITE)

'%s'READ

· 1100 SQLSTATE: HY000 (ER_TABLE_NOT_LOCKED)

LOCK TABLES'%s'

· 1101 SQLSTATE: 42000 (ER_BLOB_CANT_HAVE_DEFAULT)

BLOB/TEXT'%s'

· 1102 SQLSTATE: 42000 (ER_WRONG_DB_NAME)

'%s'

· 1103 SQLSTATE: 42000 (ER_WRONG_TABLE_NAME)

'%s'

· 1104 SQLSTATE: 42000 (ER_TOO_BIG_SELECT)

SELECTMAX_JOIN_SIZE SELECT WHERESET SQL_BIG_SELECTS=1SET SQL_MAX_JOIN_SIZE=#

· 1105 SQLSTATE: HY000 (ER_UNKNOWN_ERROR)

· 1106 SQLSTATE: 42000 (ER_UNKNOWN_PROCEDURE)

'%s'

· 1107 SQLSTATE: 42000 (ER_WRONG_PARAMCOUNT_TO_PROCEDURE)

'%s'

· 1108 SQLSTATE: HY000 (ER_WRONG_PARAMETERS_TO_PROCEDURE)

'%s'

· 1109 SQLSTATE: 42S02 (ER_UNKNOWN_TABLE)

%s%s

· 1110 SQLSTATE: 42000 (ER_FIELD_SPECIFIED_TWICE)

'%s'

· 1111 SQLSTATE: HY000 (ER_INVALID_GROUP_FUNC_USE)

· 1112 SQLSTATE: 42000 (ER_UNSUPPORTED_EXTENSION)

'%s'MySQL

· 1113 SQLSTATE: 42000 (ER_TABLE_MUST_HAVE_COLUMNS)

11

· 1114 SQLSTATE: HY000 (ER_RECORD_FILE_FULL)

'%s'

· 1115 SQLSTATE: 42000 (ER_UNKNOWN_CHARACTER_SET)

'%s'

· 1116 SQLSTATE: HY000 (ER_TOO_MANY_TABLES)

MySQL1%d

· 1117 SQLSTATE: HY000 (ER_TOO_MANY_FIELDS)

· 1118 SQLSTATE: 42000 (ER_TOO_BIG_ROWSIZE)

BLOB%ldTEXTBLOB

· 1119 SQLSTATE: HY000 (ER_STACK_OVERRUN)

%ld%ld 'mysqld -O thread_stack=#'

· 1120 SQLSTATE: 42000 (ER_WRONG_OUTER_JOIN)

OUTER JOIN ON

· 1121 SQLSTATE: 42000 (ER_NULL_COLUMN_IN_INDEX)

'%s'UNIQUEINDEX NOT NULL

· 1122 SQLSTATE: HY000 (ER_CANT_FIND_UDF)

'%s'

· 1123 SQLSTATE: HY000 (ER_CANT_INITIALIZE_UDF)

'%s'; %s

· 1124 SQLSTATE: HY000 (ER_UDF_NO_PATHS)

· 1125 SQLSTATE: HY000 (ER_UDF_EXISTS)

'%s'

· 1126 SQLSTATE: HY000 (ER_CANT_OPEN_LIBRARY)

'%s' (errno: %d %s)

· 1127 SQLSTATE: HY000 (ER_CANT_FIND_DL_ENTRY)

'%s'

· 1128 SQLSTATE: HY000 (ER_FUNCTION_NOT_DEFINED)

'%s'

· 1129 SQLSTATE: HY000 (ER_HOST_IS_BLOCKED)

'%s' 'mysqladmin flush-hosts'

· 1130 SQLSTATE: HY000 (ER_HOST_NOT_PRIVILEGED)

'%s'MySQL

· 1131 SQLSTATE: 42000 (ER_PASSWORD_ANONYMOUS_USER)

MySQL

· 1132 SQLSTATE: 42000 (ER_PASSWORD_NOT_ALLOWED)

mysql

· 1133 SQLSTATE: 42000 (ER_PASSWORD_NO_MATCH)

· 1134 SQLSTATE: HY000 (ER_UPDATE_INFO)

%ld %ld %ld

· 1135 SQLSTATE: HY000 (ER_CANT_CREATE_THREAD)

(errno %d)

· 1136 SQLSTATE: 21S01 (ER_WRONG_VALUE_COUNT_ON_ROW)

%ld

· 1137 SQLSTATE: HY000 (ER_CANT_REOPEN_TABLE)

'%s'

· 1138 SQLSTATE: 22004 (ER_INVALID_USE_OF_NULL)

NULL

· 1139 SQLSTATE: 42000 (ER_REGEXP_ERROR)

regexp'%s'

· 1140 SQLSTATE: 42000 (ER_MIX_OF_GROUP_FUNC_AND_FIELDS)

GROUP BY GROUP (MIN(),MAX(),COUNT(),...)GROUP

· 1141 SQLSTATE: 42000 (ER_NONEXISTING_GRANT)

'%s''%s'

· 1142 SQLSTATE: 42000 (ER_TABLEACCESS_DENIED_ERROR)

'%s'@'%s''%s'%s

· 1143 SQLSTATE: 42000 (ER_COLUMNACCESS_DENIED_ERROR)

'%s'@'%s''%s''%s'%s

· 1144 SQLSTATE: 42000 (ER_ILLEGAL_GRANT_FOR_TABLE)

GRANT/REVOKE

· 1145 SQLSTATE: 42000 (ER_GRANT_WRONG_HOST_OR_USER)

GRANT

· 1146 SQLSTATE: 42S02 (ER_NO_SUCH_TABLE)

'%s.%s'

· 1147 SQLSTATE: 42000 (ER_NONEXISTING_TABLE_GRANT)

'%s''%s''%s'

· 1148 SQLSTATE: 42000 (ER_NOT_ALLOWED_COMMAND)

MySQL

· 1149 SQLSTATE: 42000 (ER_SYNTAX_ERROR)

SQL MySQL

· 1150 SQLSTATE: HY000

(ER_DELAYED_CANT_CHANGE_LOCK)

%s

· 1151 SQLSTATE: HY000 (ER_TOO_MANY_DELAYED_THREADS)

· 1152 SQLSTATE: 08S01 (ER_ABORTING_CONNECTION)

'%s''%s'%ld (%s)

· 1153 SQLSTATE: 08S01 (ER_NET_PACKET_TOO_LARGE)

'max_allowed_packet'

· 1154 SQLSTATE: 08S01 (ER_NET_READ_ERROR_FROM_PIPE)

· 1155 SQLSTATE: 08S01 (ER_NET_FCNTL_ERROR)

fcntl()

· 1156 SQLSTATE: 08S01 (ER_NET_PACKETS_OUT_OF_ORDER)

· 1157 SQLSTATE: 08S01 (ER_NET_UNCOMPRESS_ERROR)

· 1158 SQLSTATE: 08S01 (ER_NET_READ_ERROR)

· 1159 SQLSTATE: 08S01 (ER_NET_READ_INTERRUPTED)

· 1160 SQLSTATE: 08S01 (ER_NET_ERROR_ON_WRITE)

· 1161 SQLSTATE: 08S01 (ER_NET_WRITE_INTERRUPTED)

· 1162 SQLSTATE: 42000 (ER_TOO_LONG_STRING)

'max_allowed_packet'

· 1163 SQLSTATE: 42000 (ER_TABLE_CANT_HANDLE_BLOB)

BLOB/TEXT

· 1164 SQLSTATE: 42000 (ER_TABLE_CANT_HANDLE_AUTO_INCREMENT)

AUTO_INCREMENT

· 1165 SQLSTATE: HY000 (ER_DELAYED_INSERT_TABLE_LOCKED)

LOCK TABLES INSERT DELAYED'%s'

· 1166 SQLSTATE: 42000 (ER_WRONG_COLUMN_NAME)

'%s'

· 1167 SQLSTATE: 42000 (ER_WRONG_KEY_COLUMN)

'%s'

· 1168 SQLSTATE: HY000 (ER_WRONG_MRG_TABLE)

MERGE

· 1169 SQLSTATE: 23000 (ER_DUP_UNIQUE)

'%s'

· 1170 SQLSTATE: 42000 (ER_BLOB_KEY_WITHOUT_LENGTH)

BLOB/TEXT'%s'

· 1171 SQLSTATE: 42000 (ER_PRIMARY_CANT_HAVE_NULL)

PRIMARY KEYNOT NULLNULL UNIQUE

· 1172 SQLSTATE: 42000 (ER_TOO_MANY_ROWS)

1

· 1173 SQLSTATE: 42000 (ER_REQUIRES_PRIMARY_KEY)

· 1174 SQLSTATE: HY000 (ER_NO_RAID_COMPILED)

MySQLRAID

· 1175 SQLSTATE: HY000 (ER_UPDATE_WITHOUT_KEY_IN_SAFE_MODE)

WHEREKEY

· 1176 SQLSTATE: HY000 (ER_KEY_DOES_NOT_EXITS)

'%s' '%s'

· 1177 SQLSTATE: 42000 (ER_CHECK_NO_SUCH_TABLE)

· 1178 SQLSTATE: 42000 (ER_CHECK_NOT_IMPLEMENTED)

%s

· 1179 SQLSTATE: 25000 (ER_CANT_DO_THIS_DURING_AN_TRANSACTION)

· 1180 SQLSTATE: HY000 (ER_ERROR_DURING_COMMIT)

COMMIT%d

· 1181 SQLSTATE: HY000 (ER_ERROR_DURING_ROLLBACK)

ROLLBACK%d

· 1182 SQLSTATE: HY000 (ER_ERROR_DURING_FLUSH_LOGS)

FLUSH_LOGS%d

· 1183 SQLSTATE: HY000 (ER_ERROR_DURING_CHECKPOINT)

CHECKPOINT%d

· 1184 SQLSTATE: 08S01 (ER_NEW_ABORTING_CONNECTION)

'%s''%s''%s'%ld (%s)

· 1185 SQLSTATE: HY000 (ER_DUMP_NOT_IMPLEMENTED)

· 1186 SQLSTATE: HY000 (ER_FLUSH_MASTER_BINLOG_CLOSED)

Binlog RESET MASTER

· 1187 SQLSTATE: HY000 (ER_INDEX_REBUILD)

'%s'

· 1188 SQLSTATE: HY000 (ER_MASTER)

'%s'

· 1189 SQLSTATE: 08S01 (ER_MASTER_NET_READ)

· 1190 SQLSTATE: 08S01 (ER_MASTER_NET_WRITE)

· 1191 SQLSTATE: HY000 (ER_FT_MATCHING_KEY_NOT_FOUND)

FULLTEXT

· 1192 SQLSTATE: HY000 (ER_LOCK_OR_ACTIVE_TRANSACTION)

· 1193 SQLSTATE: HY000 (ER_UNKNOWN_SYSTEM_VARIABLE)

'%s'

· 1194 SQLSTATE: HY000 (ER_CRASHED_ON_USAGE)

'%s'

· 1195 SQLSTATE: HY000 (ER_CRASHED_ON_REPAIR)

'%s'

· 1196 SQLSTATE: HY000 (ER_WARNING_NOT_COMPLETE_ROLLBACK)

· 1197 SQLSTATE: HY000 (ER_TRANS_CACHE_FULL)

'max_binlog_cache_size' mysqld

· 1198 SQLSTATE: HY000 (ER_SLAVE_MUST_STOP)

STOP SLAVE

· 1199 SQLSTATE: HY000 (ER_SLAVE_NOT_RUNNING)

SLAVESTART SLAVE

· 1200 SQLSTATE: HY000 (ER_BAD_SLAVE)

config CHANGE MASTER TO

· 1201 SQLSTATE: HY000 (ER_MASTER_INFO)

MySQL

· 1202 SQLSTATE: HY000 (ER_SLAVE_THREAD)

· 1203 SQLSTATE: 42000 (ER_TOO_MANY_USER_CONNECTIONS)

%s'max_user_connections'

· 1204 SQLSTATE: HY000 (ER_SET_CONSTANTS_ONLY)

SET

· 1205 SQLSTATE: HY000 (ER_LOCK_WAIT_TIMEOUT)

· 1206 SQLSTATE: HY000 (ER_LOCK_TABLE_FULL)

· 1207 SQLSTATE: 25000 (ER_READ_ONLY_TRANSACTION)

READ UNCOMMITTED

· 1208 SQLSTATE: HY000 (ER_DROP_DB_WITH_READ_LOCK)

DROP DATABASE

· 1209 SQLSTATE: HY000 (ER_CREATE_DB_WITH_READ_LOCK)

CREATE DATABASE

· 1210 SQLSTATE: HY000 (ER_WRONG_ARGUMENTS)

%s

· 1211 SQLSTATE: 42000 (ER_NO_PERMISSION_TO_CREATE_USER)

'%s'@'%s'

· 1212 SQLSTATE: HY000 (ER_UNION_TABLES_IN_DIFFERENT_DIR)

MERGE

· 1213 SQLSTATE: 40001 (ER_LOCK_DEADLOCK)

· 1214 SQLSTATE: HY000 (ER_TABLE_CANT_HANDLE_FT)

FULLTEXT

· 1215 SQLSTATE: HY000 (ER_CANNOT_ADD_FOREIGN)

· 1216 SQLSTATE: 23000 (ER_NO_REFERENCED_ROW)

· 1217 SQLSTATE: 23000 (ER_ROW_IS_REFERENCED)

· 1218 SQLSTATE: 08S01 (ER_CONNECT_TO_MASTER)

%s

· 1219 SQLSTATE: HY000 (ER_QUERY_ON_MASTER)

%s

· 1220 SQLSTATE: HY000 (ER_ERROR_WHEN_EXECUTING_COMMAND)

%s: %s

· 1221 SQLSTATE: HY000 (ER_WRONG_USAGE)

%s%s

· 1222 SQLSTATE: 21000 (ER_WRONG_NUMBER_OF_COLUMNS_IN_SELECT)

SELECT

· 1223 SQLSTATE: HY000 (ER_CANT_UPDATE_WITH_READLOCK)

· 1224 SQLSTATE: HY000 (ER_MIXING_NOT_ALLOWED)

· 1225 SQLSTATE: HY000 (ER_DUP_ARGUMENT)

'%s'

· 1226 SQLSTATE: 42000 (ER_USER_LIMIT_REACHED)

'%s''%s' %ld

· 1227 SQLSTATE: 42000 (ER_SPECIFIC_ACCESS_DENIED_ERROR)

%s

· 1228 SQLSTATE: HY000 (ER_LOCAL_VARIABLE)

'%s'1SESSION SET GLOBAL

· 1229 SQLSTATE: HY000 (ER_GLOBAL_VARIABLE)

'%s'1GLOBAL SET GLOBAL

· 1230 SQLSTATE: 42000 (ER_NO_DEFAULT)

'%s'

· 1231 SQLSTATE: 42000 (ER_WRONG_VALUE_FOR_VAR)

'%s''%s'

· 1232 SQLSTATE: 42000 (ER_WRONG_TYPE_FOR_VAR)

'%s'

· 1233 SQLSTATE: HY000 (ER_VAR_CANT_BE_READ)

'%s'

· 1234 SQLSTATE: 42000 (ER_CANT_USE_OPTION_HERE)

'%s'/

· 1235 SQLSTATE: 42000 (ER_NOT_SUPPORTED_YET)

MySQL'%s'

· 1236 SQLSTATE: HY000 (ER_MASTER_FATAL_ERROR_READING_BINLOG)

%d: '%s'

· 1237 SQLSTATE: HY000 (ER_SLAVE_IGNORED_TABLE)

“ replicate-*-table” SQL

· 1238 SQLSTATE: HY000 (ER_INCORRECT_GLOBAL_LOCAL_VAR)

'%s'%s

· 1239 SQLSTATE: 42000 (ER_WRONG_FK_DEF)

'%s': %s

· 1240 SQLSTATE: HY000 (ER_KEY_REF_DO_NOT_MATCH_TABLE_REF)

· 1241 SQLSTATE: 21000 (ER_OPERAND_COLUMNS)

%d

· 1242 SQLSTATE: 21000 (ER_SUBQUERY_NO_1_ROW)

1

· 1243 SQLSTATE: HY000 (ER_UNKNOWN_STMT_HANDLER)

%s

· 1244 SQLSTATE: HY000 (ER_CORRUPT_HELP_DB)

· 1245 SQLSTATE: HY000 (ER_CYCLIC_REFERENCE)

· 1246 SQLSTATE: HY000 (ER_AUTO_CONVERT)

'%s'%s%s

· 1247 SQLSTATE: 42S22 (ER_ILLEGAL_REFERENCE)

'%s' (%s)

· 1248 SQLSTATE: 42000 (ER_DERIVED_MUST_HAVE_ALIAS)

· 1249 SQLSTATE: 01000 (ER_SELECT_REDUCED)

%u

· 1250 SQLSTATE: 42000 (ER_TABLENAME_NOT_ALLOWED_HERE)

SELECT'%s'%s

· 1251 SQLSTATE: 08004 (ER_NOT_SUPPORTED_AUTH_MODE)

MySQL

· 1252 SQLSTATE: 42000 (ER_SPATIAL_CANT_HAVE_NULL)

SPATIALNOT NULL

· 1253 SQLSTATE: 42000 (ER_COLLATION_CHARSET_MISMATCH)

CHARACTER SET '%s'COLLATION '%s'

· 1254 SQLSTATE: HY000 (ER_SLAVE_WAS_RUNNING)

· 1255 SQLSTATE: HY000 (ER_SLAVE_WAS_NOT_RUNNING)

· 1256 SQLSTATE: HY000 (ER_TOO_BIG_FOR_UNCOMPRESS)

%d

· 1257 SQLSTATE: HY000 (ER_ZLIB_Z_MEM_ERROR)

ZLIB

· 1258 SQLSTATE: HY000 (ER_ZLIB_Z_BUF_ERROR)

ZLIB

· 1259 SQLSTATE: HY000 (ER_ZLIB_Z_DATA_ERROR)

ZLIB

· 1260 SQLSTATE: HY000 (ER_CUT_VALUE_GROUP_CONCAT)

%dGROUP_CONCAT()

· 1261 SQLSTATE: 01000 (ER_WARN_TOO_FEW_RECORDS)

%ld

· 1262 SQLSTATE: 01000 (ER_WARN_TOO_MANY_RECORDS)

%ld

· 1263 SQLSTATE: 22004 (ER_WARN_NULL_TO_NOTNULL)

%ldNULLNOT NULL

· 1264 SQLSTATE: 22003 (ER_WARN_DATA_OUT_OF_RANGE)

%ld'%s'

· 1265 SQLSTATE: 01000 (WARN_DATA_TRUNCATED)

%ld'%s'

· 1266 SQLSTATE: HY000 (ER_WARN_USING_OTHER_HANDLER)

%s%s

· 1267 SQLSTATE: HY000 (ER_CANT_AGGREGATE_2COLLATIONS)

'%s'(%s,%s)(%s,%s)

· 1268 SQLSTATE: HY000 (ER_DROP_USER)

1

· 1269 SQLSTATE: HY000 (ER_REVOKE_GRANTS)

1

· 1270 SQLSTATE: HY000 (ER_CANT_AGGREGATE_3COLLATIONS)

'%s'(%s,%s)(%s,%s)(%s,%s)

· 1271 SQLSTATE: HY000 (ER_CANT_AGGREGATE_NCOLLATIONS)

'%s'

· 1272 SQLSTATE: HY000 (ER_VARIABLE_IS_NOT_STRUCT)

'%s' XXXX.variable_name

· 1273 SQLSTATE: HY000 (ER_UNKNOWN_COLLATION)

'%s'

· 1274 SQLSTATE: HY000 (ER_SLAVE_IGNORED_SSL_PARAMS)

MySQLSSL CHANGE MASTERSSL SSLMySQL

· 1275 SQLSTATE: HY000 (ER_SERVER_IS_IN_SECURE_AUTH_MODE)

“ --secure-auth” '%s'@'%s'1

· 1276 SQLSTATE: HY000 (ER_WARN_FIELD_RESOLVED)

SELECT #%d'%s%s%s%s%s'SELECT #%d

· 1277 SQLSTATE: HY000 (ER_BAD_SLAVE_UNTIL_COND)

START SLAVE UNTIL

· 1278 SQLSTATE: HY000 (ER_MISSING_SKIP_SLAVE)

START SLAVE UNTIL“ --skip-slave-start” mysqld

· 1279 SQLSTATE: HY000 (ER_UNTIL_COND_IGNORED)

SQL UNTIL

· 1280 SQLSTATE: 42000 (ER_WRONG_NAME_FOR_INDEX)

'%s'

· 1281 SQLSTATE: 42000 (ER_WRONG_NAME_FOR_CATALOG)

'%s'

· 1282 SQLSTATE: HY000 (ER_WARN_QC_RESIZE)

%lu %lu

· 1283 SQLSTATE: HY000 (ER_BAD_FT_COLUMN)

'%s'FULLTEXT

· 1284 SQLSTATE: HY000 (ER_UNKNOWN_KEY_CACHE)

'%s'

· 1285 SQLSTATE: HY000 (ER_WARN_HOSTNAME_WONT_WORK)

MySQL“ --skip-name-resolve”

· 1286 SQLSTATE: 42000 (ER_UNKNOWN_STORAGE_ENGINE)

'%s'

· 1287 SQLSTATE: HY000 (ER_WARN_DEPRECATED_SYNTAX)

'%s' '%s'

· 1288 SQLSTATE: HY000 (ER_NON_UPDATABLE_TABLE)

%s%s

· 1289 SQLSTATE: HY000 (ER_FEATURE_DISABLED)

'%s' '%s'MySQL

· 1290 SQLSTATE: HY000 (ER_OPTION_PREVENTS_STATEMENT)

MySQL%s

· 1291 SQLSTATE: HY000 (ER_DUPLICATED_VALUE_IN_TYPE)

'%s'%s'%s'

· 1292 SQLSTATE: 22007 (ER_TRUNCATED_WRONG_VALUE)

%s: '%s'

· 1293 SQLSTATE: HY000 (ER_TOO_MUCH_AUTO_TIMESTAMP_COLS)

DEFAULTON UPDATE CURRENT_TIMESTAMPTIMESTAMP

· 1294 SQLSTATE: HY000 (ER_INVALID_ON_UPDATE)

'%s' ON UPDATE

· 1295 SQLSTATE: HY000 (ER_UNSUPPORTED_PS)

· 1296 SQLSTATE: HY000 (ER_GET_ERRMSG)

%s%d '%s'

· 1297 SQLSTATE: HY000 (ER_GET_TEMPORARY_ERRMSG)

%s%d '%s'

· 1298 SQLSTATE: HY000 (ER_UNKNOWN_TIME_ZONE)

: '%s'

· 1299 SQLSTATE: HY000 (ER_WARN_INVALID_TIMESTAMP)

%ld'%s'TIMESTAMP

· 1300 SQLSTATE: HY000 (ER_INVALID_CHARACTER_STRING)

%s: '%s'

· 1301 SQLSTATE: HY000 (ER_WARN_ALLOWED_PACKET_OVERFLOWED)

%s()max_allowed_packet (%ld)

· 1302 SQLSTATE: HY000 (ER_CONFLICTING_DECLARATIONS)

'%s%s''%s%s'

· 1303 SQLSTATE: 2F003 (ER_SP_NO_RECURSIVE_CREATE)

%s

· 1304 SQLSTATE: 42000 (ER_SP_ALREADY_EXISTS)

%s %s

· 1305 SQLSTATE: 42000 (ER_SP_DOES_NOT_EXIST)

%s %s

· 1306 SQLSTATE: HY000 (ER_SP_DROP_FAILED)

DROP %s %s

· 1307 SQLSTATE: HY000 (ER_SP_STORE_FAILED)

CREATE %s %s

· 1308 SQLSTATE: 42000 (ER_SP_LILABEL_MISMATCH)

%s: %s

· 1309 SQLSTATE: 42000 (ER_SP_LABEL_REDEFINE)

%s

· 1310 SQLSTATE: 42000 (ER_SP_LABEL_MISMATCH)

%s

· 1311 SQLSTATE: 01000 (ER_SP_UNINIT_VAR)

%s

· 1312 SQLSTATE: 0A000 (ER_SP_BADSELECT)

PROCEDURE %s

· 1313 SQLSTATE: 42000 (ER_SP_BADRETURN)

FUNCTIONRETURN

· 1314 SQLSTATE: 0A000 (ER_SP_BADSTATEMENT)

%s

· 1315 SQLSTATE: 42000 (ER_UPDATE_LOG_DEPRECATED_IGNORED)

SET SQL_LOG_UPDATE

· 1316 SQLSTATE: 42000 (ER_UPDATE_LOG_DEPRECATED_TRANSLATED)

SET SQL_LOG_UPDATESET SQL_LOG_BIN

· 1317 SQLSTATE: 70100 (ER_QUERY_INTERRUPTED)

- 1318 SQLSTATE: 42000 (ER_SP_WRONG_NO_OF_ARGS)

  %s %s %u%u
- 1319 SQLSTATE: 42000 (ER_SP_COND_MISMATCH)

  CONDITION: %s
- 1320 SQLSTATE: 42000 (ER_SP_NORETURN)

  FUNCTION %sRETURN
- 1321 SQLSTATE: 2F005 (ER_SP_NORETURNEND)

  FUNCTION %sRETURN
- 1322 SQLSTATE: 42000 (ER_SP_BAD_CURSOR_QUERY)

  SELECT
- 1323 SQLSTATE: 42000 (ER_SP_BAD_CURSOR_SELECT)

  SELECTINTO
- 1324 SQLSTATE: 42000 (ER_SP_CURSOR_MISMATCH)

  CURSOR: %s
- 1325 SQLSTATE: 24000 (ER_SP_CURSOR_ALREADY_OPEN)
- 1326 SQLSTATE: 24000 (ER_SP_CURSOR_NOT_OPEN)
- 1327 SQLSTATE: 42000 (ER_SP_UNDECLARED_VAR)

  %s
- 1328 SQLSTATE: HY000

(ER_SP_WRONG_NO_OF_FETCH_ARGS)

FETCH

· 1329 SQLSTATE: 02000 (ER_SP_FETCH_NO_DATA)

FETCH

· 1330 SQLSTATE: 42000 (ER_SP_DUP_PARAM)

: %s

· 1331 SQLSTATE: 42000 (ER_SP_DUP_VAR)

: %s

· 1332 SQLSTATE: 42000 (ER_SP_DUP_COND)

: %s

· 1333 SQLSTATE: 42000 (ER_SP_DUP_CURS)

: %s

· 1334 SQLSTATE: HY000 (ER_SP_CANT_ALTER)

ALTER %s %s

· 1335 SQLSTATE: 0A000 (ER_SP_SUBSELECT_NYI)

Subselect

· 1336 SQLSTATE: 0A000 (ER_STMT_NOT_ALLOWED_IN_SF_OR_TRG)

%s

· 1337 SQLSTATE: 42000 (ER_SP_VARCOND_AFTER_CURSHNDLR)

· 1338 SQLSTATE: 42000 (ER_SP_CURSOR_AFTER_HANDLER)

· 1339 SQLSTATE: 20000 (ER_SP_CASE_NOT_FOUND)

CASE Case

· 1340 SQLSTATE: HY000 (ER_FPARSER_TOO_BIG_FILE)

'%s'

· 1341 SQLSTATE: HY000 (ER_FPARSER_BAD_HEADER)

'%s'

· 1342 SQLSTATE: HY000 (ER_FPARSER_EOF_IN_COMMENT)

'%s'

· 1343 SQLSTATE: HY000 (ER_FPARSER_ERROR_IN_PARAMETER)

'%s' '%s'

· 1344 SQLSTATE: HY000 (ER_FPARSER_EOF_IN_UNKNOWN_PARAMETER)

'%s'

· 1345 SQLSTATE: HY000 (ER_VIEW_NO_EXPLAIN)

EXPLAIN/SHOW

· 1346 SQLSTATE: HY000 (ER_FRM_UNKNOWN_TYPE)

'%s''%s'

· 1347 SQLSTATE: HY000 (ER_WRONG_OBJECT)

'%s.%s'%s

- 1348 SQLSTATE: HY000 (ER_NONUPDATEABLE_COLUMN)
  '%s'
- 1349 SQLSTATE: HY000 (ER_VIEW_SELECT_DERIVED)
  SELECTFROM
- 1350 SQLSTATE: HY000 (ER_VIEW_SELECT_CLAUSE)
  SELECT'%s'
- 1351 SQLSTATE: HY000 (ER_VIEW_SELECT_VARIABLE)
  SELECT1
- 1352 SQLSTATE: HY000 (ER_VIEW_SELECT_TMPTABLE)
  SELECT'%s'
- 1353 SQLSTATE: HY000 (ER_VIEW_WRONG_LIST)
  SELECT
- 1354 SQLSTATE: HY000 (ER_WARN_VIEW_MERGE)
- 1355 SQLSTATE: HY000 (ER_WARN_VIEW_WITHOUT_KEY)
- 1356 SQLSTATE: HY000 (ER_VIEW_INVALID)
  '%s.%s'
- 1357 SQLSTATE: HY000 (ER_SP_NO_DROP_SP)
  %s
- 1358 SQLSTATE: HY000 (ER_SP_GOTO_IN_HNDLR)

GOTO

· 1359 SQLSTATE: HY000 (ER_TRG_ALREADY_EXISTS)

· 1360 SQLSTATE: HY000 (ER_TRG_DOES_NOT_EXIST)

· 1361 SQLSTATE: HY000 (ER_TRG_ON_VIEW_OR_TEMP_TABLE)

'%s'

· 1362 SQLSTATE: HY000 (ER_TRG_CANT_CHANGE_ROW)

%strigger %s

· 1363 SQLSTATE: HY000 (ER_TRG_NO_SUCH_ROW_IN_TRG)

%s%s

· 1364 SQLSTATE: HY000 (ER_NO_DEFAULT_FOR_FIELD)

'%s'

· 1365 SQLSTATE: 22012 (ER_DIVISION_BY_ZERO)

0

· 1366 SQLSTATE: HY000 (ER_TRUNCATED_WRONG_VALUE_FOR_FIELD)

%s '%s'%ld '%s'

· 1367 SQLSTATE: 22007 (ER_ILLEGAL_VALUE_FOR_TYPE)

%s '%s'

· 1368 SQLSTATE: HY000 (ER_VIEW_NONUPD_CHECK)

'%s.%s'CHECK OPTION

- 1369 SQLSTATE: HY000 (ER_VIEW_CHECK_FAILED)

  CHECK OPTION '%s.%s'
- 1370 SQLSTATE: 42000 (ER_PROCACCESS_DENIED_ERROR)

  '%s''%s'@'%s'%s
- 1371 SQLSTATE: HY000 (ER_RELAY_LOG_FAIL)

  %s
- 1372 SQLSTATE: HY000 (ER_PASSWD_LENGTH)

  %d
- 1373 SQLSTATE: HY000 (ER_UNKNOWN_TARGET_BINLOG)

  binlog
- 1374 SQLSTATE: HY000 (ER_IO_ERR_LOG_INDEX_READ)

  I/O
- 1375 SQLSTATE: HY000 (ER_BINLOG_PURGE_PROHIBITED)

  binlog
- 1376 SQLSTATE: HY000 (ER_FSEEK_FAIL)

  fseek()
- 1377 SQLSTATE: HY000 (ER_BINLOG_PURGE_FATAL_ERR)

- 1378 SQLSTATE: HY000 (ER_LOG_IN_USE)

· 1379 SQLSTATE: HY000 (ER_LOG_PURGE_UNKNOWN_ERR)

· 1380 SQLSTATE: HY000 (ER_RELAY_LOG_INIT)

%s

· 1381 SQLSTATE: HY000 (ER_NO_BINARY_LOGGING)

· 1382 SQLSTATE: HY000 (ER_RESERVED_SYNTAX)

'%s'MySQL

· 1383 SQLSTATE: HY000 (ER_WSAS_FAILED)

WSAStartup

· 1384 SQLSTATE: HY000 (ER_DIFF_GROUPS_PROC)

· 1385 SQLSTATE: HY000 (ER_NO_GROUP_FOR_PROC)

SELECT1

· 1386 SQLSTATE: HY000 (ER_ORDER_WITH_PROC)

ORDER

· 1387 SQLSTATE: HY000 (ER_LOGGING_PROHIBIT_CHANGING_OF)

%s

· 1388 SQLSTATE: HY000 (ER_NO_FILE_MAPPING)

: %s, errno: %d

- 1389 SQLSTATE: HY000 (ER_WRONG_MAGIC)

  %s
- 1390 SQLSTATE: HY000 (ER_PS_MANY_PARAM)

- 1391 SQLSTATE: HY000 (ER_KEY_PART_0)

  '%s'0
- 1392 SQLSTATE: HY000 (ER_VIEW_CHECKSUM)

- 1393 SQLSTATE: HY000 (ER_VIEW_MULTIUPDATE)

  '%s.%s'1
- 1394 SQLSTATE: HY000 (ER_VIEW_NO_INSERT_FIELD_LIST)

  '%s.%s'
- 1395 SQLSTATE: HY000 (ER_VIEW_DELETE_MERGE_VIEW)

  '%s.%s'
- 1396 SQLSTATE: HY000 (ER_CANNOT_USER)

  %s%s
- 1397 SQLSTATE: XAE04 (ER_XAER_NOTA)

  XAER_NOTA: XID
- 1398 SQLSTATE: XAE05 (ER_XAER_INVAL)

  XAER_INVAL:
- 1399 SQLSTATE: XAE07 (ER_XAER_RMFAIL)

XAER_RMFAIL: %s

· 1400 SQLSTATE: XAE09 (ER_XAER_OUTSIDE)

XAER_OUTSIDE:

· 1401 SQLSTATE: XAE03 (ER_XAER_RMERR)

XAER_RMERR:

· 1402 SQLSTATE: XA100 (ER_XA_RBROLLBACK)

XA_RBROLLBACK:

· 1403 SQLSTATE: 42000 (ER_NONEXISTING_PROC_GRANT)

'%s''%s''%s'

· 1404 SQLSTATE: HY000 (ER_PROC_AUTO_GRANT_FAIL)

EXECUTEALTER ROUTINE

· 1405 SQLSTATE: HY000 (ER_PROC_AUTO_REVOKE_FAIL)

· 1406 SQLSTATE: 22001 (ER_DATA_TOO_LONG)

%ld'%s'

· 1407 SQLSTATE: 42000 (ER_SP_BAD_SQLSTATE)

SQLSTATE: '%s'

· 1408 SQLSTATE: HY000 (ER_STARTUP)

%s '%s' '%s' %d %s

· 1409 SQLSTATE: HY000 (ER_LOAD_FROM_FIXED_SIZE_ROWS_TO_VAR)

· 1410 SQLSTATE: 42000 (ER_CANT_CREATE_USER_WITH_GRANT)

GRANT

· 1411 SQLSTATE: HY000 (ER_WRONG_VALUE_FOR_TYPE)

%s '%s'%s

· 1412 SQLSTATE: HY000 (ER_TABLE_DEF_CHANGED)

· 1413 SQLSTATE: 42000 (ER_SP_DUP_HANDLER)

· 1414 SQLSTATE: 42000 (ER_SP_NOT_VAR_ARG)

%sOUTINOUT

· 1415 SQLSTATE: 0A000 (ER_SP_NO_RETSET)

%s

· 1416 SQLSTATE: 22003 (ER_CANT_CREATE_GEOMETRY_OBJECT)

GEOMETRY

· 1417 SQLSTATE: HY000 (ER_FAILED_ROUTINE_BREAK_BINLOG)

1 NO SQLREADS SQL DATA

· 1418 SQLSTATE: HY000 (ER_BINLOG_UNSAFE_ROUTINE)

DETERMINISTICNO SQLREADS SQL DATA log_bin_trust_routine_creators

· 1419 SQLSTATE: HY000 (ER_BINLOG_CREATE_ROUTINE_NEED_SUPER)

SUPER log_bin_trust_routine_creators

· 1420 SQLSTATE: HY000 (ER_EXEC_STMT_WITH_OPEN_CURSOR)

· 1421 SQLSTATE: HY000 (ER_STMT_HAS_NO_OPEN_CURSOR)

(%lu)

· 1422 SQLSTATE: HY000 (ER_COMMIT_NOT_ALLOWED_IN_SF_OR_TRG)

· 1423 SQLSTATE: HY000 (ER_NO_DEFAULT_FOR_VIEW_FIELD)

'%s.%s'

· 1424 SQLSTATE: HY000 (ER_SP_NO_RECURSION)

· 1425 SQLSTATE: 42000 (ER_TOO_BIG_SCALE)

'%s'%d%d

· 1426 SQLSTATE: 42000 (ER_TOO_BIG_PRECISION)

'%s'%d%d

· 1427 SQLSTATE: 42000 (ER_M_BIGGER_THAN_D)

float(M,D)double(M,D)decimal(M,D)M>= D ('%s')

· 1428 SQLSTATE: HY000

(ER_WRONG_LOCK_OF_SYSTEM_TABLE)

'%s.%s'

· 1429 SQLSTATE: HY000 (ER_CONNECT_TO_FOREIGN_DATA_SOURCE)

'%s'

· 1430 SQLSTATE: HY000 (ER_QUERY_ON_FOREIGN_DATA_SOURCE)

'%s'

· 1431 SQLSTATE: HY000 (ER_FOREIGN_DATA_SOURCE_DOESNT_EXIST)

'%s'

· 1432 SQLSTATE: HY000 (ER_FOREIGN_DATA_STRING_INVALID_CANT_CREATE)

'%s'

· 1433 SQLSTATE: HY000 (ER_FOREIGN_DATA_STRING_INVALID)

'%s'

· 1434 SQLSTATE: HY000 (ER_CANT_CREATE_FEDERATED_TABLE)

'%s'

· 1435 SQLSTATE: HY000 (ER_TRG_IN_WRONG_SCHEMA)

· 1436 SQLSTATE: HY000 (ER_STACK_OVERRUN_NEED_MORE)

%ld%ld %ld 'mysqld -O thread_stack=#'

· 1437 SQLSTATE: 42000 (ER_TOO_LONG_BODY)

'%s'

· 1438 SQLSTATE: HY000 (ER_WARN_CANT_DROP_DEFAULT_KEYCACHE)

keycache

· 1439 SQLSTATE: 42000 (ER_TOO_BIG_DISPLAYWIDTH)

'%s'(max = %d)

· 1440 SQLSTATE: XAE08 (ER_XAER_DUPID)

XAER_DUPID: XID

· 1441 SQLSTATE: 22008 (ER_DATETIME_FUNCTION_OVERFLOW)

%s

· 1442 SQLSTATE: HY000 (ER_CANT_UPDATE_USED_TABLE_IN_SF_OR_TRG)

· 1443 SQLSTATE: HY000 (ER_VIEW_PREVENT_UPDATE)

'%s''%s%s

· 1444 SQLSTATE: HY000 (ER_PS_NO_RECURSION)

· 1445 SQLSTATE: HY000 (ER_SP_CANT_SET_AUTOCOMMIT)

autocommit

· 1446 SQLSTATE: HY000 (ER_NO_VIEW_USER)

· 1447 SQLSTATE: HY000 (ER_VIEW_FRM_NO_USER)

%s.%s

· 1448 SQLSTATE: HY000 (ER_VIEW_OTHER_USER)

SUPER%s@%s

· 1449 SQLSTATE: HY000 (ER_NO_SUCH_USER)

%s@%s

· 1450 SQLSTATE: HY000 (ER_FORBID_SCHEMA_CHANGE)

'%s''%s'

· 1451 SQLSTATE: 23000 (ER_ROW_IS_REFERENCED_2)

(%s)

· 1452 SQLSTATE: 23000 (ER_NO_REFERENCED_ROW_2)

(%s)

· 1453 SQLSTATE: 42000 (ER_SP_BAD_VAR_SHADOW)

`...`

· 1454 SQLSTATE: HY000 (ER_PARTITION_REQUIRES_VALUES_ERROR)

%s PARTITIONINGVALUES %s

· 1455 SQLSTATE: HY000 (ER_PARTITION_WRONG_VALUES_ERROR)

%s PARTITIONINGVALUES %s

· 1456 SQLSTATE: HY000 (ER_PARTITION_MAXVALUE_ERROR)

MAXVALUE1

· 1457 SQLSTATE: HY000 (ER_PARTITION_SUBPARTITION_ERROR)

· 1458 SQLSTATE: HY000 (ER_PARTITION_WRONG_NO_PART_ERROR)

· 1459 SQLSTATE: HY000 (ER_PARTITION_WRONG_NO_SUBPART_ERROR)

· 1460 SQLSTATE: HY000 (ER_CONST_EXPR_IN_PARTITION_FUNC_ERROR)

· 1461 SQLSTATE: HY000 (ER_NO_CONST_EXPR_IN_RANGE_OR_LIST_ERROR)

RANGE/LIST VALUES

· 1462 SQLSTATE: HY000 (ER_FIELD_NOT_FOUND_PART_ERROR)

· 1463 SQLSTATE: HY000 (ER_LIST_OF_FIELDS_ONLY_IN_HASH_ERROR)

KEY

· 1464 SQLSTATE: HY000 (ER_INCONSISTENT_PARTITION_INFO_ERROR)

frmfrm

· 1465 SQLSTATE: HY000 (ER_PARTITION_FUNC_NOT_ALLOWED_ERROR)

%s

· 1466 SQLSTATE: HY000 (ER_PARTITIONS_MUST_BE_DEFINED_ERROR)

%s

· 1467 SQLSTATE: HY000 (ER_RANGE_NOT_INCREASING_ERROR)

VALUES LESS THAN

· 1468 SQLSTATE: HY000 (ER_INCONSISTENT_TYPE_OF_FUNCTIONS_ERROR)

VALUES

· 1469 SQLSTATE: HY000 (ER_MULTIPLE_DEF_CONST_IN_LIST_PART_ERROR)

Multiple definition of same constant in list partitioning

· 1470 SQLSTATE: HY000 (ER_PARTITION_ENTRY_ERROR)

· 1471 SQLSTATE: HY000 (ER_MIX_HANDLER_ERROR)

MySQL

· 1472 SQLSTATE: HY000 (ER_PARTITION_NOT_DEFINED_ERROR)

%s

· 1473 SQLSTATE: HY000 (ER_TOO_MANY_PARTITIONS_ERROR)

· 1474 SQLSTATE: HY000 (ER_SUBPARTITION_ERROR)

RANGE/LISTHASH/KEY

· 1475 SQLSTATE: HY000 (ER_CANT_CREATE_HANDLER_FILE)

· 1476 SQLSTATE: HY000 (ER_BLOB_FIELD_IN_PART_FUNC_ERROR)

BLOB

· 1477 SQLSTATE: HY000 (ER_CHAR_SET_IN_PART_FIELD_ERROR)

VARCHAR

· 1478 SQLSTATE: HY000 (ER_UNIQUE_KEY_NEED_ALL_FIELDS_IN_PF)

%s

· 1479 SQLSTATE: HY000 (ER_NO_PARTS_ERROR)

%s= 0

· 1480 SQLSTATE: HY000 (ER_PARTITION_MGMT_ON_NONPARTITIONED)

· 1481 SQLSTATE: HY000 (ER_DROP_PARTITION_NON_EXISTENT)

· 1482 SQLSTATE: HY000 (ER_DROP_LAST_PARTITION)

DROP TABLE

· 1483 SQLSTATE: HY000 (ER_COALESCE_ONLY_ON_HASH_PARTITION)

COALESCE PARTITIONHASH/KEY

· 1484 SQLSTATE: HY000 (ER_ONLY_ON_RANGE_LIST_PARTITION)

%s PARTITIONRANGE/LIST

· 1485 SQLSTATE: HY000 (ER_ADD_PARTITION_SUBPART_ERROR)

· 1486 SQLSTATE: HY000 (ER_ADD_PARTITION_NO_NEW_PARTITION)

1

· 1487 SQLSTATE: HY000 (ER_COALESCE_PARTITION_NO_PARTITION)

1

· 1488 SQLSTATE: HY000 (ER_REORG_PARTITION_NOT_EXIST)

· 1489 SQLSTATE: HY000 (ER_SAME_NAME_PARTITION)

· 1490 SQLSTATE: HY000 (ER_CONSECUTIVE_REORG_PARTITIONS)

· 1491 SQLSTATE: HY000 (ER_REORG_OUTSIDE_RANGE)

· 1492 SQLSTATE: HY000 (ER_DROP_PARTITION_FAILURE)

· 1493 SQLSTATE: HY000 (ER_DROP_PARTITION_WHEN_FK_DEFINED)

· 1494 SQLSTATE: HY000 (ER_PLUGIN_IS_NOT_LOADED)

'%s'

B.2.

- include/errmsg.h MySQL
- libmysql/errmsg.c %d%s

- 2000 (CR_UNKNOWN_ERROR)
  MySQL
- 2001 (CR_SOCKET_CREATE_ERROR)
  UNIX(%d)
- 2002 (CR_CONNECTION_ERROR)
  '%s' (%d)MySQL
- 2003 (CR_CONN_HOST_ERROR)
  '%s' (%d)MySQL
- 2004 (CR_IPSOCK_ERROR)
  TCP/IP(%d)
- 2005 (CR_UNKNOWN_HOST)
  MySQL'%s' (%d)
- 2006 (CR_SERVER_GONE_ERROR)
  MySQL
- 2007 (CR_VERSION_ERROR)

= %d= %d

· 2008 (CR_OUT_OF_MEMORY)

MySQL

· 2009 (CR_WRONG_HOST_INFO)

· 2010 (CR_LOCALHOST_CONNECTION)

UNIX

· 2011 (CR_TCP_CONNECTION)

%sTCP/IP

· 2012 (CR_SERVER_HANDSHAKE_ERR)

· 2013 (CR_SERVER_LOST)

MySQL

· 2014 (CR_COMMANDS_OUT_OF_SYNC)

· 2015 (CR_NAMEDPIPE_CONNECTION)

%s

· 2016 (CR_NAMEDPIPEWAIT_ERROR)

%s %s (%lu)

· 2017 (CR_NAMEDPIPEOPEN_ERROR)

%s %s (%lu)

- 2018 (CR_NAMEDPIPESETSTATE_ERROR)

  %s %s (%lu)
- 2019 (CR_CANT_READ_CHARSET)

  %s (%s)
- 2020 (CR_NET_PACKET_TOO_LARGE)

  'max_allowed_packet'
- 2021 (CR_EMBEDDED_CONNECTION)
- 2022 (CR_PROBE_SLAVE_STATUS)

  SHOW SLAVE STATUS
- 2023 (CR_PROBE_SLAVE_HOSTS)

  SHOW SLAVE HOSTS
- 2024 (CR_PROBE_SLAVE_CONNECT)
- 2025 (CR_PROBE_MASTER_CONNECT)
- 2026 (CR_SSL_CONNECTION_ERROR)

  SSL
- 2027 (CR_MALFORMED_PACKET)
- 2028 (CR_WRONG_LICENSE)

'%s'MySQL

- 2029 (CR_NULL_POINTER)
- 2030 (CR_NO_PREPARE_STMT)
- 2031 (CR_PARAMS_NOT_BOUND)
- 2032 (CR_DATA_TRUNCATED)
- 2033 (CR_NO_PARAMETERS_EXISTS)
- 2034 (CR_INVALID_PARAMETER_NO)
- 2035 (CR_INVALID_BUFFER_USE)

  %d
- 2036 (CR_UNSUPPORTED_PARAM_TYPE)

  %d %d
- 2037 (CR_SHARED_MEMORY_CONNECTION)

  %s
- 2038 (CR_SHARED_MEMORY_CONNECT_REQUEST_ERROR)

  (%lu)

· 2039 (CR_SHARED_MEMORY_CONNECT_ANSWER_ERROR) (%lu)

· 2040 (CR_SHARED_MEMORY_CONNECT_FILE_MAP_ERROR) (%lu)

· 2041 (CR_SHARED_MEMORY_CONNECT_MAP_ERROR) (%lu)

· 2042 (CR_SHARED_MEMORY_FILE_MAP_ERROR) (%lu)

· 2043 (CR_SHARED_MEMORY_MAP_ERROR) (%lu)

· 2044 (CR_SHARED_MEMORY_EVENT_ERROR) %s(%lu)

· 2045 (CR_SHARED_MEMORY_CONNECT_ABANDONED_ERROR) (%lu)

· 2046 (CR_SHARED_MEMORY_CONNECT_SET_ERROR) (%lu)

· 2047 (CR_CONN_UNKNOW_PROTOCOL)

· 2048 (CR_INVALID_CONN_HANDLE)

· 2049 (CR_SECURE_AUTH)

4.1.1 'secure_auth'

· 2050 (CR_FETCH_CANCELED)

mysql_stmt_close()

· 2051 (CR_NO_DATA)

· 2052 (CR_NO_STMT_METADATA)

· 2053 (CR_NO_RESULT_SET)

· 2054 (CR_NOT_IMPLEMENTED)

MySQLMySQL dev.mysql.com

C

C.1. MySQL AB
C.2. MySQL
C.3.
C.4. MySQL
C.5. MySQL
C.6. MySQL
C.7. MySQL

MySQL

C.1. MySQL AB

MySQL AB MySQL

· Michael (Monty) Widenius

o MySQL**mysqld**

o

o mysys

o ISAMMyISAMB-tree

o HEAP 1981 1984

o **replace**

o Connector/ODBC (MyODBC)WindowsODBC

o MIT-pthreads MySQL Unireg

o mSQL msqlperlDBD/DBIDB2mysql

o crash-meMySQL

· David Axmark

o “” **texi2html**

o

o AutoconfAutomakeLibtool

o .

o README

o

o

o

o 10 mysys

o Monty

o ""MySQL

· Jani Tolonen

o **mysqlimport**

o

o PROCEDURE ANALYSE()

· Sinisa Milivojevic

o zlib

o

o INSERT

o **mysqldump** –e

o LOAD DATA LOCAL INFILE

o SQL_CALC_FOUND_ROWS SELECT

o --max-user-connections=...

o net_read and net_write_timeout

o GRANT/REVOKESHOW GRANTS FOR

o 4.0

o 4.0UNION

- DELETE/UPDATE
- 4.1
-
- MySQL++ C++ APIMySQLGUI
  - Tonu Samuel
- VIO
- MySQL Filesystem MySQL
- CASE
- MD5()COALESCE()
- MyISAMRAID
  - Sasha Pachev
- 4.0
- SHOW CREATE TABLE.
- mysql-bench
  - Matt Wagner
- MySQL
- Webmaster 2002
  - Miguel Solorzano
- Win32
- Windows NT
- WinMySQLAdmin

· Timothy Smith

o

o RPM

o libmysqld

· Sergei Golubchik

o

o MERGE

o

· Jeremy Cole

o

o ALTER TABLE ... ORDER BY ....

o UPDATE ... ORDER BY ....

o DELETE ... ORDER BY ....

· Indrek Siitan

o Web

o

· Jorge del Conde

o **MySQLCC** (**MySQL**)

o Win32

o

· Venu Anuganti

- MyODBC 3.51
- 4.1
  - Arjen Lentz
- MySQL
- O'Reilly
  - Alexander (Bar) BarkovAlexey (Holyfoot) BotchkovRamil Kalimullin
- 4.1GISR-Trees
- 4.1Unicode
  - Oleksandr (Sanja) Byelkin
- 4.0
- 4.1
- 5.0
  - Aleksey (Walrus) KishkinAlexey (Ranger) Stroganov
-
- MySQL
  - Zak Greant
- MySQL
  - Carsten Pedersen
- MySQL
  - Lenz Grimmer
-

· Peter Zaitsev

o SHA1()AES_ENCRYPT()AES_DECRYPT()

o

· Alexander (Salle) Keremidarski

o

o

· Per-Erik Martin

o 5.0

· Jim Winstead

o Web

o

· Mark Matthews

o Connector/J driver (Java).

· Peter Gulutzan

o SQL

o MySQL/

o

· Guilhem Bichot

o MySQL 4.0

o DECIMAL

o Author of mysql_tableinfo.

o 5.1

· Antony T. Curtis

o MySQLOS/2

· Mikael Ronstrom

o 2000 NDB API

o 19942004NDB

o

· Jonas Oreland

o

o MySQL

o NDB

o

· Pekka Nouisiainen

o MySQL

o MySQLBLOB

o MySQL

· Martin Skold

o MySQL

o NDBMySQL

· Magnus Svensson

o MySQL

o NDBMySQL

· Tomas Ulin

o MySQL

· Konstantin Osipov

o

o

· Dmitri Lenev

o

o 5.0

C.2. MySQL

MySQL ABMySQLMySQL MySQL

· Gianmassimo Vigazzola <qwerg@mbox.vol.it> or <qwerg@tin.it>

Win32/NT

· Per Eric Olsson

· Irena Pancirov <irena@mail.yacc.it>

Borland Win32 mysqlshutdown.exemysqlwatch.exe

· David J. Hughes

SQL MySQL ABTcXmSQL UniregSQL **Mysqladminmysql** mSQL MySQLmSQL mSQLAPI mSQLMySQL APIMySQL mSQL client/insert_test.cclient/select_test.cmSQL mSQL MySQLmSQLDavid J. Hughes

· Patrick Lynch

http://www.mysql.com/

· Fred Lindberg

qmailMySQL MySQL

· Igor Romanenko <igor@frog.kiev.ua>

Mysqldump msqldumpMonty

· Yuri Dario

MySQL OS/2

· Tim Bunce

mysqlhotcopy

· Zarko Mocnik <zarko.mocnik@dem.si>

· "TAMITO" <tommy@valley.ne.jp>

_MBujissjis

· Joshua Chamas <joshua@chamas.com>

NT MySQL

· Yves Carlier <Yves.Carlier@rug.ac.be>

Mysqlaccess

· Rhys Jones <rhys@wales.com> (And GWE Technologies Limited)

JDBC

· Dr Xiaokun Kelvin ZHU <X.Zhu@brad.ac.uk>

JDBC MySQLJava

· James Cooper <pixel@organic.com>

· Rick Mehalick <Rick_Mehalick@i-o.com>

xmysqlMySQLX

· Doug Sisk <sisk@wix.com>

Red Hat LinuxMySQLRPM

· Diemand Alexander V. <axeld@vial.ethz.ch>

Red Hat Linux-AlphaMySQLRPM

· Antoni Pamies Olive <toni@readysoft.es>

IntelSPARCMySQLRPM

· Jay Bloodworth <jay@pathways.sde.state.sc.us>

MySQL 3.21RPM

· David Sacerdote <davids@secnet.com>

DNS

· Wei-Jou Chen <jou@nematic.ieo.nctu.edu.tw>

BIG5

· Wei He <hewei@mail.ied.ac.cn>

GBK

· Jan Pazdziora <adelton@fi.muni.cz>

· Zeev Suraski <bourbon@netvision.net.il>

FROM_UNIXTIME() ENCRYPT()**bison**

· Luuk de Boer <luuk@wxs.nl>

DBI/DBDcrash-me **mysql_setpermission**

· Alexis Mikhailov <root@medinf.chuvashia.su>

UDFs CREATE FUNCTIONDROP FUNCTION

· Andreas F. Bobak <bobak@relog.ch>

AGGREGATE

· Ross Wakelin <R.Wakelin@march.co.uk>

MySQL-Win32InstallShield

· Jethro Wright III <jetman@li.net>

libmysql.dll

· James Pereria <jpereira@iafrica.com>

Mysqlmanager1MySQLWin32 GUI

· Curt Sampson <cjs@portal.ca>

MIT-pthreadsNetBSD/AlphaNetBSD 1.3/i386

· Martin Ramsch <m.ramsch@computer.org>

MySQL

· Steve Harvey

mysqlaccess

· Konark IA-64 Centre of Persistent Systems Private Limited

http://www.pspl.co.in/konark/MySQLWin64

· Albert Chin-A-Young.

Tru64 TCP

· John Birrell

OS/2pthread_mutex()

· Benjamin Pflugmann

MERGEINSERTSMySQL

· Jocelyn Fournier

MySQL 4.1

· Marc Liyanage

Mac OS X Mac OS X PKG

· Robert Rutherford

QNX

· NDB

100 Ataullah Dabaghi1999 1/3 AXE NDB 1992

James H. ThompsonMaurizio MenghiniWojciech TrycLuca BerraZarko MocnikWim BonisElmar Haneke<jehamby@lightside><psmith@BayNetworks.com><duane@connect.co Deppner <ted@psyber.com>Mike SimonsJaakko Hyvatti

MySQL

· Daniel Koch <dkoch@amcity.com>

Irix

· Luuk de Boer <luuk@wxs.nl>

· Tim Sailer <tps@users.buoy.com>

DBD::mysql

· Boyd Lynn Gerber <gerberb@zenez.com>

SCO

· Richard Mehalick <RM186061@shellus.com>

xmysql

· Zeev Suraski <bourbon@netvision.net.il>

Apache PHP SQL

· Francesc Guasch <frankie@citel.upc.es>

· Jonathan J Smith <jsmith@wtp.net>

Linux SQL

· David Sklar <sklar@student.net>

PHPPerlMySQL

· Alistair MacDonald <A.MacDonald@uel.ac.uk>

LinuxHP-UX **mysqlbug**

· John Lyon <jlyon@imag.net>

LinuxMySQL .rpm

· Lorvid Ltd. <lorvid@WOLFENET.com>

///

· Patrick Sherrill <patrick@coconet.com>

ODBCVisualC++

· Randy Harmon <rjharmon@uptimecomputers.com>

DBDLinuxSQL

C.3.

MySQL MySQL

· Paul DuBois

MontyDavid

· Kim Aldale

MontyDavid

· Michael J. Miller Jr. <mke@terrapin.turbolift.com>

1MySQL / MySQL

· Yan Cailin

2000 MySQL Big5HKhttp://mysql.hitstar.com/ linuxdb.yeah.net

· Jay Flaherty <fty@mediapulse.com>

Perl DBI/DBD

· Paul Southworth <pauls@etext.org>, Ray Loyzaga <yar@cs.su.oz.au>

· Therrien Gilbert <gilbert@ican.net>, Jean-Marc Pouyot <jmp@scalaire.fr>

· Petr Snajdr, <snajdr@pvt.net>

· Jaroslaw Lewandowski <jotel@itnet.com.pl>

- Miguel Angel Fernandez Roiz

- Roy-Magne Mo <rmo@www.hivolda.no>

MySQL 3.21.xx

- Timur I. Bakeyev <root@timur.tatarstan.ru>

- <brenno@dewinter.com> & Filippo Grassilli <phil@hyppo.com>

- Dirk Munzinger <dirk@trinity.saar.de>

- Billik Stefan <billik@sun.uniag.sk>

- Stefan Saroiu <tzoompy@cs.washington.edu>

- Peter Feher

- Roberto M. Serqueira

- Carsten H. Pedersen

- Arjen G. Lentz

C.4. MySQL

MySQL MySQL

· Fred Fish

C Monty

· Richard A. O'Keefe

· Henry Spencer

regex WHEREREGEXP regexp

· Chris Provenzano

pthreads Chris Provenzano Monty1_60_beta6 mit-pthreads/Changes-mysql

· Jean-loup Gailly and Mark Adler

zlib WindowsMySQL

· Bjorn Benson

safe_malloc“ --debug” MySQL

· Free Software Foundation

readline **mysql**

· The NetBSD foundation

libedit **mysql**

C.5. MySQL

API MySQL

http://solutions.mysql.com/software/

· Tim Bunce, Alligator Descartes

DBD (Perl)

· Andreas Koenig <a.koenig@mind.de>

MySQLPerl

· Jochen Wiedmann <wiedmann@neckar-alb.de>

Perl DBD::mysql

· Eugene Chan <eugene@acenet.com.sg>

MySQLPHP

· Georg Richter

MySQL 4.1 PHP 5.0 mysqliAPI MySQL 4.1

· Giovanni Maruzzelli <maruzz@matrice.it>

iODBC (Unix ODBC)

· Xavier Leroy <Xavier.Leroy@inria.fr>

LinuxThreads LinuxMySQL

C.6. MySQL

MySQL MySQL

·

gcc **gdb**libc strto.cLinux

· Xemacs

MySQL AB/

· Julian Seward

valgrind valgrind MySQL

· Dorothea LütkehausAndreas Zeller

DDD 1gdb

C.7. MySQL

MySQL ABMySQLMySQL MySQL MySQL

· VA Linux / Andover.net

· NuSphere

MySQL

· Stork Design studio

1998-2000MySQL

· Intel

WindowsLinux

· Compaq

Linux/Alpha

· SWSoft

mysqld

· FutureQuest

--skip-show-database

MySQLMySQL dev.mysql.com

DMySQL

D.1. 5.1.x
D.1.1. 5.1.2
D.1.2. 5.1.1
D.2. MyODBC
D.2.1. MyODBC 3.51.12
D.2.2. MyODBC 3.51.11

MySQL MySQL 5.1 MySQL 5.1.2-alphaMySQL 5.0 MySQL 5.05.1 MySQL 4.1MySQL *MySQL 4.1*

5.1

MySQL MySQLhttp://dev.mysql.com/downloads/

BitKeeper ChangeSet ChangeSet

D.1. 5.1.x

D.1.1. 5.1.2
D.1.2. 5.1.1

5.1

5.1.x

D.1.1. 5.1.2

· TEMPORARY TEMPORARY Bug #12084

D.1.2. 5.1.1

· PARTITION BYCREATE TABLE Bug #12097

· NDBCREATE TABLEnodegroupCREATE TABLE Bug #12114

· 64 ORDER BY Bug #12116

· LOCK TABLES Bug #10600

D.2. MyODBC

D.2.1. MyODBC 3.51.12
D.2.2. MyODBC 3.51.11

D.2.1. MyODBC 3.51.12

· N/A

· SQLColumns() Bug #9539

D.2.2. MyODBC 3.51.11

· mysql_list_dbcolumns()insert_fields() Bug #8198

· SQL_VARBINARYSQLGetTypoInfo()tinyblob SQL_BINARYSQLGetTypoInfo() SQL_VARBINARYvarbinary SQL_BINARYbinarySQL_LONGVARBINARYlongblobBug #8138

MySQLMySQL dev.mysql.com

E

E.1. MySQL
E.1.1. MySQL
E.1.2.
E.1.3. **gdb mysqld**
E.1.4.
E.1.5. **mysqld**
E.1.6.
E.2. MySQL
E.3. DBUG
E.4. RTS
E.5.

MySQL
http://www.mysql.com/

MySQLGPLMySQL

POSIX Solaris 2.5 Sun PThreads 2.4Linux
Leroy<Xavier.Leroy@inria.fr>LinuxThreads

UnixMIT-pthreadsmit-pthreads/README
(http://www.humanfactor.com/pthreads/)

MySQL 4.0.2MySQLMITChris ProvenzanoPthreadsMIT Pthreads
http://www.mit.edu/afs/sipb/project/pthreads/
http://www.mit.edu:8001/people/proven/IAP_2000/POSIX 2.8.5
“MIT-pthreads ”

FSU Pthreads http://moss.csc.ncsu

mysysthr_lock.c thr_alarm.c /

C++ **gcc** SPARCwo
xlC_r), Intel **ecc/icc** Compaq **cxx**)

./configure --without-server.

/Makefile GNU Automake Autoconf

remake

```
/bin/rm */.deps/*.P
/bin/rm -f config.cache
aclocal
autoheader
aclocal
automake
autoconf
./configure --with-debug=full --prefix='your installation directory'

# The makefiles generated above need GNU make 3.75 or newer.
# (called gmake below)
gmake clean all install init-db
```

MySQL E.1“MySQL”

mysqld mysys/thr_alarmmysys/thr_lock

E.1. MySQL

E.1.1. MySQL
E.1.2.
E.1.3. **gdb**
E.1.4.
E.1.5. **mysqld**
E.1.6.

MySQL--skip-new --safe-mode
MySQL”

mysqld my.cnf **mysqld --p**
defaults

mysqld CPU“” **mysqladmin pr**
mysqladmin -i10 processlist status

mysqladmin debug MySQLMySQL

PTIMIZE TABLE **myisamchk**I 5

OS 2.12“”

E.1.1. MySQL

MySQLMySQL--with-debug--with-debug=fullMySQLMySQL
mysqld --help--debug **mysqladmin vermysqldmysql ... --debug**

gcc egcsconfigure

```
CC=gcc CFLAGS="-O2" CXX=gcc CXXFLAGS="-O2 -felide-constructors \
   -fno-exceptions -fno-rtti" ./configure --prefix=/usr/local/mysql
   --with-debug --with-extra-charsets=complex
```

libstdc++C++C++MySQL

--with-debug=fullMySQLSAFEMALLOCSAFEMALLOC
--skip-safemalloc **mysqld**malloc()fr

--with-debug **mysqld**MySQL -gCFLAGSCXXFLAGS with-debug **mysqld** **gdbgdb**

MySQL **mysqld**“”stderr MySQLMySQL

Windows MySQLmysqld.exe

E.1.2.

mysqld

mysqld mysqld -V -deb MySQL 4.1 **mysqld**

mysqld Unix/tmp/mysqld.traceWindows

```
shell> mysqld --debug
```

Windows--standalone **mysqld**

```
C:\> mysqld-debug --debug --standalone
```

mysql.exe **mysq**

mysqld --debug=d,info,error,query,general,where:O,/tmp/mysqld.trace

.

ftp

Fred Fish **DBUG** E.3“DBUG”

E.1.3. gdbmysqld

mysqld **gdbmysqld**

Linux **gdbmysqld**run --one-threadsomegdb 5.1 ASAP

NTPL Linux **gdbmysqld**

- **mysqld** ready for connections
- **mysqld** pthread_mutex_lock()pthread_mutex_unlock()

gdb

```
LD_ASSUME_KERNEL=2.4.1
export LD_ASSUME_KERNEL
```

gdbmysqld--skip-stack-trace **gdb**

MySQL 4.0.14mysqld--gdb SIGINT^C

gdb **gdb**MySQL -O thread_cache_size= 'max_connections
mysqld -O thread_cache_size=5'

mysqldSIGSEGVLinux--core-file **mysqld**

```
shell> gdb mysqld core
gdb>   backtrace full
gdb>   exit
```

A.4.2“MySQL”

Linux **gdb** 4.17.x .gdb

```
set print sevenbit off
handle SIGUSR1 nostop noprint
handle SIGUSR2 nostop noprint
handle SIGWAITING nostop noprint
handle SIGLWP nostop noprint
handle SIGPIPE nostop
handle SIGALRM nostop
handle SIGHUP nostop
handle SIGTERM nostop noprint
```

gdbgdb 5.x **gdb**

mysqld

```
shell> gdb /usr/local/libexec/mysqld
gdb> run
```

```
...
backtrace full # Do this when mysqld crashes
```

mysqlbugMySQL 1.7.1.1“MySQL ”

mysqld strace /usr/proc/bin/pstack

```
strace /tmp/log libexec/mysqld
```

Perl DBI traceDBI_TRACE

E.1.4.

mysqld **mysqld**
pointer **mysqld** gcc E.1.1“MySQL”

```
mysqld got signal 11;
The manual section 'Debugging a MySQL server' tells you how to use a
stack trace and/or the core file to produce a readable backtrace tha
help in finding out why mysqld died
Attempting backtrace. You can use the following information to find
where mysqld died.  If you see no messages after this, something wen
terribly wrong...
stack range sanity check, ok, backtrace follows
0x40077552
0x81281a0
0x8128f47
0x8127be0
0x8127995
0x8104947
0x80ff28f
0x810131b
0x80ee4bc
0x80c3c91
0x80c6b43
0x80c1fd9
0x80c1686
```

mysqld

1. mysqld.stack
2. **mysqld**

```
nm -n libexec/mysqld > /tmp/mysqld.sym
```

MySQL"debug" mysqld.sym.gz

```
gunzip < bin/mysqld.sym.gz > /tmp/mysqld.sym
```

3. resolve_stack_dump -s /tmp/mysqld.sym -n mysqld.stack.

mysqld **mysqld**

E.1.5. mysqld

--log **mysqld** **myisamchk** 5 .

mysqld --log **mysqld mysqld**

--log *host_name*.log **mysqld** **mysqld**

SELECTEXPLAIN **mysqld** 7.2.1“

--log-slow-queries **mysqld** 5.11.4 “”

hostname.err mysqld restarted
MySQLMySQLmysqlMySQL
http://lists.mysql.com/

myisam-recover **mysqld**MySQLMyISAM “”
hostname.err 'Warning: Checking table ...'
5.3.1“ **mysqld**”

mysqldChecking table... **mysqld**

E.1.6.

mysqld

- MySQL **mysqladmin shutdown**
-

- **myisamchk -s database/*.MYI myisamchk -r database/*table*.MYI**
-
- MySQL
- --log-binStart **mysqld** 5.11.3“” **mysqld**use
- mysqld server
-
- --log-bin **mysqld**
- **mysqlbinlog update-log-file | mysql**hostname-bin.#MySQL
- **mysqld** ftp http://bugs.mysql.com//pub/mysql/upload/ FTPFTP MySQL https://support.mys

mysql_find_rows

E.2. MySQL

MySQL --with-debug--with-debug=fullMySQL

MYSQL_DEBUG

```
shell> MYSQL_DEBUG=d:t:O,/tmp/client.trace
shell> export MYSQL_DEBUG
```

/tmp/client.trace

MySQL

```
shell> mysql --debug=d:t:O,/tmp/client.trace
```

“”

mysql.hMySQLMySQLmysql.h

E.3. DBUG

MySQLMySQLFred FishDBUG MytSQL

MySQLDBUGMySQLdbugDBUGMySQL

--debug="..."the -#...

MySQL--debug/tmp/program_name.traceUnix
\program_name.trace Windows

```
<field_1>:<field_2>:...:<field_N>
```

‘,’

```
flag[,modifier,modifier,...,modifier]
```

d	DBUG_<N>DBUG
D	-#D,20
f	/d
F	
i	PIDID
g	dbugmon.out
L	
n	
N	
o	stderr
O	o
p	DBUG_PROCESS
P	

r	
S	_sanity(_file_,_line_) _sanity() 0safemalloc
t	/

-#

```
-#d:t
-#d:f,main,subr1:F:L:t,20
-#d,input,output,files:n
-#d:t:i:O,\\mysqld.trace
```

MySQL, d enter, exit, error, warning, info, loop

E.4. RTS

MySQLRTS

RTSPOSIXPOSIX

mysys/my_pthread.c

pthread_get_specific sigwaitpthread_cond_wait, pthread_cond_timedwait() -1 errno

ALRMread, write, open...MyS

pthread_cond_timedwait() mysys/thr_alarm.cEINTR

RTSMySQL

- MySQLPOSIX
- -DHAVE_rts_threads
- thr_alarm
- my_pthread.hmy_pthread.c
- thr_alarmSolaris

```
Main thread: 1
Thread 0 (5) started
Thread: 5  Waiting
process_alarm
Thread 1 (6) started
Thread: 6  Waiting
process_alarm
process_alarm
thread_alarm
Thread: 6  Slept for 1 (1) sec
```

```
Thread: 6  Waiting
process_alarm
process_alarm
thread_alarm
Thread: 6  Slept for 2 (2) sec
Thread: 6  Simulation of no alarm needed
Thread: 6  Slept for 0 (3) sec
Thread: 6  Waiting
process_alarm
process_alarm
thread_alarm
Thread: 6  Slept for 4 (4) sec
Thread: 6  Waiting
process_alarm
thread_alarm
Thread: 5  Slept for 10 (10) sec
Thread: 5  Waiting
process_alarm
process_alarm
thread_alarm
Thread: 6  Slept for 5 (5) sec
Thread: 6  Waiting
process_alarm
process_alarm

...
thread_alarm
Thread: 5  Slept for 0 (1) sec
end
```

E.5.

MySQL MySQL

- FSU Pthreads RTS SCOSCOFSU Pthreads MIT-pthreads
- LinuxThreads
-

“”

MySQLMySQL dev.mysql.com

F

MySQL

MySQL [4.3.2“”]

CXX	C++ **configure**
CC	C **configure**
CFLAGS	C **configure**
CXXFLAGS	C++ **configure**
DBI_USER	Perl DBI
DBI_TRACE	Perl DBI
HOME	**mysql**$HOME/.mysql_history
LD_RUN_PATH	libmysqlclient.so
MYSQL_DEBUG	

MYSQL_HISTFILE	**mysql** $HOME/.mysql_history
MYSQL_HOST	**mysql**
MYSQL_PS1	**mysql**
MYSQL_PWD	**mysqld** 5.8.6“”
MYSQL_TCP_PORT	TCP/IP
MYSQL_UNIX_PORT	Unix
PATH	shellMySQL
TMPDIR	
TZ	A.4.6“”
UMASK_DIR	UMASKANDed
UMASK	
USER	WindowsNetWare**mysqld**

MySQLMySQL dev.mysql.com

GMySQL

MySQLHenry Spencer POSIX 1003.2C MySQL SQLREGEXP3.3.4.7 “”

MySQLREGEXP Henry Spencerregex(7) MySQL regex regex.7

hellohello

1 hello|wordhelloword

B[an]*s BananasBaaaaasBsB s an

REGEXP

. ^

```
mysql> SELECT 'fo\nfo' REGEXP '^fo$';                    -> 0
mysql> SELECT 'fofo' REGEXP '^fo';                       -> 1
```

. $

```
mysql> SELECT 'fo\no' REGEXP '^fo\no$';                  -> 1
mysql> SELECT 'fo\no' REGEXP '^fo$';                     -> 0
```

. .

```
mysql> SELECT 'fofo' REGEXP '^f.*$';                     -> 1
mysql> SELECT 'fo\r\nfo' REGEXP '^f.*$';                 -> 1
```

· a*

0a

```
mysql> SELECT 'Ban' REGEXP '^Ba*n';                    -> 1
mysql> SELECT 'Baaan' REGEXP '^Ba*n';                  -> 1
mysql> SELECT 'Bn' REGEXP '^Ba*n';                     -> 1
```

· a+

1a

```
mysql> SELECT 'Ban' REGEXP '^Ba+n';                    -> 1
mysql> SELECT 'Bn' REGEXP '^Ba+n';                     -> 0
```

· a?

01a

```
mysql> SELECT 'Bn' REGEXP '^Ba?n';                     -> 1
mysql> SELECT 'Ban' REGEXP '^Ba?n';                    -> 1
mysql> SELECT 'Baan' REGEXP '^Ba?n';                   -> 0
```

· de|abc

deabc

```
mysql> SELECT 'pi' REGEXP 'pi|apa';                    -> 1
mysql> SELECT 'axe' REGEXP 'pi|apa';                   -> 0
mysql> SELECT 'apa' REGEXP 'pi|apa';                   -> 1
mysql> SELECT 'apa' REGEXP '^(pi|apa)$';               -> 1
mysql> SELECT 'pi' REGEXP '^(pi|apa)$';                -> 1
mysql> SELECT 'pix' REGEXP '^(pi|apa)$';               -> 0
```

· (abc)*

abc0

```
mysql> SELECT 'pi' REGEXP '^(pi)*$';                    -> 1
mysql> SELECT 'pip' REGEXP '^(pi)*$';                   -> 0
mysql> SELECT 'pipi' REGEXP '^(pi)*$';                  -> 1
```

· {1}, {2,3}

{n}{m,n} “” mn

o a*

a{0,}

o a+

a{1,}

o a?

a{0,1}

a{n}an a{n,}an a{m,n}amn mn

mn0RE_DUP_MAX 255 0RE_DUP_MAXmnmn

```
mysql> SELECT 'abcde' REGEXP 'a[bcd]{2}e';              -> 0
mysql> SELECT 'abcde' REGEXP 'a[bcd]{3}e';              -> 1
mysql> SELECT 'abcde' REGEXP 'a[bcd]{1,10}e';           -> 1
```

· [a-dX], [^a-dX]

^abcdX“-”12[0-9]
“-”[]

```
mysql> SELECT 'aXbc' REGEXP '[a-dXYZ]';                 -> 1
mysql> SELECT 'aXbc' REGEXP '^[a-dXYZ]$';               -> 0
mysql> SELECT 'aXbc' REGEXP '^[a-dXYZ]+$';              -> 1
```

```
mysql> SELECT 'aXbc' REGEXP '^[^a-dXYZ]+$';            -> 0
mysql> SELECT 'gheis' REGEXP '^[^a-dXYZ]+$';           -> 1
mysql> SELECT 'gheisa' REGEXP '^[^a-dXYZ]+$';          -> 0
```

· [.characters.]

[] regexp/cname.h

```
mysql> SELECT '~' REGEXP '[[.~.]]';                    -> 1
mysql> SELECT '~' REGEXP '[[.tilde.]]';                -> 1
```

· [=character_class=]

[][=character_class=]o(+)[[=o=]][[=(+)=]][o(+)]

· [:character_class:]

[][:character_class:]

alnum	
alpha	
blank	
cntrl	
digit	
graph	

lower	
print	
punct	
space	
upper	
xdigit	

ctype(3)

```
mysql> SELECT 'justalnums' REGEXP '[[:alnum:]]+';       -> 1
mysql> SELECT '!!' REGEXP '[[:alnum:]]+';               -> 0
```

· [[:<:]], [[:>:]]

wordwordwordalnum(_)

```
mysql> SELECT 'a word a' REGEXP '[[:<:]]word[[:>:]]';   -> 1
mysql> SELECT 'a xword a' REGEXP '[[:<:]]word[[:>:]]';  -> 0
```

2“ \” MySQL“ +”“ 1+2”

```
mysql> SELECT '1+2' REGEXP '1+2';                       -> 0
mysql> SELECT '1+2' REGEXP '1\+2';                      -> 0
mysql> SELECT '1+2' REGEXP '1\\+2';                     -> 1
```

HMySQL

H.1. _____

MySQL 5.1

H.1.

61

MySQLMySQL dev.mysql.com

I

I.1.
I.2.
I.3.
I.4.
I.5. XA

MySQL

I.1.

SQL SELECT ... INTO MySQL SQL 20.2.9.3 “SELECT ... INTO”

SQL

· CHECK TABLES

· LOCK TABLES, UNLOCK TABLES

· LOAD DATA, LOAD TABLE

· SQLPREPAREEXECUTEDEALLOCATE PREPARE SQL MySQL 5.0.13

· OPTIMIZE TABLE

·

· INFOSELECT SHOW SELECT … INTOFETCH

· FLUSH FLUSH

20.4“”

INFORMATION_SCHEMAPARAMETERS SHOW CREATE

CALL SQL

I.2.

MySQL 5.0.2 mysql_stmt_attr_set() C API 1

UPDATE WHERE CURRENT OFDELETE WHERE CURRENT OF

ID

1

CHECK TABLESHANDLER READSHOW BINLOG EVENTS

I.3.

NULLALLANYSOME NULL TRUEFALSE

SELECTINSERTUPDATEDELETESETDO

· *expr* IN (*subquery*)*exprn*-tuple *n*-tuples

· *expr op* {ALL|ANY|SOME} (*subquery*)*expr*

n-tuples

```
(val_1, ..., val_n) IN (subquery)
```

```
(val_1, ..., val_n) op {ALL|ANY|SOME} (subquery)
```

IN IN“ =” AND ALLANYSOME

2

```
(col1, col2, ...) = (val1, val2, ...)
```

```
col1 = val1 AND col2 = val2 AND ...
```

IN“ =”

IN

FROM

```
DELETE FROM t WHERE ... (SELECT ... FROM t ...);
```

```
UPDATE t ... WHERE col = (SELECT ... FROM t ...);
```

```
{INSERT|REPLACE} INTO t (SELECT ... FROM t ...);
```

FROM

```
UPDATE t ... WHERE col = (SELECT (SELECT ... FROM t...) AS _t ...);
```

FROM“ t”“ t”

join

INSELECT DISTINCT

```
SELECT col FROM t1 WHERE id_col IN (SELECT id_col2 FROM t2 WHERE con
```

```
SELECT DISTINCT col FROM t1, t2 WHERE t1.id_col = t2.id_col AND cona
```

DISTINCT

MySQL MySQL

```
SELECT a FROM outer_table AS ot
WHERE a IN (SELECT a FROM inner_table AS it WHERE ot.b = it.b);
```

MySQLouter_tableinner_table outer_tableinner_table

```
SELECT a FROM outer_table AS ot, inner_table AS it
WHERE ot.a = it.a AND ot.b = it.b;
```

inner_tableouter_table “ot.a,ot.b”

FROM

FROMMERGE MERGE

```
SELECT * FROM (SELECT * FROM t1 WHERE t1.t1_col) AS _t1, t2 WHERE t2
```

```
SELECT * FROM t1, t2 WHERE t1.t1_col AND t2.t2_col;
```

1. t1

2. t1t2

IN= ANY<> ANY= ALL<> ALL“”

```
SELECT a FROM big_table AS bt
WHERE non_key_field IN (SELECT non_key_field FROM table WHERE condit
```

```
CREATE TABLE t (key (non_key_field))
(SELECT non_key_field FROM table WHERE condition)
```

big_table bt.non_key_field“t”

I.4.

.

· MERGE

FROM

I.3“”

MERGE

```
CREATE VIEW v1 AS
SELECT * FROM t2 WHERE EXISTS (SELECT 1 FROM t1 WHERE t1.a = t2.a);

UPDATE t1, v2 SET t1.a = 1 WHERE t1.b = v2.b;
```

“”
TEMPTABLE

DROP TABLEALTER TABLE

“”

· PREPARE

```
· CREATE VIEW v AS SELECT 1;
· PREPARE s FROM 'SELECT * FROM v';
· ALTER VIEW v AS SELECT 2;
· EXECUTE s;
```

EXECUTE12

.

```
·                CREATE VIEW v AS SELECT 1;
·                delimiter //
·                CREATE PROCEDURE p ()
·                BEGIN
·                  DECLARE i INT DEFAULT 0;
·                  WHILE i < 5 DO
·                    SELECT * FROM v;
·                    SET i = i + 1;
·                    ALTER VIEW v AS SELECT 2;
·                  END WHILE;
·                END;
·                //
·                delimiter ;
·                CALL p();
```

p()SELECT1

UNION MySQL

· WHERE SELECT

· UPDATEJoin1

· DELETEJoin

I.5. XA

XAInnoDB

MySQL XAXA MySQL“ XA” MySQLRM
TM 1XA XAXA InnoDB

XA STARTJOINRESUME

XA ENDSUSPEND [FOR MIGRATE]

XA xidbqual MySQL XA XA

XAPREPAREDMySQL XA PREPARED
PREPARED XA

MySQLMySQL dev.mysql.com

JGNU

1991.6

©19891991Free Software Foundation

59 Temple PlaceSuite 330BostonMA 02111-1307USA

GNU GPL GNU

free software GNU

1 2

no warranty

GNU

1. GPL“”“”“”“”
licensee

2.

3.

a.

b.

c.

4. 2)12 31

a. 12

b. 3 12

c. b

5.

6.

7.

8.

,

9.

10./

“”

11.

12.“”

13.

“”

C,yyyy

GNU

GNU

GNU

Free Software Foundation, Inc., 59 Temple Place - Suite 330, Bos

Gnomovision 69 C 19XX

Gnomovision‘ show w’

‘ show c’

‘ show w’‘ show c’‘ show w’‘ show c’

YoyodyneJames HarkerGnomovision

Ty coon 1989.4.1

Ty coon

GNU

MySQLMySQL dev.mysql.com

KMySQL FLOSS

MySQL ABMySQL“ FLOSS”

0.4200598

FLOSS GPLMySQL FLOSSGNUGPL2.0

GPL 2.0

1. “” 111 1FLOSS

a. GPL“”“”

b. “”

i. FLOSS

ii. FLOSS

c. GPL“”“”“”“” FLOSS”

GPLMySQL AB“”

2. **FLOSS**

	/
	2.0
Apache	1.0/1.1/2.0

Apple	2.0
	Perl 5.8.0
BSD	"July 22 1999"
	1.0
GNU"Lesser"(LGPL)	2.0/2.1
Jabber	1.0
MIT	-
Mozilla(MPL)	1.0/1.1
	2.0
OpenSSL SSLeay	"2003" ("1998")
PHP	3.0
Python(CNRI Python)	—
Python	2.1.1

Sleepycat	"1999"
W3C	"2001"
X11	"2001"
Zlib/libpng	—
Zope	2.0

3. 2003http://www.gnu.org/philosophy/free-sw.htmlOpen Source Initiative 1.9http://www.opensource.org/docs/definition.php

4.

a. GPL

b.

5. FLOSSMySQL AB“”“” FLOSS GPL“” FLOSS FLOSS GPL GPL FLOSS GPL

A

FLOSS FLOSS“ FLOSS”

Apache Portable Runtime (APR)	Apache2.0

MySQLMySQL dev.mysql.com

! (logical NOT)
!= (not equal)
"
% (modulo)
% (wildcard character)
& (bitwise AND)
&& (logical AND)
() (parentheses)
(Control-Z) \Z
* (multiplication)
+ (addition)
- (subtraction)
- (unary minus)
--password option
-p option
.my.cnf file MySQL
.mysql_history file
.pid (process ID) file
/ (division)
/etc/passwd MySQLSELECT
< (less than)
<<
<< (left shift)
<= (less than or equal)
<=> (equal to)
<> (not equal)
= (equal)
> (greater than)
>= (greater than or equal)
>> (right shift)
\" (double quote)
\' (single quote)
\0 (ASCII 0)

\b (backspace)
\n (linefeed)
\n (newline)
\r (carriage return)
\t (tab)
\Z (Control-Z) ASCII 26
\\ (escape)
^ (bitwise XOR)
_ (wildcard character)
`
|| (bitwise OR)
|| (logical OR)
~

A

aborted clients
aborted connection
ABS()
access control 1
access denied errors
access privileges MySQL
Access program MyODBC
account privileges
  adding MySQL
accounts
  anonymous user MySQL
  root MySQL
ACID InnoDB
ACLs MySQL
ACOS()
ActiveState Perl WindowsActiveState Perl
ADDDATE()
adding
  character sets
  native functions
  new account privileges MySQL
  new functions MySQL
  new user privileges MySQL

new users, UnixMySQL
procedures, MySQL
user-defined functions
addition (+)
ADDTIME()
ADO program, MyODBC
AES_DECRYPT()
AES_ENCRYPT()
age
calculating
alias
alias names
case sensitivity
aliases
for expressions, GROUP BY
for tables, SELECT
in GROUP BY clauses, GROUP BY
in ORDER BY clauses, GROUP BY
names
on expressions, SELECT
ALL, SELECT
ALLOW_INVALID_DATES SQL mode, SQL
ALTER COLUMN, ALTER TABLE
ALTER DATABASE, ALTER DATABASE
ALTER FUNCTION, ALTER PROCEDUREALTER FUNCTION
ALTER PROCEDURE, ALTER PROCEDUREALTER FUNCTION
ALTER SCHEMA, ALTER DATABASE
ALTER TABLE, ALTER TABLE ALTER TABLE
ALTER VIEW, ALTER VIEW
altering
database, ALTER DATABASE
schema, ALTER DATABASE
ANALYZE TABLE, ANALYZE TABLE
AND
bitwise
logical
anonymous user, MySQL 1 2
ANSI mode
running, ANSIMySQL

ANSI SQL mode SQL
ANSI_QUOTES SQL mode SQL
answering questions
    etiquette
Apache ApacheMySQL
API's
    list of MySQL
APIs API
    Perl MySQL Perl API
approximate-value literals
ARCHIVE storage engine ARCHIVE
ARCHIVE table type ARCHIVE
Area() PolygonMultiPolygon
argument processing UDF
arithmetic expressions
arithmetic functions
AS SELECTJOIN
AsBinary() Geometry
ASCII()
ASIN()
AsText() Geometry
ATAN()
ATAN2()
attackers
    security against MySQL
AUTO-INCREMENT
    ODBC ODBCAUTO_INCREMENT
AUTO_INCREMENT AUTO_INCREMENT
    and NULL values NULL
AVG() GROUP BY
AVG(DISTINCT) GROUP BY

B

backslash
    escape character
backspace (\b)
BACKUP TABLE BACKUP TABLE
backups

database BACKUP TABLE
batch
mysql option
batch mode mysql
BDB storage engine BDB (BerkeleyDB)
BDB table type BDB (BerkeleyDB)
BDB tables
BdMPolyFromText() WKTGeometry
BdMPolyFromWKB() WKBGeometry
BdPolyFromText() WKTGeometry
BdPolyFromWKB() WKBGeometry
BEGIN START TRANSACTIONCOMMITROLLBACK BEGIN ... EN
XA transactions XASQL
benchmark suite MySQL
BENCHMARK()
benchmarks
BerkeleyDB storage engine BDB (BerkeleyDB)
BerkeleyDB table type BDB (BerkeleyDB)
BETWEEN ... AND
Big5 Chinese character encoding
BIGINT data type
BIN()
BINARY Cast
BINARY data type BINARYVARBINARY
binary distributions MySQL ABMySQL
installing UnixMySQL
on Linux Linux
binary log
BIT data type
BitKeeper tree
BIT_AND() GROUP BY
BIT_COUNT
BIT_COUNT()
bit_functions
example
BIT_LENGTH()
BIT_OR
BIT_OR() GROUP BY
BIT_XOR() GROUP BY

BLACKHOLE storage engine BLACKHOLE
BLACKHOLE table type BLACKHOLE
BLOB
  inserting binary data
  size
BLOB columns
  default values BLOBTEXT
  indexing CREATE TABLE
BLOB data type BLOBTEXT
BOOL data type
BOOLEAN data type
Borland Builder 4 program MyODBC
Borland C++ compiler Borland C++
Boundary()
brackets
  square
buffer sizes
  client API
  mysqld server
Buffer() Spatial
bug reports
  criteria for
bugs
  known MySQL
  reporting
bugs database
bugs.mysql.com
building
  client programs

C

C API
  data types MySQL C API
  functions C API
  linking problems C API
C Prepared statement API
  functions C API
C++ APIs MySQL C++ API

C++ Builder MyODBC
C++ compiler
gcc
C++ compiler cannot create executables MySQL
C:\my.cnf file
CACHE INDEX CACHE INDEX
caches
clearing FLUSH Syntax
calculating
dates
calendar MySQL
CALL CALL
calling sequences for aggregate functions
UDF UDF
calling sequences for simple functions
UDF UDF
can't create/write to file
carriage return (\r)
CASE CASE
case sensitivity
in identifiers
in names
in searches
in string comparisons
case-sensitivity
in access checking
of database names MySQLSQL
of table names MySQLSQL
CAST Cast
cast functions Cast
cast operators Cast
casts Cast
CC environment variable MySQL
cc1plus problems MySQL
CEILING()
Centroid() MultiPolygon
CFLAGS environment variable MySQL
CHANGE MASTER TO CHANGE MASTER TO
ChangeLog MySQL

changes
    log MySQL
    MySQL 5.1 5.1.x
changes to privileges 2
changing
    column ALTER TABLE
    column order
    field ALTER TABLE
    table ALTER TABLEALTER TABLE
changing socket location MySQLMySQL/tmp/mysql.sock
CHAR data type String
CHAR VARYING data type
CHAR()
CHARACTER data type
character sets
    adding
Character sets
CHARACTER VARYING data type
character-sets-dir
    mysql option
characters
    multi-byte
CHARACTER_LENGTH()
CHARACTER_SETS
    INFORMATION_SCHEMA table INFORMATION_SCHEMA
    CHARACTER_SETS
CHARSET()
CHAR_LENGTH()
check options
    myisamchk myisamchk
CHECK TABLE CHECK TABLE
checking
    tables for errors MyISAM
checksum errors Solaris
CHECKSUM TABLE CHECKSUM TABLE
Chinese
choosing
    a MySQL version MySQL
choosing types

clearing
caches FLUSH Syntax
client programs
building
client tools API
clients
debugging MySQL
threaded
CLOSE Cursor CLOSE Statement
closing
tables MySQL
COALESCE()
COERCIBILITY()
ColdFusion program MyODBC
collating
strings
COLLATION()
COLLATIONS
INFORMATION_SCHEMA table INFORMATION_SCHEMA COLLATIONS
COLLATION_CHARACTER_SET_APPLICABILITY
INFORMATION_SCHEMA table INFORMATION_SCHEMA COLLATION_CHARACTER_SET_APPLICABILITY
column
changing ALTER TABLE
column comments CREATE TABLE
column names
case sensitivity
columns
changing
indexes
names
other types
selecting
storage requirements
types
COLUMNS
INFORMATION_SCHEMA table INFORMATION_SCHEMA COLUMNS

COLUMN_PRIVILEGES
    INFORMATION_SCHEMA table INFORMATION_SCHEMA
    COLUMN_PRIVILEGES
command syntax
command-line history
    mysql
command-line options mysqld
    mysql
    mysqladmin mysqladminMySQL
commands
    for binary distribution UnixMySQL
    replication masters SQL
    replication slaves SQL
commands out of sync
Comment syntax
comments
    adding
    starting '--'
COMMIT START TRANSACTIONCOMMITROLLBACK
    XA transactions XASQL
comparison operators
compatibility
    with mSQL
    with ODBC CREATE TABLE JOIN
    with Oracle MySQLSQLGROUP BY DESCRIBE
    with PostgreSQL MySQLSQL
    with standard SQL MySQL
    with Sybase USE
compiler
    C++ gcc
compiling
    on Windows WindowsMySQL
    optimizing
    problems MySQL
    speed MySQL
    statically
    user-defined functions
compliance
    Y2K 2000

composite subpartitioning
compress
    mysql option
COMPRESS()
compressed tables
CONCAT()
CONCAT_WS()
concurrent inserts
Conditions DECLARE
config-file
    mysqld_multi option mysqld_multiMySQL
config.cache MySQL
config.cache file MySQL
configuration files
configuration options
configure
    running after prior invocation MySQL
configure option
    --with-charset
    --with-collation
    --with-extra-charsets
    --with-low-memory MySQL
configure script
connecting
    remotely with SSH SSHWindowsMySQL
    to the server MySQL
    verification 1
connection
    aborted
CONNECTION_ID()
Connector/JDBC
Connector/ODBC MySQL Connector/ODBC
    reporting problems MyODBC

    MySQL
connect_timeout variable mysqladminMySQL
constant table EXPLAINSELECT MySQLWHERE
constraints MySQL
CONSTRAINTS

INFORMATION_SCHEMA table INFORMATION_SCHEMA TABLE_CONSTRAINTS
Contains()
contributing companies
list of MySQL
contributors
list of MySQL
control access 1
control flow functions
CONV()
conventions
typographical
CONVERT Cast
CONVERT TO ALTER TABLE
CONVERT_TZ()
ConvexHull() Spatial
copying databases MySQL
copying tables CREATE TABLE
COS()
COT()
COUNT() GROUP BY
COUNT(DISTINCT) GROUP BY
counting
table rows
crash MySQL
recovery myisamchk
repeated MySQL
crash-me MySQL
crash-me program MySQL
CRC32()
CREATE DATABASE CREATE DATABASE
CREATE FUNCTION CREATE PROCEDURECREATE FUNCTION CREATE FUNCTION/DROP FUNCTION
CREATE INDEX CREATE INDEX
CREATE PROCEDURE CREATE PROCEDURECREATE FUNCTION
CREATE SCHEMA CREATE DATABASE
CREATE TABLE CREATE TABLE
CREATE USER CREATE USER
CREATE VIEW CREATE VIEW

creating
bug reports
database CREATE DATABASE
databases
default startup options
schema CREATE DATABASE
tables
creating user accounts CREATE USER
CROSS JOIN JOIN
Crosses()
CR_SERVER_GONE_ERROR MySQL
CR_SERVER_LOST_ERROR MySQL
CSV storage engine CSV
CSV table type CSV
CURDATE()
CURRENT_DATE
CURRENT_TIME
CURRENT_TIMESTAMP
CURRENT_USER()
CURTIME()
customer support
mailing address
customers
of MySQL MySQL
CXX environment variable MySQL
CXXFLAGS environment variable MySQL

D

data
character sets
loading into tables
retrieving
size
data type
BIGINT
BINARY BINARYVARBINARY
BIT

BLOB BLOBTEXT
BOOL
BOOLEAN
CHAR String
CHAR VARYING
CHARACTER
CHARACTER VARYING
DATE DATETIMEDATETIMESTAMP
DATETIME DATETIMEDATETIMESTAMP
DEC
DECIMAL
DOUBLE
DOUBLE PRECISION
ENUM ENUM
FIXED
FLOAT
GEOMETRY MySQL
GEOMETRYCOLLECTION MySQL
INT
INTEGER
LINESTRING MySQL
LONG BLOBTEXT
LONGBLOB
LONGTEXT
MEDIUMBLOB
MEDIUMINT
MEDIUMTEXT
MULTILINESTRING MySQL
MULTIPOINT MySQL
MULTIPOLYGON MySQL
NATIONAL CHAR
NCHAR
NUMERIC
POINT MySQL
POLYGON MySQL
REAL
SET SET
SMALLINT
TEXT BLOBTEXT

TIME TIME
TIMESTAMP DATETIMEDATETIMESTAMP
TINYBLOB
TINYINT
TINYTEXT
VARBINARY BINARYVARBINARY
VARCHAR String
VARCHARACTER
YEAR YEAR
data types
C API MySQL C API
overview
database
altering ALTER DATABASE
creating CREATE DATABASE
deleting DROP DATABASE
mysql option
database design
Database information
obtaining SHOW
database metadata INFORMATION_SCHEMA
database names
case sensitivity
case-sensitivity MySQLSQL
DATABASE()
databases
backups
copying MySQL
creating
defined MySQL
information about
names
replicating MySQL
selecting
symbolic links Unix
using
DataJunction MyODBC
DATE DATE
date and time functions

Date and Time types
date calculations
DATE columns
    problems DATE
DATE data type DATETIMEDATETIMESTAMP
date functions
    Y2K compliance 2000
date types
    Y2K issues Y2K
date values
    problems DATETIMEDATETIMESTAMP
DATE()
DATEDIFF()
DATETIME data type DATETIMEDATETIMESTAMP
DATE_ADD()
DATE_FORMAT()
DATE_SUB()
DAY()
DAYNAME()
DAYOFMONTH()
DAYOFWEEK()
DAYOFYEAR()
db table
    sorting 2
DB2 SQL mode SQL
DBI interface MySQL Perl API
DBI->quote
DBI->trace gdbmysqld
DBI/DBD interface MySQL Perl API
DBI_TRACE environment variable gdbmysqld
DBI_USER environment variable
DBUG package DBUG
DEALLOCATE PREPARE SQL
debug
    mysql option
debug-info
    mysql option
debugging
    client MySQL

server MySQL
DEC data type
decimal arithmetic
DECIMAL data type
decimal point
DECLARE DECLARE
DECODE()
decode_bits myisamchk variable myisamchk
DEFAULT
constraint
default
privileges MySQL
default hostname MySQL
default installation location
default options
DEFAULT value clause CREATE TABLE
default values MySQLCREATE TABLE INSERT
BLOB and TEXT columns BLOBTEXT
implicit CREATE TABLE
suppression
DEFAULT()
default-character-set
mysql option
defaults
embedded
DEGREES()
DELAYED INSERT DELAYED
delayed_insert_limit INSERT DELAYED
DELETE DELETE
deleting
database DROP DATABASE
foreign key ALTER TABLEFOREIGN KEY
function CREATE FUNCTION/DROP FUNCTION
index ALTER TABLE DROP INDEX
primary key ALTER TABLE
rows
schema DROP DATABASE
table DROP TABLE
user MySQLDROP USER

users MySQL,DROP USER
deletion
mysql.sock MySQL/tmp/mysql.sock
Delphi program MyODBC
derived tables FROM
DESC DESCRIBE
DESCRIBE DESCRIBE
design
choices
issues MySQL
limitations MySQL
DES_DECRYPT()
DES_ENCRYPT()
developers
list of
development source tree
Difference() Spatial
digits
Dimension()
directory structure
default
DISCARD TABLESPACE ALTER TABLE
disconnecting
from the server
Disjoint()
disk full MySQL
disk issues
disks
splitting data across Windows
display size
display triggers SHOW TRIGGERS
display width
displaying
information
Cardinality SHOW INDEX
Collation SHOW INDEX
SHOW SHOW,SHOW COLUMNS,SHOW INDEX,SHOW OPEN TABLES,SHOW TABLES
table status SHOW TABLE STATUS

Distance()
DISTINCT MySQLDISTINCTGROUP BY SELECT
DISTINCTROW SELECT
DIV
division (/)
DNS MySQLDNS
DO DO
DocBook XML
documentation source format
Documenters
list of
DOUBLE data type
DOUBLE PRECISION data type
double quote (\")
downgrading MySQL
downloading MySQL
DROP DATABASE DROP DATABASE
DROP FOREIGN KEY ALTER TABLE FOREIGN KEY
DROP FUNCTION DROP PROCEDUREDROP FUNCTION CREATE FUNCTION/DROP FUNCTION
DROP INDEX ALTER TABLE DROP INDEX
DROP PRIMARY KEY ALTER TABLE
DROP PROCEDURE DROP PROCEDUREDROP FUNCTION
DROP SCHEMA DROP DATABASE
DROP TABLE DROP TABLE
DROP USER DROP USER
DROP VIEW DROP VIEW
dropping
user MySQLDROP USER
DUAL SELECT
DUMPFILE SELECT
dynamic table characteristics

E

Eiffel Wrapper MySQL Eiffel Wrapper
ELT()
email lists The MySQL
embedded MySQL server library libmysqldMySQL

ENCODE()
ENCRYPT()
encryption functions
END BEGIN ... END
EndPoint() LineString
entering
queries
ENUM
size
ENUM data type ENUM
Envelope()
environment variable
CC MySQL
CFLAGS MySQL
CXX MySQL
CXXFLAGS MySQL
HOME
LD_RUN_PATH LinuxSolaris
MYSQL_DEBUG
MYSQL_HISTFILE
MYSQL_HOST MySQL
MYSQL_PWD MySQL
MYSQL_TCP_PORT Unix
MYSQL_UNIX_PORT Unix
PATH UnixMySQLMySQL
USER MySQL
Environment variable
CC
CFLAGS
CXX MySQL
CXXFLAGS
DBI_TRACE gdbmysqld
DBI_USER
HOME
LD_LIBRARY_PATH Perl DBI/DBD
LD_RUN_PATH Perl DBI/DBD
MYSQL_DEBUG MySQL
MYSQL_HISTFILE
MYSQL_HOST

MYSQL_PS1
MYSQL_PWD
MYSQL_TCP_PORT
MYSQL_UNIX_PORT mysql_install_db
PATH
TMPDIR mysql_install_db
TZ
UMASK
UMASK_DIR
USER
Environment variables
CXX MySQL
environment variables
list of
equal (=)
Equals()
error messages
can't find file
languages
errors
access denied
checking tables for MyISAM
common
directory checksum Solaris
handling for UDFs UDF
known MySQL
linking MySQL
list of MySQL
reporting MySQL
ERROR_FOR_DIVISION_BY_ZERO SQL mode SQL
escape (\\)
escape characters
estimating
query performance
exact-value literals
example
mysqld_multi option mysqld_multiMySQL
EXAMPLE storage engine EXAMPLE
EXAMPLE table type EXAMPLE

examples
    compressed tables myisampackMyISAM
    myisamchk output
    queries
Excel MyODBC
execute
    mysql option
EXECUTE SQL
EXP()
EXPLAIN EXPLAINSELECT
EXPORT_SET()
expression aliases GROUP BYSELECT
expressions
    extended
extensions
    to standard SQL MySQL
ExteriorRing() Polygon
EXTRACT()
extracting
    dates

F

FALSE
    testing for
fatal signal 11 MySQL
features of MySQL MySQL
FEDERATED storage engine FEDERATED
FEDERATED table type FEDERATED
FETCH FETCH
field
    changing ALTER TABLE
FIELD()
FILE
files
    binary log
    config.cache MySQL
    error messages
    log

my.cnf
not found message
permissions
query log
repairing myisamchk
script mysql
size limits MySQL
slow query log
tmp mysql_install_db
update log (obsolete)
filesort optimization MySQLORDER BY
FIND_IN_SET()
FIXED data type
fixed-point arithmetic
FLOAT data type
floating-point number
floats
FLOOR()
FLUSH FLUSH Syntax
flush tables mysqladminMySQL
FOR UPDATE SELECT
force
mysql option
FORCE INDEX SELECTJOIN
FORCE KEY SELECTJOIN
foreign key
constraint PRIMARY KEYUNIQUE
deleting ALTER TABLE FOREIGN KEY
foreign keys Foreign KeysALTER TABLE
FORMAT()
Forums MySQLMySQL
FOUND_ROWS()
FreeBSD troubleshooting MySQL
FROM SELECT
FROM_DAYS()
FROM_UNIXTIME()
ft_max_word_len myisamchk variable myisamchk
ft_min_word_len myisamchk variable myisamchk
ft_stopword_file myisamchk variable myisamchk

full disk MySQL
full-text search .
FULLTEXT .
fulltext
    stopword list MySQL
function
    deleting CREATE FUNCTION/DROP FUNCTION
functions .
    arithmetic .
    bit .
    C API C API
    C Prepared statement API C API
    cast Cast
    control flow .
    date and time .
    encryption .
    GROUP BY GROUP BY
    grouping .
    information .
    mathematical .
    miscellaneous .
    native
        adding .
    new MySQL
    string .
    string comparison .
    user-defined MySQL
        adding .
Functions
    user-defined CREATE FUNCTION/DROP FUNCTION
functions for SELECT and WHERE clauses .
Future development of MySQL MySQL

G

gcc .
gdb
    using gdbmysqld
general information .

General Public License MySQL
geographic feature
GeomCollFromText() WKTGeometry
GeomCollFromWKB() WKBGeometry
geometry
GEOMETRY data type MySQL
GEOMETRYCOLLECTION data type MySQL
GeometryCollection() MySQL
GeometryCollectionFromText() WKTGeometry
GeometryCollectionFromWKB() WKBGeometry
GeometryFromText() WKTGeometry
GeometryFromWKB() WKBGeometry
GeometryN() GeometryCollection
GeometryType()
GeomFromText() WKTGeometry Geometry
GeomFromWKB() WKBGeometry Geometry
geospatial feature
getting MySQL MySQL
GET_FORMAT()
GET_LOCK()
GIS MySQL
GLength() LineStringMultiLineString
global privileges GRANTREVOKE
goals of MySQL MySQL
GPL
  General Public License GNU
  GNU GNU
  MySQL FLOSS MySQL FLOSS
GRANT GRANTREVOKE
GRANT statement MySQLSSL GRANT
grant tables 2
  re-creating Unix
  sorting 1 2
  upgrading
granting
  privileges GRANTREVOKE
GRANTS SHOW GRANTS
greater than (>)
greater than or equal (>=)

GREATEST()
GROUP BY MySQLGROUP BY
aliases in GROUP BY
extensions to standard SQL GROUP BYSELECT
GROUP BY functions GROUP BY
grouping
expressions
GROUP_CONCAT() GROUP BY

H

HANDLER HANDLER
Handlers DECLARE Handlers
handling
errors UDF
hash partitioning HASH
hash partitionsmanaging HASHKEY
hash partitionssplitting and merging HASHKEY
HAVING SELECT
HEAP storage engine MEMORY (HEAP)
HEAP table type MEMORY (HEAP)
help
mysql option
mysqld_multi option mysqld_multiMySQL
HEX()
hexadecimal values
HIGH_NOT_PRECEDENCE SQL mode SQL
HIGH_PRIORITY SELECT
hints MySQLSQLSELECTJOIN
index SELECTJOIN
history of MySQL MySQL
HOME environment variable
host
mysql option
host table 2
sorting 2
host.frm
problems finding Unix
hostname

default MySQL
hostname caching MySQLDNS
HOUR()
html
mysql option

I

ID
unique ID
identifiers
case sensitivity
quoting
IF IF
IF()
IFNULL()
IGNORE INDEX SELECTJOIN
IGNORE KEY SELECTJOIN
ignore-space
mysql option
IGNORE_SPACE SQL mode SQL
implicit default values CREATE TABLE
IMPORT TABLESPACE ALTER TABLE
IN
increasing
performance FAQ
increasing with replication
speed MySQL
index
deleting ALTER TABLEDROP INDEX
index hints SELECTJOIN
indexes CREATE INDEX
and BLOB columns CREATE TABLE
and IS NULL MySQL
and LIKE MySQL
and NULL values CREATE TABLE
and TEXT columns CREATE TABLE
assigning to key cache CACHE INDEX
block size

columns
leftmost prefix of MySQL
multi-column
multiple-part CREATE INDEX
names
use of MySQL
INET_ATON()
INET_NTOA()
information about partitionsobtaining
information functions
INFORMATION_SCHEMA INFORMATION_SCHEMA
INFORMATION_SCHEMA
INNER JOIN JOIN
InnoDB InnoDB
Solaris 10 x86_64 issues Solaris
InnoDB storage engine InnoDB
InnoDB table type InnoDB
InnoDB tables
INSERT INSERTINSERT
INSERT ... SELECT INSERT
INSERT DELAYED INSERT DELAYED
INSERT statement
grant privileges MySQL
INSERT()
inserting
speed of INSERT
installation layouts
installation overview MySQL
installing
binary distribution UnixMySQL
Linux RPM packages LinuxMySQL
Mac OS X PKG packages,Mac OS XMySQL
overview MySQL
Perl Perl
Perl on Windows WindowsActiveState Perl
source distribution MySQL
user-defined functions
INSTR()
INT data type

integer arithmetic
INTEGER data type
integers
InteriorRingN() Polygon
internal compiler errors MySQL
internal locking
internals MySQL
Internet Relay Chat IRCMySQL
Intersection() Spatial
Intersects()
INTERVAL()
introducer
    string literal
invalid data
    constraint
IRC IRCMySQL
IS boolean_value
IS NOT boolean_value
IS NOT NULL
IS NULL MySQLIS NULL
    and indexes MySQL
ISAM storage engine
ISAM table type
IsClosed() MultiLineString
IsEmpty()
ISNULL()
ISOLATION LEVEL SET TRANSACTION
IsRing() LineString
IsSimple()
IS_FREE_LOCK()
IS_USED_LOCK()
ITERATE ITERATE

J

JOIN JOIN

K

Key cache
MyISAM MyISAM
key cache
assigning indexes to CACHE INDEX
key partitioning KEY
key partitionsmanaging HASHKEY
key partitionssplitting and merging HASHKEY
key space
MyISAM
keys
foreign Foreign Keys
multi-column
searching on two
keywords MySQL
key_buffer_size myisamchk variable myisamchk
KEY_COLUMN_USAGE
INFORMATION_SCHEMA table INFORMATION_SCHEMA
KEY_COLUMN_USAGE
KILL KILL
known errors MySQL

L

language support
last row
unique ID ID
LAST_DAY()
LAST_INSERT_ID() INSERT
LAST_INSERT_ID([expr])
layout of installation
LCASE()
LD_LIBRARY_PATH environment variable Perl DBI/DBD
LD_RUN_PATH environment variable LinuxSolarisPerl DBI/DBD
LEAST()
LEAVE LEAVE
LEFT JOIN MySQLLEFT JOINRIGHT JOIN JOIN
LEFT OUTER JOIN JOIN
LEFT()
leftmost prefix of indexes MySQL

legal names
LENGTH()
less than (<)
less than or equal (<=)
libmysqld libmysqldMySQL
    options
libraries
    list of MySQL
library
    mysqlclient API
    mysqld API
License MySQL FLOSS
LIKE
    and indexes MySQL
    and wildcards MySQL
LIMIT MySQLLIMITSELECT
limitations
    design MySQL
    MySQL Limitations MySQL
    replication
limits
    file-size MySQL
    MySQL Limitslimits in MySQL MySQL
linear hash partitioning LINEAR HASH
linear key partitioning KEY
linefeed (\n)
LineFromText() WKTGeometry
LineFromWKB() WKBGeometry
LINESTRING data type MySQL
LineString() MySQL
LineStringFromText() WKTGeometry
LineStringFromWKB() WKBGeometry
linking
    errors MySQL
    problems C API
    speed MySQL
links
    symbolic
Linux

binary distribution, Linux
source distribution, Linux
list partitioning, LIST
list partitionsadding and dropping, RANGELIST
list partitionsmanaging, RANGELIST
literals
LN()
LOAD DATA FROM MASTER, LOAD DATA FROM MASTER
LOAD DATA INFILE, LOAD DATA INFILE NULL
LOAD TABLE FROM MASTER, LOAD TABLE tbl_name FROM MASTER
loading
tables
LOAD_FILE()
local-infile
mysql option
LOCALTIME
LOCALTIMESTAMP
LOCATE()
LOCK IN SHARE MODE, SELECT
LOCK TABLES, LOCK TABLESUNLOCK TABLES
locking
page-level
row-level
table-level
locking methods
log
changes, MySQL
mysqld_multi option, mysqld_multiMySQL
log files
maintaining
names
Log files, MySQL
LOG()
LOG10()
LOG2()
logical operators
LONG data type, BLOBTEXT
LONGBLOB data type
LONGTEXT data type

LOOP LOOP
LOWER()
LPAD()
LTRIM()

M

Mac OS X
    installation,Mac OS XMySQL
mailing address
    for customer support
mailing list address
mailing lists The MySQL
    archive location
    guidelines
main features of MySQL MySQL
maintaining
    log files
    tables
MAKEDATE()
MAKETIME()
make_binary_distribution
MAKE_SET()
manual
    available formats
    online location
    typographical conventions
master/slave setup
MASTER_POS_WAIT() MASTER_POS_WAIT()
MATCH ... AGAINST()
matching
    patterns
math
mathematical functions
MAX() GROUP BY
MAX(DISTINCT) GROUP BY
MAXDB SQL mode SQL
maximum memory used mysqladminMySQL
maximums

maximum tables per join
max_allowed_packet variable
MAX_CONNECTIONS_PER_HOUR
max_join_size variable
MAX_QUERIES_PER_HOUR
MAX_UPDATES_PER_HOUR
MAX_USER_CONNECTIONS
MBR MBR
MBRContains() MBR
MBRDisjoint() MBR
MBREqual() MBR
MBRIntersects() MBR
MBROverlaps() MBR
MBRTouches() MBR
MBRWithin() MBR
MD5()
MEDIUMBLOB data type
MEDIUMINT data type
MEDIUMTEXT data type
MEMORY storage engine MEMORY (HEAP)
MEMORY table type MEMORY (HEAP)
memory usage
myisamchk myisamchk
memory use MySQLmysqladminMySQL
MERGE storage engine MERGE
MERGE table type MERGE
MERGE tables
defined MERGE
messages
languages
metadata
database INFORMATION_SCHEMA
methods
locking
MICROSECOND()
MID()
MIN() GROUP BY
MIN(DISTINCT) GROUP BY
Minimum Bounding Rectangle MBR

minus
    unary (-)
MINUTE()
mirror sites MySQL
miscellaneous functions
MIT-pthreads MIT-pthreads
MLineFromText() WKTGeometry
MLineFromWKB() WKBGeometry
MOD (modulo)
MOD()
modes
    batch mysql
modules
    list of MySQL
modulo (%)
modulo (MOD)
monitor
    terminal
MONTH()
MONTHNAME()
MPointFromText() WKTGeometry
MPointFromWKB() WKBGeometry
MPolyFromText() WKTGeometry
MPolyFromWKB() WKBGeometry
mSQL compatibility
MSSQL SQL mode SQL
multi-byte character sets
multi-byte characters
multi-column indexes
MULTILINESTRING data type MySQL
MultiLineString() MySQL
MultiLineStringFromText() WKTGeometry
MultiLineStringFromWKB() WKBGeometry
multiple servers MySQL
multiple-part index CREATE INDEX
multiplication (*)
MULTIPOINT data type MySQL
MultiPoint() MySQL
MultiPointFromText() WKTGeometry

MultiPointFromWKB() WKBGeometry
MULTIPOLYGON data type MySQL
MultiPolygon() MySQL
MultiPolygonFromText() WKTGeometry
MultiPolygonFromWKB() WKBGeometry
My
derivation MySQL
my.cnf file
MyISAM
compressed tables
size
MyISAM key cache MyISAM
MyISAM storage engine MyISAM
MyISAM table type MyISAM
myisamchk
example output
options myisamchk
myisampack
myisam_block_size myisamchk variable myisamchk
MyODBC MySQL Connector/ODBC
reporting problems MyODBC
MySQL
defined MySQL
introduction MySQL
pronunciation MySQL
mysql
MySQL AB
defined MySQL AB
MySQL binary distribution MySQL
MYSQL C type C API
MySQL C type C API
MySQL in MySQL 5.0 and 5.1 MySQL
mysql command-line options
mysql commands
list of mysql
MySQL Dolphin name MySQL
MySQL history MySQL
mysql history file
MySQL mailing lists MySQL

MySQL name MySQL
mysql prompt command mysql
MySQL source distribution MySQL
mysql status command mysql
MySQL storage engines
MySQL table types
MySQL version MySQL
MySQL++ MySQL C++ API
mysql.server
mysql.sock
    changing location of
    protection MySQL/tmp/mysql.sock
MYSQL323 SQL mode SQL
MYSQL40 SQL mode SQL
mysqlaccess
mysqladmin CREATE DATABASE DROP DATABASE SHOW STATUS
SHOW VARIABLES FLUSH SyntaxKILL
    mysqld_multi option mysqld_multiMySQL
mysqladmin command-line options mysqladminMySQL
mysqlbinlog
mysqlbug
mysqlbug script
    location
mysqlcheck
mysqlclient library API
mysqld
    mysqld_multi option mysqld_multiMySQL
    starting MySQL
mysqld library API
mysqld options mysqld
mysqld server
    buffer sizes
mysqld-max mysqld-maxMySQL
mysqldump MySQL
mysqld_multi
mysqld_safe
mysqlhotcopy
mysqlimport MySQLLOAD DATA INFILE
mysqlshow

mysqltest
MySQL MySQL
mysql_affected_rows() mysql_affected_rows()
mysql_autocommit(). mysql_autocommit()
MYSQL_BIND C type C API
mysql_change_user() mysql_change_user()
mysql_character_set_name() mysql_character_set_name()
mysql_close() mysql_close()
mysql_commit(). mysql_commit()
mysql_connect() mysql_connect()
mysql_create_db() mysql_create_db()
mysql_data_seek() mysql_data_seek()
MYSQL_DEBUG environment variable MySQL
mysql_debug() mysql_debug()
mysql_drop_db() mysql_drop_db()
mysql_dump_debug_info() mysql_dump_debug_info()
mysql_eof() mysql_eof()
mysql_errno() mysql_errno()
mysql_error() mysql_error()
mysql_escape_string() mysql_escape_string()
mysql_fetch_field() mysql_fetch_field()
mysql_fetch_fields() mysql_fetch_fields()
mysql_fetch_field_direct() mysql_fetch_field_direct()
mysql_fetch_lengths() mysql_fetch_lengths()
mysql_fetch_row() mysql_fetch_row()
MYSQL_FIELD C type C API
mysql_field_count() mysql_field_count()mysql_num_fields()
MYSQL_FIELD_OFFSET C type C API
mysql_field_seek() mysql_field_seek()
mysql_field_tell() mysql_field_tell()
mysql_fix_privilege_tables
mysql_free_result() mysql_free_result()
mysql_get_character_set_info() mysql_get_character_set_info()
mysql_get_client_info() mysql_get_client_info()
mysql_get_client_version() mysql_get_client_version()
mysql_get_host_info() mysql_get_host_info()
mysql_get_proto_info() mysql_get_proto_info()
mysql_get_server_info() mysql_get_server_info()
mysql_get_server_version() mysql_get_server_version()

mysql_hex_string() mysql_hex_string()
MYSQL_HISTFILE environment variable
MYSQL_HOST environment variable MySQL
mysql_info() ALTER TABLEINSERTLOAD DATA INFILE UPDATE
mysql_info()
mysql_init() mysql_init()
mysql_insert_id() INSERTmysql_insert_id()
mysql_install_db
mysql_install_db script mysql_install_db
mysql_kill() mysql_kill()
mysql_library_end() mysql_library_end()
mysql_library_init() mysql_library_init()
mysql_list_dbs() mysql_list_dbs()
mysql_list_fields() mysql_list_fields()
mysql_list_processes() mysql_list_processes()
mysql_list_tables() mysql_list_tables()
mysql_more_results(). mysql_more_results()
mysql_next_result(). mysql_next_result()
mysql_num_fields() mysql_num_fields()
mysql_num_rows() mysql_num_rows()
mysql_options() mysql_options()
mysql_ping() mysql_ping()
MYSQL_PS1 environment variable
MYSQL_PWD environment variable MySQL
mysql_query() mysql_query()C API
mysql_real_connect() mysql_real_connect()
mysql_real_escape_string() mysql_real_escape_string()
mysql_real_query() mysql_real_query()
mysql_refresh() mysql_refresh()
mysql_reload() mysql_reload()
MYSQL_RES C type C API
mysql_rollback(). mysql_rollback()
MYSQL_ROW C type C API
mysql_row_seek() mysql_row_seek()
mysql_row_tell() mysql_row_tell()
mysql_select_db() mysql_select_db()
mysql_server_end() mysql_server_end()
mysql_server_init() mysql_server_init()
mysql_set_character_set() mysql_set_character_set()

mysql_set_server_option() mysql_set_server_option()
mysql_shutdown() mysql_shutdown()
mysql_sqlstate() mysql_sqlstate()
mysql_ssl_set() mysql_ssl_set()
mysql_stat() mysql_stat()
MYSQL_STMT C type C API
mysql_stmt_affected_rows() mysql_stmt_affected_rows()
mysql_stmt_attr_get() mysql_stmt_attr_get()
mysql_stmt_attr_set() mysql_stmt_attr_set()
mysql_stmt_bind_param() mysql_stmt_bind_param()
mysql_stmt_bind_result() mysql_stmt_bind_result()
mysql_stmt_close() mysql_stmt_close()
mysql_stmt_data_seek() mysql_stmt_data_seek()
mysql_stmt_errno() mysql_stmt_errno()
mysql_stmt_error(). mysql_stmt_error()
mysql_stmt_execute() mysql_stmt_execute()
mysql_stmt_fetch() mysql_stmt_fetch()
mysql_stmt_fetch_column() mysql_stmt_fetch_column()
mysql_stmt_field_count() mysql_stmt_field_count()
mysql_stmt_free_result() mysql_stmt_free_result()
mysql_stmt_init() mysql_stmt_init()
mysql_stmt_insert_id() mysql_stmt_insert_id()
mysql_stmt_num_rows() mysql_stmt_num_rows()
mysql_stmt_param_count() mysql_stmt_param_count()
mysql_stmt_param_metadata() mysql_stmt_param_metadata()
mysql_stmt_prepare() mysql_stmt_prepare()
mysql_stmt_reset() mysql_stmt_reset()
mysql_stmt_result_metadata. mysql_stmt_result_metadata()
mysql_stmt_row_seek() mysql_stmt_row_seek()
mysql_stmt_row_tell() mysql_stmt_row_tell()
mysql_stmt_send_long_data(). mysql_stmt_send_long_data()
mysql_stmt_sqlstate() mysql_stmt_sqlstate()
mysql_stmt_store_result() mysql_stmt_store_result()
mysql_store_result() mysql_store_result()C API
MYSQL_TCP_PORT environment variable Unix
mysql_thread_end() mysql_thread_end()
mysql_thread_id() mysql_thread_id()
mysql_thread_init() mysql_thread_init()
mysql_thread_safe() mysql_thread_safe()

MYSQL_UNIX_PORT environment variable mysql_install_dbUnix
mysql_use_result() mysql_use_result()
mysql_warning_count(). mysql_warning_count()
my_init() my_init()
my_ulonglong C type C API
my_ulonglong values
printing C API

N

named pipes MySQLMySQL
named-commands
mysql option
names
case sensitivity
variables
NAME_CONST()
naming
releases of MySQL MySQL
NATIONAL CHAR data type
native functions
adding
native thread support MySQL
NATURAL LEFT JOIN JOIN
NATURAL LEFT OUTER JOIN JOIN
NATURAL RIGHT JOIN JOIN
NATURAL RIGHT OUTER JOIN JOIN
NCHAR data type
negative values
nested queries Subquery
net etiquette
netmask notation
in mysql.user table 1
NetWare NetWareMySQL
net_buffer_length variable
New features in MySQL MySQL
new procedures
adding MySQL
new users

adding UnixMySQL
newline (\n)
no matching rows
no-auto-rehash
mysql option
no-beep
mysql option
no-log
mysqld_multi option mysqld_multiMySQL
no-named-commands
mysql option
no-pager
mysql option
no-tee
mysql option
non-delimited strings DATETIMEDATETIMESTAMP
Non-transactional tables
NOT
logical
NOT BETWEEN
not equal (!=)
not equal (<>)
NOT IN
NOT LIKE
NOT NULL
constraint
NOT REGEXP
Novell NetWare NetWareMySQL
NOW()
NO_AUTO_CREATE_USER SQL mode SQL
NO_AUTO_VALUE_ON_ZERO SQL mode SQL
NO_BACKSLASH_ESCAPES SQL mode SQL
NO_DIR_IN_CREATE SQL mode SQL
NO_FIELD_OPTIONS SQL mode SQL
NO_KEY_OPTIONS SQL mode SQL
NO_TABLE_OPTIONS SQL mode SQL
NO_UNSIGNED_SUBTRACTION SQL mode SQL
NO_ZERO_DATE SQL mode SQL
NO_ZERO_IN_DATE SQL mode SQL

NUL .
NULL Working with NULLNULL
testing for null .
NULL value Working with NULL NULL
NULL values
and AUTO_INCREMENT columns NULL
and indexes CREATE TABLE
and TIMESTAMP columns NULL
vs. empty values NULL
NULLIF() .
numbers .
NUMERIC data type .
numeric types .
NumGeometries() GeometryCollection
NumInteriorRings() Polygon
NumPoints() LineString

O

OCT() .
OCTET_LENGTH() .
ODBC MySQL Connector/ODBC
ODBC compatibility CREATE TABLE JOIN
odbcadmin program MyODBC
OLAP GROUP BY
OLD_PASSWORD() .
ON DUPLICATE KEY INSERT
one-database
mysql option .
online location of manual .
ONLY_FULL_GROUP_BY SQL mode SQL
OPEN OPEN
Open Source
defined MySQL
open tables MySQLmysqladminMySQL
OpenGIS .
opening
tables MySQL
opens mysqladminMySQL

OpenSSL Using yaSSL
open_files_limit variable mysqlbinlog
operating systems
file-size limits MySQL
supported MySQL
Windows versus Unix WindowsMySQLUnixMySQL
operations
arithmetic
operators
cast Cast
logical
optimization
tips
optimizations MySQLWHERE
OPTIMIZE TABLE OPTIMIZE TABLE
optimizer
controlling
optimizing
DISTINCT MySQLDISTINCT
filesort MySQLORDER BY
GROUP BY MySQLGROUP BY
LEFT JOIN MySQLLEFT JOINRIGHT JOIN
LIMIT MySQLLIMIT
tables Table
option files
options
command-line mysqld
mysql
mysqladmin mysqladminMySQL
configure
embedded server
libmysqld
myisamchk myisamchk
provided by MySQL
replication
OR
bitwise
logical
OR Merge optimization

Oracle compatibility MySQLSQLGROUP BY DESCRIBE
ORACLE SQL mode SQL
ORD()
ORDER BY ALTER TABLE SELECT
aliases in GROUP BY
OUTFILE SELECT
Overlaps()
overview

P

packages
list of MySQL
page-level locking
pager
mysql option
parameters
server
parentheses (and)
PARTITION
partition management
partitioning
partitioning by hash HASH
partitioning by key KEY
partitioning by linear hash LINEAR HASH
partitioning by linear key KEY
partitioning by list LIST
partitioning by range RANGE
partitioning concepts MySQL
partitioning information commands
partitioning support MySQL
partitioning types
partitioningadvantages MySQL
partitioningenabling MySQL
partitionsadding and dropping
partitionsanalyzing
partitionschecking
partitionsmanaging
partitionsmodifying

partitionsoptimizing
partitionsrepairing
partitionssplitting and merging
password
  mysql option
  mysqld_multi option mysqld_multiMySQL
  root user MySQL
password encryption
  reversibility of
PASSWORD() 1
passwords
  for users MySQL
  forgotten
  lost
  resetting
  security
  setting GRANTREVOKESET PASSWORD
PATH environment variable UnixMySQLMySQL
pattern matching
performance
  benchmarks
  disk issues
  estimating
  improving FAQ
PERIOD_ADD()
PERIOD_DIFF()
Perl
  installing Perl
  installing on Windows WindowsActiveState Perl
Perl API MySQL Perl API
Perl DBI/DBD
  installation problems Perl DBI/DBD
permission checks
  effect on speed SELECT
perror
PHP API MySQL PHP API
PI()
PIPES_AS_CONCAT SQL mode SQL
POINT data type MySQL

point in time recovery
Point() MySQL
PointFromText() WKTGeometry
PointFromWKB() WKBGeometry
PointN() LineString
PointOnSurface() MultiPolygon
PolyFromText() WKTGeometry
PolyFromWKB() WKBGeometry
POLYGON data type MySQL
Polygon() MySQL
PolygonFromText() WKTGeometry
PolygonFromWKB() WKBGeometry
port
    mysql option
portability
    types
porting
    to other systems
POSITION()
post-install
    multiple servers MySQL
post-installation
    setup and testing
PostgreSQL compatibility MySQLSQL
POSTGRESQL SQL mode SQL
POW()
POWER()
precision
    arithmetic
precision math
PREPARE SQL
    XA transactions XASQL
PRIMARY KEY ALTER TABLECREATE TABLE
    constraint PRIMARY KEYUNIQUE
primary key
    deleting ALTER TABLE
privilege
    changes 2
privilege information

location MySQL
privilege system .
described .
privileges
access MySQL
adding MySQL
default MySQL
deleting MySQLDROP USER
display SHOW GRANTS
dropping MySQLDROP USER
granting GRANTREVOKE
revoking GRANTREVOKE
problems
access denied errors .
common errors .
compiling MySQL
DATE columns DATE
date values DATETIMEDATETIMESTAMP
installing on IBM-AIX IBM-AIX
installing on Solaris Solaris
installing Perl Perl DBI/DBD
linking MySQL
ODBC MyODBC
reporting .
starting the server MySQL
table locking .
time zone .
PROCEDURE SELECT
procedures
adding MySQL
stored .
process support MySQL
processes
display SHOW PROCESSLIST
processing
arguments UDF
PROCESSLIST SHOW PROCESSLIST
program variables
setting .

programs
client
crash-me
list of
prompt
mysql option
prompts
meanings
pronunciation
MySQL MySQL
protocol
mysql option
PURGE MASTER LOGS PURGE MASTER LOGS
Python API MySQL Python API

Q

QUARTER()
queries
entering
estimating performance
examples
speed of SELECT
Twin Studies project
Query Cache MySQL
query log
questions mysqladminMySQL
answering
quick
mysql option
QUOTE()
quotes
in strings
quoting
quoting binary data
quoting of identifiers

R

RADIANS()
RAND()
range partitioning RANGE
range partitionsadding and dropping RANGELIST
range partitionsmanaging RANGELIST
raw
  mysql option
re-creating
  grant tables Unix
read_buffer_size myisamchk variable myisamchk
REAL data type
REAL_AS_FLOAT SQL mode SQL
reconfiguring MySQL
reconnect
  mysql option
RECOVER
  XA transactions XASQL
recovery
  from crash myisamchk
  point in time
reducing
  data size
references ALTER TABLE
ref_or_null MySQLIS NULL
regex MySQL
REGEXP
regular expression syntax
  described MySQL
Related()
relational databases
  defined MySQL
release numbers MySQL
RELEASE SAVEPOINT SAVEPOINTROLLBACK TO SAVEPOINT
releases
  naming scheme MySQL
  testing MySQL
  updating
RELEASE_LOCK()
RENAME TABLE RENAME TABLE

RENAME USER RENAME USER
renaming user accounts RENAME USER
reordering
columns
repair options
myisamchk myisamchk
REPAIR TABLE REPAIR TABLE
repairing
tables
REPEAT REPEAT
REPEAT()
replace
REPLACE REPLACE
REPLACE ... SELECT INSERT
REPLACE()
replication MySQL
replication limitations
replication masters
commands SQL
replication options
replication slaves
commands SQL
reporting
bugs
Connector/ODBC problems MyODBC
errors MySQL
MyODBC problems MyODBC
REQUIRE GRANT option SSL GRANT GRANTREVOKE
reserved words
exceptions MySQL
RESET MASTER RESET MASTER
RESET SLAVE RESET SLAVE
restarting
the server Unix
RESTORE TABLE RESTORE TABLE
restrictions
server-side cursors
stored routines
subqueries

triggers
views
retrieving
data from tables
return (\r)
return values
UDFs UDF
REVERSE()
REVOKE GRANTREVOKE
revoking
privileges GRANTREVOKE
RIGHT JOIN JOIN
RIGHT OUTER JOIN JOIN
RIGHT()
RLIKE
ROLLBACK START TRANSACTIONCOMMITROLLBACK
XA transactions XASQL
ROLLBACK TO SAVEPOINT SAVEPOINTROLLBACK TO SAVEPOINT
ROLLUP GROUP BY
root password MySQL
root user
password resetting
ROUND()
rounding
rounding errors
ROUTINES
INFORMATION_SCHEMA table INFORMATION_SCHEMA ROUTINES
row-level locking
rows
counting
deleting
locking
matching problems
selecting
sorting
ROW_COUNT()
RPAD()
RPM file LinuxMySQL

RPM Package Manager LinuxMySQL
RTRIM()
RTS-threads RTS
running
ANSI mode ANSIMySQL
batch mode mysql
multiple servers MySQL
queries
running configure after prior invocation MySQL

S

safe-updates
mysql option
safe-updates option --safe-updates
Sakila MySQL
SAVEPOINT SAVEPOINTROLLBACK TO SAVEPOINT
scale
arithmetic
schema
altering ALTER DATABASE
creating CREATE DATABASE
deleting DROP DATABASE
SCHEMA()
SCHEMATA
INFORMATION_SCHEMA table INFORMATION_SCHEMA SCHEMATA
SCHEMA_PRIVILEGES
INFORMATION_SCHEMA table INFORMATION_SCHEMA SCHEMA_PRIVILEGES
script files mysql
scripts
mysqlbug
mysql_install_db mysql_install_db
searching
and case sensitivity
full-text
MySQL Web pages
two keys

SECOND()
secure-auth
    mysql option
security
    against attackers MySQL
security system MySQL
SEC_TO_TIME()
SELECT
    LIMIT SELECT
    optimizing EXPLAINSELECT
    Query Cache MySQL
SELECT INTO SELECT ... INTO
SELECT INTO TABLE SELECT INTO TABLE
SELECT speed SELECT
selecting
    databases
select_limit variable
SEQUENCE AUTO_INCREMENT
sequence emulation
sequences AUTO_INCREMENT
server
    connecting MySQL
    debugging MySQL
    disconnecting
    restart Unix
    shutdown Unix
    starting Unix
    starting and stopping MySQL
    starting problems MySQL
server variables SHOW VARIABLES
server-side cursor restrictions
servers
    multiple MySQL
SESSION_USER()
SET SETVariable SET Statement
    size
SET data type SET
SET GLOBAL SQL_SLAVE_SKIP_COUNTER SET GLOBAL SQL_SLAVE_SKIP_COUNTER

SET OPTION SET
SET PASSWORD SET PASSWORD
SET PASSWORD statement
SET SQL_LOG_BIN SET SQL_LOG_BIN
SET TRANSACTION SET TRANSACTION
setting
passwords
setting passwords SET PASSWORD
setting program variables
setup
post-installation
SHA()
SHA1()
shell syntax
SHOW BINARY LOGS SHOW MASTER LOGS
SHOW BINLOG EVENTS SHOWSHOW BINLOG EVENTS
SHOW CHARACTER SET SHOW CHARACTER SET
SHOW COLLATION SHOW COLLATION Syntax
SHOW COLUMNS SHOWSHOW COLUMNS
SHOW CREATE DATABASE SHOWSHOW CREATE DATABASE
SHOW CREATE FUNCTION SHOW CREATE PROCEDURESHOW CREATE FUNCTION
SHOW CREATE PROCEDURE SHOW CREATE PROCEDURESHOW CREATE FUNCTION
SHOW CREATE SCHEMA SHOWSHOW CREATE DATABASE
SHOW CREATE TABLE SHOWSHOW CREATE TABLE
SHOW CREATE VIEW SHOW CREATE VIEW
SHOW DATABASES SHOWSHOW DATABASES
SHOW ENGINE SHOWSHOW ENGINE
SHOW ENGINES SHOWSHOW ENGINES
SHOW ERRORS SHOWSHOW ERRORS
SHOW extensions SHOW
SHOW FIELDS SHOW
SHOW FUNCTION STATUS SHOW PROCEDURE STATUSSHOW FUNCTION STATUS
SHOW GRANTS SHOWSHOW GRANTS
SHOW INDEX SHOWSHOW INDEX
SHOW INNODB STATUS SHOW
SHOW KEYS SHOWSHOW INDEX

SHOW MASTER LOGS SHOWSHOW MASTER LOGS
SHOW MASTER STATUS SHOWSHOW MASTER STATUS
SHOW OPEN TABLES SHOWSHOW OPEN TABLES
SHOW PRIVILEGES SHOWSHOW PRIVILEGES
SHOW PROCEDURE STATUS SHOW PROCEDURE STATUSSHOW FUNCTION STATUS
SHOW PROCESSLIST SHOWSHOW PROCESSLIST
SHOW SCHEMAS SHOWSHOW DATABASES
SHOW SLAVE HOSTS SHOWSHOW SLAVE HOSTS
SHOW SLAVE STATUS SHOWSHOW SLAVE STATUS
SHOW STATUS SHOW
SHOW STORAGE ENGINES SHOW ENGINES
SHOW TABLE STATUS SHOW
SHOW TABLE TYPES SHOWSHOW ENGINES
SHOW TABLES SHOWSHOW TABLES
SHOW TRIGGERS SHOWSHOW TRIGGERS
SHOW VARIABLES SHOW
SHOW WARNINGS SHOWSHOW WARNINGS
SHOW with WHERE INFORMATION_SCHEMASHOW
show-warnings
    mysql option
shutdown_timeout variable mysqladminMySQL
shutting down
    the server Unix
sigint-ignore
    mysql option
SIGN()
silent
    mysql option
    mysqld_multi option mysqld_multiMySQL
silent column changes
SIN()
single quote (\')
size of tables MySQL
sizes
    display
skip-column-names
    mysql option
skip-line-numbers

mysql option
SLEEP()
slow queries mysqladminMySQL
slow query log
SMALLINT data type
socket
mysql option
socket location
changing
Solaris installation problems Solaris
Solaris troubleshooting MySQL
Solaris x86_64 issues InnoDB
sorting
character sets
data
grant tables 1 2
table rows
sort_buffer_size myisamchk variable myisamchk
sort_key_blocks myisamchk variable myisamchk
SOUNDEX()
SOUNDS LIKE
source distribution
installing MySQL
source distributions
on Linux Linux
SPACE()
MySQL
speed
compiling MySQL
increasing with replication MySQL
inserting INSERT
linking MySQL
of queries SELECTSELECT
SQL
defined MySQL
SQL commands
replication masters SQL
replication slaves SQL
SQL-92

extensions to MySQL
SQL_BIG_RESULT SELECT
SQL_BUFFER_RESULT SELECT
SQL_CACHE SELECTSELECT
SQL_CALC_FOUND_ROWS SELECT
SQL_NO_CACHE SELECTSELECT
SQL_SMALL_RESULT SELECT
sql_yacc.cc problems MySQL
SQRT()
square brackets
SRID()
SSH SSHWindowsMySQL
SSL and X509 Basics
SSL command-line options SSL
SSL related options SSL GRANT GRANTREVOKE
stability MySQL
standard SQL
extensions to MySQL
Standard SQL
differences from GRANTREVOKE
standards compatibility MySQL
START
XA transactions XASQL
START SLAVE START SLAVE
START TRANSACTION START TRANSACTIONCOMMITROLLBACK
starting
comments '--'
mysqld MySQL
the server Unix
the server automatically MySQL
Starting many servers MySQL
StartPoint() LineString
startup options
default
startup parameters
mysql
mysqladmin mysqladminMySQL
tuning
statements

GRANT MySQL
INSERT MySQL
statically
compiling
STATISTICS
INFORMATION_SCHEMA table INFORMATION_SCHEMA STATISTICS
stats_method myisamchk variable myisamchk
status
tables SHOW TABLE STATUS
status command
results mysqladminMySQL
status variables SHOW STATUS
STD() GROUP BY
STDDEV() GROUP BY
STDDEV_POP() GROUP BY
STDDEV_SAMP() GROUP BY
STOP SLAVE STOP SLAVE
stopping
the server MySQL
stopword list
user-defined MySQL
storage engine
ARCHIVE ARCHIVE
storage engines
choosing
storage of data
storage requirements
column type
storage space
minimising
stored procedures
stored procedures and triggers
defined
stored routine restrictions
STRAIGHT_JOIN SELECTJOIN
STRCMP()
STRICT SQL mode SQL

STRICT_ALL_TABLES SQL mode SQL
STRICT_TRANS_TABLES SQL mode SQL
string collating
string comparison functions
string comparisons
    case sensitivity
string functions
string literal introducer
string types String
strings
    defined
    escaping characters
    non-delimited DATETIMEDATETIMESTAMP
striping
    defined
STR_TO_DATE()
SUBDATE()
subpartitioning
subpartitions
subqueries Subquery
subquery Subquery
subquery restrictions
subselects Subquery
SUBSTR()
SUBSTRING()
SUBSTRING_INDEX()
SUBTIME()
subtraction (-)
SUM() GROUP BY
SUM(DISTINCT) GROUP BY
superuser MySQL
support
    for operating systems MySQL
    mailing address
suppression
    default values
Sybase compatibility USE
symbolic links Windows
SymDifference() Spatial

syntax
    regular expression MySQL
SYSDATE()
system
    privilege
    security
system optimization
system table EXPLAINSELECT
system variables SHOW VARIABLES
SYSTEM_USER()

T

tab (\t)
table
    changing ALTER TABLEALTER TABLE
    deleting DROP TABLE
    mysql option
table aliases SELECT
table cache MySQL
table is full SET
table names
    case sensitivity
    case-sensitivity MySQLSQL
Table scans
    avoiding
table types
    choosing
table-level locking
tables
    ARCHIVE ARCHIVE
    BDB BDB (BerkeleyDB)
    Berkeley DB BDB (BerkeleyDB)
    BLACKHOLE BLACKHOLE
    changing column order
    checking myisamchk
    closing MySQL
    compressed format
    constant EXPLAINSELECT MySQLWHERE

copying CREATE TABLE
counting rows
creating
CSV CSV
defragment
defragmenting OPTIMIZE TABLE
deleting rows
displaying status SHOW TABLE STATUS
dynamic
error checking MyISAM
EXAMPLE EXAMPLE
FEDERATED FEDERATED
flush mysqladminMySQL
fragmentation OPTIMIZE TABLE
grant 2
HEAP MEMORY (HEAP)
host 2
improving performance
information
information about
InnoDB InnoDB
loading data
maintenance regimen
maximum size MySQL
MEMORY MEMORY (HEAP)
MERGE MERGE
merging MERGE
multiple 1

MyISAM MyISAM
names
open MySQL
opening MySQL
optimizing Table
partitioning MERGE
repairing
retrieving data
selecting columns
selecting rows

sorting rows
symbolic links Unix
system EXPLAINSELECT
too many
unique ID for last row ID
updating
TABLES
INFORMATION_SCHEMA table INFORMATION_SCHEMA TABLES
table_cache MySQL
TABLE_PRIVILEGES
INFORMATION_SCHEMA table INFORMATION_SCHEMA TABLE_PRIVILEGES
TAN()
tar
problems on Solaris Solaris
Tcl API MySQL Tcl API
tcp-ip
mysqld_multi option mysqld_multiMySQL
TCP/IP MySQLMySQL
technical support
mailing address
tee
mysql option
temporary file
write access mysql_install_db
temporary tables
problems TEMPORARY TABLE
terminal monitor
defined
testing
connection to the server 1
installation Unix
of MySQL releases MySQL
post-installation
testing mysqld
mysqltest MySQL
TEXT
size

TEXT columns
    default values BLOBTEXT
    indexing CREATE TABLE
TEXT data type BLOBTEXT
thread packages
    differences between
thread support MySQL
    non-native MIT-pthreads
threaded clients
threads mysqladminMySQL SHOW PROCESSLIST MySQL
    display SHOW PROCESSLIST
    RTS RTS
TIME data type TIME
time types
time zone problems
TIME()
TIMEDIFF()
timeout INSERT DELAYED
    connect_timeout variable mysqladminMySQL
    shutdown_timeout variable mysqladminMySQL
TIMESTAMP
    and NULL values NULL
TIMESTAMP data type DATETIMEDATETIMESTAMP
TIMESTAMP()
TIMESTAMPADD()
TIMESTAMPDIFF()
TIME_FORMAT()
TIME_TO_SEC()
TINYBLOB data type
TINYINT data type
TINYTEXT data type
tips
    optimization
TMPDIR environment variable mysql_install_db
TODO
    embedded server (TODO)
    symlinks Unix
tools

list of MySQL
Touches()
TO_DAYS()
trace DBI method gdbmysqld
TRADITIONAL SQL mode SQL
transaction-safe tables InnoDB
transactions
support InnoDB
Translators
list of
trigger restrictions
triggers SHOW TRIGGERS
TRIGGERS
INFORMATION_SCHEMA table INFORMATION_SCHEMA TRIGGERS
TRIM()
troubleshooting
FreeBSD MySQL
Solaris MySQL
TRUE
testing for
TRUNCATE TRUNCATE
TRUNCATE()
tutorial
Twin Studies
queries
type conversions
types
columns
data
date
Date and Time
numeric
of tables
portability
strings String
time
typographical conventions
TZ environment variable

U

UCASE()
UCS-2
UDFs CREATE FUNCTION/DROP FUNCTION
  compiling
  defined MySQL
  return values UDF
ulimit
UMASK environment variable
UMASK_DIR environment variable
unary minus (-)
unbuffered
  mysql option
UNCOMPRESS()
UNCOMPRESSED_LENGTH()
UNHEX()
Unicode
Unicode Collation Algorithm Unicode
UNION UNION
Union() Spatial
UNIQUE ALTER TABLE
  constraint PRIMARY KEYUNIQUE
unique ID ID
UNIX_TIMESTAMP()
UNKNOWN
  testing for
unloading
  tables
UNLOCK TABLES LOCK TABLESUNLOCK TABLES
unnamed views FROM
UNTIL REPEAT
UPDATE UPDATE
updating
  releases of MySQL
  tables
upgrading MySQL

different architecture MySQL
grant tables
UPPER()
uptime mysqladminMySQL
URLs for downloading MySQL MySQL
USE USE
USE INDEX SELECTJOIN
USE KEY SELECTJOIN
user
mysql option
mysqld_multi option mysqld_multiMySQL
user accounts
creating CREATE USER
renaming RENAME USER
USER environment variable MySQL
user privileges
adding MySQL
deleting MySQLDROP USER
dropping MySQLDROP USER
user table
sorting 1
user variables
USER()
user-defined functions
adding MySQL
User-defined functions CREATE FUNCTION/DROP FUNCTION
usernames
and passwords MySQL
users
adding UnixMySQL
deleting MySQLDROP USER
root MySQL
USER_PRIVILEGES
INFORMATION_SCHEMA table INFORMATION_SCHEMA
USER_PRIVILEGES
uses
of MySQL MySQL
using multiple disks to start data Windows
UTC_DATE()

UTC_TIME()
UTC_TIMESTAMP()
UTF-8
UTF8
UUID()

V

valid numbers
    examples
VALUES()
VARBINARY data type BINARYVARBINARY
VARCHAR
    size
VARCHAR data type String
VARCHARACTER data type
variables
    mysqld
    server SHOW VARIABLES
    status SHOW STATUS
    system SHOW VARIABLES
    System
    user
    values
VARIANCE() GROUP BY
VAR_POP() GROUP BY
VAR_SAMP() GROUP BY
verbose
    mysql option
    mysqld_multi option mysqld_multiMySQL
version
    choosing MySQL
    latest MySQL
    mysql option
    mysqld_multi option mysqld_multiMySQL
VERSION()
vertical
    mysql option
view restrictions

views CREATE VIEW
  updatable CREATE VIEW
VIEWS
  INFORMATION_SCHEMA table INFORMATION_SCHEMA VIEWS
virtual memory
  problems while compiling MySQL
Visual Basic MyODBC

W

wait
  mysql option
WEEK()
WEEKDAY()
WEEKOFYEAR()
Well-Known Binary format (WKB)
Well-Known Text format (WKT)
What is an X509/Certificate? Basic SSL Concepts
What is encryption Basic SSL Concepts
WHERE MySQLWHERE
  with SHOW INFORMATION_SCHEMASHOW
WHILE WHILE Statement
widths
  display
Wildcard character (%)
Wildcard character (_)
wildcards
  and LIKE MySQL
  in mysql.columns_priv table 2
  in mysql.db table 2
  in mysql.host table 2
  in mysql.tables_priv table 2
  in mysql.user table 1
Windows MySQL Connector/ODBC
  compiling on WindowsMySQL
  open issues WindowsMySQLUnixMySQL
  upgrading WindowsMySQL
  versus Unix WindowsMySQLUnixMySQL
with-big-tables option

Within()
without-server option
WKB format (WKB)
WKT format (WKT)
Word program MyODBC
wrappers
    Eiffel MySQL Eiffel Wrapper
write access
    tmp mysql_install_db
write_buffer_size myisamchk variable myisamchk

X

X() Point

XA BEGIN XASQL
XA COMMIT XASQL
XA PREPARE XASQL
XA RECOVER XASQL
XA ROLLBACK XASQL
XA START XASQL
XA transactions XA
    transaction identifiers XASQL
xid
    XA transaction identifier XASQL
xml
    mysql option
XOR
    bitwise
    logical

Y

Y() Point

Year 2000 compliance 2000
Year 2000 issues Y2K
YEAR data type YEAR

YEAR()
YEARWEEK()

MySQLMySQL dev.mysql.com