



NI DataSocket Server Help

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Use this help file as a reference for information about the [DataSocket Server](#), [DataSocket Server Manager](#), [DataSocket Server Diagnostics](#) utility, and the concepts you need to understand so you can transfer data using the DataSocket Server.

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For more information about this help file, refer to the following topics:

[Conventions](#)—formatting and typographical conventions in this help file

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DataSocket Server

Overview

A DataSocket Server is an executable that enables data exchange between multiple [DataSocket Readers](#) and [DataSocket Writers](#). The DataSocket Server accepts and stores information from [data sources](#) and relays it to other [data targets](#). When you run a DataSocket Server on a computer, you make data easily accessible to DataSocket Readers and Writers on the same computer or other computers connected through a TCP network, such as the Internet.



Note The DataSocket Server requires support for TCP/IP networking on the computer. If you have a working Web browser on the computer, the TCP/IP driver is installed.

Launching the DataSocket Server

Launch the DataSocket Server by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server**.



Tip When the DataSocket Server is running, you see the DataSocket icon in the Windows system tray, indicating that the DataSocket Server is running. To check on its status, right-click the DataSocket icon and select **Show DataSocket Server** from the shortcut menu.

Configuring the DataSocket Server

The default DataSocket Server configuration works for many Internet applications, but you might need to change the configuration for some applications. To modify the DataSocket Server configuration, use the [DataSocket Server Manager](#).



Note Changes that you make to the DataSocket Server using the DataSocket Server Manager take effect the next time you launch the DataSocket Server. If you change the server configuration in the DataSocket Server Manager when the DataSocket Server is running, you must shut down and launch the DataSocket Server again before the changes take effect.

Shutting Down the DataSocket Server

To shut down the DataSocket Server, select **Server»Shutdown DataSocket Server** in the DataSocket Server. If the DataSocket Server is hidden, right-click the DataSocket icon in the Windows system tray and select **Shutdown DataSocket Server** from the shortcut menu.

Data Items

A data item on a [DataSocket Server](#) represents a real-world measurement. [DataSocket Readers](#) can subscribe to data items on a DataSocket Server, and [DataSocket Writers](#) can create and publish or update data items on a DataSocket Server.

There are two types of data items—predefined data items and dynamically created data items:

- Predefined data items always exist on the DataSocket Server, and they always have an initial value associated with them. Because the DataSocket Server never releases predefined data items, their values exist even when no DataSocket client is connected to them. Predefined data items can have [special read and write access groups](#) so you can allow different computers to access different predefined data items.
- Dynamically created data items exist only as long as there is at least one DataSocket client connected to read or write the data item value. When no connections to a dynamically created data item remain, the DataSocket Server releases the data item and its value.

By default, only programs running on the same computer as the DataSocket Server can create data items or publish to data items, whereas applications on the same computer or other computers can read data items. Use the [DataSocket Server Manager](#) to specify which computers can create data items, publish to data items, and subscribe to data items.

Data Source

A data source is a location to which you want a [DataSocket Reader](#) to connect and retrieve data. You specify a data source location with a URL. Like URLs you use in a Web browser, the data source locator can point to many different types of sources depending on the prefix. The prefix is called the URL scheme. DataSocket supports several schemes:

- dstp: ([DataSocket transfer protocol](#))
- http: (hypertext transfer protocol)
- ftp: (file transfer protocol)
- opc: (OLE for Process Control)
- fieldpoint:, logos:, lookout: ([communication protocol for National Instruments FieldPoint modules, National Instruments LabVIEW Datalogging and Supervisory Control \(DSC\) Module processes, and National Instruments Lookout processes](#))
- file: (local file servers)

Data Target

A data target is a location to which you want a [DataSocket Writer](#) to connect and write data. You specify a data target with a URL. Like URLs you use in a Web browser, the data target locator can point to many different types of sources depending on the prefix. The prefix is called the URL scheme. DataSocket supports several schemes:

- dstp: ([DataSocket transfer protocol](#))
- ftp: (file transfer protocol)
- opc: (OLE for Process Control)
- fieldpoint:, logos:, lookout: ([communication protocol for National Instruments FieldPoint modules, National Instruments LabVIEW Datalogging and Supervisory Control \(DSC\) Module processes, and National Instruments Lookout processes](#))
- file: (local file servers)

DataSocket

DataSocket is a technology that simplifies data exchange between an application and other applications, files, FTP servers, and Web servers. It provides one common API to a number of different communication protocols.

DataSocket, both a technology and a group of tools, facilitates the exchange of data and information between an application and a number of different [data sources](#) and [data targets](#). These sources and targets include files, HTTP/FTP servers, OLE for Process Control (OPC) servers, and National Instruments [DataSocket Servers](#) for publishing live data between applications. Often, these sources and targets are located on a different computer. You can specify DataSocket sources and targets (connections) using URLs (uniform resource locators) that adhere to the familiar URL model.

DataSocket uses an enhanced data format for exchanging measurement data, as well as the attributes of the data. Data attributes might include information such as an acquisition rate, test operator name, time stamp, and quality of data.

Although you can use general purpose file I/O functions, TCP/IP functions, and FTP/HTTP requests to transfer data between different applications, applications and files, and different computers, you must write a significant amount of program code to do so. DataSocket greatly simplifies this task by providing a unified API for these low-level communication protocols. Transferring data across computers with DataSocket is as simple as using a browser to read Web pages on the Internet.

DSTP

DataSocket Transfer Protocol. Protocol based on TCP/IP through which data is passed between DataSocket clients—known as DataSocket [Reader](#) and [Writer](#) applications—using the [DataSocket Server](#).

You connect to a DataSocket Server from DataSocket Reader and Writer applications using the DSTP URL scheme, as demonstrated in the following example URLs.

The following URL connects to the data item named wave on the DataSocket Server running on the local computer:

```
dstp://localhost/wave
```

The following URL connects to the data item named wave on a DataSocket Server running on a networked computer named lab:

```
dstp://lab/wave
```

Logos Protocol

The National Instruments Logos protocol sends and receives live data to and from National Instruments FieldPoint modules, National Instruments LabVIEW Datalogging and Supervisory Control (DSC) Module processes, and National Instruments Lookout processes. The following URLs are functionally equivalent:

logos://computer_name/process/data_item_name

lookout://computer_name/process/data_item_name

fieldpoint://computer_name/process/data_item_name

DataSocket Server Manager

The DataSocket Server Manager is an executable that configures default settings and predefined data items for the [DataSocket Server](#) on the local computer. You can launch the DataSocket Server Manager by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**.



Note You cannot configure a DataSocket Server remotely or programmatically. You must locally configure the DataSocket Server with the DataSocket Server Manager.

Changes that you make to the DataSocket Server using the DataSocket Server Manager take effect the next time you launch the DataSocket Server. If you change the DataSocket Server configuration in the DataSocket Server Manager while the DataSocket Server is running, you must shut down and launch the DataSocket Server again before the changes take effect.

You can perform the following tasks with the DataSocket Server Manager:

- [Limit the total number of simultaneous connections](#) to the [DataSocket Server](#) from [DataSocket Readers](#) and [DataSocket Writers](#)
- [Limit the number of data items](#) that DataSocket clients are allowed to dynamically create on the DataSocket Server
- [Set buffering constraints for predefined items and dynamically created items](#)
- [Add users to permission groups](#)
- [Create new permission groups](#)
- [Create predefined data items](#)
- [Import and export DataSocket Server Manager configurations](#)

Configuring Buffering

Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager** to configure buffering constraints. Buffering constraints set the maximum size of the buffer in terms of packets and in terms of bytes. These constraints prevent a buffer from growing unbounded and consuming excessive memory.

Complete the following steps to configure [server-side buffering](#) for predefined data items or to configure default buffering constraints for dynamically created data items.

Buffering Constraints for Predefined Data Items

1. [Create a predefined data item](#). By default, the DataSocket Server Manager sets the maximum buffer size to 25 MB and 1 packet, effectively providing unbuffered behavior.
2. To override the default buffering constraints, select the data item from the **Predefined Data Items** category and specify new **Max Buffer Bytes** and **Max Buffer Packets** values.

Buffering Constraints for Dynamically Created Data Items

You can specify default buffering constraints that apply to all data items created dynamically on the DataSocket Server. Any dynamic data item residing on the DataSocket Server inherits the default buffering constraints when the DataSocket Server creates the data item.

1. Select **DfltBufferMaxBytes** from the **Server Settings** category and set the new maximum buffer size in bytes.
2. Select **DfltBufferMaxPackets** from the **Server Settings** category and set the new maximum buffer size in packets.

Configuring Permissions to the DataSocket Server

You can categorize users according to how they interact with the DataSocket Server and what permission they need for connecting to the DataSocket Server. Different permission groups include read access, write access, data item creators, and administrators. You also can [define new permission groups](#).

Use the permission groups to group hosts with similar needs. The DataSocket Server Manager provides the following default groups:

- The **Administrators** permission group is reserved for future use and mainly intended for retrieving management information from the DataSocket Server.
- The **DefaultReaders** permission group can read all dynamically created data items from the DataSocket Server. In addition, the **DefaultReaders** permission group can read from any predefined data item that has its read access group set to **DefaultReaders**.
- The **DefaultWriters** permission group can write to all dynamically created data items on the DataSocket Server. In addition, the **DefaultWriters** permission group can write to any predefined data item that has its write access group set to **DefaultWriters**.
- The **Creators** permission group can dynamically create new data items on the DataSocket Server.

Complete the following steps to add a user to a default group:

1. Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**.
2. Select the group from the **Permission Groups** list.
3. Click the **Add Host** button to add a user to the group.
4. Add the user to the permission group using either the name or IP address in dotted decimal notation of the computer. The DataSocket Server Manager also has two variables, **localhost** and **everyhost**; **localhost** represents the local computer (the computer where the server is running) and **everyhost** represents all computers (unrestricted access).

Creating Permission Groups

You can create new permission groups for other sets of users. For example, you might need a permission group that reads only predefined data items, unlike the **DefaultReaders** group. Predefined items can have special read and write access groups. You can specify which groups can create items, write items, and read items. As a result, different computers can have individualized access to different predefined items.

Complete the following steps to create a new permission group that reads or writes to a predefined data item.

1. Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**.
2. Click the **New Group** button.
3. Enter a descriptive name for the permission group in the **Name** textbox.
4. Modify the **Hosts** list to include the computers to which you want to grant access. You can specify a computer either by the computer name on the network or the IP address in dotted decimal notation. The DataSocket Server Manager also has two variables, **localhost** and **everyhost**; **localhost** represents the local computer (the computer where the server is running) and **everyhost** represents all computers (unrestricted access).
5. Select the data item to which you want to grant access from the **Predefined Data Items** list, and then select the new permission group from the **Read Access** or **Write Access** pull-down menu.

Creating Predefined Data Items on the DataSocket Server

You can specify [data items](#) that must be automatically created and initialized when you launch the DataSocket Server. As you create DataSocket clients, consider defining the data items in the DataSocket Server Manager so that you can [define access permission groups](#) for the data items. Complete the following steps to predefine a data item on a DataSocket Server.

1. Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**. The **Predefined Items** category lists all items that the DataSocket Server creates each time you launch it. These items exist without DataSocket client connections, unlike dynamically created items that exist only during a DataSocket client connection.
2. Click the **New Item** button.
3. Enter a detailed description for the item in the **Description** textbox. For example, you might list the data source, the data type, and access permissions.
4. Enter a descriptive name for the data item in the **Name** textbox.
5. Grant read and write access to permission groups by selecting the appropriate permission group from the **Read Access** and **Write Access** pull-down menus.
6. If you want to allow multiple writers to connect to the DataSocket Server, place a checkmark in the **Allow Multiple Writers** checkbox.
7. Specify the data type and a value for the **Initial Value**.

Remember that predefined data items exist even without a DataSocket client connection. If a DataSocket Reader is connected to a predefined data item on the DataSocket Server before a DataSocket Writer is connected, the DataSocket Server returns the initial value to the Reader. DataSocket Writers overwrite default values; when a DataSocket Writer writes to a predefined data item, that item retains the value even if the DataSocket Writer disconnects from the server. After a DataSocket Writer overwrites the initial value of a predefined item, the item does not return to the initial value unless the DataSocket Server is shut down and relaunched.

Limiting the Number of Dynamically Created Data Items

Complete the following steps to limit the number of data items the DataSocket Server can dynamically create.

1. Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**.
2. Select **MaxItem** from the **Server Settings** category.
3. Set the maximum number of data items you want to allow the DataSocket Server running on the local computer to dynamically create. The DataSocket Server can create between 1 and 1000 dynamic data items, which does not include predefined data items. The default is 200.

Saving DataSocket Server Configurations

You can create multiple DataSocket Server configurations and import and export them, which is especially useful when you want a [DataSocket Server](#) on another computer to have the same configuration as the one on the local computer because you cannot configure the DataSocket Server remotely or programmatically. You must locally configure the DataSocket Server with the DataSocket Server Manager. By default, the DataSocket Server uses the configuration specified in `cwdssini.dss`, which exists in the same directory as the DataSocket Server executable.

Saving Default Configurations

After you configure settings in the DataSocket Server Manager, select **Settings»Save Settings Now** to save the settings to cwdssini.dss.

Importing Configurations

To import settings from another file, select **Settings»Import Settings** and select a file from the **Open DataSocket Server configuration** dialog box.

Exporting Configurations

To save the current configuration of the DataSocket Server so you can load it on another computer or at a later time, select **Settings»Export Settings** and select a file from the **Save DataSocket Server configuration** dialog box.

Setting Connection Limits

Complete the following steps to limit the number of simultaneous connections to the DataSocket Server.

1. Launch the [DataSocket Server Manager](#) by selecting **Start»Programs»National Instruments»DataSocket»DataSocket Server Manager**.
2. Select **MaxConnections** from the **Server Settings** category.
3. Set the maximum number of simultaneous connections you want to allow to the DataSocket Server running on the local computer. You can set **MaxConnections** between 1 and 1000. The default is 50.

Buffering

Buffering is a [DataSocket Transfer Protocol \(DSTP\)](#) feature that minimizes the likelihood that a [DataSocket Server](#) will drop data values. With buffering, the DataSocket Server temporarily stores the values published to a data item in a first-in, first-out (FIFO) buffer for the data item before sending the data to subscribing clients. Provided that a buffer never exceeds its capacity, buffering prevents unprocessed values from being overwritten and dropped by the DataSocket Server.

You can [configure individual buffering constraints](#) for each predefined data item on a DataSocket Server or you can [configure default buffering constraints](#) for all dynamically created data items.



Note Some application development environments such as LabVIEW maintain client-side buffers in addition to the server-side buffer. To minimize data loss, set the buffering constraints for both the DataSocket Server and the subscribing DataSocket clients. Refer to the *LabVIEW Help* for information about client-side buffering in LabVIEW.

Sometimes the DataSocket Server will have to drop values to enforce the buffering constraints for a data item. When the DataSocket Server needs to drop a value, it drops values from the front of a buffer—that is, it drops older data in favor of newer data. More specifically, the DataSocket Server drops a value from the front of a buffer when one of the following conditions is true:

- All clients currently subscribed to the data item have received the value, or
- Inserting a new value into the back of the buffer violates either of the two buffering constraints that you set for that data item.

The DataSocket Server does not notify DataSocket Readers or Writers when it drops data values. DataSocket Writers can add a sequence number attribute to the published data, so DataSocket Readers can detect dropped values in a data stream by checking the sequence number attribute.

DataSocket Server Diagnostics Utility

To launch the **DataSocket Server Diagnostics** utility, select **Tools»Diagnostics** in the [DataSocket Server](#). Use this utility to view information about the active data items on the DataSocket Server and to fine-tune buffering constraints.

Viewing Information about Data Items

To view information about a specific data item, select the data item from the tree in the left pane of the window. In the right pane of the window, you can find information about the DataSocket clients currently subscribing to the data item, buffering constraints, buffer utilization, and number of packets that were dropped.

Adjusting Buffering Constraints

You can adjust the buffering constraints in the DataSocket Server Diagnostics utility to fine-tune performance. To update a buffering constraint for a data item, select the data item, update the **Bytes** or **Packets** constraint value in the numeric control, and click the **Update** button to apply the new constraint.

After you fine-tune the buffering constraints, save the settings to the DataSocket Server configuration file by selecting **File»Save Settings**.



Note When you save data items and new buffering constraints to the configuration file, you save only predefined data items, not dynamically created data items currently published on the DataSocket Server. The DataSocket Server saves predefined data items with their initial values, not their current values.

Reading from a DataSocket Server

Use NI LabVIEW, LabWindows/CVI, or Measurement Studio to create a DataSocket Reader application. A DataSocket Reader application subscribes to live data being published by a [DataSocket Writer](#) application to a [DataSocket Server](#). Use the DataSocket APIs provided in LabVIEW, LabWindows/CVI, and Measurement Studio to create a VI or application that connects to the DataSocket Server using a [URL](#) and retrieves live updates as new data is published to the DataSocket Server.



Note You must have Internet Explorer 3.0 or later installed on Windows computers on which you run DataSocket Readers or Writers.

Refer to the LabVIEW Help, LabWindows/CVI Help, or Measurement Studio Help for information about creating a DataSocket Reader VI or application.

Writing to a DataSocket Server

Use NI LabVIEW, LabWindows/CVI, or Measurement Studio to create a DataSocket Writer application. A DataSocket Writer application publishes live data to a [DataSocket Server](#). Use the DataSocket APIs provided in LabVIEW, LabWindows/CVI, and Measurement Studio to create a VI or application that connects to the DataSocket Server using a [URL](#) and publishes updates that a [DataSocket Reader](#) application can retrieve.



Note You must have Internet Explorer 3.0 or later installed on Windows computers on which you run DataSocket Readers or Writers.

Refer to the LabVIEW Help, LabWindows/CVI Help, or Measurement Studio Help for information about creating a DataSocket Writer VI or application.

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Related Documentation

The following documents contain information that you might find helpful as you use this help file:

- [LabVIEW Help](#)
- [Measurement Studio Help](#)
- [LabWindows/CVI Help](#)

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Conventions

This help file uses the following conventions:

- » The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.



This icon denotes a tip, which alerts you to advisory information.



This icon denotes a note, which alerts you to important information.

bold

Bold text denotes items that you must select or click on in the software, such as menu items and dialog box options. Bold text also denotes parameter names, emphasis, or an introduction to a key concept.

green

Underlined text in this color denotes a link to a help topic, help file, or Web address.

italic

Italic text denotes variables or cross references. This font also denotes text that is a placeholder for a word or value that you must supply.

monospace

Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames and extensions, and code excerpts.

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