Welcome

Topics

- **Who Should Read This Guide**
- **How This Guide Is Organized**
- **Amazon Elastic Load Balancing Resources**

_Elastic Load Balancing_ is a cost-effective and easy-to-use web service that distributes application loads between two or more EC2 instances.

This is the _Elastic Load Balancing Developer Guide_. This section describes who should read this guide, how the guide is organized, and other resources related to Elastic Load Balancing.

The following Amazon Web Services (AWS) products will occasionally be referred to using the following abbreviated forms; all copyrights and legal protections still apply.

<table>
<thead>
<tr>
<th>Full Name</th>
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<tr>
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<td>Amazon EC2</td>
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<td>Amazon Machine Image</td>
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Who Should Read This Guide

This guide is intended for developers, as well as those in IT/Operations, who are building web applications or services hosted in the Amazon Elastic Compute Cloud.

Required Knowledge and Skills

Use of this guide assumes you are familiar with the following:

- XML. For an overview, go to the [W3 Schools XML Tutorial](https://www.w3schools.com/xml).
- Web services. For an overview, go to the [W3 Schools Web Services Tutorial](https://www.w3schools.com/webservices/).
- A programming language for consuming a web service and any related tools.
- Programming Amazon Elastic Cloud Computing (EC2) applications or services that use Amazon EC2 web service APIs. For information about Amazon EC2, go to the [Amazon EC2 product information page](https://aws.amazon.com/ec2/).
How This Guide Is Organized

This guide is organized into several major sections described in the table below.

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There are more sections under each category to help you with more specific information as well as a glossary and an index. Most sections are written to stand on their own with some cross dependencies. You should, in general, be able to look up the information you need and go back to work. However, you can also read through the major sections sequentially to get in-depth knowledge about the service.
# Amazon Elastic Load Balancing Resources

The table below lists related resources that you'll find useful as you work with this service.

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<tr>
<th>Resource</th>
<th>Description</th>
</tr>
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<td>The FAQ covers the top 20 questions developers have asked about this product.</td>
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<td>Release notes</td>
<td>The release notes give a high-level overview of the current release. They specifically note any new features, corrections, and known issues.</td>
</tr>
<tr>
<td>AWS Developer Resource Center</td>
<td>A central starting point to find documentation, code samples, release notes, and other information to help you build innovative applications with AWS.</td>
</tr>
<tr>
<td>Discussion Forums</td>
<td>A community-based forum for developers to discuss technical questions related to Amazon Web Services.</td>
</tr>
<tr>
<td>AWS Support Center</td>
<td>The home page for AWS Technical Support, including access to our Developer Forums, Technical FAQs, Service Status page, and Premium Support.</td>
</tr>
<tr>
<td>Premium Support</td>
<td>The primary web page for information about AWS Premium Support, a one-on-one, fast-response support channel to help you build and run applications on AWS Infrastructure Services.</td>
</tr>
<tr>
<td>Amazon Elastic Load Balancing product information</td>
<td>The primary web page for information about Amazon Elastic Load Balancing.</td>
</tr>
<tr>
<td>Contact Us</td>
<td>A central contact point for inquiries concerning AWS billing, account, events, abuse etc.</td>
</tr>
<tr>
<td>Conditions of Use</td>
<td>Detailed information about the copyright and trademark usage at Amazon.com and other topics.</td>
</tr>
</tbody>
</table>
What's New

This What's New is associated with the 2009-05-15 release of Elastic Load Balancing. This guide was last updated on September 17, 2009.

The following table describes the important changes since the last release of Elastic Load Balancing Developer Guide.

<table>
<thead>
<tr>
<th>Change</th>
<th>Description</th>
<th>Release Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updated/added content</td>
<td>Bug fixes; added new region information.</td>
<td>09 September 2009</td>
</tr>
<tr>
<td>Updated content</td>
<td>Bug fixes.</td>
<td>21 July 2009</td>
</tr>
<tr>
<td>Added content</td>
<td>Instructions for Command Line Tools have been added to the User Scenarios section.</td>
<td>28 May 2009</td>
</tr>
<tr>
<td>New Service</td>
<td>This is the first release of Elastic Load Balancer Developer Guide. Future updates and changes will be noted here.</td>
<td>18 May 2009</td>
</tr>
</tbody>
</table>
Introduction to Elastic Load Balancing

Topics

- What is Elastic Load Balancing?
- Elastic Load Balancing Concepts
- Elastic Load Balancing Conceptual Overview
- Availability Zones and Regions
What is Elastic Load Balancing?

Elastic Load Balancing is a cost-effective and easy to use web service to help you improve availability and scalability of your application. It makes it easy for you to distribute application loads between two or more EC2 instances. Elastic Load Balancing enables availability through redundancy and supports traffic growth of your application.

Benefits

The core benefits of Elastic Load Balancing:

- **Application scalability**—Support traffic growth and distribute the application load among multiple EC2 instances by sending requests to the most suitable instance. Add new instances without interrupting your application.
- **Application availability**—Increase the availability of your application by protecting against application and instance failure.
- **Cost-effective**—Pay only for what you use, as you use it, with no up-front commitments. There are no pre-purchase commitments required and there is no minimum amount of use required.
Elastic Load Balancing Concepts

This section introduces you to Elastic Load Balancing terminology and concepts. Many of the concepts introduced in this chapter are discussed in more specific contexts in later chapters. The concepts are briefly presented here to give you a basic understanding of common Amazon Load Balancing Service terms.

For more information, please see the introductory and conceptual overviews - What is Elastic Load Balancing? and Conceptual Overview of Elastic Load Balancing.

LoadBalancer

A LoadBalancer is represented by a DNS name and a set of ports and provides the destination to which all requests intended for your application should be directed. Each LoadBalancer can distribute requests to multiple application instances. LoadBalancers can span multiple Availability Zones within an EC2 region, but cannot span multiple regions.

Note
To create or work with a load balancer in a specific region, the corresponding regional service endpoint should be used. In the United States, the endpoint is:

- https://us-east-1.elasticloadbalancing.amazonaws.com
In Europe, the endpoint is:

- https://eu-west-1.elasticloadbalancing.amazonaws.com

If no endpoint is explicitly specified, the US endpoint will be used by default.

When a LoadBalancer is created, it is associated with an auto generated DNS name. You are free to map that to any other domain name (such as www.mywebsite.com) using CNAME or some other technique.
Elastic Load Balancing Conceptual Overview

Elastic Load Balancing lets you automatically distribute and balance the incoming application traffic among all the instances you are running. The service also makes it easy to add new instances when you need to increase the capacity of your application. You can dynamically register or deregister instances from the LoadBalancer as the capacity requirements of your application change with time.

In the following figure, requests enter the LoadBalancer and are routed to instances within the selected Availability Zones. You can make changes to the LoadBalancer configuration through Elastic Load Balancing.
The LoadBalancer is represented by a DNS name and a set of ports. You will still need a CNAME, or equivalent, in order to map the generated DNS name to a name that is meaningful to you and your customers (e.g. www.mywebsite.com). After you have created your LoadBalancer, you will take the information returned by the service and map it to the public facing DNS name that your customers will see.

Once you create your LoadBalancer, you need to register
your instances with it.

The LoadBalancer also monitors the health of your instances registered with your LoadBalancer. When the LoadBalancer detects a problem with an instance, it stops distributing traffic to it. When the instance is healthy again, the LoadBalancer restarts distributing traffic to it. This process allows your application to automatically react to issues that might affect your customers without your having to be involved beyond configuring the healthcheck.
Availability Zones and Regions

A Load Balancer can distribute traffic to instances across all Availability Zones within a region.

Note
Elastic Load Balancing does not distribute traffic across regions.

Incoming traffic is load balanced equally across all Availability Zones enabled for your LoadBalancer, so it is important to have *equivalent* numbers of instances in each zone. For example, if you have 10 instances in AvailabilityZone us-east-1a and 2 in us-east-1b, the traffic will still be equally distributed between the two Availability Zones. As a result, the two instances in us-east-1b will have to serve the same amount of traffic as the 10 instances in us-east-1a. As a best practice, we recommend you keep equivalent or nearly equivalent number of instances in each of your Availability Zones.

We recommend, for critical applications, that you distribute the requests across multiple availability zones.

For more information, please see the [Using Elastic Load Balancing](#) and [API Reference](#) to use the service to its fullest capability.
Using Elastic Load Balancing

Topics

- Using the Query API
- Using the SOAP API
- User Scenarios

This section provides task-oriented descriptions of how to use Elastic Load Balancing operations. For a complete description of Elastic Load Balancing operations, refer to the API Reference.
Using the Query API

Query requests are HTTP or HTTPS requests that use the HTTP verb GET or POST and a Query parameter named Action or Operation. Action is used throughout this documentation, although Operation is supported for backward compatibility with other AWS Query APIs.
Query Parameters

Each Query request must include some common parameters to handle authentication and selection of an action. For more information, see Common Request Parameters.

Note
Some API operations take lists of parameters. These lists are specified using the following notation: $param.member.n$. Values of $n$ are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:

```plaintext
&attribute.member.1=this
&attribute.member.2=that
```
The Request ID

In every response from Amazon Web Services (AWS), you will find ResponseMetadata, which contains a string element called RequestId. This is simply a unique identifier AWS assigns to this request for tracking and troubleshooting purposes.

To improve readability of the API documentation and reduce redundancy, RequestId is not listed on the individual API documentation pages.
Query API Authentication

You can send Query requests over either HTTP or HTTPS. Regardless of which protocol you use, you must include a signature in every Query request. This section describes how to create the signature. The method described in the following procedure is known as signature version 2.

To create the signature

1. Create the canonicalized query string that you need later in this procedure:
   a. Sort the UTF-8 query string components by parameter name with natural byte ordering.
      
      The parameters can come from the GET URI or from the POST body (when Content-Type is application/x-www-form-urlencoded).
      
      b. URL encode the parameter name and values according to the following rules:
          
          - Do not URL encode any of the unreserved characters that RFC 3986 defines.
These unreserved characters are A-Z, a-z, 0-9, hyphen (-), underscore (_), period (.), and tilde (~).

- Percent encode all other characters with %XY, where X and Y are hex characters 0-9 and uppercase A-F.
- Percent encode extended UTF-8 characters in the form %XY%ZA....
- Percent encode the space character as %20 (and not +, as common encoding schemes do).

**Note**
Currently all AWS service parameter names use unreserved characters, so you don't need to encode them. However, you might want to include code to handle parameter names that use reserved characters, for possible future use.

- Separate the encoded parameter names from their encoded values with the equals sign (=) (ASCII character 61), even if the parameter value is empty.
- Separate the name-value pairs with an ampersand (&) (ASCII code 38).

2. Create the string to sign according to the following
pseudo-grammar (the "\n" represents an ASCII newline).

```
StringToSign = HTTPVerb + "\n" +
ValueOfHostHeaderInLowercase + "\n" +
HTTPRequestURI + "\n" +
CanonicalizedQueryString <from the preceding step>
```

The `HTTPRequestURI` component is the HTTP absolute path component of the URI up to, but not including, the query string. If the `HTTPRequestURI` is empty, use a forward slash (`/`).

3. Calculate an RFC 2104-compliant HMAC with the string you just created, your Secret Access Key as the key, and SHA256 or SHA1 as the hash algorithm.


4. Convert the resulting value to base64.

5. Use the resulting value as the value of the `Signature` request parameter.

Important

The final signature you send in the request must be URL encoded as specified in RFC 3986 (for more information, go to [http://www.ietf.org/rfc/rfc3986.txt](http://www.ietf.org/rfc/rfc3986.txt)). If your toolkit
URL encodes your final request, then it handles the required URL encoding of the signature. If your toolkit doesn't URL encode the final request, then make sure to URL encode the signature before you include it in the request. Most importantly, make sure the signature is URL encoded only once. A common mistake is to URL encode it manually during signature formation, and then again when the toolkit URL encodes the entire request.
Query Example

Example EnableAvailabilityZoneForLoadBalancer API Request

This example uses the Elastic Load Balancing API EnableAvailabilityZoneForLoadBalancer.

https://elasticloadbalancing.amazonaws.com/?AvailabilityZones.member.1=us-east-1c
&LoadBalancerName=ReferenceLB1
&Action=EnableAvailabilityZoneForLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=<Your AWS Access Key ID>
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-02-17T05%3A13%3A00.000Z

Following is the string to sign.

GET
elasticloadbalancing.amazonaws.com
/

AWSAccessKeyId=<Your AWS Access Key ID>
&Action=EnableAvailabilityZoneForLoadBalancer
&AvailabilityZones.member.1=us-east-1c
&LoadBalancerName=ReferenceLB1
&SignatureMethod=HmacSHA1
&SignatureVersion=2
&Timestamp=2009-02-17T05%3A13%3A00.000Z
&Version=2009-05-15
Following is the signed request.

```plaintext
https://elasticloadbalancing.amazonaws.com/?Action=EnableAvailabilityZones&
  AvailabilityZones.member.1=us-east-1c
  AWSAccessKeyId=<Your AWS Access Key ID>
  LoadBalancerName=ReferenceLB1
  SignatureVersion=2
  SignatureMethod=HmacSHA1
  Timestamp=2009-10-17T05%3A13%3A00.000Z
  Signature=<URLEncode(Base64Encode(Signature))>
  Version=2009-05-15
```
Using the SOAP API

Topics

- WSDL and Schema Definitions
- Programming Language Support
- Request Authentication
- The Response Structure
- Web Services References
WSDL and Schema Definitions

You can access the Elastic Load Balancing web service using the SOAP web services messaging protocol. This interface is described by a Web Services Description Language (WSDL) document, which defines the operations and security model for the particular service. The WSDL references an XML Schema document, which strictly defines the data types that might appear in SOAP requests and responses. For more information on WSDL and SOAP, see Web Services References.

Note

Elastic Load Balancing supports SOAP only through HTTPS.

All schemas have a version number. The version number appears in the URL of a schema file and in a schema's target namespace. This makes upgrading easy by differentiating requests based on the version number.
Programming Language Support

Since the SOAP requests and responses in Elastic Load Balancing follow current standards, any programming language with the appropriate library support can be used. Languages known to have this support include C++, C#, Java, Perl, Python and Ruby.
Request Authentication

Elastic Load Balancing complies with the current WS-Security standard, which requires you to hash and sign SOAP requests for integrity and non-repudiation. WS-Security defines profiles which are used to implement various levels of security. Secure SOAP messages use the BinarySecurityToken profile, consisting of an X.509 certificate with an RSA public key.

The following is the content of an insecure RunInstances operation (using EC2 as an example):

```xml
<RunInstances xmlns="http://ec2.amazonaws.com/doc/2009"
               xmlns:xs="http://www.w3.org/2001/XMLSchema"
               xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <instancesSet>
    <item>
      <imageId>ami-60a54009</imageId>
      <minCount>1</minCount>
      <maxCount>3</maxCount>
    </item>
  </instancesSet>
  <groupSet/>
</RunInstances>
```

To secure the request, we add the BinarySecurityToken element.

The secure version of the request begins with the
If you are matching this against requests generated by Elastic Load Balancing supplied libraries, or those of another vendor, the following are the most important elements.

**Elements**

- **BinarySecurityToken**—Contains the X.509 certificate in base64 encoded PEM format

- **Signature**—Contains an XML digital signature created using the canonicalization, signature algorithm, and digest method

- **Timestamp**—Requests to Elastic Load Balancing are valid within 5 minutes of this value to help prevent replay attacks
The Response Structure

In response to a request, the Elastic Load Balancing service returns an XML data structure that conforms to an XML schema defined as part of the Elastic Load Balancing WSDL. The structure of a XML response is specific to the associated request.

The following is an example response (using EC2 as an example):

```xml
  <reservationId>r-47a5402e</reservationId>
  <ownerId>UYY3TLBUXIEON5NQVUUX60MPWBZIQNFM</ownerId>
  <groupSet>
    <item>
      <groupId>default</groupId>
    </item>
  </groupSet>
  <instancesSet>
    <item>
      <InstanceId>i-2ba64342</InstanceId>
      <imageId>ami-60a54009</imageId>
      <InstanceState>
        <code>0</code>
        <name>pending</name>
      </InstanceState>
      <DNSName/>
    </item>
    <item>
      <InstanceId>i-2bc64242</InstanceId>
      <imageId>ami-60a54009</imageId>
    </item>
  </instancesSet>
</RuninstancesResponse>
```
<InstanceState>
  <code>0</code>
  <name>pending</name>
</InstanceState>

<DNSName>ec2-67-202-51-176.compute-1.amazonaws.com</DNSName>
</item>

<item>
  <InstanceId>i-2be64332</InstanceId>
  <imageId>ami-60a54009</imageId>
  <InstanceState>
    <code>0</code>
    <name>pending</name>
  </InstanceState>
  <DNSName>ec2-67-202-51-122.compute-1.amazonaws.com</DNSName>
  <keyName>example-key-name</keyName>
  <instanceType>m1.small</instanceType>
  <launchTime>2007-08-07T11:54:42.000Z</launchTime>
</item>
</instancesSet>
</RunInstancesResponse>
Web Services References

For more information about using web services, go to any of the following resources:

- [Web Service Description Language (WSDL)](https://www.w3.org/2001/06(wsdl2.0 개요).html)
- [WS-Security BinarySecurityToken Profile](https://docs.oasis-open.org/wss/2004/01/oasis-200401-wss-ws-security-token-profile-1.0.xsd)
User Scenarios

Topics

- How to Set Up an HTTP LoadBalancer
- How to Set Up an HTTPS LoadBalancer
- How to Expand a Load Balanced Application to an Additional Availability Zone
- How to Disable an Availability Zone from a Load Balanced Application
- How to Tear Down an Existing LoadBalancer

The following discuss some common user scenarios for using the Elastic Load Balancing API. These scenarios demonstrate the API sequences needed to accomplish the given tasks.

Note
The examples in the following sections assume that your instances are in the US region. If your instances are in Europe, you must specify the eu-west1 region by using the --region eu-west-1 parameter or setting the EC2_REGION environment variable.
How to Set Up an HTTP LoadBalancer

In this example, you create a LoadBalancer for an HTTP service. You specify that the LoadBalancer listens on port 80 and distributes traffic to port 8080 on the instances. You also specify that Availability Zone us-east-1a is enabled for your LoadBalancer. Once the LoadBalancer is created, you configure an application health check for the instances, and register the instances with the LoadBalancer.

Preconditions:

- Your AWS account is signed up for Amazon EC2
- In Availability Zone us-east-1a, you have launched the instances you intend to register with your LoadBalancer
- The instances to be registered with your LoadBalancer respond to the target of the health check with an HTTP status code 200
API Example

To set up an HTTP LoadBalancer

1. Call CreateLoadBalancer with the following parameters:
   - AvailabilityZones = us-east-1a
   - Listeners
     - Protocol = HTTP
     - InstancePort = 8080
     - LoadBalancerPort = 80
   - LoadBalancerName = MyLoadBalancer

   The operation returns the DNS name of your LoadBalancer. You can then map that to any other domain name (such as www.mywebsite.com) using a CNAME or some other technique.

2. Call ConfigureHealthCheck with the following parameters:
- `LoadBalancerName` = MyLoadBalancer
- `Target` = http:8080/ping

**Note**

Make sure your instances respond to /ping on port 8080 with an HTTP 200 status code.

- `Interval` = 30
- `Timeout` = 3
- `HealthyThreshold` = 2
- `UnhealthyThreshold` = 2

3. Call `RegisterInstancesWithLoadBalancer` with the following parameters:

- `LoadBalancerName` = MyLoadBalancer
- `Instances` = [i-4f8cf126, i-0bb7ca62]
Command Line Tools Example

To set up an HTTP LoadBalancer

1. Use the `elb-create-lb` command as in the following example.

   ```
PROMPT> elb-create-lb MyLoadBalancer --headers --
   --listener "lb-port=80,instance-port=8080,protocol=HTTP"
   --availability-zones us-east-1a
   ```

   Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>DNS-NAME</th>
<th>DNS-NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNS-NAME</td>
<td>MyLoadBalancer-2111276808.us-east-1.elb.amazonaws.com</td>
</tr>
</tbody>
</table>

2. Use the `elb-configure-healthcheck` command as in the following example.

   ```
PROMPT> elb-configure-healthcheck MyLoadBalancer
   ```

   Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>HEALTH-CHECK</th>
<th>TARGET</th>
<th>INTERVAL</th>
<th>TIMEOUT</th>
<th>HEALTHY-THRESHOLD</th>
<th>UNHEALTHY-THRESHOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH-CHECK</td>
<td>HTTP:8080/ping</td>
<td>30</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
3. Use the `elb-register-instances-with-lb` command as in the following example.

```
PROMPT> elb-register-instances-with-lb MyLoadBalancer
```

Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>INSTANCE</th>
<th>INSTANCE-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTANCE</td>
<td>i-4f8cf126</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>i-0bb7ca62</td>
</tr>
</tbody>
</table>
Give Us Your Feedback

Your input is important to us to help make our documentation helpful and easy to use. Please take a minute to give us your feedback on how well we were able to help you use Elastic Load Balancing. Just click this feedback link. Thank you.
How to Set Up an HTTPS LoadBalancer

In this example, you create a LoadBalancer for an HTTPS service. Currently, Elastic Load Balancing does not have SSL termination capability. For HTTPS traffic, you need to set the LoadBalancer listener protocol to TCP. You specify that the LoadBalancer listens on port 443 and distributes traffic to port 8443 on the instances. You also specify that Availability Zone us-east-1a is enabled for your LoadBalancer. Once the LoadBalancer is created, you configure an application health check for the instances, and register the instances with the LoadBalancer.

Preconditions:

- Your AWS account is signed up for Amazon EC2
- In Availability Zone us-east-1a, you have launched the instances you intend to register with your LoadBalancer
- The instances to be registered with your LoadBalancer accept TCP connections on the port
specified in the target of the health check
API Example

To set up an HTTPS LoadBalancer

1. Call `CreateLoadBalancer` with the following parameters:
   - AvailabilityZones = us-east-1a
   - `Listeners`
     - `Protocol` = TCP
     - `InstancePort` = 8443
     - `LoadBalancerPort` = 443
   - `LoadBalancerName` = MyLoadBalancer

   The operation returns the DNS name of your LoadBalancer. You can then map that to any other domain name (such as www.mywebsite.com) using CNAME or some other technique.

2. Call `ConfigureHealthCheck` with the following parameters:
○ **LoadBalancerName** = MyLoadBalancer

○ **Target** = TCP:8443

Note
Make sure your instances accept TCP connections on port 8443.

○ **Interval** = 30

○ **Timeout** = 3

○ **HealthyThreshold** = 2

○ **UnhealthyThreshold** = 2

3. Call **RegisterInstancesWithLoadBalancer** with the following parameters:

○ **LoadBalancerName** = MyLoadBalancer

○ **Instances** = [i-4f8cf126, i-0bb7ca62]
Command Line Tools Example

To set up an HTTPS LoadBalancer

1. Use the `elb-create-lb` command as in the following example.

   ```
PROMPT> elb-create-lb MyLoadBalancer --headers --
   ```

   Elastic Load Balancing returns the following:

   ```
   DNS-NAME   DNS-NAME
   DNS-NAME   MyLoadBalancer-2111276808.us-east-1.elb.amazonaws.com
   ```

2. Use the `elb-configure-healthcheck` command as in the following example.

   ```
PROMPT> elb-configure-healthcheck MyLoadBalancer
   ```

   Elastic Load Balancing returns the following:

   ```
   HEALTH-CHECK TARGET INTERVAL TIMEOUT HEALTHY-THRESHOLD UNHEALTHY-THRESHOLD
   HEALTH-CHECK   TCP:8443   30   3   2   2
   ```
3. Use the **elb-register-instances-with-lb** command as in the following example.

```
PROMPT> elb-register-instances-with-lb MyLoadBalancer
```

Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>INSTANCE</th>
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Give Us Your Feedback

Your input is important to us to help make our documentation helpful and easy to use. Please take a minute to give us your feedback on how well we were able to help you use Elastic Load Balancing. Just click this feedback link. Thank you.
How to Expand a Load Balanced Application to an Additional Availability Zone

In this example, you expand your EC2 application to run in an additional Availability Zone (us-east-1b). To do so, you first register the instances in the Availability Zone us-east-1b with the LoadBalancer. You wait for the instances to show up in the OutOfService state for the LoadBalancer. Finally you enable Availability Zone us-east-1b for your LoadBalancer.

**Note**

It is important to register instances in the new Availability Zone with your LoadBalancer before adding the Availability Zone. When you call EnableAvailabilityZonesForLoadBalancer, the LoadBalancer begins to route traffic equally amongst all the enabled Availability Zones. If the instances have not been registered, requests going to the new Availability Zone will fail.

Preconditions:

- You have set up an HTTP LoadBalancer in Availability Zone us-east-1a as in Setting up a Load Balance to Use HTTP.
In Availability Zone us-east-1b, you have launched the instances you intend to register with your LoadBalancer.
API Example

To expand a load balanced application to an additional Availability Zone

1. Call `RegisterInstancesWithLoadBalancer` with the following parameters:
   - `LoadBalancerName = MyLoadBalancer`
   - `Instances = [i-3a8cf324, i-2603ca33]`

2. Call `DescribeInstanceHealth` with the following parameters.
   - `LoadBalancerName = MyLoadBalancer`
   - `Instances = i-3a8cf324, i-2603ca33`

3. When the instances from the previous step are in the `OutOfService` state, you can proceed to the next step. Call `EnableAvailabilityZonesForLoadBalancer`.
   - `LoadBalancerName = MyLoadBalancer`
   - `Availability Zones = us-east-1b`
The operation returns the updated list of Availability Zones enabled for your LoadBalancer.
Command Line Tools Example

To expand a load balanced application to an additional Availability Zone

1. Use the `elb-register-instances-with-lb` command as in the following example.

   ```
   PROMPT> elb-register-instances-with-lb MyLoadBalancer
   ```

   Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>INSTANCE</th>
<th>INSTANCE-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTANCE</td>
<td>i-3a8cf324</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>i-2603ca33</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>i-4f8cf126</td>
</tr>
<tr>
<td>INSTANCE</td>
<td>i-0bb7ca62</td>
</tr>
</tbody>
</table>

2. Use the `elb-describe-instance-health` command as in the following example.

   ```
   PROMPT> elb-describe-instance-health MyLoadBalancer
   ```

   Elastic Load Balancing returns the following:
3. Use the **elb-enable-zones-for-lb** command as in the following example.

```shell
PROMPT> elb-enable-zones-for-lb MyLoadBalancer --headers --availability-zones us-east-1b
```

Elastic Load Balancing returns the following:

```plaintext
AVAILABILITY_ZONES    AVAILABILITY-ZONES
AVAILABILITY_ZONES    us-east-1a, us-east-1b
```
Give Us Your Feedback

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How to Disable an Availability Zone from a Load Balanced Application

In this example, you disable the Availability Zone us-east-1a for your EC2 application.

This scenario assumes that you have an HTTP LoadBalancer enabled in Availability Zones us-east-1a and us-east-1b.

You disable the Availability Zone for the LoadBalancer first, then give the instances time to go into the OutOfService state before deregistering them from your LoadBalancer.

>Note
Your LoadBalancer always distributes traffic to all the enabled Availability Zones. If all the instances in an Availability Zone are deregistered or unhealthy before that Availability Zone is disabled for the LoadBalancer, all requests sent to that Availability Zone will fail until DisableAvailabilityZonesForLoadBalancer calls for that Availability Zone.
API Example

To disable an availability zone from a Load Balanced Application

1. Call `DisableAvailabilityZonesForLoadBalancer` with the following parameters:

   - `LoadBalancerName` = MyLoadBalancer
   - Availability Zones = us-east-1a

   The operation returns the updated list of Availability Zones enabled for your LoadBalancer.

2. Call `DescribeInstanceHealth` with the following parameters. You have to wait until all of the instances in the disabled Availability Zones are in the `OutOfService` state.

   - `LoadBalancerName` = MyLoadBalancer
   - Instances = i-4f8cf126, i-0bb7ca62

3. Call `DeregisterInstancesFromLoadBalancer` with the following parameters:
○ LoadBalancerName = MyLoadBalancer

○ Instances = i-4f8cf126, i-0bb7ca62
Command Line Tools Example

To disable an availability zone from a Load Balanced Application

1. Use the `elb-disable-zones-for-lb` command as in the following example.

```
PROMPT> elb-disable-zones-for-lb MyLoadBalancer
```

Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>AVAILABILITY_ZONES</th>
<th>AVAILABILITY-ZONES</th>
</tr>
</thead>
<tbody>
<tr>
<td>AVAILABILITY_ZONES</td>
<td>us-east-1a</td>
</tr>
</tbody>
</table>

2. Use the `elb-describe-instance-health` command as in the following example.

```
PROMPT> elb-describe-instance-health MyLoadBalancer
```

Elastic Load Balancing returns the following:

<table>
<thead>
<tr>
<th>INSTANCE</th>
<th>INSTANCE-ID</th>
<th>STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSTANCE</td>
<td>INSTANCE-ID</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------</td>
<td></td>
</tr>
<tr>
<td>i-4f8cf126</td>
<td>OutOfService</td>
<td></td>
</tr>
<tr>
<td>i-0bb7ca62</td>
<td>OutOfService</td>
<td></td>
</tr>
</tbody>
</table>

**Note**

Only when the instances are in the OutOfService state can you progress to the next step.

3. Use the `elb-deregister-instances-from-lb` command as in the following example.

```
PROMPT> elb-deregister-instances-from-lb MyLoadBalancer --headers --instances i-4f8cf126,i-0bb7ca62
```

Elastic Load Balancing returns the following:

```
<table>
<thead>
<tr>
<th>INSTANCE</th>
<th>INSTANCE-ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>i-3a8cf324</td>
<td></td>
</tr>
<tr>
<td>i-2603ca33</td>
<td></td>
</tr>
</tbody>
</table>
```
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How to Tear Down an Existing LoadBalancer

In this example, you stop using Elastic Load Balancing on a currently load balanced EC2 fleet. You delete the LoadBalancer, which automatically deregisters the associated instances from the LoadBalancer.
API Example

To tear down an existing LoadBalancer

- Call `DeleteLoadBalancer` with `LoadBalancerName = MyLoadBalancer`.

The operation returns an empty response.
Command Line Tools Example

To tear down an existing LoadBalancer

- Use the `elb-delete-lb` command as in the following example.

```
PROMPT> elb-delete-lb MyLoadBalancer
```

Elastic Load Balancing returns the following:

```
Warning: Deleting a LoadBalancer can lead to service disruption to any customers connected to the LoadBalancer. Are you sure you want to delete this LoadBalancer? [Yn]
```

Enter Y to delete the Load Balancer

Elastic Load Balancing returns the following:

```
OK-Deleting LoadBalancer
```
Give Us Your Feedback

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API Reference

Topics

- WSDL Locations
- API Conventions
- Common Request Parameters
- Error Codes
- Elastic Load Balancing Actions
- Data Types

The following sections of the guide provide reference material for Elastic Load Balancing. For more information about any concepts or programming tasks associated with the reference material, refer to the previous chapters in this guide.
WSDL Locations

API Conventions
Data Types and Elastic Load Balancing WSDL

Values provided as parameters to the various operations must be of the indicated type. Standard XSD types (like string, boolean, int) are prefixed with xsd:. Complex types defined by the Elastic Load Balancing Service WSDL are prefixed. Please look at the individual WSDL for guidance.

Note
The following example uses an EC2 element, not an element from this service. This section will be expanded later into the beta. However, the information here using this example is still valid.

For example, the <imagesSet> element in the following XML snippet is of type xsd:string[].

```xml
<imagesSet>
  <item>
    <imageId>ami-61a54008</imageId>
  </item>
  <item>
    <imageId>ami-61b54608</imageId>
  </item>
</imagesSet>
```

The <instancesSet> element in the following XML
snippet is of type xsd:string[].

```xml
<instancesSet>
  <item>
    <imageId>ami-60a54009</imageId>
    <minCount>10</minCount>
    <maxCount>30</maxCount>
  </item>
  <item>
    <imageId>ami-60b54209</imageId>
    <minCount>5</minCount>
    <maxCount>20</maxCount>
  </item>
</instancesSet>
```
Common Request Parameters

All Query operations share a set of common parameters that must be present in each call:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Indicates the action to perform.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Example: CreateLoadBalancer</td>
<td></td>
</tr>
<tr>
<td>AWSAccessKeyId</td>
<td>The Access Key ID for the request sender. This identifies the account which will be charged for usage of the service. The account with which the Access Key ID is associated must be signed up for Amazon EC2, or requests will not be accepted.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Example: 1Q0MXFEV71ZS32XQFTR2</td>
<td></td>
</tr>
<tr>
<td>Expires</td>
<td>The date and time at which the signature included in the request expires, in the format YYYY-MM-DDThh:mm:ssZ.</td>
<td>Conditional</td>
</tr>
<tr>
<td></td>
<td>Condition: Either Expires or Timestamp must be present in the request, but not both.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example: 2009-01-07T15:04:56Z</td>
<td></td>
</tr>
<tr>
<td>Timestamp</td>
<td>The date and time at which the request is signed, in the format YYYY-MM-DDThh:mm:ssZ. For more information, go to ISO 8601.</td>
<td>Conditional</td>
</tr>
<tr>
<td></td>
<td>Condition: Either Timestamp or Expires must be present in the request, but not both.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example: 2009-01-07T15:04:56Z</td>
<td></td>
</tr>
<tr>
<td>Signature</td>
<td>The request signature. For more information, see Query API Authentication.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Example: Qnp14Qk/7t1NHzfXC177Vb8atDA=</td>
<td></td>
</tr>
<tr>
<td>SignatureMethod</td>
<td>The hash algorithm you use to create the request signature. Valid values: HmacSHA256</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>HmacSHA1. For more information, see Query API Authentication.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example: HmacSHA256</td>
<td></td>
</tr>
</tbody>
</table>
Parameter values must be URL-encoded. This is true for any Query parameter passed to Elastic Load Balancing; and is typically necessary in the Signature parameter. Some clients do this automatically, but this is not the norm.
Error Codes

Topics

- Overview
- Elastic Load Balancing Client Error Codes
- Common Server Error Codes
- Common Client Error Codes
Overview

There are two types of error codes: client and server.

Client error codes suggest that the error was caused by something the client did, such as an authentication failure or an invalid parameter. In the SOAP API, these error codes are prefixed with `Client`, such as `Client.LoadBalancerNotFound`. In the Query API, these errors are accompanied by a 400-series HTTP response code.

Server error codes suggest a server-side issue caused the error and should be reported. In the SOAP API, these error codes are prefixed with `Server`. For example: `Server.ServiceUnavailable`. In the Query API, these errors are accompanied by a 500-series HTTP response code.
Elastic Load Balancing Client Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Fault Code Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuplicateLoadBalancerName</td>
<td>LoadBalancer name already exists for this account. Please choose another name.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account. (For more information, please see LoadBalancer.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>

400 Bad Request Client

InvalidConfigurationRequest
Requested configuration change is invalid.
409 ConflictClient

InvalidInstance
Invalid instance.
400 Bad Request Client

TooManyLoadBalancers
You have attempted to create more LoadBalancers than allowed. For more information, please see LoadBalancer.
400 Bad Request Client

ValidationError
One or more input parameters are invalid. 400 Bad Request Client
# Common Server Error Codes

The following server errors can be returned in addition to the specific errors listed for each service.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Fault Code Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>InternalFailure</td>
<td>Indicates that the request processing has failed due to some unknown error, exception or failure.</td>
<td>500 Internal Failure Error</td>
<td>Server</td>
</tr>
<tr>
<td>ServiceUnavailable</td>
<td>Indicates that the request has failed due to a temporary failure of the server.</td>
<td>503 Service Unavailable Error</td>
<td>Server</td>
</tr>
</tbody>
</table>
Common Client Error Codes

The following client errors are common across all the services in this Public Beta and may be returned in addition to the specific errors listed for each service.

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Fault Code Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>ElementNotSigned</td>
<td>An element that is marked/configured to be signed is not signed (AWS SOAP only).</td>
<td>403</td>
<td>Forbidden</td>
</tr>
<tr>
<td>IncompleteSignature</td>
<td>The request signature does not conform to AWS standards.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidAction</td>
<td>The action or operation requested is invalid.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidClientTokenId</td>
<td>The X.509 certificate or AWS Access Key Id provided does not exist in our records.</td>
<td>403</td>
<td>Forbidden</td>
</tr>
<tr>
<td>InvalidParameterCombination</td>
<td>Parameters that must not be used together were used together.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidParameterValue</td>
<td>Bad or out of range value was supplied for the input parameter.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidQueryParameter</td>
<td>AWS query string is malformed, does not adhere to AWS standards.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidSecurity</td>
<td>The security token provided in the input is missing or expired (AWS SOAP only).</td>
<td>403</td>
<td>Forbidden</td>
</tr>
<tr>
<td>InvalidSecurityToken</td>
<td>Incorrect or invalid data is supplied for the security token.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>InvalidSOAPRequest</td>
<td>The SOAP request is invalid or malformed.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>MalformedInput</td>
<td>The request is invalid or malformed.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>MalformedQueryString</td>
<td>The query string is malformed.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>MalformedSOAPSignature</td>
<td>The signature element in the SOAP request is malformed.</td>
<td>400</td>
<td>Bad Request</td>
</tr>
<tr>
<td>Error Description</td>
<td>Description</td>
<td>HTTP Status Code</td>
<td>Error Type</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>MissingAction</td>
<td>The request is missing an action or operation parameter.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>MissingAuthenticationToken</td>
<td>Request must contain either a valid (registered) AWS Access Key ID or X.509 certificate.</td>
<td>403 Forbidden</td>
<td>Client</td>
</tr>
<tr>
<td>MissingParameter</td>
<td>An input parameter that is mandatory for processing the request is not supplied.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>OptInRequired</td>
<td>The AWS Access Key Id needs a subscription for the service</td>
<td>403 Forbidden</td>
<td>Client</td>
</tr>
<tr>
<td>RequestExpired</td>
<td>Request is past expired date or more than 15 minutes past request date.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>RequiresSSL</td>
<td>The request must be made over SSL connection.</td>
<td>401 Unauthorized</td>
<td>Client</td>
</tr>
<tr>
<td>Throttling</td>
<td>Request was denied due to request throttling.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>WSSecurityMultipleCredentialError</td>
<td>More than one credential was received in the WS-Security header of the request.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>WSSecurityEncodingTypeError</td>
<td>The BinarySecurityToken is not base64 encoded.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>WSSecurityMultipleX.509Error</td>
<td>More than one X.509 binary security token received in WS-Security header of the request.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>UnknownEnvelopeNamespace</td>
<td>The envelope namespace used to define the SOAP request is invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Elastic Load Balancing Actions

The following actions are available from Elastic Load Balancing.

Creation and Deletion Actions:

- `CreateLoadBalancer`
- `DeleteLoadBalancer`

Registration Actions:

- `RegisterInstancesWithLoadBalancer`
- `DeregisterInstancesFromLoadBalancer`

Descriptive Actions (LoadBalancers):

- `DescribeLoadBalancers`
- `DescribeInstanceHealth`

Availability Zone Actions:
• EnableAvailabilityZonesForLoadBalancer

• DisableAvailabilityZonesForLoadBalancer

Healthcheck Actions:

• ConfigureHealthCheck
ConfigureHealthCheck
Description

This API enables you to define an application healthcheck for the instances.

Note
Completion of this API does not guarantee that operation has completed. Rather, it means that the request has been registered and the changes will happen shortly.
# Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerName</td>
<td>The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode).</td>
<td></td>
</tr>
<tr>
<td>HealthCheck</td>
<td>Structure containing the configuration information for the new healthcheck.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type:</td>
<td></td>
</tr>
</tbody>
</table>

**HealthCheck**

Yes
## Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthCheck</td>
<td>Updated healthcheck for the instances.</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">HealthCheck</a></td>
</tr>
<tr>
<td></td>
<td>Availability: Always returned</td>
</tr>
</tbody>
</table>

Type: [HealthCheck](#)
## Special Errors

Common errors for all calls are listed and described in a separate section, please see [API Error Codes](#).

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see <a href="#">LoadBalancer</a>.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>Validation Error</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

```
https://elasticloadbalancing.amazonaws.com/?SignatureVersion=2
&Action=ConfigureHealthCheck
&Version=2009-05-15
&HealthCheck.Timeout=2
&HealthCheck.Target=HTTP%3A80%2Fservlets-examples%2Fservlet
&HealthCheck.Interval=5
&HealthCheck.UnhealthyThreshold=2
&HealthCheck.HealthyThreshold=2
&LoadBalancerName=manual010AP
&Timestamp=2009-02-09T22%3A26%3A28.000Z
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&Signature=%XXX YOUR SIGNATURE XXX%3D
```

Sample Response

Example Query Response

```
<ConfigureHealthCheckResult>
  <HealthCheck>
    <Interval>5</Interval>
    <Target>HTTP:80/servlets-examples/servlet/</Target>
    <HealthyThreshold>2</HealthyThreshold>
    <Timeout>2</Timeout>
  </HealthCheck>
</ConfigureHealthCheckResult>
```
<UnhealthyThreshold>2</UnhealthyThreshold>
</HealthCheck>
</ConfigureHealthCheckResult>
Related Operations

The following operations also return information on the LoadBalancer and/or its instances.

- **DescribeLoadBalancers**
- **DescribeInstanceHealth**
CreateLoadBalancer
Description

This API creates a new LoadBalancer.

Note
Currently, your quota of LoadBalancers is limited to five per region.

Once the call has completed successfully, a new LoadBalancer will be created, but it will not be usable until at least one instance has been registered.

When the LoadBalancer creation is completed, you can check whether it is usable by using the

**DescribeInstanceHealth** API. The LoadBalancer is usable as soon as any registered instance is *InService*.

Note
Load balancer DNS names will vary depend on the region in which they were created. For load balancers created in the United States, the DNS name will end with:

- us-east-1.elb.amazonaws.com

For load balancers created in Europe, the DNS name will end with:

- eu-west-1.elb.amazonaws.com
# Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvailabilityZones</td>
<td>List of Availability Zones. This list can be modified after the creation of the LoadBalancer. The Availability Zones specified must be in the same EC2 region as the LoadBalancer. You must specify at least one Availability Zone. Traffic will be equally distributed across all zones.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: AvailabilityZones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some API operations take lists of parameters. These lists are specified using the following notation: param.member.n. Values of n are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp;attribute.member.1=this &amp;attribute.member.2=that</td>
<td></td>
</tr>
<tr>
<td>LoadBalancerName</td>
<td>The mnemonic name associated with the LoadBalancer. The name must be unique within your set of LoadBalancers requests on the specified protocol and received by Elastic Load Balancing on the LoadBalancerPort are load balanced across the registered instances and sent to port InstancePort.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode).</td>
<td></td>
</tr>
<tr>
<td>Listeners</td>
<td>This parameter is used to denote a list of the following tuples LoadBalancerPort, InstancePort, and Protocol.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Note

Some API operations take lists of parameters. These lists are specified using the following notation: `param.member.n`. Values of `n` are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:

```
&attribute.member.1=this
&attribute.member.2=that
```
## Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNSName</td>
<td>DNS name for the LoadBalancer.</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
</tr>
<tr>
<td></td>
<td>Availability: Always returned</td>
</tr>
</tbody>
</table>
# Special Errors

Common errors for all calls are listed and described in a separate section, please see [API Error Codes](#).

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuplicateLoadBalancerName</td>
<td>The LoadBalancer name requested already exists in this AWS account.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td></td>
<td>This error is returned if you try creating a LoadBalancer with the same name as a current LoadBalancer that you have, but with a different set of parameters. If you try creating a LoadBalancer with the same name and parameters of a LoadBalancer you already have, then the system will simply return the same output as it did when you created the LoadBalancer the first time. In other words, in such a case, you won't get an error, but you simply will get the same information back (but still only one LoadBalancer of that name and with that set of parameters.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TooManyLoadBalancers</td>
<td>Quota of LoadBalancers has already been reached.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>ValidationErro</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)


Sample Response

Example Query Response

<CreateLoadBalancerResult><DNSName> TestLoadBalancer-380544827.us-east-1.elb.amazonaws.com</DNSName></CreateLoadBalancerResult>
Related Operations

- DeleteLoadBalancer
- RegisterInstancesWithLoadBalancer
- DeregisterInstancesFromLoadBalancer
- EnableAvailabilityZonesForLoadBalancer
- DisableAvailabilityZonesForLoadBalancer
DeleteLoadBalancer
Description

This API deletes the specified LoadBalancer. On deletion, all of the configured properties of the LoadBalancer will be deleted. If you attempt to recreate the LoadBalancer, you need to reconfigure all the settings. The DNS name associated with a deleted LoadBalancer is no longer be usable. Once deleted, the name and associated DNS record of the LoadBalancer no longer exist and traffic sent to any of its IP addresses will no longer be delivered to your instances. You will not get the same DNS name even if you create a new LoadBalancer with same `LoadBalancerName`.

To successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.

Note

Because this API has been designed to be idempotent, even if the LoadBalancer does not exist or has been deleted, `DeleteLoadBalancer` still returns a success.
## Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
</table>
| `LoadBalancerName` | The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account. Type: String  
Default: None  
Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode). | Yes      |
Response Elements

None.
Special Errors

Common errors for all calls are listed and described in a separate section, please see

**API Error Codes.**

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>ValidationError</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

https://elasticloadbalancing.amazonaws.com/
?LoadBalancerName=ReferenceAP1
&Action=DeleteLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05%3A47%3A28.000Z
&Signature=%XXX YOUR SIGNATURE XXX%3D

Sample Response

Example Query Response

<DeleteLoadBalancerResult/>
Related Operations

CreateLoadBalancer
DeregisterInstancesFromLoadBalancer
Description

This API deregisters instances from the LoadBalancer. Trying to deregister an instance that is not registered with the LoadBalancer does nothing.

In order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.

Once the instance is deregistered, it will stop receiving traffic from the LoadBalancer.
Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instances</td>
<td>List of <em>EC2 instance</em> IDs consisting of all instances you want to be deregistered.</td>
<td></td>
</tr>
</tbody>
</table>

**Instances**

Default: None

**Note**

Some API operations take lists of parameters. These lists are specified using the following notation: param.member.n. Values of n are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:

```
&attribute.member.1=this
&attribute.member.2=that
```

Yes

**LoadBalancerName**

The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.

Type: String

Default: None

Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last
character. Maximum length of name is 32 characters (characters are 16-bit Unicode).
Yes
# Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Type:</th>
<th>Instances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instances</td>
<td>Updated list of remaining instances registered with the LoadBalancer.</td>
<td></td>
<td>Instances</td>
</tr>
</tbody>
</table>
Special Errors

Common errors for all calls are listed and described in a separate section, please see API Error Codes.

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see LoadBalancer.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>InvalidInstance</td>
<td>This error is returned if any of the specified instances are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>ValidationError</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

```plaintext
https://elasticloadbalancing.amazonaws.com/
?LoadBalancerName=ReferenceAP1
&Instances.member.1.InstanceId=i-6055fa09
&Action=DeregisterInstancesFromLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05%3A42%3A57.000Z
&Signature=%XXX YOUR SIGNATURE XXX%3D
```

Sample Response

Example Query Response

```xml
<DeregisterInstancesFromLoadBalancerResult>
  <Instances/>
</DeregisterInstancesFromLoadBalancerResult>
```
Related Operations

RegisterInstancesWithLoadBalancer
DescribeLoadBalancers
Description

This API returns detailed configuration information for the specified LoadBalancers, or if no LoadBalancers are specified, then the API returns configuration information for all LoadBalancers created by the caller. For more information, please see

LoadBalancer.

You must have created the specified input LoadBalancers in order to retrieve this information. In other words, in order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.
## Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNames</td>
<td>A list of <code>LoadBalancerNames</code>, the mnemonic name that was associated with the LoadBalancer at creation time.</td>
<td>No</td>
</tr>
</tbody>
</table>

Type: `LoadBalancerNames`

Default: If the list is empty, the call will return descriptions for all the LoadBalancers active.

![Note]

Some API operations take lists of parameters. These lists are specified using the following notation:

`param.member.n`. Values of `n` are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter parameter list looks like this:

```
&attribute.member.1=this
&attribute.member.2=that
```
# Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>LoadBalancerDescriptions</em></td>
<td>List of LoadBalancer description structures.</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">LoadBalancerDescription</a></td>
</tr>
</tbody>
</table>

Type: [LoadBalancerDescription](#)
Special Errors

Common errors for all calls are listed and described in a separate section, please see API Error Codes.

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see LoadBalancer.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>Validation Error</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

```
https://elasticloadbalancing.amazonaws.com/
?Action=DescribeLoadBalancers
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05:14:21.000Z
&Signature=%XXX YOUR SIGNATURE XXX%
```

Sample Response

Example Query Response

```
<DescribeLoadBalancersResult>
  <LoadBalancersDescriptions>
    <member>
      <Listeners>
        <member>
          <Protocol>HTTP</Protocol>
          <LoadBalancerPort>80</LoadBalancerPort>
          <InstancePort>80</InstancePort>
        </member>
      </Listeners>
      <LoadBalancerName>TestLoadBalancer</LoadBalancerName>
    </member>
  </LoadBalancersDescriptions>
</DescribeLoadBalancersResult>
```
<HealthCheck>
  <Interval>30</Interval>
  <Target>TCP:80</Target>
  <HealthyThreshold>10</HealthyThreshold>
  <Timeout>5</Timeout>
  <UnhealthyThreshold>2</UnhealthyThreshold>
</HealthCheck>

<DNSName>TestLoadBalancer-400948911.us-east-1.elb.amazonaws.com</DNSName>

<AvailabilityZones>
  <member>us-east-1b</member>
</AvailabilityZones>

</LoadBalancersDescriptions>
</DescribeLoadBalancersResult>
Related Operations

The following operations also return information on the LoadBalancer and/or its instances.

- DescribeInstanceHealth
DescribeInstanceHealth
Description

This API returns the current state of the instances of the specified LoadBalancer. If no instances are specified, the state of all the instances for the LoadBalancer is returned.

You must have been the one who created in the LoadBalancer. In other words, in order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.
Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instances</strong></td>
<td>List of instances IDs whose state is being queried.</td>
<td></td>
</tr>
</tbody>
</table>

**Instances**

Default: If the list is empty, it returns the state of all the instances registered with this LoadBalancer.

No

**LoadBalancerName**

The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.

Type: String

Default: None

Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode).

Yes
## Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstanceStates</td>
<td>Structure containing instance Health information for the specified instances, such as <em>InService OutOfService</em> state.</td>
</tr>
<tr>
<td>Type:</td>
<td><em>InstanceStates</em></td>
</tr>
<tr>
<td>Availability:</td>
<td>Always returned</td>
</tr>
</tbody>
</table>


## Special Errors

Common errors for all calls are listed and described in a separate section, please see [API Error Codes](#).

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account. (For more information, please see <a href="#">LoadBalancer</a>.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>InvalidInstance</td>
<td>This error is returned if any of the specified instances are invalid. This error is returned if any of the specified instances are not registered with this LoadBalancer.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>ValidationError</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

https://elasticloadbalancing.amazonaws.com/
?SignatureVersion=2
&Action=DescribeInstanceHealth
&Version=2009-05-15
&LoadBalancerName=manual006AP
&Timestamp=2009-10-08T17%3A58%3A07.000Z
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&Signature=%XXX YOUR SIGNATURE XXX%3D

Sample Response

Example Query Response

<DescribeInstanceHealthResult>
  <InstanceStates>
    <member>
      <Description>N/A</Description>
      <State>InService</State>
      <InstanceId>i-8e0ea3e7</InstanceId>
      <ReasonCode>N/A</ReasonCode>
    </member>
  </InstanceStates>
</DescribeInstanceHealthResult>
<Description>Instance registration is still in progress</Description>
<State>OutOfService</State>
<InstanceId>i-6055fa09</InstanceId>
<ReasonCode>ELB</ReasonCode>
</member>
</InstanceStates>
</DescribeInstanceHealthResult>
Related Operations

The following operations also return information on the LoadBalancer and/or its instances.

- [DescribeLoadBalancers](#)
DisableAvailabilityZonesForLoadBalancer
Description

This API removes the specified EC2 Availability Zones from the set of configured Availability Zones for the LoadBalancer. Once an Availability Zone is removed, all the instances registered with the LoadBalancer that are in the removed Availability Zone go into the OutOfService state. Upon Availability Zone removal, the LoadBalancer attempts to equally balance the traffic among its remaining usable Availability Zones. Trying to remove an Availability Zone that was not associated with the LoadBalancer does nothing.

There must be at least one Availability Zone registered with a LoadBalancer at all times. You cannot remove all the Availability Zones from a LoadBalancer.

In order for this call to be successful, you must have created the LoadBalancer. In other words, in order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.
**Request Parameters**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvailabilityZones</td>
<td>List of Availability Zones to be removed from the LoadBalancer. There must be at least one Availability Zone registered with a LoadBalancer at all times. You cannot remove all the Availability Zones from a LoadBalancer. Specified Availability Zones must be in the same region.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type:</td>
<td></td>
</tr>
</tbody>
</table>

**AvailabilityZones**

*Note*

Some API operations take lists of parameters. These lists are specified using the following notation: param.member.n. Values of n are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:

```
&attribute.member.1=this
&attribute.member.2=that
```

**Yes**

*LoadBalancerName*

The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.

Type: String

Default: None

Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last
character. Maximum length of name is 32 characters (characters are 16-bit Unicode).
Yes
## Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvailabilityZones</td>
<td>List of updated Availability Zones for the LoadBalancer. Type: AvailabilityZones</td>
</tr>
</tbody>
</table>
## Special Errors

Common errors for all calls are listed and described in a separate section, please see [API Error Codes](#).

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see <a href="#">LoadBalancer</a>.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>InvalidConfigurationRequest</td>
<td>Requested configuration change is invalid. This error is returned if you attempt to remove all the registered Availability Zones for the LoadBalancer.</td>
<td>409 Conflict</td>
<td>Client</td>
</tr>
<tr>
<td>Validation Error</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

```
https://elasticloadbalancing.amazonaws.com/
?AvailabilityZones.member.1=us-east-1a
&LoadBalancerName=ReferenceAP2
&Action=DisableAvailabilityZonesForLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05%3A13%3A43.000Z
&Signature=%XXX YOUR SIGNATURE XXX%3D
```

Sample Response

Example Query Response

```
<DisableAvailabilityZonesForLoadBalancerResult>
 <AvailabilityZones>
  <member>us-east-1c</member>
 </AvailabilityZones>
</DisableAvailabilityZonesForLoadBalancerResult>
```
Related Operations

EnableAvailabilityZonesForLoadBalancer
EnableAvailabilityZonesForLoadBalancer
Description

This API is used to add one or more EC2 Availability Zones to the LoadBalancer.

The LoadBalancer evenly distributes requests across all its registered Availability Zones that contain instances. As a result, you must ensure that your LoadBalancer is appropriately scaled for each registered Availability Zone.

Note
The new EC2 Availability Zones to be added must be in the same EC2 region as the Availability Zones for which the LoadBalancer was created.

In order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.
## Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvailabilityZones</td>
<td>List of new Availability Zones for the LoadBalancer. The Availability Zone must be in the same region as the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">AvailabilityZones</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>Some API operations take lists of parameters. These lists are specified using the following notation: param.member.n. Values of n are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp;attribute.member.1=this</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&amp;attribute.member.2=that</td>
<td></td>
</tr>
<tr>
<td>LoadBalancerName</td>
<td>The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode).</td>
<td></td>
</tr>
</tbody>
</table>
# Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AvailabilityZones</td>
<td>Updated list of Availability Zones for the LoadBalancer.</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">AvailabilityZones</a></td>
</tr>
<tr>
<td></td>
<td>Availability: Always returned</td>
</tr>
</tbody>
</table>

*Type: [AvailabilityZones](#)*
Special Errors

Common errors for all calls are listed and described in a separate section, please see API Error Codes.

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see LoadBalancer.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>Validation Error</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

```
https://elasticloadbalancing.amazonaws.com/
?AvailabilityZones.member.1=us-east-1c
&LoadBalancerName=ReferenceAP1
&Action=EnableAvailabilityZonesForLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05%3A13%3A00.000Z
&Signature=%XXX YOUR SIGNATURE XXX%3D
```

Sample Response

Example Query Response

```
<EnableAvailabilityZonesForLoadBalancerResult>
  <AvailabilityZones>
    <member>us-east-1c</member>
    <member>us-east-1b</member>
    <member>us-east-1a</member>
  </AvailabilityZones>
</EnableAvailabilityZonesForLoadBalancerResult>
```
Related Operations

- DisableAvailabilityZonesForLoadBalancer
- CreateLoadBalancer
- RegisterInstancesWithLoadBalancer
RegisterInstancesWithLoadBalancer
Description

This API adds new instances to the LoadBalancer.

Once the instance is registered, it starts receiving traffic and requests from the LoadBalancer. Any instance that is not in any of the Availability Zones registered for the LoadBalancer will be moved to the OutOfService state. It will move to the InService state when the Availability Zone is added to the LoadBalancer.

You must have been the one who created the LoadBalancer. In other words, in order to successfully call this API, you must provide the same account credentials as those that were used to create the LoadBalancer.

Note

Completion of this API does not guarantee that operation has completed. Rather, it means that the request has been registered and the changes will happen shortly.
# Request Parameters

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instances</td>
<td>List of instances IDs that should be registered with the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: Instances</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
</tbody>
</table>

**Note**
Some API operations take lists of parameters. These lists are specified using the following notation: param.member.n. Values of n are integers starting from 1. All lists of parameters must follow this notation, including lists that only contain one parameter. For example, a Query parameter list looks like this:

```
&attribute.member.1=this
&attribute.member.2=that
```

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerName</td>
<td>The mnemonic name associated with the LoadBalancer. The name must be unique within your AWS account.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Default: None</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Constraints: Must only use alphanumeric characters (case sensitive) and dash (-). Dash cannot be first or last character. Maximum length of name is 32 characters (characters are 16-bit Unicode).</td>
<td></td>
</tr>
</tbody>
</table>
# Response Elements

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>Instances</code></td>
<td>Updated list of instances for the LoadBalancer.</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">Instances</a></td>
</tr>
</tbody>
</table>
Special Errors

Common errors for all calls are listed and described in a separate section, please see API Error Codes.

<table>
<thead>
<tr>
<th>Error</th>
<th>Description</th>
<th>HTTP Status Code</th>
<th>SOAP Prefix</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerNotFound</td>
<td>LoadBalancer name does not exist for the account in this region. (For more information, please see LoadBalancer.)</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>InvalidInstance</td>
<td>This error is returned if any of the specified instances are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
<tr>
<td>ValidationErrors</td>
<td>One or more input parameters are invalid.</td>
<td>400 Bad Request</td>
<td>Client</td>
</tr>
</tbody>
</table>
Examples

Sample Request

Example Request (Query)

https://elasticloadbalancing.amazonaws.com/?LoadBalancerName=ReferenceAP1
&Instances.member.1.InstanceId=i-6055fa09
&Action=RegisterInstancesWithLoadBalancer
&Version=2009-05-15
&AWSAccessKeyId=XXX YOUR ACCESS KEY XXX
&SignatureVersion=2
&SignatureMethod=HmacSHA1
&Timestamp=2009-10-17T05%3A40%3A29.000Z
&Signature=%%XXX YOUR SIGNATURE XXX%3D

Sample Response

Example Query Response

<RegisterInstancesWithLoadBalancerResult>
  <Instances>
    <member>
      <InstanceId>i-6055fa09</InstanceId>
    </member>
  </Instances>
</RegisterInstancesWithLoadBalancerResult>
Related Operations

- DeregisterInstancesFromLoadBalancer
- CreateLoadBalancer
- EnableAvailabilityZonesForLoadBalancer
Data Types

Topics

- AvailabilityZones
- HealthCheck
- HealthCheckInterval
- HealthCheckTimeout
- HealthyThreshold
- Instance
- InstancePort
- Instances
- InstanceState
- InstanceStates
- Listener
- Listeners
- LoadBalancerDescription
- LoadBalancersDescriptions
- LoadBalancerNames
- UnhealthyThreshold

The Load Balancing API contains several data types that various operations use. This section describes each data type in detail.

Since both the Query and SOAP APIs return the same
XML body, the data types described in the WSDL are used in both.
AvailabilityZones

The AvailabilityZones data type. The number of elements is *unbounded*. 
Relevant Operations

- EnableAvailabilityZonesForLoadBalancer
- DisableAvailabilityZonesForLoadBalancer
- DescribeLoadBalancers
The following table describes the elements contained in AvailabilityZones.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>An Availability Zone.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
<td></td>
</tr>
</tbody>
</table>
HealthCheck

The HealthCheck data type.
Relevant Operations

- ConfigureHealthCheck
- DescribeLoadBalancers
## Contents

The following table describes the elements contained in HealthCheck.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthyThreshold</td>
<td>The number of consecutive health probe successes required before moving the instance to the Healthy state. The default is three and a valid value lies between two and ten.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">HealthyThreshold</a></td>
<td></td>
</tr>
<tr>
<td>Interval</td>
<td>The approximate interval (in seconds) between health checks of an individual instance. The default is 30 seconds and a valid interval must be between 5 seconds and 600 seconds. Also, the interval value must be greater than the Timeout value</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">HealthCheckInterval</a></td>
<td></td>
</tr>
<tr>
<td>Target</td>
<td>The instance being checked. The protocol is either TCP or HTTP. The range of valid ports is one (1) through 65535.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Notes: TCP is the default, specified as a TCP: port pair, for example &quot;TCP:5000&quot;. In this case a healthcheck simply attempts to open a TCP connection to the instance on the specified port. Failure to connect within the configured timeout is considered unhealthy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For HTTP, the situation is different. HTTP is specified as a HTTP:port;/;PathToPing; grouping, for example &quot;HTTP:80/weather/us/wa/seattle&quot;. In this case, a HTTP GET request is issued to the instance on the given port and path. Any answer other than &quot;200 OK&quot; within the timeout period is considered unhealthy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The total length of the HTTP ping target needs to be 1024 16-bit Unicode characters or less.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
<td></td>
</tr>
<tr>
<td>Timeout</td>
<td>Amount of time (in seconds) during which no response means a failed health probe. The default is five seconds and a valid value must be between 2 seconds and 60 seconds. Also, the timeout value must be less than the Interval value.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: <a href="#">HealthCheckTimeout</a></td>
<td></td>
</tr>
<tr>
<td>UnhealthyThreshold</td>
<td>The number of consecutive health probe failures that move the instance to the unhealthy state. The default is 5 and a valid value lies between 2</td>
<td>Yes</td>
</tr>
</tbody>
</table>
and 10.

Type: UnhealthyThreshold
HealthCheckInterval

The HealthCheckInterval data type.
Relevant Operations

- [ConfigureHealthCheck](#)
- [DescribeLoadBalancers](#)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthCheckInterval</td>
<td>The HealthCheckInterval data type is the approximate interval between health checks of an individual instance. The interval is specified in seconds. The default is 30 seconds and a valid interval must be between 5 seconds and 600 seconds. Also, the interval value must be greater than the Timeout value of healthcheck.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
HealthCheckTimeout

The HealthCheckTimeout data type.
Relevant Operations

- ConfigureHealthCheck
- DescribeLoadBalancers

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthCheckTimeout</td>
<td>The HealthCheckTimeout data type is an integer that represents the amount of time, in seconds, during which no response means a failed health probe. The default is five seconds and a valid value must be between 2 seconds and 60 seconds. Also, the timeout value must be less than the Interval value of HealthCheck.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
HealthyThreshold

The HealthyThreshold data type.
# Relevant Operations

- [ConfigureHealthCheck](#)
- [DescribeLoadBalancers](#)

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>HealthyThreshold</td>
<td>The HealthyThreshold data type is a simple type of type: integer. It is the number of consecutive health probe successes before moving the instance back to the Healthy state. The default is three (3) and a valid value lies between two (2) and ten (10).</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Instance

The Instance data type.
Relevant Operations

- DescribeLoadBalancers
- DescribeInstanceHealth
- RegisterInstancesWithLoadBalancer
- DeregisterInstancesFromLoadBalancer
The following table describes the elements contained in instance.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstanceId</td>
<td>An <em>EC2 instance</em> ID.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
<td></td>
</tr>
</tbody>
</table>
InstancePort

The InstancePort data type.
Relevant Operations

- **CreateLoadBalancer**
- **DescribeLoadBalancers**

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstancePort</td>
<td>The InstancePort data type. It is the TCP port on which the server on the instance is listening. Valid instance ports are one (1) through 65535. This property cannot be modified for the life of the LoadBalancer.</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Instances

The Instances data type. This type is *unbounded*.
Relevant Operations

- DescribeLoadBalancers
- DescribeInstanceHealth
- RegisterInstancesWithLoadBalancer
- DeregisterInstancesFromLoadBalancer
The following table describes the elements contained in instances.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>An instance.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: Instance</td>
<td></td>
</tr>
</tbody>
</table>
InstanceState

The InstanceState data type.
Relevant Operations

- DescribeInstanceHealth
The following table describes the elements contained in instancestate.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>InstanceId</td>
<td>EC2 instance ID of the instance. Type: string</td>
</tr>
<tr>
<td>State</td>
<td>Current status of the instance:</td>
</tr>
<tr>
<td></td>
<td>• The state can be InService, when traffic is being routed to the instance by the LoadBalancer</td>
</tr>
<tr>
<td></td>
<td>• The state can be OutOfService, when traffic is not being routed to the instance by the LoadBalancer</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
</tr>
<tr>
<td>ReasonCode</td>
<td>ReasonCode returns a string that provides more information about the cause of OutOfService instances. Specifically, it indicates whether the cause is Elastic Load Balancing or the instance behind the Load Balancer.</td>
</tr>
<tr>
<td></td>
<td>See the Description element of this data type.</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
</tr>
<tr>
<td>Description</td>
<td>Possible reasons for an OutOfService state include the following:</td>
</tr>
<tr>
<td></td>
<td>• Health checks to the instance are failing, or at a minimum have consecutively failed the UnhealthyThreshold number of health checks, and therefore is not considered healthy</td>
</tr>
<tr>
<td></td>
<td>• The registered instance has not consecutively passed the configured HealthyThreshold number of health checks, and therefore is still not yet considered healthy</td>
</tr>
<tr>
<td></td>
<td>• The LoadBalancer (of the given LoadBalancer name) is not available</td>
</tr>
<tr>
<td></td>
<td>• The instance has terminated</td>
</tr>
<tr>
<td></td>
<td>• The instance is in an EC2 Availability Zone that the LoadBalancer has not been configured to route traffic to</td>
</tr>
<tr>
<td></td>
<td>For more information about health checks, please see the HealthCheck data type and the API, ConfigureHealthCheck.</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
</tr>
</tbody>
</table>
InstanceStates

The InstanceStates data type. This type is *unbounded*.
Relevant Operations

- DescribeInstanceHealth
The following table describes the elements contained in instance states.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>instance state information.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Type: `InstanceState`
Listener

The Listener data type.
Relevant Operations

- [CreateLoadBalancer](#)
- [DescribeLoadBalancers](#)
## Contents

The following table describes the elements contained in Listener.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerPort</td>
<td>The external TCP port of the LoadBalancer. Valid LoadBalancer ports are - 80, 443 and 1024 through 65535. This property cannot be modified for the life of the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: integer</td>
<td>----------</td>
</tr>
<tr>
<td>InstancePort</td>
<td>The InstancePort data type is simple type of type: integer. It is the TCP port on which the server on the instance is listening. Valid instance ports are one (1) through 65535. This property cannot be modified for the life of the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: integer</td>
<td>----------</td>
</tr>
<tr>
<td>Protocol</td>
<td>LoadBalancer transport protocol to use for routing - TCP or HTTP. This property cannot be modified for the life of the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
<td>----------</td>
</tr>
</tbody>
</table>
Listeners

The Listeners data type.
Relevant Operations

- CreateLoadBalancer
- DescribeLoadBalancers
The following table describes the elements contained in Listeners.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>A Listener description structure.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: Listener</td>
<td></td>
</tr>
</tbody>
</table>
LoadBalancerDescription

The LoadBalancerDescription data type. This structure contains the configuration details of a LoadBalancer that gets returned in the DescribeLoadBalancers API.
Relevant Operations

- DescribeLoadBalancers
## Contents

The following table describes the elements contained in LoadBalancerDescription.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>LoadBalancerName</td>
<td>The mnemonic name associated with the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td>AvailabilityZones</td>
<td>List of Availability Zones.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: AvailabilityZones</td>
<td></td>
</tr>
<tr>
<td>CreatedTime</td>
<td>Time that the LoadBalancer was created.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: dateTime</td>
<td></td>
</tr>
<tr>
<td>DNSName</td>
<td>External DNS name associated with the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: String</td>
<td></td>
</tr>
<tr>
<td>Instances</td>
<td>List of instance IDs. EC2 instances comprise the instances for the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: Instances</td>
<td></td>
</tr>
<tr>
<td>HealthCheck</td>
<td>Structure containing the various health probes conducted on the LoadBalancer.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: HealthCheck</td>
<td></td>
</tr>
<tr>
<td>Listeners</td>
<td>LoadBalancerPort, InstancePort, and Protocol are returned in a list of tuples in the Listeners element.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: Listeners</td>
<td></td>
</tr>
</tbody>
</table>
LoadBalancersDescriptions

The LoadBalancersDescriptions data type. The type is unbounded.
Relevant Operations

- DescribeLoadBalancers
The following table describes the elements contained in LoadBalancersDescriptions.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>a LoadBalancer description structure. Type: LoadBalancerDescription</td>
<td>Yes</td>
</tr>
</tbody>
</table>
LoadBalancerNames

The LoadBalancerNames data type. The type is unbounded.
Relevant Operations

- DescribeLoadBalancers
The following table describes the elements contained in LoadBalancerNames.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>member</td>
<td>a LoadBalancer by name.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Type: string</td>
<td></td>
</tr>
</tbody>
</table>
UnhealthyThreshold

The UnhealthyThreshold data type.
Relevant Operations

- ConfigureHealthCheck
- DescribeLoadBalancers

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>UnhealthyThreshold</td>
<td>The UnhealthyThreshold data type is a simple type of type: integer. It is the number of consecutive health probe failures that move the instance to the Unhealthy state. The default is five (5) and a valid value lies between two (2) and ten (10).</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Glossary
Access Key ID

An alphanumeric token that uniquely identifies a request sender. This ID is associated with your Secret Access Key.

Amazon Machine Image

An Amazon Machine Image (AMI) is an encrypted machine image stored in Amazon Simple Storage Service (Amazon S3). It contains all the information necessary to boot instances of your software.

Availability Zone

Amazon EC2 locations are composed of regions and Availability Zones. Availability Zones are distinct locations that are engineered to be insulated from failures in other Availability Zones and provide inexpensive, low latency network connectivity to other Availability Zones in the same region.

LoadBalancer

Elastic Load Balancing key term. Please see the detailed information on this term, located at key term LoadBalancer.
Amazon EC2 locations are composed of regions and Availability Zones. Regions are geographically dispersed and will be in separate geographic areas or countries. Regions consist of one or more Availability Zones.

Secret Access Key

A key assigned to you by Amazon Web Services (AWS) when you sign up for an AWS account. Used for request authentication.

unbounded

Term used in Web Service Definition Language (WSDL), e.g. maxOccurs="unbounded", meaning that the number of potential occurrences is not limited by a set number. Very often used when defining a data type that is a list of other types, such as an unbounded list of integers (element members) or an unbounded list of other complex types that are element/members of the list being defined.
Document Conventions

This section lists the common typographical and symbol use conventions for AWS technical publications.
Typographical Conventions

This section describes common typographical use conventions.

<table>
<thead>
<tr>
<th>Convention</th>
<th>Description/Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call-outs</td>
<td>A call-out is a number in the body text to give you a visual reference. The reference point is for further discussion elsewhere. You can use this resource regularly.</td>
</tr>
<tr>
<td>Code in text</td>
<td>Inline code samples (including XML) and commands are identified with a special font. You can use the command <code>java -version</code>.</td>
</tr>
<tr>
<td>Code blocks</td>
<td>Blocks of sample code are set apart from the body and marked accordingly.</td>
</tr>
<tr>
<td>Emphasis</td>
<td>Unusual or important words and phrases are marked with a special font. You must sign up for an account before you can use the service.</td>
</tr>
<tr>
<td>Internal cross references</td>
<td>References to a section in the same document are marked.</td>
</tr>
<tr>
<td>Logical values, constants, and regular expressions, abstracta</td>
<td>A special font is used for expressions that are important to identify, but are not code. If the value is <code>null</code>, the returned response will be <code>false</code>.</td>
</tr>
<tr>
<td>Product and feature names</td>
<td>Named AWS products and features are identified on first use. Create an Amazon Machine Image (AMI).</td>
</tr>
<tr>
<td>Operations</td>
<td>In-text references to operations. Use the <code>GetHITResponse</code> operation.</td>
</tr>
<tr>
<td>Parameters</td>
<td>In-text references to parameters.</td>
</tr>
</tbody>
</table>
The operation accepts the parameter `AccountID`.

<table>
<thead>
<tr>
<th>Response elements</th>
<th>In-text references to responses.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A container for one <code>CollectionParent</code> and one or more <code>CollectionItems</code>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technical publication references</th>
<th>References to other AWS publications. If the reference is hyperlinked, it is also underscored.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For detailed conceptual information, see the <em>Amazon Mechanical Turk Developer Guide</em>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User entered values</th>
<th>A special font marks text that the user types.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At the password prompt, type <code>MyPassword</code>.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User interface controls and labels</th>
<th>Denotes named items on the UI for easy identification.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>On the File menu, click Properties.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>When you see this style, you must change the value of the content when you copy the text of a sample to a command line.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><code>% ec2-register &lt;your-s3-bucket&gt;/image.manifest</code></td>
</tr>
</tbody>
</table>

See also the following symbol convention.
# Symbol Conventions

This section describes the common use of symbols.

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<th>Symbol</th>
<th>Description/Example</th>
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<tr>
<td>Mutually exclusive</td>
<td>(Parentheses</td>
<td>and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optional</td>
<td>[square brackets]</td>
<td>Within a code description, square brackets denote completely optional commands or parameters.</td>
</tr>
<tr>
<td>parameters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XML variable text</td>
<td></td>
<td>Use square brackets in XML examples to differentiate them from tags.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td>&lt;arrow brackets&gt;</td>
<td>Within a code sample, arrow brackets denote a variable that must be replaced with a valid value.</td>
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