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For the Windows and Linux operating systems

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Amazon Elastic Load Balancing Integration Guide

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Chapter 1

Introduction

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Purpose of the Elastic Load Balancing Integration

Amazon Elastic Load Balancing (ELB) makes it possible to distribute application load between two or more Amazon Elastic Compute Cloud (EC2) instances.

This integration uses the Elastic Load Balancing Query API released on 2012-06-01.

Supported Versions

Operations Orchestration Version	Amazon Elastic Load Balancing Version
OO Content Pack 16	Elastic Load Balancing API Version 2012-06-01

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6. Click **HP Operations Orchestration 9.00**.
7. Search for the required HP Operations Orchestration Content Pack.

Chapter 2

Getting Started with the Amazon Elastic Load Balancing Integration

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Installing and Configuring the Integration

No special installation and configuration instructions are required for the Amazon Elastic Load Balancing integration. You can also use Elastic Load Balancing through the Amazon EC2 console. To access the Amazon EC2 console, go to <http://aws.amazon.com/console/> and use your EC2 credentials to log on. Amazon has created specialized plug-ins for several browsers, such as Elasticfox for Firefox, that allow easy interaction with Amazon EC2.

Amazon Elastic Load Balancing Use Cases

This section describes some user scenarios and shows how Elastic Load Balancing operations can be used to accomplish several common tasks.

Set up an HTTP Load Balancer

Set up a load balancer for an HTTP service by specifying the ports used by the load balancer, defining a health check, and registering some instances.

1. Run the **Create Load Balancer** operation with the following inputs and values:
 - availabilityZones = us-east-1a
 - protocol = HTTP
 - instancePort = 8080
 - loadBalancerPort = 80
 - loadBalancerName = MyLoadBalancer
2. Run the **Configure Health Check** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - target = http:80/ping
 - interval = 30
 - healthyThreshold = 2
 - unhealthyThreshold = 2
3. Run the **Register Instances With Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - instanceIds = The instances that are running in availability zone us-east-1a.

Set up an HTTPS Load Balancer

Elastic Load Balancing does not have SSL termination capability. So, for HTTPS traffic you must set the protocol for the load balancer listener to TCP. This scenario is similar to the previous one; you create a load balancer with the protocol set to TCP, configure the health check, and then register instances.

1. Run the **Create Load Balancer** operation with the following inputs and values:
 - availabilityZones = us-east-1a
 - protocol = TCP
 - instancePort = 8443
 - loadBalancerPort = 443
 - loadBalancerName = MyLoadBalancer
2. Run the **Configure Health Check** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - target = TCP:8443 (make sure that your instances accept TCP connections on port 8443)
 - interval = 30
 - timeout = 3
 - healthyThreshold = 2
 - unhealthyThreshold = 2

3. Run the **Register Instances With Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - instancelds = the instances that are running in availability zone us-east-1a

Expand a Load Balanced Application to an Additional Availability Zone

Register instances with the load balancer, wait for them to be in the **OutOfService** state, and then enable a new availability zone for the load balancer. You must register the instances before you enable the availability zone because when you run the **Enable Availability Zones** operation, the load balancer begins to route traffic to the new zone (the traffic is distributed equally among all availability zones). If no instances are registered in the new zone, all requests assigned there will fail. .

1. Run the **Register Instances With Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - instancelds = The instances you want to work in the new availability zone
2. Run the **Describe Instance Health** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - instancelds = The instances used in the previous step

Note: You must wait until the instances are in the **OutOfService** state.

3. Run the **Enable Availability Zones For Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - availabilityZones = The new availability zone in which your instances are located (for example us-east-1b)

Disable an Availability Zone from a Load Balanced Application

Disable an availability zone from a load balanced application. When you deregister all the instances from an availability zone, the load balancer still routes traffic to that zone. To make sure that no invalid requests are made, you must first disable the availability zone from the load balancer, wait for the instances to go in the **OutOfService** state, and then deregister the instances from the load balancer

1. Run the **Disable Availability Zones For Load Balancer** operation with the following inputs and values:

- loadBalancerName = MyLoadBalancer
 - availabilityZones = the zone you want to disable from the load balancer
2. Run the **Describe Instance Health** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - instancelds = the instances in the availability zone that you want to disable

Note: You must wait until the instances are in the **OutOfService** state.

3. Run the **Deregister Instances From Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - availabilityZones = the instances in the availability zone that you want to disable

Tear Down an Existing Load Balancer

When you delete a load balancer, the instances are automatically deregistered.

- Run the **Delete Load Balancer** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer

Enable Duration-based Session Stickiness

Create a stickiness policy and use it to enable sticky sessions for a load balancer.

1. Run the **Create LB Cookie Stickiness Policy** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - policyName = MyLoadBalancerPolicy
 - cookieExpirationPeriod = 60
2. Run the **Set Load Balancer Policies Of Listener** operation with the following inputs and values:
 - loadBalancerName = MyLoadBalancer
 - loadBalancerPort = 80
 - policyNames = MyLoadBalancerPolicy

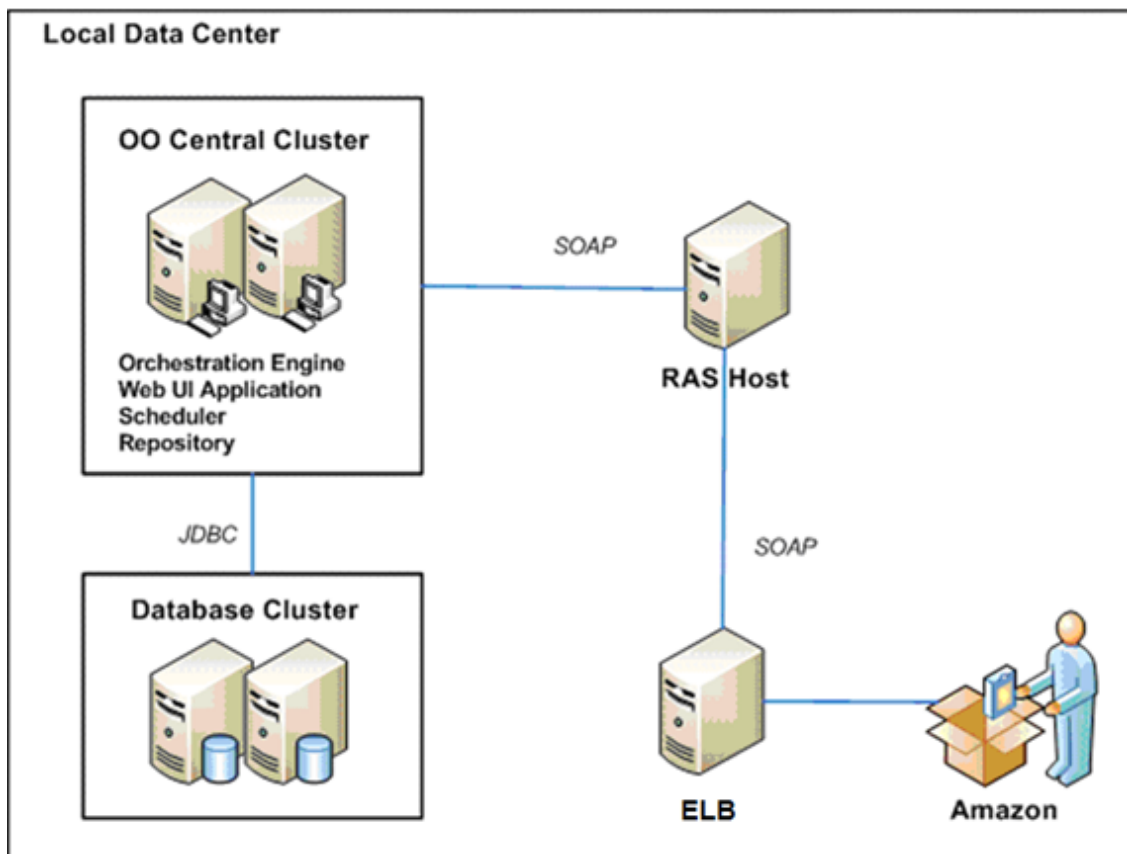
Enable Application-controlled Session Stickiness

This is similar to "[Enable Duration-based Session Stickiness](#)" above , but the life of the session follows that of an application-generated cookie.

1. Run the **Create Application Cookie Stickiness Policy** operation with the following inputs and values:

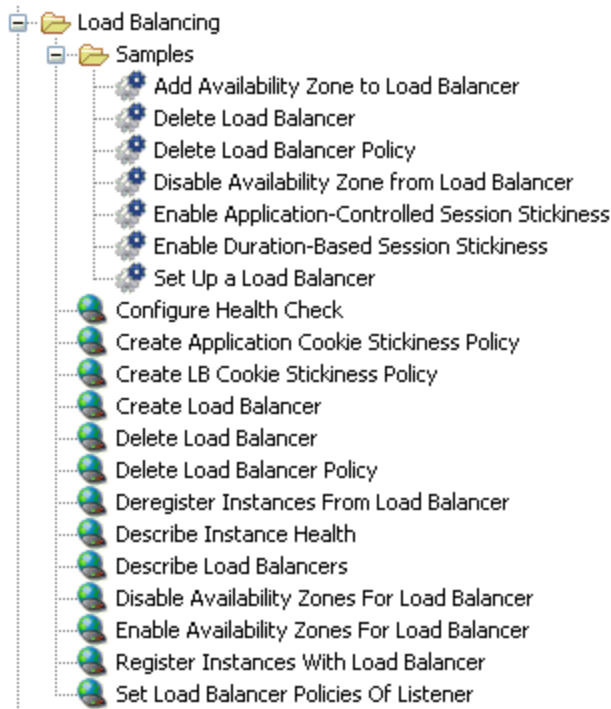
- loadBalancerName = MyLoadBalancer
 - policyName = MyAppCookiePolicy
 - cookieName = myCookie
2. Run the **Set Load Balancer Policies Of Listener** operation with the following inputs and values:
- loadBalancerName = MyLoadBalancer
 - loadBalancerPort = 80
 - policyNames = myAppCookiePolicy

Amazon Elastic Load Balancing — OO Integration Architecture



Location of Amazon Elastic Load Balancing Integration Operations and Flows in OO Studio

The Elastic Load Balancing integration contains the following operations and flows in the **OO Studio Library/Integrations/Amazon/Load Balancing/** folder.



Chapter 3

Troubleshooting

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Troubleshooting Overview

This section provides troubleshooting procedures and tools you can use to solve problems you may encounter while using this integration. It also includes a list of the error messages you may receive while using the integration and offers descriptions and possible fixes for the errors.

General Troubleshooting Procedures and Tools

When troubleshooting issues related to the Elastic Load Balancing integration occur, verify the following steps:

- The same operation works when it is performed through the EC2 console using the same parameters
- Your access key and proxy parameters are correct

Error Messages

This section lists the error codes you may receive while using this integration. Each error code includes possible causes and fixes for the error.

- `CertificateNotFound`
The specified SSL ID does not refer to a valid SSL certificate in the AWS Identity and Access Management Service.
- `DuplicateLoadBalancerName`
The load balancer name already exists for this account. Choose another name.
- `DuplicatePolicyName`
A policy with the same name exists for this load balancer. Choose another name.

- `Failed to open HTTP connection; failed to GET resource at ...`

The HTTP connection to AWS cannot be established (for instance, because of an incorrect value for the **serviceEndpoint**, **proxyHost**, or **proxyPort** input).
- `IncompleteSignature`

The request signature does not conform to AWS standards.
- `InternalFailure`

The request processing has failed due to some unknown error, exception, or failure.
- `InvalidAction`

The action or operation requested is invalid.
- `InvalidAvailabilityZone`

The `availabilityZones` input value is invalid.
- `InvalidClientId`

The X.509 certificate or AWS Access Key ID provided does not exist in our records
- `InvalidConfigurationRequest`

The requested configuration change is invalid.
- `InvalidInstance`

The specified `EndPoint` is not valid.
- `InvalidParameterCombination`

Parameters that must not be used together were used together.
- `InvalidParameterValue`

A bad or out of range value was supplied for the input parameter.
- `InvalidQueryParameter`

The AWS query string is malformed; it does not adhere to AWS standards.
- `ListenerNotFound`

The load balancer does not have a listener configured at the given port.
- `LoadBalancerNotFound`

The specified load balancer could not be found.
- `MalformedQueryString`

The query string is malformed.
- `MissingAction`

The request is missing an action or operation parameter.
- `MissingAuthenticationToken`

The request must contain either a valid (registered) AWS Access Key ID or X.509 certificate.

- `MissingParameter`

An input parameter that is mandatory for processing the request is not supplied.

- `OptInRequired`

The AWS Access Key ID needs a subscription for the service.

- `PolicyNotFound`

One or more specified policies were not found.

- `RequestExpired`

The request is past its expiration date or the request date (either with 15 minute padding), or the request date occurs more than 15 minutes in the future.

- `ServiceUnavailable`

The request has failed due to a temporary failure of the server.

- `SignatureDoesNotMatch`

The calculated request signature does not match the signature you provided. Check your AWS Secret Access Key and signing method. Consult the service documentation for details.

- `Throttling`

The request was denied due to request throttling.

- `TooManyLoadBalancers`

The quota for the number of load balancers has already been reached.

- `TooManyPolicies`

The quota for number of policies for this load balancer has already been reached. With the load balancing operations, `NumberFormatExceptions` may occur when converting the values of some inputs to numeric types. For instance, the `Configure Health Check` operation may fail with the following input must be a valid integer: `interval` or `Proxy port` is not a valid integer if the specified inputs were not assigned integer numeric values.

- `InvalidConfigurationRequest`

This error message can appear with the following:

- Policy can be associated only with a listener with one of HTTP, HTTPS as frontend protocol.
- You cannot have an `LBCookieStickinessPolicy` at the same time as an `AppCookieStickinessPolicy`.
- Multiple policies are not allowed for `LBCookieStickinessPolicyType`.

Chapter 4

Security

This section describes how security is handled by the Amazon Elastic Load Balancing integration.

The Elastic Load Balancing integration uses the Elastic Load Balancing Query API. To perform its task, each Elastic Load Balancing operation sends a query to Amazon. This query is sent over HTTPS and the Symphony Client library is used for sending the actual requests. Every Elastic Load Balancing operation has two inputs: **accessKey** and **accessKeyId**. These are provided by Amazon for every Amazon account.

According to Amazon, in addition to the name of the action and the list of parameters, you must include a signature in every query request. The signature is created by using the **accessKey** provided by the user. The steps for creating a signature are described on the Amazon Web site at <http://docs.amazonwebservices.com/AWSEC2/2009-04-04/DeveloperGuide/index.html?using-query-api.html>, and are implemented by the operations.

The Elastic Load Balancing integration uses version 2 of the signature. For calculating an RFC 2104-compliant HMAC with the query string created by using the input parameters, the integration uses the secret Access Key as the key, and SHA1 as the hash algorithm. You should not perform any special configuration; you just need to provide the **accessKey** and **accessKeyId**.

Chapter 5

OO Tools You Can Use with the Amazon Elastic Load Balancing Integration

Following are OO tools that you can use with the Amazon Elastic Load Balancing integration:

- **RSFlowInvoke.exe and JRSFlowInvoke.jar**

RSFlowInvoke (RSFlowInvoke.exe or the Java version, JRSFlowInvoke.jar) is a command-line utility that allows you to start a flow without using Central (although the Central service must be running). RSFlowInvoke is useful when you want to start a flow from an external system, such as a monitoring application that can use a command line to start a flow.

- **Web Services Wizard (wswizard.exe)**

When you run the Web Services Wizard, you provide it with the WSDL for a given Web service. The WSDL string you provide as a pointer can be a file's location and name or a URL. The Web Services Wizard displays a list of the methods in the API of the Web service that you specify. When you run the wizard, pick the methods you want to use, and with one click for each method you have selected, the wizard creates an HP OO operation that can execute the method. This allows you to use the Web Services Wizard to create operations from your monitoring tool's API.

These tools are available in the Operations Orchestration home folder in **/Studio/tools**.