HP Operations Orchestration Software

Software Version: 7.60.02

Amazon Virtual Private Cloud Integration Guide

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- The OO Support site
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Note: Contact your OO contact if you have any difficulties with this process.

In OO: How to find Help, PDFs, and tutorials

The HP Operations Orchestration software (HP OO) documentation set is made up of the following:

- Help for Central

  Central Help provides information to the following:

  - Finding and running flows
  - For HP OO administrators, configuring the functioning of HP OO
  - Generating and viewing the information available from the outcomes of flow runs

  The Central Help system is also available as a PDF document in the HP OO home directory, in the \Central\docs subdirectory.

- Help for Studio

  Studio Help instructs flow authors at varying levels of programming ability.

  The Studio Help system is also available as a PDF document in the HP OO home directory, in the \Studio\docs subdirectory.

- Animated tutorials for Central and Studio

  HP OO tutorials can each be completed in less than half an hour and provide basic instruction on the following:

  - In Central, finding, running, and viewing information from flows
  - In Studio, modifying flows

  The tutorials are available in the Central and Studio subdirectories of the HP OO home directory.

- Self-documentation for operations and flows in the Accelerator Packs and ITIL folders

  Self-documentation is available in the descriptions of the operations and steps that are included in the flows.

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Overview of Amazon Virtual Private Cloud integration

With this integration, you can build HP Operations Orchestration (OO) operations that are integrated into the Amazon Virtual Private Cloud (VPC).

VPC integrates with Amazon EC2. To use this integration successfully, you should have knowledge of the VPC and EC2 technology.

This document will explain how this integration has been implemented and how the operations included communicate between OO and VPC.

Use cases and scenarios

The following are the major use cases for the Amazon VPC integration, and the operations that you can use to implement them.

1. Manage customer gateways:
   - Create Customer Gateway
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2. Manage DHCP options:
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   - Detach Vpn Gateway

Installation and configuration instructions

No special installation and configuration instructions are required for the Amazon Virtual Private Cloud integration. In order to use Amazon VPC, you must first subscribe to Amazon EC2 and Amazon VPC by going to http://aws.amazon.com/vpc/. Amazon has created specialized plugins for several browsers, such as Elasticfox for Firefox, that allow easy interaction with Amazon EC2 and Amazon VPC.

Versions

Operations Orchestration Version	Amazon VPC Version
7.60.02	VPC API Version 2009-07-15

Architecture
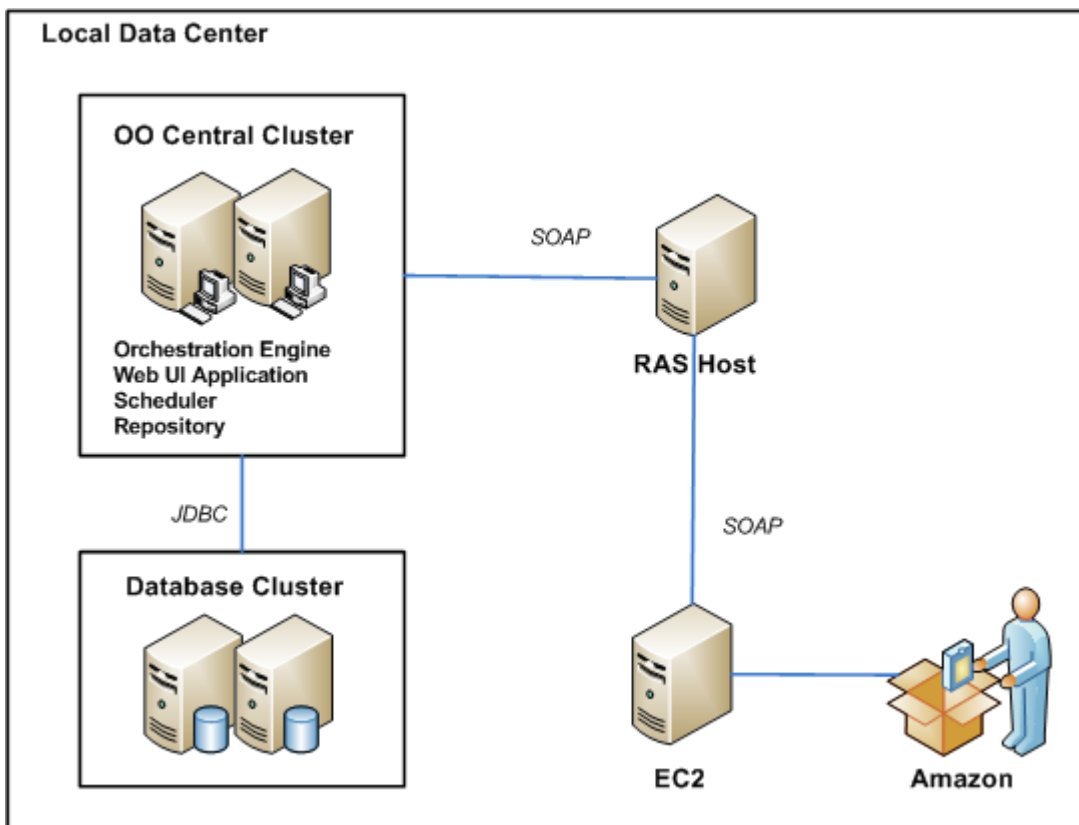
Figure 1 - Amazon VPC architecture

VPC integration operation infrastructure

The VPC integration includes the following operations in the OO Studio Library/Integrations/ Amazon/VPC/ folder.
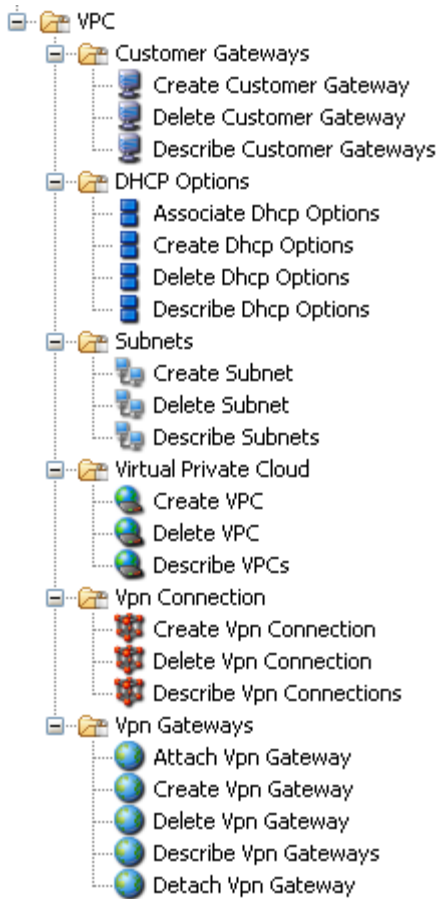
Figure 2 – Amazon VPC integration operation infrastructure

Common inputs in the integration

OO operations use inputs to specify how they obtain the data that they need and when the data is obtained. The following inputs are used consistently throughout the VPC integration's operations.

accessKeyId

> The ID of the secret access key associated with your Amazon AWS account.

accessKey

> The secret access key associated with your Amazon AWS account.

proxyHost

> The proxy server used to connect to Amazon.

proxyPort

> The port used to connect to the proxy server. **proxyHost** and **proxyPort** must both be empty or specified.

serviceEndpoint

> The endpoint to which the requests are sent. The default value is **ec2.amazonaws.com** which corresponds to the United States region. Another equivalent endpoint for the United States is **us-east-1.ec2.amazonaws.com**, while for Europe it is **eu-west-1.ec2.amazonaws.com**.

Operation specifics

This section describes the Amazon VPC integration's operations, including any operation-specific inputs. The operations are grouped by their basic functionality:

- Customer gateways
- DHCP options
- Subnets
- Virtual Private Cloud
- VPN connection
- VPN gateways

Customer Gateways

Create Customer Gateway

The **Create Customer Gateway** operation provides information to AWS about your customer gateway device. The customer gateway is the device at your end of the VPN connection (the VPN gateway is the device at the AWS side of the VPN connection). AWS may delete a customer gateway that you create with this operation if you leave it inactive for an extended period of time (inactive means that there's no VPN connection in use with the customer gateway).

All of the operation's inputs except the following are described in *Common inputs in the integration*.

type

> The type of VPN connection that this customer gateway supports. For example, **ipsec.1**.

ipAddress

> The Internet-routable IP address for the customer gateway's outside interface. The address must be static and cannot be behind a device performing network address translation (NAT).

bgpAsn

> The customer gateway's Border Gateway Protocol (BGP) Autonomous System Number (ASN).

The operation returns the following:

requestId

> The ID of the request you have sent to Amazon by using this operation.

returnResult

> The ID of the created customer gateway.

state

> The state of the customer gateway.

type

The type of VPN connection supported by the gateway.

ipAddress

The IP address for the gateway.

bgpAsn

The gateway's Border Gateway Protocol (BGP) Autonomous System Number (ASN).

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Delete Customer Gateway

The **Delete Customer Gateway** operation deletes a customer gateway. You must delete the VPN connection before deleting the customer gateway. AWS may delete a customer gateway if you leave it inactive for an extended period of time (inactive means that there's no VPN connection in use with the customer gateway).

All of the operation's inputs except the following are described in *Common inputs in the integration*.

customerGatewayId

The ID of the customer gateway you want to delete.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The only valid value is **true**. If the deletion is not successful, an error message is returned and the operation fails.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Describe Customer Gateways

The **Describe Customer Gateways** operation provides you with information about your customer gateways.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

customerGatewayIds

A list of customer gateway IDs separated by delimiters. If you leave this input blank, all of the customer gateways are described.

delimiter

The delimiter for the list of customer gateway IDs. The default value is a comma ','.

rowDelimiter

The delimiter used between rows in the output table. The default value is the line separator character of the current OS.

colDelimiter

    The delimiter used between columns in the output table. The default value is a comma ','.

The operation returns the following:

requestId

    The ID of the request you have sent to Amazon by using this operation.

returnResult

    A table containing the following columns: **Customer Gateway ID**, **State**, **Type**, **IP Address**, and **BGPASN** (Border Gateway Protocol Autonomous System Number). Each row in the table corresponds to a gateway.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

DHCP Options

Associate Dhcp Options

The **Associate Dhcp Options** operation associates a set of previously created DHCP options or the default DHCP options with the specified VPC.

All of the operation's inputs except the following are described in *Common inputs in the integration.*

dhcpOptionsId

    The ID of the DHCP options you want to associate with the VPC, or **default** for the default DHCP options.

vpcId

    The ID of the VPC.

The operation returns the following:

requestId

    The ID of the request you have sent to Amazon by using this operation.

returnResult

    The only valid value is **true**. If the association is not successful, an error structure is returned.

Notes:

- The default options consist of the standard EC2 host name, no domain name, no DNS server, no NTP server, and no NetBIOS server or node type.
- After you associate the options with the VPC, any existing instances and all new instances that you launch in that VPC use the options.
- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Create Dhcp Options

The **Create Dhcp Options** operation creates a set of DHCP options that can be associated with one or more VPCs.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

dhcpConfigurationKey.1

The first name of a DHCP option.

dhcpConfigurationValue.1

A first value or a list of values for the DHCP option.

dhcpConfigurationKey.[number]

To include more DHCP option names, you must add extra inputs using the naming convention **dhcpConfigurationKey.[number]** where **[number]** is the next sequential number, for example 2, 3, 4.

dhcpConfigurationValue.[number]

To include more DHCP option values, you must add extra inputs using the naming convention **dhcpConfigurationValue.[number]** where **[number]** is the next sequential number, for example 2, 3, 4.

delimiter

The delimiter for the values list.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The ID of the newly created DHCP option.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Delete Dhcp Options

The **Delete Dhcp Options** operation deletes a set of DHCP options.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

dhcpOptionsId

The ID of the DHCP options.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The only valid value is **true**. If the association is not successful, an error structure is returned.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.

- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Describe Dhcp Options

The **Describe Dhcp Options** operation provides information about one or more sets of DHCP options.

All of the operation's inputs except the following are described in *Common inputs in the integration.*

dhcpOptionsIds

A DHCP option ID. You can specify more than one separating then with the value in the **delimiter** input.

delimiter

The delimiter for the list of IDs. The default value is a comma (,).

rowDelimiter

The delimiter used between rows in the output table. The default value is the line separator of the current operating system.

colDelimiter

The delimiter used between columns in the output table. The default value is a comma (,).

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

An output table containing the IDs, keys, and values of the DHCP options.

Subnets

Create Subnet

The **Create Subnet** operation creates a new subnet. An Amazon VPC subnet is a segment of a VPC's IP address range to which Amazon EC2 instances can be attached. Subnets allow you to group instances based on security and operational needs.

All of the operation's inputs except the following are described in *Common inputs in the integration.*

vpcId

The ID of the VPC on which want to create the subnet.

cidrBlock

The CIDR block you want the subnet to cover. It must contain a slash followed by one or two digits. For example, 10.0.1.0/24.

availabilityZone

The Availability Zone in which you want the subnet.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The ID of the created subnet.

state

The current state of the subnet. The valid values are **pending** and **available**.

availableIpAddressCount

The number of unused IP addresses in the subnet (the IP addresses for any stopped instances are considered unavailable).

availabilityZone

The Availability Zone the subnet is in.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Delete Subnet

The **Delete Subnet** operation deletes a subnet from a VPC. You must terminate all running instances in the subnet before deleting it, otherwise Amazon VPC returns an error.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

subnetId

The ID of the subnet.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The only valid value is **true**. If the deletion is not successful, you receive an error structure.

Notes:

- Like all Amazon VPC operations, the results might not be visible instantly.
- Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" is returned.

Describe Subnets

The **Describe Subnets** provides information about the specified subnets.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

volumeId

The ID of the volume from which the snapshot will be generated.

userIds

A list of users to whom you grant access. This list can only contain IDs which must be numeric.

groups

A list of the groups to which you grant access (according to Amazon, currently the only supported value is **all**; other values may be supported in the future).

delimiter

The delimiter for the elements of the inputs that contain lists.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

A table containing the following columns: the subnet's id, the Availability Zone the subnet is in, the current state of the subnet (**pending** or **available**), the number of unused IP addresses in the subnet, the CIDR block assigned to the subnet, and the ID of the VPC the subnet is in. Each row in the table corresponds to a subnet. If some columns are empty, 'null' is returned. If one of the **accessKeyId** or **accessKey** is invalid, the result is "400 Bad Request" and the operation fails.

Notes:

- At least one of the **userIds** or **groups** inputs should not be empty.
- Like all Amazon VPC operations, the results might not be visible instantly. Since all Amazon requests must include a timestamp, the RAS machine system clock should be properly set, otherwise a "400 Bad Request" will be returned

Virtual Private Cloud

Create VPC

The **Create VPC** operation creates an Amazon virtual private cloud.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

CIDR

A valid Classless Inter-Domain Routing (CIDR) block. It must contain a slash followed by one or two digits (for example, 10.0.0.0/28).The smallest VPC you can create uses a /28 netmask (16 IP addresses), and the largest uses a /16 netmask (65,536) IP addresses.

delimiter

The delimiter that separates the fields that describe a VPC in the result string. The default value is a comma (,).

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The Amazon VPC in a table having the following columns: VPC Id, status, CIDR block, and DHCP options. The column fields are separated by the delimiter. If you have no VPCs, an empty string is returned.

Delete VPC

The **Delete VPC** operation deletes an Amazon virtual private cloud.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpcId

A valid ID of an existing VPC.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

A boolean value of **true** if the deletion succeeded.

Describe VPCs

The **Describe VPCs** operation returns a list of your Amazon virtual private clouds (VPC).

All of the operation's inputs except the following are described in *Common inputs in the integration.*

vpcIds

A list of the VPC identifiers to describe. The list may be empty, in which case all VPCs are described. If provided, the VPCs are returned in the order of the IDs given by this input.

delimiter

The delimiter used for the **vpcIds** list. The default value is a comma (,).

rowDelimiter

The delimiter that separates VPC descriptions in the output string. The default value is the line separator for the current operating system.

colDelimiter

The delimiter that separates the fields that describe a VPC in the result string. The default value is a comma (;).

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The EC2 VPCs in a table with the following columns: VPC Id, status, CIDR block, and DHCP options. Column fields are separated by the **colDelimiter**. If you have no VPCs, an empty string is returned.

Vpn Connection

Create Vpn Connection

The **Create Vpn Connection** operation creates a new VPN connection between an existing VPN gateway and a customer gateway.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

type

The type of VPN connection.

customerGatewayId

The ID of the customer gateway.

vpnGatewayId

The ID of the VPN gateway.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The ID of the created VPN connection.

customerGatewayConfiguration

The customer gateway configuration.

Delete Vpn Connection

The **Delete Vpn Connection** operation deletes a VPN connection.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnConnectionId

The ID of the VPN connection to delete.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The valid value is **true**. If the deletion fails, an error message is returned.

Describe Vpn Connections

The **Describe Vpn Connections** operation provides information about VPN connections.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnConnectionIds

A list of VPN connection IDs, separated by the delimiter defined in the **delimiter** input. If you leave this input blank, all VPN connections are described.

vpnConnectionKey.1

The first filter name (key) of a VPN connection.

vpnConnectionValue.1

A value or list of values for the **vpnConnectionKey.1** filter name (key).

vpnConnectionKey.[number]

For more VPN connection names, you must add extra inputs using the following naming convention: `vpnConnectionKey.[number]` where `[number]` is the next sequential number (for example, 2, 3, 4).

dhcpConfigurationValue.[number]

For more VPN connection values, you must add extra inputs using the following naming convention: `dhcpConfigurationValue.[number]` where `[number]` is the next sequential number (for example, 2, 3, 4).

delimiter

The delimiter for the list of IDs in **vpnConnectionIds**. The default value is a comma (,).

rowDelimiter

The delimiter used between rows in the output table. The default value is the line separator of the current operating system.

colDelimiter

The delimiter used between columns in the output table. The default value is a comma (,).

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

A description containing the VPN connection ID, VPN gateway ID, customer gateway ID, and customer gateway configuration.

Vpn Gateways

Attach Vpn Gateway

The **Attach Vpn Gateway** operation attaches a VPN gateway to a VPC.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnGatewayId

The ID of the gateway you want to attach to the VPC.

vpcId

The ID of the VPC to be attached to the VPN gateway.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

A message containing the result of the operation.

state

The state of the VPN gateway.

vpcId

The VPC attached to the VPN gateway.

Create Vpn Gateway

The **Create Vpn Gateway** operation creates a new VPN gateway. A VPN gateway is the VPC-side endpoint for the VPN connection. You can create a VPN gateway before creating the VPC itself. AWS might delete any VPN gateway created with this operation if it is left inactive for an extended period of time (inactive means that there is no VPN connection in use with the VPN gateway).

All of the operation's inputs except the following are described in *Common inputs in the integration*.

type

The type of VPN connection this VPN gateway supports (for example, **ipsec.1**).

availabilityZone

The Availability Zone where you want the VPN gateway.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The ID of the created VPN gateway.

state

The state of the operation.

type

The type of VPN connection.

Delete Vpn Gateway

The **Delete Vpn Gateway** operation deletes a VPN gateway. Before you delete a VPN gateway, it is a best practice to detach it from the VPC and delete the VPN connection.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnGatewayId

The ID of the VPN gateway.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The valid value is **true**. If the deletion fails, an error structure is displayed instead.

Describe Vpn Gateways

The **Describe Vpn Gateways** operation provides information about the VPN gateways.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnGatewayIds

The list of VPN gateways. If you leave this input blank, all VPN gateways are described.

delimiter

The delimiter for the list of **vpnGatewayIds** IDs. The default value is a comma (,).

rowDelimiter

The delimiter used between rows in the output table. The default value is the line separator of the current operating system.

colDelimiter

The delimiter used between columns in the output table. The default value is a comma (,).

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The description of the required VPN gateways including the following information: the VPN gateway ID, type, state, availability zone, and VPC ID.

Detach Vpn Gateway

The **Detach Vpn Gateway** operation detaches a VPN gateway from a VPC.

All of the operation's inputs except the following are described in *Common inputs in the integration*.

vpnGatewayId

The ID of the gateway you want to detach from the VPC.

vpcId

The ID of the VPC from which you want to detach the VPN gateway.

The operation returns the following:

requestId

The ID of the request you have sent to Amazon by using this operation.

returnResult

The valid value is **true**. If the detachment fails, an error structure is displayed instead.

Troubleshooting

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 VPC integration, there are several steps that you should verify:

1. Verify that the same operation works when it is performed through the VPC console using the same parameters.
2. Verify that your access key and proxy parameters are correct.
3. Verify that the RAS machine system clock is properly set since all Amazon queries must include a timestamp.

Error messages

This section lists the error messages you may receive while using this integration.

Failed to open HTTP connection.

AWS was not able to validate the provided access credentials. Error code: AuthFailure.

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

Invalid integer value ###. Error code: InvalidParameterValue.

Value (###) for parameter bgpAsn is invalid. Invalid Format. Error code: InvalidParameterValue.

The following input must not be null: bgpAsn.

Value (###) for parameter ipAddress is invalid. Invalid Format. Error code: InvalidParameterValue.

The request must contain the parameter ipAddress. Error code: MissingParameter.

Value (###) for parameter type is invalid. Invalid Format. Error code: InvalidParameterValue.

The following input must not be null: type.

The customerGateway ID '###' does not exist. Error code: InvalidCustomerGatewayID.NotFound.

is not a valid Key name. This message appears if the filterName is invalid.

The following input must not be null: customerGatewayId

The vpc ID '###' does not exist. Error code: InvalidVpcID.NotFound.

The name of the Key (DHCP option) with number 1 is not valid.

The dhcpOption ID '###' does not exist. Error code: InvalidDhcpOptionID.NotFound.

Value (###) for parameter availabilityZone is invalid. Subnets can currently only be created in the following availability zones: eu-west-1b. Error code: InvalidParameterValue.

The subnet ID '###' does not exist. Error code: InvalidSubnetID.NotFound.

Invalid mask for the CIDR! This should be an integer between 16 and 28.

Invalid CIDR!

The provided IP is invalid!

The vpnGateway ID '###' does not exist. Error code: InvalidVpnGatewayID.NotFound.

The attachment with vpn gateway ID '###' and vpc ID '###' does not exist. Error code: InvalidVpnGatewayAttachment.NotFound.

Security

This section describes how security is handled by the Amazon VPC integration.

The VPC integration uses the Amazon VPC Query API. To perform its task, each VPC 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 VPC 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/AmazonVPC/2009-07-15/DeveloperGuide/index.html?using-query-api.html and are implemented by the operations.

The VPC 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 use the secret Access Key as the key, and SHA1 as the hash algorithm. You should not perform any special configurations; just provide the **accessKey** and **accessKeyId**.

Tools

Following are OO tools that you can use with the Amazon VPC 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 %OO_home%/Studio/tools/ folder.