HP Operations Orchestration Software

Software Version: 7.60

Amazon Elastic Compute Cloud Integration Guide

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There are two Web sites where you can find support and documentation, including updates to OO Help systems, guides, and tutorials:

- The OO Support site
- BSA Essentials Network

Support

Documentation enhancements are a continual project at Hewlett-Packard Software. You can obtain or update the HP OO documentation set and tutorials at any time from the HP Software Product Manuals Web site. You will need an HP Passport to log in to the Web site.

To obtain HP OO documentation and tutorials

1. Go to the HP Software Product Manuals Web site (*http://support.openview.hp.com/selfsolve/manuals*).
2. Log in with your HP Passport user name and password.

   OR

   If you do not have an HP Passport, click **New users – please register** to create an HP Passport, then return to this page and log in.

   If you need help getting an HP Passport, see your HP OO contact.

3. In the **Product** list box, scroll down to and select **Operations Orchestration**.
4. In the **Product Version** list, click the version of the manuals that you're interested in.
5. In the **Operating System** list, click the relevant operating system.
6. Click the **Search** button.
7. In the **Results** list, click the link for the file that you want.

BSA Essentials Network

For support information, including patches, troubleshooting aids, support contract management, product manuals and more, visit the following site: *http://www.hp.com/go/bsaessentialsnetwork*

This is the **BSA Essentials Network** Web page. To sign in:

1. Click **Login Now**.
2. On the **HP Passport sign-in** page, enter your HP Passport user ID and password and then click **Sign-in**.
3. If you do not already have an HP Passport account, do the following:
   a. On the **HP Passport sign-in** page, click **New user registration**.
   b. On the **HP Passport new user registration** page, enter the required information and then click **Continue**.
   c. On the confirmation page that opens, check your information and then click **Register**.
   d. On the **Terms of Service** page, read the Terms of use and legal restrictions, select the **Agree** button, and then click **Submit**.
4. On the **BSA Essentials Network** page, click **Operations Orchestration Community.**

The Operations Orchestration Community page contains links to announcements, discussions, downloads, documentation, help, and support.

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 Elastic Compute Cloud integration

With this integration, you can build HP Operations Orchestration (OO) flows that are integrated into the Amazon Elastic Compute Cloud (EC2).

The EC2 integration uses the EC2 Query API released on 04/04/2009 to integrate with OO. To use this integration successfully, you should have knowledge of the EC2 technology.

This document will explain how this integration has been implemented and how the operations included communicate between OO and EC2.

Use cases and scenarios

The following are the major use cases for the Amazon EC2 integration, and the operations and flows that you can use to implement them.

1. Enumerate availability zones and regions:
   - Enumerate Availability Zones operation
   - Enumerate Regions operation
2. Manage elastic block store:
   - Snapshots
     - o Create Snapshot operation
     - o Delete Snapshot operation
     - o Describe Snapshots operation
     - o Get Snapshot Details operation
   - Volumes
     - o Attach Volume operation
     - o Create Volume operation
     - o Delete Volume operation
     - o Describe Volumes operation
     - o Detach Volume operation
     - o Get Volumes Details operation
3. Work with elastic IPs:
   - Allocate New Elastic Ip operation
   - Associate Elastic Ip operation
   - Disassociate Elastic Ip operation
   - Enumerate Elastic Ips operation
   - Release Elastic Ip operation
4. Manage images:
   - Enumerate Images operation
   - Get Image Details operation
   - Modify Image Attribute operation
   - Register Image operation
   - Remove Image operation
   - Reset Image Attribute operation
5. Manage Windows bundle tasks:

- Bundle Windows Instance operation
- Cancel Bundle Task operation
- Enumerate Bundle Tasks operation
- Get Bundle Task Details operation

6. Manage instances:
   - Describe instances operation
   - Get Instance Details operation
   - Get System Log operation
   - Monitor Instance operations
   - Restart Instance operation
   - Start Instances operation
   - Stop Instance operation
   - Unmonitor Instance operations

7. Manage key pairs:
   - Allocate New Key Pair operation
   - Delete Key Pair operation
   - Enumerate Key Pairs operation

8. Manage security groups:
   - Allow Access To Security Group operation
   - Create Security Group operation
   - Delete Security Group operation
   - Describe Security Groups operation
   - Get Security Group Details operation
   - Revoke Access To Security Group operation

Installation and configuration instructions

No special installation and configuration instructions are required for the Amazon EC2 integration. 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 plugins for several browsers, such as Elasticfox for Firefox, that allow easy interaction with Amazon EC2.

Versions

Operations Orchestration Version	Virtual Infrastructure Version
7.60	EC2 API Version 2009-04-04

Architecture
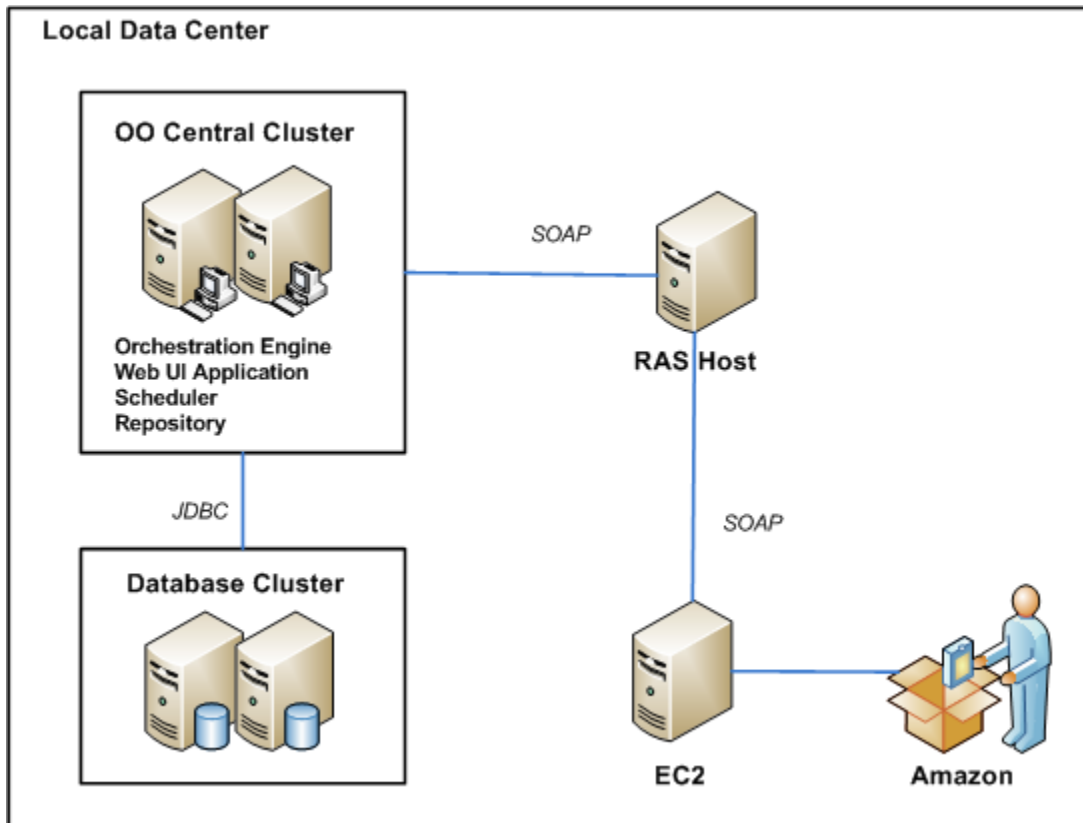
Figure 1 - Amazon EC2 architecture

EC2 integration operation and flow infrastructure

The EC2 integration includes the following operations in the OO Studio Library/Integrations/ Amazon/EC2/ folder.
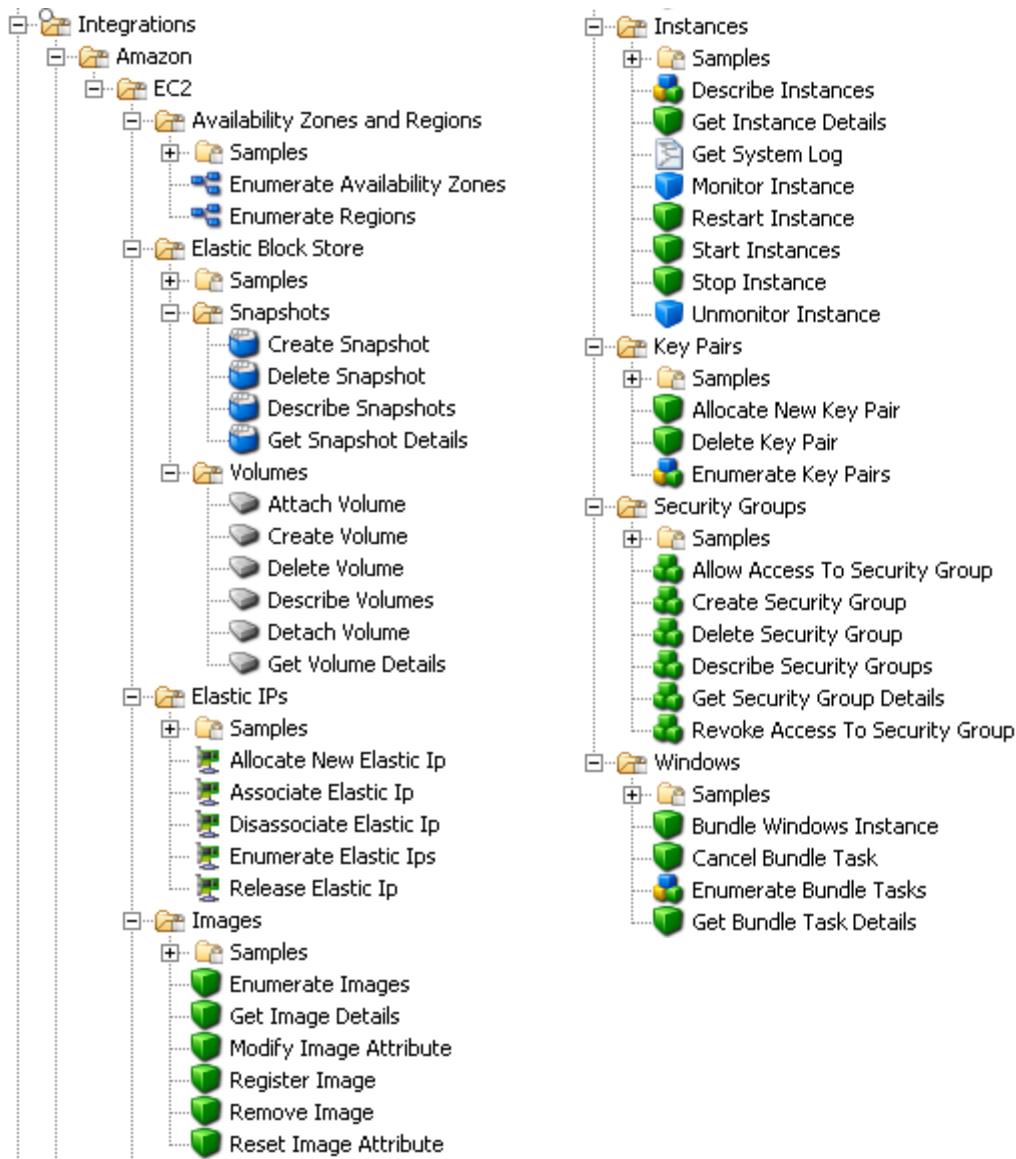
Figure 2 – Amazon EC2 integration operation and flow infrastructure

Common inputs in the integration

OO flows and 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 EC2 integration's operations and flows.

accessKeyId

The ID of the access key that uniquely identifies the user account. This can be obtained from the Amazon console.

accessKey

The secret access key that uniquely identifies the user. This can be obtained from the Amazon console.

proxyHost

The proxy host used for accessing the Internet. This is an optional input.

proxyPort

The port used for the proxy. This is an optional input.

serviceEndpoint

The endpoint to which the requests are sent. This is an optional input. The default is **us-east-1.ec2.amazonaws.com**.

Operation and flow specifics

This section describes the Amazon EC2 integration's operations and flows, including any operation- or flow-specific inputs. The flows and operations are grouped by their basic functionality:

- Availability zones and regions
- Elastic block store—snapshots and volumes
- Elastic IPs
- Images
- Instances
- Key pairs
- Security groups
- Windows bundle tasks

The sample flows in the OO Library/Integrations/Amazon/EC2/ folder perform some of the most common tasks that need to be automated when using EC2, such as starting instances, allocating elastic IPs, and working with images. Each of these sample flows has a description that describes in detail what it does. You can use these flows as they are or as templates for new operations.

Working with availability zones and regions

Enumerate Availability Zones

The **Enumerate Availability Zones** operation retrieves a list of your Amazon EC2 availability zones.

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

delimiter

The delimiter used for the results list. The default 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 delimiter-separated list of your available availability zones.

notAvailableZones

A delimiter-separated list of availability zones which are not available for use, but are visible to you (this list usually has no elements).

Enumerate Regions

The **Enumerate Regions** operation lists the regions that are currently available to you.

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

rowDelimiter

The delimiter to place between the rows of the results table. The default is the line separator character for the current operating system.

colDelimiter

The delimiter to be placed between the columns of the results table. The default 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 available regions in a table having the following columns: **Region name** and **Region endpoint**.

Example:
```
eu-west-1,eu-west-1.ec2.amazonaws.com
us-east-1,us-east-1.ec2.amazonaws.com
```

Working with elastic block store

Working with snapshots

Create Snapshot

The **Create Snapshot** operation creates a snapshot of an EBS volume and stores it in S3.

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

volumeId

The ID of the volume from which the snapshot is generated. This ID can be found using the Amazon EC2 console.

The operation returns the ID of the generated snapshot.

The operation also returns the following:

requestId

The Amazon request ID.

volumeId

The ID of the volume from which the snapshot is generated.

status

The snapshot state.

startTime

The timestamp when the snapshot was initiated.

progress

The progress of the snapshot, in percentage.

Delete Snapshot

The **Delete Snapshot** operation deletes a snapshot of an Amazon EBS volume.

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

snapshotId

The ID of the snapshot to be deleted.

The operation returns the following:

requestId

The Amazon request ID.

Describe Snapshots

The **Describe Snapshots** operation describes the status of Amazon EBS snapshots. If you provide a list of snapshot IDS, only those snapshots are described. Otherwise, all the snapshots you own are described.

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

snapshotIds

An optional list of snapshot IDs. If you provide this list, only those snapshots are described.

delimiter

The delimiter to place between the elements of the snapshot ID list. The default is a comma (**,**).

rowDelimiter

The delimiter to place between the rows of an output table. The default is the line separator of the current operating system.

colDelimiter

The delimiter to be placed between the columns of an output table. The default is a comma (,).

The operation returns the following:

returnResult

A table containing the following columns: **snaphost id, volume id** (the ID of the volume from which the snapshot was created), **snapshot status** (**pending**, **completed**, or **error**), timestamp (the timestamp when the snapshot was initiated), **snapshot progress** (the progress of the snapshot creation process, in percentage).

Each row in the table corresponds to a snapshot. If a column's result is empty, 'null' is returned instead.

requestId

The Amazon request Id.

Get Snapshot Details

The **Get Snapshot Details** operation describes the status of an EBS snapshot.

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

snapshotId

The ID of the snapshot to be described.

The operation returns the following:

requestId

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

returnResult

> The snapshot identifier.

snapshotId

> The snapshot identifier.

status

> The status of the snapshot (for example, **pending**, **completed**, or **error**).

volumeId

> The ID of the volume from which the snapshot was created.

startTime

> The timestamp when the snapshot was initiated.

progress

> The progress of the snapshot creation process, in percentage.

Working with volumes

Attach Volume

The **Attach Volume** operation attaches an Amazon EBS volume to a running instance and exposes it as the specified device.

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

volumeId

> The ID of the Amazon EBS volume. The volume must not be attached to any instance.

instanceId

> The ID of the instance to which the volume attaches. The volume and instance must be within the same availability zone, and the instance must be running.

deviceName

> Specifies how the device is exposed to the instance (for example, **/dev/sdh**, **/dev/sdi**, **xvdh**, and **xvdi**).

The operation returns the following:

requestId

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

returnResult

> The status of the attaching process (for example, **attaching**).

attachTime

> The time the process was launched.

Notes:

- The Windows devices are **xvda** through **xvdp**. **xvda**, and **xvdb** are reserved by the operating system and **xvdc** is assigned to drive C:\.
- The Linux and UNIX devices are **/dev/sdf** through **/dev/sdl**. The devices **/dev/sda1**, **/dev/sda2**, **/dev/sdb**, **/dev/sdc**, **/dev/sdd**, and **/dev/sde** are reserved.

- If the response of the operation is **attaching**, this does not guarantee that the volume attached. Use the **Get Volume Details** operation to check the status of the volume. If the volume has not attached it may be because you specified an invalid device name.

Create Volume

The **Create Volume** operation creates a new Amazon EC2 volume.

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

size

A positive integer that represents the size of the volume in GBs. This input is required if you are not creating a volume from a snapshot.

snapshotId

The snapshot from which to create the new volume. This input is required if you do not specify the **size** input.

availabilityZone

The availability zone in which to create the new volume.

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 volume.

volumeId

The ID of the newly created volume.

size

The size of the newly created volume in GBs.

status

The volume state (for example, **creating**, **available**, **in-use**, **deleting**, **error**).

createTime

The timestamp when volume creation was initiated.

availabilityZone

The availability zone in which the volume was created.

snapshotId

The snapshot from which the volume was created, if applicable.

Delete Volume

The **Delete Volum**e operation deletes an Amazon EBS volume.

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

volumeId

The ID of the Amazon EBS volume. The volume must not be attached to any instance.

The operation returns the following:

requestId

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

returnResult

> The status of the process (for example, **deleting**).

Describe Volumes

The **Describe Volumes** operation describes the status of your Amazon EBS volumes. If you specify a list of volume IDs, only those volumes are described. Otherwise, all volumes that you own are described. Note that this operation does not return information about the attachment state. Use the **Get Volume Details** operation for that.

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

volumeIds

> An optional list of volume IDs. If you specify a list of volume IDs, only those volumes will be described.

delimiter

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

rowDelimiter

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

colDelimiter

> The delimiter used between columns in the output table. The default 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 with the following columns: **volume id**, **volume size**, **id of the snapshot from which the volume was created**, **the availability zone**, **the volume's status** (for example, **creating**, **available**, **in-use**, **deleting**, or **error**). Each row corresponds to a different volume. If some columns are empty, the result is "null".

Detach Volume

The **Detach Volume** operation detaches an Amazon EBS volume from an instance.

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

volumeId

> The ID of the Amazon EBS volume to be detached.

instanceId

> The ID of the instance to which the volume is attached.

deviceName

> Specifies how the device is exposed to the instance (for example, **/dev/sdh**, **/dev/sdi**, **xvdh**, or **xvdi**).

force

    Set to **true** if a previous detachment attempt did not occur cleanly. This option can lead to data loss or a corrupted file system.

The operation returns the following:

requestId

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

returnResult

    The status of the process (for example, **detaching**).

attachTime

    The time the association was created.

Notes:

- The Windows devices are **xvda** through **xvdp**. **xvda** and **xvdb** are reserved by the operating system, and **xvdc** is assigned to drive C:\.

- The Linux and UNIX devices are **/dev/sdf** through **/dev/sdl**. The devices **/dev/sda1**, **/dev/sda2**, **/dev/sdb**, **/dev/sdc**, **/dev/sdd**, and **/dev/sde** are reserved.

Get Volumes Details

The **Get Volumes Details** operation describes the status of an EBS volume.

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

volumeId

    The ID of the volume to describe.

rowDelimiter

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

colDelimiter

    The delimiter used between columns in the **attachmentSet** output table. The default 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 volume ID.

volumeId

    The volume ID.

size

    The volume size.

snapshotId

    The snapshot from which the volume was created. This field may be empty.

availabilityZone

    The availability zone in which the volume was created.

status

The volume state (for example, **creating**, **available**, **in-use**, **deleting**, or **error**).

createTime

The timestamp from when the volume was created. This is converted to the RAS machine timezone.

attachmentSet

A table that lists the instances to which the volume is attached. Currently, you can attach a volume to just one instance, but this table is used in case the volume attaches to multiple instances in the future. The table has the following columns: **instance ID**, **the device through which the volume is exposed to the instance** (for example, **/dev/sdf** on a Linux system or **xvdf** on a Windows system), **the attachment state**, **the time stamp when the volume was attached**, and the **volume ID**. Each row corresponds to a different instance.

Working with Elastic IPs

Allocate New Elastic Ip

The **Allocate New Elastic Ip** operation acquires an elastic IP address for use with your Amazon EC2 account.

All of the flow's inputs are described in *Common inputs in the integration*.

The operation returns the following:

requestId

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

returnResult

Your new elastic IP address.

Associate Elastic Ip

The **Associate Elastic Ip** operation associates an elastic IP address with an instance. If the IP address is currently assigned to another instance, it is reassigned to the new instance. The old instance will not have a public DNS name for a few minutes. If you call this operation more than once with the same inputs, Amazon EC2 does not return an error.

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

ipAddress

The elastic IP address to use for your instance.

instanceId

The ID of the instance.

The operation returns the following:

requestId

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

returnResult

Returns **true** if the operation completes successfully.

Disassociate Elastic Ip

The **Disassociate Elastic Ip** operation disassociates the specified elastic IP address from the instance to which it is assigned. If the IP address is not currently assigned to an instance, the operation succeeds but does nothing. The instance to which the address was associated will not have a public DNS name for a few minutes.

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

ipAddress

   The elastic IP address you want to disassociate.

The operation returns the following:

requestId

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

returnResult

   Returns **true** if the operation completes successfully.

Enumerate Elastic Ips

The **Enumerate Elastic Ips** operation lists the elastic IPs assigned to your account.

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

rowDelimiter

   The row delimiter in the results table. The default value is the line separator for the current operating system.

colDelimiter

   The column delimiter in the results 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

   Your elastic IPs in a table with the following columns: IP Address and the Instance ID associated to that address.

   Example:
   ```
   174.129.17.27,i-c0ad46a8
   174.129.17.39,null
   ```

Release Elastic Ip

The **Release Elastic Ip** operation releases an elastic IP address associated with your Amazon EC2 account. If you run this operation on an elastic IP address that you do not own (maybe you have released it already), the operation fails. Releasing an IP address automatically disassociates it from any instance with which it is associated. To disassociate an IP address without releasing it, use the **Disassociate Elastic Ip** operation. The instance will not have a public DNS name for a few minutes.

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

ipAddress

>The elastic IP address to release from your account.

The operation returns the following:

requestId

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

returnResult

>Returns **true** if the operation completes successfully.

Working with images

Enumerate Images

The **Enumerate Images** operation returns a list of the Amazon EC2 images that are accessible to you. Images include AMIs (Amazon Machine Image), AKIs (Amazon Kernel Image), and ARIs (Amazon RAM disk Image). You can filter the results to include only images:

- Of a particular type
- Published by a particular user
- Based on the criterion that they are accessible only to you or they are public

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

imageOwners

>A list of the IDs of the owners whose images you want to see (for example, **099720109477,3272169288991**). If you leave this input empty, all of the images are returned.

executableBy

>Specifies the accessibility of the images (for example, **all** or **self**).

colDelimiter

>The column delimiter for the results table.

rowDelimiter

>The row delimiter for the results table.

delimiter

>The delimiter for the elements of the list results.

The operation returns the following:

requestId

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

returnResult

>The images in a table with the following columns: **AMI ID**, **Manifest Location**, **Visibility**, and **Platform**.

>**Example:**

>```
>aki-4d58b924,ec2-paid-ibm-images/vmlinuz-2.6.16.60-0.29-
>xenpae.i386.manifest.xml,true,null
>aki-8049aee9,ec2-paid-ibm-images/vmlinuz-2.6.16.60-0.29-
>xenpae.i386.manifest.xml,true,null
>```

```
aki-8149aee8,ec2-paid-ibm-images/vmlinuz-2.6.16.60-0.29-
xenpae.i386.manifest.xml,true,null
aki-db4bacb2,ec2-paid-ibm-images/vmlinuz-2.6.16.60-0.30-
xen.x86_64.manifest.xml,true,null
```

Note: Visibility is **true** if the image is public and **false** if it only has implicit and explicit launch permissions. Platform is not always specified.

Get Image Details

The **Get Image Details** operation returns details about a particular Amazon image. The image can be AMI (Amazon Machine Image), AKI (Amazon Kernel Image), or ARI (Amazon RAM disk Image).

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

imageId

The ID of the image you want details about. If you specify a nonexistent ID, the operation fails.

delimiter

The delimiter for the elements of the result lists.

The operation returns the following:

returnResult

The ID of the image you want details about.

imageLocation

The location of the image.

kernelId

The operating system kernel associated with the image (only for AMIs, optional).

ramdiskId

The RAM disk associated with the image (only for AMIS, optional).

platform

The operating system platform (optional).

architecture

The architecture of the image (for example, **i386** or **x86_64**).

ownerId

The account number of the image owner.

status

The status of the image. If the operation returns **available**, the image is successfully registered and available for launching. If the operation returns **deregistered**, the image is deregistered and no longer available for launching.

imageType

The type of the image (for example, **machine**, **kernel**, or **ramdisk**).

isPublic

Returns **true** if this image has public launch permissions and **false** if it only has implicit and explicit launch permissions.

productCodes

The product codes of the image.

requestId

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

Modify Image Attribute

The **Modify Image Attribute** operation modifies an attribute of an AMI (Amazon Machine Image). This allows you to make the AMI public, grant permission to the AMI for a given user, or associate a product code with the AMI.

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

amiId

> The ID of the AMI you want to modify.

attribute

> The attribute to modify (**launchPermission** or **productCode**).

operationType

> The operation to perform (the valid values are **add** and **remove**). Specify this input only if the **attribute** input is set to **launchPermission**.

userIds

> A list of users to whom you want to grant or revoke access. The list can only contain numeric IDs. Specify this input only if the **attribute** input is set to **launchPermission**.

groups

> The groups to which you want to grant or revoke access (according to Amazon, the only currently supported value is **all**; other values may be supported in the future). Specify this input only if the **attribute** input is set to **launchPermission**.

productCode

> The product code to associate with your AMI. Specify this input only if the **attribute** input is set to **productCode**. According to Amazon, each AMI can have a single product code associated with it. The user must be the owner of the AMI to associate a product code with it.

delimiter

> The delimiter for the elements of the list inputs.

The operation returns the following:

requestId

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

returnResult

> Returns **true** if the operation completes successfully and **false** if it does not.

Notes:

- If the **attribute** input is set to **productCode**, the **productCode** input cannot be empty.
- If the **attribute** input is set to **launchPermission**, the **operationType** input and at least one of the **userIds** or **groups** inputs should not be empty.
- An Amazon DevPay account is needed in order to be able to change the **productCode**.
- **Important:** Once set, the **productCode** cannot be changed or removed.

Register Image

The **Register Image** operation registers an AMI with Amazon EC2. Images must be registered before they can be launched. You can register an image more than once, and have multiple AMI IDs for the same image at the same time.

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

imageLocation

> The full path to your AMI manifest in Amazon S3 storage (for example, **/mybucket/myimage.manifest.xml**).

The operation returns the following:

requestId

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

returnResult

> The unique ID of the newly registered machine image (an AMI ID).

Remove Image

The **Remove Image** operation deregisters the specified AMI. Once deregistered, the AMI cannot be used to launch new instances. The image will is not deleted from Amazon S3.

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

amiId

> The ID of the AMI you want to deregister.

The operation returns the following:

requestId

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

returnResult

> Returns **true** if the operation completes successfully.

Reset Image Attribute

The **Reset Image Attribute** operation resets an attribute of an AMI to its default value.

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

amiId

> The ID of the AMI you want to modify.

attribute

> The attribute to reset (the valid values are **launchPermission** and **productCodes**). **Note:** Amazon informs us that the **productCodes** attribute cannot currently be reset.

The operation returns the following:

requestId

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

returnResult

> Returns **true** if the operation completes successfully and **false** if it does not.

Working with Instances

Describe instances

The **Describe Instances** operation returns a list of Amazon EC2 instances.

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

instanceIds

A list of the instance IDs to describe. If you leave this input empty, all instances are described. The instances are not returned in the order that the IDs are given in this input, but in the order the instances are stored by Amazon EC2. This is the same order in which the inputs can be seen in the Amazon console.

delimiter

The delimiter used for the **instanceIds** list and for the list of security groups in the response string. The default is a comma (,).

rowDelimiter

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

colDelimiter

The delimiter that separates the fields that describe an instance in the result string. The default is a semicolon (;).

The operation returns the following:

requestId

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

returnResult

Your EC2 instances in a table with the following columns: Instance Id, AMI ID, Machine type, Status, Public DNS, Key pair name, and Security groups. Column fields are separated by the **colDelimiter**. If you have no instances, an empty string is returned.

Get Instance Details

The **Get Instance Details** operation returns details about a specific Amazon EC2 instance.

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

instanceIdentifier

The ID of the instance you want details about. If you specify a nonexistent ID, the operation fails.

delimiter

The delimiter used for the **instanceIds** list and for the list of security groups in the response string. The default is a comma (,).

The operation returns the following:

returnResult

The **instanceId** of the specified instance.

imageId

The ID of the AMI used for this instance.

kernelId

The operating system kernel associated with the instance (optional).

platform

The operating system platform (optional).

publicDns

The public hostname of the instance (contactable from outside the Amazon EC2 network).

privateDns

The private hostname of the instance (can only be used inside the Amazon EC2 network).

launchTime

The time the instance was launched.

status

The status of the instance (for example, **running**, **pending**, or **terminated**).

transitionReason

The reason the instance entered this state.

availabilityZone

The availability zone in which the instance is located.

machineType

The type of the instance (for example, **m1.small** or **c1.xlarge**).

ownerId

The account number of the AMI owner.

ramdiskId

The RAM disk associated with the image (optional).

keyPairname

The key pair name if this instance was launched with an associated key pair.

launchIndex

The order in which the instance was launched when launching more than one instance in one reservation.

monitoring

The monitoring status.

reservationId

The reservation ID used to launch the instance.

productCodes

A list of product codes.

groupSet

A list of the security groups to which the instance belongs, separated by the **delimiter**.

requestId

The ID of the request sent to Amazon.

Note: Instances that are terminated or starting up may not have a public DNS name or other attributes.

Get System Log

The **Get System Log** operation retrieves the console output (the system log) of a running instance. Instance console output is buffered and posted shortly after instance boot, reboot, and termination. Amazon EC2 preserves the most recent 64 KB of output which is available for at least one hour after the most recent post.

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

instanceId
> The ID of the instance you want to query.

The operation returns the following:

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

returnResult
> The console output.

updateTime
> The time the output was last updated.

Note: This operation may also work on instances which were terminated a few days before. Use the **Get Instance Details** operation to verify that the queried instance is still alive.

Monitor Instance

The **Monitor Instance** operation enables Amazon CloudWatch monitoring for a running instance.

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

instanceIdentifier
> The ID of the instance you want to monitor.

The operation returns the following:

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

returnResult
> The state of the monitoring after the execution of this operation (for example, **pending**).

Restart Instance

The **Restart Instance** operation requests a reboot of one instance. The operation succeeds if the instance is valid and belongs to you. Requests to reboot terminated instances are ignored.

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

instanceIdentifier
> The ID of the instance you want to reboot.

The operation returns the following:

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

returnResult

    Returns **true** if the instance is restarted. This may take some time and the instance's status may remain **running** while it is being restarted.

Note: We recommend that you to verify (using the **Get Instance Details** operation) that the instance you want to restart exists and that it is in the **running** state. Otherwise, the operation's **returnResult** may be **true** but nothing may have happened.

Start Instances

The **Start Instances** operation launches a specified number of instances of an AMI for which you have permissions. If Amazon EC2 cannot launch the minimum number of AMIs you request, no instances are launched. If there is insufficient capacity to launch the maximum number of AMIs you request, Amazon EC2 launches the minimum number specified for each AMI and allocates the remaining available instances using round robin.

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

amiId

    The unique ID of the AMI you want to launch.

minCount

    The minimum number of instances you want to launch from the specified AMI.

maxCount

    The maximum number of instances you want to launch.

kernelId

    The ID of the kernel with which to launch the instance.

ramdiskId

    The ID of the RAM disk with which to launch the instance. This is required by some kernels.

keyName

    The name of one of your existent key pairs, used to access your instance. Launching public images without a key pair ID leaves them inaccessible.

securityGroup

    The name of the security group of which your instances are part. If you do not specify this input, the **default** group is used.

userData

    The user data. Any user-supplied data is treated as opaque data; what you provide is what you get back. All instances launched together get the same user-supplied data. User data is limited to 16K. This limit applies to the data in raw form.

instanceType

    The instance type (the valid values are **m1.small**, **m1.large**, **m1.xlarge**, **c1.medium**, and **c1.xlarge**. If the **amiId** input denotes a 64-bit image, this input should be provided with one of the following values: **m1.large**, **m1.xlarge**, or **c1.xlarge**. If the **amiId** input denotes a 32-bit image, you can leave this input empty or provide it with one of the following values: **m1.small** or **c1.medium**. If you leave the input empty, a small instance is created by default (Amazon may change this in the future).

placementZone

    The placement constraints (availability zones) for launching the instances. By default, Amazon selects an availability zone automatically.

monitoring

Set this input to **true** if the instance should be monitored after launch. Otherwise, set it to **false**. The default value is **false**. If you do not provide a value for this input, the instance is be monitored after starting.

delimiter

The delimiter for the returned list of IDs. The default is (,).

The operation returns the following:

returnResult

A list containing the IDs of your newly started instances.

reservationId

The reservation ID used to launch the instances.

requestId

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

requesterId

The ID of the requester who has sent this request to Amazon.

Notes:

- If **minCount** and **maxCount** are not specified, one instance is launched.
- The architecture of your AMI, RAM disk, and kernel must match. Even then, there is no guarantee a given combination will function correctly or boot successfully if they weren't designed to be used together.
- Instances will usually enter the **pending** state after this operation. They will not have DNS names and other attributes for up to a few minutes.
- If any of the AMIs have a product code attached for which the user has not subscribed, the operation fails.

Stop Instance

The **Stop Instance** operation terminates an instance. If you terminate an instance more than once, each call succeeds. Terminated instances remain visible (for instance, for the **Describe Instances** operation) after termination for approximately one hour.

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

instanceIdentifier

The ID of the instance you want to terminate.

The operation returns the following:

requestId

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

returnResult

The state of the instance after the operation (for example, **shutting-down**).

previousState

The state the instance was in before you stopped it (for example, **running**).

Unmonitor Instance

The **Unmonitor Instance** operation disables Amazon CloudWatch monitoring for a running instance.

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

instanceIdentifier
> The ID of the instance for which you want to disable monitoring.

The operation returns the following:

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

returnResult
> The state of the monitoring after the execution of this operation (for example, **disabling**).

Working with key pairs

Allocate New Key Pair

The **Allocate New Key Pair** operation creates a new 2048-bit RSA key pair with the specified name. The private key is returned as an unencrypted PEM encoded PKCS#8 private key. If a key with the specified name already exists, Amazon EC2 returns an error.

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

keyName
> The name of the new key pair.

The operation returns the following:

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

returnResult
> The key material of your RSA private key.

keyFingerprint
> An SHA-1 digest of the DER encoded private key.

Delete Key Pair

The **Delete Key Pair** operation deletes the specified key pair by removing the public key from Amazon EC2. You must own the key pair. The operation succeeds if you call it more than once on a given key and even if the key does not exist. We recommend that you check that the key you want to delete exists by using the **Enumerate Key Pairs** operation.

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

keyName
> The name of the key pair 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

Returns **true** if the operation succeeds.

Enumerate Key Pairs

The **Enumerate Key Pairs** operation lists key pairs available to you.

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

rowDelimiter

The row delimiter in the results table. The default value is the line separator for the current operating system.

colDelimiter

The column delimiter in the results 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

Your key pairs in a table with the following columns: Key name and Fingerprint.

Example:
```
testkey2,8c:0a:1a:c8:a5:07:cb:3d:0e:60:3f:00:7d:a1:e9:c4:4f:28:e4:7b
minFedora,8b:79:f0:6d:6d:4c:73:80:c0:1a:9e:e3:81:f3:cc:3f:33:20:cf:89
```

Working with security groups

Allow Access To Security Group

The **Allow Access To Security Group** operation adds new permissions to the given security group. The new permissions can be specified by providing the **sourceSecurityGroupName** and the **sourceSecurityGroupOwnerId** inputs, or the source **cidrIp**, **ipProtocol**, **fromPort**, and **toPort** inputs.

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

groupName

The name of the group to modify.

sourceSecurityGroupName

The name of the source security group.

sourceSecurityGroupOwnerId

The user ID of the owner of the source security group.

ipProtocol

The IP protocol used. The valid values are **tcp**, **udp**, and **icmp**.

fromPort

The start of the port range for the TCP and UDP protocols, and the type number for the ICMP protocol. For ICMP, **-1** indicates a wildcard (any ICMP type number).

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toPort

> The end of the port range for the TCP and UDP protocols, and the type number for the ICMP protocol. For ICMP, **-1** indicates a wildcard (any ICMP type number).

cidrIp

> The source IP in CIDR format.

The operation returns the following:

requestId

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

returnResult

> Returns **true** when the operation is successful and **false** when it is not.

Notes:

- If you add a combination of access parameters that already exists, the operation fails.
- If new permissions are specified by a source group name, any machine from **sourceSecurityGroupName** can connect to any machine from **groupName**, using any of the TCP, UDP, or ICMP protocols.

Create Security Group

The **Create Security Group** operation creates a new security group.

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

groupName

> The name of the new group. This name must be unique per account.

groupDescription

> The description of the group. This is only informational, and can contain alphanumeric characters, spaces, dashes, and underscores.

The operation returns the following:

requestId

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

returnResult

> Returns **true** when the operation is successful or **false** if it is not.

Delete Security Group

The **Delete Security Group** operation deletes a security group.

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

groupName

> The name of the security group 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

Returns **true** when the operation is successful or **false** if it is not.

Notes:

- If you attempt to delete a security group which used to exist but has been recently deleted, the operation might go to **Success**. This may happen because Amazon remembers a deleted security group for a certain amount of time.
- If you attempt to delete a security group that contains instances, a fault is returned.
- If you attempt to delete a security group that is referenced by another security group, a fault is returned. For example, if Security Group B has a rule that allows access from Security Group A, Security Group A cannot be deleted until you remove the rule.

Describe Security Groups

The **Describe Security Groups** operation describes the security groups that you own. By default, this operation returns information about all of your security groups, but you can specify a list of group names to restrict the results to only those specified.

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

groupNames

The names of the groups that you want to describe. If you leave this input blank, all of your owned groups are described.

delimiter

The delimiter for the list of group names. The default is a comma (,).

rowDelimiter

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

colDelimiter

The delimiter used between columns in the output table. The default 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 listing the security groups, one in each row. The table has the following columns: group name, group owner id, and group description.

groupNames

A list of the group names of your security groups.

Get Security Group Details

The **Get Security Group Details** operation returns information about a specific security group that you own.

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

groupName

The name of the security group you want to describe.

rowDelimiter

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

colDelimiter

The delimiter used between columns in the output table. The default 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 name of the group.

groupName

The name of the group.

ownerId

The ID of the owner of the group.

groupDescription

The description of the group.

ipPermissions

A table describing the permissions for this group, one in each row. The table has the following columns:

- **ip protocol**
- **from port** The start of the port range for the TCP and UDP protocols, or an ICMP type number (an ICMP type number of **-1** indicates a wildcard—any ICMP type number).
- **to port** The end of the port range for the TCP and UDP protocols, or an ICMP code **(-1** indicates a wildcard).
- **source security group** The name of the source security group.
- **user id**   The user ID of the owner of the source security group.
- **source IP in CIDR notation**

Revoke Access To Security Group

The **Revoke Access To Security Group** operation removes a permission from the specified security group. The permission can be specified by the **sourceSecurityGroupName** and **sourceSecurityGroupOwnerId** inputs, or by the source **cidrIp**, **ipProtocol**, **fromPort**, and **toPort** inputs.

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

groupName

The name of the security group.

sourceSecurityGroupName

The name of the source security group.

sourceSecurityGroupOwnerId

The user ID of the owner of the source security group.

ipProtocol

The IP protocol used. The valid values are **tcp**, **udp**, and **icmp**.

fromPort

The start of the port range for the TCP and UDP protocols, and the type number for the ICMP protocol. For ICMP, **-1** indicates a wildcard (any ICMP type number).

toPort

The end of the port range for the TCP and UDP protocols, and the type number for the ICMP protocol. For ICMP, **-1** indicates a wildcard (any ICMP type number).

cidrIp

The source IP in CIDR format.

The operation returns the following:

requestId

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

returnResult

Returns **true** when the operation is successful or **false** if it is not.

Working with Windows bundle tasks

Bundle Windows Instance

The **Bundle Windows Instance** operation bundles the Windows instance. The bundling process creates a new image from a running instance and stores the AMI data in S3. Once it is bundled, you must register the image using the **Register Image** operation prior to launching it.

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

instanceId

The ID of the instance you want to bundle.

storageBucket

The Amazon S3 bucket in which to store the AMI. You must specify a bucket that you already own. If you specify a bucket that belongs to someone else, Amazon EC2 returns an error.

storagePrefix

A prefix that specifies the beginning of the file name of the AMI. Your image is stored in the bucket specified by the **storageBucket** input under the name `<storagePrefix>`**.manifest.xml**.

s3AccessKeyId

The ID of the secret access key associated with your S3 AWS account, if it is different from the EC2 account. If you do not specify the **s3AccessKeyId** input, the operation uses the EC2 access key ID.

s3AccessKey

The secret access key associated with your S3 AWS account, if it is different from the EC2 account. If you do not specify the **s3AccessKey** input, the operation uses the EC2 access key.

The operation returns the following:

requestId

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

returnResult

The Bundle ID by that identifies the bundle task.

status

    The state of the bundle task (for example, **pending**).

startTime

    The time the bundle task started.

Notes:

- You cannot start another bundle task on an instance until the running task is terminated. Also, if the path you specified for the image already exists, any images under that name may be overwritten.
- The **s3AccessKeyId** and **s3AccessKey** inputs work together. Therefore, you must specify values for both of them or leave them both.

Cancel Bundle Task

The **Cancel Bundle Task** operation aborts a bundle task.

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

bundleId

    The ID of the bundle task. If you specify a nonexistent ID, the operation fails. If you specify the ID of an already terminated bundle task, the operation may succeed but nothing will happen.

The operation returns the following:

returnResult

    The instance ID of the instance that was being bundled.

startTime

    The time the task was launched.

updateTime

    The time the status of the task was last updated.

status

    The status of the task (for example, **canceling** or **failed**).

progress

    The progress of the task (0% - 100%).

bucket

    The S3 bucket where the image would have been placed.

prefix

    The name under which the image would have been placed in the bucket.

requestId

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

Enumerate Bundle Tasks

The **Enumerate Bundle Tasks** operation returns a list of your bundle tasks in a table.

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

rowDelimiter

    The row delimiter in the results table. The default value is the line separator for the current operating system.

colDelimiter

The column delimiter in the results 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

Your bundle tasks in a table having the following columns: Bundle ID, Instance ID, Status, Start time, and Progress. The column fields are separated by **colDelimiter** and the rows by **rowDelimiter**.

Example:

```
bun-49789d20,i-d63cd5be    complete,2009-08-25T10:04:55.000Z,null
bun-4f789d26,i-d63cd5be    failed,2009-08-25T10:58:57.000Z,null
```

Get Bundle Task Details

The **Get Bundle Task Details** operation returns details about a specified bundle task.

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

bundleId

The ID of the bundle task. If you specify a nonexistent ID, the operation fails.

The operation returns the following:

returnResult

The instance ID of the instance that is being bundled.

startTime

The time the task was launched.

updateTime

The time the status of the task was last updated.

status

The status of the task (for example, **running**, **complete**, or **failed**).

progress

The progress of the task (0% - 100%).

bucket

The S3 bucket where the image will be placed.

prefix

The name under which the image will be placed in the bucket.

requestId

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

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 EC2 integration, there are several steps that you should verify:

1. Verify that the same operation works when it is performed through the EC2 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. Each error message includes possible causes and fixes for the error.

400 Bad Request

This message indicates that the RAS machine system clock may not be properly set or that you may have supplied an incorrect value for another parameter to an EC2 operation.

403 Forbidden

This message indicates that you may have provided a wrong **accessKeyId** or **accessKey.**

failed to GET resource at...

This message indicates that you may have provided an incorrect proxy host or proxy port and that a proxy is needed for accessing the Internet.

Security

This section describes how security is handled by the Amazon EC2 integration.

The EC2 integration uses the EC2 Query API. To perform its task, each EC2 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 EC2 operation has 2 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 EC2 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 configuration, just provide the **accessKey** and **accessKeyId**.

Tools

Following are OO tools that you can use with the Amazon EC2 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.