HP Cloud Service Automation

Software Version: 4.50

Content Pack User Guide

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Contents

Introduction

This guide provides instructions to import contents to HP Cloud Service Automation (HP CSA) to create service offerings, which users can subscribe from the HP CSA Marketplace Portal.

The intended audience of this document are system administrators of HP CSA, who configure and provision resources such as compute, storage, and network.

Steps to import content packs to HP CSA

Importing content packs to HP CSA involves the following steps:

Importing content packs

The following options are available to import HP CSA OOTB contents:

- While installing HP CSA 4.50 or upgrading to HP CSA 4.50, select the **Install additional provider integration service designs, components and content** option. This option invokes the HP Cloud Content Capsule Installer and installs the content automatically.

  For information about how to install HP CSA 4.50, which includes installing content, see *HP Cloud Service Automation Installation Guide* on HP Software Support.

  For information about how to upgrade to HP CSA 4.50, which includes installing content, see *HP Cloud Service Automation Upgrade Guide* on HP Software Support.

- If you skip the step to install contents while installing HP CSA 4.50, you can manually install the contents using HP Cloud Content Capsule Installer.

  To run HP Cloud Content Capsule Installer, go to `CSA_HOME/Tools/CSLContentInstaller/`

  For information about HP Cloud Content Capsule Installer and importing contents, see *HP CSA Content Installation* guide on HP Software Support.

  > **Note:** To search for documents, you need to log on to HP Software Support using your HP Passport credentials.
  >
  > On the Home page, go to Dashboard > Manuals. Select the product (for example, Cloud Service Automation). In the Search for Answers field, enter the search criteria, and then click the Search icon. Matching results will be displayed.

Configuring contents

When importing contents, HP CSA Installer and HP Cloud Content Capsule Installer automatically install the required HP Operations Orchestration (HP OO) workflows and service designs. After

importing the contents, you need to log on to Cloud Service Management Console and configure service offerings as required.

Subscribing service

After logging on to the HP CSA Marketplace Portal, you can subscribe service offerings. If you have configured multiple organizations in HP CSA or published your service to a catalog other than the Global Shared Catalog, log on to the appropriate Marketplace Portal for your organization.

Software requirements

The following table lists the software components and the required versions.

Component	Supported version	Recommended version
HP Cloud Service Automation	4.50	4.50 CSA-INTEGRATIONS - 4.50.0000 is located at `<CSA_HOME>\CSAKit-4.5\OO Flow Content\10X` CSA-CONFIG - 4.10.0000 is located at `<CSA_HOME>\Tools\ComponentTool\contentpacks`
HP Operations Orchestration	10.21	OO 10.21.0001 with the following HP Operations Orchestration 10 Standard content packs: oo10-base-cp -1.4.4 oo10-cloud-cp -1.4.0 oo10-hp-solutions-cp -1.4.0 oo10-virtualization-cp -1.4.0 oo10-sa-cp -1.2.1 oo10-sm-cp -1.0.3 **Note:** Listed above are the current HP OO versions. These will be installed automatically when the user installs the contents. The latest version of HP OO can be download from HPLN.
HP Server Automation	10.21	10.21

Component	Supported version	Recommended version
HP Database and Middleware Automation	10.30	10.30
VMware vCenter	4.x, 5.x	5.x
JBoss	8.5, 8.7, 9.x	9.0.0 **Note:** You must purchase and download the JBoss installation separately.
OpenStack	Juno	Juno
HP Matrix Operating Environment	7.x	7.41
HP Network Automation	9.x, 10.x	10.0
HP Virtual Services Router	VSR1000	VSR1000 An example for physical switch is HP Procurve
HP Service Manager	9.34	9.34
Windows Server	2008 R2	2008 R2
HP SiteScope	10.30	10.30
HP Universal CMDB	10.11	10.11
HP vPV	2.10.010 or later	2.20
HP Codar	1.50	1.50
HP OneView	1.10 1.20 required for automated storage provisioning	1.20
HP ICsp	7.4, 7.4.1	7.4.1

Note: HP CSA OOTB Sequenced service designs, offerings, and subscriptions are not supported with HP Codar 1.50 only license. Add HP CSA license on HP Codar 1.50 to get these features.

For information about topology and sequenced service designs, see *HP Cloud Service Automation Concepts Guide* on HP Software Support.

Update OO jar

To update any of the OO jar, the user needs to extract the OOTB capsule and select the intended jar.

User can import the OO jar to OO studio and start updating the OO jars.

Use case	OO jar
Amazon AWS Integration	com.hp.csl.base.util.jar com.hp.csl.amazon.ec2.jar
Amazon EC2 Topology	com.hp.csl.base.util.jar com.hp.csl.amazon.ec2.topology
HP Matrix Operating Environment Integration	com.hp.csl.base.util.jar com.hp.csl.matrix.jar
ICSP Topology Integration	com.hp.csl.oneview.jar com.hp.csl.icsp.jar
Monitoring and Configuration Management using vCenter Compute	com.hp.csl.vmware.vcenter.jar com.hp.csl.ucmdb.jar com.hp.csl.sitescope.jar com.hp.csl.base.util.jar
OneView Topology Integration	com.hp.csl.oneview.jar
OpenStack Content	com.hp.csl.base.util.jar com.hp.csl.openstack.util.jar com.hp.csl.openstack.jar
OpenStack Topology	com.hp.csl.openstack.topology.jar
Providers Go Active	com.hp.csl.goactive.jar

Use case	OO jar
Provision JBoss on vCenter Compute	com.hp.csl.base.util.jar com.hp.csl.middleware.util.jar com.hp.csl.vmware.vcenter.jar com.hp.csl.dma.jar com.hp.csl.sa.agentinstallation.jar
Provision VLAN using Network Automation	com.hp.csl.vmware.vcenter.jar com.hp.csl.na.jar com.hp.csl.base.util.jar
SA Software Policies Deployment on vCenter Compute	com.hp.csl.vmware.vcenter.jar com.hp.csl.sa.agentinstallation.jar com.hp.csl.sa.softwarepolicies.jar com.hp.csl.base.util.jar
Service Manager Integration	com.hp.csl.sm.jar
vCenterTopology	com.hp.csl.base.util.jar com.hp.csl.sitescope.topology.jar com.hp.csl.vcenter.topology.jar
VMWare vCenter Compute	com.hp.csl.vmware.vcenter.jar com.hp.csl.base.util.jar
VPV Integration	com.hp.csl.vmware.vcenter.jar com.hp.csl.base.util.jar com.hp.csl.vpv.integration.jar

User credentials

Make sure that you have all of your credentials handy before trying to integrate content packs with HP CSA. The following table lists the default user names and passwords, which the user can change or reset.

Portal	Username	Password
HP Cloud Service Management Console	admin	cloud

Portal	Username	Password
HP CSA Market place portal	consumer	cloud
HP Operations Orchestration console	admin	admin

Documentation

For more information about HP CSA, refer to the following documents:

- HP CSA Installation Guide or HP Cloud Service Automation Upgrade Guide - Provides information about installing HP CSA 4.50 or upgrading to HP CSA 4.50.
- HP Cloud Service Automation Concepts Guide - provides information about HP CSA key terminology, significant functionality, and important processes.
- HP Cloud Service Automation System and Software Support Matrix - Provides information about supported components and version.
- HP Cloud Service Automation Configuration Guide - provides information about how to set up the Cloud Service Management Console and HP CSA to enable users to login and use the Cloud Service Management Console and Marketplace Portal.
- HP Cloud Service Automation Content Installation Guide - provides information about how to run HP Cloud Content Capsule Installer and import contents.

The above documents are available on HP Software Support.

For more information about software documentation, see "Additional resources" on page 275.

Deprecated: For information about the service designs and HP Operations Orchestration content packs that have been deprecated, see "Appendix E: Deprecated contents" on page 272.

Amazon AWS

Configuring Amazon Web Services

The following steps are required to configure Amazon Web Services (AWS) to integrate Amazon Elastic Compute Cloud (Amazon EC2) successfully with HP Cloud Service Automation.

Sign up as an AWS EC2 user

You must be a registered user to access AWS EC2 Services.

To sign up, open http://aws.amazon.com/console/ and create an AWS account.

Configure a security group and keypair

Configure security group and keypair as per the requirement.

1. Go to http://aws.amazon.com/console/ and login.
2. Go to **EC2 Services**.
3. Click **Keypairs**.
4. Click **Create New Keypair**.
5. Enter the keypair details and note down the key pair (for later use).

Setup proxy on HP Operations Orchestration

This step is optional in case HP Operations Orchestration has direct internet access.

1. Log on to HP Operations Orchestration.
2. Go to **Content Management** > **Configuration Items** > **System Properties**.
3. Enter the details for properties CSA_Proxy_Host and CSA_Proxy_Port.

Use case: Amazon EC2 (Topology)

This section describes the steps to provision a classic Amazon EC2 instance with an option to add network interface and volume.

Configuration requirements

The following configurations must be completed and tested before you proceed with the integration:

- Configure Cloud Service Management Console and Marketplace Portal.
- Configure Amazon EC2 account.

  The values of the properties configured in the Amazon EC2 account will be added in HP CSA.
- Configure HP Operations Orchestration. This must be operational.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
SERVICE DESIGN Amazon EC2	Amazon AWS

Creating resource providers

Resource providers must be created in HP CSA. The resource provider required for this implementation and the service access point are listed in the following table.

Provider name	Service access point
Amazon AWS	https://ec2.us-west-1.amazonaws.com:443

To create a resource provider:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Providers**.
3. From the list of all providers, select a provider type, and then click **Create**.
4. In the **Create Resource Provider** dialog box, enter the required details, and then click **Create**.

To view the created resource provider, click **Providers** on the Dashboard.

Publishing topology design

After importing the service design and components, you can publish the service design.

To publish a topology design:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** > **Topology** > **Designer**.

3. Select the service design.
4. Click the **Editor** tab.
5. Select the component in the design.

   On the right side, properties of the selected component will be displayed. If desired, enter appropriate values, which can be viewed by subscribers.

   The following tables list the property names and definitions.

   Amazon Server

   Represents a server on the AWS provider.

Component name	Description
Name	Name of the Amazon Server.
amiId	Amazon Machine Image(AMI) Id. An AMI provides the information required to launch an instance, which is a virtual server in the cloud. Amazon by default provides many 32-bit and 64-bit AMIs.
availabilityZone	Amazon hosts on multiple locations world-wide called as regions and each region has multiple locations called as availability zone. The AWS instances will be provisioned in the zones specified.
instanceNamePrefix	The prefix name for the instance to be provisioned.
keyName	Amazon EC2 uses public–key cryptography to encrypt and decrypt login information. To log on to your instance, you must create a key pair, specify the name of the key pair when you launch the instance. Launching public images without a key pair Id leaves them inaccessible.
Username	Login name used to deploy application on the newly created instance.
password	Password used to log on to the instance. The privateKey must be left blank if this property is used.
privateKey	If the instance allows key-pair based authentication to login, then the complete private key content has to be copied.

Component name	Description
SecurityGroupIds	A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. User can specify comma separated list of security group ids your instances will be part of. If empty, the default group is used. **Caution:** Specify this optional input only when deploying an EC2 instance into Amazon Virtual Private Cloud (VPC). Specifying this input when deploying an instance into classic EC2 (Default VPC) will result in OO flow failure.
subnetId	The ID of the subnet from which the eth0 network interface of the instance will get an IP address allocated. If not specified, AWS will allocate an IP address from the default subnet in the specified zone.

Amazon Volume

Represents a volume on the AWS provider.

Component name	Description
Name	Name of the Amazon Volume component.
deviceName	The name of the device (for example: /dev/sdh or xvdh).
availabilityZone	The available zone in which to create the new volume.
instanceNamePrefix	The prefix name for the instance to be provisioned.
volumeSize	The size of the volume in GB. Valid value range for volume size is 1-1024.

6. Click **Save** to save the design.

   Now, you can test the design.

7. Click the **Overview** tab, and then click **Test Run**.

   a. Click **Finish** to launch the test deployment.

   b. Click the **View** button to watch the progress of the job.

c. On the **Test Run** screen, click **Events**, and then select the event.

After successfully deploying a service with a test run, you can publish your design.

8. Click the **Overview** tab, and then click **Publish**.

Creating service offering

Service offerings are created from service designs and published to a catalog available on the Marketplace Portal. Subscribers can order services based on this service design.

To create a service offering:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Offerings**.
3. Click **Create**.

   The **Create Offering** dialog box will open.
4. Select the service design.
5. Enter a name for the new service offering.

   This is the name of the offering that will be visible to the subscribers of this service.
6. Click **Create**.

After creating the offering, you can modify the pricing information, associate documents, or modify the subscriber options.

Publishing service offering to Global Shared Catalog

Global Shared Catalog is installed by default when HP CSA is installed. When you publish a service offering to this catalog, that service offering will be visible in every organization's Marketplace Portal.

To publish the service offering to Global Shared Catalog:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Catalogs**.
3. Select **Global Shared Catalog**.
4. Click the **Offerings** tab, and then click **Add Offering**.
5. Select the service offering you created.

6. Click the **In Category** drop down, and then select the category from the list.

   In the Marketplace Portal, the service offering will appear under this category.

7. Click **Publish**.

A service offering published to a catalog will be available to the user for subscription.

Subscribing service

After the service offering is published to a catalog, you can subscribe it from the Marketplace Portal. If you have configured multiple organizations in HP CSA or published your service offering to a catalog other than the Global Shared Catalog, log on to the appropriate Marketplace Portal of your organization.

To subscribe service:

1. Log on to Cloud Service Management Console as an administrator.
2. Click **Marketplace**.
3. Log on to the Marketplace portal.
4. Click the **Sidebar Menu**, and then click **Browse Catalog**.
5. Select a service offering, and enter the values of the offering as required.
6. Click **Checkout**.
7. Enter the details such as the subscription name and end date.
8. Click **Submit Request**.

Open the Subscriptions tab to monitor the status of your subscription.

Canceling a subscription

To cancel a subscription:

1. On the **Sidebar Menu**, click **Subscriptions**.
2. Identify the subscription that you want to cancel.
   a. Click the subscription to view its details.
   b. Click **View Linked Service** to view the details of the service offering you subscribed.
   c. Click **Cancel Subscription** to cancel the subscription.

3. Click **Yes** to confirm that you want to cancel the subscription.
4. Confirm that the status for the subscription is canceled.

When you cancel the subscription, the resource IDs that were assigned to the service (VLAN ID, IP details, and ACL rule numbers) are automatically released.

Use case: Amazon AWS Integration (Sequenced)

Amazon EC2 Compute with Elastic Load Balancer and Virtual Private Cloud

This section describes how to provision Amazon EC2 Compute with Elastic Load Balancer (ELB) and Virtual Private Cloud (VPC).

From this content pack, the integration provides two different service designs to provision a classic Amazon EC2 instance with an option to add an Elastic Lad Balancer (ELB) and another design which provisions an Amazon EC2 instance in a specified Virtual Private Cloud (VPC).

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Configure Cloud Service Management Console and Marketplace Portal.
- Configure Amazon EC2 account.

  The values of the properties configured in this EC2 account will then be added in HP CSA.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
Amazon EC2 Compute with ELB	Amazon AWS
Amazon EC2 Compute in VPC	

Creating resource providers

The following table lists the resource provider required for this implementation and the service access point.

Provider name	Service access point
Amazon AWS	IP address and port number for EC2, such as https://ec2.amazonaws.com:443

Note: For the AWS provider, the user name is the user's AWS Access Key ID and the password is the user's Secret Access Key.

To create a resource provider, complete the steps in "Creating resource providers" on page 20.

After creating the resource provider, click the **Properties** tab for the provider and add the following properties.

Proxy property name	Value
proxyHost	IP address of proxy server
proxyPort	Proxy port number
proxyUsername	Proxy user name
proxyPassword	Proxy password

Configuring subscriber options

Subscriber options that are shown to the subscriber in the service offering are loaded from an XML file.The XML file that is included is a sample EC2.xml located at `<CSA_HOME>\jboss-as\standalone\deployments\csa.war\propertysources`. To get the up-to-date information about images available in AWS, the admin must use the resource synchronization feature in HP CSA.

For information about adding resource pool and resource synchronization, see "Adding resource pool" on the next page.

By default the `CSA_CP_EC2_OPTION_XML_FILE` is set to `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\csa.war\propertysources\EC2.xml`.

Note: <CSA_HOME> and folder separator will be different for Windows and Linux. In this case, OS specific values must be given.

If the HP Operation Orchestration is installed on a different system, set the path to `<Temp-folder>/EC2.xml`.

After the file is created by Resource Synchronization action, copy it to the system where Cloud Service Automation is installed as `<CSA_HOME>/jboss-as/standalone/deployments/csa.war/propertysources/EC2.xml`.

Adding resource pool

To add resource pool:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Providers**.
3. On the left side pane, select Amazon AWS provider type.
4. On the right side pane, click the Amazon AWS provider.
5. On the toolbar, click **Resource Pools**, and then click **Create**.
6. In the **Create Resource Pool** dialog box, enter the following details:
   a. Dispaly Name: EC2 Image Sync
   b. Known By Provider As: EC2 Image Sync
   c. Resource Synchronization Action: EC2 Image Sync
7. Enter the above details, and then click **Create**.
8. Click **Synchronize** to create the dynamic options file `EC2.xml`.

After adding a resource provider successfully, the Last Synchronized Date will be updated.

If a subscriber tries to subscribe a service before this EC2.xml file is created, the subscription page will display an error because the properties page fails to load.

If you see a time out error in the Marketplace Portal while subscribing, increase the value of `the DynamicPropertyFetch.READ_TIMEOUT` property from the default value of 3000 to 6000 in the `csa.properties` file in the `<CSA_HOME>\jboss-as\standalone\deployments\csa.war\WEB-INF\classes` folder in CSA_Home of the HP CSA system.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers.

You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
Amazon EC2 - Compute with ELB	Amazon AWS
Amazon EC2 – ELB Registration	Amazon AWS
Amazon EC2- Flex Server Resources	Amazon AWS

To associate a resource offering with provider:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Providers**.
3. Select the provider that you want to associate with the offering.
4. Select the **Offerings** tab.
5. Click **Select**.
6. Select the resource offerings, and then click **Add**.

After you have created the resource provider, to view the proxy properties, click the **Providers** tab.

Creating credentials and system variables

Define the following system property under configuration in HP Operations Orchestration if it does not already exist.

System property name	Description
OO_HTTP_WAIT	By default this value is 0. This property can be set to the number of seconds to wait if there is network latency.
CSA_CP_EC2_ API_ WAIT_TIME	Sleep time or time to wait before making Enumerate Image List API call for EC2. Default is 5 seconds.
CSA_CP_EC2_ OPTION_XML_ FILE	For example: `C:\Program Files\Hewlett Packard\CSA\jboss-as\standalone\deployments\csa.war\propertysources\EC2.xml`

Publishing service design

To publish a service design:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** > **Sequenced** > **Designer**.
3. Click on the service design version.
4. On the **Overview** tab, click **Publish**.

   The confirmation message displayed informs the user that after publishing the service design, no modifications can be made.

   Click **Yes** to publish the design.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish a service offering , complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP Operations Orchestration flows

Flows used in this integration, including its input, parameters, and description are described here.

Amazon EC2 - provision server

Provisions an Amazon EC2 instance.

Type	Parameter name	Description
Input	username	AWS username
Input	password	AWS password
Input	providerSAP	AWS access point
Input	availabilityZone	Availability zone for AWS
Input	securityGroup	Security group used for AWS
Input	amid	Image ID
Input	volumeSize	Size of the EBS volume
Input	instanceType	Type of the instance launched

Type	Parameter name	Description
Input	keypair	Keypair used to connect to the instance
Input	prefix	Name of the instance
Input	SVC_ INSTANCE_ID	This token will resolve to the service instance ID. The default value for this token is [TOKEN: SVC_INSTANCE_ID].
Input	proxyPort	Port configured for proxy
Input	proxyHost	Proxy host name or IP address

After running the process definition tool and creating a new resource pool, a new `EC2.xml` file will be created on every Synchronize Now action. This file will fetch the most current information from AWS and create the JSP files for choosing the platform, image, and keypair based on the region and zone selected. It is recommended that you synchronize this data at least once a week.

Note: You can get the Security Group ID from the Amazon Console or from the Administrator.

Limitations

Amazon web services supports only Signature version 4 for the newly added regions such as Frankfurt (eu-central-1) and Beijing (cn-north-1). This causes AWS content to fail since the OO integrations used currently support only Signature version 2. Until the OO integrations support Signature version 4, the temporary workaround available is to use an OO system property called CSA_CP_EC2_REGION_ EXCLUDE_LIST. This property is a comma separated list of AWS regions to be excluded and is currently populated with 'cn-north-1, eu-central-1' to exclude Beijing and Frankfurt regions.

In future, if there is a new region, which supports only Signature version 4, then the name of that region must be added exactly as AWS reports it. After the OO integrations start supporting Signature version 4, this system property can be set to 'null' to not exclude any region.

HP Database and Middleware Automation

Installing HP Database and Middleware Automation

For information about installing HP Database and Middleware Automation (HP DMA), see *HP Database and Middleware Automation Installation Guide* at on HP Software Support.

Configuring HP Database and Middleware Automation

DMA organization

Create the consumer organization on HP DMA. The organization name on HP DMA must match the HP CSA consumer organization identifier, which is the identifier created for the consumer organization name by HP CSA.

See the Roles and Permissions, Role-Based Database and Middleware Automation Permissions sections in the *HP Server Automation User Guide: Database and Middleware Automation* on HP Software Support.

User permissions

For information about the HP Server Automation user permissions required to deploy applications using DMA, see the Roles and Permissions, Types of Permissions sections in the *HP Server Automation User Guide: Database and Middleware Automation* and *HP Database and Middleware Automation Platform User Guide* on HP Software Support.

Solution pack

Import the required solution pack to the HP DMA server. For JBoss, download the AS Provisioning solution pack under Middleware Solution Packs.

For information about the steps required to import the solution packs, see the Solutions, Working with Solution Packs sections of the *HP Server Automation User Guide: Database and Middleware Automation* on HP Software Support.

Workflow dependencies

The HP DMA workflows may require some dependent software packages to be imported into the HP Server Automation core. After installing the solution pack, refer to the workflow documentation to find the dependencies.

On the HP DMA console, click the Automation tab, and then click workflows. Select the required workflow to run. To view the work flow documentation, double-click the workflow.

The JBoss - Provision Software workflow requires JDK 1.7 and supports JBoss EAP and WildFly versions. Download the required packages to a temp directory on the machine containing the HP

Server Automation client. The dependent software should be imported into the HP Server Automation core.

To import the software:

1. Open the HP Server Automation client.
2. On the right side pane, click **Library** > **Packages** > **Required OS Version.**
3. On the left pane, right-click an empty area, and then select **Import Software**.
4. Select all files (downloaded dependencies), and then click **Import**.

Use case: Provision JBoss on vCenter Compute (Sequenced)

This section describes how to deploy DMA JBoss using the HP DMA application provider for HP CSA. It shows how you can simplify and accelerate the creation of the Jboss lifecycle service design and implementation so that it can be consumed more easily by multiple business users and managed more quickly and consistently by administrators.

This implementation supports the following JBoss use case:

- Provision JBoss on vCenter Compute

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Install VMware vCenter.
- Configure HP CSA Cloud Service Management Console and Marketplace Portal.

  You must be able to successfully deploy the simple vCenter that ship with HP CSA.
- Configure HP Server Automation account.

  It must have privileges that enable you to import software packages into the HP Server Automation library.
- Configure the providers for HP Database and Middleware Automation, HP Server Automation, and VMware vCenter in HP CSA.
- Install and configure HP DMA and its solution packs.

HP DMA solution packs

HP DMA solution packs contain workflows that automate the lifecycle actions that are available through this integration. To access the solution packs, you must have a valid support contract and the account must be linked to a Service Agreement ID (SAID).

You must install each of the following solution packs for this implementation:

- Database Provisioning Solution Pack
- Database Patching Solution Pack
- Database Compliance Solution Pack
- Discovery Solution Pack

Downloading solution packs

To download HP DMA solution packs:

1. Go to HPLN, and log on with your HP Passport credentials.
2. On the right side, click **Associated Communities**.
3. Click **Database Solution Packs** or **Middleware Solution Packs**.
4. Click the **Downloads** tab.

Download the solution packs listed above.

Configuring HP DMA for provisioning JBoss

This section describes the additional configuration that must be done to HP DMA for using it to provision JBoss.

Copying workflows

This integration uses the workflows listed in the following table:

Original workflow name	Copied workflow name
JBoss - Provision Software	CSL JBoss - Provision Software

To copy workflows:

1. Log on to HP Database and Middleware Automation at https://<DMA_Server>:<Port>/dma/ as an administrator.
2. Click **Automation** > **Workflows**.
3. Select a workflow listed in the table above.
4. Click **Copy** at the bottom of the window.
5. Update the name of the copied workflow according to the table above.
6. Click **Save**.

Creating policies

To create a new policy:

1. Log on to HP Database and Middleware Automation at https://<DMA_Server>:<Port>/dma/ as an administrator.
2. Go to **Automation** > **Policies**.
3. Click **New Policy**.
4. Enter the policy name.
5. Add the attributes for each policy as defined in the following tables.

Details of the policies used by this integration are listed in the tables below.

CSL - JBoss Provision Software Policy

The first policy must be named as CSL - JBoss Provision Software Policy. It requires the attributes listed in the table below:

Value	Binary
Java Binary Archive	/root/jdk-7u71-linux-x64.gz or later
JBoss Binary Archive	/root/wildfly-9.0.0.Alpha1.tar.gz or later

CSL Discovery policy

The second policy must be named as CSL Discovery. It requires the attributes listed in the following table:

Attribute	Value
Trust SSL Certificates	True
Web Service Password	<password>

Attribute	Value
Web Service URL	https://<DMA HostName>:8443/dma
Web Service User	<admin user name>

Note: Values for Web Service URL, Web Service User, and Web Service Password must match your HP DMA server and administrator credentials.

Creating deployments

This integration requires the deployments listed in the following table to provision the JBoss Server:

Deployment name	Workflow name
CSL JBoss - Provision Software	CSL JBoss - Provision Software

To create deployment:

1. Log on to HP Database and Middleware Automation at https://<DMA_Server>:<Port>/dma/ as an administrator.
2. Go to **Automation** > **Deployments**.
3. Click **New Deployment**.
4. Enter a deployment name.
5. Select the corresponding workflow.
6. Click **Add All** in the Targets area for the organization.
7. Click **Save**.
8. On the **Parameters** tab, specify the values for the parameters for the deployment.

   See the table below for the deployment parameters for each deployment. Update all deployment parameter values for the corresponding deployment.
9. Click **Save**.

Note: You must use the workflow and deployment names in the configuration exactly as shown in the tables. If you change the names, you have to change the corresponding resource offering properties as well.

CSL JBoss - Provision Software

Parameter name	Value	Type
Java Binary Archive	CSL JBoss - Provision Software Policy.Java Binary Archive	Policy Attribute
JBoss Binary Archive	CSL JBoss - Provision Software Policy.Jboss Binary Archive	Policy Attribute
Web Service Password	CSL Discovery.Web Service Password	Policy Attribute
Web Service URL	CSL Discovery.Web Service URL	Policy Attribute
Web Service User	CSL Discovery.Web Service User	Policy Attribute

Importing binary archives into HP Server Automation library

This section explains how to import the JBoss binary archives into the HP Server Automation library using the HP Server Automation Client.

The following binaries are required:

- jdk-7u71-linux-x64.gz or later
- wildfly-9.0.0.Alpha1.tar.gz or later

Note: You must also import OS Specific DMA client files and DMA Agent support files.

To import binary archive:

1. Launch the HP Server Automation Java Client from the Windows Start Menu.

   The default location of the HP Server Automation Java Client is **Start** > **All Programs** > **HP Software** > **HP Server Automation Client**.

   If the HP Server Automation Client is not installed locally, follow the instructions in the *Download and Install the SA Client Launcher* section in *the Server Automation Single-Host Installation Guide* on HP Software Support.

2. Select **Library** > **By Folder**.
3. Select the opsware/Tools/Database & Middleware Automation folder.
4. If this is your first import, then you must create a repository:

a. Right-click **Database & Middleware Automation**, and then select **New Folder**.

b. Name the new folder as Repository.

5. Select the Repository folder you just created, and then click **Actions** > **Import Software**.

   The Import Software dialog will open.

6. Click **Browse** and locate the binary archive file (package) that you want to import.

7. Select the character encoding to be used. The default encoding is English ASCII.

   You must specify the character encoding so that HP Server Automation can extract the metadata contained in the packages and correctly display the information in non-ASCII characters in the HP Server Automation Client (such as on the Package Properties pages). Package metadata includes comments, READMEs, scripts, descriptions, and content lists.

8. Click **Open**. You will return to the Import Software dialog.

9. Select **ZIP Archive** for the Type.

10. Click **Browse** and locate the folder, where you want to save the binary archive in HP Server Automation.

    For example: Opsware/Tools/Database & Middleware Automation/Repository.

11. Click **Select**. You will return to the Import Software dialog.

12. Select the operating system family or operating system for the platform.

13. Click **Import**.

    If a package that you import already exists in the specified folder, you will be prompted regarding how to handle the duplicate file. Press F1 to view online help that explains the options.

14. Click **Close** after the import is complete.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
Provision JBoss on vCenter Compute	HP Database and Middleware Automation

Configuring resource offerings for HP DMA 10.30

For HP DMA 10.30, the user needs to make some changes in Resource Offering property. The following table lists the properties of the resource offering (HP DMA Jboss) used in this integration.

HP DMA Jboss

Property name	Value
dmaDeploymentName	CSL JBoss - Provision Software
dmaWorkflowName	CSL JBoss - Provision Software

To change the resource offerings properties:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** > **Sequenced**.
3. Click **Resource Offerings**.
4. Select the provider type as **HP Database and Middleware Automation**.
5. Select the resource offering.
6. Update the properties according to the table above.

Note: The values in the table above are based on HP DMA workflow steps used for provisioning JBoss. You must use the workflow and deployment names in the configuration exactly as shown in the tables. If you change the workflow names in HP DMA, change the corresponding resource offering properties as well.

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to change options to values that are appropriate for your environment. You may also add or remove images as needed.

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and the service access points. You may need to change them to reflect your environment.

Provider name	Service access point
HP Server Automation	https://<SA Core-Hostname>:443

Provider name	Service access point
VMware vCenter	https://<vCenter-Hostname>:443
HP Database and Middleware Automation	https://<DMA-Hostname>:8443

To create resource provider, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
HP SA install Agent	HP Server Automation
HP DMA Agent Policy Installs	HP Server Automation
HP DMA JBoss	HP Database and Middleware Automation
vCenter Compute	VMware vCenter
vCenter Compute Flex Server Resources	VMware vCenter
vCenter Compute NOOP	VMware vCenter

To associate resource offerings with providers, complete the steps in "Associating resource offerings with providers" on page 27.

Changing component properties

You can change the following properties in the server group to provision JBoss on vCenter Compute service design if required:

Property name	Description
customSpec	Customization specification
datacentreName	vCenter data center name
templateReference	Template reference
hostNamePrefix	Host Name
memoryOp	Memory in MB
nCPUOp	Number of CPU cores
vmFolder	Path for VM to be deployed

To change component properties:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** > **Sequenced** > **Designer**.
3. Select the service design.
4. Click the **Designer** tab.
5. Select the component.
6. Change the values for the component properties listed in the table above.

Click the Help icon if you need help editing component properties.

Publish service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in"Creating service offering" on page 23 .

Configuring consumer organization

You must configure the consumer organization in HP DMA. To do this, you must get the organization identifier from HP CSA:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Organizations**.
3. Select **CSA Consumer**.
4. Select **General Information** in the central panel.
5. Record the value displayed for **Organization Identifier**.

After getting the organization identifier, you can create the organization in HP DMA.

To create a new organization:

1. Log on to the HP DMA portal at https://<DMA Host>:<Port>/dma/ as an administrator.

   The default port number is 8443.
2. Click **Environment**.

3. Select **New Organization**.
4. Enter the organization identifier for the Name.

   This is the value you recorded in the previous steps.
5. Click **Save**.

Publishing service offering to Global Shared Catalog

To publish service offering to the Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Accessing JBoss Console

To access JBoss console, log on http://localhost:8080/ .

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

Limitation

This offering has been tested for Linux deployments only.

HP Matrix Operating Environment

Installing HP Matrix Operating Environment

Install HP Matrix Operating Environment (HP MOE) infrastructure orchestration according to the manufacturer's recommendations. See *HP Cloud Service Automation System and Software Support Matrix* for version requirements on HP Software Support.

Configuring HP Matrix Operating Environment

For information about how to configure HP Matrix Operating Environment infrastructure orchestration, see `%CSA_HOME%\CSAKit-4.5\Lib\matrix operating environment\README.txt`.

Use case: HP Matrix Operating Environment Integration (Sequenced)

This section describes how to use HP MOE to provision simple compute. This integration can be leveraged to provision other software like Oracle, SQL, WebSphere, and Weblogic on VMs that are created using HP MOE Compute Provisioning.

HP MOE flows use generic provider types and resource offering category types. Custom HP MOE flows will push custom resource offerings to particular service component servers, server groups, or both. The flow also populates the required resource offering parameters to service component servers, server groups, or both, based on the resource offering configuration.

The following use cases can be considered:

- Use HP MOE to provision a VM.
- Use HP MOE service templates to provision the service infrastructure with resource allocation like number of servers, number of CPUs, and memory size.

About HP MOE

HP MOE is a cloud management software for infrastructure as a service (IaaS) that increases agility.

HP MOE enables us to:

- Design and provision infrastructure services in minutes via a self-service portal.
- Optimize infrastructure with capacity planning and showback or chargeback.
- Protect service continuity with automated cost-effective failover.

Configuration requirements

The following configurations must be completed and tested for this implementation:

- Install and configure VMware vCenter.
- Create a VM template in VMware vCenter, which has the HP Server Automation agent and all related policies installed.
- Configure HP CSA Cloud Service Management Console and Marketplace Portal.
- Configure a working matrix environment.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
MOE Infrastructure Compute	HP Matrix Operating Environment

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to enter subscriber options that are appropriate for your environment. You may also add or remove images as needed.

Creating resource providers

The resource providers must be created in HP CSA. The following table lists the resource provider required for this implementation and the service access points; you may need to change them to reflect your environment.

Provider name	Service access point
HP Matrix Operating Environment	https://<Matrix-Hostname>:51443/hpio/controller/soap/v4

To create a resource provider, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
HP MOE Infrastructure Compute	HP Matrix Operating Environment

To associate resource offerings with providers, see "Associating resource offerings with providers" on page 27.

Publishing service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish a service offering to the catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription,complete the steps in "Canceling a subscription" on page 24.

HP Operations Orchestration flows

Add custom type resource binding subflow

This flow adds the custom based resource offering and the properties attached to the infrastructure service component to its child server and server group components.

If the value for the resources offering property roServiceComponent is set to SERVER, SERVER_GROUP, or BOTH, then this flow will add the custom type resource and populate the infrastructure service component properties for the server, server group, or both.

Type	Parameter name	Description
Input	srvList	HP CSA component ID for one or more server (delimited by the pipe | character) on which the custom resource binding is to be created.
input	srvGrpList	HP CSA component ID for one or more server group (delimited by the pipe | character) on which the HP Universal CMDB resource binding is to be created.
input	userIdentifier	HP CSA user ID
input	customResProviderId	HP CSA resource provider ID for the custom provider, to be used by the custom resource binding on the server and server group components.
input	customOffrName	Name of the custom offering to be attached to the server and server group components.
input	customBindingOrder	Resource binding order for the custom offering to be attached to the server and server group components.
input	customOffrID	Offering id of the custom resource offering.
input	infraComponentID	Infrastructure component ID.

Limitations

This solution assumes the same deployment of resource offering across all groups in the HP MOE template.

For example, for a HP DMA deployment using HP MOE as compute provider, all the groups in the HP MOE template will have the same HP DMA workflow applied.

VMware Tools will not be installed on the VM created through HP MOE.

HP Network Automation

Installing HP Network Automation

HP Network Automation (HP NA) must be installed and configured before you use it to provision a VLAN from a networking switch. For installation instructions, see the *HP Network Automation Software Installation and Upgrade Guide* on HP Software Support.

Configuring HP Network Automation

HP NA must be installed and configured before you use it to provision a VLAN from a networking switch.

To configure HP Network Automation, perform the following steps:

1. Install HP Network Automation.
2. Network Automation supplies NA driver pack with the base installation by default.

   HP recommends installing the latest HP NA driver pack after installing HP NA.

   The HP NA May 2015 driver pack can be downloaded from HP Live Network.

   To download the driver pack, you need to register with HP Passport.
3. Set up the HP Networking switch with the management IP address.
   a. Enable SSH, TFTP, and SCP in the switch according to your requirements.
   b. Ensure that the configured networking switch is accessible from the HP NA server.
4. Discover and take a snapshot of the configured networking switch in the HP NA portal. The user guide helps you to set up this step.

   For example, in NA v9.20 the user guide is available in NA server at <HP NA Install Path>\docs\en\user_guide.pdf.

   This path may vary based on the installed HP NA version. The networking switch must be discovered and managed by HP NA.
5. Import the command script to the HP NA portal.

   See the `README.txt` file on the HP CSA instance in the `<CSA Install Path>\CSAKit-4.5\Lib\network` automation folder for more details.

The command script must be tested manually and be able to execute successfully from the HP NA console.

Use case: Provision VLAN using Network Automation (Sequenced)

This section explains the steps to create a VLAN using HP Network automation. HP Network Automation software automates the complete operational lifecycle of network devices from provisioning to policy-based change management, compliance, and security administration.

The key benefits of HP NA include:

- Reduces costs by automating time-consuming manual compliance and configuration tasks.
- Passes audit and compliance requirements easily with proactive policy enforcement and audit and compliance reports.
- Improves network security by recognizing and fixing security vulnerabilities before they impact your network.
- Increases network stability and uptime by preventing inconsistencies and misconfigurations.
- Uses process-powered automation to deliver application integrations, which deliver full IT lifecycle workflow automation.

The HP VSR1000 Router Series is a virtualized application that provides functionality similar to a physical router. The VSR1000 series enables significant operational savings as a result of its agility and ease of deployment. Like other virtual applications, the routers run in a virtual machine on an industry-standard x86-based server. Resources on the VSR1000 series can be dynamically allocated and upgraded on demand as performance requirements grow.

This implementation involves the following step:

- The flow allocates a free tag and sets the network name custom attribute with a user-provided name and then provisions the VLAN.

Configuration requirements

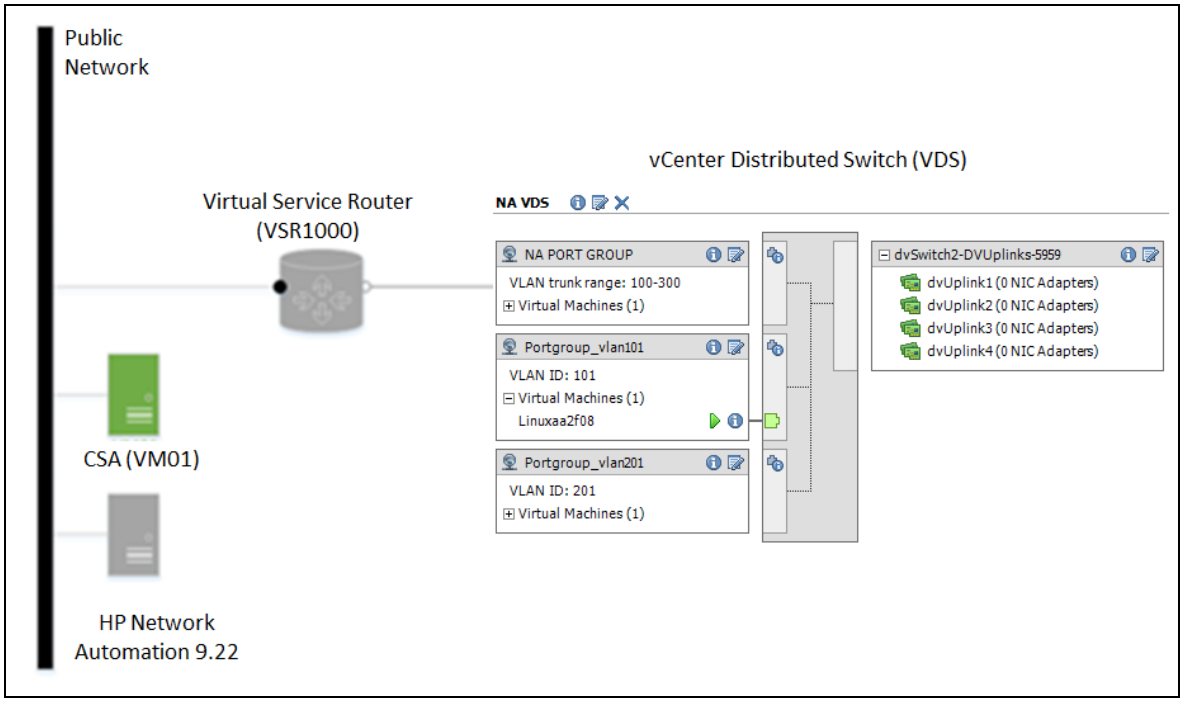
Configuration depends on the type of switch that the user is using. The following configurations must be done if the content is used with a virtual switch such as VSR1000:

Note: This integration is demonstrated using a virtual switch VSR1000.

- Download and configure HP Virtual Services Router (VSR1000) in vCenter Client.
- Configure vSphere Distributed Switch (VDS) in vCenter Client.
- Install the latest NA Driver Pack in HP Network Automation.

  Download the NA driver pack at https://hpln.hp.com//node/19/contentfiles?dir=12108
- Configure HP Network Automation with resource identity pools.
- Configure the HP CSA administrator and consumer portals.

The following image depicts an overview of the networking layout:



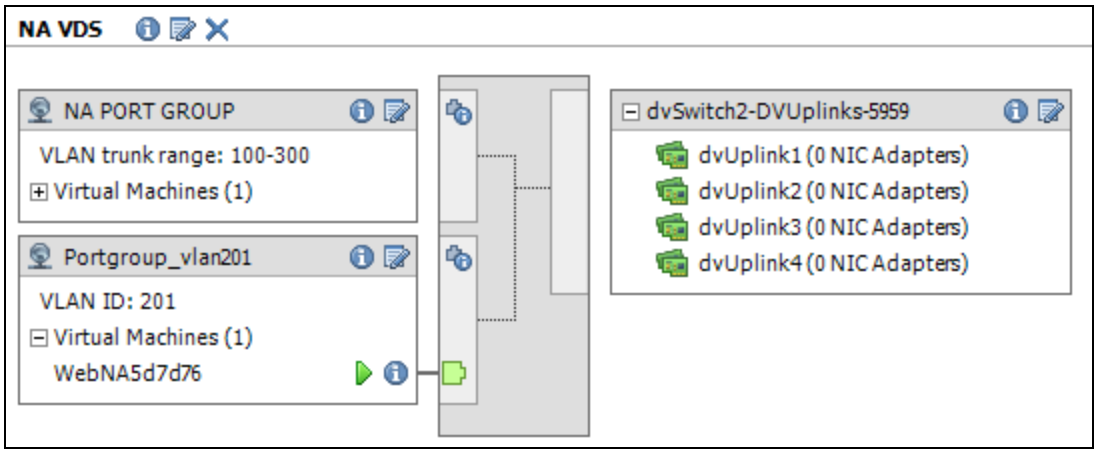
Configuring vSphere Distributed Switch in vCenter

Create a vSphere Distributed Switch in a vCenter server data center to handle networking traffic for all associated hosts on the data center. This implementation requires a Distributed Switch instead of a standard switch because the HP VSR must be connected to a distributed port group to use VLAN trunking.

To create the Distributed Switch, perform the following steps:

1. In the vSphere Client, select the **Networking inventory** view and then select the data center.
2. Select **Inventory** > **Datacenter** > **New vSphere Distributed Switch**.

3. Select the vSphere Distributed Switch Version: 5.0.0.
4. Click **Next**.
5. In the **Name** text box, enter a name for the new vSphere Distributed Switch.
6. Use the arrows to select the number of uplink ports, and then click **Next**.
7. Select whether to add hosts and their physical adapters to the vSphere Distributed Switch. You can add this later also.
8. Click **Next**.
9. Select whether to automatically create a default port group. This option creates a distributed port group with default settings (Optional) .
10. Click **Finish**.



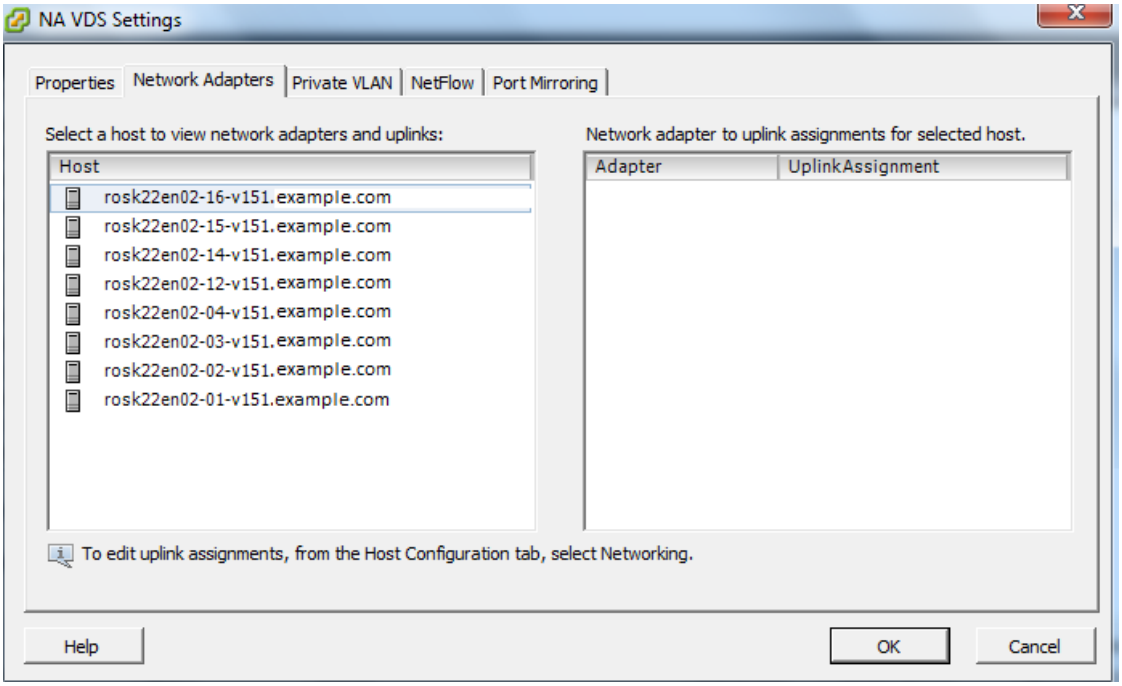
Adding hosts to a vSphere Distributed Switch

After the vSphere Distributed Switch is created, perform the following steps to add hosts at the distributed switch level:

1. Log on to the vSphere Client, and then select the **Networking inventory** view.
2. Right-click the vSphere Distributed Switch in the inventory pane, and then select **Add Host**.
3. Select the hosts to add, and then click **Next**.

   Do not select any physical adapters to add under the selected hosts.
4. Migrate virtual machine networking to the Distributed Switch (optional).

5. Review the settings for the Distributed Switch and then click **OK**.

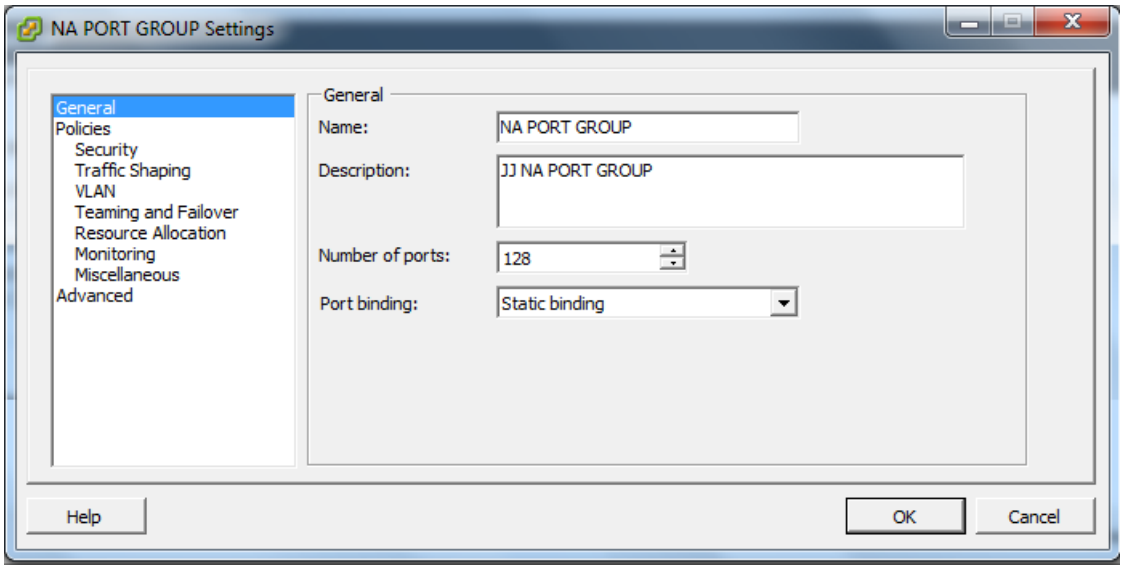


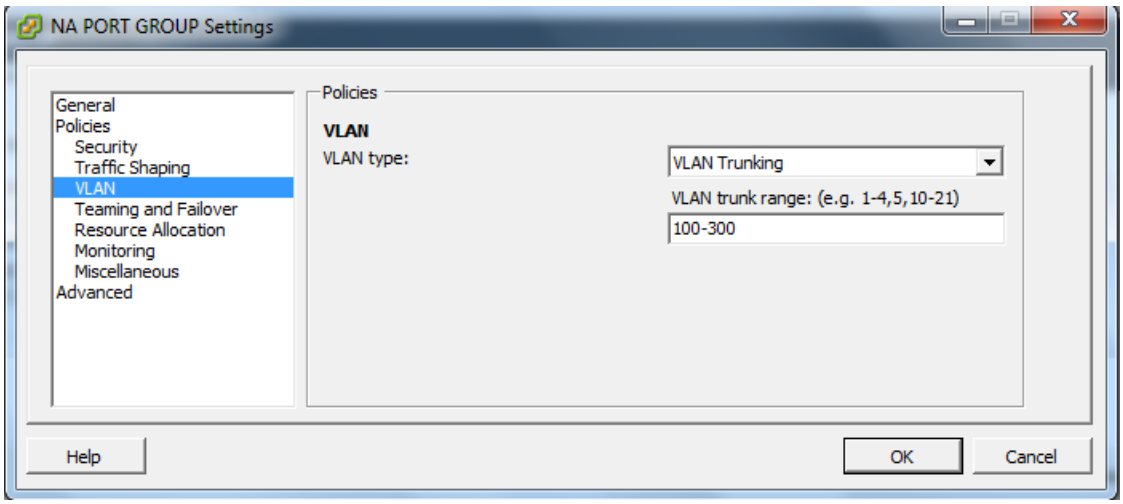
Adding a distributed port group

To add a distributed port group to a vSphere Distributed Switch to create a distributed switch network for your virtual machines, perform the following steps:

1. Log on to the vSphere Client, and then select the Networking inventory view.
2. Select **Inventory** > **vSphere Distributed Switch** > **New Port Group**.
3. Enter a name and the number of ports for the new distributed port group.
4. Select **VLAN Trunking** as the VLAN type.
5. Enter the VLAN trunk range.

   For example, 100-300. The VLAN trunk range should match the VLAN IDs configured in the HP Network Automation resource pools.
6. Click **Next**.
7. Click **Finish**.
8. Verify the HP Network Automation port group settings (Optional):





Downloading and configuring a virtual service router

To download and configure the HP Virtual Services Router, perform the following steps:

1. Download the HP Virtual Service Router (VSR1000) from the following URL:

   http://h17007.www1.hp.com/us/en/networking/products/routers/HP_VSR1000_Virtual_Services_Router_Series/index.aspx#.U2zx9fmSzuw

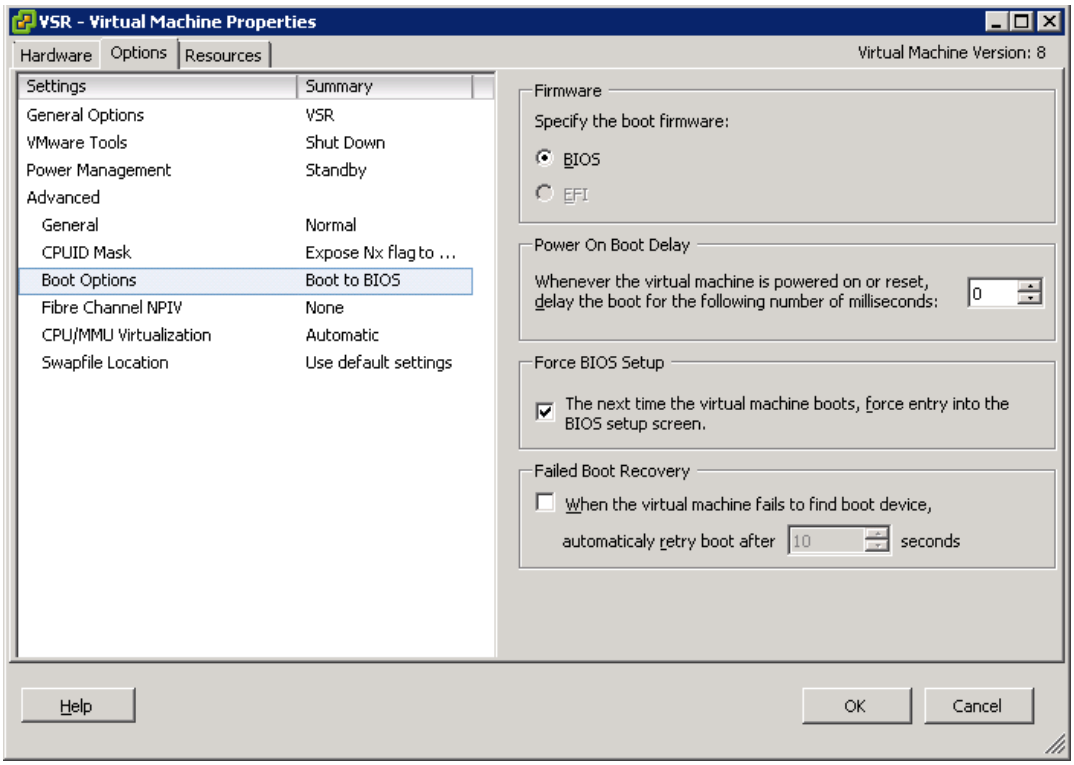
2. Deploy the `VSR1000_HP-CMW710-E0101P01-X64.ova` template in your vCenter Client.

3. To install the `VSR1000_HP-CMW710-E0101P01-X64.iso` image, perform the following steps:

a. Right-click the virtual machine from the navigation tree, and then click **Edit**.

b. Click the **Options** tab.

c. Select the check box in the **Force BIOS Setup** area, and then click **OK**.

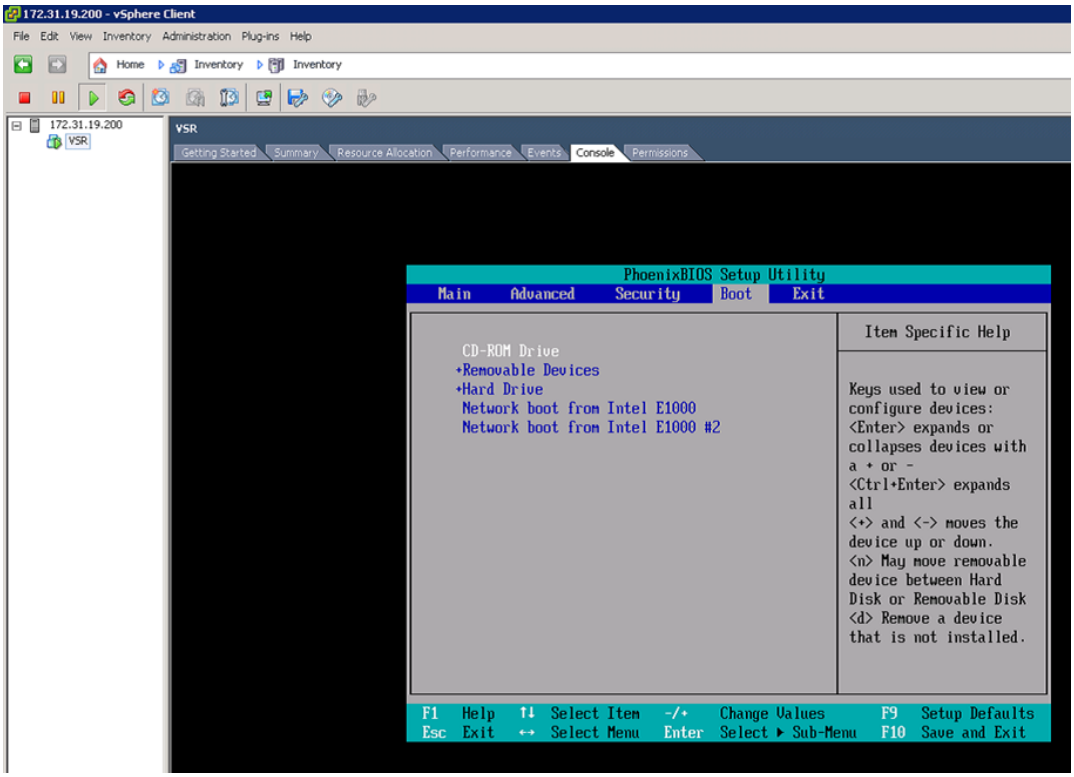


d. Select the newly created virtual machine from the navigation tree.

e. On the **Console** tab, select the **Boot** tab to start the virtual machine.

f. Configure the virtual machine to preferentially boot from the CD-ROM drive.

g. Save the configuration, and then exit.



h. Connect the CD drive of the VM to the ISO image of the HP VSR.

i. Right-click on the VM in the left navigation pane, and then click **Edit Settings**.

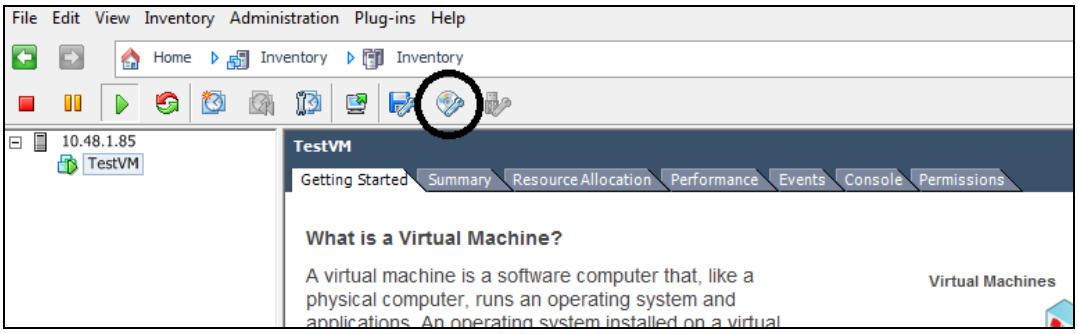
j. In the Virtual Machine Properties window, click **CD/DVD Drive 1**.

k. On the right pane, select the **Device Type** section, and then click **Client Device**.

l. Click **OK** to save the changes.

m. Power on the VM before mounting the ISO.

n. From the top menu, click the CD-ROM icon and then select **CD/DVD Drive 1** > **Connect to ISO image on local disk**.



Your disk is now mounted and available for use by the VM.

o. Boot the virtual machine from the ISO image and enter the installation interface.

p. In the installation interface, enter 1 to select Fresh Install. This upgrades the HP VSR to the version in the ISO image.

q. After the installation is complete, disconnect the CD drive.

r. Enter yes to reboot the system and complete installing the HP VSR.

s. After the reboot is complete, type the `display version` command to verify that the system software image is correct.

Configuring user access via SSH

To set the user name and password for the HP VSR, execute the following commands:

```
sys
ssh server enable
public-key local create rsa
user-interface class vty
authentication-mode scheme
protocol inbound ssh
quit
local-user <username>
password simple <password>
service-type ssh
authorization-attribute user-role network-admin
quit
```

Configuring IPs

To configure the interface to use DHCP for IP address acquisition, execute the following commands:

```
sys
int g1/0
ip address dhcp-alloc
```

Configuring ACLs

The HP VSR permits all packets that do not match any ACL rules by default. Execute the following commands to create an ACL that ensures access to the VSR device:

```
sys

acl number 2001 name acl2001

rule 0 permit

quit

int gi1/0

packet-filter name acl2001 inbound

packet-filter name acl2001 outbound

quit
```

After you create the ACL, you can optionally enter the `packet-filter default deny` command to change the default action of the router. Ensure that you have console access to the router before changing the default.

The HP Network Automation Command Scripts file includes the script to dynamically configure the HP VSR. You can only use the script to configure user access and packet filtering after the HP VSR is assigned an IP address manually.

Adding a distributed port group to a virtual service router

To add a distributed port group to an HP virtual services router, perform the following steps:

1. Log on to the vSphere client and select the **VMs and Templates** inventory view.
2. Select the **HP Virtual Services Router**.
3. Right-click and select **Edit Settings**.
4. Click the **Add** button to select the distributed port group.
5. Select the **Ethernet Adapter**, and then click **Next**.
6. Select the distributed port group from the **Network Label** drop-down menu.
7. Click **Next**.
8. Click **Finish**.
9. Execute the following command from the console to determine the DHCP-allocated IP address of the gi1/0 interface:

```
display int gi1/0
```

You can now log in to the HP VSR through SSH.

Adding device groups

Creating a device group helps you categorize devices based on organizational needs.

To add new device groups:

1. On the menu bar, under **Devices**, select **New**, and then click **Device** Group.

   The New Group page opens.

2. Add the new device group, and then click the **Save** button.

Field	Description
Group Name	Enter a group name.
Description	Enter a description of the group.
Site <name>	The site name should be default.
Sharing	Select public sharing.
Parent Device Group	The Inventory group appears in the drop-down menu. You can also select another group.Your selection is ignored if you make the group private. Private groups cannot be part of the group hierarchy.
Devices	Enter the IP address of the HP Virtual Services Router.

Adding devices

To add a new device:

1. On the menu bar, under **Devices,** select **New,** and then click **Device**.

   The New Device page opens.

2. Add the new device, and then click the **Save** button.

Field	Description
IP Address (or DNS name)	Enter the IP Address of the HP Virtual Services Router or any other device that user may wish to use

Field	Description
Hostname	Enter the host name of the device
Site *<name>*	The site name should be default
Belongs to Groups	Select the name of the device group
Device Driver	Choose the device specific to the device being used Here, EXT_HP (Choose the Specify Driver Option and then select EXT_HP (formerly H3C) Corporation switches, routers, U200 and SecPath firewalls, 3Com Corporation switches 4500G, S4800G, S7900 series, Comware version 5.x, 7.10, VRP 8.50 from the drop-down menu.) is used as an example.
Password information	
Use device-specific password information	Enter the Router user name and password
Additional information	
Model	Enter the manufacturer model number for the device. For example: VSR1000
Vendor	Enter the vendor of the device. For example: HP

Importing command scripts

Click the **Import/Export Commands Scripts** link on the Command Scripts page to open the Import/Export Scripts/Diagnostics page.

Field	Description
Import	Select the `HPN Virtual Network.exp` command script to import. **Note:** To import a command script or diagnostic from a non-driver source, select **Import from file**, and then enter the file name or click **Browse**. Copy the `HPN Virtual Network.exp` command script from the `C:\Program Files\Hewlett-Packard\CSA \CSAKit-4.5\Lib\network automation` folder to your VM location. Click **Import**, and then select the HP Network Automation scripts to import.

Instillation notes:

The following steps explain how to import the command script `HPN Virtual Network.exp` to HP NA portal:

Step 1: Import command script to the NA portal

To import the command script `HPN Virtual Network.exp`:

1. Log on to the HP NA portal as an administrator (the administrator user is created during HP NA portal installation).
2. Click **Devices** > **Device Tools** > **Command Scripts**.
3. Click **Import/Export Command Scripts**.
4. From the Import/Export Scripts/Diagnostics page, click **Choose File** and browse to the location of the HPN Virtual Network.exp command script.
5. Click **Import**.

   The default location of the command script file is `C:\Program Files\Hewlett-Packard\CSA \CSAKit-4.5\Lib\network automation`
6. Click **Import**.
7. From the Import Scripts page, verify that the **HPN Create Vlan** and **HPN Delete Vlan** checkboxes are selected.
8. Click **Continue**.

   The message *Important: You have successfully imported one or more Command Scripts or Diagnostics* is displayed.
9. Verify the command scripts imported.
10. Click **Devices** > **Device Tools** > **Command Scripts** and verify that HPN Create Vlan and HPN Delete Vlan are listed in the Command Scripts page.

Step 2: Validate Imported Command Scripts

1. Click **Devices** > **Device Tools** > **Command Scripts**.
2. From the Command Scripts page, for HPN Create Vlan, click **Run**.
3. From the New Task/Template - Run Command Script page, select switch management IP address ('Applies to' field) of your discovered switch and enter values for Vlan Id, Vlan SubnetIP, and Vlan SubnetMask.

   For example, set Vlan Id = 200, Vlan Subnet IP = 192.168.30.1 and Vlan Subnet Mask =

255.255.255.0

4. Click **Save**.

If the networking switch is already discovered and a device snapshot is successfully taken in the HP NA portal, the message 'Succeeded' is displayed.

Step 3: Verify or update the command script mode

To verify/update the command script mode:

1. Click **Devices** > **Device Tools** > **Command Scripts**.
2. For HPN Create Vlan, click **Edit**.
3. From the Edit Command Script page:
   - If you are using an HP networking switch, verify the Mode is 'ProCurve configuration'.
   - If you are using another networking switch, select an appropriate Mode from the drop-down box.
4. Repeat steps 2 and 3 for the 'HPN Delete Vlan' command script.

- If you are using an HP networking switch, verify that the 'HPN Create Vlan' and 'HPN Delete Vlan' command scripts use the Device specific Network Automation driver.

  For Example, HP VSR1000 uses EXT_HP (formerly H3C) and HP ProCurve uses EXT_HP_ Procurve.
- If you want to use another networking switch, update the mode of each command script, and also update each script code for the corresponding network switch.
- Verify that HPCSA_NA_CreateVlanScript and HPCSA_NA_DeleteVlanScript script System properties are present in HP OO central.

Enabling custom field option in HP NA

Custom resource identity fields enable storing of additional information with each resource identity.

For example, an IP address resource identity might have custom fields for subnet mask, gateway, and DNS.

To enable the custom field option in HP NA, perform the following steps from the HP NA console:

1. Open **Admin** > **Administrative Settings** > **User Interface** page.
2. In the **Enhanced Custom Fields** area, select the **Enable Enhanced Custom Fields** check box.
3. Click **Save**.

Downloading distribution files

The distribution file for the HP Network Automation distribution file can be found on HPLN. Extract the distribution file to a temporary location on the HP CSA server.

The distribution file contains all the flows used by integrations in the content pack. You will import these flows as part of the configuration for all integrations.

The extracted contents will include a zip file for each implementation in this content pack. The zip file for this implementation includes the files listed in the following table.

Note: HP Cloud Content Capsule Installer deploys the distribution file automatically.

Contents of the distribution files are listed in the following table:

Folder	File name	Description
`%CSA_HOME%\CSAKit-4.5\Lib\network automation\`	`HPN Virtual Network.exp`	HP Network Automation scripts used for this implementation

No other folders are currently used.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
Provision VLAN using Network Automation	HP Network Automation

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this implementation and the service access points. You may need to change them to reflect your environment.

Provider name	Service access point
Network Automation	https://<Network Automtion IP Addresss>

To create resource providers, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
HP NA Provision VLAN	HP Network Automation

To associate resource offerings with providers, complete the steps in "Associating resource offerings with providers" on page 27.

Changing component properties

You must edit the service design and change the properties of Virtual Network Component listed in following table.

Property name	Description
switchIPAddress	Management IP address of the switch which is already discovered by HP NA portal
vlanId	VLAN ID which is required to create a vlan in the switch. The VLAN ID should be a number between 1 and 4094. For example: 222
vlanIPSubnet	Subnet IP address to be configured for created VLAN ID. For example: 192.168.30.1
vlanSubnetMask	VLAN Subnet mask to be configured for created vlan. For example: 255.255.255.0
vlanTag	Resource identity ID of VLAN

To change component properties, complete the steps in "Changing component properties" on page 39.

Publishing service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish the service offering to Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe a service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP OneView and HP Insight Control server provisioning

This section explains the integration of HP Cloud Service Automation (HP CSA) with HP OneView and HP Insight Control server provisioning (HP ICsp) to enable the deployment of physical servers with a selected operating system. The integration uses the embrace UI capability with HP CSA and HP Operations Orchestration (HP OO) to allow a user to create a service design using the Topology Designer and import components from HP OneView and HP ICsp. Service designers can select predefined server profiles from HP OneView and build plans from HP ICsp and import them into HP CSA so that they can be used when creating new topology service designs.

This section provides the detailed instructions to install the solution, create simple IaaS and SaaS designs, and finally deploy and manage a service from the HP CSA Marketplace Portal.

Use case: OneView and ICsp Topology Integration

The integration of HP Cloud Service Automation (HP CSA) with OneView and Insight Control server provisioning (ICsp) enable the deployment of physical servers with a selected operating system.

Prerequisites

The following table lists software and supported versions:

Software	Version
HP Cloud Service Automation (HP CSA)	4.50
HP CSA Content Pack	4.50

Required components and supported versions are listed in the following table:

Component	Version
HP OneView	1.10 1.20 required for automated storage provisioning
HP Insight Control server provisioning	7.4, 7.4.1
ProLiant servers	Refer to OneView Support Matrix OneView 1.10 OneView 1.20

Component	Version
Intelligent Provisioning	Refer to OneView Support Matrix
HP Operations Orchestration	10.21

The following table lists the HP Operations Orchestration content required to enable the HP OneView Managed Server Provisioning capsule. The HP OO content is installed during the HP CSA installation process. If you have been notified by HP support that an update to the following content is necessary, updates to the HP Operations Orchestration content can be downloaded from HP Live Network.

Component	Version
OO Base Content	1.4.4
OO Solutions Content	1.4.0

HP Insight Control server provisioning setup

The HP CSA integration to HP Insight Control server provisioning (ICsp) is intended to leverage an existing HP ICsp appliance or appliances that have been configured to deploy the desired operating system versions in your environment.

Working operating system build plans must be available and tested before being imported as components in HP CSA. Follow the Insight Control Server Provisioning 7.4 Installation Guide to import required media and customize any scripts as required for your environment.

Limitations of HP ICsp

Limitations of HP ICsp are the following:

- If you are creating customized build plans in HP ICsp, the build plan names must be prefixed with 'ProLiant OS –'. Only the build plans that are prefixed with 'ProLiant OS –' are visible in the Component Import wizard.
- All customization of build plans must be self-contained in HP ICsp with an exception that 'Custom Attributes' may be specified in HP CSA as an input property to the HP ICsp OS Build plan component used in the service design. HP CSA does not provide server personality data such as hostname or IP address.

  For information about custom attributes, see "Creating service designs with HP ICsp custom attributes" on page 90.

Note: To customize an out-of-the-box build plan, copy an existing build plan and modify it to point at a configuration file that you have customized. Click the Save As button to make a copy of an existing build plan and configuration file.

HP OneView setup

The HP CSA integration to HP OneView is intended to leverage an existing HP OneView appliance or appliances that are managing physical servers and other physical infrastructure such as network switches and storage devices in your environment.

Create and validate unassigned server profiles (being used as templates) in HP OneView before being imported as components in HP CSA. Local storage, externally managed SAN storage, and HP OneView managed SAN storage are supported.

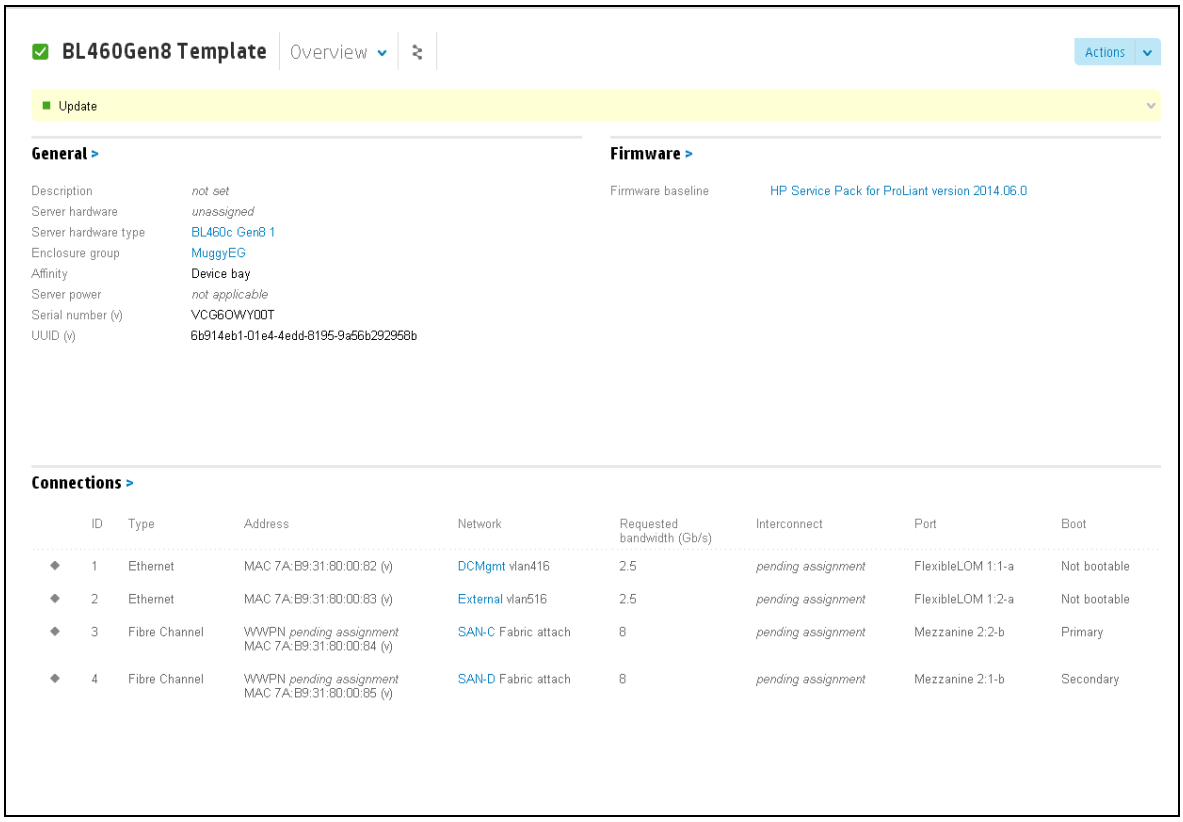
Create a server profile template

Creating one or more server profile(s) to use as a template will enable you to build HP CSA service designs that deploy and manage physical servers using HP OneView.

Consider the following key points when creating server profiles to use as templates:

- Use alphanumeric characters for server profile names. Special characters can cause errors when profiles are copied.
- Leave the Server hardware as Unassigned.
- Define the Ethernet and Fibre Channel Connections.
- If HP ICsp will be used for OS deployment, include an Ethernet connection with network access to HP ICsp.
- See the appropriate section below for more specfic guidance for creating profiles that utilize local storage, externally managed SAN storage, and HP OneView managed SAN storage.

Later in the configuration process, you will import this unassigned Server Profile into HP CSA and use it in your topology service design. If desired, create multiple server profiles reflecting the options you wish to use to deploy your servers. A sample server profile is shown in the following figure.

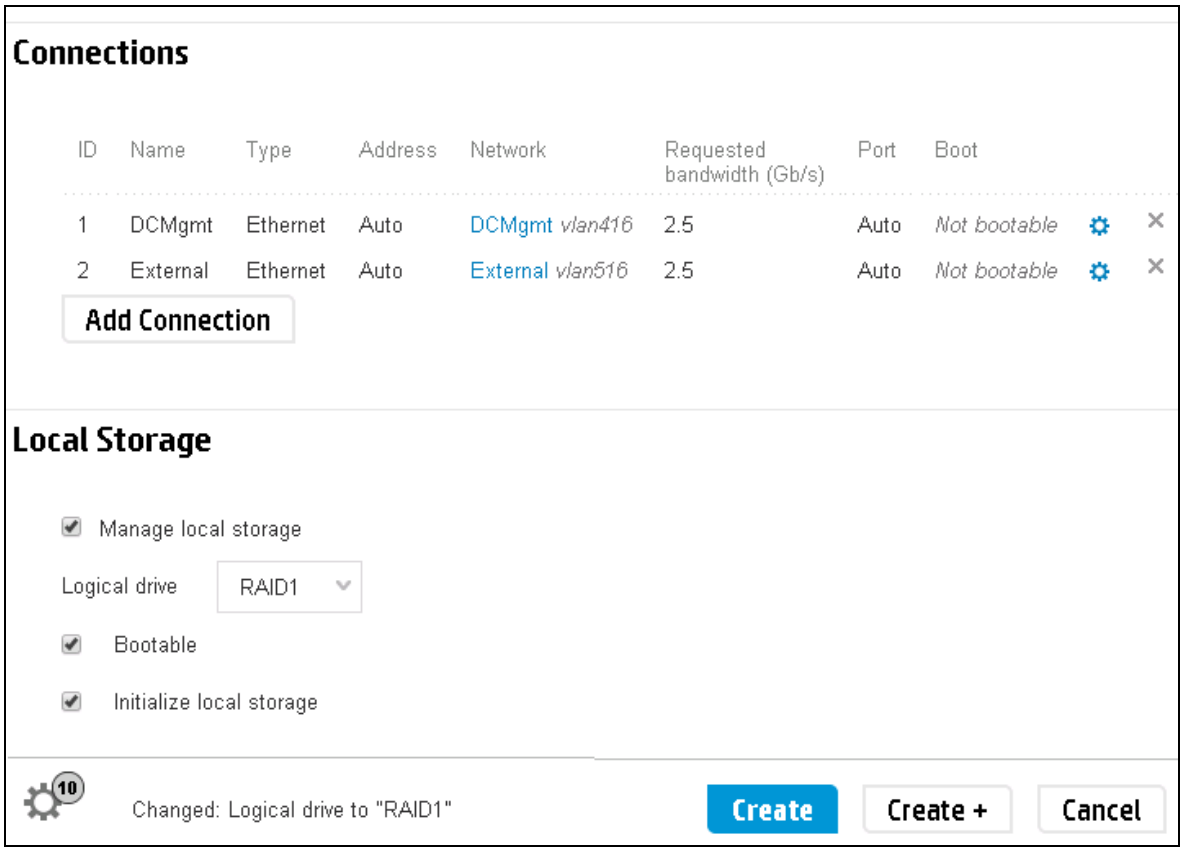


Managing local storage with HP OneView

HP OneView supports deploying servers with local boot disk. Supported server types are listed in the HP OneView support matrix at www.hp.com/go/oneview/docs.

A sample subset of server profile with local storage is shown in the following figure.

The local storage section sets the RAID level, allows you to set the disk as bootable, and can be set to initialize the storage before provisioning.



For information about how to manage local storage, see HP OneView documentation.

HP OneView externally managed SAN storage configuration for blade servers

If automatic storage provisioning is not available, it is possible to preallocate storage for each blade server using the World Wide Port Name ((WWPN) for the Fibre Channel ports. This solution requires disabling Virtual World Wide Names (WWN) in HP OneView.

For information about disabling virtual WWN, see "Appendix B: Disabling virtual WWNs in HP OneView" on page 265.

Note: This solution requires additional steps to move a server profile from one server to another as the storage is presented to the first servers physical WWPNs. Moving to another server will require unpresenting the storage from the first server's WWPN's and presenting it to the second servers WWPN's in addition to reassigning the profile within HP OneView.

After disabling the virtual WWN allocation, perform the following steps for each server you wish to deploy:

1. Determine the WWPNs for the Host-Bus Adapters (HBAs) in the server. See "Appendix C: Creating temporary server profiles to discover WWPN of HBAs" on page 266 for a method that

leverages temporary profiles in HP OneView to make it easy to determine WWPNs without installing an OS or needing to boot to the adapter BIOS.

2. Present one or more disks to your server.
3. Create server profile(s) as appropriate that define Fibre Channel connections that will allow the servers to connect to the presented disks.

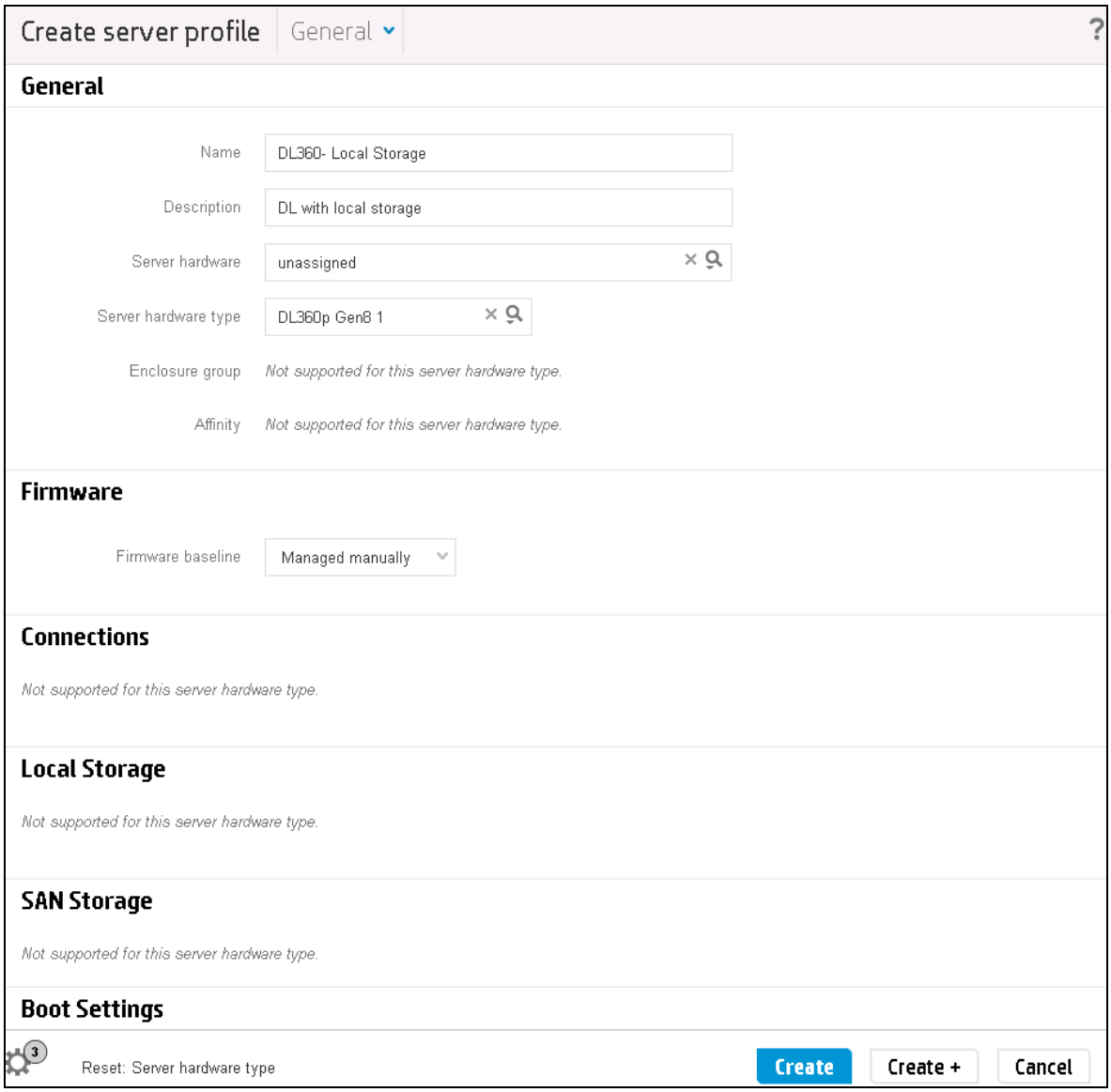
HP OneView local and externally managed SAN storage configuration for rack mount servers

HP OneView does not manage network or storage connectivity for rack mount servers. Servers with external storage must be physically powered on to determine the World Wide Port Names (WWPN) required for preallocating storage. One method to determine the WWPN is to open an iLO session to the server and power it on. When the option appears during Power On Self Test (POST), press Ctrl+Q to enter QLogic FastUTIL or Ctrl+E to enter Emulex OneConnect to obtain the WWPN needed to present storage.

Once you have obtained the WWPN and provisioned the storage, create a server profile for your rack mount server. Make sure to select the appropriate server hardware type and firmware baseline. Networking and storage are not managed by HP OneView for rack mount servers. The servers must be configured with a network that has access to HP ICsp to deploy OS build plans.

A sample profile for a DL server is shown in the following figure.

Note: Use alphanumeric characters for server profile names. Special characters can cause errors when profiles are copied.

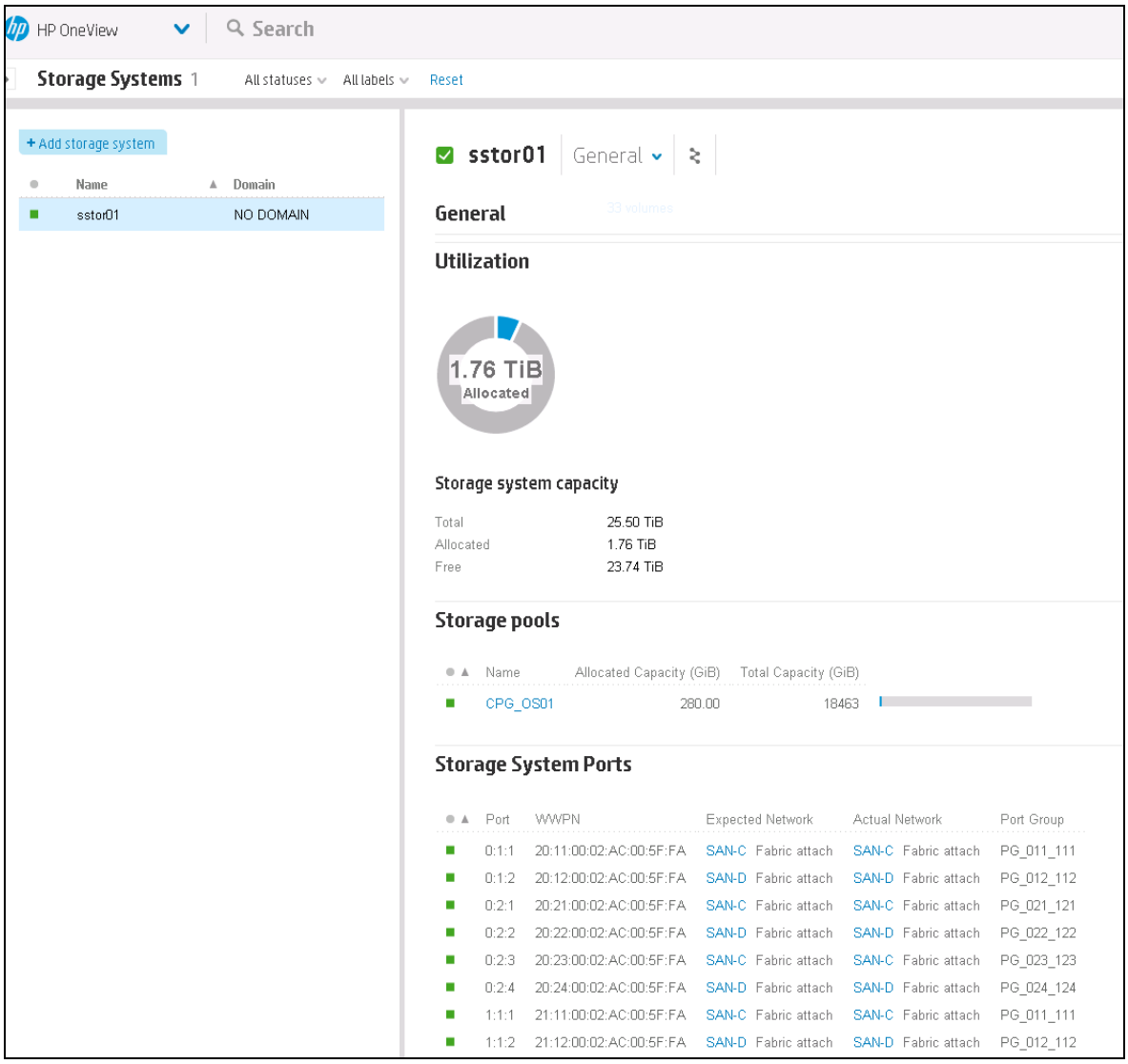


HP OneView Managed SAN storage configuration

Automated storage provisioning is supported with HP OneView 1.20. For automated storage provisioning, HP OneView must be configured as follows:

1. Add a storage system.
2. Define storage pools.

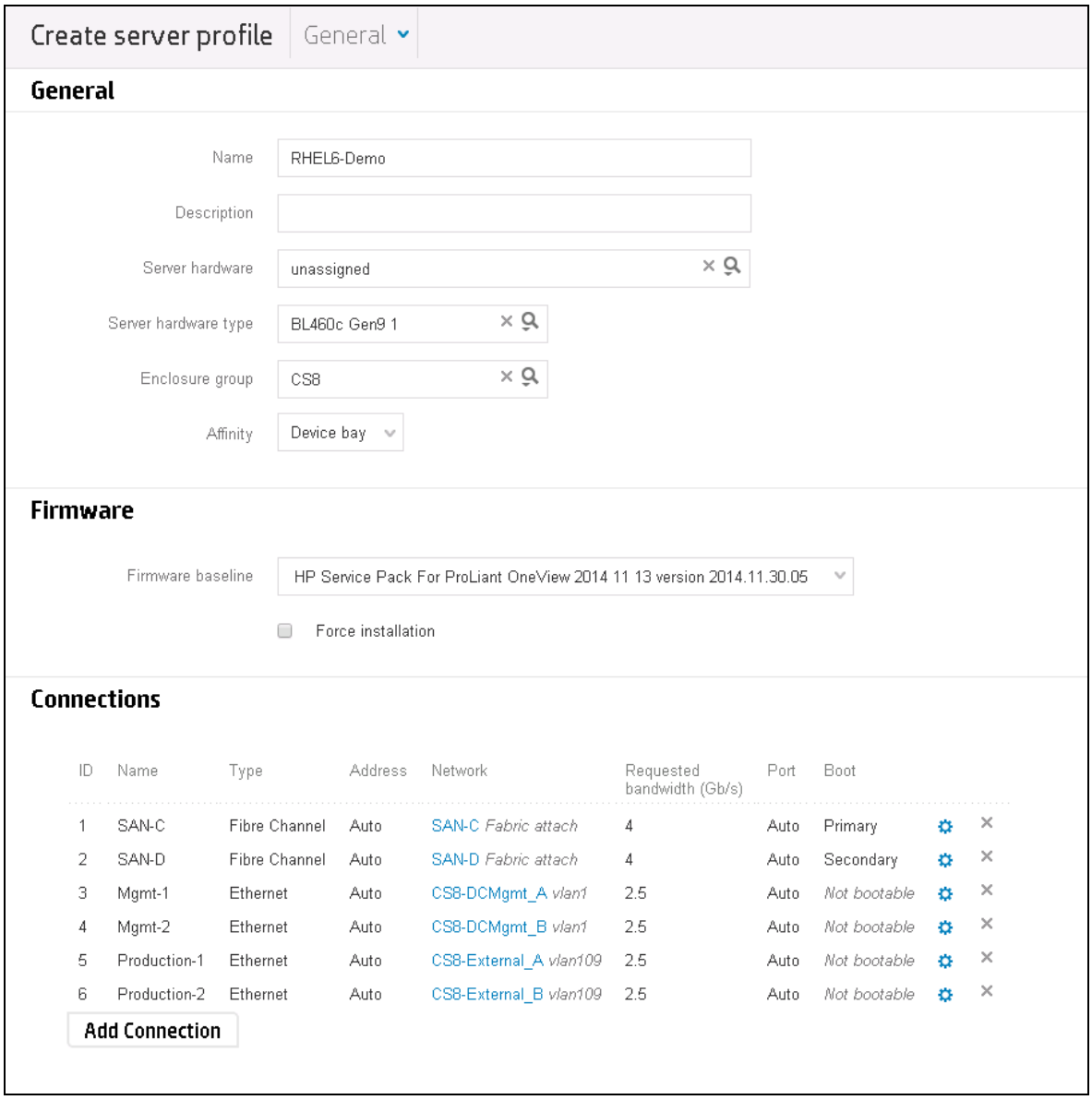
A sample storage system configuration with storage pools and storage system ports specified is shown in the following figure.



For information about defining storage pools and storage system ports, see the HP OneView User Guide.

3. Create a server profile template that specifies Fibre Channel connections to your SAN storage.
4. Specify the primary and secondary boot paths, and then select Use Adapter BIOS.
5. Create the Ethernet connections.

A sample profile including Ethernet and Fibre Channel connections is shown in the following figure.



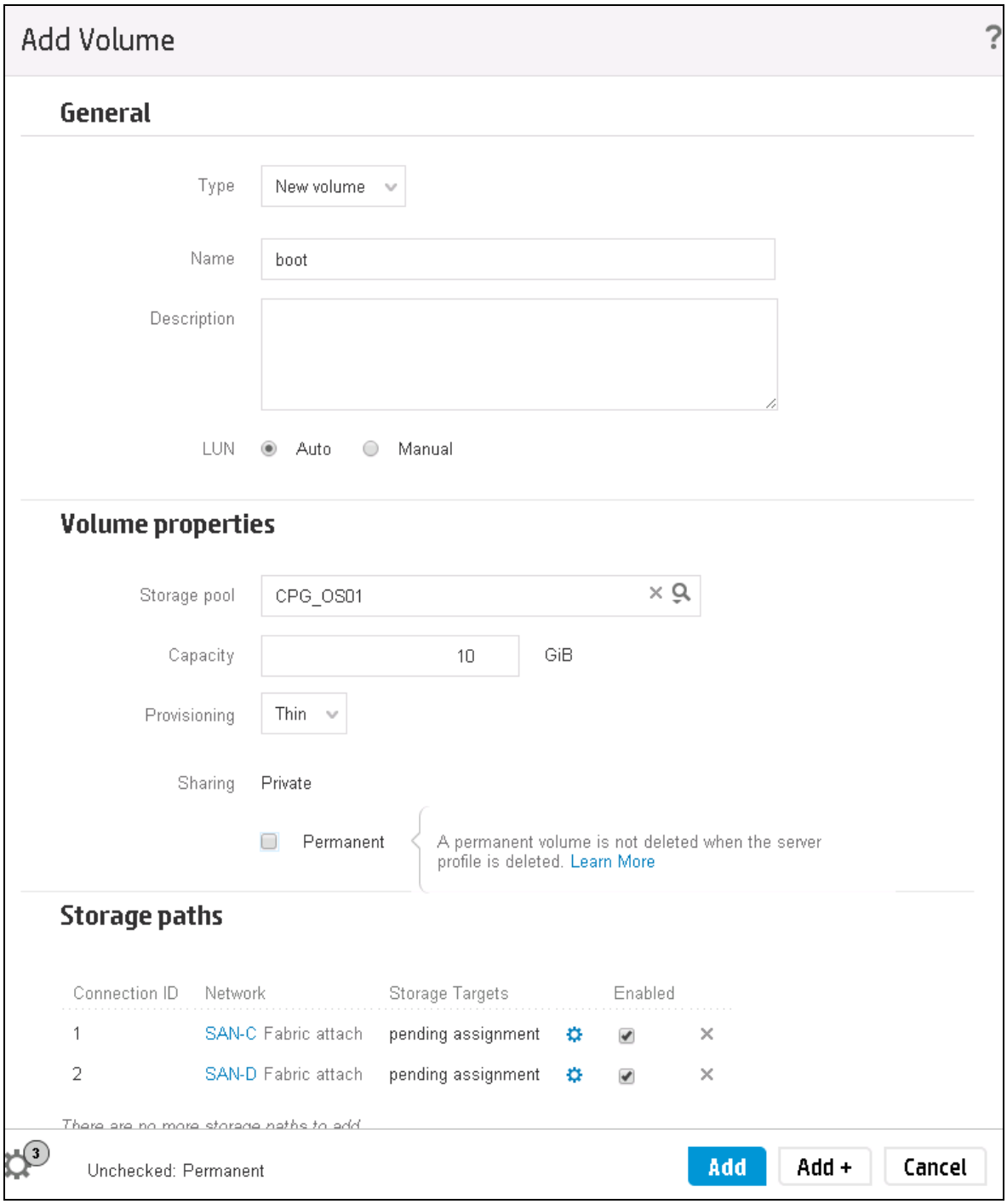
6. Select the **Manage SAN Storage** check box.
7. Choose the **OS type** in the drop down, and then click **Add Volume**.
8. Select the new volume.
9. Enter a name for your boot disk and select Auto LUN. The name of your boot disk must start with 'boot'.

   Note that the volume will be automatically created when you create the server profile. If the volume name specified is not unique, the volume name will be changed to ensure uniqueness. Additional data disks can be defined in the server profile. The data disks name must not start with 'boot'. You can specify Auto LUN or manually set the LUN for data disks.

Note: The prefix for the boot disk is specified in a system property in HP Operations Orchestration. The default prefix is 'boot'.

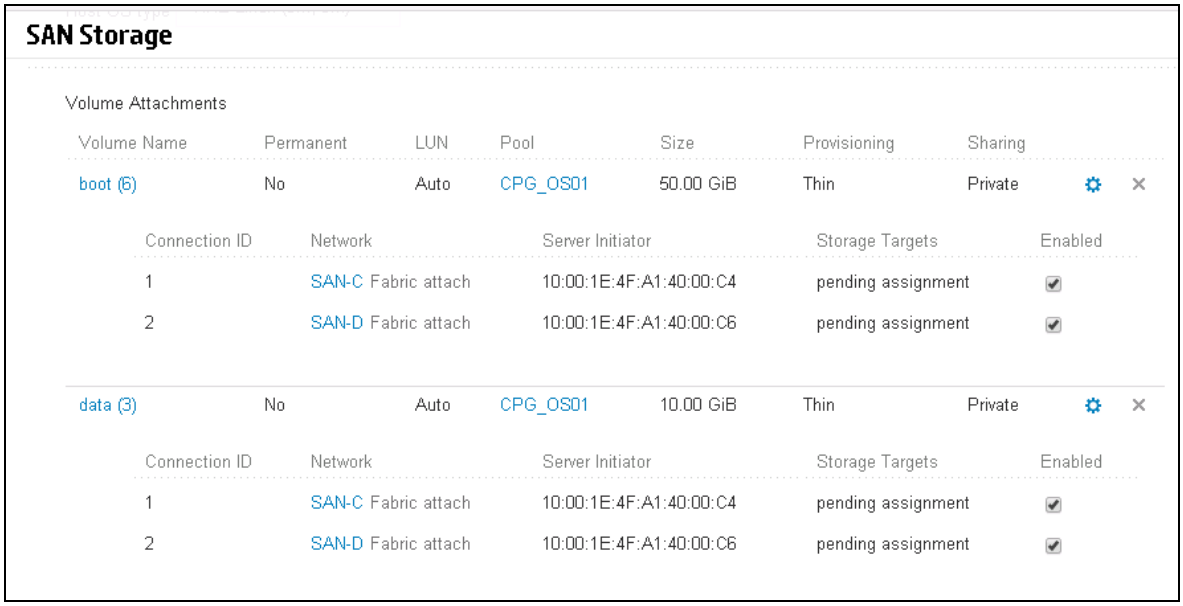
If you wish to modify the default prefix, log on to HP Operations Orchestration Central, go to **Content Management** > **Configuration Items** > **System Properties**. Select **Edit** and add an override value for ONEVIEW_SAN_BOOT_VOLUME_NAME_REGEXP.

A sample boot volume specification is shown in the following figure.



10. Select your storage pool, capacity, and provisioning.
11. You must clear the **Permanent** check box to automatically remove volumes when the server profile is deleted.
12. Storage paths should already be listed as they were created when you defined the Fibre Channel connections.

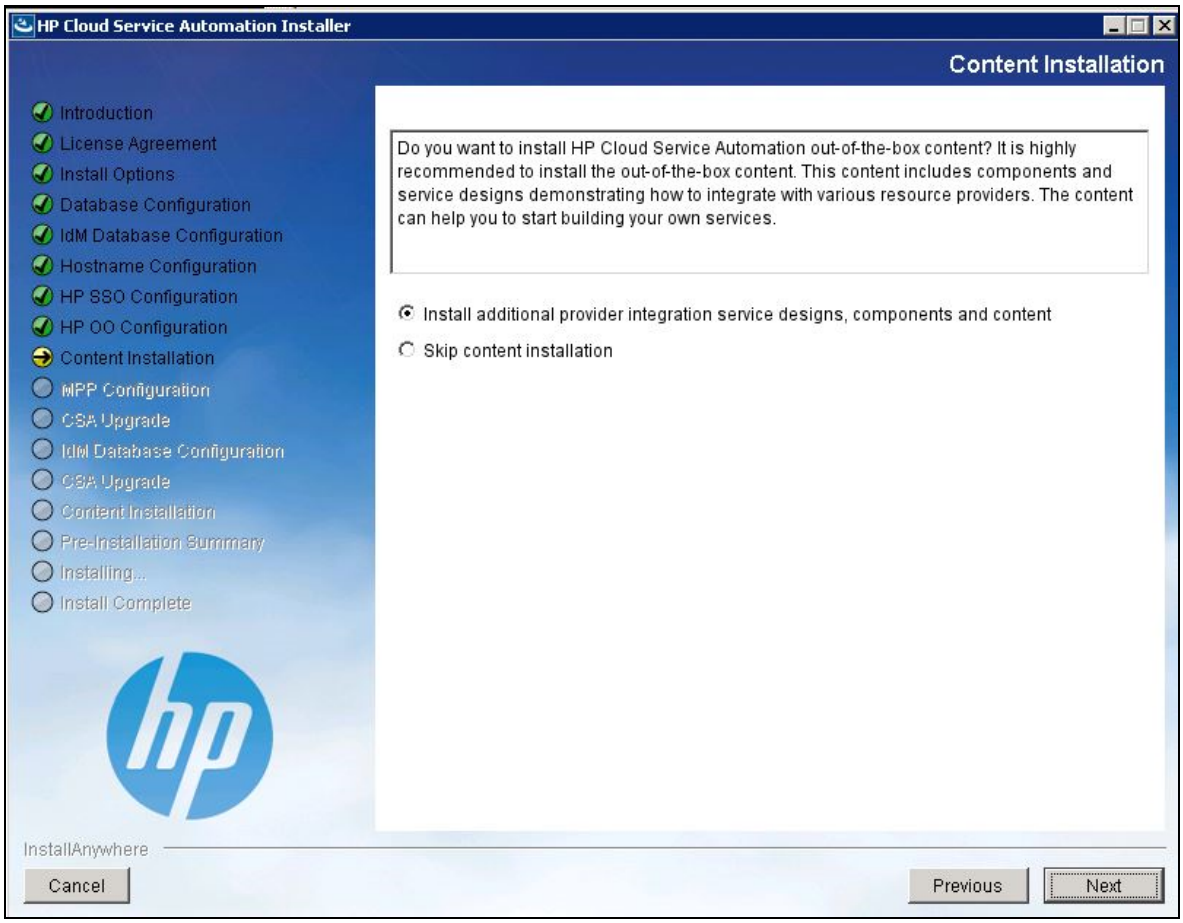
After adding the volume data, the server profile will include SAN Storage definition as shown in the following figure.



Solution installation

Out-of-the-box-installation

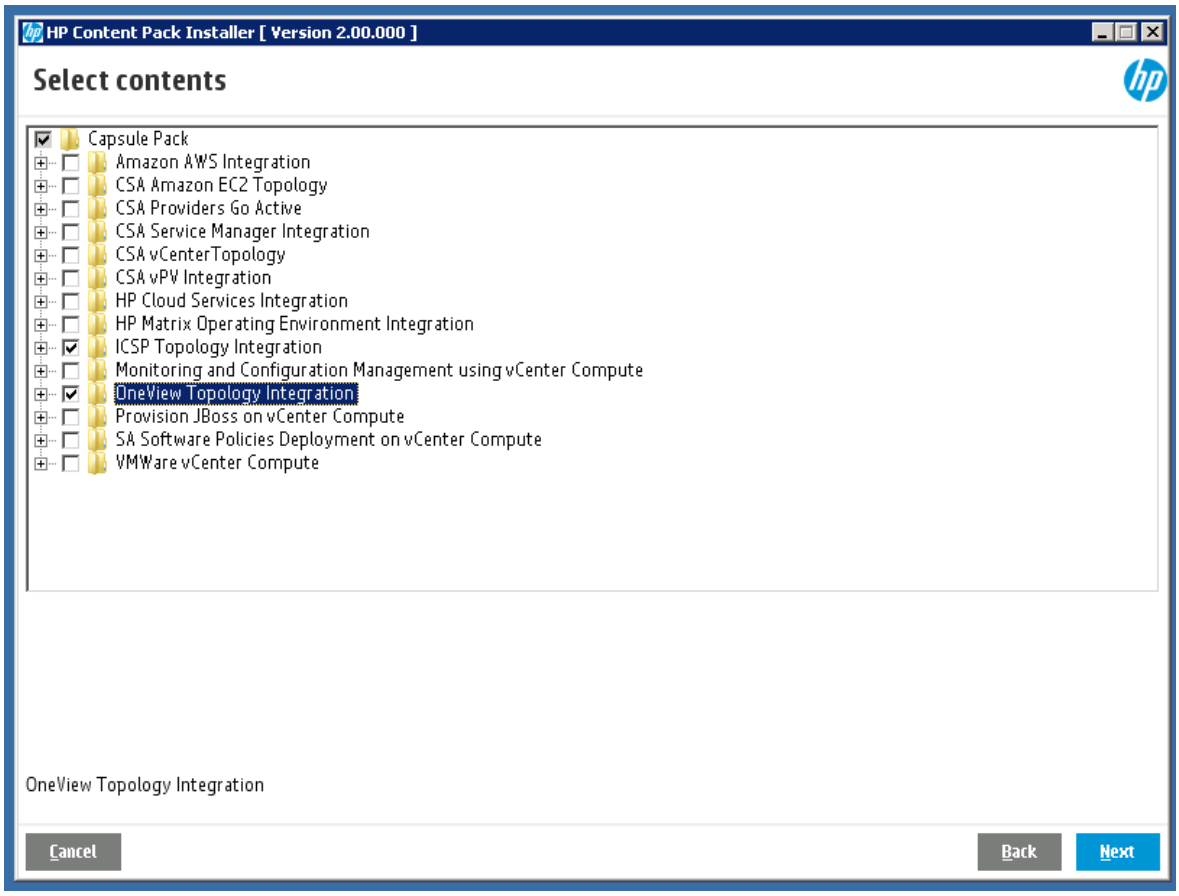
The HP CSA OneView Managed Server Provisioning content is most easily installable by selecting the **Install additional provider integration service designs, components and content** option when installing or upgrading to HP CSA 4.50. If you are using the graphical HP CSA Installer by choosing to install the additional content as shown in the following figure, the solution will be installed out-of-the-box with HP CSA 4.50.



Manual installation

If you do not install the sample content at the time of installing HP CSA 4.50 or upgrading to HP CSA 4.50, the HP CSA OneView Managed Server Provisioning content can still be easily installed on your server later. The solution is packaged in the `csa-ootb-content-04.50.000.zip` content capsule pack file located in the `Tools/CSLContentInstaller` below the location where HP CSA was installed. Additionally the `csl-content-installer.jar` tool located in the same directory can be used to perform a graphical or silent installation of all of the sample content in the `csa-ootb-content-04.50.000.zip` file or if you choose, just the HP OneView and HP ICsp subset of that content as shown in the following figure.

For information about how to install content manually, see *Content Installation Guide* at HP Software Support.



Solution configuration

The installer you ran in the "Solution installation" section automatically installs the required HP Operations Orchestration workflows and copies the files to the appropriate locations to allow configuration of HP OneView and HP Insight Control Server Provisioning as providers for HP CSA. The installer also automatically imports the default service designs required for physical server provisioning. Restarting the csa service is part of the installation instructions and must be done before continuing with the solution configuration steps in this section.

This section provides the instructions to:

- Make servers available for provisioning using HP OneView server labels
- Set server login information
- Create HP OneView and HP ICsp providers
- Import HP OneView server profiles and HP ICsp build plans as components

- Create a service design
- Create an offering

Managing server availability

Deployment of physical servers from HP CSA requires the HP OneView administrator to identify servers with a label. The HP OneView administrator must apply labels to each server they wish to make available to HP CSA for service deployments.

HP OneView label usage

The physical server provisioning capability provided by this utility requires that available servers are labeled to identify servers available for deployment. Only servers that have the label hpcsaUNASSIGNED will be used for deployment.

Servers can also be labeled for restricted use by specific HP CSA organizations using organization labels. Examples of organization labels are shown in the following table. A server can have multiple organization labels. If a user requesting a service is not in any of the organizations identified by the labels provided, the server is unavailable to that user.

Note: This solution does not require the creation of organization labels. If no organization labels are present, a server labeled with hpcsaUNASSIGNED is available to any user.

Label	Effect
onlyForCSACONSUMEROrg	Server is available for use only by users in the Consumer organization
onlyForSALESOrg	Server is available for use only by users in the CSA Sales Organization.
onlyForFINANCEOrg	Server is available for use only by users in the CSA Finance Organization

Creating HP OneView labels

Label assignment can be set from the HP OneView web interface.

Manual label process

Caution: Do not modify the labels during provisioning.

All hpcsa labels other than hpcsaUNASSIGNED are for internal use only during deployment and should not be modified or removed.

1. From the HP OneView console, select **Server Hardware** view.
2. Select a server on the left panel, and then select **Labels** view in the drop down list on the right panel.
3. Click the **Edit** link next to the Labels name.

   The **Edit Labels** dialog box opens. You have to position your mouse over Labels to bring up the Edit link.
4. Enter 'hpcsaUNASSIGNED', and then click the **Add** button.
5. Add organization labels using the format in Table 4 if desired.
6. Repeat this process for each server you wish to make available for automated deployment from CSA.

Additional labels used by provisioning process

During the service provisioning process, the labels on HP OneView servers are changed to reflect the current availability state of the server.

The following table lists the labels applied to servers during the provisioning process.

Label	Meaning
hpcsaUNASSIGNED	Server is available for use
hpcsaRESERVED	Server is reserved for a deployment
hpcsaDEPLOYING	Server is in the process of being deployed
hpcsaDEPLOYED	Server is currently deployed
hpcsasubID<subscription ID>	Server in use by the specified HP CSA subscription ID.
hpcsa testRun <CSA_ CONTEXT_ID>	Server is in use by a test run associated with the specified HP CSA context ID.
hpcsaFAILEDDEPLOY	Server failed to deploy successfully. The failed deployment requires debugging to determine why it failed and fix the issue causing the failure. A server in this state must be manually re-labeled to hpcsaUNASSIGNED before it can be used again by CSA for deployment. See "Appendix A: Troubleshooting" on page 263 for instructions on manual label cleanup process.

Setting properties in Operations Orchestration Central

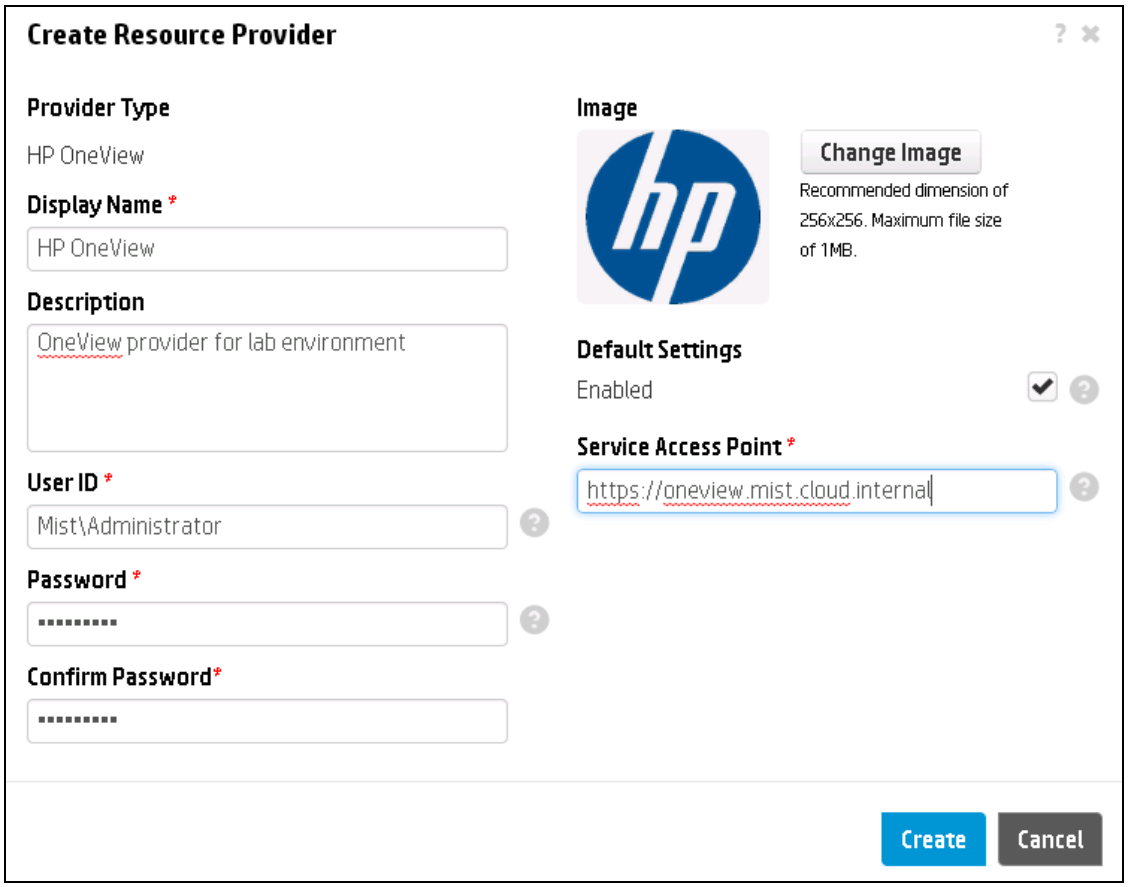
HP ICsp OS deployment requires creation of an HP Operations Orchestration Central system account with server iLO login permission. If you do not use signed certificates, you will also need to change the default trust setting.

- Log on to Operations Orchestration Central.
- Select **Content Management** > **Configuration Items** > **System Accounts** tab.
- Select **ILO_ADMIN**, and then click the **Edit** icon.
- Set the Username and Password fields to specify a user that has been configured to allow access to iLO on all the servers you wish to use for deployment and then click the **Save** button.
- Close the Operations Orchestration Central.

Creating providers

1. Select **HP OneView** from the Provider List, and then click **Create**.
2. Enter the Display Name as HP OneView as shown in the following figure.
3. Enter a valid User ID and Password for HP OneView.

   This user must have the Infrastructure administrator role in HP OneView.
4. Enter the URL used to access HP OneView in the Service Access Point field, and then click **Create**.



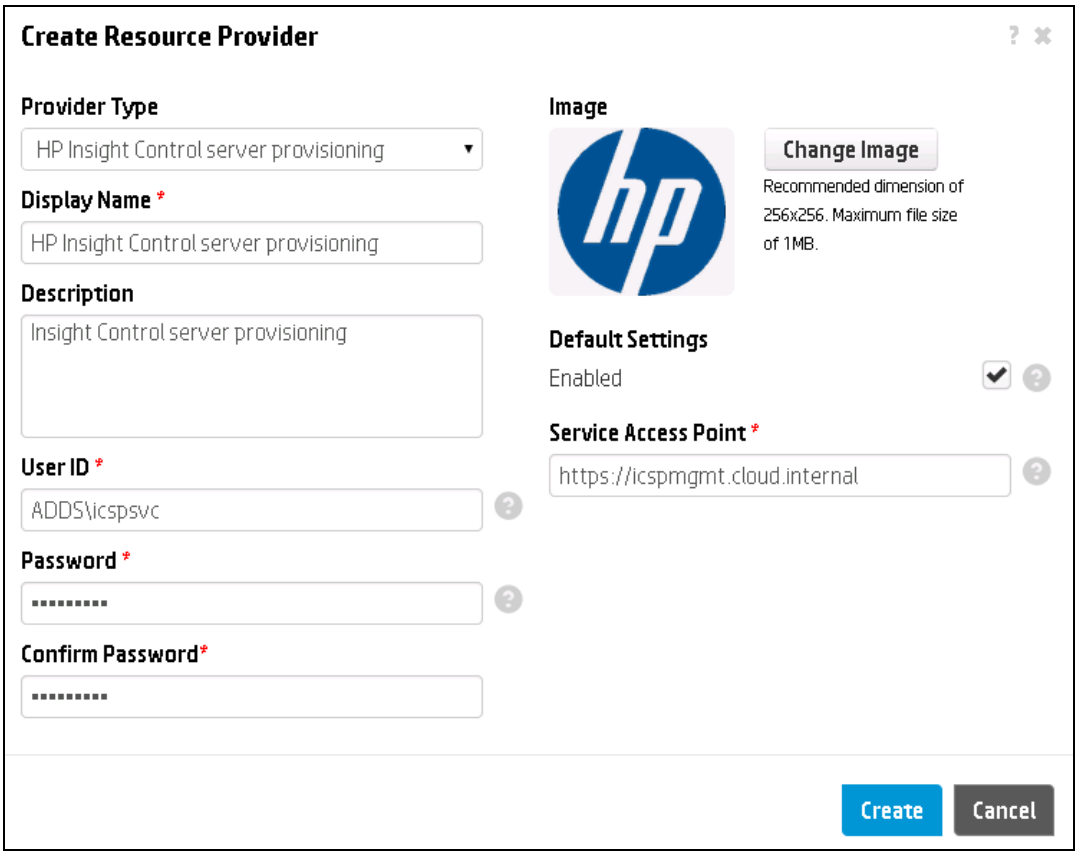
5. a. Select **HP Insight Control Server Provisioning** from the Provider List, and then click **Create**.

   b. Enter the Display Name as 'HP Insight Control server provisioning' as shown in the following figure.

   c. Enter a valid User ID and Password for HP Insight Control server provisioning.

      This user must have the Infrastructure administrator role in HP ICsp. This role grants full administrative privileges to all items and actions including the ability to configure the ICsp appliance.

   d. Enter the URL used to access HP ICsp in the Service Access Point field , and then click **Create**.



Note: Unless you have imported the HP ICsp appliance's certificate into the default HP Operations Orchestration central truststore, either the 'trustAllRoots' or the 'trustKeystore' property may need to be modified.

For information about the certificate, see "Managing Appliance Certificates" below.

Managing Appliance Certificates

By default, the certificate generated by HP OneView and HP ICsp appliances are self-signed; they are not issued by a trusted certificate authority.

Note: HP Operations Orchestration operations that communicate with the HP OneView and HP ICsp appliances will fail until one of the following procedures is performed.

To familiarize yourself with the options related to managing the appliance certificates, see the *Managing certificates from a browser* section in the *HP OneView User Guide* at http://www.hp.com/go/oneview/docs or *HP Insight Control Server Provisioning 7.4 Administrator Guide* at http://www.hp.com/go/insightcontrol/docs. These guides contain instructions for 'Using a

certificate authority' to replace the default self-signed certificate with one that has been generated by a trusted certificate authority.

For information about the options for certificate management in HP Operations Orchestration, see *HP OO Central Guide* and the *HP OO Hardening Guide* on HP Live Network.

The three primary methods to enable HP Operations Orchestration to trust the certificates of your HP OneView and HP ICsp appliances are as follows:

1. Import a new certificate generated using a certificate authority that is trusted by HP Operations Orchestration Central (recommended).

2. Export the appliance self-signed certificate (using the same process documented when 'Downloading and importing a self-signed certificate' for a browser section in the *HP OneView User Guide* at http://www.hp.com/go/oneview/docs) and import it into the default HP Operations Orchestration Central `cacerts` using the following steps:

   a. Transfer the appliance certificate you downloaded to somewhere on the server where HP OO central is installed.

   b. Import the appliance self-signed certificate using the keytool utility located at `<OO install dir>/java/bin/keytool` with a command similar to the following, where the entries in bold text have been replaced by your values:

   ```
   keytool -importcert -alias <applianceX> -keystore <OO install
   dir>/java/lib/security/cacerts –file <appliance certificate path> -storepass
   <changeit>
   ```

   c. Restart the HP Operations Orchestration Central service.

   For more information about updating client certificates and other related configuration tasks in HP OO, see the *Configuring Client Certificate Authentication in Central* section in the *HP OO Hardening Guide* at HP Live Network.

3. Disable strict SSL certificate checking for https communication between HP Opererations Orchestration and the appliances by setting the 'trustAllRoots' provider property to True.

   This should only be considered in development environments where other means have been employed to mitigate the security risk disabling strict SSL certificate checks.

Caution: HP does not recommend the practice of disabling strict SSL certificate checks or using self-signed certificates (even if you trust the originator) in production environments.

Creating service designs and offerings

After completing the initial configuration tasks, services designers can begin the process of creating, testing, and publishing new service designs that users will be able to order from the HP CSA Marketplace portal.

Service design	Provider
Deploy Server with HP OneView Profile	HP OneView
Deploy Server with HP OneView Profile and ICSP BuildPlan	HP Insight Control server provisioning

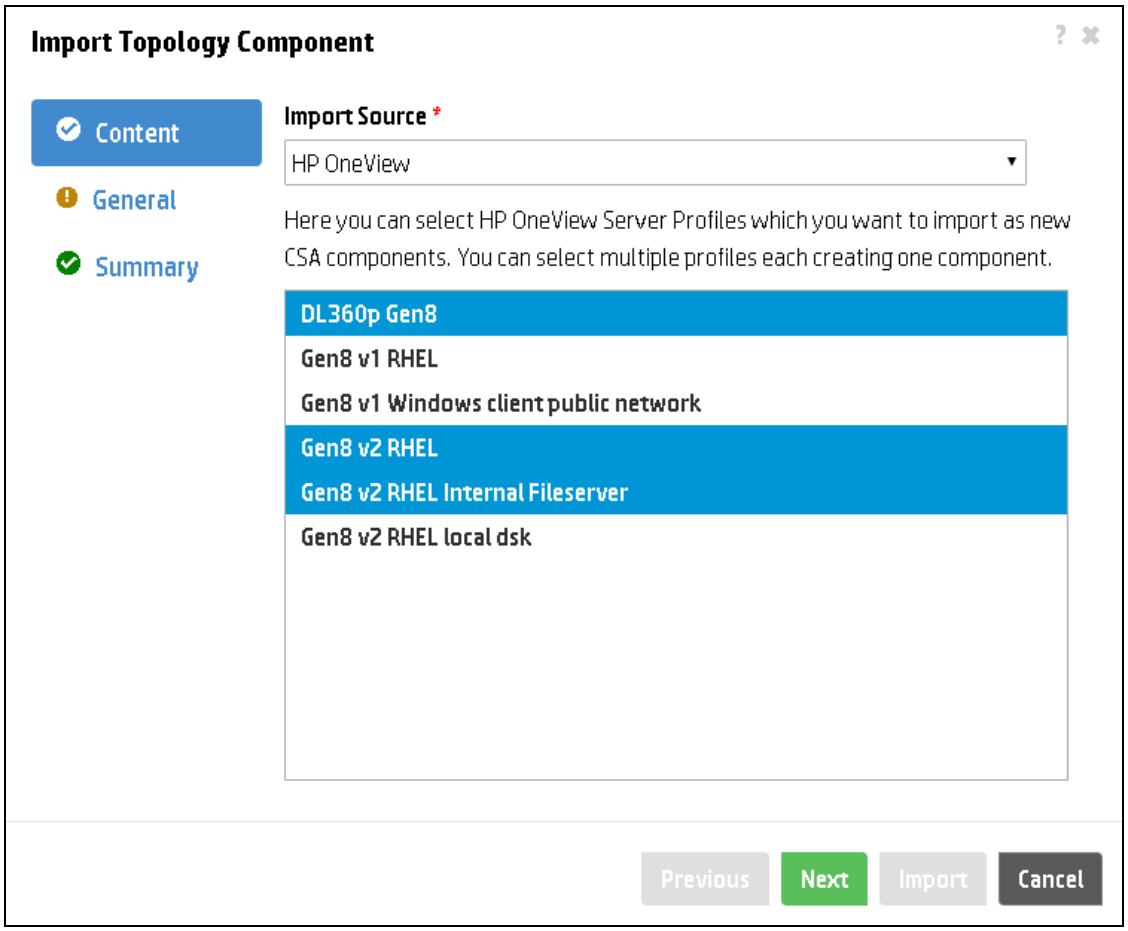
Importing components

For HP OneView and HP ICsp provider types, new components will need to be imported if new server profiles or OS build plans have respectively been created on the provider.

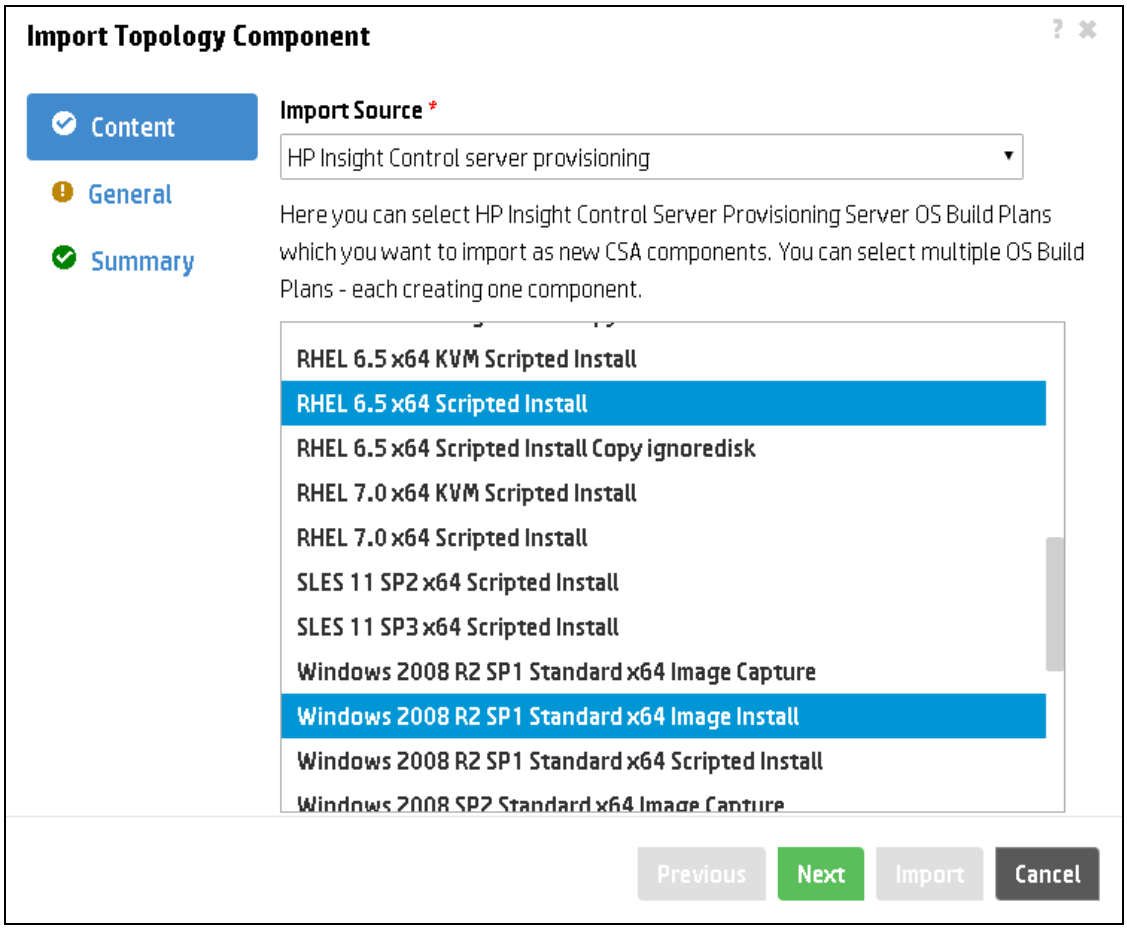
Topology components are not automatically imported from a provider when a new provider is defined in HP CSA. The below process can be used to import HP OneView and HP ICsp components after defining the providers or to bring in new or updated components from those providers later.

1. From the CSA Management Console, click **Designs**.
2. Click **Topology**, and then click **Components**.
3. Click the **Import** button.
4. From the **Import Source** drop down list, select **HP OneView**.

   HP CSA will query your HP OneView provider and display a list of 'unassigned' server profiles that can be imported as topology design components.
5. Select HP OneView server profiles as shown in the following figure, and then click **Next**.



6. Click the **General** tab, select a specific image or tags if desired, and then click **Next**.
7. Click the **Summary** tab, review your selections, and then click **Import**.
8. Click the **Import** button again to import the build plans from HP ICsp.
9. From the **Import Source** drop down list, select **HP Insight Control server provisioning**.
10. Select the build plans you wish to make available in a topology service design and click **Next** as shown in the following figure.



11. Click the **General** tab, select a specific image or tags if desired and click **Next**.

> **Note:** If you do not select an image after importing, ICsp build plans will automatically select an OS specific icon. If you are importing more than one type of OS (as shown in the above figure), it is recommended to leave the default image choice to allow the automatic selection to take place.

12. Click the **Summary** tab to review your selections, and then click **Import**.

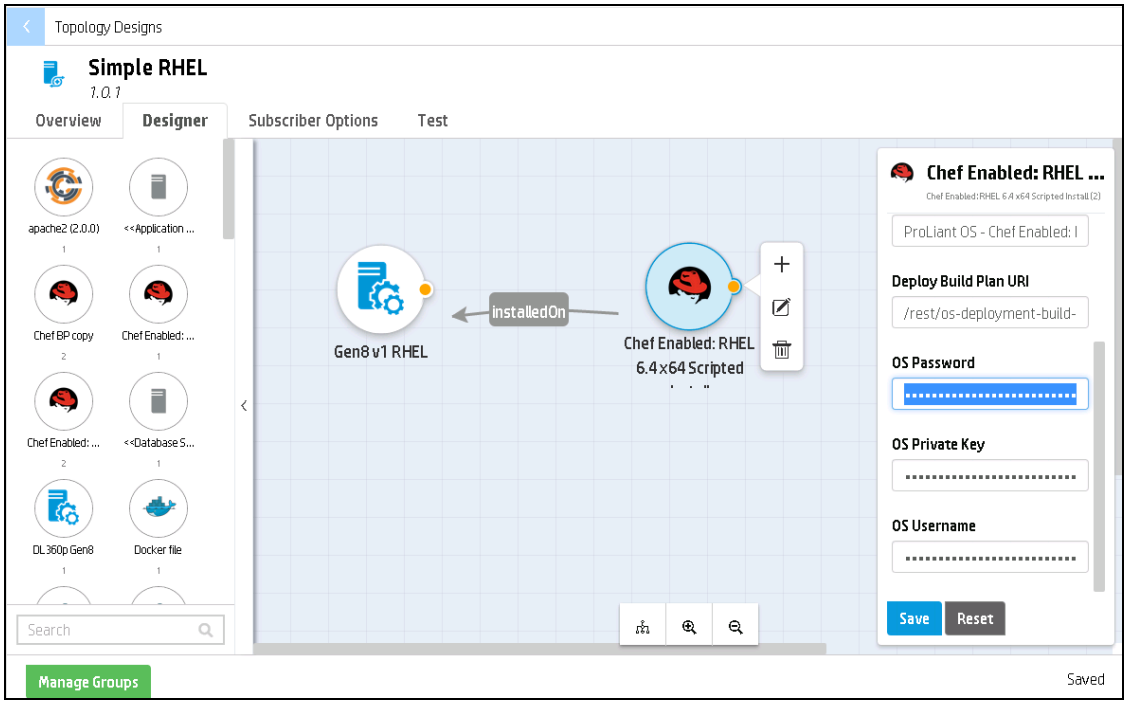
Creating simple IaaS service design

After the desired build plans and server profiles have been imported as components, it is possible to create infrastructure as a service (IaaS) service designs. The following section describes how to create a basic topology service design.

Complete the following steps to create a new service design:

1. From the CSA Management Console Dashboard, click **Designs**.
2. Click **Topology**, and then click **Designer**.
3. Click **Create**, and enter a Display Name and Description (if desired).
4. If desired, click **Change Image** and select a new Image. **Select tags** if you want to use a tag to make the design easier to locate.
5. Click **Create**.
6. Select the **Designer** tab.

   The HP OneView and HP ICsp components you imported in the previous sections are available for you to use in your new service design.
7. Drag or double-click your imported server profile to the canvas.
8. Drag or double-click your imported build plan to the canvas.
9. Drag a connector between the Build Plan and the Server Profile. Once the connector is made it will have a label 'Installed On'.



10. Select the Build Plan component on the canvas and in the component properties pane (on the right side), set the OS Password, OS Private Key (if needed), and OS Username properties as shown in the following figure.

Note: These settings do not control what the Build Plan will use during deployment (they are not inputs that influence the build plan), but instead should reflect the username and password that will be configured by the Build Plan as specified in the build plan itself or Custom Attributes settings. These properties exist so that follow-on HP CSA components are able to access the deployed OS.

11. If desired, specify a value for the **Cleanup Build Plan Name** property, or leave it blank if no cleanup is needed during *undeploy*. When specifying a cleanup build plan, ensure that you specify the entire build plan name (for example: ProLiant HW - Erase Server)

Note: By default, no OS build plan is run during undeploy. For dynamically created SAN storage, the LUN is automatically deleted when the server profile is deleted on a service cancellation.

Caution: If you choose to add an OS Build Plan to run on *undeploy*, be aware that some build plans will wipe all attached storage including shared storage. Ensure that you do not accidentally delete shared storage by verifying the actions of any undeploy build plans assigned in your service design.

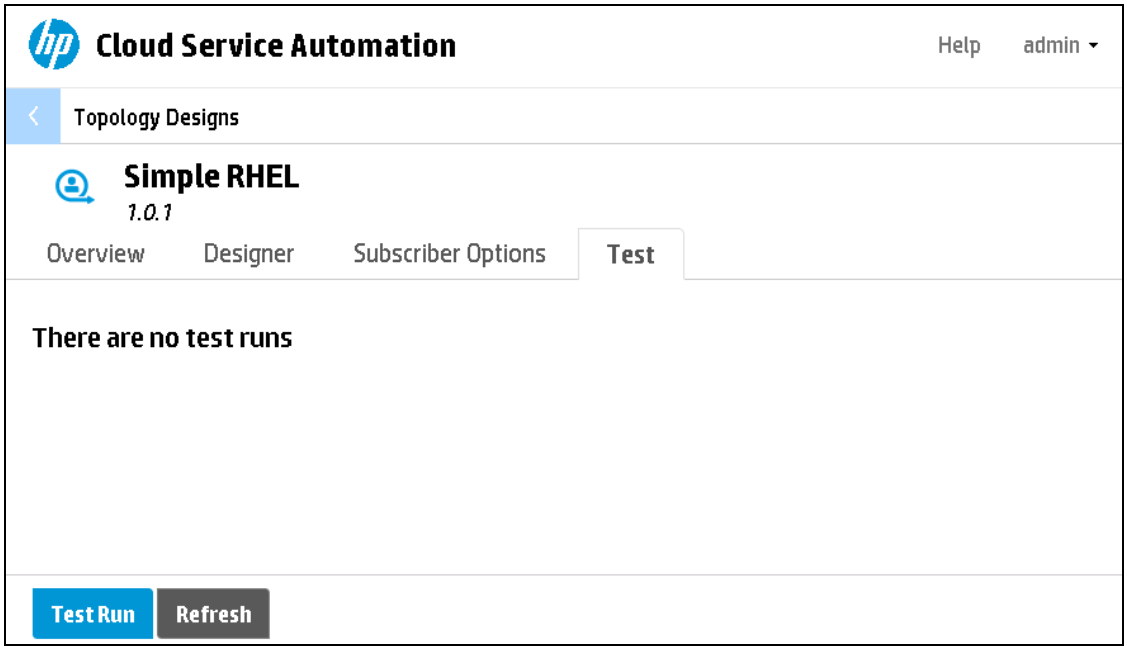
12. Click **Save** to save the property value settings.

Testing designs

Now that the design has been created and properties have been specified, it can be tested.

To test the new service design:

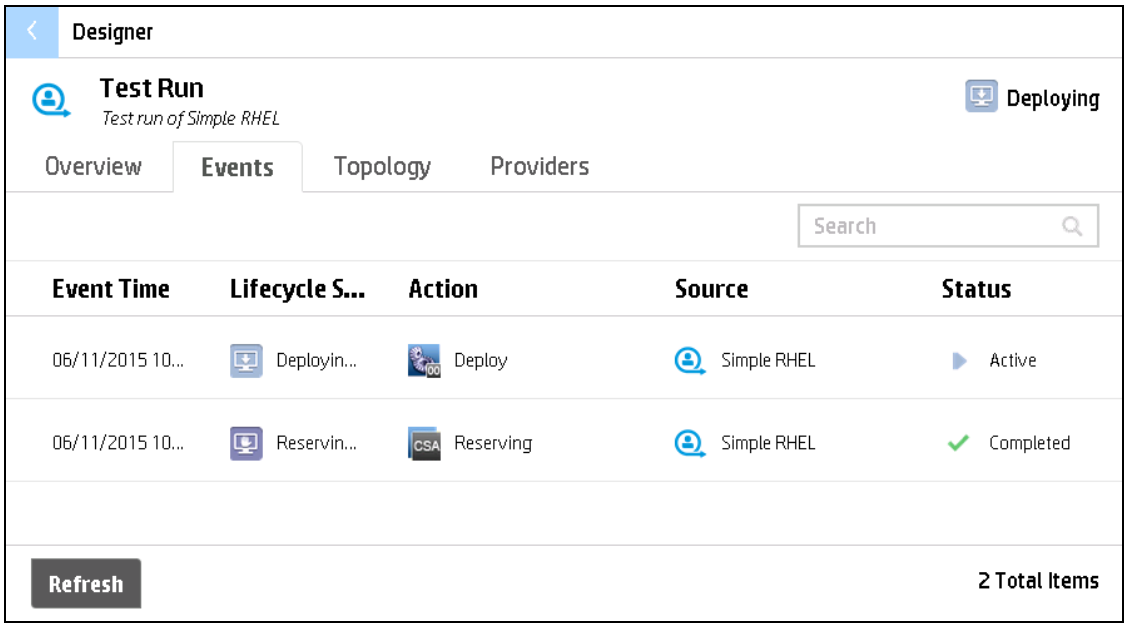
1. Click the **Test** tab, and then click the **Test Run** button.



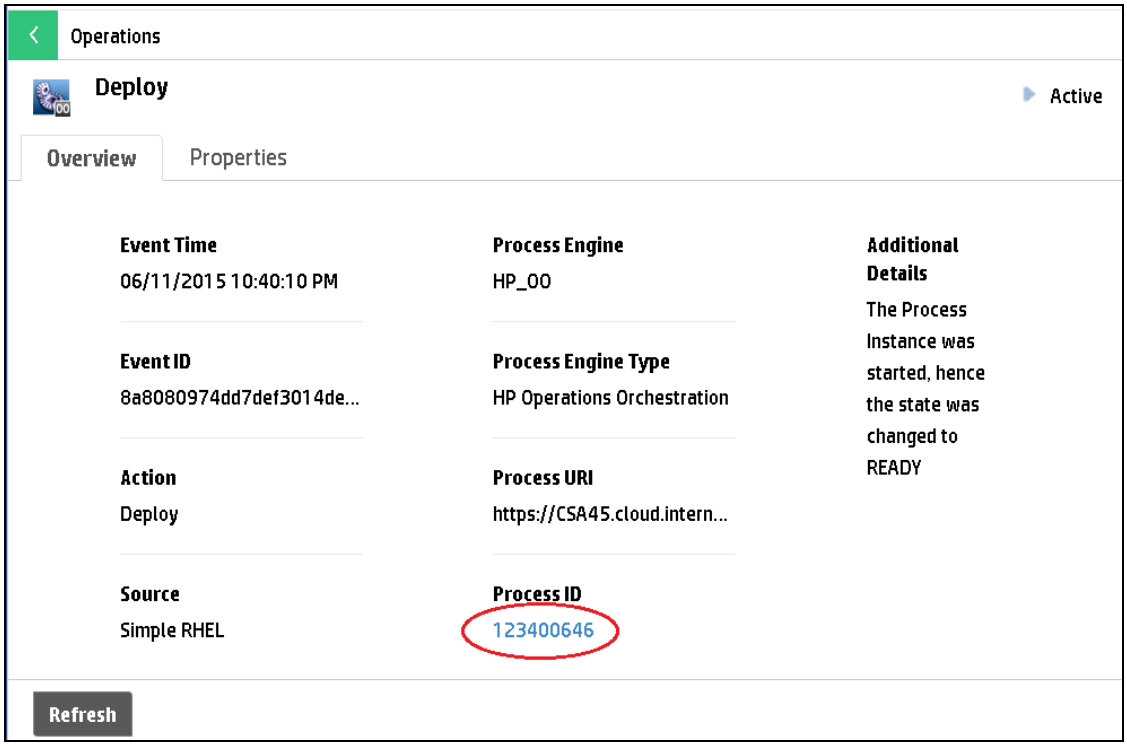
2. If desired, specify a value for the Display Name of the test run (for example, Simple Design try 1).

> **Note:** Setting a unique Display Name field will make it easier to identify workflows in HP Operations Orchestration.

3. If you have configured Environments for your HP OneView and HP ICsp providers, select the appropriate environment for deployment.
4. Click **Finish** to launch the test deployment.
5. Click the **View** button to view the progress of the job.
6. Click the **Events** tab from the Test Run screen.



7. Click the event for the 'Deploy' action from the top of the list.
8. Click the link under the Process ID to view the progress of the job from HP Operations Orchestration Central.



For information about debugging issues with service deployments, see "Appendix A: Troubleshooting" on page 263.

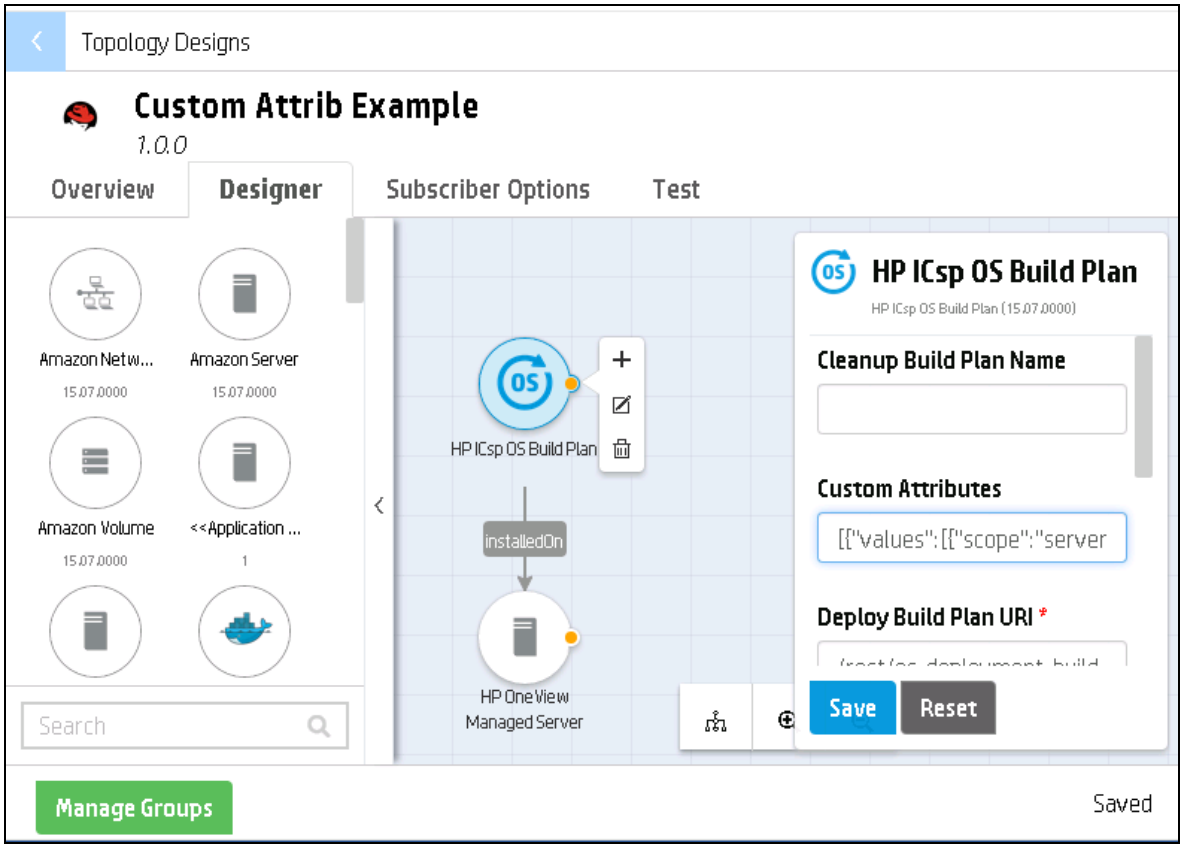
9. After successfully deploying a service with a test run, you can publish your design.

10. Click the **Overview** tab for your Topology design, and then click the **Publish** button.

    Confirm that you wish to publish your design when reminded that after publishing it cannot be modified. If you need to edit the service design, create a new version, test it, and then publish the new version.

Creating service designs with HP ICsp custom attributes

In the simple IaaS design described above, no guidance was given regarding the Custom Attributes property of the Build Plan component. For most OS Build Plans that ship out-of-the-box with HP ICsp, there are no required custom attributes, but if you have a build plan that requires custom attributes or you wish to set one or more optional custom attributes, this can be specified using the Custom Attributes property as shown in the following figure.



The value specified for this property should be a JSON formatted string that defines custom attributes in the format expected by the HP ICsp REST API as the value specified for the component property above will be passed through to a PUT call of the /rest/os-deployment-servers/{id} API.

As each build plan accepts different attributes, the below JSON sample simply focuses on showing the proper format for hypothetical key1 and key2 custom attributes. Review the attributes documented in your build plan for which specific key/value pairs are supported. As per the JSON specification, you can specify values with or without spacing as to your preference; however the compressed format shown in figure X will typically be easier to read on HP CSA and HP Operations Orchestration web pages.

The examples below only specify 'server' scoped attributes. This is the only scope supported by HP CSA Custom Attributes property for HP ICsp OS build plans components.

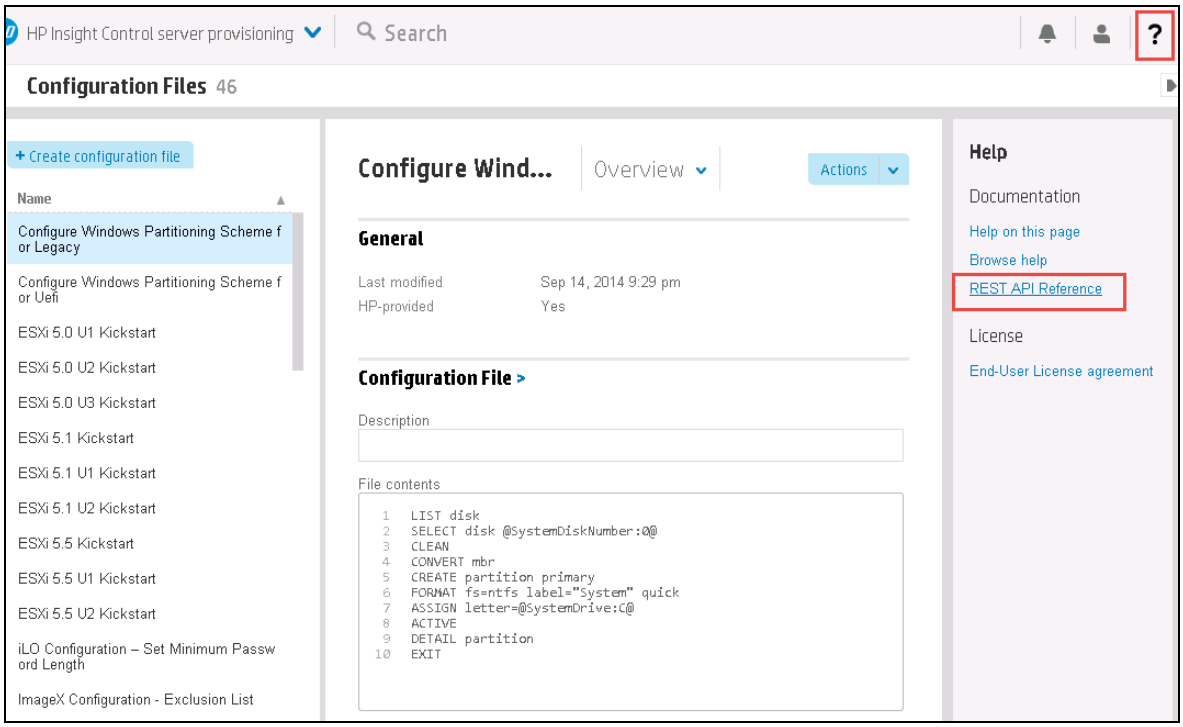
```
[{"values":[{"scope":"server","value":"some value"}],"key":"key1"},{"values":[{"scope":"server","value":"another value"}],"key":"key2"}]
```

An example for Custom Attributes property value with spacing/indentation is given below.

```
[
    {
      "values": [
        {
          "scope": "server",
          "value": "some value"
        }
      ],
      "key": "key1"
    },
    {
      "values": [
        {
          "scope": "server",
          "value": "another value"
        }
      ],
      "key": "key2"
    }
]
```

Note: This property will overwrite the existing custom attributes values and will accept a subset of key/value custom attributes so that you do not need to provide the full existing set of (default) custom attributes along with your additions/overrides. Any existing values of the same key(s) will be overwritten, but other existing keys that were previously configured in HP ICsp will not be otherwise impacted.

For more specific guidance on the format of this JSON string, click the Help icon on your appliance and see the HP ICsp REST API documentation.



In particular, the PUT operation for the /rest/os-deployment-servers/{id} operation should be reviewed by selecting Servers from the Deployment section of the API reference.

Due to the potential for error or wide influence on the build plan deployment the Custom Attributes property should be approached with care:

- HP recommends you always perform a test run of your design each time the Custom Attributes property has been modified to validate it has the desired effect.
- It is not recommended for this property to be exposed to consumer users to control (in an option set) or to view and is therefore defaulted to not being consumer visible.

Creating service design including Chef component

The design created in the "Creating service designs with HP ICsp custom attributes" can be modified to include deployment of any component type that utilizes the Server Capability relationship to perform additional configuration of the server. Examples of such components are Chef cookbook and Puppet class components.

The following steps explain how to add a Chef cookbook component to HP OneView Managed Provisioning designs. These instructions assume familiarity with configuring a Chef provider in HP CSA. For more information, see the *Content Provided by Chef* section in the *HP Cloud Service Automation Topology Components Guide* (software version: 4.50) on HP Software Support.

1. Confirm that your Chef provider is configured and you have imported the desired Chef cookbook component(s):

   a. Click **Providers** from the Dashboard of the HP CSA Management Console.

   b. Select your Chef provider (if a Chef provider does not exist, you can add it by following the instructions in the *HP Cloud Service Automation Topology Components Guide*).

   c. From the Chef provider page, select the Components tab and review components listed. If the desired cookbooks are listed skip to step 2 below.

   d. To add more Chef cookbook components, you must import them from your Chef server. Click the **Manage** button, which will open the components page in a new tab in your browser.

   e. Click the **Import** button at the bottom of the page.

   f. Select Chef as the Import Source and then select which cookbooks to import using a similar process to the one documented in the "Importing components" on page 83.

2. Confirm that you have the desired “Chef enabled” OS Build plan component(s):

   a. Create, or confirm you have already created, a customized ICsp OS build plan for the OS version you wish to deploy. For details, see "Appendix D: Prepare ICsp OS Build Plan to work with Chef" on page 270.

   b. Clcik **Providers** from the Dashboard of the HP CSA Management Console.

   c. Select your HP Insight Control server provisioning provider.

   d. From the HP ICsp provider page, click the **Components** tab and review the components listed. If the desired OS Build Plans are listed, skip to step 3 below.

   e. To add more ICsp OS build plan components, you must import them from your ICsp appliance. Click the **Manage** button, which will open the components page in a new tab in your browser.

   f. Click the **Import** button at the bottom of the page.

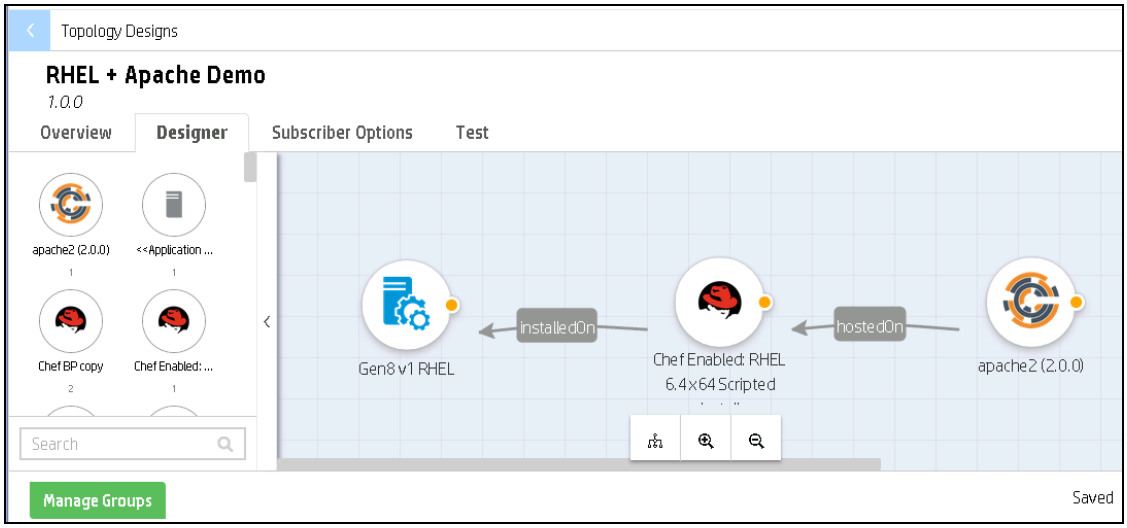
   g. Select Insight Control server provisioning as the Import Source and then select which OS build plans to import as per step 8 in the "Importing components" on page 83.

3. Navigate to the Topology Designs page by clicking **Designs** > **Topology** > **Designer**.

4. Create a new simple IaaS service design, that uses the desired “Chef enabled” OS build plan as per the "Creating simple IaaS service design" section.

5. You can now add the desired Chef component to deploy after the OS.

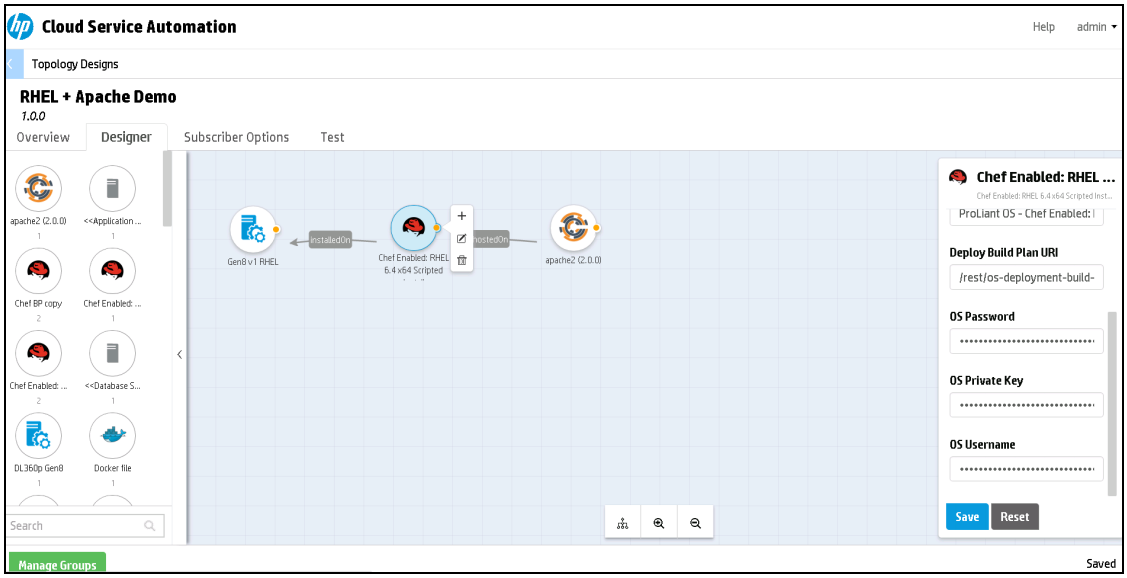
Drag or double-click on a Chef component and draw the connector between the Chef component and the ICsp OS Build Plan component. The link will appear with a *hostedOn* label. In the following figure, an Apache2.0.0 component has been added.



6. Confirm the OS Password and OS Username properties have been set as discussed in the "Creating simple IaaS service design" section(step 10).

   Since OS Password and OS Username are confidential properties, you might find it difficult to confirm. In such case, reset the user name and password.. These properties must be set for the Chef cookbook to deploy successfully.

7. Click the **Test** tab to test your design. After verifying that your service design works as expected, publish the service design.



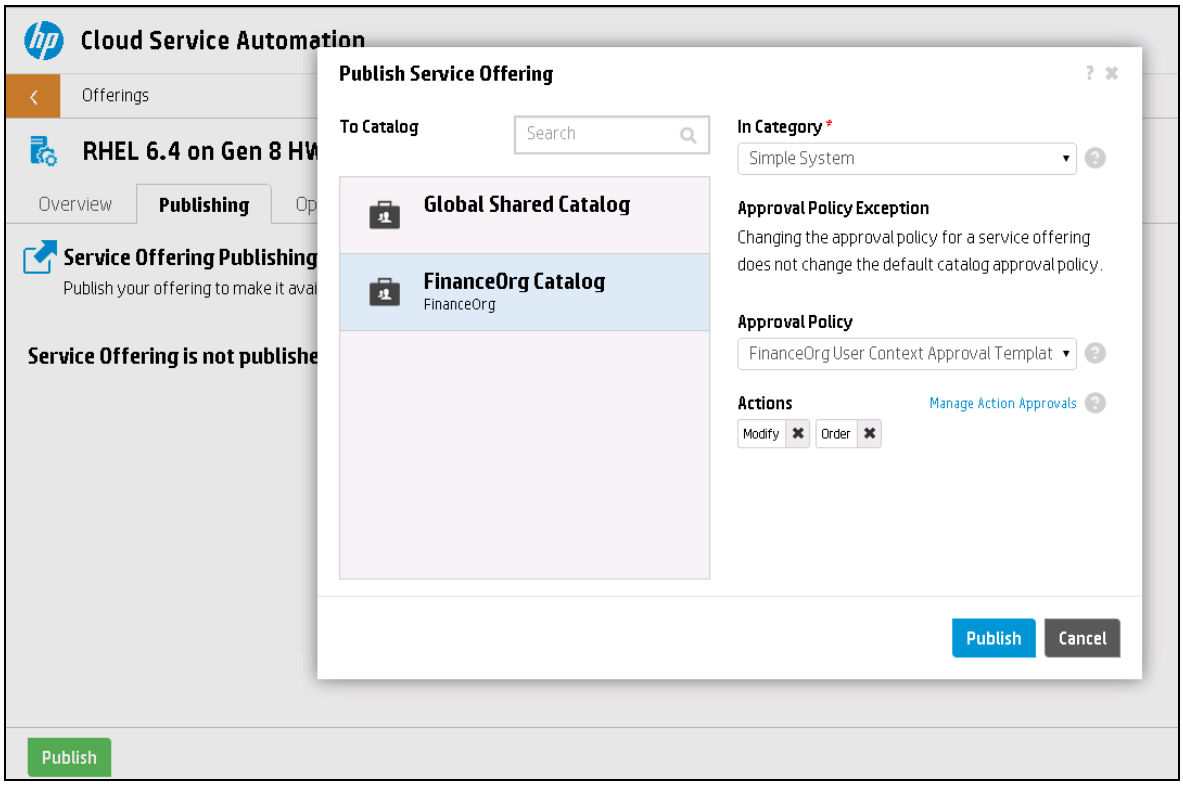
Creating service offerings

Service offerings are created from service designs and published to a catalog available from the CSA Marketplace Portal.

1. From the CSA Management Console, click **Offerings**.
2. Click the **Create** button.
3. Click  under Service Design to display a list of available service designs.
4. Select the service design you published, and then click the **Select** button.
5. Enter a Display Name and Version Name. The Display Name followed by Version Name is the Service Offering name that the end user will see from the CSA Marketplace Portal.
6. Enter a description and change the image if desired. Click **Create**.
7. If desired, click the **Pricing** tab and set the price for your service.
8. Click the **Publishing** tab, and then click **Publish**.
9. Select a Catalog, Category and set Approval policy.

Note: HP recommends that you set an approval policy for your organization to ensure proper use of expensive physical server usage. Approval policies cannot be set when services are published to the Global Shared Catalog.

An example for publishing the service to the Finance Organization catalog is shown in the following figure.



10. Click the **Publish** button.

11. After publishing the service to a catalog, it will be available to the end user for subscription.

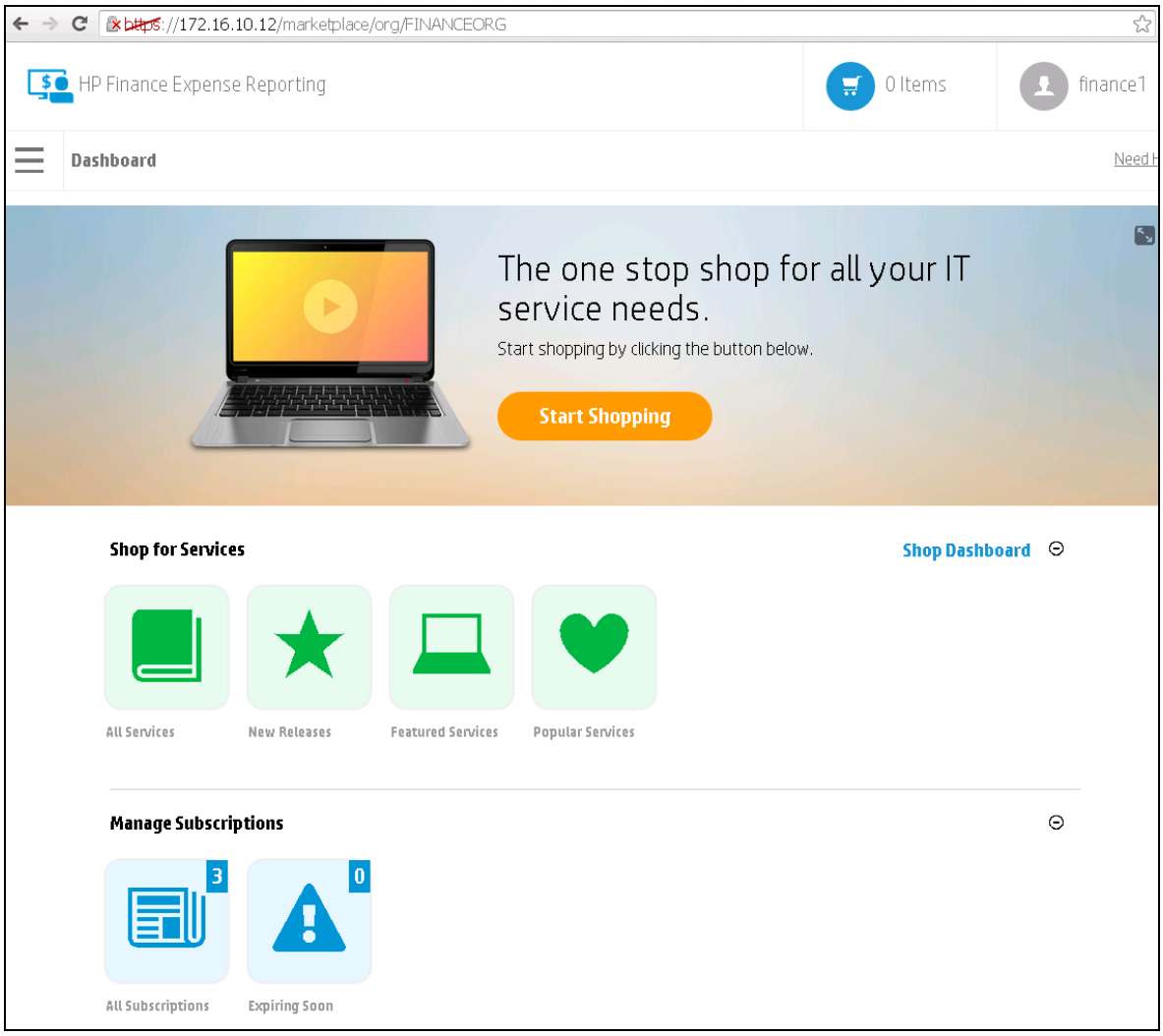
Deploying a service

Ordering and managing the service from the CSA Marketplace Portal

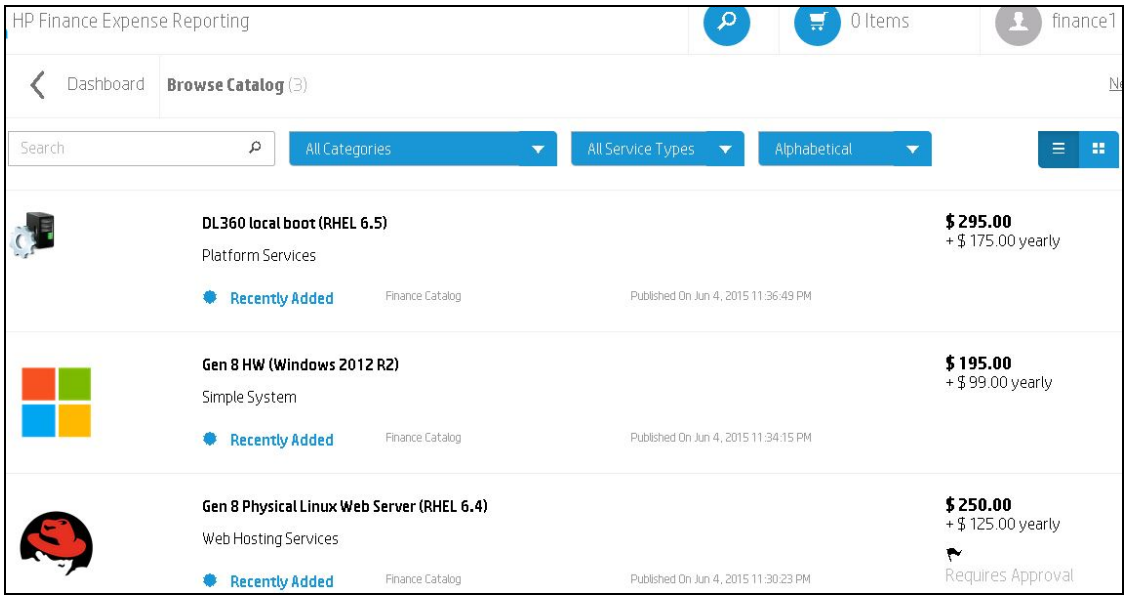
After the service is published to a catalog, an end user can order it from the Marketplace Portal. If you have configured multiple organizations in HP CSA or published your service to a catalog other than the Global Shared Catalog, log on to the appropriate Marketplace Portal for your organization.

1. Log on to the Marketplace Portal as a member of the organization you specified when the service offering was published.

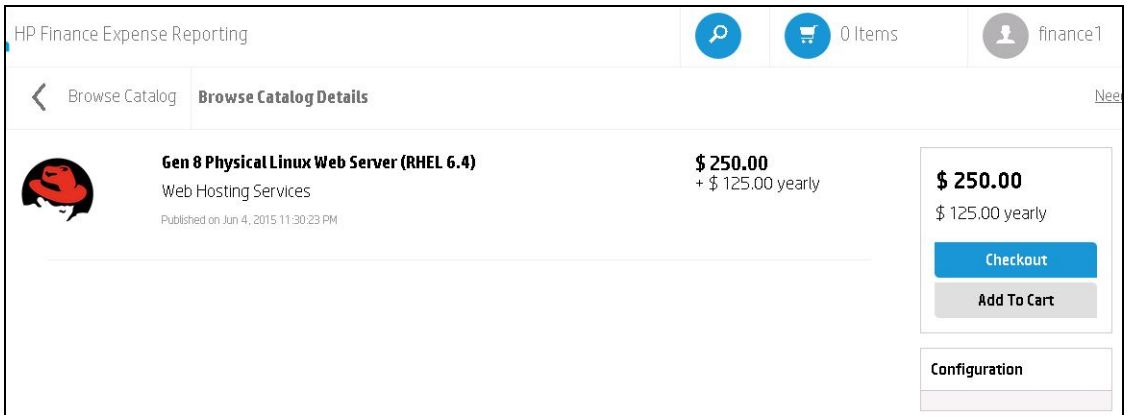
An example for Finance organization portal is shown in the following figure and finance1 user is a member of the organization.



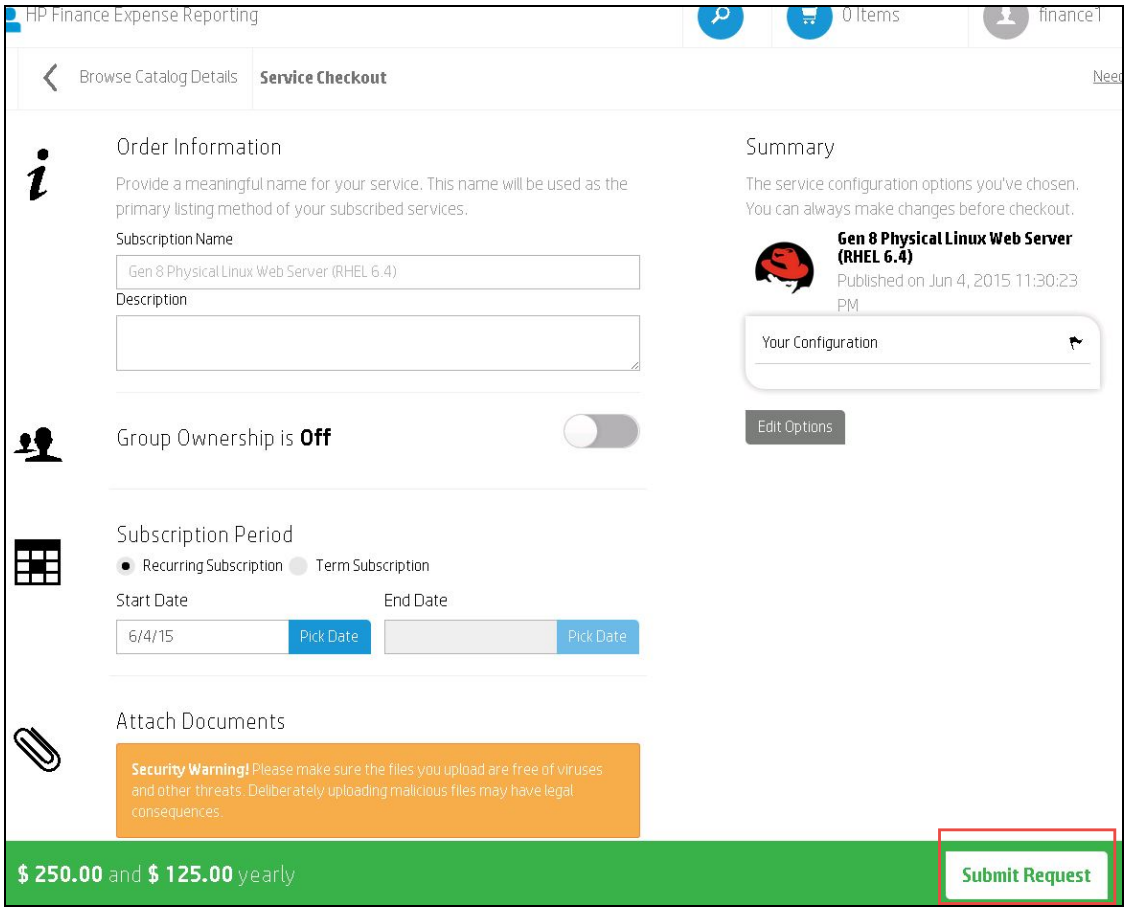
2. Click **All Services** to display the catalog of services available to the finance1 user.
3. Select the service you created to a Gen 8 Physical Linux Web Server.



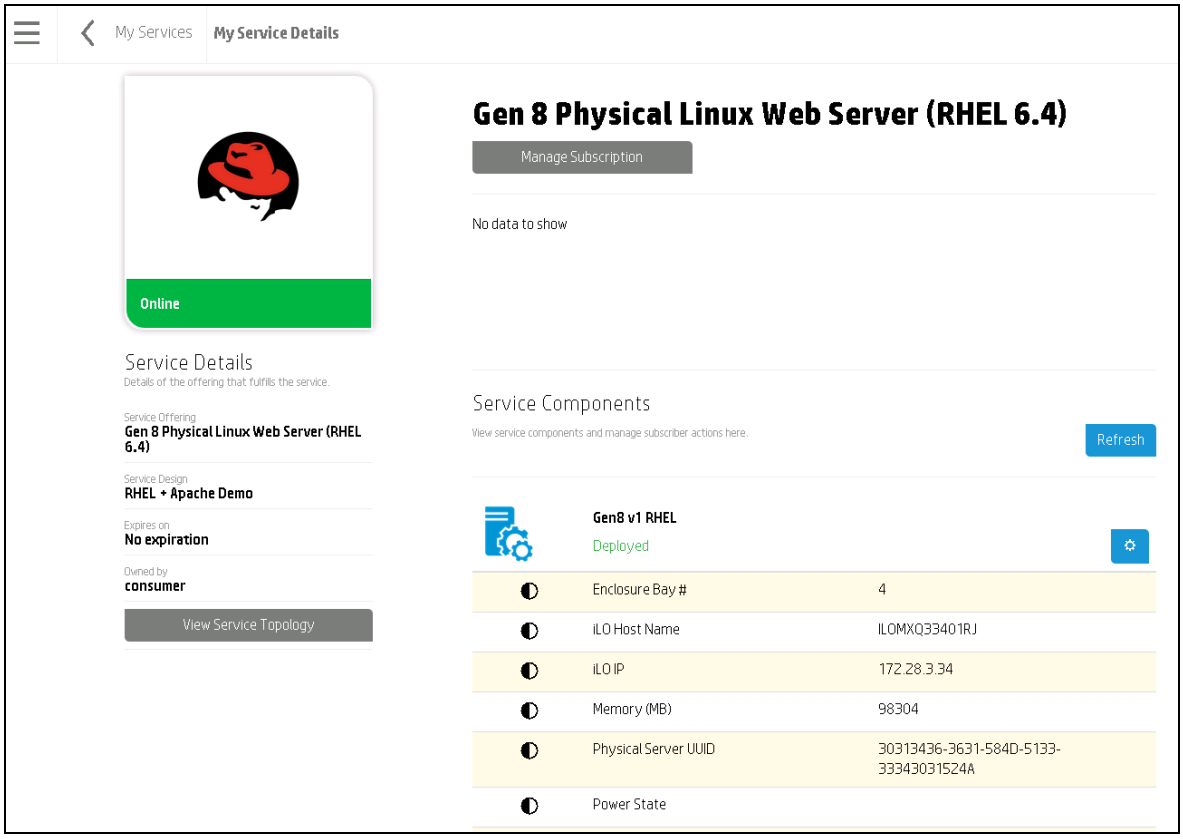
4. Click **Checkout** to proceed with the subscription.



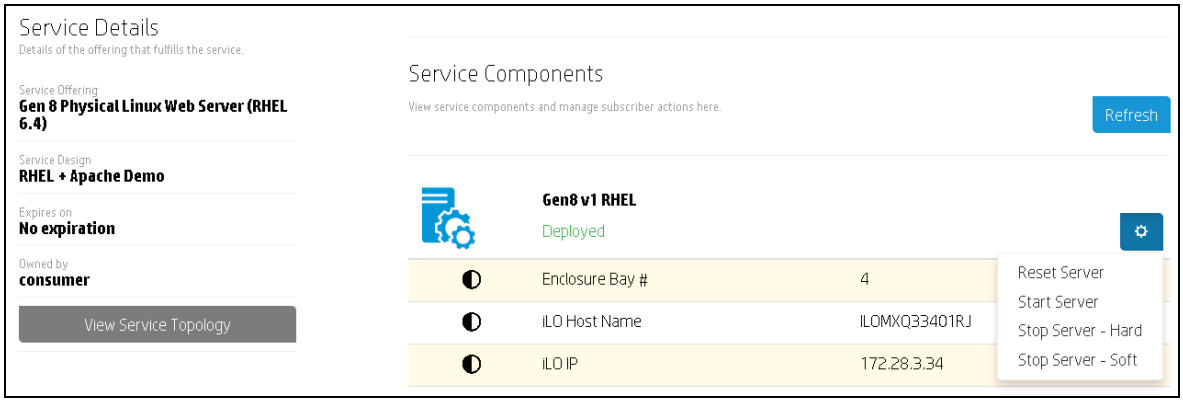
5. Provide a subscription name and description.
6. Specify the Start and End Date.
7. Click **Submit Request** to deploy the service.


HP Finance Expense Reporting
0 Items
finance1
Browse Catalog Details
Service Checkout
Order Information
Provide a meaningful name for your service. This name will be used as the primary listing method of your subscribed services.
Subscription Name
Gen 8 Physical Linux Web Server (RHEL 6.4)
Description
Group Ownership is Off
Subscription Period
Recurring Subscription
Term Subscription
Start Date
6/4/15
Pick Date
End Date
Pick Date
Attach Documents
Security Warning! Please make sure the files you upload are free of viruses and other threats. Deliberately uploading malicious files may have legal consequences.
Summary
The service configuration options you've chosen. You can always make changes before checkout.
Gen 8 Physical Linux Web Server (RHEL 6.4)
Published on Jun 4, 2015 11:30:23 PM
Your Configuration
Edit Options
$ 250.00 and $ 125.00 yearly
Submit Request

The following figures show a successfully deployed service.



After the service is successfully deployed, it can be managed from the My Services menu. The service can be stopped and restarted or deleted.



Known issues

Defect	Reason	Workaround
When using HP OneView topology components in scalable groups, server reservation errors will occur if the scalable group is set to use an instance count greater than 1.	Scalable group instances deploy in parallel creating a race condition in the HP Operations Orchestration content that is utilized by the OneView topology components. This results in all instances of the scalable group reserving the same server and a deployment failure.	This issue will be fixed in the upcoming HPLN content release in July 2015.
Importing HP CSA topology components from HP OneView may sometimes fail prior to listing available server profiles.	Unhandled timeouts or communication errors with the HP OneView appliance.	Retry the operation. In most cases, a second attempt to import the components will succeed.
Application deployment when using a HP Server Automation policy component with an HP ICsp OS Build Plan component fails.	HP Server Automation agent is not installed or configured automatically as part of the HP SA policy component deployment.	None

OpenStack

Use case: OpenStack content (Sequenced)

This section explains the steps to provision compute with storage.

OpenStack - a commercial distribution built on OpenStack technology- provides an open, scalable, highly available enterprise grade cloud platform with the agility, innovation, and economics to help to build, manage, and consume hybrid clouds.

OpenStack helps to flexibly deploy and host workloads, applications, and services across Traditional IT and into whichever cloud delivery model - public, private, or managed/hosted - that best enables your business.

HP CSA is architected to provide an open, heterogeneous, extensible single pane IT service control point with OpenStack to manage multiple cloud resource pools from HP and other providers, to design-orchestrate full stack services and IT service broker capabilities.

This integration includes HP CSA service designs and HP Operations Orchestrations workflows, which can be used to create a service offering for consumers to request and manage server instance and block storage volume from OpenStack environment.

Specific service design (OpenStack - Multitenant support) has been provided to demonstrate multi-tenancy using HP CSA Identity Management (IdM), OpenStack Identity (Keystone) API v3 and API v3 OS-TRUST extension.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Configure Cloud Service Management Console and Marketplace Portal.
- Configure providers for OpenStack Juno software in HP CSA.
- Configure OpenStack environment. This must be operational.
- Configure HP Operations Orchestration. It must be operational.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
OpenStack-Compute with Storage v4.0	OpenStack
OpenStack-Multi-Tenant Support v2.0	

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and typical service access points. You may need to change them to reflect your environment.

Provider name	Service access point
OpenStack	Provide OpenStack identity service API access endpoint: http://<openstack-identity-service-ip or host>:<port>/version Example: http://<openstack-host>:5000/v3 http://<openstack-host>:5000/v2.0 OpenStack - Multi-tenant Support v2.0 service design requires Keystone API version 3. OpenStack - Compute with Storage v4.0 service design can be used with both Keystone v2.0 and v3. Therefore, it is recommended to configure v3 endpoint as both designs supports that. User name and password: OpenStack Admin User and password. **Note:** For multi-tenancy, provider user needs to be the same as integration account user or transport user configured in the IdM.

To create a resource provider, complete the steps in "Creating resource providers" on page 20.

Configuring property file

HP CSA 4.50

Deploy the `provider.properties` file from the `<CSA-Installation-Path>\<csa jboss path>\standalone\deployments\csa.war\propertysources` folder to the HP CSA server under the path `<CSA-Installation-Path>\<csa jboss path>\modules\system\layers\base\sun\jdk\main\service-loader-resources`

Note: The display name entered while configuring the provider must be the same as `provider.properties` file.

If you enter provider display name as OpenStack, then the `provider.properties` file must have the following:

```
bind.os.provider.name= OpenStack
```

Service designs

OpenStack – Compute with Storage v4.0

HP CSA admin can use this design to create service offering for the consumers. To subscribe service, the user first need to select the tenant, which resources need to be utilized, and then select the appropriate server configuration.

Note: Though OpenStack supports Keystone API v2.0, it also supports v3. Therefore, it is recommended to use v3 endpoint as provider service access point (SAP).

If the service design is manually imported, make sure that all the JSPs in the service design and os-common.jsp are placed in the following location:

HP CSA 4.50: `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\csa.war\propertysources`

OpenStack - Multi-Tenant support v2.0

This design supports multi-tenancy or user context enable or disable switch in the form of subscriber option 'User Context & Tenant Name'. HP CSA administrator must update this option with appropriate value while creating service offering and make it invisible to consumers.

Note: The Openstack multi-tenant service design, when used on a CSA 4.5 instance with IdM secondary authentication enabled, is supported with only one OpenStack provider defined. If there are 2 or more OpenStack providers defined and IdM secondary authentication is enabled, then the service offering in Marketplace Portal might have issues in loading.

Example:

- Value: “true#<tenant name>”

  In this case, multi-tenant or user context is set to true. It takes HP CSA user and the logged in organization into account to work with the provider to process request.

- Value: “false#<specific tenant name in openstack>”

  In this case, multi-tenant or user context is disabled. So, it takes the provider configured user and <specific tenant name in openstack> into account while processing user request.

  This requires provider service access point to be configured with Keystone API v3 endpoint.

Note: If the service design is manually imported, make sure that all the JSPs in the service design and os-common-v3.jsp are placed in the following location:

HP CSA 4.50: `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\csa.war\propertysources`

For more information about muti-tenancy support, see "Multi-tenancy support" on page 113.

Associating resource offerings with providers

New resource offerings that were imported with the service design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
OpenStack – Flex Server Count v2.0	OpenStack
OpenStack – Compute v2.0	OpenStack
OpenStack – Compute Actions v3.0	OpenStack
OpenStack – Storage v1.0	OpenStack
OpenStack – Storage Actions v2.0	OpenStack
OpenStack Keypair v1.0	OpenStack

To associate resource offerings with providers, complete the steps in "Associating resource offerings with providers" on page 27.

Configuring instance details email for subscription

Before subscribing, the user can edit the default properties, which are included in the instance details email.

To configure the email with subscription details:

1. Click **OpenStack – Compute v2.0** resource offering.
2. Click the **Properties** tab.

   Default properties of the created instance will be displayed.
3. Modify the properties if required, and then click **OK**.

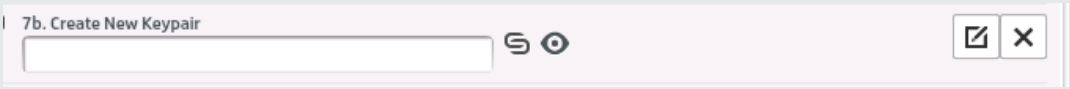
Upon successful subscription, the user receives the email with the details specified.

Publishing service design

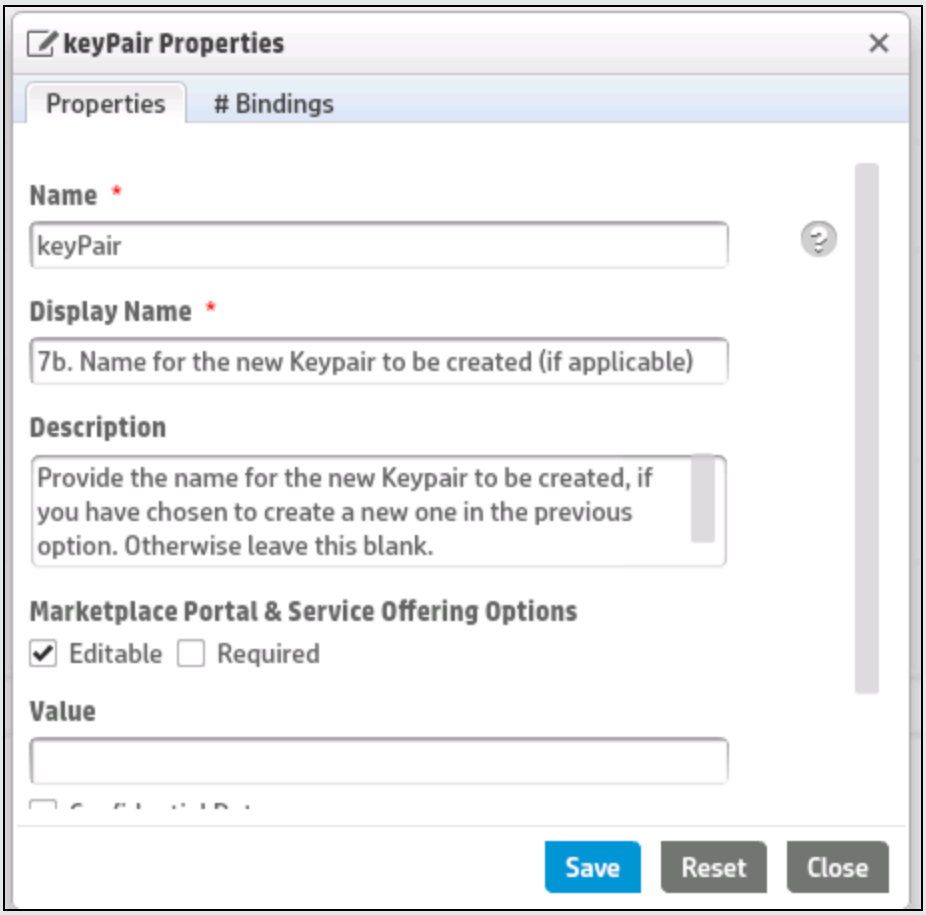
Before publishing the OpenStack - Multi-tenant support v2.0 service design, you must complete

the following steps:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** >**Sequenced** > **Designer**.
3. Click the **OpenStack – Multi-tenant v2.0** service design.
4. Click the **Subscriber Options** tab.
5. Click the **Expand all the option sets**  and the **Show all the properties**  icons to view all the properties.
6. Click the **Edit** icon of the property '7b.Name of the key pair to be created (if applicable)'.



7. In the **KeyPair Properties** window, clear the **Required** check box.



8. Click **Save** in the KeyPair Properties window. You must click the Save button in the Subscriber Options tab.

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish service offering to the Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

To monitor the status of subscription, click the **Subscriptions** tab.

Based on network latency, loading dynamic values from the OpenStack portal will vary. If Marketplace Portal shows an internal error, increase the "Dynamic Property Fetch Retrieve Data Timeout" and "Dynamic Property Fetch Response Data size limitation" values in the `csa.war property` file, which is under the path `<CSA-Installation-Path>\<csa jbosspath>\standalone\deployments\csa.war\WEB-INF\classes\csa.war`.

The following table lists the required subscriber options:

Subscriber option	Value
Tenant Name	Tenant/project name in OpenStack
Availability Zone	The name of the availability zone
Flavor	The flavor reference for the desired flavor for your server instance
Image	The image reference for the desired image for your server instance
Private Network Name	The name of the Private network. Subscribers can select more than one network

Subscriber option	Value
Public Network Name	The name of the Public network
Keypair Details	The name of the security key used with the new server. The user can select from the existing keypair or create a new keypair. If the user creates a new keypair and if LDAP is configured, the private key is sent through an email. If the user wants to create a new Keypair, then the user needs to select the Create a new Keypair option from the Select from existing Keypair drop down list.
Security Group Name	The name of the security group used with the new server
Server Name Prefix	The prefix name for the new server

The following table lists the required subscriber options if OpenStack Block Storage Options is selected.

Subscriber option	Value
Volume Name	The display name for the new volume
Volume Description	A description for the new volume
Volume Size in GB	The size, in gigabytes for the new volume

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP Operations Orchestration flows

Flows used in this integration, including its input, parameter name, and description are described here.

Openstack Compute - Deploy

Creates a new server instance.

Type	Parameter name	Description
Input	imageName	Image which has to be deployed.

Type	Parameter name	Description
Input	flavorName	Flavor name using which instance has to be created.
Input	keypairname	Name of the Keypair to use.
Input	serverName	Specifies the name for the VM.
Input	tenantName	A name for the tenant/project that is unique within OpenStack.
Input	privateNetwork	Name of the private network.
Input	floatingIPPool	Name of the public network.

Openstack Compute - UnDeploy

Deletes a server instance.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

Openstack Compute – Hard Reboot

Performs a hard reboot of a server. A hard reboot (HARD) is equivalent to power cycling the server.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

Openstack Compute – Soft Reboot

Performs a soft reboot of a server. In a soft reboot (SOFT), the operating system is signaled to restart, which allows for a graceful shutdown of all processes.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

Openstack Compute – Start Server

Returns a STOPPED server to ACTIVE status.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

Openstack Compute – Stop Server

Description: Halts a running server and changes status to STOPPED.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

Openstack Compute - Suspend

Suspends a server and changes its status to SUSPENDED.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

OpenStack Compute – Resume Server

Resumes a SUSPENDED server and changes its status to ACTIVE.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

OpenStack Compute – Associate Floating IP

Associates floating IP to a server.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

OpenStack Compute – Disassociate Floating IP

Disassociates floating IP from the server.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

OpenStack Compute – Refresh

Refreshes the state of the server.

Type	Parameter name	Description
Input	serverId	Specifies the server ID for the VM
Input	tenantId	Tenant ID

OpenStack Storage– Add Storage Volume

Creates a new volume.

Type	Parameter name	Description
Input	volumeSize	The size, in gigabytes, for the new volume.
Input	volumeDisplayName	The display name for the new volume.
Input	volumeDisplayDescription	A description for the new volume.

OpenStack Storage– Remove Storage Volume

Type	Parameter name	Description
Input	volumeID	The ID of the volume to delete.

OpenStack Storage– Extend Volume

Type	Parameter name	Description
Input	volumeSize	The size, in gigabytes

OpenStack Storage– Create Snapshot

Creates a new snapshot.

Type	Parameter name	Description
Input	displayName	The name of the snapshot to be created.
Input	displayDescription	The description of the snapshot to be created..
Input	volumeId	The ID of the volume from which to create the snapshot

OpenStack Storage – Delete Snapshot

Deletes the specified snapshot.

Type	Parameter name	Description
Input	snapshotId	The ID of the snapshot to delete

OpenStack Storage – Add Storage Volume from Snapshot

Creates a new Volume from a snapshot.

Type	Parameter name	Description
Input	volumeSize	The size, in gigabytes, for the new volume.
Input	volumeDisplayName	The display name for the new volume.
Input	volumeDisplayDescription	A description for the new volume.
Input	snapshotId	The ID of the snapshot from which to create the new volume

Set up an attached volume

After you create a Block Storage Volume and attach it to an instance, you need to perform the following tasks within the instance to prepare the attached volume for use.

Use SSH to connect to your server

To use SSH to log on to your instance, type the following command:

```
$ ssh –i <keypair><myinstance>@<ipaddress>
```

For example:

```
$ chmod 0600 keypair1.pem
$ exec ssh-agent bash
$ ssh-add keypair1.pem
$ ssh -i keypair1.pem cirros@10.11.12.5
```

Format the volume

1. To ensure that the device for new volume is present, type the following command:

   ```
   $ ls /dev/vdb
   /dev/vdb
   ```

2. To format the volume, type the following command:

   ```
   $ mkfs /dev/vdb
   ```

Mount the volume

1. To mount the newly formatted disk, type the following commands:

   ```
   $ mkdir /Test
   $ mount /dev/vdb /Test
   ```

2. To verify that the newly mounted volume has the correct size, type the following command:

   ```
   $ df -h
   ```

   Output similar to the following is displayed:

Filesystem	Size	USed	Available	Used%	Mounted on
/dev	998.2M	0	998.2M	0%	/dev
/dev/vda	387.4M	10.4M	357.0M	3%	/
tmpfs	1001.8M	0	1001.8M	0%	/dev/shm
tmpfs	200.0K	96.0K	104.0K	48%	/run
/dev/vdb	1007.9M	1.3M	955.4M	0%	/Test

   You can see from the output that the Cinder-created volume has the correct size. This indicates that the process has worked end-to-end.

Multi-tenancy support

In HP CSA, an organization is an entity defined by the HP CSA administrator and can be a company, business unit, department, or group. Membership in an organization is determined by the organization's identity management configuration, which HP CSA accesses to authenticate the user's login credentials with OpenLDAP or Microsoft Active Directory. The administrator determines a member's entry point into the cloud and associates each member with services and resources.

HP CSA identity management (IdM), apart from the primary authentication with OpenLDAP or Microsoft Active Directory it supports configuration of secondary authentication with OpenStack Identity (keystone) service to enable an integration account or transport user to perform OpenStack actions on behalf of another user. On successful secondary authentication against keystone, generate a Keystone Trust ID using the authenticated user as the Trustor and the configured integration account as the Trustee.

In OpenStack, a project is a logical grouping of users, and is used to define quotas and access to virtual machine images.

In OpenStack, an administrator implements multi-tenancy by manually mapping HP CSA organizations to OpenStack projects. This mapping is established through the use of a directory service: OpenLDAP or Microsoft Active Directory.

Note: Mapping can be established manually without Keystone being configured to use OpenLDAP or Microsoft Active Directory.

The following table shows the examples for supported mapping:

CSA	OpenStack
CSA Organization (Marketing) • mkt_user1 • mkt_user2	Project (MARKETING) • mkt_user1 • mkt_user2
CSA Organization (Engineering) • eng_user1 • eng_user2	Project (ENGINEERING) • eng_user1 • eng_user2

Mapping organizations to projects and identity management secondary authentication with Keystone ensures that all subscription requests from organization users are fulfilled in the context of user and the corresponding project.

- Resources from only the user's project are consumed.
- Integration account to perform OpenStack actions on behalf of requested user.

HP CSA organization user can then use the Marketplace Portal to check out an offering and create a subscription in HP CSA market place portal. HP CSA logs in to OpenStack using the relevant project user credentials and orchestrates the provisioning of instances.

Multi-tenancy can be implemented by following the three steps below:

1. Enabling Keystone authentication in IdM.

   Set `idm.keystone.enabled = true` in the file `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\idm-service.war\WEB-INF\spring\applicationContext.properties`.

2. Creating an OpenStack Resource Provider in CSA Management console.

   Provide the Service Access Point for Keystone service and the IdM Keystone Integration account credentials.

   Specify following properties for the OpenStack provider:

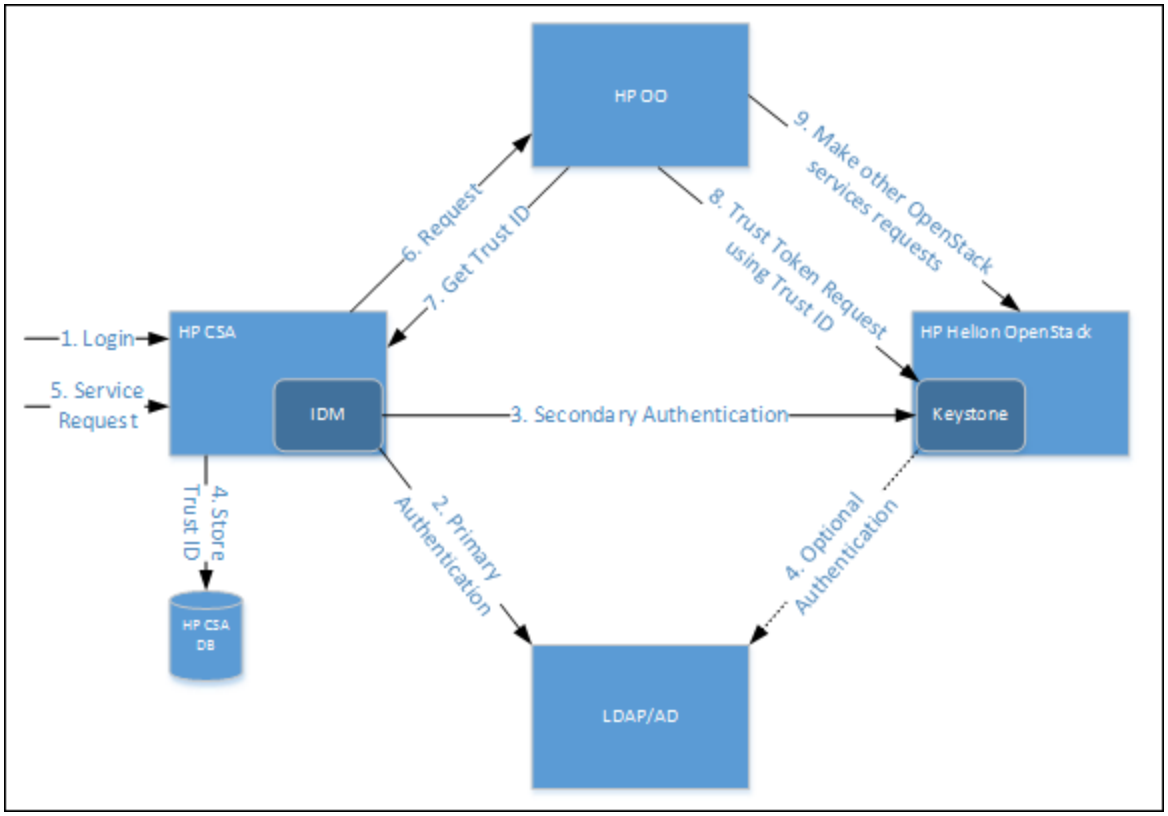
   - Project - Enter the project in OpenStack in which provisioning should occur when provisioning topology designs in which enableUserContext is set to False for every OpenStack component in the design. If all OpenStack designs set enableUserContext to True, the Project may be left empty, and the subscriber will be able to select the project at provisioning time from the set of projects to which the subscriber is authorized.
   - Domain - Enter the domain in OpenStack that should be used. This domain must be configured for authentication in the same fashion as the consumer organizations for which this provider will be used.

- Transport Token - When checked, a domain-scoped transport token will be used for communication with OpenStack. When unchecked, a project-scoped transport token will be used. The provider user must have administrative rights on the domain in order to use domain-scoped transport tokens.

3. Setup organization in HP CSA with a directory service endpoint: OpenLDAP or Microsoft Active Directory that is also configured in the OpenStack Keystone instance.

Mapping CSA organizations LDAP to LDAP of OpenSTack Keystone instance and identity management secondary authentication with Keystone ensure that all subscription requests from organization users are fulfilled in the context of user and the selected project.

The sequence of operations performed in multi-tenancy is shown in the figure below.



In general, this feature works as follows:

- Following a successful authentication against one of the primary mechanisms (LDAP, Active Directory), attempt to authenticate against a secondary mechanism (Keystone) using the same credentials and organization.
- On successful authentication against Keystone, generate a Keystone trust ID using the authenticated user as the trustor and the configured integration account as the trustee.
- As needed, use the Keystone trust ID to generate a Keystone impersonation token so that provider account configured can perform OpenStack actions on behalf of the truster.

Note: Integration account configured in IdM for secondary authentication and OpenStack provider configured in HP CSA should be the same.

Verify secondary authentication

Log on to HP CSA Organization consumer portal (example: ENGINEERING/engg_user1) and verify the IdM logs at `<CSA install path>\<Jboss…>\standalone\log\hpcloud-idm-service.log`

```
2014-11-13 16:02:29,731 [http-/0.0.0.0:8444-7] INFO
com.hp.ccue.identity.authn.MultiTenantAuthenticationProvider - Authentication
succeeded for user engg_user1
```

```
2014-11-13 16:02:30,786 [AsyncAppender-Dispatcher-Thread-80] INFO
com.hp.ccue.identity.audit.CSAAuditor - Audited event:
{1415923350685:AUTHENTICATION:LOGIN:IDM:engg_user1:ENGINEERING:CSA42-
OO1020:null:Authentication success}
```

Limitations

Limitations of this implementation are:

- Does not support instance customization like hostname and DNS.
- Supports configuration of CSA IdM to work with single Keystone. Hence, the multi-tenancy feature is also supported with single Keystone.
- Supports configuration of JSPs to work with only one provider from a given provider type.

Troubleshooting

If the public network selected by subscriber does not have a router interface with the selected private network, it will fail to associate a Floating IP.

If you already have any subscription using Keystone v2.0, then configuring provider to v3 might fail.

If the user wants to create a new Keypair, then, the user needs to select “--Create a new Keypair--” option from the **Select from existing Keypair** dropdown list.

Use case: OpenStack Topology

This section explains how to integrate HP CSA with OpenStack based private cloud environments such as HP Helion OpenStack and any other OpenStack Cloud.

This implementation includes HP CSA service designs and HP Operations Orchestrations workflows that can be used to create a service offering for consumers to request and manage server instance, block storage volume and network from an OpenStack environment.

Key features supported by this implementation are:

- Multiple OpenStack Keystone Providers.
- Ability to impersonate a user using IdM Keystone Secondary Authentication.
- Ability to add Scalable Stack of Components in the topology design.
- Following OpenStack topology components:
  - OpenStack Server
  - OpenStack Volume
  - OpenStack Network Interface
  - OpenStack Security Group
  - OpenStack Floating IP
  - OpenStack Private Network
  - OpenStack External Network
  - OpenStack Router
  - OpenStack Load Balancer
  - OpenStack Swift Container

The following table lists the contents included in CSA OpenStack Topology Capsule:

Component	Name
Service Design	OpenStack Basic Compute, Storage and Network
Service Design	OpenStack Swift Container
OO Content Pack	CSA-OPENSTACK

Component	Name
JSPs	csa-openstack-common-v3.jsp
	csa-openstack-ext-networks-v3.jsp
	csa-openstack-priv-networks-v3.jsp
	csa-openstack-subnets-v3.jsp
	csa-openstack-routers-v3.jsp
	csa-openstack-flavors-v3.jsp
	csa-openstack-images-v3.jsp
	csa-openstack-keypairs-v3.jsp
	csa-openstack-securitygroups-v3.jsp
	csa-openstack-zones-v3.jsp
	csa-openstack-volume-types-v3.jsp
	csa-openstack-swift-storage-policies.jsp
	csa-openstack-swift-quota-bytes.jsp

Supported OpenStack API versions

The following table lists the supported Openstack API versions for using this content:

Service	Version
Nova (Compute)	v2
Keystone (Identity)	v3
Neutron (Network)	v2.0
Cinder (Block Storage)	v1
Glance (Image)	v2.0
Swift Object Store	v1

Configuration requirements

Complete and test the following configurations before you set up this implementation:

- Configure HP CSA Cloud Service Management Console and Marketplace Portal.
- Configure providers in HP CSA for OpenStack environment.
- Configure OpenStack environment. It must be operational.
- Configure HP Operations Orchestration. It must be operational.

Configuring service offerings

Configuring organization and catalog

Note: HP recommends setting up separate organizations for each OpenStack instance and configure the same LDAP that your Keystone service points to. This is to make sure that the CSA users in the particular organization are in sync with Keystone users.

To configure organization and catalog:

1. Create Organization
    a. Go to Cloud Service Automation Management Console > **Organization**.
    b. Click **Create Organization** and enter the a name of the organization.
2. Configure LDAP
    a. Provide LDAP Server Information.
    b. Provide LDAP Attributes.
    c. Provide User Login Information.
3. Configure Access Control
    a. Assign access control to LDAP groups for **Service Consumer** and **Consumer Organization Administrator** roles.
4. Configure Catalog Access Control
    a. Click **Catalog**, and then go to the default catalog created for the Organization.
    b. Assign Access Control to LDAP groups for accessing the offerings published in this catalog.
5. Configure Environments for Catalog

a. Associate Environments to the Catalog.

   The offerings published in the catalog will be able to only access the providers associated with the same environment.

Creating resource providers

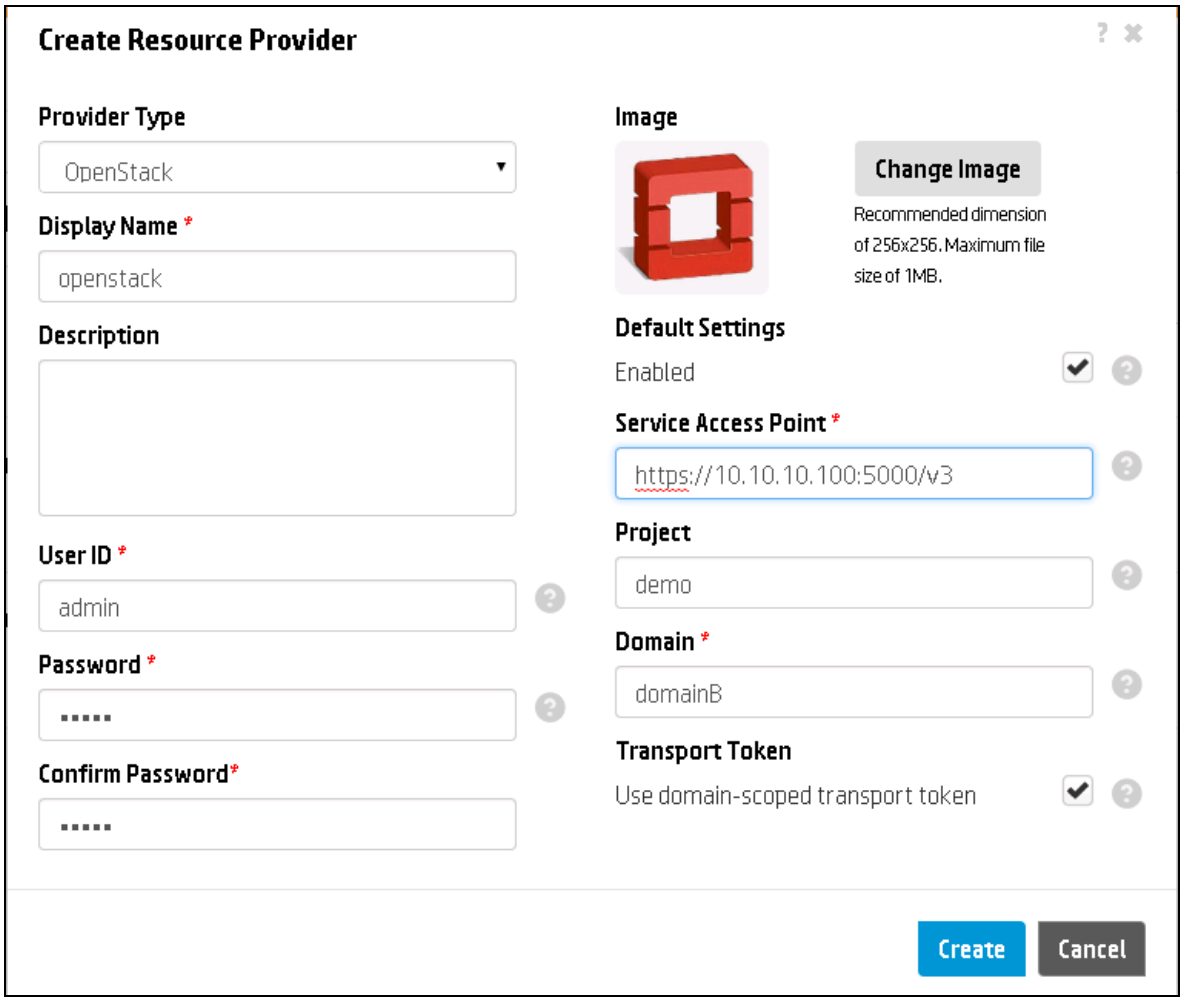
HP Cloud Service Automation supports Multiple OpenStack Keystone providers. For each OpenStack Keystone instance, you must create a separate resource provider in HP CSA under the OpenStack provider type.

OpenStack provider type needs the following input fields:

Provider input field	Description
Service Access Point	Provide OpenStack identity service API access endpoint: http://<OS-identity-service-ip or host>:<port>/version For example: http://<OS-host>:5000/v3 IdM Secondary Authentication needs Keystone v3.
User ID	OpenStack Keystone user, who can be part of multiple tenant or single tenant.
Password	Password for Keystone user.
Project	Specify the project, which is required for a user who has administrative privileges on the OpenStack system and can establish trusts for any authorized users during user login. This field is available for OpenStack providers only. This is a required field if you want to run the offering in Admin mode (that is, when user impersonation is not required).
Domain	Specify the associated Keystone domain where operations will be performed. This field is available for OpenStack providers only.
Use domain scoped transport token	Domain scoped transport token will be used if set to true.

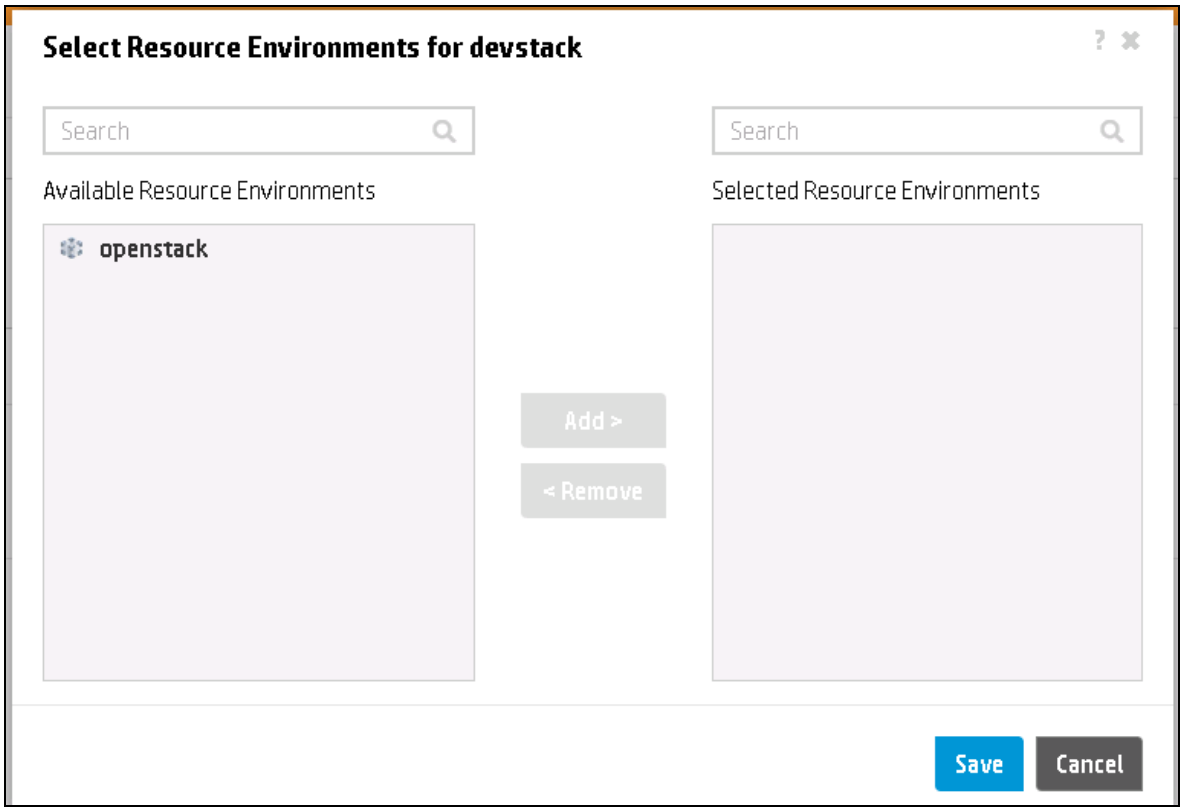
To create resource providers, complete the steps in "Creating resource providers" on page 20.

You can see the new providers on the **Providers** tab.



Note: If Keystone secondary authentication is enabled in IdM, then creating a provider of type OpenStack would also save Keystone configuration details in IdM database.

To associate the provider to an environment, click the **Environments** tab, and then select **Resource Environments** for the provider.



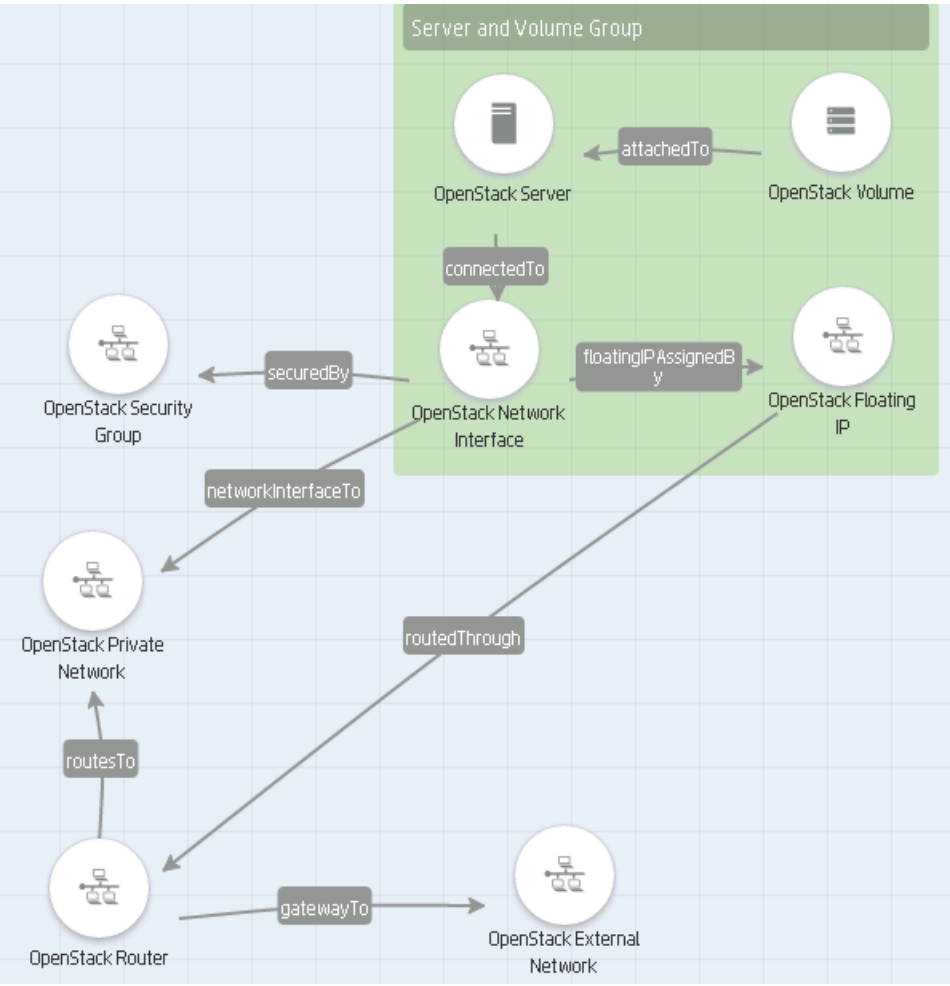
Service designs

OpenStack Basic Compute, Storage, and Network

This service design consists of following OpenStack components:

- OpenStack Server
- OpenStack Volume
- OpenStack Network Interface
- OpenStack SecurityGroup
- OpenStack FloatingIP
- OpenStack Private Network
- OpenStack Router
- OpenStack External Network

The following figure depicts the relationship between these components.



A service offering associated with this design can be used to provision one or more compute instances attached to the same number of block storage volumes. The compute instances get a private IP address from a private network and also get a Floating IP address from a public IP pool that is associated with an external network through a router. Access Control to the Server can be provided by assigning security groups.

For information about OpenStack topology components, see "OpenStack topology components" on page 137.

Option model for OpenStack topology designs

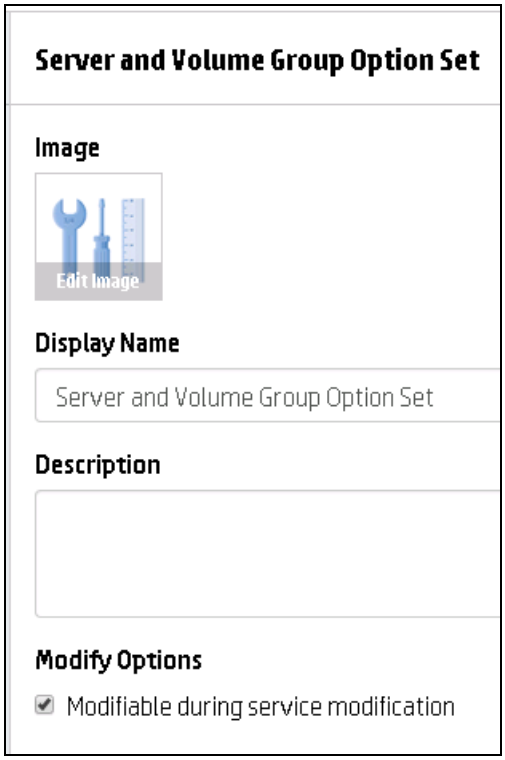
Service designer can create an option model to dynamically fetch the values for various component properties.

It is recommend to create separate option sets for modifiable and non-modifiable properties in the design.

Modifiable Option Set

Note that none of the OpenStack components in this sample design are modifiable. However, if a managed group is present in the design then one can scale-out the members of the group by modifying the subscription. This is accomplished by including a modifiable option set (“Modifiable during service

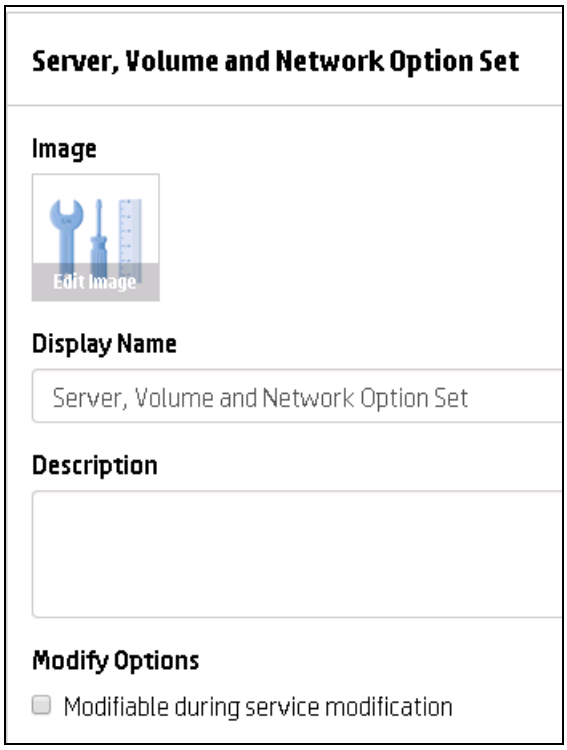
modification" attribute of option set should be checked) in the design with the only modifiable property being the instanceCount property of the managed group.



Note: OpenStack Load Balancer component is also a modifiable component with the modifiable property being ipAddressList. However, this property gets its value directly from OpenStack Server components and does not actually need a user input, so do not expose this property in the Option model. When scale-out operation is performed during subscription modification, the Load Balancer component will also be scaled-out.

Non-modifiable Option Set

This option set should have 'Modifiable during service modification' attribute unchecked.



The following table specifies how option properties should be created for a typical design that contains OpenStack Server, Volume, Network Interface, Security Group, Floating IP, Private Network, Router, and External Network components. It also suggests the JSPs to be used when the user needs to select values from a dynamic list:

Property	Type	Default value	JSP (for Dynamic LIST)	HTTP Parameters	Bindings
enableUserContext (Enable User Impersonation Mode)	Boolean	True	N/A	N/A	Server.enableUserContext, NetworkInterface.enableUserContext, SecurityGroup.enableUserContext, PrivateNetwork.enableUserContext, ExternalNetwork.enableUserContext

Property	Type	Default value	JSP (for Dynamic LIST)	HTTP Parameters	Bindings
serverNamePrefix (Server Name Prefix)	String	Any	N/A	N/A	Server.serverNamePrefix
flavorName	LIST (Dynamic)		csa-openstack-flavors-v3.jsp	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	Server.flavorName
imageName	LIST (Dynamic)		csa-openstack-images-v3.jsp	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	Server.imageName
Keypair	LIST (Dynamic)		csa-openstack-keypairs-v3.jsp	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	Server.keypair

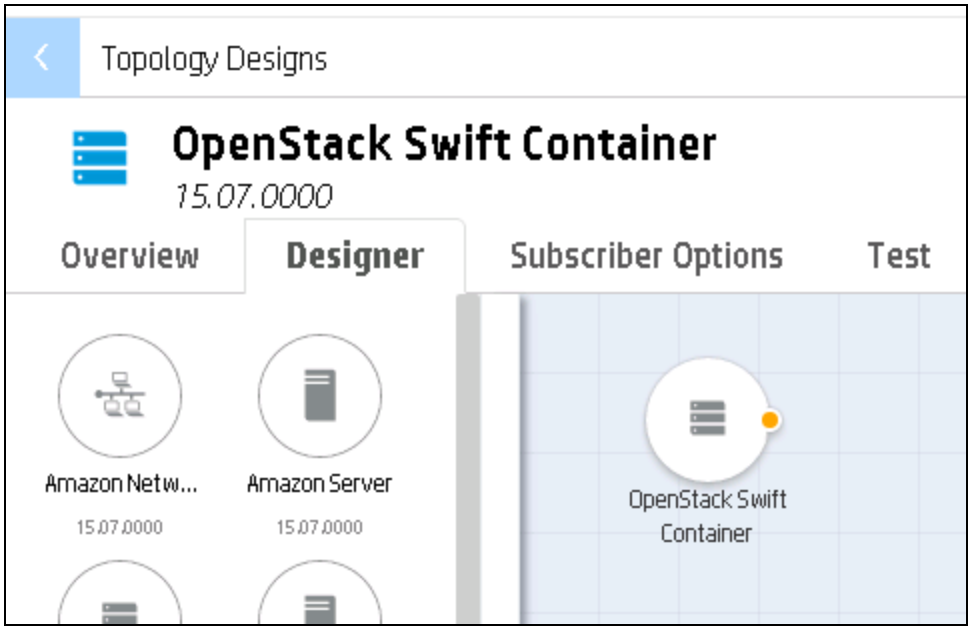
Property	Type	Default value	JSP (for Dynamic LIST)	HTTP Parameters	Bindings
securityGroup	LIST (Dynamic, Multi-Select		csa-openstack-securitygroups-v3.jsp	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	SecurityGroup.securityGroupNames
availabilityZone	LIST (Dynamic)		csa-openstack-zones-v3.jsp	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	Server.availabilityZone
volumeNamePrefix	String	Any	N/A	N/A	Volume.volumeNamePrefix
volumeDescription	String	Any	N/A	N/A	Volume.volumeDescription
volumeSize (Volume Size in GB)	Integer	I	N/A	N/A	Volume.volumeSize
volumeType	LIST (Dynamic	csa-openstack-volume-types-v3.jsp		providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	Volume.volumeType
volumeDevice	String		N/A	N/A	Volume.volumeDevice

Property	Type	Default value	JSP (for Dynamic LIST)	HTTP Parameters	Bindings
privateNetwork	LIST (Dynamic)	csa-openstack-priv-networks-v3.jsp		providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	PrivateNetwork.networkName
Subnet	LIST (Dynamic)	csa-openstack-subnets-v3.jsp		providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] privateNetwork=[CLIENT:privateNetwork] userId=[TOKEN:REQ_USER_ID]	PrivateNetwork.subnetName
externalNetwork	LIST (Dynamic)	csa-openstack-ext-networks-v3.jsp		providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] userId=[TOKEN:REQ_USER_ID]	providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext]

Property	Type	Default value	JSP (for Dynamic LIST)	HTTP Parameters	Bindings
Router	LIST (Dynamic)	csa-openstack-routers-v3.jsp		providerId=[PROVIDER:OPENSTACK:ID] enableUserContext=[CLIENT:enableUserContext] externalNetwork=[CLIENT:externalNetwork] userId=[TOKEN:REQ_USER_ID]	Router.routerName

OpenStack Swift Container

This service design consists of 'OpenStack Swift Container' component. Container is a logical component representing an object store.



A service offering associated with this design can be used to provision OpenStack Swift Container instance. After creating a container in the OpenStack environment, user should be able to see container details along with Container URL in the Marketplace Portal.

The following table lists the properties that should be created for a typical design that contains OpenStack Swift Container component and the details required to associate the properties with the component.

Property	Type	Default value	JSP (for Dynamic list)	HTTP parameters	Bindings
enableUserContext (Enable User Impersonation Mode)	String	True	N/A	N/A	Container.enableUserContext
containerNamePrefix (Container Name Prefix)	String	Any	N/A	N/A	Container.containerNamePrefix
containerReadAccess (Access Control)	LIST	Private			Container.containerReadAccess
storagePolicy (Storage Policy)	LIST	Policy-0	csa-openstack-swift-storage-policies.jsp	providerId=[PROVIDER:OPENSTACK:ID]	Container.storagePolicy
containerQuotaBytes (Container Size)	LIST		csa-openstack-swift-quota-bytes.jsp	providerId=[PROVIDER:OPENSTACK:ID]	Container.containerQuotaBytes
containerQuotaCount (Object Count/Limit)	String	NONE			Container.containerQuotaCount

Publishing service design

To publish the service design, complete the steps in "Publishing topology design" on page 20.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish service offering to Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

You can also publish the service offering to a specific Catalog defined for a CSA Organization.

Note: HP recommends creating a separate CSA organization for each OpenStack instance and configure it to the same LDAP that your Keystone service points to.

Subscribing service

Configuration requirements: Prerequisites

- Create OpenStack providers in HP CSA
- Associate each provider to environments
- Associate all the catalogs that include OpenStack offerings

The service offerings associated with OpenStack topology components can be executed in two modes:

1. User Impersonation mode

   In this mode, all the subscriptions are fulfilled in the context of the subscriber.

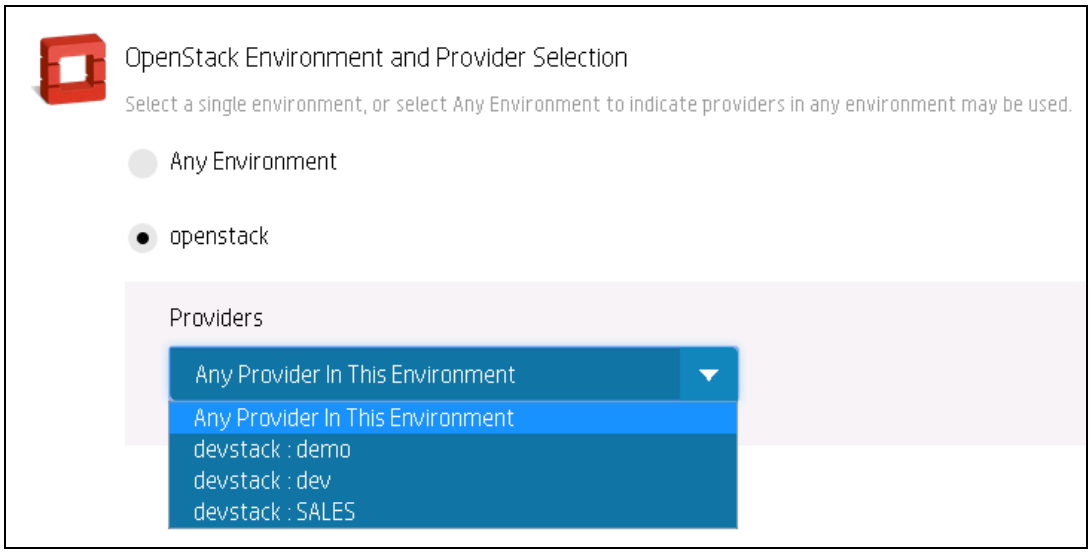
   Note: You must enable KeyStone in IdM.

   For enabling Keystone, set `idm.keystone.enabled = true` in the file `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\idm-service.war\WEBINF\spring\applicationContext.properties`.

   Steps for subscribing service:

   - Log on to the Marketplace Portal as a Keystone user of the desired Organization.
   - Select the OpenStack Offering from the specific catalog.
   - For the OpenStack Offerings that meet all the requirements specified before, the user will see a list of providers and OpenStack projects that the user has access to, in the OpenStack Environment and Provider Selection CSA seeded Option Set.

     Note: If you select Any Environment or Any Provider in this Environment option, then any provider and its associated project will be randomly selected. There is no guarantee that all the JSPs select the same provider or project. Therefore, it is not a recommended choice for OpenStack dynamic options.



- After selecting the specific provider:project, where the service needs to be provisioned,set the enableUserContext to True.
- All the Dynamic Lists will be populated at this point with the values based on the context selected (Provider, Project and User). Choose the value from each list.
- Specify values for other non-list properties such as Server Name Prefix and Volume Name Prefix.
- On the right pane, click **Checkout**.
- Provide a name for the subscription and specify an end date.
- Submit the request.

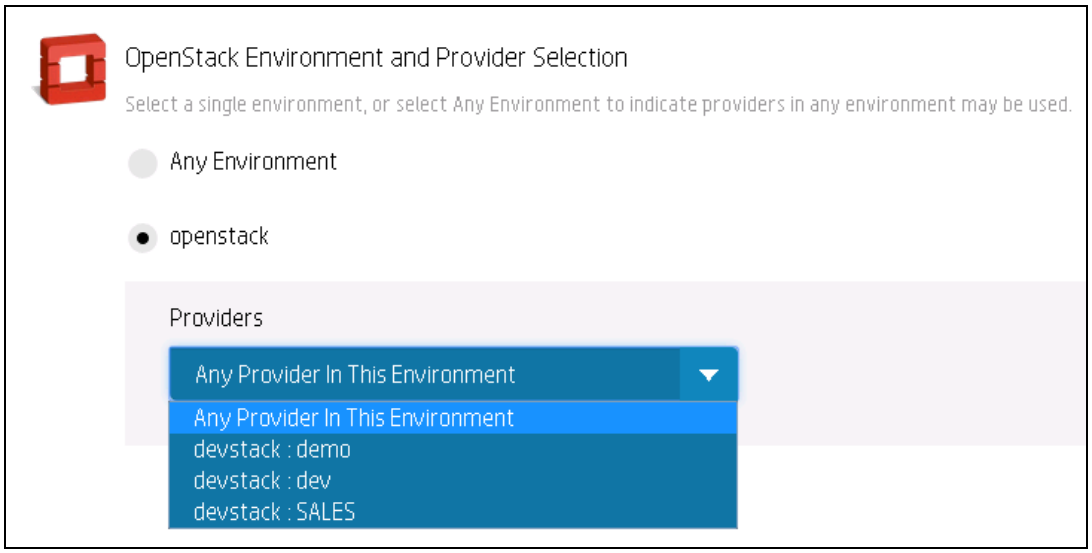
2. Admin Mode (when user impersonation is not desired)

   In this mode, all the subscriptions are fulfilled by the user configured in the OpenStack Resource Provider.

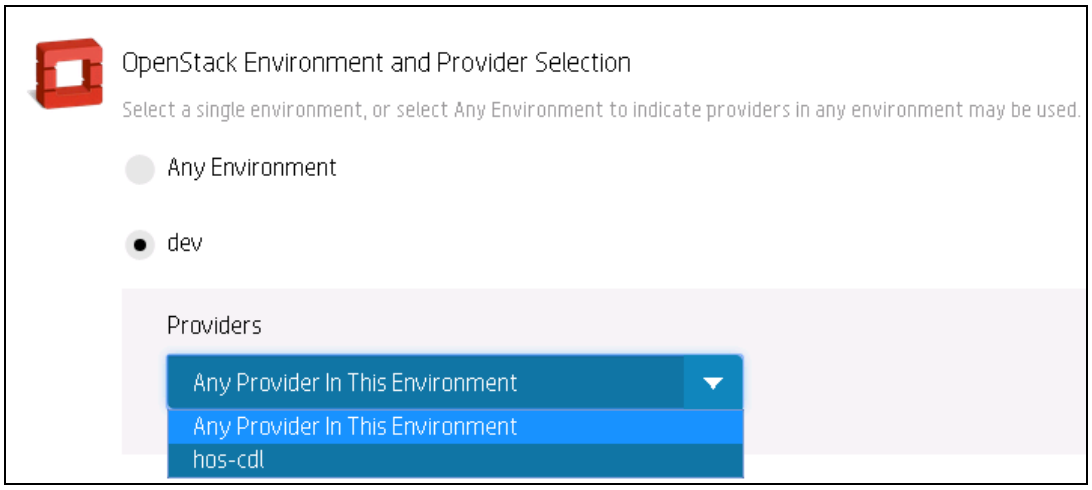
   Note: Keystone may or may not be enabled in IdM for this mode.

   Steps for subscribing service:

   - Log on to the Marketplace Portal as a Keystone user of the desired Organization.
   - Select an OpenStack Offering from the specific Catalog.
   - If IdM Keystone is enabled, the user will see a list of provider and OpenStack projects that the user has access to in the in the OpenStack Environment and Provider Selection CSA seeded Option Set.



- If IdM Keystone is not enabled, the user will see a list of OpenStack providers only in the OpenStack Environment and Provider Selection CSA seeded Option Set.



Note: If you select Any Environment or Any Provider in this Environment option, then any provider and its associated project will be randomly selected. There is no guarantee that all the JSPs select the same provider. Therefore, it is not a recommended choice for OpenStack dynamic options.

- After selecting the specific provider where the service needs to be provisioned, set the enableUserContext to False.

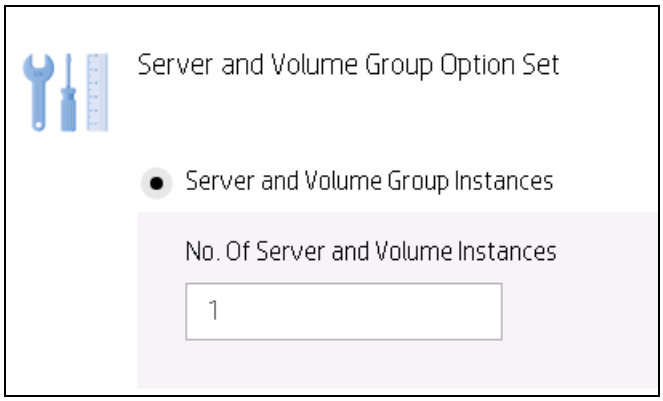
Note: In Admin mode, the project used will be always the one configured in the OpenStack Resource Provider even if the IdM Keystone is enabled.

- All the Dynamic Lists will be populated at this point with the values based on the context selected (Provider, Provider Project, and Provider User). Choose the value from each list.
- Specify values for other non-list properties such as Server Name Prefix and Volume Name Prefix.
- On the right pane, click **Checkout**.
- Provide a name for the subscription and specify an end date.
- Submit the request.

Modifying subscription

Service can be scaled in and out by modifying an existing active subscription. Currently CSA 4.50 only supports scale-out of the service.

1. Click the **Subscriptions** tab.
2. Identify the OpenStack subscription that you want to modify.
3. Increase the **instanceCount** property to the desired value. The display name might be different for the instanceCount property.



4. Click **Modify Subscription**.
5. Provide a name for the subscription and specify an end date.
6. Click **Submit Subscription**.

All the members of the scaling group will be deployed based on the incremented value of instance Count. If an OpenStack Load Balancer component exists in the design, then the Load Balancer Pool will be modified to add the newly added members.

Canceling subscription

To cancel a subscription, follow the instruction in "Canceling a subscription" on page 24.

Multi-tenancy support

In HP Cloud Service Automation (HP CSA), an organization is an entity defined by the HP CSA administrator and can be a company, business unit, department, or group. Membership in an organization is determined by the organization's identity management configuration, which HP CSA accesses to authenticate the user's login credentials with OpenLDAP or Microsoft Active Directory. The administrator determines a member's entry point into the cloud and associates each member with services and resources.

HP CSA identity management (IdM), apart from the primary authentication with OpenLDAP or Microsoft Active Directory, supports configuration of secondary authentication with OpenStack Identity (keystone) service to enable an integration account or transport user to perform OpenStack actions on behalf of another user. On successful secondary authentication against keystone, IdM generates a Keystone Trust ID using the authenticated user as the Trustor and the configured integration account as the Trustee.

OpenStack implements projects as defined by OpenStack technology. A project is a logical grouping of users, and is used to define quotas and access to virtual machine images.

Multi-tenancy can be implemented by following the three steps below:

1. Enabling Keystone authentication in IDM.

   Set idm.keystone.enabled = true in the file `C:\Program Files\Hewlett-Packard\CSA\jboss-as\standalone\deployments\idm-service.war\WEB-INF\spring\applicationContext.properties`.

2. Creating an OpenStack Resource Provider in CSA Management console.

   Provide the Service Access Point for Keystone service and the IdM Keystone Integration account credentials.

   Specify following properties for the OpenStack provider:

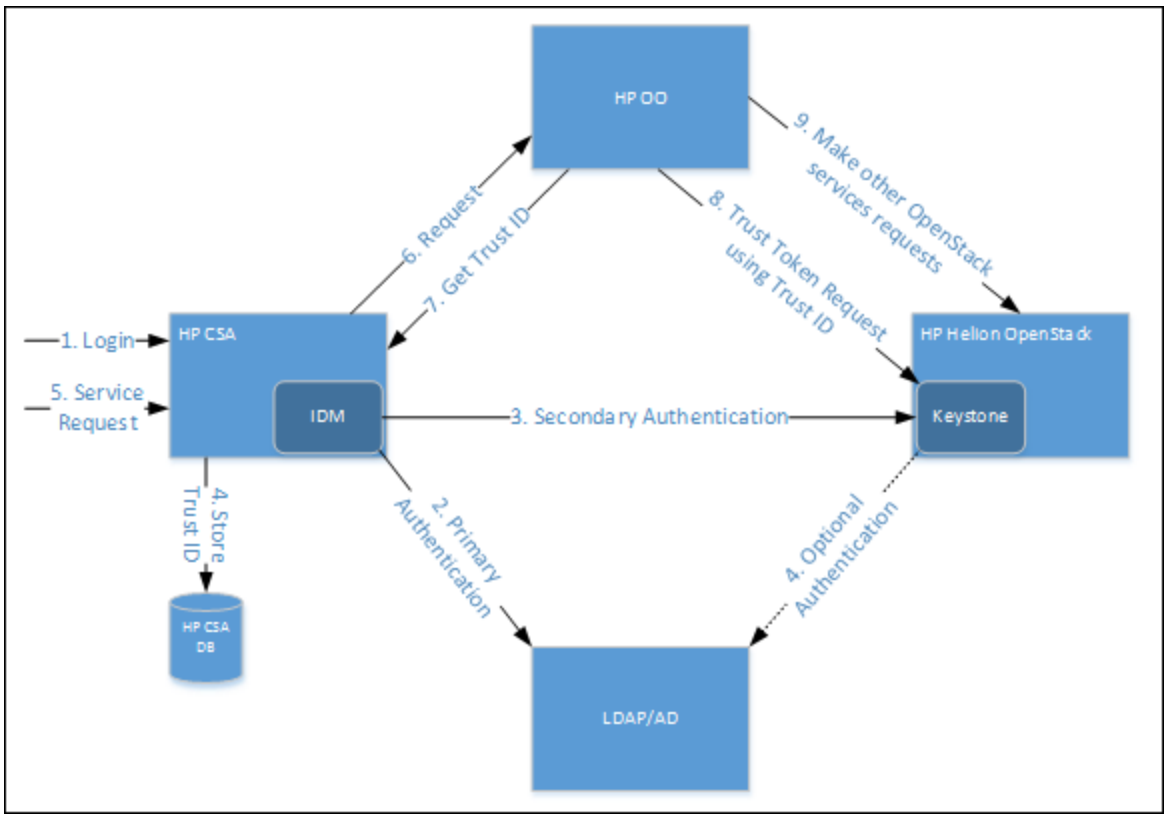
   - Project - Enter the project in OpenStack in which provisioning should occur when provisioning topology designs in which enableUserContext is set to False for every OpenStack component in the design. If all OpenStack designs set enableUserContext to True, the Project may be left empty, and the subscriber will be able to select the project at provisioning time from the set of projects to which the subscriber is authorized.

   - Domain - Enter the domain in OpenStack that should be used. This domain must be configured for authentication in the same fashion as the consumer organizations for which this provider will be used.

   - Transport Token - When checked, a domain-scoped transport token will be used for communication with OpenStack. When unchecked, a project-scoped transport token will be used. The provider user must have administrative rights on the domain in order to use domain-scoped transport tokens.

3. Setup organization in HP CSA with a directory service endpoint: OpenLDAP or Microsoft Active Directory that is also configured in the OpenStack Keystone instance.

Mapping CSA organizations LDAP to LDAP of OpenSTack Keystone instance and identity management secondary authentication with Keystone ensure that all subscription requests from organization users are fulfilled in the context of user and the selected project.



In general, this feature works as follows:

1. Following a successful authentication against one of the primary mechanisms (LDAP, Active Directory), IdM attempts to authenticate against a secondary mechanism (Keystone) using the same credentials to Keystone service.

2. On successful authentication against Keystone, generates a Keystone trust IDs using the authenticated user as the trustor and the configured integration account (provider user) as the trustee, for all the OpenStack project that the user has access to.

3. As needed, choose one of the project and associated Keystone trust ID and use it to generate a Keystone impersonation token so that provider account configured can perform OpenStack actions on behalf of the trustor.

Verifying secondary authentication

For information about Verifying secondary authentication, see "Verify secondary authentication" on page 116.

Setting up attached volume

For information about setting up attached volume, see "Set up an attached volume" on page 112.

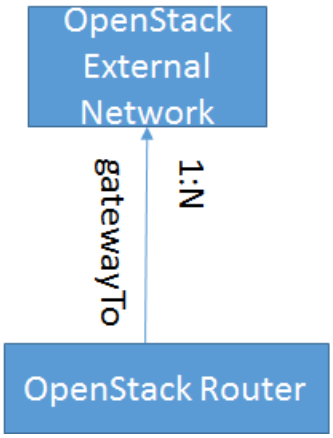
OpenStack topology components

The following table lists the common Input parameters for all Operations for all OpenStack Topology components

Parameter name	Description	Mapping type
identityServiceendpoint	trustId	Provider property URI
identityServicePassword	Password for transportUser or Admin user in keystone	Provider property URI
identityServiceUsername	transportUser or Admin user in keystone	Provider property USERNAME
tenantName	Keystone project for transport User or Admin user	Provider property project
enableUserContext	Flag to enable user context mode. Default – false	Component property
domainName	Keystone domain for transport User or Admin user. Default value – default	Provider property domain
trustId	Keystone trustId for project selected, admin/transport user as trustee and subscriber as trustor	Context token – KEYSTONE_ TRUST_ID

OpenStack External Network

A network already defined in OpenStack, defined as an external network. This is usually where the servers access the public internet. Public IP pools are allocated through this network.



Properties

Parameter name	Description
externalNetworkName	External Network Name

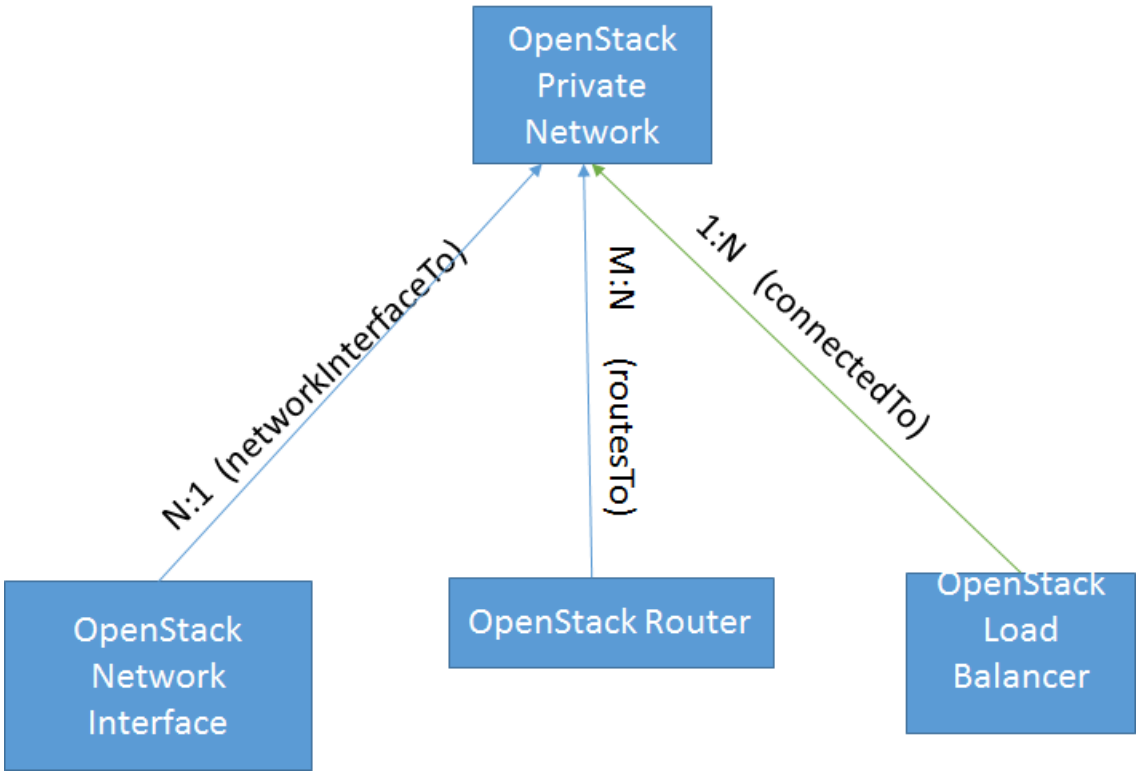
Operations

Validate External Network – This is the deploy operation for the component.

It validates the existence of the external network and gets back as output the internal id of the network.

OpenStack Private Network

An OpenStack network that is not defined as external network. It is responsible for providing IP addresses to Servers/Ports from a Subnet. Servers within the same private network are directly accessible to each other.



Properties

Parameter name	Description
networkName	Private Network Name
createNetwork	Flag to specify whether to create a new network or use an existing one
subnetName	Subnet Name
subnetDescription	Subnet Description
createSubnet	Flag to specify whether to create a new subnet or use an existing one.
ipVersion	The IP version. Valid values:IPV4 or IPV6. Must be specified if createSubnet=true
enableDHCP	Set to true if DHCP is enabled for the subnet and false if DHCP is disabled. Must be specified if createSubnet=true
disableGateway	When set to true, the subnet will be created without a gateway IP address. Otherwise the default IP Address will be used. Can be specified if createSubnet=true
dnsServers	Comma separated list of DNS server host names or IP address. Example: 16.17.18.19,15.16.17.18. Can be specified if createSubnet=true.

Parameter name	Description
cidrNetworkAddress	Network Address in CIDR format <startingIpAddress:maskSize>. Examples: 10.0.0.1/24, 192.168.0.1/24, 2001:DB8::/48. Must be specified if createSubnet=true

Operations

- **Create Network and Subnet** – This is the deploy operation for the component.
  - It allows to choose an existing private network and one of its associated subnets.
  - A private network and subnet can also be created by setting the flag createNetwork and createSubnet to true.
  - For creating a new subnet, a cidrNetworkAddress must be provided to select the IPs from. A subnet may optionally have a gateway and a list of DNS name servers.
- **Deploy Private Network Failure Handler** – This is the deploy failure handler for the component.

It will rollback the operations performed during the deploying phase of the component. If a new private network or subnet was created during the deploy operation, they will be deleted when this operation is executed.

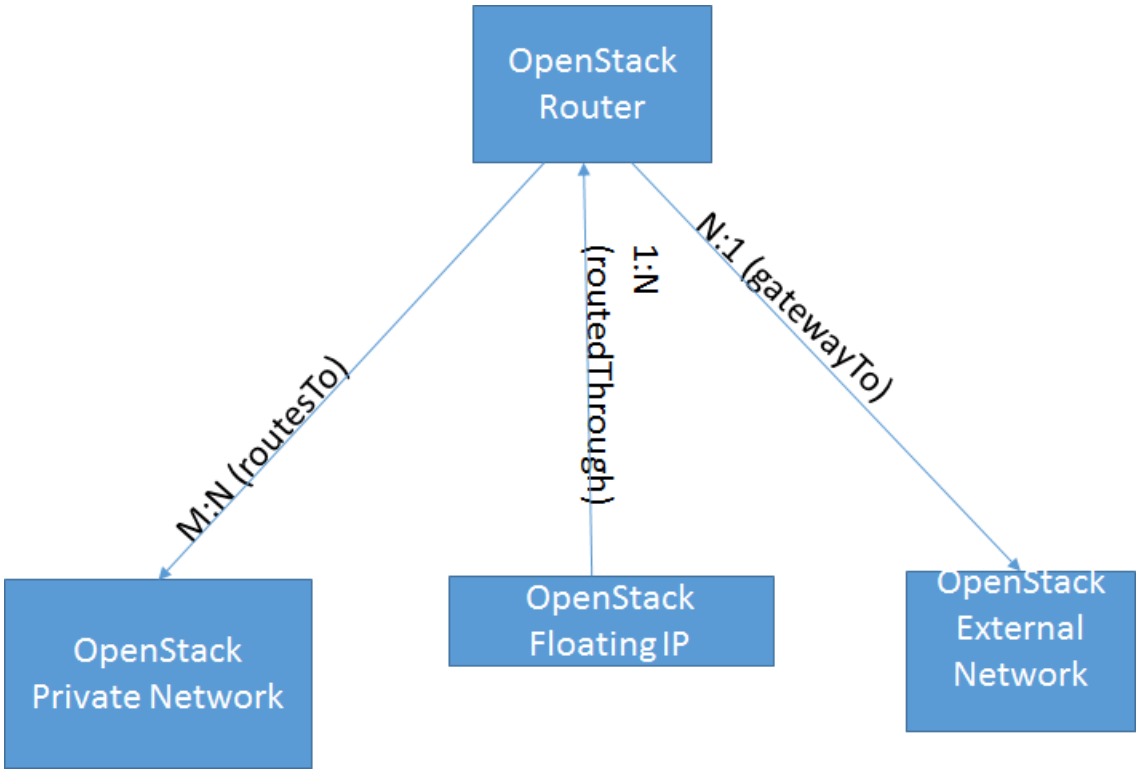
- **Delete Network and Subnet** – This is the undeploy operation for the component.

It will de-provision any new network or subnet created.

OpenStack Router

A virtual router, which can either be referenced or created for the design service instance. Router is used to NAT internal traffic to external networks. It has an interface for each subnet it is associated with and the IP address of such interface is the subnets gateway IP.

Relationships



Properties

Parameter name	Description
createRouter	Flag to specify whether to create a new router or user an existing one
routerName	routerName
externalNetworkId	External Network Id of the external network to which router is connected

Operations

- **Create Router** – This is the deploy operation for the component.
  - It allows to use an existing router.
  - A router can also be created if createRouter flag is set to true.
  - It also creates an internal interface for the attached private network subnet if it does not exist. If the default gateway IP is used the interface creation errors out.
- **Deploy Router Failure Handler** – This is the deploy failure handler for the component.

  It will rollback the operations performed during the deploying phase of the component. If a new router or an interface is created for the subnet, they will be deleted when this operation is executed.

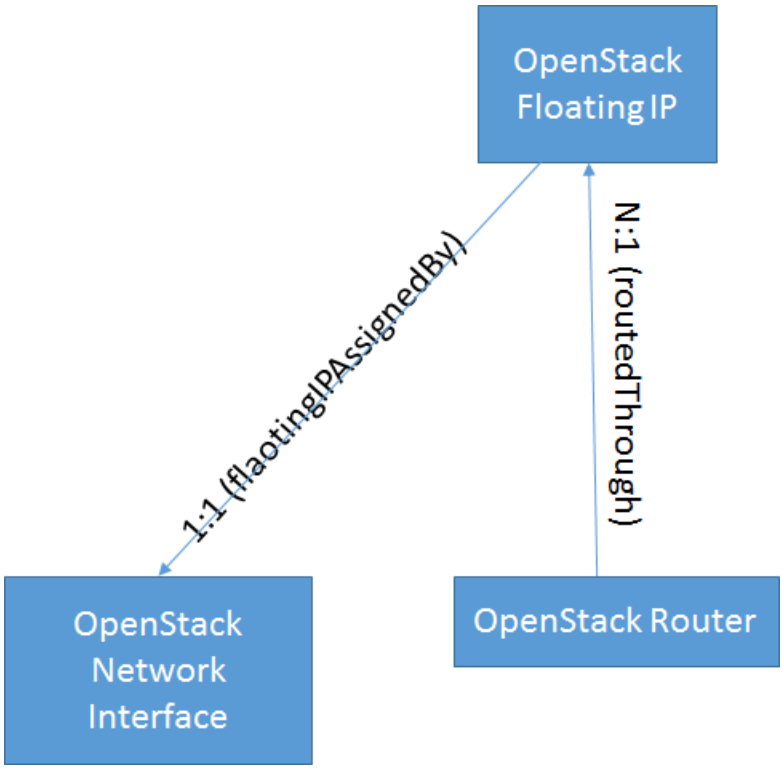
- **Delete Router** - This is the undeploy operation for the component.

  It will de-provision any new router and its associated interface. The interface cannot be deleted if there are associated floating IPs.

OpenStack Floating IP

A Floating IP is an IP address on an external network, which is associated with a specific port, and optionally a specific IP address, on a private network. A Floating IP allows access to an instance on a private network from an external network.

Relationships



Properties

Parameter name	Description
externalNetworkId	External Network pool from which the Floating IP needs to be fetched or created.

Operations

- **Deploy Floating IP**
  - It will either fetch a floating IP from a public pool or create a new floating IP on that pool, if none exists. This depends on the existing network connectivities to allow this. For example: an external network exists and is accessible to the user and the private network/subnet for the server is routable to external network.
  - If the externalNetworkId is invalid, then the operation will fail. If a null value is provided the operation will use any existing external network in OpenStack
- **Deploy Floating IP Failure Handler**

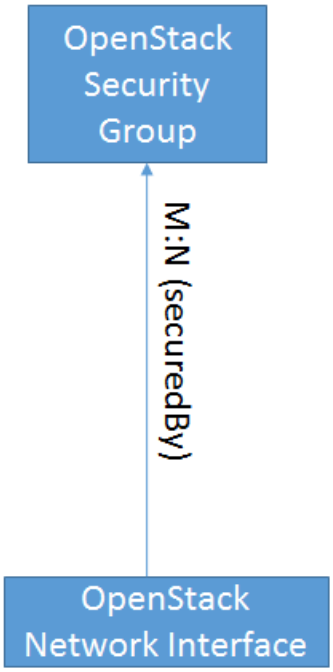
  It will delete any floating IP that got created during deploy operation.
- **Undeploy Floating IP**

  It will delete any floating IP that got created during deploy operation.

OpenStack Security Group

Security groups and security group rules allows administrators and tenants the ability to specify the type of traffic and direction (ingress/egress) that is allowed to pass through a port. A security group is a container for security group rules.

Relationships



Properties

Parameter name	Description
createSecurityGroup	Flag to specify whether to create a new security group or user existing ones.
securityGroups	Names of Security Groups to be added to the server.
securityGroupPortList	Comma separated port list to be opened on server for incoming traffic (for example, 22,80,8000-9000). Must be provided if createSecurityGroup is true.

Operations

- **Deploy Security Group**
  - It allows to use one or more existing security groups.
  - A new security group can be also be created by setting createSecurityGroup to true. One must specify the securityGroupPortList in case of creating a new security group. An Ingres rule will be created with protocol type as TCP
- **Deploy Security Group Failure Handler**

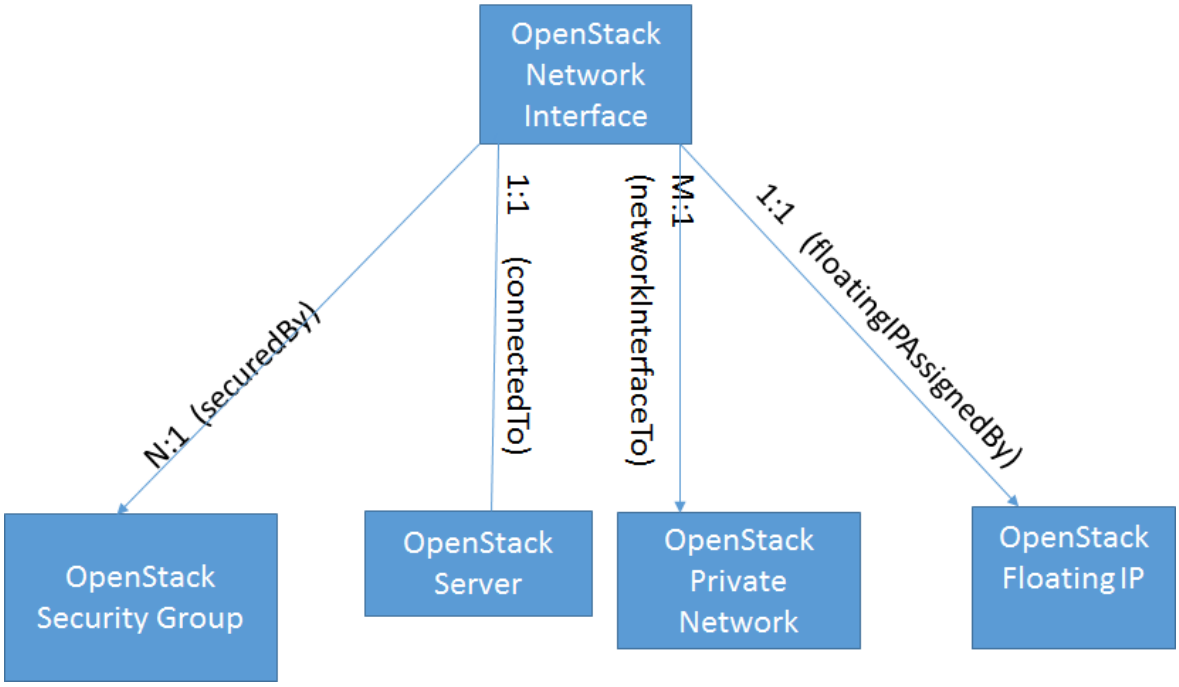
  Any new security group created during deploy operation will be deleted
- **Undeploy Security Group**

  Any new security group created during deploy operation will be deleted

OpenStack Network Interface

An OpenStack Network Interface component represents a virtual switch port on a logical network switch. Virtual instances attach their interfaces into ports. The logical port also defines the MAC address and the IP address(es) to be assigned to the interfaces plugged into them. When IP addresses are associated to a port, this implies the port is associated with a subnet, as the IP address was taken from the allocation pool for a specific subnet.

Relationship



Properties

Parameter name	Description
networkId	Private network ID
subnetId	Subnet ID
floatingIpId	Floating IP ID
securityGroupIds	Security Groups ID

Operations

- **Deploy Network Interface**
  - A network port will be created on the subnet with a fixedIP
  - Floating IPs are assigned to the port
  - Security Groups are assigned to the port
- **Deploy Network Interface Failure Handler**

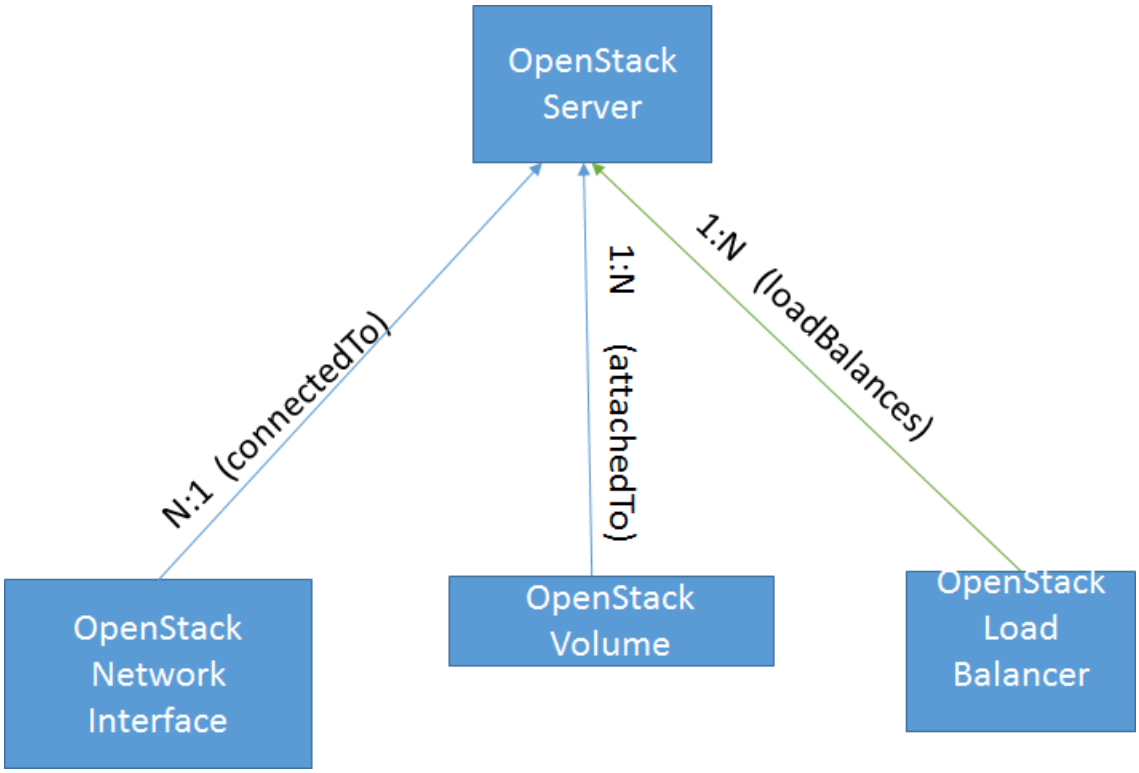
  Network port will be deprovisioned
- **Network port will be deprovisioned**

  Network port will be deprovisioned.

OpenStack Server

Server is a logical topology component that represents a virtual machine in OpenStack cloud. Virtual machines are cloned from pre-configured images.

Relationships



Capabilities

OpenStack Server component supports Server capability with following parameter mappings:

Capability property	Component property
Hostname	serverName
instanceId	serverId
ipAddress	sshEnabledIpAddress
Password	Password
privateKey	privateKey
Username	Username

Input properties

Parameter name	Description
availabilityZone	Availability Zone in which server will be provisioned
flavorName	Identifies the sizing of the server
imageName	Name of the image to be used to create the servers
keypairName	Keypair Name to associate with server for accessing it
serverNamePrefix	Beginning characters of host name
portIds	Port IDs to be associated with the Server
Username	Username for logging into the server
Password	Password for logging into the server
privateKey	privateKey associated with the keypair

Output properties

Parameter name	Description
Disk	Disk size
floatingIPAddress	Floating IP Address List with the network name
IPAddressList	Private IP Address List with network name
Memory	Memory
securityGroups	Security Group List
serverId	Server ID
serverName	Server Name
serverStatus	Server Status
sshEnabledIpAddress	Server Status

Operations

- **Deploy Server**
  - Provisions virtual machines using OpenStack Nova APIs.
  - Virtual Machines are launched using specified image, flavor (CPU/RAM/DISK) and Keypair.
  - Virtual Machines will be associated with one or more network interface (ports) which in turn may also have floating IPs and security groups.
- **Deploy Server Failure Handler**

Rolls-back the operations performed during deployment. It will de-provision OpenStack virtual machine.

- **Undeploy Server**

  De-provisions OpenStack virtual machine.

Public actions

- **Add Security group**

  Adds a new security group to the fixed IP (private IP) associated with a specific port. The security group should already exist in OpenStack project.

  Input parameters:

Parameter Name	Description
securityGroupInput	Name of the security group to be added
fixedIpInput	Fixed IP (private IP) Address. (Can be found in ipAddressList)

- **Remove Security Group**

  Removes security group from the fixed IP.

  Input parameters:

Parameter Name	Description
securityGroupInput	Name of the security group to be removed
fixedIpInput	Fixed IP (private IP) Address. (Can be found in ipAddressList

- **Associate Floating IP**

  - Associates a floating IP to a fixed IP. The floating IP is fetched from a public pool.
  - If no floating IP is available in the pool, a new floating IP is allocated to the pool and associated with the fixed IP.
  - If a floating IP already exists for the fixed IP then floating IP not assigned again, since only one floating IP can be associated for a fixed IP.

  Input parameters:

Parameter Name	Description
externalNetworkInput	External Network Name
fixedIpAddressInput	Fixed IP (private IP) Address. (Can be found in ipAddressList)

- **Disassociate Floating IP**

  Dis-associates a floating IP from the server

  Input parameters:

Parameter Name	Description
floatingIpInput	floatingIpInput (can be found in floatingIpAddress)

- **Start Server**

  Starts a stopped Server

- **Stop Server**

  Stops a running active server

- **Suspend Server**

  Suspends (stores state of the VM on disk) a server and changes its status to SUSPENDED

- **Resume Server**

  Resumes (restores state of VM from disk) a SUSPENDED server and changes its status to ACTIVE

- **Pause Server**

  Pauses a server and changes its status to PAUSED

- **Unpause Server**

  Unpauses a PAUSED Server

- **Refresh Server Info**

  Refreshes Server Status, Floating IP Addresses, Security Groups on MPP

- **Soft Reboot Server**

  The operating system is signaled to restart, which allows for a graceful shutdown of all processes

- **Hard Reboot Server**

Equivalent to power cycling the server

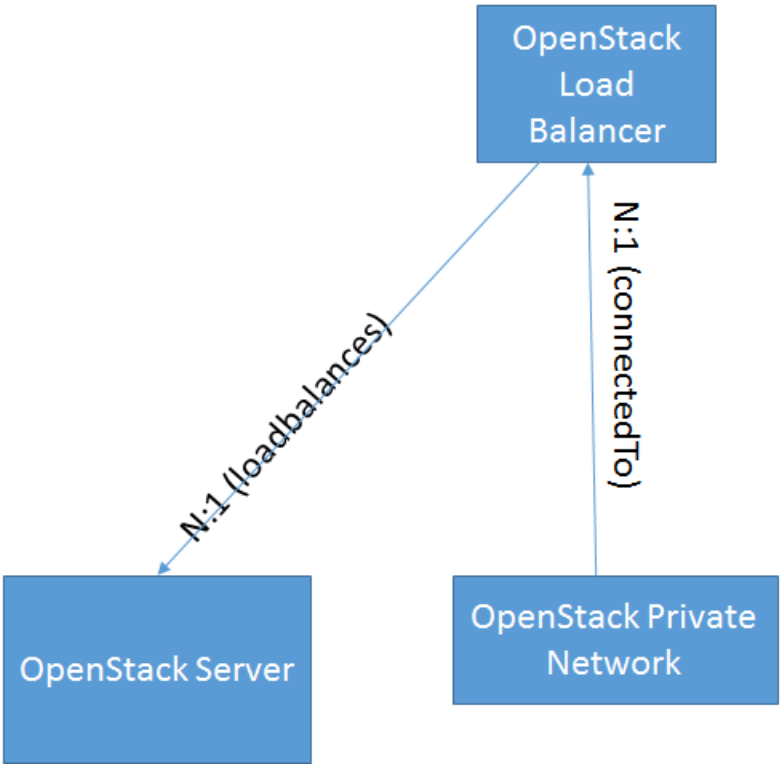
OpenStack Load Balancer

Load balances pools are virtual machines with haproxy installed on them. They are used to balance application running on specified port on various server connected to the same subnet as the load balancer pool.

Note: This component is not supported if the version of HP Helion OpenStack is less than or equal to 1.1

Note: OpenStack Load Balancer is a modifiable component with the modifiable property being ipAddressList which gets adjusted after a scale-in/scale-out operation.

Relationships



Properties

Parameter name	Description
poolName	Load Balancer pool name
poolDescription	Load Balancer pool description

Parameter name	Description
subnetId	Subnet connected to the pool
lbMethod	Load Balancing Method. Valid Values: ROUND_ROBIN, LEAST_ CONNECTIONS, SOURCE_IP. Default: ROUND_ROBIN
lbProtocol	Protocol used for load balancing an application. Valid Values: HTTP, HTTPS, TCP. Default: HTTP
lbPort	Port on which the application to be load balanced in running. Default: 80
vipName	Virtual IP Name
vipDesc	Virtual IP description
addHealthMonitor	Flag to specify if you want to add a health monitor to the load balancer pool. Default: false
hmType	Specify the type of health monitoring. Valid Values: PING, HTTP, HTTPS, TCP. Default: PING
hmDelay	The minimum time in seconds between regular checks of a member. Default: 20
hmTimeout	The maximum time in seconds for a monitor to wait for a reply. Default: 10
hmRetries	Number of permissible failures before changing the status of a member to inactive. Value range: 1-10. Default: 3
hmHttpUrlPath	URL path for monitoring. Default: /
hmHttpExpectedCodes	Comma separated list of expected HTTP codes upon successful monitoring. Default: 200,201,202
ipAddressList	IP Address List of the servers that need to be load balanced

Operations

- **Deploy Load Balancer**
  - Creates a load balancer pool using OpenStack LBaaS. The pool will be created on the specified subnet.
  - Creates and associates a Virtual IP to the pool.
  - Adds a health Monitor if addHealthMonitor flag is true.
  - Adds all the servers IPs as members to the pool that are in the same subnet as the pool.
- **Deploy Load Balancer Failure Handler**

- Removes all the members from the pool, if already added in deploy operation.
- Deletes the VIP from the pool.
- Deletes any health monitor if added.
- Deletes the pool.

- **Undeploy Load Balancer**
  - Removes all the members from the pool.
  - Deletes the VIP from the pool.
  - Deletes any health monitor if added.
  - Deletes the pool.
- **Modify Load Balancer**
  - If a scalable group containing OpenStack Server is scaled-out via subscription modification, the new added server will be added to the Load Balancer pool.
  - If a scalable group containing OpenStack Server is scaled-in via subscription modification, the un-provisioned servers will be removed from the Load Balancer pool.

  Note: Currently CSA 4.5 only supports scale-out operation.
- **Modify Load Balancer Failure Handler**

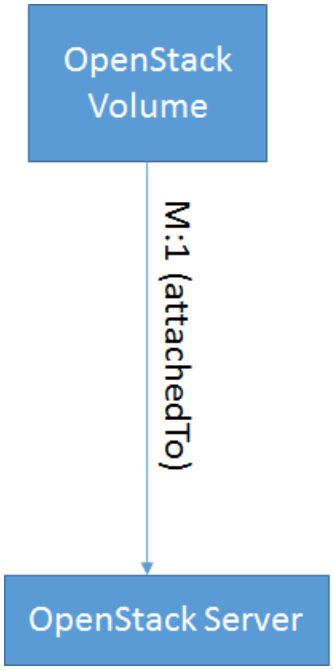
  This will roll-back the scale-in or scale-out operations performed on Load Balancer pool during modification.
- **Unmodify Load Balancer**

  This will roll-back the scale-in or scale-out operations performed on Load Balancer pool during modification.

OpenStack Volume

Represents a persistent store and not the boot or ephemeral volumes. A Server can have multiple Volumes attached to it.

Relationships



Properties

Parameter name	Description
availabilityZone	Availability Zone in which volume will be provisioned.
serverId	ID of Server to which Volume will be attached
volumeNamePrefix	Beginning characters of volume name.
volumeDescription	Volume description.
volumeType	Volume Type.
volumeSize	The size, in gigabytes, for the new volume.
volumeDevice	The device file on the server which the volume is presented as. Example: /dev/sdf

Operations

- **Deploy Volume**
  - Creates a storage volume of specified volumeType in the same availability zone as server.
  - Attaches the volume to the related server.
- **Deploy Volume Failure Handler**

- Detaches the volume from the server
- Deletes the volume

- **Undeploy Volume**
  - Deletes any snapshots for the volume
  - Detaches the volume from the server
  - Deletes the volume

Public actions

- **Create Snapshot**

  Creates Snapshot for Volume

  Creates a list of snapshot names and ids as output of this operation.

Parameter name	Description
snapshotNameInput	Snapshot Name
snapshotDescInput	Snapshot Description

- **Delete Snapshot**

  Deletes Snapshot for Volume

Parameter name	Description
snapshotIdInput	Snapshot Id which needs to be deleted. You may get the snapshot id from the snapshotIds list property of the component

OpenStack Swift container

The OpenStack Object Store known as swift, offers cloud storage software to store and retrieve lots of data with a simple API. Swift is a highly available, distributed, eventually consistent object/blob store. Organizations can use swift to store lots of data efficiently, safely, and cheaply.

Swift Object Storage is ideal for cost effective, scale-out storage, and storing unstructured data that can grow without bound. It provides a fully distributed, API-accessible storage platform that can be integrated directly into applications used for backup, archive, and data retention.

This section describes how to integrate HP CSA with OpenStack Swift Object Storage. From this content pack, the solution provides a topology service design to provision a Swift Container with needed options and public actions to manage the container's lifecycle.

Properties

Parameter name	Description
containerName	Name of the OpenStack Swift Container.
containerNamePrefix	Prefix for the container names. If specified, this overrides the container name and is used to generate container names along with UUID. This is also the input to be used with scaled services.
containerQuotaBytes	Container Quota Size in Bytes.
containerQuotaCount	Container Object Quota Count.
containerReadAccess	Container Read Access Control, which could be either Private or Public.
storagePolicy	Storage Policy for the Container, as defined in Swift.
enableUserContext	Enable Multi-Tenant Support, is of type Boolean defaulting to false. If set to true, then CSA and OpenStack must be using the same identity store.

Public actions

- **Disable Versioning**

  Disables Object versioning on the container

- Enable **Versioning**

  Enables Object versioning on the container. This operation needs another container with appropriate access where the older version objects can be stored.

- **Make Private**

  Sets read access for the container to Private

- **Make Public**

  Sets read access for the container to Public

- **Refresh Container info**

  Gets the latest container information

Limitations

This implementation does not support instance customization like hostname and DNS.

Known issues

- If the public network selected by subscriber does not have a router interface with the selected private network, it will fail to associate a Floating IP.
- The public action (Detach Volume) that is triggered immediately after an 'Attach Volume' might fail. It takes few minutes to update in OpenStack portal.

Troubleshooting

If the public network selected by subscriber does not have a router interface with the selected private network, it will fail to associate a Floating IP.

Provider Go Active

This section provides an overview about Provider Go Active solution and how to use it to verify providers configured in HP CSA.

Use case: Verify provider communication (CSA Provider Go Active)

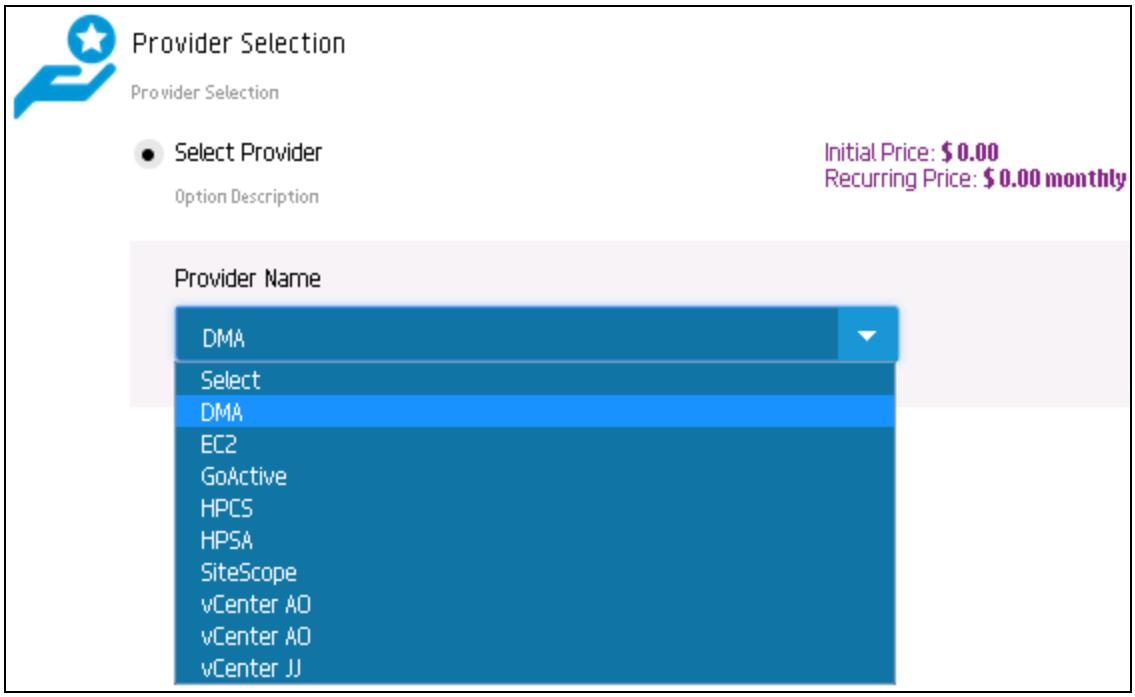
Provider Go Active solution helps HP CSA administrators to select a particular provider configured in the environment and run a test to verify its communication by using provider configuration. Provider configuration includes provider username, password, service access point and any provider properties as per the provider requirements.

Administrator can navigate to the provider specific subscription and run the test again. Administrator can also create new subscription as and when new providers are added to the environment to verify the same.

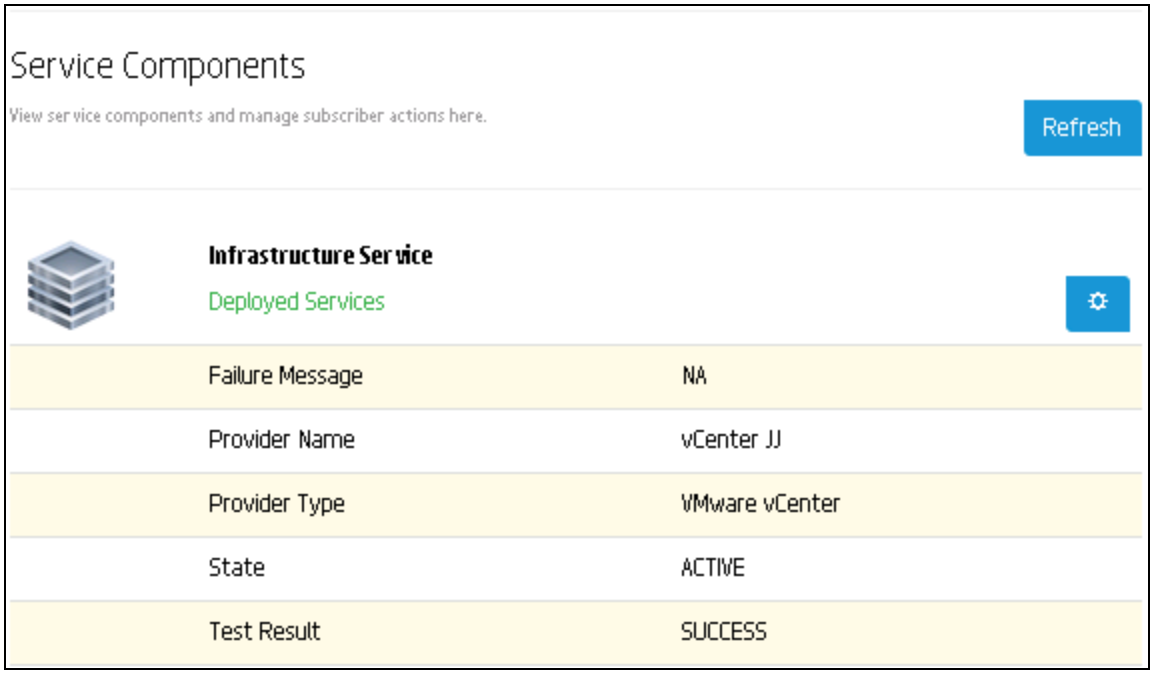
Solution is extensible because all the provider list is dynamically fetched. Administrator can select any of the provider from the list. If the specific provider verification is not supported, subscription goes online with the status NOT SUPPORTED. When the support gets added at the backend, use public actions to rerun the test.

Log on to Marketplace Portal and follow the steps to subscribe service.

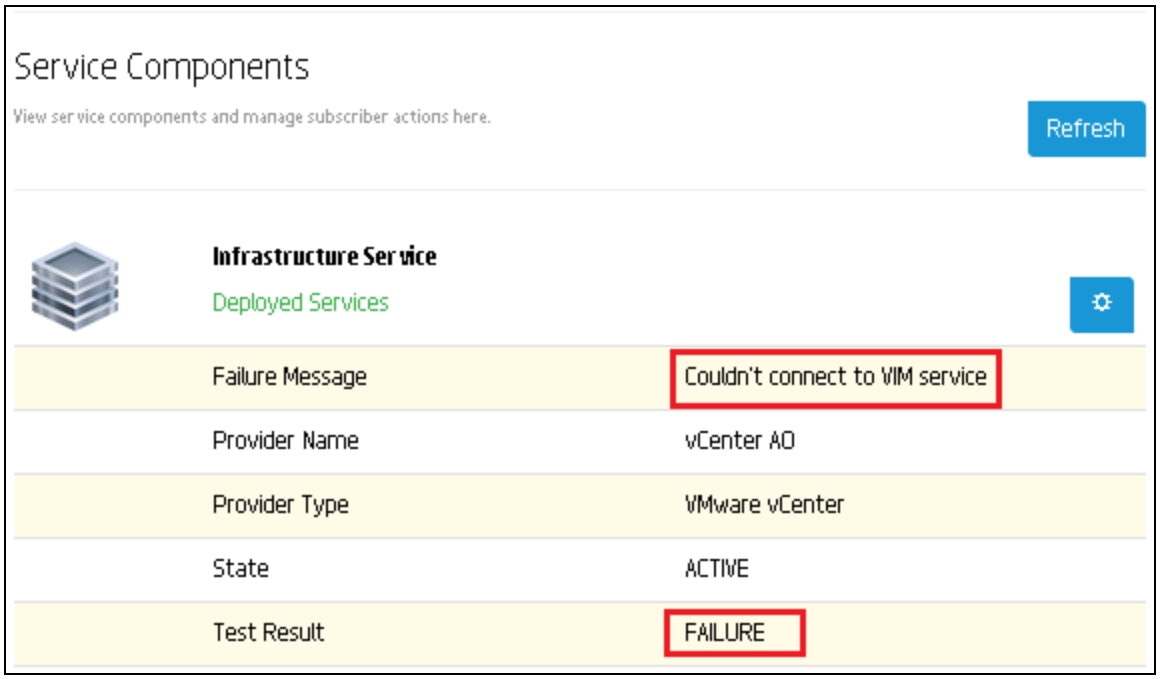
To run the test, select the resource provider:



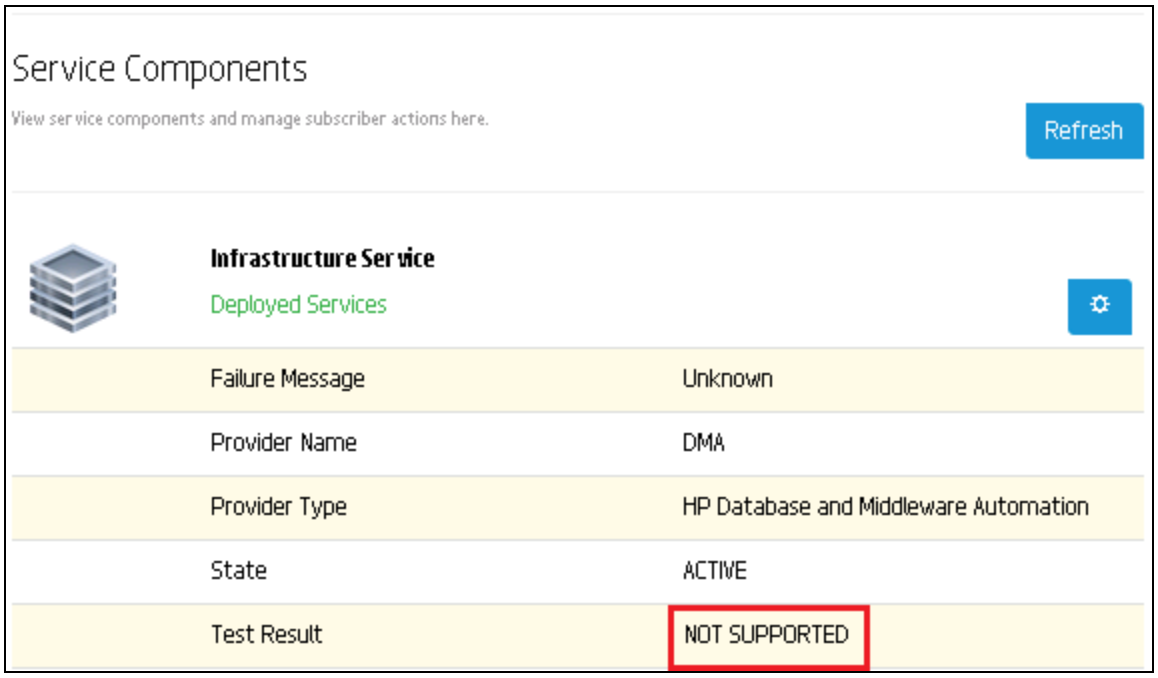
If the provider communication test run is successful, the subscription details will be shown as in the following figure:



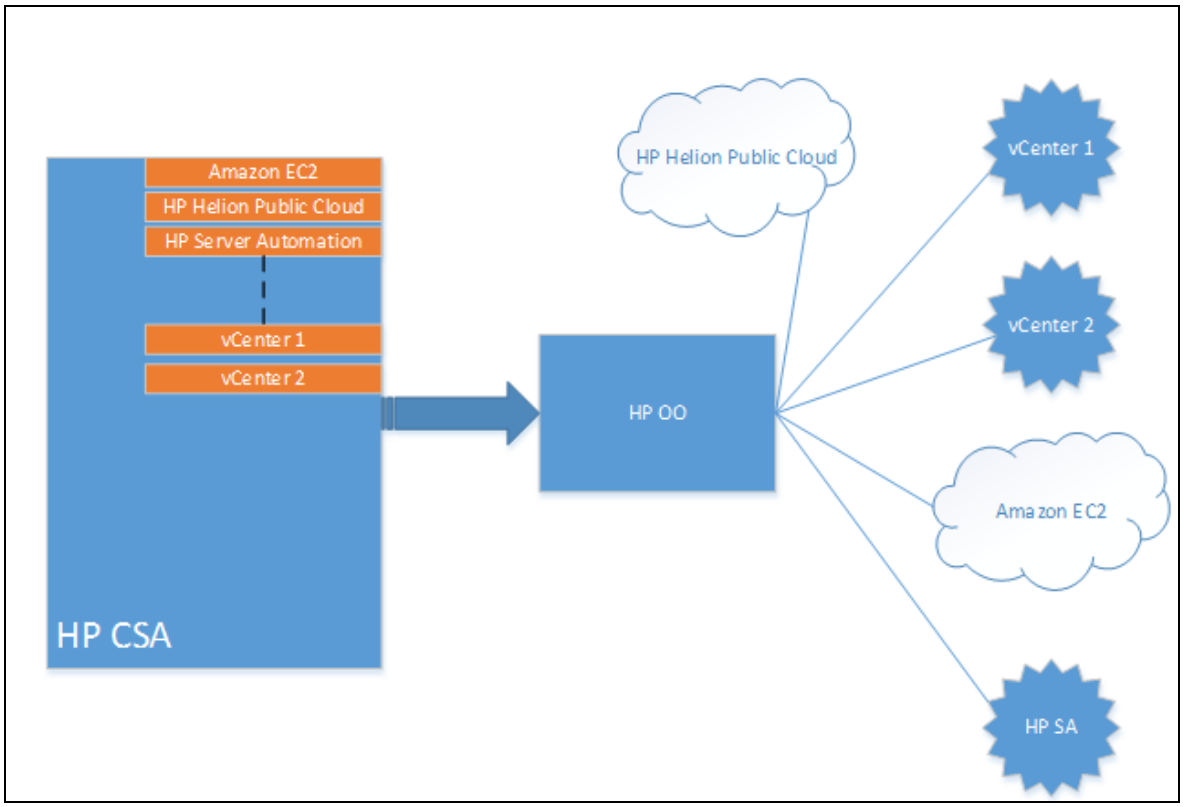
In case the provider communication test run fails, the subscription details will be shown as in the following figure:



If the specific provider verification is not supported, the subscription details will be shown as in the following figure:



High level solution diagram of Provider Go Active is depicted below:



Service design

To verify the resource provider communication, use the following service design:

Service design	Description
Provider Communication Test	Provider Communication Test

Creating service offering

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Admin only catalog

This solution helps administrators to verify providers. So, this service offering needs to be published to the appropriate Admin only catalog.

To publish a service offering to the Admin only catalog:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Catalogs**.
3. Click **CSA Admin Catalog**.
4. Click the **Offerings** tab.
5. Click **Add Offering**.
6. Select the service offering you created in the previous steps, and then click **Select**.
7. Select the category under which this service offering should appear in the Marketplace portal.
8. Click **Publish**.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP Server Automation

HP Server Automation automates operations and processes across IT teams and systems.

For information about how HP SA deploys software policies to the provisioned server, see "Use case: HP Server Automation software policies deployment on vCenter Compute " on page 229.

Installing HP Server

HP Server Automation must be installed and configured before you can use it to deploy applications. For installation instructions, see the *HP Server Automation Simple/Advanced Installation Guide* on HP Software Support.

Configuring HP Server Automation Software Policies

HP Server Automation must be installed and configured before you can use it to deploy applications. See the *HP Server Automation Simple/Advanced Installation Guide* on HP Software Support for information about setting permissions.

You can find the steps required to prepare a clone template in vCenter in the *HP Cloud Service Automation Configuration Guide* on HP Software Support.

Prerequisites

- Prepare a VM template. For instructions, see the *HP Cloud Service Automation Configuration Guide* on HP Software Support.
- OO-SA content pack 1.2.0.001 must be installed in Operations Orchestration 10.21.

HP Service Manager

Use case: HP Service Manager as an external approval system (Sequenced)

This section explains how to use HP Service Manager as an external approval system.

Installing HP Service Manager

Install HP Service Manager according to the manufacturer's recommendations. For version requirements, see *HP Cloud Service Automation System and Software Support Matrix* at HP Software Support.

Installation notes:

- Do not install HP Service Manager on the same system where HP Operations Orchestration is installed. HP Service Manager and HP Operations Orchestration must run on separate systems.
- Calculate the resources needed for the HP Service Manager server using the information provided in the *HP Service Manager Interactive Installation Guide* on HP Software Support.

HP Service Manager account prerequisites

- HP Service Manager integration account must have enough privilege for creating change tickets in HP SM change module (example account: falcon or System.Admin).
- An operator in HP Service Manager must have the privilege to approve or deny the created change request ticket (example account:Change.Approver).
- After the operator makes decision about the SM change tickets, the HP CSA workload will be approved or denied.
- HP Service Manager has to be configured with LDAP (Active Directory).

Configuring HP Service Manager

The following steps must be completed to configure HP Service Manager:

Step 1: Import the HP CSA integration file into HP Service Manager

Importing the HP CSA integration file into HP Service Manager creates the OO_CSA and `WSCentralServiceService` script libraries and OnChangeApproval and OnChangeDenied macros.

1. Log on to the HP Service Manager Windows client using the Falcon account or another account with administrator privileges.
2. From the System Navigator, click **Connection** > **Tailoring** > **Database Manager** or enter db in the command window and click **RUN**.
3. Click **Import/Load**.
4. Locate the HPSM_CSA_Integration_file.unl file installed with HP CSA.

   The default location of the file is `%CSA_HOME%\Tools\CSLContentInstaller` where `%CSA_HOME%` is the directory, where HP Cloud Service Automation is installed (for example, `C:\Program Files\Hewlett-Packard\CSA`).

   If HP CSA and HP Service Manager are installed on different systems, copy this file to the system running HP Service Manager.
5. Click **Load FG**.

Step 2: Verify the installation of the script library and macros

1. Log on to the HP Service Manager Windows client using the Falcon account or another account with administrator privileges.
2. Enter **unload** in the command window and click **RUN**. Verify that the HPSM CSA Integration file is listed.
3. From the System Navigator, click **Connection** > **Tailoring** > **Script Library**.
4. Verify that the **OO_CSA** script library exists. In the **Name** field, type **OO_CSA**, and click **Find**.
5. Verify that the **WSCentralServiceService** script exists. In the **Name** field, type **WSCentralServiceService**, and click **Find**.
6. Validate the credentials for the HP Operations Orchestration Central server. View the **OO_CSA** script and validate the values for **centralUser** and **centralPassword**. Edit the script and update these values if they are not set to the correct credentials. After updating a value, click **Save**.
7. Update the URL for the HP Operations Orchestration Central server. View the **OO_CSA** script and update the value for **centralURL**. Replace localhost with the hostname of the HP Operations Orchestration Central server. Click **Save**.
8. From the System Navigator, click **Connection** > **Tailoring** > **Tailoring Tools** > **Macros**.
9. Verify the OnChangeApproval and OnChangeDenied macros exist.

Step 3: Modify the approval definition

Update the sample Approval Definition provided with HP Service Manager to create a new subscription approval.

1. Use the HP Service Manager unload tools to back up the sample Approval Definition.
2. Log on to the HP Service Manager Windows client using the Falcon account or another account with administrator privileges.
3. From the System Navigator, click **Connection** > **Change Management** > **Maintenance** > **Approvals**.
4. Search for the Subscription Approval. In the **Name** field, type **Subscription Approval**, and then click **Find**.
5. Verify or set the following fields and values:

Field name	Value
Name	Subscription approval
Approval Condition	true
Approval Type	All must approve
Group/Oper	Change.Approver
Sequence	1
Condition	true

6. Click **Save**.

Step 4: Enable SSL between HP Service Manager and HP Operations Orchestration

1. Create a self-signed certificate using the fully-qualified domain name of the system on which HP Operations Orchestration is installed to replace the existing HP Operations Orchestration Central server certificate.

   Note: If the existing HP Operations Orchestration Central server certificate uses a CN with the fully-qualified domain name of the system on which HP Operations Orchestration is installed, you do not need to create a self-signed certificate. You can use the existing HP Operations Orchestration Central server certificate.

   Refer to Replacing the Central SSL/TLS Server Certificate with a Self-Signed Certificate section in the *System Configuration and Hardening Guide* (a copy of this guide can be found in `%ICONCLUDE_HOME%\docs\Configuration and Hardening Guide.pdf` or `$ICONCLUDE_HOME/docs/ConfigurationandHardeningGuide.pdf`).

2. Export HP Operations Orchestration's SSL certificate. On the system on which HP Operations

Orchestration is installed, open a command prompt and type the following:

Windows

```
cd "%ICONCLUDE_HOME%"
```

```
.\java\bin\keytool -export -alias tomcat -file pas.crt -keystore
.\Central\var\security\key.store -storepass changeit
```

Linux

```
cd $ICONCLUDE_HOME
```

```
./java/bin/keytool -export- -alias tomcat -file pas.crt -keystore
./Central/var/security/key.store -storepass changeit
```

3. Copy `pas.crt` to the system on which HP Service Manager is installed, to the `<HPSM_install_directory>\Server\RUN\jre\lib\security` (Windows) or `<HPSM_install_directory>/Server/RUN/jre/lib/security` (Linux) directory.

4. On the system on which HP Service Manager is installed, import the HP Operations Orchestration certificate. Open a command prompt and type the following:

   Windows

   ```
   cd "<HPSM_install_directory>\Server\RUN\jre\lib\security"
   ```

   ```
   "<HPSM_install_directory>\Server\RUN\jre\bin\keytool.exe" -importcert -alias
   tomcat -file pas.crt -keystore cacerts -storepass changeitgeit
   ```

   Linux

   ```
   cd <HPSM_install_directory>/Server/RUN/jre/lib/security
   ```

   ```
   <HPSM_install_directory>/Server/RUN/jre/bin/keytool.exe -importcert -alias
   tomcat -file pas.crt -keystore cacerts -storepass changeit
   ```

Step 5: Map the fully-qualified domain to the IP of the system on which HP Operations Orchestration is installed

When HP Service Manager accesses HP Operations Orchestration as a client, the HP Operations Orchestration certificate uses a hardcoded key for the CN. On the system running HP Service Manager, this CN (the fully-qualified domain name (FQDN) of the system on which HP Operations Orchestration is installed) must be mapped to the IP address of the system on which HP Operations Orchestration Central server is installed. The following is an example of how to map the CN to the IP address:

1. On the system running HP Service Manager, open `C:\Windows\system32\drivers\etc\hosts` (Windows) or `/etc/hosts` (Linux) in a text editor.

2. Add the following to the file:

```
<IP_address_of_HPOO_central_server>   <FQDN>
```

where <IP_address_of_HPOO_central_server> is the IP address of the system on which HP Operations Orchestration Central server is installed and <FQDN> is the fully-qualified domain name of the system on which HP Operations Orchestration Central server is installed.

3. Save and close the file.

Configuring SM OO system properties

Configure the following system accounts and properties:

OO System Account

HPCSA_SERVICEMANAGER_CREDENTIALS - configure it with Service Manager system credentials

OO System Properties

HPCSA_ServiceManager_Host - Service Manager Host/IP Address

HPCSA_ServiceManager_Port - Service Manager service port

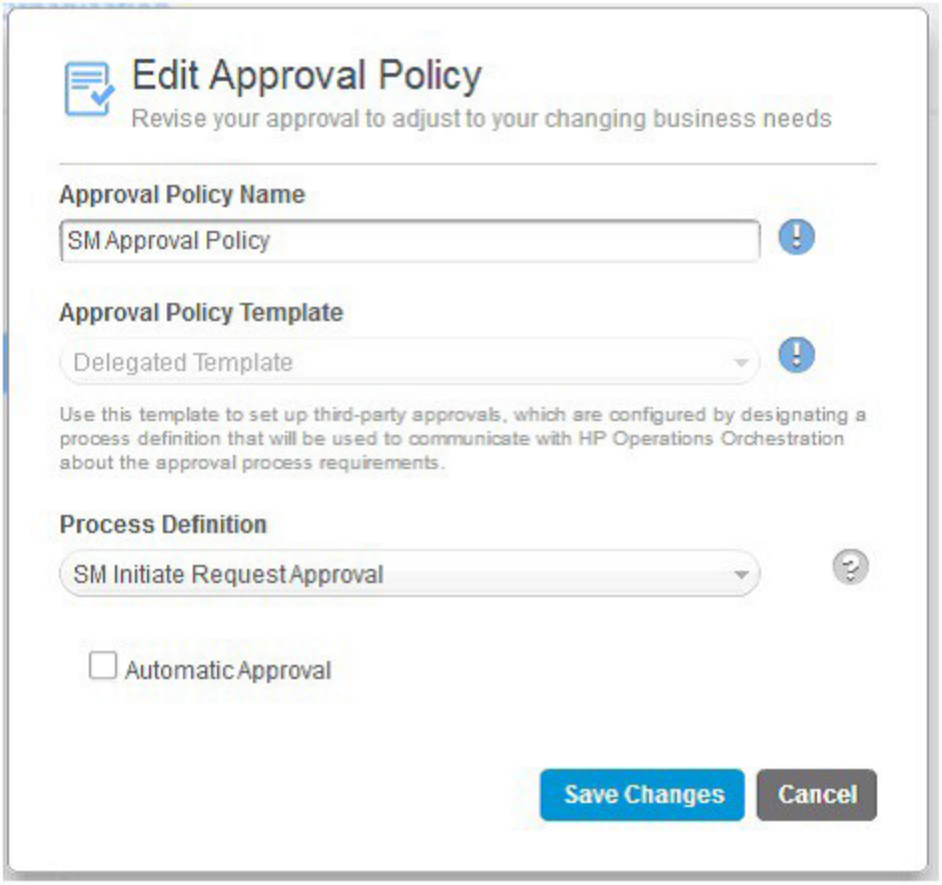
HPCSA_ServiceManager_Protocol - Service Manager service access protocol

HPCSA_ServiceManager_Version - Target Service Manager version "9.30" or "9.3x"

Configuring external approval

To configure external approval, complete the following steps:

1. Log on to the HP CSA Management Console as an administrator.
2. Click the **Service Catalogs** tab.
3. Select the catalog that you want to use or create new one.
4. Click **Approval Policies**.
5. Click **Add Approval Policy** at the bottom of the screen. The **Add Approval Policy** dialog will open.
6. Enter a name for the policy and select **Delegated template** for the approval template. The **Process Definition** field will be displayed.
7. Select **SM Initiate Request Approval** for the process definition.
8. Click **Save Changes**.



9. Return to the Service Catalog, and click **Published Offerings**.
10. Add a new offering or edit an exist offering.
11. Set the approval process to **Active**, and select **SM Initiate Request Approval** for the approval policy again.
12. Save the offering.

Configuring HP SM LDAP (Active Directory) integration

To configure LDAP for HP SM, complete the following steps:

1. Create a new HP CSA Consumer user in the Active Directory server to request a change ticket (for example: consumer).
2. Log on to the HP SM client as an administrative user such as falcon or System.Admin.
3. In HP SM, create a new power user with the same name created for the HP CSA Consumer user

in Active Directory (consumer) by cloning an administrator account such as falcon.

4. Click **Connection** > **System Administration** > **Ongoing Maintenance** > **System** > **LDAP mapping**.
5. Enter values for the following:
   a. LDAP Server: IP Address of LDAP server
   b. LDAP Port: 389
   c. LDAP Base Directory: CN=Users,DC=CSA,DC=COM (This is sample data)
6. Click **Save**.
7. Click **Set File/Field Level Mapping** and in the Name field, enter 'operator'.
8. Click **Search**.
9. Check the fields mentioned in step 5 to make sure that the entries are correct on the <HP Service Manager LDAP Mapping - File/Field Level Specifications > page.
10. In the Field Name/LDAP Attribute Name table, make sure that you have value CN for the NAME field in the Field Name column.
11. Edit sm.ini, which is located in <HPSM install directory>\Server\RUN\ and include the following properties:
    a. ldapauthenticateonly:1 ldapnostrictlogin:1
    b. ldapbinddn:CN=Administrator,CN=Users,DC=CSA,DC=COM ldapbindpass:password
    c. ldapdisable:0 ldapstats:1
12. Restart the HP SM server.

Now you should be able to log on to HP Service Manager using an LDAP user and password.

HP SM execution order

To approve or deny the HP SM change request ticket:

1. Log on to the HP CSA Consumer Portal as the user, who has privileges to create a service request.
2. Request the service offering that you modified in the "Configuring external approval" section.

3. Log on to HP Service Manager using an account which has privilege to approve or deny the created change request ticket (example account: Change. Approver)

4. Click **Approval** inbox from the menu navigator, check the request related change tickets that have been created and are waiting for approval.

5. Click **Approve** or **Deny** to make a decision on this request.

   The subscription will not be created until the approval has been made. HP CSA deploys the approved subscription requests.

Limitation

To request the HP CSA subscription, HP CSA Consumer user should be created both in HP Service Manager and HP CSA. That is, the user type 'consumer' should be present both in HP CSA and HP Service manager.

HP SiteScope and HP Universal CMDB

HP SiteScope is an agentless monitoring software focused on monitoring the availability and performance of distributed IT infrastructures, including Servers, Network devices and services, Applications and application components, operating systems and various IT enterprise components.

For information about how the VMware vCenter server is monitored using Sitescope and configured using UCMDB, see "Use case: Monitoring and configuration management using vCenter Compute" on page 223.

Installing HP SiteScope

Install HP SiteScope to the correct version and patch level. See *HP Cloud Service Automation System and Software Support Matrix* for version requirements.

Installation notes:

- Do not install HP SiteScope on the HP Operations Orchestration server. It must be on its own server.
- Calculate the resources needed for the HP SiteScope server using the information in the HP SiteScope documentation. This calculation should include the number of target servers that you expect HP CSA to monitor.
- During installation, you can change the port for the HP SiteScope service to avoid potential conflicts with other web servers that use the default port value of 8080. Select any available port on the system and keep track of the port number that you select.

HP software product documentation is available on HP Software Support.

Configuring HP SiteScope

The following tasks are required to configure HP SiteScope to integrate successfully with HP CSA:

- Enable HP CSA to configure HP SiteScope monitors
- Auto-Deploy the HP CSA templates and credential profiles
- Manually import additional HP CSA templates
- Configure HP CSA credential profiles
- Configure HP SiteScope administrator credentials

Step 1: Enable HP CSA to configure HP SiteScope monitors

HP SiteScope is installed with a default secured API calls required for configuring monitors. HP Cloud Service Automation does not support secured API calls; therefore, you must change this setting. To re-configure HP SiteScope so that it does not use secure APIs, you must make the following changes to the configuration:

1. Stop the HP SiteScope service by executing the following command in a console window:

   ```
   net stop SiteScope
   ```

2. Open the HP SiteScope `<sitescopeInstallDir>\groups\master.config` file in a text editor.

3. Change the `_accessControlled=true property value to _accessControlled=false`.

4. Restart the HP SiteScope service by executing the following command in a console window:

   ```
   net start SiteScope
   ```

Step 2: Auto-deploy the HP CSA templates and credential profiles

1. Log on to the HP SiteScope server as an administrator.

2. Log on to the HP CSA server.

3. From the HP CSA server, copy the `%CSA_HOME%\CSAKit-4.5\Lib\sitescope\CSA templates autoimport.tmpl` file to the `<sitescopeInstallDir>\persistency\import` directory on the HP SiteScope server (where `%CSA_HOME%` is the directory in which HP CSA is installed).

4. Log on to the HP SiteScope Dashboard.

5. Select the **Templates** context. In the template tree, look for the CSA templates container. You must wait for the HP SiteScope server to finish processing the `CSA templates autoimport.tmpl` file before the CSA templates template container is displayed.

6. Select **Preferences** context > **Credential Preferences** and look for the WINDOWS-CSA-TARGETS and LINUX-CSA-TARGETS credential profiles, which you will configure in step 4: Configure HP CSA Credential Profiles.

Step 3: Manually import additional HP CSA templates

Two additional HP CSA templates, CSA templates Silver and CSA templates Gold, must be manually imported.

1. Log on to the HP SiteScope Dashboard.

   Note: You must be able to access files in the %CSA_HOME%\CSAKit-4.5\Lib\sitescope directory from the HP SiteScope Dashboard. If necessary, copy this directory to the system from which you are launching the HP SiteScope Dashboard.

2. Select **Templates**.

3. In the template tree, right-click **SiteScope** and select **Import**.
4. Browse to `%CSA_HOME%\CSAKit-4.5\Lib\sitescope` (or the directory to which this directory was copied) and import `CSA templates Silver.tmpl`.
5. Repeat steps 3 and 4, but import `CSA templates Gold.tmpl`.

Step 4: Configure HP CSA credential profiles

Configure the credentials used to log on to every Windows system and every Linux system monitored by HP SiteScope. The credentials for all Windows systems must be the same. Likewise, the credentials for all Linux systems must be the same.

1. Log on to the HP SiteScope Dashboard.
2. Select **Preferences** > **Credential Preferences**.
3. Edit the **LINUX-CSA-TARGETS** credential profile and supply login credentials for your Linux environment.
4. Edit the **WINDOWS-CSA-TARGETS** credential profile and supply login credentials for your Windows environment.

Step 5: Configure HP SiteScope administrator credentials

Configure the credentials used to log in as the administrator of HP SiteScope. These credentials are used by HP CSA when configuring HP SiteScope resource providers from the Cloud Service Management Console.

1. Log on to the HP SiteScope Dashboard.
2. Select **Preferences** > **User Management Preferences**.
3. Right-click **SiteScope Administrator** and select **Edit User**.
4. If not already specified, enter a login name and password for the SiteScope administrator

Installing HP Universal CMDB

Install HP Universal CMDB (HP UCMDB) to the correct version and patch level. If you are using an existing installation of HP UCMDB, then you should verify that the necessary patches and updates have been applied. See HP Cloud Service Automation System and Software Support Matrix for version requirements.

If you are installing HP UCMDB, then you should follow the installation instructions in the HP UCMDB documentation on HP Software Support and then follow the instructions presented here to configure your installation.

To start the HP UCMDB Server service:

1. Click **Start** > **All Programs** > **HP UCMDB** > **Start HP Universal CMDB Server**.
2. Monitor the service status by browsing to http://localhost:8080/status.

   You will need to wait until the Default Client status is up on the status page. This takes approximately five minutes. Until then, the HP UCMDB console cannot be used.

HP software product documentation is available on HP Software Support.

Configuring HP Universal CMDB

To configure HP UCMDB, deploy a file to your HP UCMDB server:

1. Log on to the HP CSA server.
2. From theHP CSA server, navigate to the `%CSA_HOME%\CSAKit-4.5\Lib\ucmdb` folder where `%CSA_HOME%` is the directory in which HP CSA is installed.
3. Copy the `%CSA_HOME%\CSAKit-4.5\Lib\ucmdb\CSAIntegration.zip` file to the HP UCMDB server.
4. Refer to the `%CSA_HOME%\CSAKit-4.5\Lib\ucmdb\README.txt` file for more information on how to deploy the zipped file.

HP Virtualization Performance Viewer

HP Virtualization Performance Viewer (HP vPV) provides visibility into performance and capacity information across elements in the cloud and virtualized environments. It also provides placement and optimization suggestions that can assist in right sizing the environment. Additional features of HP vPV include a useful mechanism to drill down and troubleshoot Guest OS level problems in real time, using forecast reports and what-if scenario modeling. HP vPV allows to manage the virtual capacity of any given infrastructure environment.

For information about the use case, see "Use case: HP vPV Integration" on page 235.

Configuring HP vPV

The user must have a HP vPV version 2.20 Linux server set up and ready to use. An additional patch is required to extend the functionality for placement suggestion.

You can download the hot fix HF_04022015_179395_VPV from the patch hub site at https://patch-hub.corp.hp.com/crypt-web/protected/viewContent.do?patchId=HF_04022015_179395_VPV&product=crypt%3Avirtualization_performance_viewer%3A&hasProdBreadcrumb=true.

Additional configurations must be done to HP vPV for managing and monitoring providers in your environment. This content provides placement suggestion only for vCenter type providers. Hence, all vCenter providers must be added to the HP vPV server.

Complete the following steps to add vCenter type provider to the HP vPV environment:

1. Go to https://<vPV IPAddress>:8444/PV/ and access HP vPV using secure access.
2. On the menu bar, click **Admin** > **General** > **Data Sources**.
3. Specify the details of your vCenter Host and its access information to add providers to the HP vPV environment.
4. Click **Test Connection** to test network connectivity in the environment.
5. If the connection is successful, click **Add** to add the vCenter to HP vPV.
6. Ensure that the vCenters have Configuration set to Statistics Level = 2. This enables HP vPV to read OS level performance information.

   To set up the statistic levels on the vCenter, follow the steps in the *Enabling Statistics Level 2 configurations in vCenter* section below.
7. After configuring the vCenters as providers in the HP vPV environment, click **Restart Colection** to start data collection process.

8. The initial data collection process depends on the number of hosts and clusters configured in the environment, and may take a few minutes to complete.

Note: The initial data collection process depends on the number of hosts and clusters configured in the environment, and may take a few minutes to complete.

Enabling Statistics Level 2 configurations in VMware vCenter

To set the statistics level on the VMware vCenter server, complete the following steps:

1. In the vSphere Client, click **Administration** > **vCenter Server Settings**.
2. In the vCenter Server Settings dialog window, click **Statistics**.

   The Statistics Interval page displays the time interval to save the vCenter Server statistics and the duration to save the information.
3. Click **Edit**.
4. In the Edit Statistics Interval window, set the values.

VMware vCenter

Installing and configuring VMware vCenter

Install VMware vCenter according to the manufacturer's recommendations. For example, follow the VMware best practices for managing individual ESX servers from a vCenter instance. You can find the VMware documentation at http://www.vmware.com/support/pubs/.

You must have a vCenter instance that can support the flows that actuate vSphere VMs. See *HP Cloud Service Automation System and Software Support Matrix* for version requirements.

Both the *HP Cloud Service Management Console Help*, which is available in a printable PDF format, and the *HP Cloud Service Automation System and Software Support Matrix* are available on HP Software Support.

Configuring VMware vCenter

Configure VMware vCenter by installing prepared templates. In the vSphere environment, a template is a master copy of a virtual machine that can be used to create many clones. A clone is a copy of a virtual machine.

Virtual machines created by the HP CSA solution are created based on virtual machine templates.

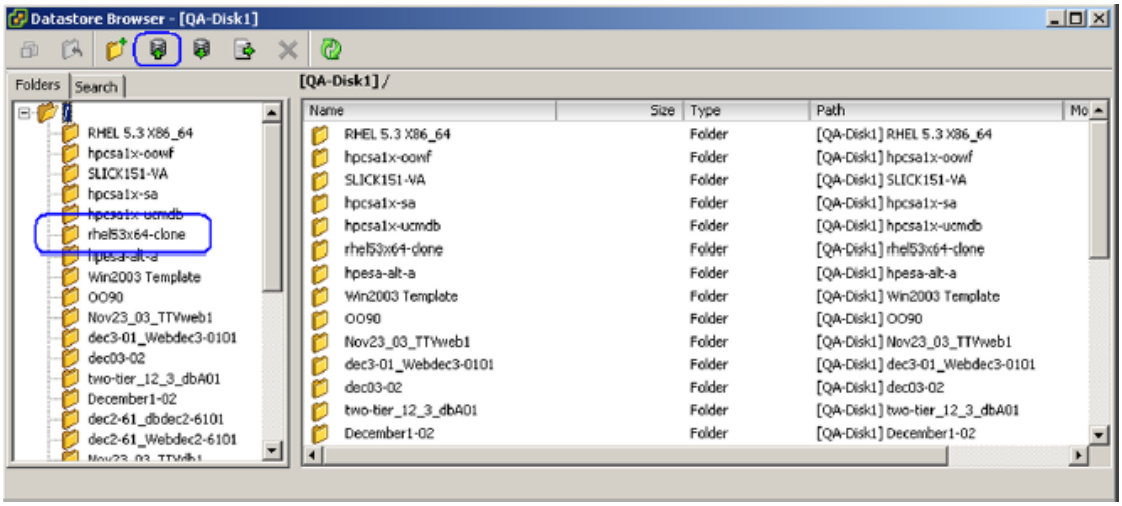
For more information about creating templates and working with clones in vSphere, see the *vSphere Virtual Machine Administration Guide* for vCenter Server (EN-000312-02) at http://www.vmware.com/support/pubs/.

To install a prepared template, do the following:

1. Locate a prepared template.
2. Copy the template folder to the system containing the vSphere client software.
3. On the vSphere client software menu, select **View** > **Inventory** > **Datastores** to see a list of available datastores on your vCenter server.
4. Right-click one of the available datastores, and select **Browse Datastore** to see the directory structure of that datastore.
5. Copy the template folder to the datastore by clicking on the **Upload files to this datastore** button.

   The following image shows the Datastore Browser window with Upload files to this datastore

highlighted. It also shows a rhel53x64-clone folder that was uploaded to this datastore:



For more information, see the vSphere documentation at http://www.vmware.com/support/pubs/.

Use case: VMware vCenter Compute (Sequenced)

This solution demonstrates how to integrate HP CSA with VMware vCenter Server, by creating VMware vCenter provider and providing an offering to deploy Virtual Machines(VMs) from a given template.

VMware vCenter Server (previously known as VMware VirtualCenter) is a data center management server application developed by VMware Inc. to monitor virtualized environments. VMware vCenter Server provides centralized management and operation, resource provisioning and performance evaluation of virtual machines residing on a distributed virtual data center. VMware vCentre Server is designed primarily for vSphere, VMware's platform for building virtualized cloud infrastructures.

HP CSA is architected to provide an open, heterogeneous, extensible single pane IT service control point with VMware vCenter to manage multiple cloud resource pools from HP and other providers, to design-orchestrate full stack services and IT service broker capabilities.

This implementation includes HP CSA service designs and HP Operations Orchestrations workflows, which can be used to create a service offering for consumers to request and manage server instance from VMware vCenter Server environment.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Configure VMware vCenter
- Configure VMware vCenter provider in HP CSA

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
vCenter Compute	VMware vCenter
vCenter Compute with Basic Options	

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to change options to values that are appropriate for your environment. You may also add or remove images as needed.

Creating resource providers

Resource providers must be created in HP CSA.The following table lists resource providers required for this implementation and the service access points. You may need to change them to reflect your environment.

Provider name	Service access point
VMware vCenter	https://<vCenter-Server>:443

To create resource providers, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the service design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table.

Resource offering	Provider
vCenter Compute	VMware vCenter
vCenter Compute Flex Server Resources	VMware vCenter
vCenter Compute No Operation	VMware vCenter

To associate a resource offering with a provider, complete the steps in "Associating resource offerings with providers" on page 27.

Changing component properties

You must change the following properties for the vCenter Compute service design components.

Component	Property name	Description
Server	customSpec	VM Template Customization Specification
Server	datacenterName	Datacenter name in the vCenter
Server	memory	Memory in MB
Server	nCPU	Total number of CPUs
Server	templateReference	VM template as in the vCenter
Server Group	serverCount	Total number of servers
Server	hostNamePrefix	Host Name Prefix
Server	vmFolder	Folder name as in VMware vCenter. If not specified, then VMs will be deployed at the root “/” (optional).

The vCenter Compute with Basic Options service design demonstrates basic subscriber options for vCenter Compute.

To change component properties, follow the steps in "Changing component properties" on page 39.

Note: The values for nCPU, memory, ipAddress may change during the subscription lifecycle. If subscriber options directly bind to them, the modified value may not be reflected in the Marketplace Portal. To overcome this limitation, new properties that end with Op have been introduced (CPUOp and memoryOp). Subscriber options will be bound to these properties and the flow will copy the value from the options to the actual properties.

Publishing the service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

service offering must be created in HP CSA before subscribers can request services based on this service design.

To create service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish service offering to the Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP Operations Orchestration flows

The following sections describe the flows used in this integration and the descriptions.

Flow name	Description
vCenter Restart Server	Restart the Virtual Machine
vCenter Simple Compute - Deploy	Provision a Simple Vcenter Linux VM from a VM template
vCenter Simple Compute - Undeploy	Undeploy the cloned server from vCenter
vCenter Start Server	Start the Virtual Machine
vCenter Stop Server	Stop the Virtual Machine
vCenter Suspend Server	Suspend the Virtual Machine

Flow name	Description
vCenter Simple Compute - Validate Input Properties	Validates virtual machine deployment input properties. This can be attached pre deployment state to check all the required information available to deploy.
vCenter Simple Compute - Server Group Flexin Server	Remove a Server from the Server Group. Random Server will be selected from the Server Group.
vCenter Simple Compute - Server Group Flexout Server	Provision a Server and add to the Server Group
vCenter Simple Compute - Server Flex CPU	This flow will flex up or flex down the CPU configuration of a server. The user is expected to enter the CPU in number that the servers should have. The flow will then apply this input as the final state of the CPU for the server. If the CPU of the server is less than the user input, then the server CPU will be flexed up to the input. If the CPU is lesser, then the server CPU will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.
vCenter Simple Compute - Server Flex Memory	This flow will flex up or flex down the memory configuration of a server. The user is expected to enter the memory in MB that the servers should have. The flow will then apply this input as the final state of the memory for the server. If the memory of the server is less than the user input, then the server memory will be flexed up to the input. If the memory is lesser, then the server memory will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.

Limitation

If the specified vmFolder does not exist in VMware vCenter, the subscription will fail.

Use case: VMware vCenter Topology

This section describes how to use VMware vCenter Server, formerly VMware Virtual Center, as a provider for HP CSA to deploy VMs using templates. This implementation also demonstrates how to configure static IP address to the network interface for the VM.

VMware vCenter Server provides centralized management of virtualized hosts and virtual machines from a single console. VMware vCenter Server gives administrators deep visibility into the configuration of all the critical components of a virtual infrastructure from a single point. With VMware vCenter Server, virtual environments are easier to manage: a single administrator can manage hundreds of workloads, more than doubling typical productivity in managing physical infrastructure.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Configure HP CSA Cloud Service Management Console and Marketplace Portal.
- Configure providers for VWware vCenter in HP CSA.
- Configure VMware vCenter.
- Configure HP Operations Orchestration. It must be operational.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
vCenter Simple Compute	VMware vCenter

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and the service access point. You should change them to reflect your environment.

Provider name	Service access point
VMware vCenter	https://<vCenter-Server>:443

For the VMware provider properties, the DATACENTERNAME is the user's VMware Data center name.

To create resource providers, complete the steps in "Creating resource providers" on page 20.

Creating credentials and system variables

After you import the flows, you must create system variables and credentials to subscribe service successfully.

Define the following system property under configuration in HP Operations Orchestration if it does not already exist.

Name	Description
vCenterDelay	Time in seconds to wait for collecting the power state status of the deployed VM. By default, this value is 30 seconds.User can set the time frame.

Changing component properties

To change component properties, complete the steps in "Changing component properties" on page 39.

Publishing a topology design

After importing the design and components, you can publish the Topology design.

Service design	Provider
vCenter Simple Compute	VMware vCenter

vCenter Server

This component represents a server on the VMware vCenter provider

Property name	Description
Name	Name of the vCenter Server.
vmTemplateReference	The template used for cloning the VM in the vCenter server from HP CSA
customizationSpec	Select the specific customization specification applicable for the vm instance
vmNamePrefix	The prefix name for the instance to be provisioned.
username	Login name used to deploy application.

Property name	Description
password	Password used to login to the instance and 'privateKey' should be left blank if this property is used.
privateKey	If the instance allows key-pair based authentication to login then the complete private key content has to be copied.
cpuCount	Number of CPUs for the instance to be provisioned.
memorySize	Size of the Memory for the instance to be provisioned.
vmFolder	Folder path for the instance to be provisioned.

To publish topology design, complete the steps in "Publishing topology design" on page 20.

Publishing service design

To publish the service design, complete the steps in "Publishing topology design" on page 20.

Creating service offering

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish service offering to the Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

Use case: Configuring intelligent resource management

Intelligent Resource Management provides a model to represent resource demand across different categories of providers. It also provides capacity and utilization awareness of these resources in HP CSA. HP CSA does not control management of actual resources on providers, but the goal is to manage the capacities made available to HP CSA from providers and track their utilization. HP CSA accounts for the utilization of these resource capacities for each subscription in HP CSA.

Prerequisites

Process definitions for out-of-the-box (OOTB) HP Operations Orchestration (HP OO) content must be uploaded into HP CSA successfully. For more information, see the *HP Cloud Service Automation Configuration Guide* at http://h20230.www2.hp.com/selfsolve/manuals/.

Concept of resource pools

A resource pool models the capacity and utilization of resources, which are represented as elements in the service model. Resource pools are optionally configured to represent those resources that a resource provider makes available to HP CSA.

HP CSA can model resource supply in resource pools associated with each resource provider. For example, you can create resource pools on a VMware vCenter resource provider to represent collections of virtual resources for a single hypervisor, a cluster, or the entire datacenter. You can also model HP Matrix Operating Environment infrastructure orchestration resource pools (pools of CPU, memory, and storage) as HP CSA resource pools.

HP CSA models resource demand using properties on service design components. HP CSA links the property demand to a specific resource pool's supply via resource binding actions during service instantiation.

The property on a service design that links to a specific resource pool via resource binding is known as measurable property. A measurable property has a resource type and a unit of measurement.

HP CSA allows you to define the following resource types for each pool:

- CPU
- IPv4 address
- IPv6 address
- License
- Memory
- Physical server
- Power
- Storage
- Subnet
- Virtual Server
- VLAN

Provider and pool selection internal actions

HP CSA provides the following internal actions to help with provider and pool selection:

Build Resource Provider and Pool List

This internal action builds a candidate list of resource providers and associated resource pools that meet the following requirements:

- The resource pool has the 'Availability' option set to Enabled.
- One or more resource types (CPU, Memory, and Storage) are added to the pool with the Resource Availability option marked as 'Available' or 'Unlimited'.
- The resource pool should have enough capacity to support all the resource types defined in the pool. If resource type is marked 'Available', then the difference between Total Available to CSA and Current CSA Utilization must be greater than the value required by the measurable property.
- If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate pool list is further restricted to only include resource providers in one or more of the selected resource environments.

Select Resource Provider and Pool

This internal action selects a resource pool and provider from the candidate list that was built by the Build resource provider and pool list action. The selected resource provider and pool will then be available to resource offering actions in the token RSC_PROVIDER_ID and RSC_POOL_ID, respectively. The selected pool will, optionally, be written to a property on the associated service component if the Pool Property Name input to the action is provided.

Select resource provider and pool from parent

This internal action selects the resource pool and provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Pool Property Name properties. The selected resource provider and pool will then be available to resource offering actions in the token RSC_PROVIDER_ID and RSC_POOL_ID, respectively. The selected pool will also be written to a `Pool Property Name` property on the associated service component.

Resource accounting internal actions

HP CSA provides the following internal actions to consume or release the resource types defined on the pool:

Increase resource utilization

- Configures this action during the Reserve state transition.
- It increases the Available to CSA resource type in a resource pool by the values of the measurable properties configured on a resource binding.

Decrease resource utilization

- Configures this action during Un-Reserve state transition.
- It decreases the Available to CSA resource type in a resource pool by the values of the measurable properties configured on a resource binding.

Resource management

HP CSA provides the capability to model, manage, and track resources of providers. Resource pools are used to model the capacity and utilization of resources. To model a pool, you need to identify the resource types to be managed like CPU and Memory, and capacity of each resource type. Also, to consume these resources during service subscription, measurable properties are configured on service components to capture the demand for each resource type.

Resource supply management

HP CSA resource administrators take care of supply management.

The following steps summarize the supply management in HP CSA:

- Administrator identifies the capacity of each resource that can be allocated for a provider and pool to configure a resource supply.
- Configures multiple pools per provider.
- Supports multiple resources per pool.

  For example, a pool can have CPU, Memory, and Storage resources configured.
- HP CSA supports Environment association with the pool or provider.

Resource demand management

The following steps summarize resource demand management in HP CSA:

- Resource demand is expressed using the measurable properties, which are described as properties on a Service Component. Measurable properties have a resource type and a unit of measurement.
- A resource or multiple resources (CPU and Storage) in demand will be presented to provider and resource pools. The provider and the pool which satisfy the resource demand will be selected for utilization.
- If the resource demand cannot be determined during provider selection, then you can externalize the provider and pool selection. Additionally, an HP OO workflow has to be developed which will determine the resource demand and select the appropriate provider and pool.
- Once the demand criteria is satisfied, then accounting actions will utilize the resources and decrease the allocated capacity of the resource from the resource pool. These actions are defined in Reserve/Un-Reserve transitions phases.

Use case: Resource pool use case

HP CSA administrators configure resource pools on HP CSA to utilize the resources of the provider. The following use cases can be derived while configuring providers and pools on HP CSA:

- Administrators have to know the available resource capacity for each resource that needs to be configured on the HP CSA resource pool. During provider and pool selection, these resources will be consumed accordingly.
- Administrators cannot determine the available resource capacity to configure on the resource pool. In such cases, they can still configure the pool but externalize the provider and pool selection by determining the resources available on the actual provider.

This use case explains the first case. For information about the second use case, see "Use case: Custom Resource Provider and Pool selection" on page 201.

For example, consider the following scenario:

You need to design a service to provision a simple compute server using the provider VMware vCenter. The service should consume resources from the pool while provisioning, and release the resources back to the pool during tear down of the service.

The purpose of this example is to help the reader understand how to configure resource pools, resource types for each pool, configure measurable properties, and configure internal actions on resource bindings.

The steps will not illustrate basic HP CSA operations (for example, adding a resource provider and publishing a service offering).

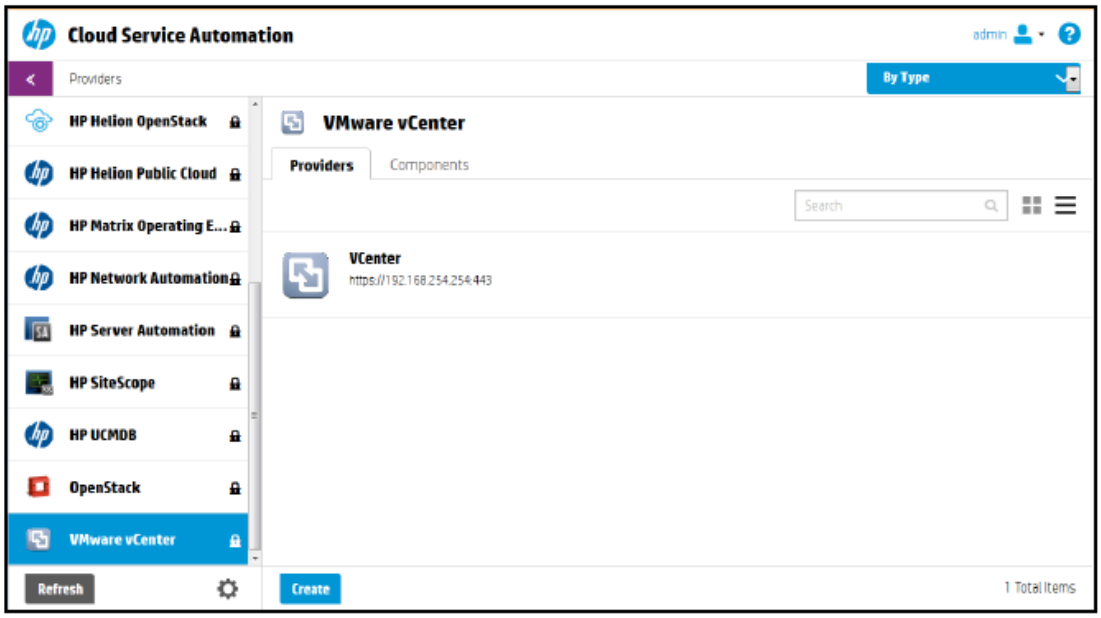
Since HP CSA ships with the out-of-the-box content vCenter Compute Modify, use this content to illustrate the steps. To import the content, use the Designs tab in the Cloud Service Management Console.

Service design	Provider
vCenter Compute Modify	VMware vCenter

Configuring resource pool

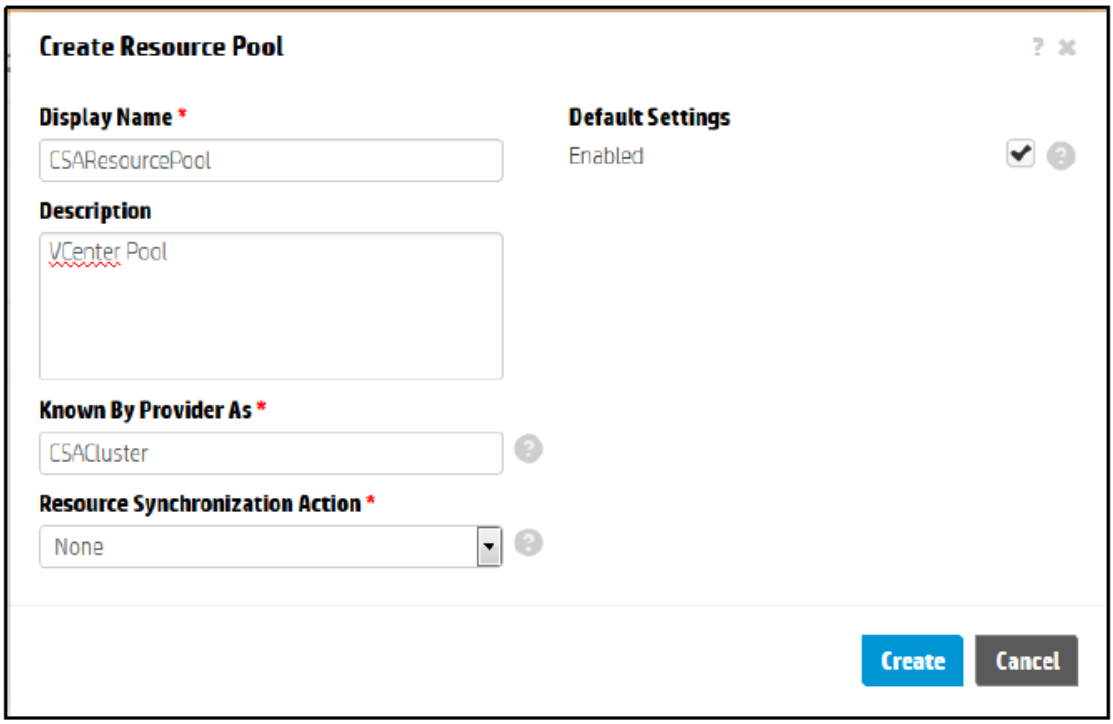
1. Add a vCenter provider.

   Because this example is based on vCenter, create a provider and resource pool based on the vCenter provider. Create a vCenter provider in the **Providers** area of the Management console.



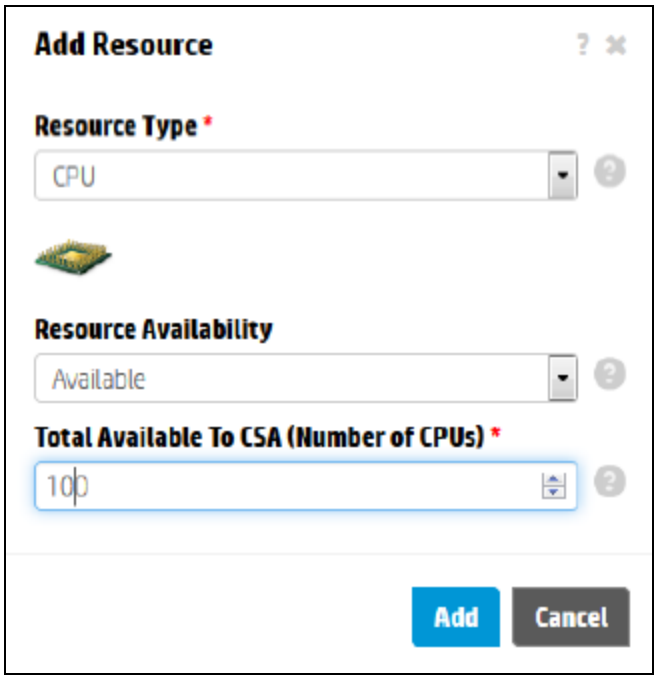
2. Add a resource pool.

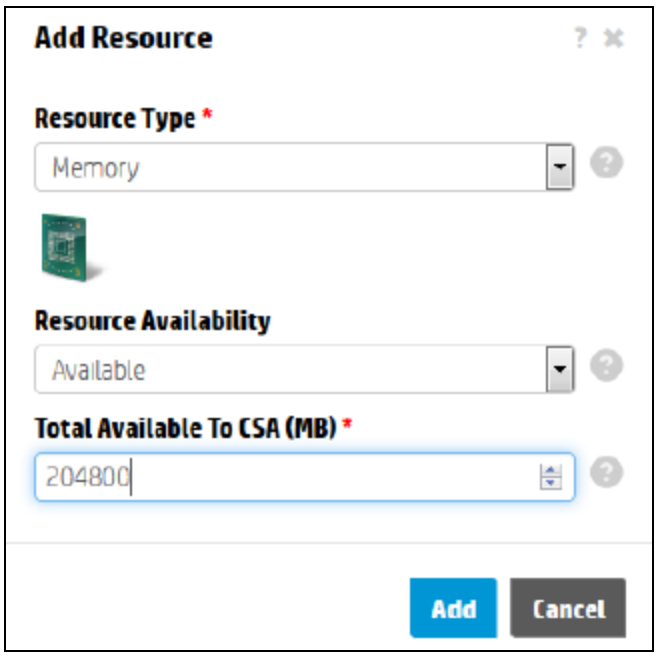
   Click the created resource provider. Create a resource pool from the **Resource Pools** tab. While creating the provider in the Known By Provider As field, add either the datacenter name or the cluster name of the provider.



3. Add a resource type to the pool.

   Consume CPU and Memory resources from the pool. Add these two resource types from the Resources tab on the pool. Add the Total Available to CSA values for the respective resource types. The Total Available to CSA value is the total capacity allocated for the resource that will be utilized by HP CSA.

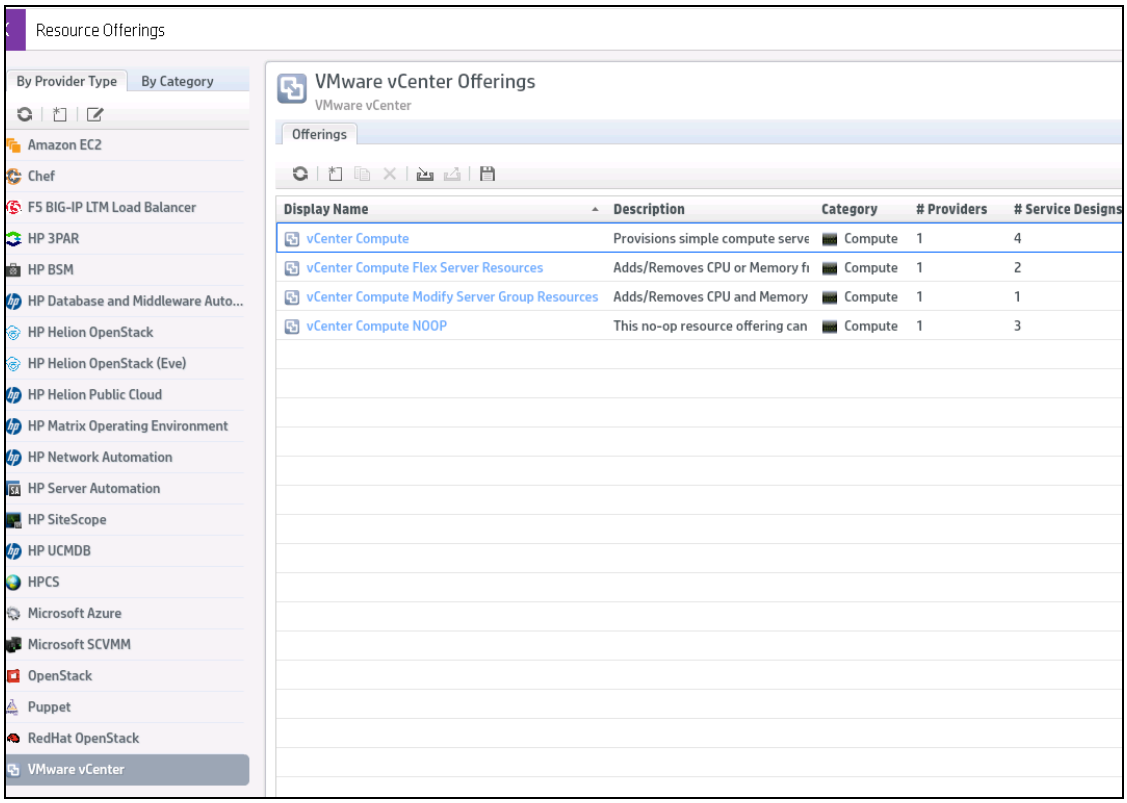




Now, the two types of resources added to the pool are CPU and Memory.

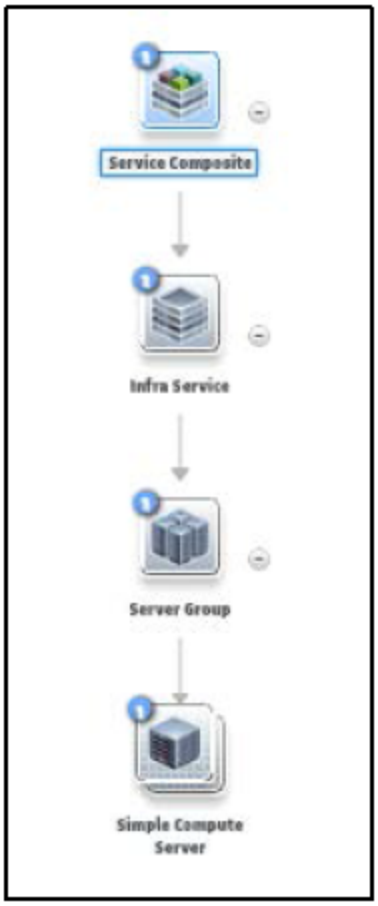
4. Associate resource offering to the provider.

   Add the vCenter Compute, vCenter NOOP, and vCenter Modify Server Group Resource offerings to the vCenter provider.



5. Create a service design.

   Create a service design with the following hierarchy of service components: Service Composite > Infrastructure Service > Server Group > Server. The Server component is marked as a pattern component.

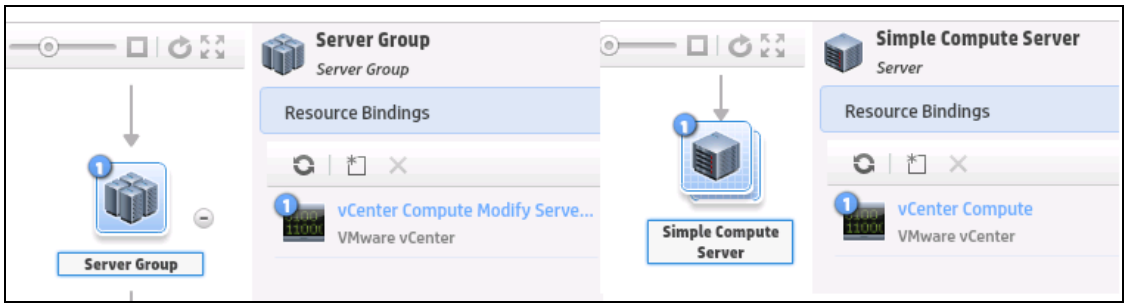


6. Configure the resource offerings on the components.

   The following table lists the resource offerings to be added on the components:

Component	Resource Offering
Server Group	vCenter Compute NOOP
Server	vCenter Compute

   The following figure depicts the resource offerings added on to components:

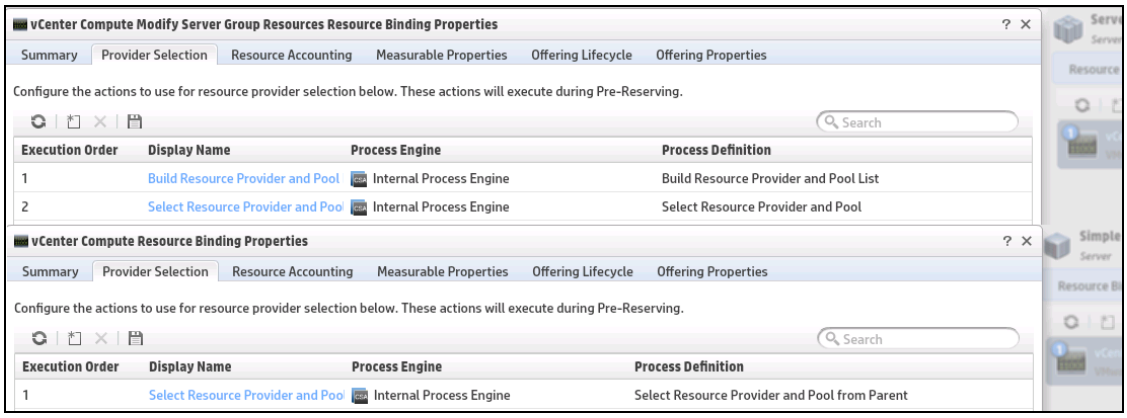


7. Configure the provider and pool internal actions on the components.

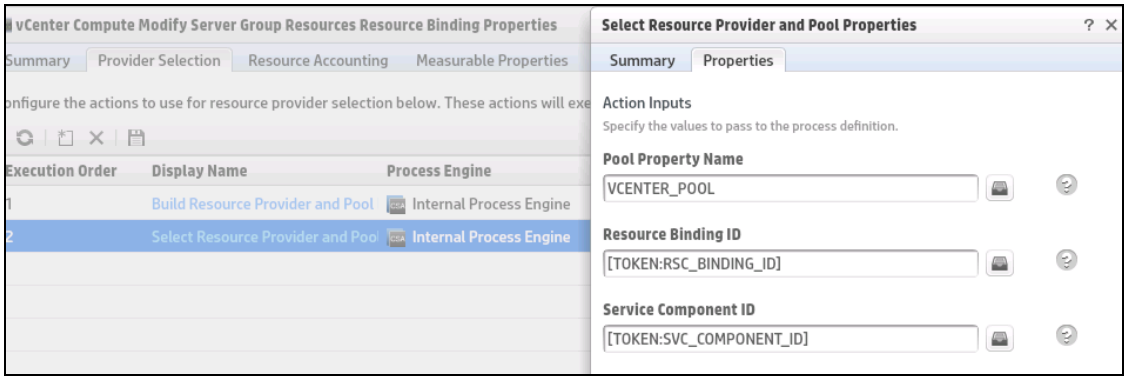
   Add the internal actions listed in the following table. These internal actions are added in the Provider Selection tab on Resource binding. Also, add the provider property name on the internal actions as defined in the table:

Component	Internal Action	Provider Property Name
Server Group	Build Resource Provider and Pool List	
	Select Resource Provider and Pool	VCENTER_POOL
Server	Select Resource Provider and Pool from Parent	VCENTER_POOL

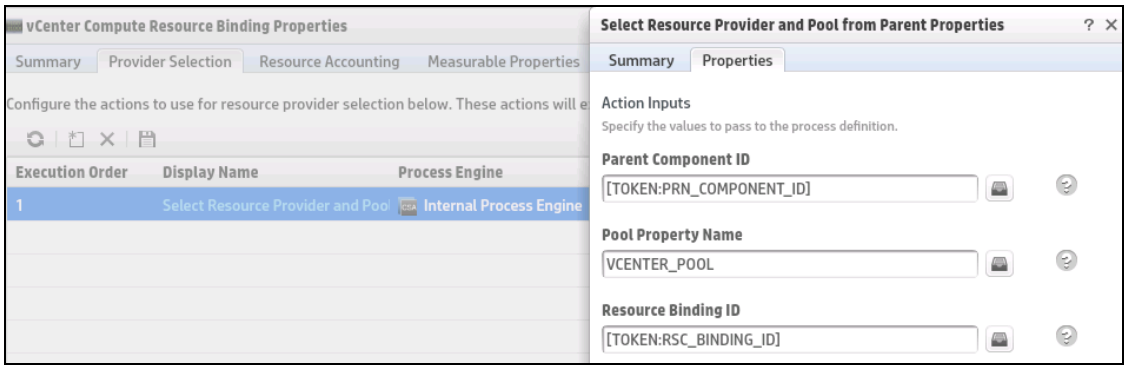
   The following figure depicts the internal actions on the Server Group Resource Binding:



Setting provider properties internal actions on the server group resource binding is depicted in the following figure:

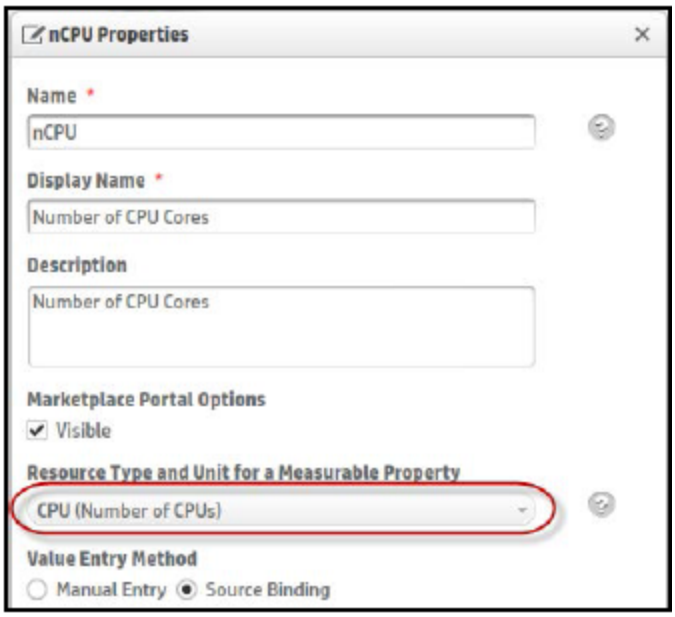


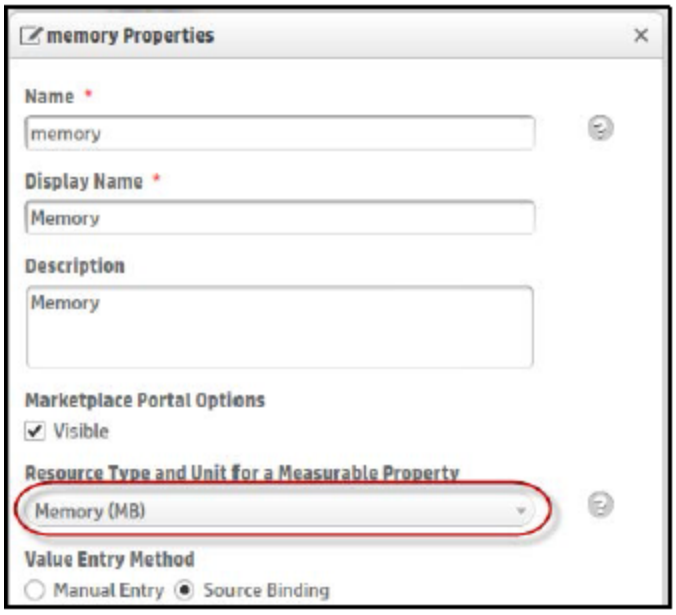
Provider property name on the select resource provider and pool from parent internal action is depicted in the following figure:



8. Configure the resource types on the CPU and Memory properties.

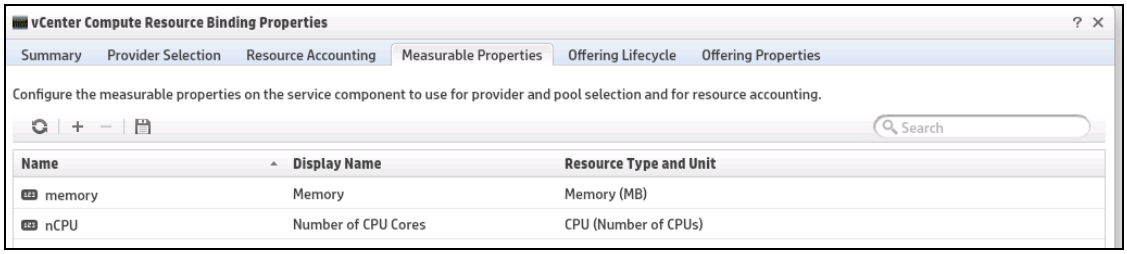
Open the Properties tab where the nCPU and memory properties are defined on the Server component. These properties should be marked with appropriate resource type as shown in the following figure. The resource type on the properties qualifies them to be measurable.





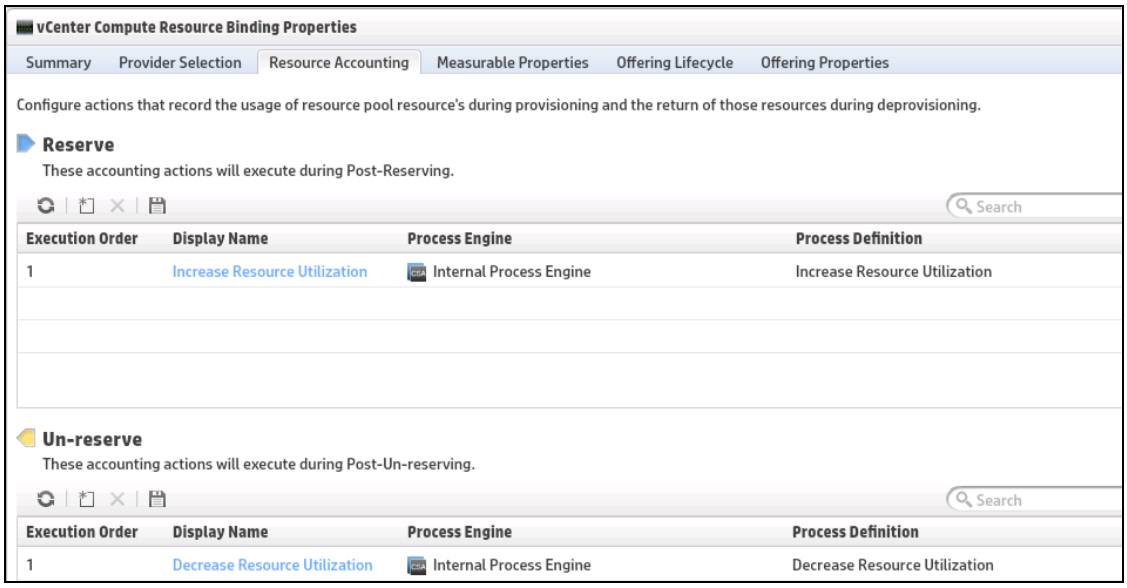
9. Configure the nCPU and Memory properties on to the Resource Binding.

Click **Resource Binding vCenter Compute** on the Server component. Add the properties nCPU and Memory onto the Measurable Properties tab. The property values will be accounted during provider and pool selection.



10. Configure the Resource Accounting internal actions onto the Resource Binding.

    Add the Increase Resource Utilization internal action onto the Reserve state, and the Decrease Resource Utilization internal action onto the Un-Reserve state. These internal actions will be executed during the Reservation phase of the life cycle execution of the Server component.



11. Define property values on the components.

Property values have to be defined for component properties for both the Server Group and Server components.

After executing these steps, the service is ready to be associated with a service offering, and published to a catalog. After a user subscribes to this service, HP CSA creates a service instance which moves through the HP CSA lifecycle phases.

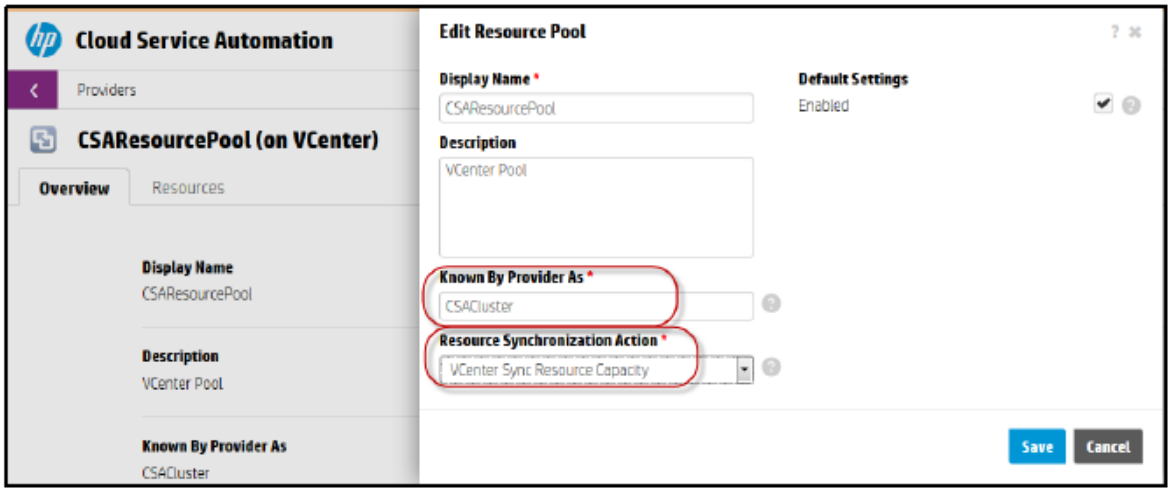
Resource utilization report

Administrators can view the resource capacity allocated and resources utilized for each resource pool from the Cloud Service console. You can manually increase the resource capacity allocated. Automatic resource capacity allocation can be set using the Resource Sync option on the resource pool.

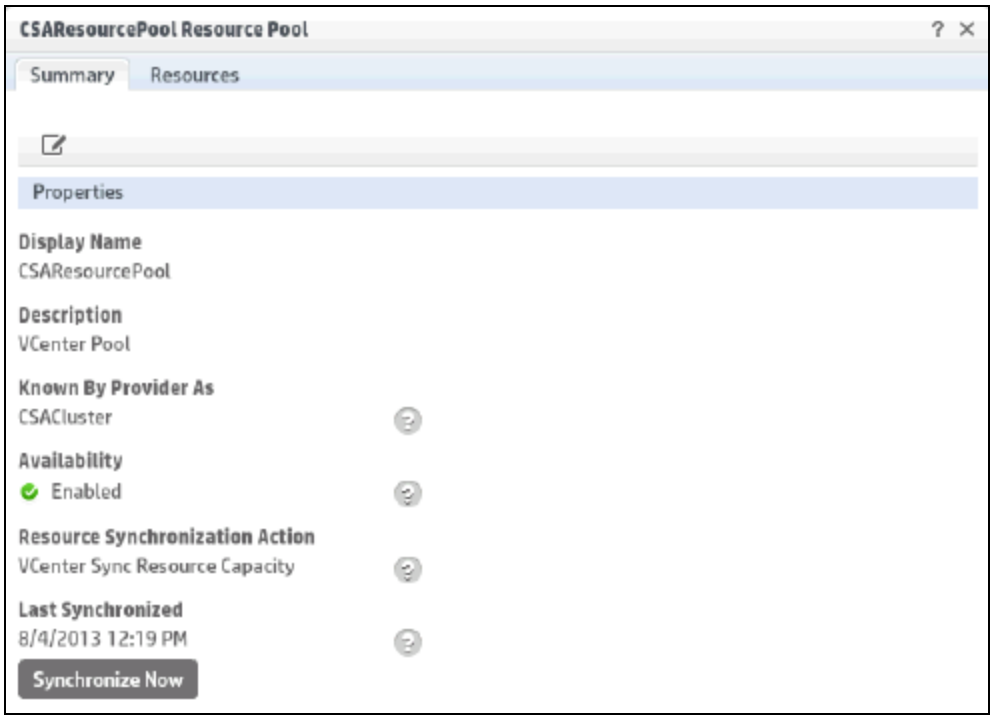
Resource synchronization

Resource capacity on the resource pool is used during provider and pool selection. Administrators can set the capacity manually or automatically. Available resource capacity units can be retrieved from a provider single hypervisor, cluster or a datacenter and update the Total Available to CSA value using the Utilization REST API. You can externalize the resource capacity update using HP OO flows wrapped to retrieve allocated units and update the resource capacity on the pool. HP CSA provides an OOTB vCenter Sync Resource Capacity HP OO flow to update the resource capacity retrieved from a vCenter provider.

You can set the HP OO action flow using the Resource Synchronization Action option on the resource pool. While configuring the Sync action, Known By Provider As should be a provider Cluster name or a Datacenter name.



Resource synchronization can be scheduled by triggering the Synchronize Now button on the resource pool. On success, the Last Synchronized field will display the latest timestamp when the resource pool was updated.



REST APIs

Get resource pool details

This API is used to get the resource pool artifact details.

URI	/artifact/<resourcePoolID>
Method	GET
Parameters	userIdentifier=<user_id> Required; the user ID you want to use as credentials for this API call. This user should be a consumer user who has the necessary permissions for the data you want to work with. scope=[base | baseplusone | subtree] Optional; default is base. If value is base, then the object is returned. If value is baseplusone, then the object and its first level children are returned. If value is subtree, then the object and all of its descendants are returned. detail=[required | basic | standard | template | full] Optional; default is full. See the values for the detail parameter in the HP CSA documentation. Some API calls do not support all possible values for this parameter.

Returns	200 - Updated 404 - Not found 500 - Server exception

Update resource pool details

URI	/artifact/<resourcePoolID>
Method	PUT
Parameters	userIdentifier=<user_id> Required; the user ID you want to use as credentials for this API call. This user should be a consumer user who has the necessary permissions for the data you want to work with. _action_=merge

XML Input without Synchronize action	<ResourcePool> <name>${name}</name> <displayName>${displayName}</displayName> <poolReference>${poolReference}</poolReference> <resourceProvider><id>${providerId}</id></resourceProvider> <state> <name>ACTIVE</name> </state> <artifactType> <name>RESOURCE_POOL</name> </artifactType> <resourceCapacity> <id>${capacityId}</id> <resourceType> <id>${resourceTypeId}</id> <name>${resourceTypeName}</name> </resourceType> <unit> <name>${unit}</name> </unit> <availabilityIndicator> <name>${availabilityIndicator}</name> </availabilityIndicator> <availableToCsa>${availableValue}</availableToCsa> <usedByCsa>${usedByCSA}</usedByCsa> </resourceCapacity> </ResourcePool>

XML Input with Synchronize action	<ResourcePool> <name>${name}</name> <displayName>${displayName}</displayName> <poolReference>${poolReference}</poolReference> <resourceProvider><id>${providerId}</id></resourceProvider> <action> <id>${actionId}</id> <name>${actionName}</name> <processDefinition> <id>${processDefId}</id> <name>${actionName}</name> </processDefinition> </action> <state> <name>ACTIVE</name> </state> <artifactType> <name>RESOURCE_POOL</name> </artifactType> <resourceCapacity> <id>${capacityId}</id> <resourceType> <id>${resourceTypeId}</id> <name>${resourceTypeName}</name> </resourceType> <unit> <name>${unit}</name> </unit> <availabilityIndicator> <name>${availabilityIndicator}</name> </availabilityIndicator> <availableToCsa>${availableValue}</availableToCsa> <usedByCsa>${usedByCSA}</usedByCsa> </resourceCapacity> </ResourcePool>

Use case: Custom Resource Provider and Pool selection

HP CSA comes with out-of-the-box resource provider selection actions. These actions select a list of resource providers and pools that are capable of providing a resource offering and select a provider and pool from this list. This selection functionality can be further refined by filtering the list of providers based on a desired condition, before the final resource provider and pool is selected.

Prerequisites

Experience with HP Operations Orchestration (HP OO) flow authoring is also required. User must have run the Process Definition tool for the out-of-the-box content.

For more information, see the *HP Cloud Service Automation Configuration Guide* at http://h20230.www2.hp.com/selfsolve/manuals/.

Concept

HP CSA provides capability to configure demand and utilization of resource capacity across categories of providers. Resource Pool is the model to capture the demand and express the utilization consumed on HP CSA per provider. Each pool can be configured with multiple capacities like CPU and Memory, which will be consumed by HP CSA during subscription fulfillment. Capacity is consumed during the Reservation phase and released during Un-Reservation phase of the lifecycle process.

Resource pools can be configured in HP CSA for the following two cases:

- To manage (increase or decrease) resource capacity and select the provider and pool that satisfy the demand.
- To manage only the utilization of resource capacity, but externalize the selection of provider and pool.

This use case explains how to manage the utilization of resource capacity and externalize the selection of provider and pool.

The following internal actions help with provider and pool selection:

- Build Resource Provider and Pool List
- Select Resource Provider and Pool

These actions are explained in the following sections.

Build Resource Provider and Pool List

This action performs the following:

- Builds a list of resource providers and pools.
- Filters the list belonging to at least one of the resource environments that are associated with the corresponding service catalog (a catalog used to publish the service offering related to the service design that performs this action).

The following are the criteria to build a candidate list of resource providers and pools:

- They must have the provider availability option set to Enabled.
- They must have the pool availability option set to Enabled.

The Build Resource Provider and Pool List action also sets the valid list of resource providers to the list resulting from this action.

Select Resource Provider and Pool

Select Resource Provider and Pool action selects a resource provider and a pool from the valid list of pools built by the Build Resource Provider and Pool List action. The resource provider is selected randomly from the list of valid providers. The selected provider is then written to a property on the associated service component. Users specify the name of this property through a well-known property of this action.

Use case

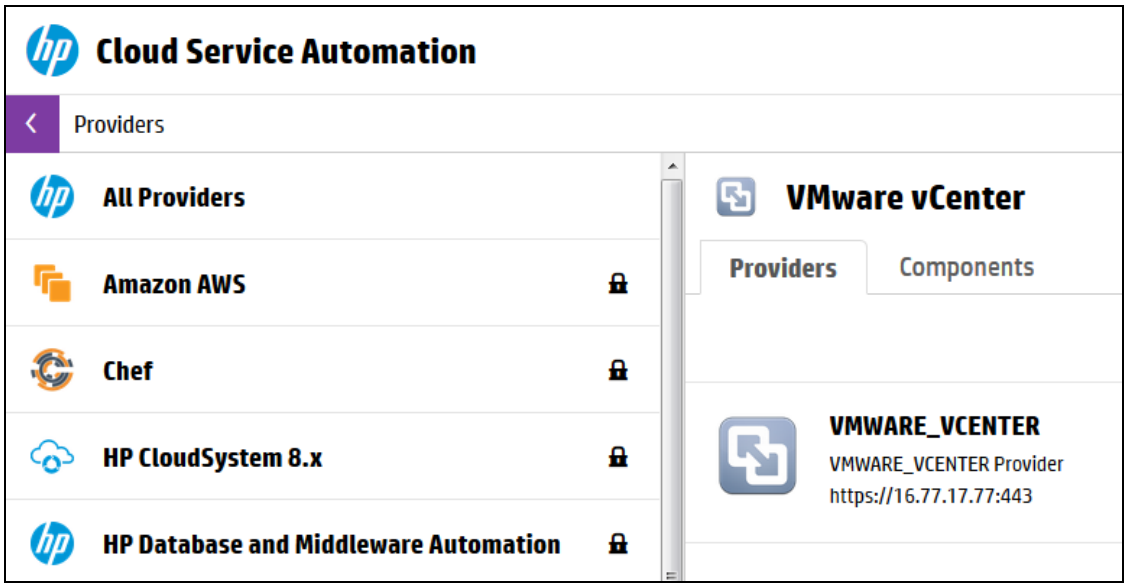
Data store is an essential resource capacity that is consumed by various applications in a data center. Consider a VMware vCenter provider having three data stores in a data center. Subscription request fulfillment requires selecting a data store having enough disk space to provision the server instance. Each data store can be configured as a provider pool on the vCenter resource provider. During provider selection, appropriate data stores can be selected by comparing the disk size request from the customer subscription against the provider's data store disk space.

Since HP CSA contains out-of-the-box sample content for VMware vCenter, you will import it into the Designs area of the Cloud Service Management console and use it to illustrate the steps. Import the vCenter Compute Custom Pool Selection content now.

Service design	Provider
vCenter Compute Custom Pool Selection	VMware vCenter

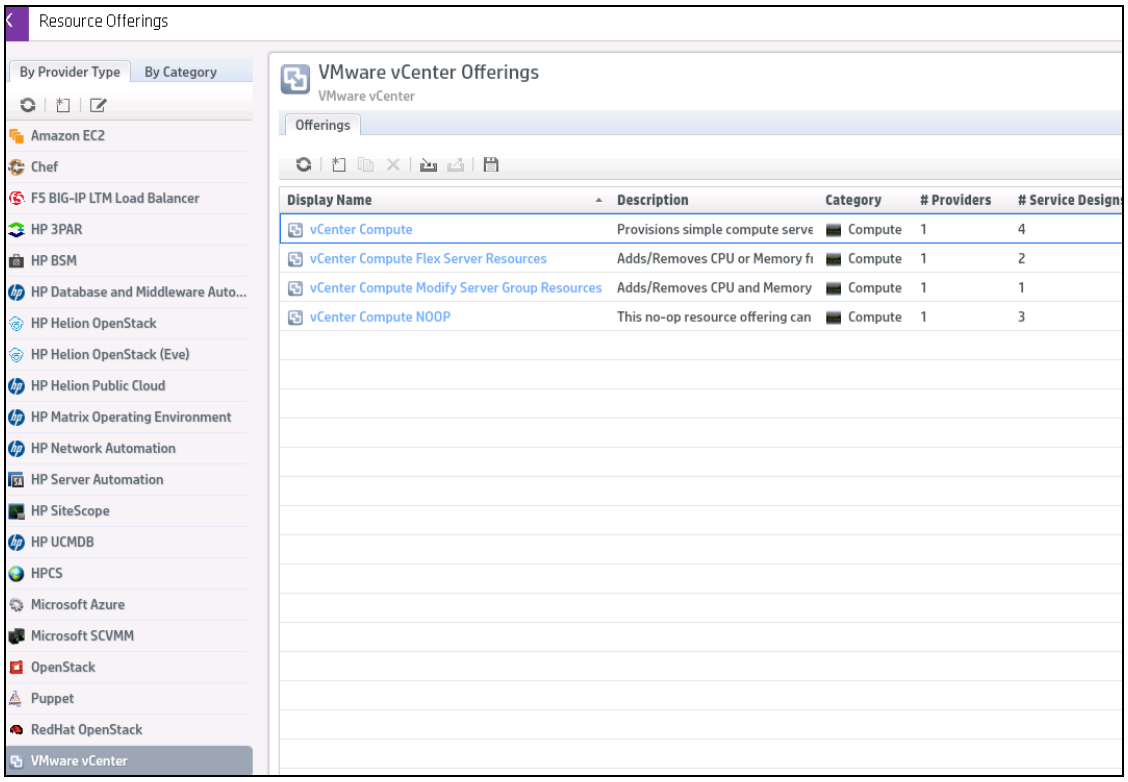
Steps to configure provider selection

1. Add a vCenter resource provider.



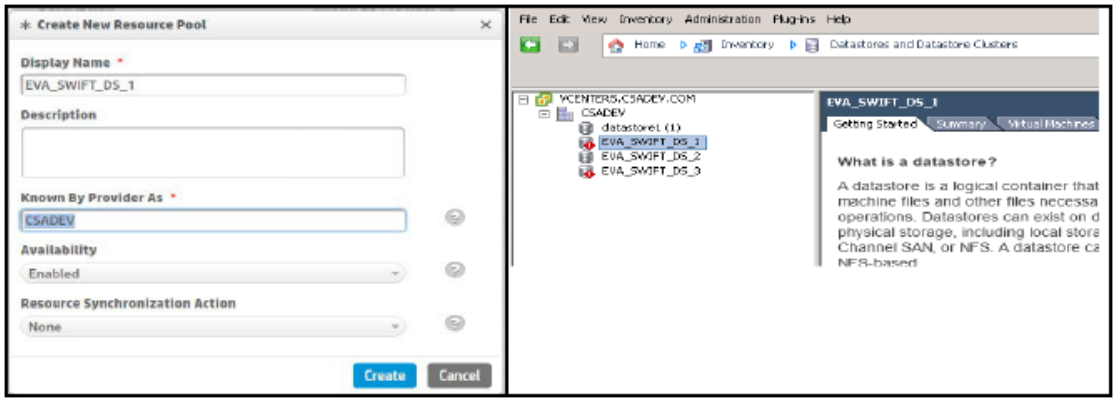
2. Associate resource offerings to resource providers capable of offering the resource.

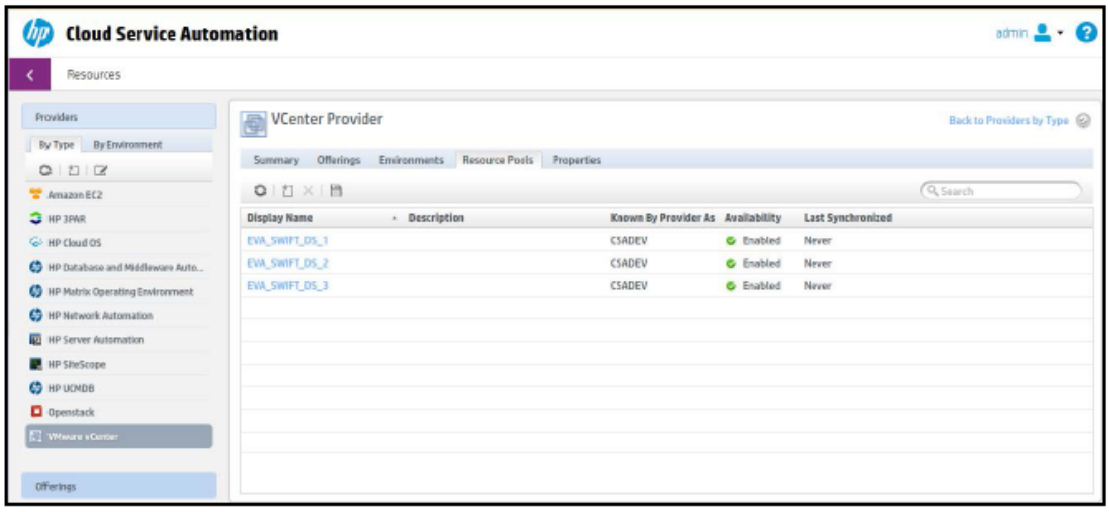
   For this example, associate the VMware vCenter provider with the resource offering named vCenter Compute, vCenter Compute Flex Service Resources, and vCenter Compue No Operation.



3. Create resource pools.

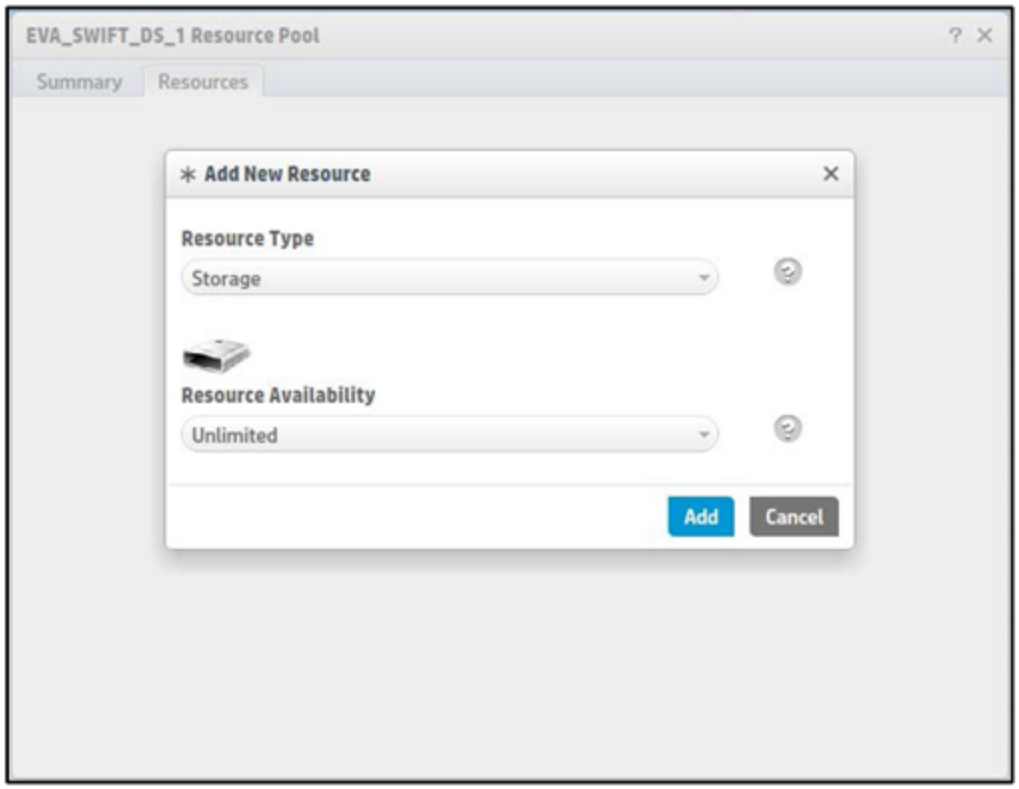
   Create data store pools on HP CSA so that they have display names that are the same as the name on the VMware vCenter provider. The following figure depicts the three data store pools for the provider, and that they have been given the same display names in HP CSA.





4. Add the resource capacity and availability for each resource pool.

   Add storage capacity for the data store resource pool. Select the 'Unlimited' resource availability option.

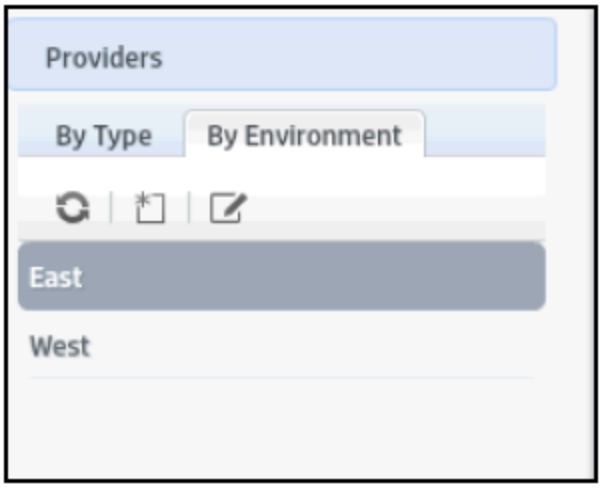


5. Add the providers to the resource environment.

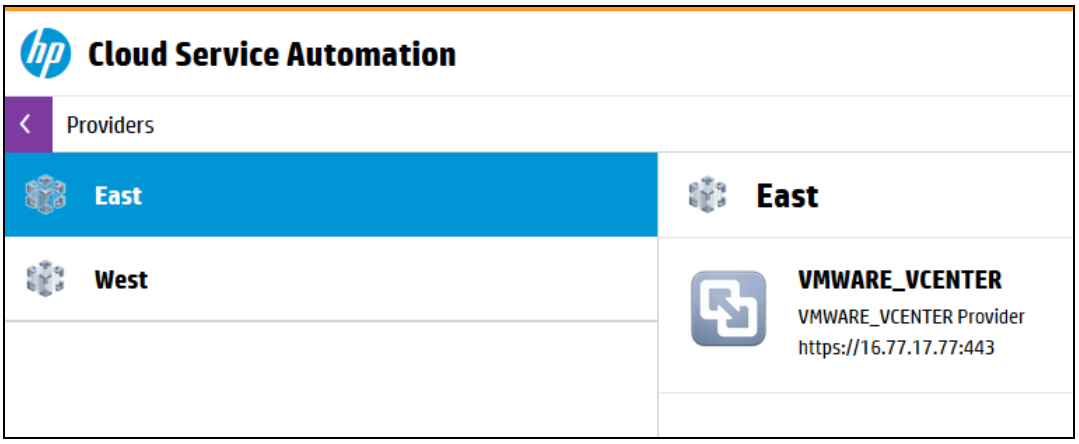
Note: This is an optional step during provider configuration.

Providers can be grouped together by resource environment. One or more resource environments can be linked to a service catalog to restrict provider selection at subscription time. The steps to do this are indicated in the following example:

a. Add two regions, East and West, on the Environment tab under Providers.



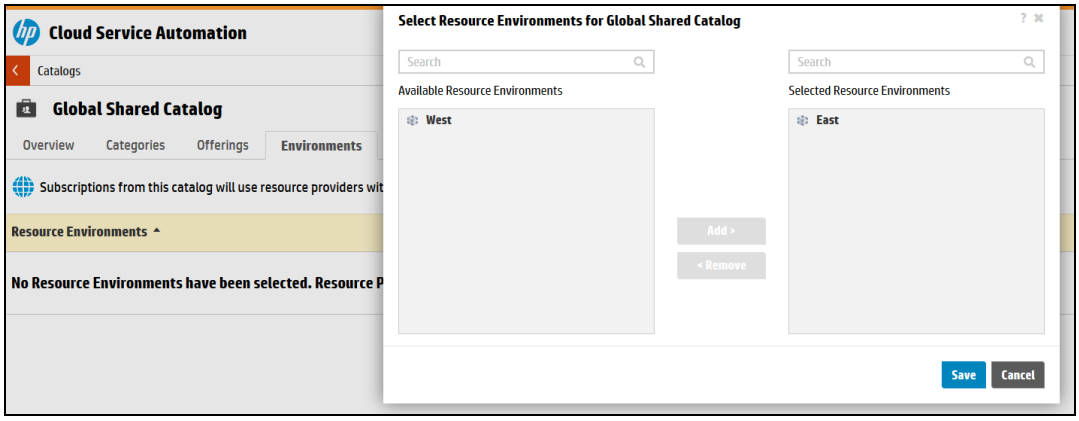
b. Associate the necessary providers into each resource environment.



c. Add the resource environments onto the desired catalogs in the Catalog area of the CSA interface.

In this example, add the ‘East’ resource environment into the ‘Global’ catalog, so subscriptions requested from the ‘Global’ catalog will always choose providers from the ‘East’

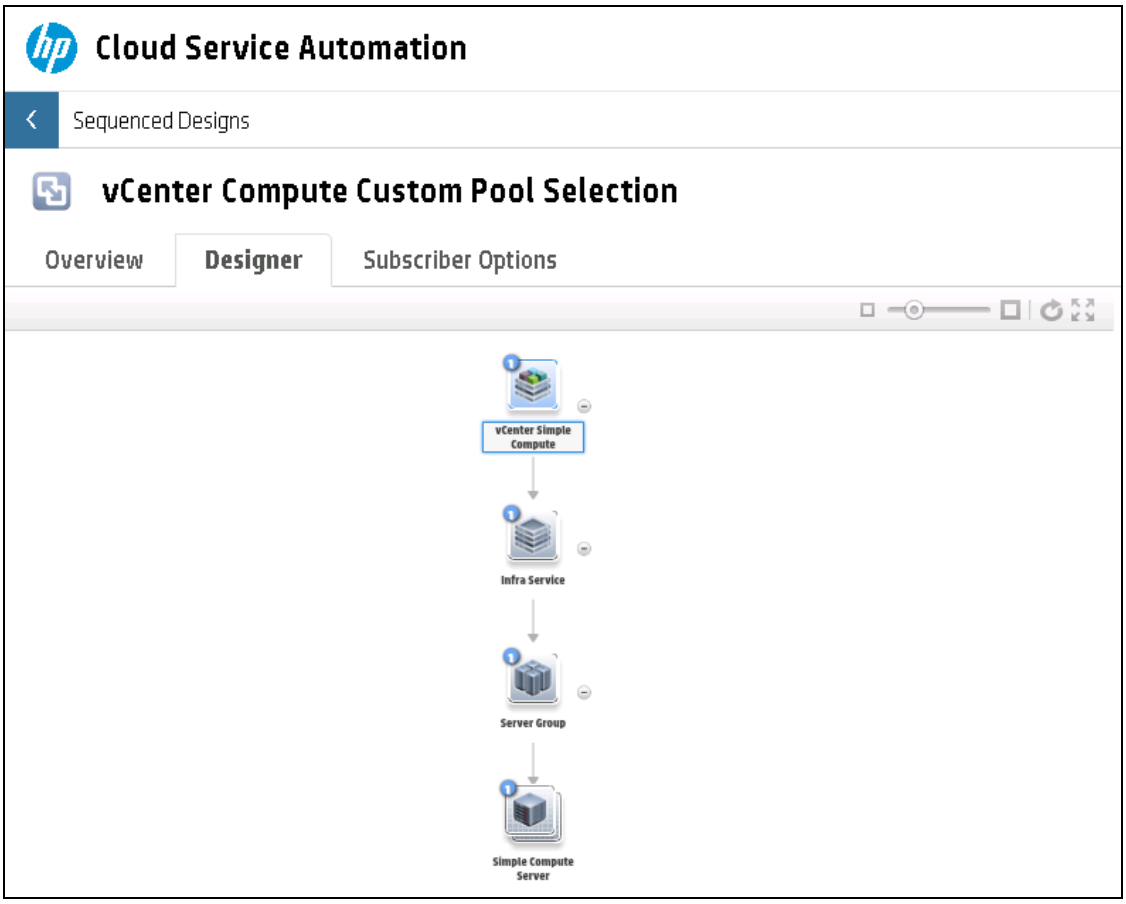
resource environment during the provider selection stage of subscription fulfillment.



6. Create a service design.

   For this example, create a service design having the following components, with the hierarchy as indicated in the following list and shown in the following figure:

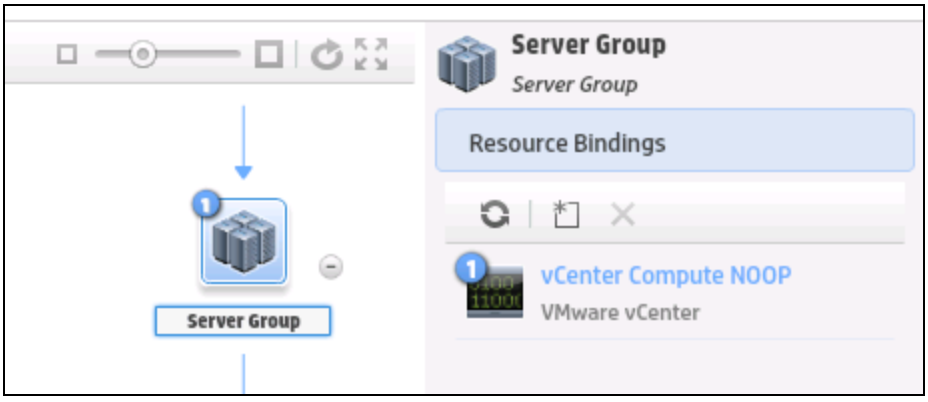
   - Service Composite
   - Infrastructure Service
   - Server Group
   - Server

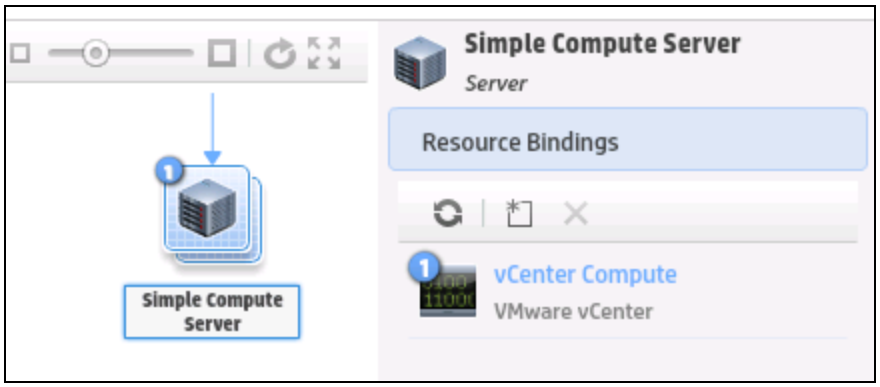


7. Add the resource offerings to the components.

   Resource offerings are associated with components using resource bindings.

   In this example, add the vCenter Compute No Operation binding to the Server Group component, and the vCenter Compute and vCenter Compute Flex Server Resources binding to the Server Component.

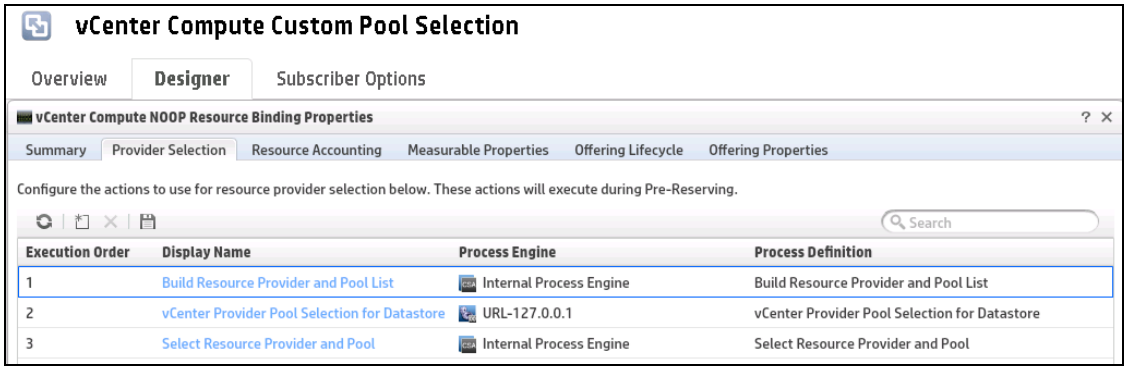




8. Create Provider Selection actions for the resource bindings on the Server Group component.

   Add the following actions to the Server Group component's binding (vCenter Compute No Operations) in the following order:

   - Build Resource Provider and Pool List (Internal Process Engine)
   - vCenter Provider Pool Selection for Data Store (HP OO Flow)
   - Select Resource Provider and Pool (Internal Process Engine)

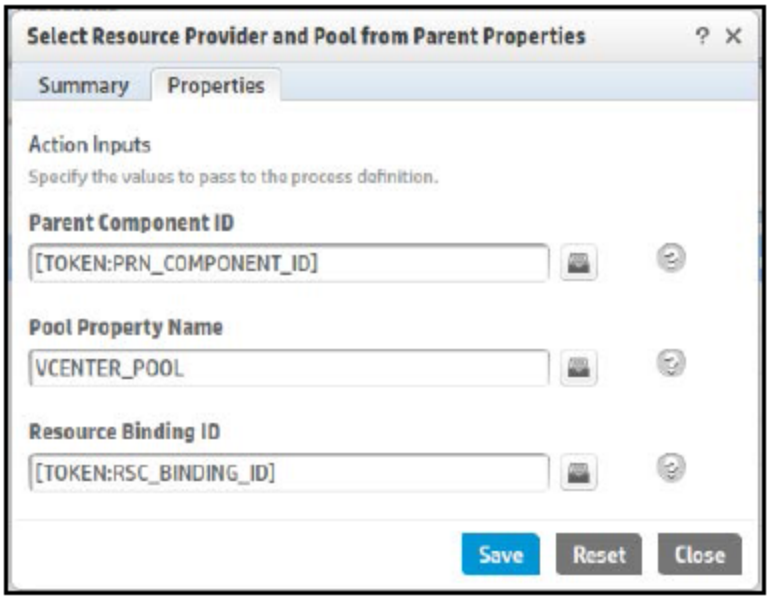


9. Specify the property of the Select Resource Provider and Pool internal action.

   The Select Resource Provider and Pool action has a property called Pool Property Name. With this property the user can specify the name of the property in which the selected resource provider ID will be set as a property of the service component.

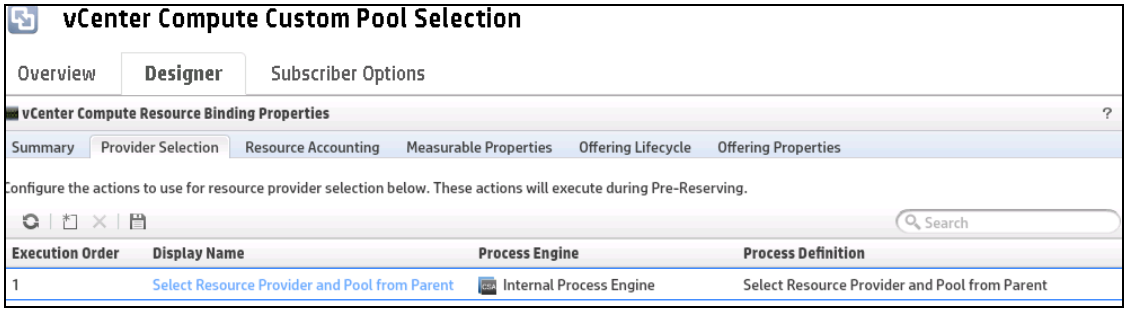
   For example, if the user specifies VCENTER_POOL as the value for this property, then the selected provider pool Id will be set as a property on the service component as follows:

   Provider=ID of Selected Provider Pool



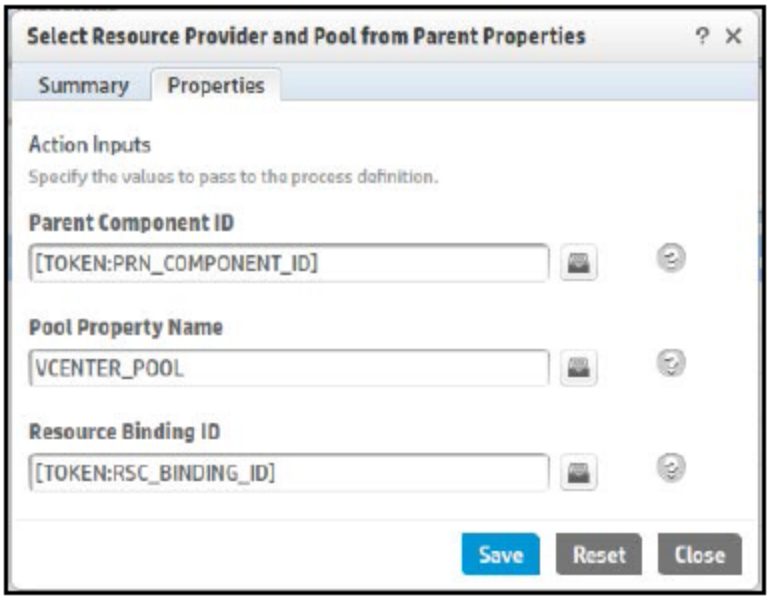
10. Create Provider Selection actions for the resource bindings on the Server component.

    Add the Select Resource Provider and Pool from Parent internal action on the Server component's binding (vCenter Compute and vCenter Compute Flex Server Resources).

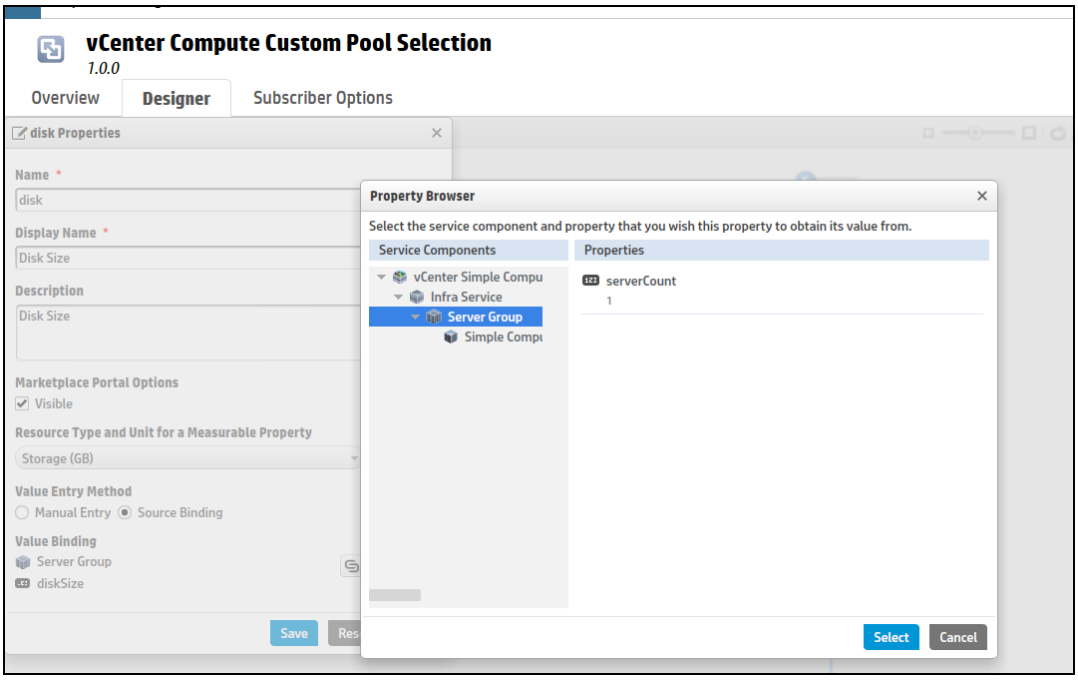


11. Specify the property of the internal action.

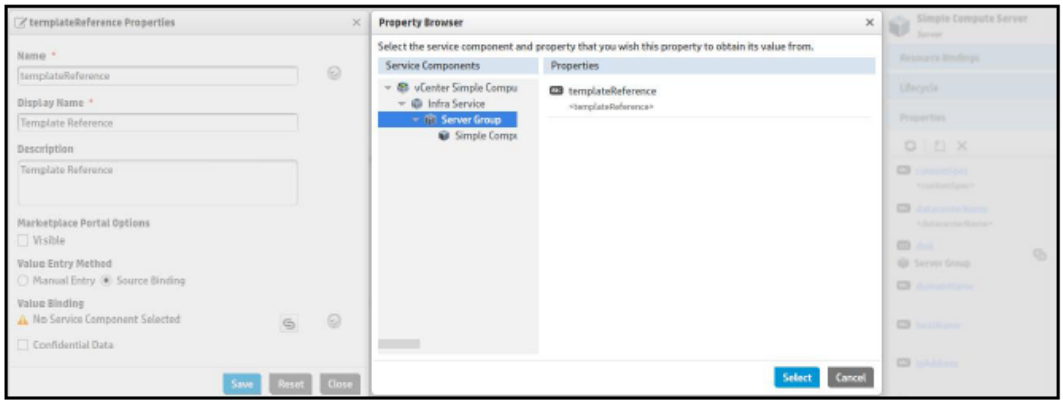
    The Select Resource Provider and Pool from Parent action has a property called Pool Property Name. Set the value of this property as VCENTER_POOL. The action will retrieve the Provider Pool Id populated on the property VCENTER_POOL from the parent Server Group component and store it on the Server component.



12. Create the following component properties on the Server Group component:
    - An Integer property named ‘diskSize’
    - A String property named ‘templateReference’
13. Source bind the Server component properties to the Server Group component, as follows:
    a. Source bind the disk property on the Server component to the diskSize property on the Server Group component.

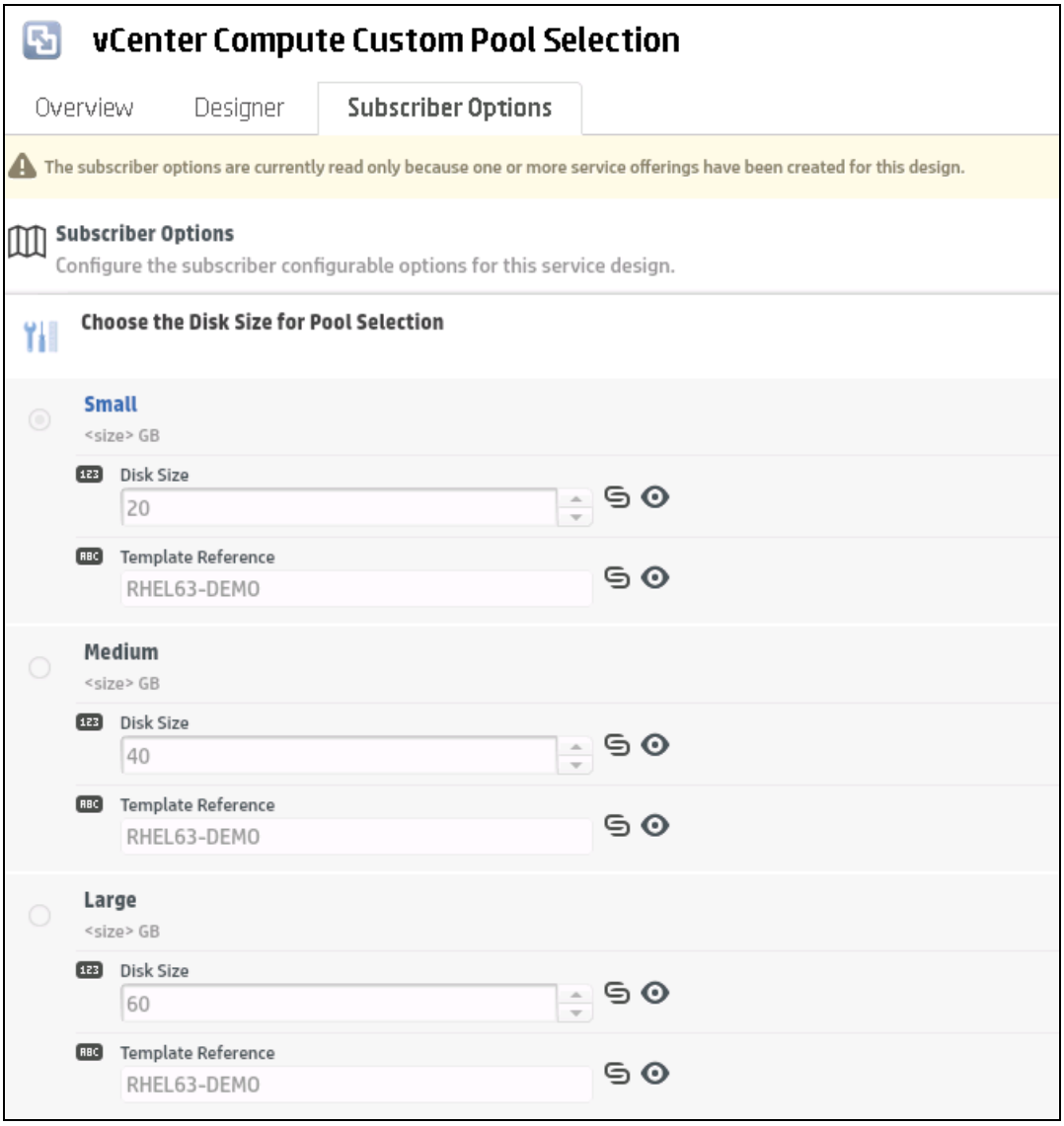


b. Source bind the templateReference property on the Server component to templateReference property on the Server Group component.



14. Create the necessary subscriber options, as follows:

a. Create an option set having options for various disk sizes (Small and Medium).



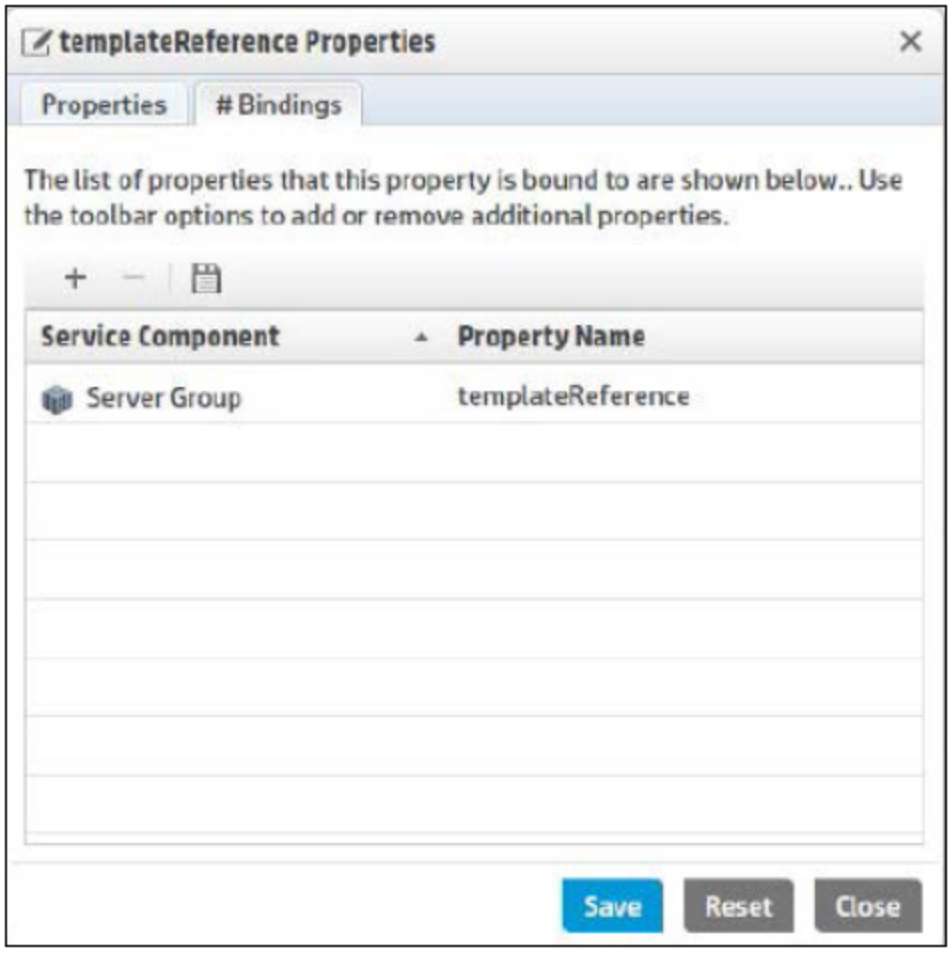
b. Create a DiskSize property of Integer type on each option having values corresponding to the storage sizes.

c. Create a templateReference property of String type on each option, the value being a clone template name residing on the vCenter provider. The clone template should provision the instance for the requested disk size.

d. Create a target binding between the DiskSize property on each Option to the diskSize property on the Server Group.

e. Create target binding between the templateReference property on each Option to the

templateReference property on the Server Group.



15. Publish the design.

    After you have completed the above steps in this procedure, the service is ready to be associated with a service offering and published to a catalog. After a user subscribes to the published service, HP CSA creates a service instance that moves through the HP CSA lifecycle phases. When the provider selection actions are executed during the Reserving – Pre-Transition lifecycle phase, the following sequence of operations occurs:

    - Build Resource Provider and Pool List, an internal action, gets the list of resource providers associated with the resource offering corresponding to the resource binding, and HP CSA stores the vCenter Provider and the list of pools associated with the provider. The list stored in HP CSA for the binding is called the Candidate Provider and Pool list.
    - vCenter Provider Pool Selection of Datastore, an HP OO flow, performs the following steps:
        - Retrieves the storage requested by the consumer using the HP CSA Rest API.

          See "REST APIs" section.

          The value is stored in the ‘diskSize’ property on the Server Group component.

- Retrieves the list of data store names and corresponding storage space from the VMware vCenter provider.
- Retrieves the Candidate Provider and Pool List stored in the previous action using the HP CSA Rest API.

  For information, see "REST APIs" section.
- Retrieves the disk size property value defined on the Server Group component.
- Verifies the pool names for each of the above lists against the candidate pool list.
- Filters the candidate pool list which satisfies the storage space against the disk size.
- Updates the filtered candidate list as a valid pool list onto HP CSA using the HP CSA Rest API.

- Select Resource Provider and Pool, an internal action, performs the following steps:
  - Retrieves the list of valid provider and pools built by the previous action.
  - Selects a random pool id and saves it on the VCENTER_POOL property on the Server Group component.

REST APIs

Get the list of candidate providers and pools

To get the list of candidate providers and pools, use the GET artifact API.

URI:

https://localhost:8444/csa/rest/artifact/<RESOURCE_BINDING_ID>?userIdentifier=<USER_ID>&scope=view&view=candidatepools

Method: GET

Response:

```
<ResourceBinding>
       <id>90e72d893cd0fb1d013cd108d496004f</id>
       <objectId>90e72d893cd0fb1d013cd108d496004f</objectId>
       <isCriticalSystemObject>false</isCriticalSystemObject>
       <description>binding_February 12, 2013 6:14:59 PM UTC</description>
       <name>binding_February 12, 2013 6:14:59 PM UTC</name>
       <displayName>binding_February 12, 2013 6:14:59 PM UTC</displayName>
       <artifactType>
       ... ... ...
       </artifactType>
```

```
        <disabled>false</disabled>
        <candidateProvider>
             <id>90e72d893ccf9a39013ccf9cf167001a</id>
             <resourceProvider>
                <id>90e72d893ccf9a39013ccf9cf167001a</id>
                <objectId>90e72d893ccf9a39013ccf9cf167001a</objectId>
                <isCriticalSystemObject>false</isCriticalSystemObject>
                <name>Provider2_February 12, 2013 6:13:54 PM UTC</name>
                <displayName>Provider2</displayName>
                <disabled>false</disabled>
             </resourceProvider>
              <candidatePool>
                <id>90e72d893ccf9a39013ccf9d5d630022</id>
                <objectId>90e72d893ccf9a39013ccf9d5d630022</objectId>
                <isCriticalSystemObject>false</isCriticalSystemObject>
                <name>P2-Pool1_February 12, 2013 6:14:22 PM UTC</name>
                <displayName>P2-Pool1</displayName>
                <disabled>false</disabled>
                <useProviderEnv>false</useProviderEnv>
             </candidatePool>
             <candidatePool>
              ... ... ...
             </candidatePool>
          </candidateProvider>
</ResourceBinding>
```

Update the list of valid providers

To update the list of valid providers use the PUT artifact API.

URI:

https://localhost:8444/csa/rest/artifact/<RESOURCE_BINDING_ID>?userIdentifier=<USER_ID>&scope=view&view=validproviderspools

Method: PUT

Body: Include the refined list of valid providers. In this example, we have refined the list to remove Provider3.

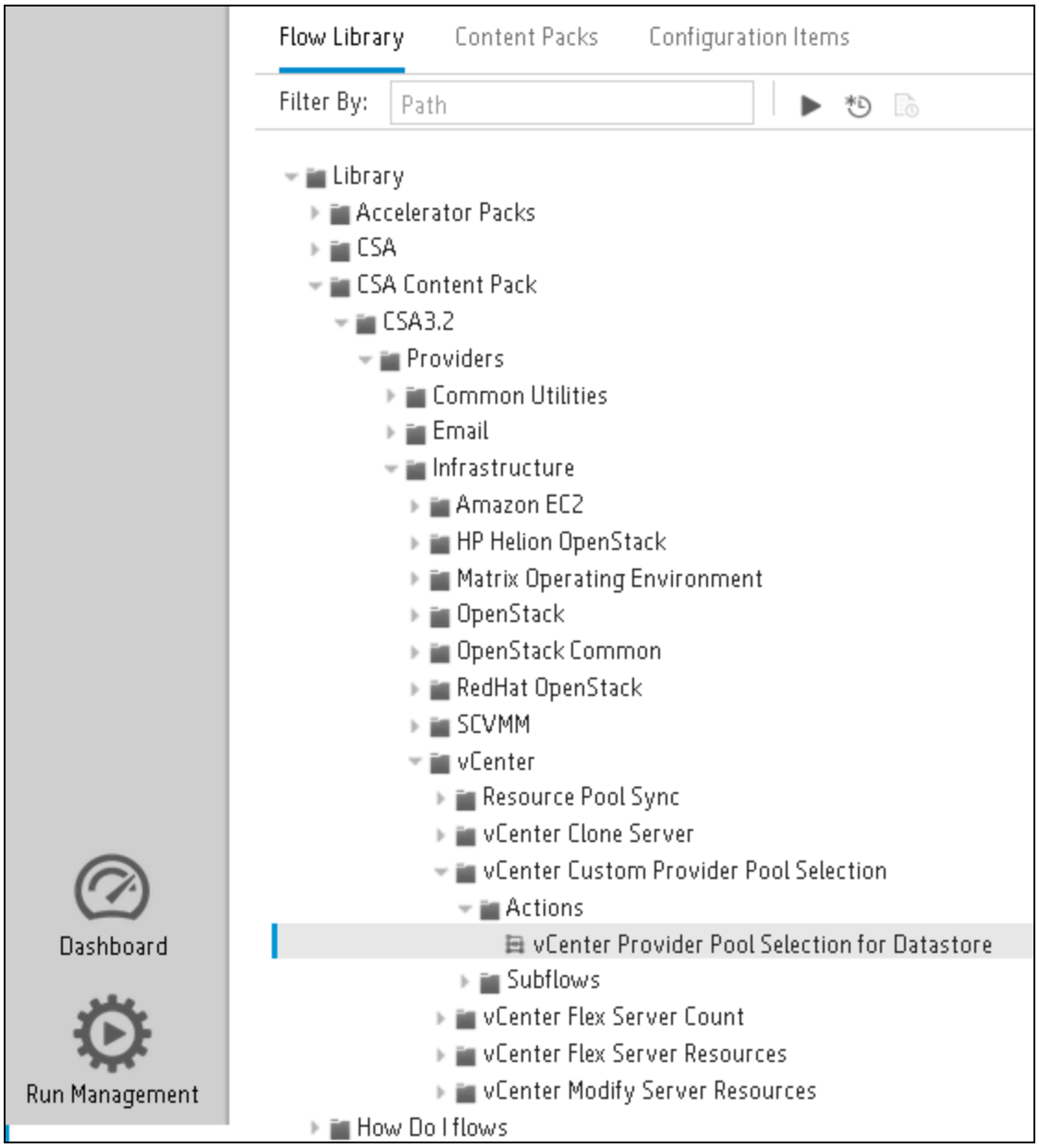
```
<ResourceBinding>
       <id>90e72d893ccf9a39013ccfa0076a0099</id>
       <validProvider>
               <resourceBinding>
                    <id>90e72d893ccf9a39013ccfa0076a0099</id>
               </resourceBinding>
               <resourceProvider>
                    <id>90e72d893ccf9a39013ccf9cf167001a</id>
               </resourceProvider>
               <validPool>
                    <id>90e72d893ccf9a39013ccf9c6be60014</id>
```

```
                </validPool>
                <validPool>
                     <id>90e72d893ccf9a39013ccf9c6be60016</id>
                </validPool>
        </validProvider>
        <validProvider>
        ......
        </validProvider>
</ResourceBinding>
```

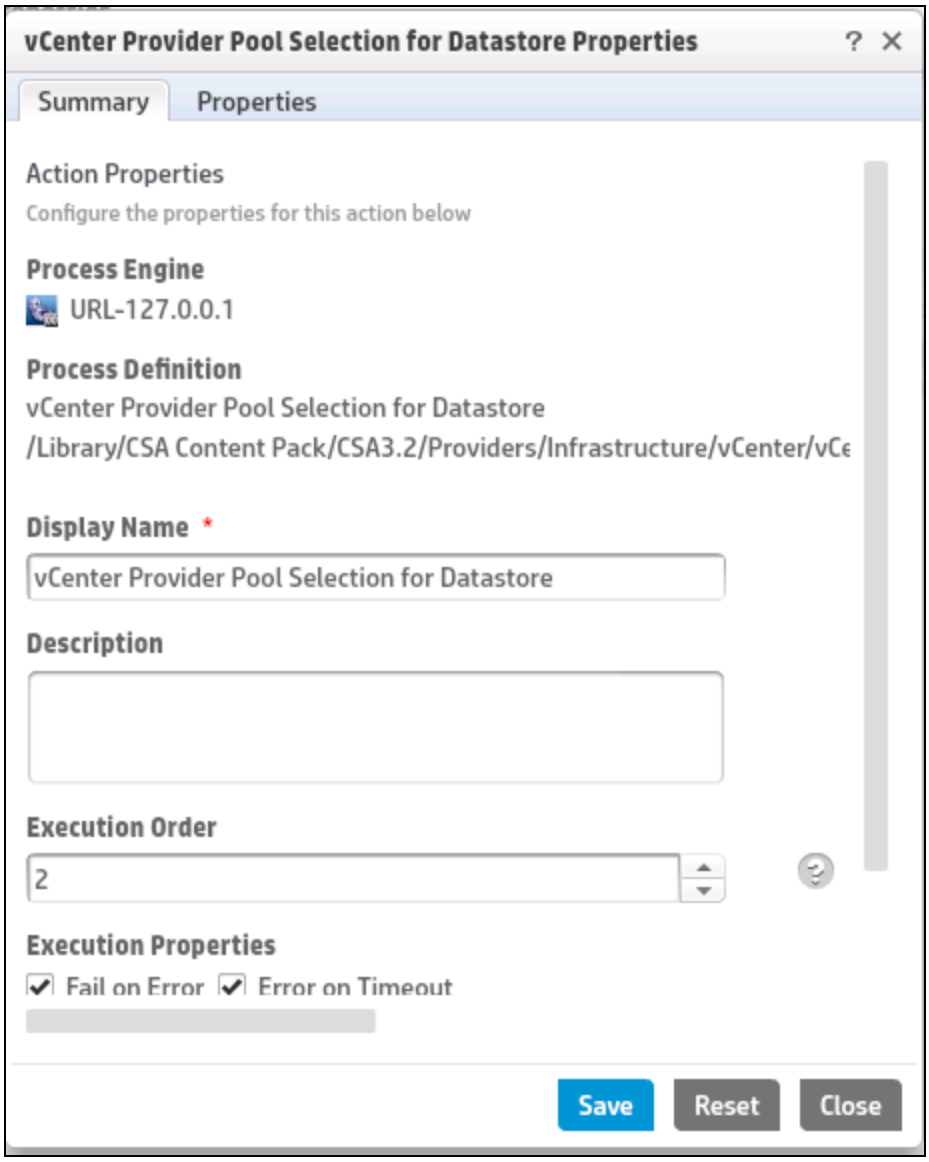
HP Operations Orchestration flow

This section provides a brief overview of how custom pool selection is implemented in the vCenter Provider Pool Selection for Datastore HP Operations Orchestration flow. This flow is provided as out-of-the-box content with HP CSA.

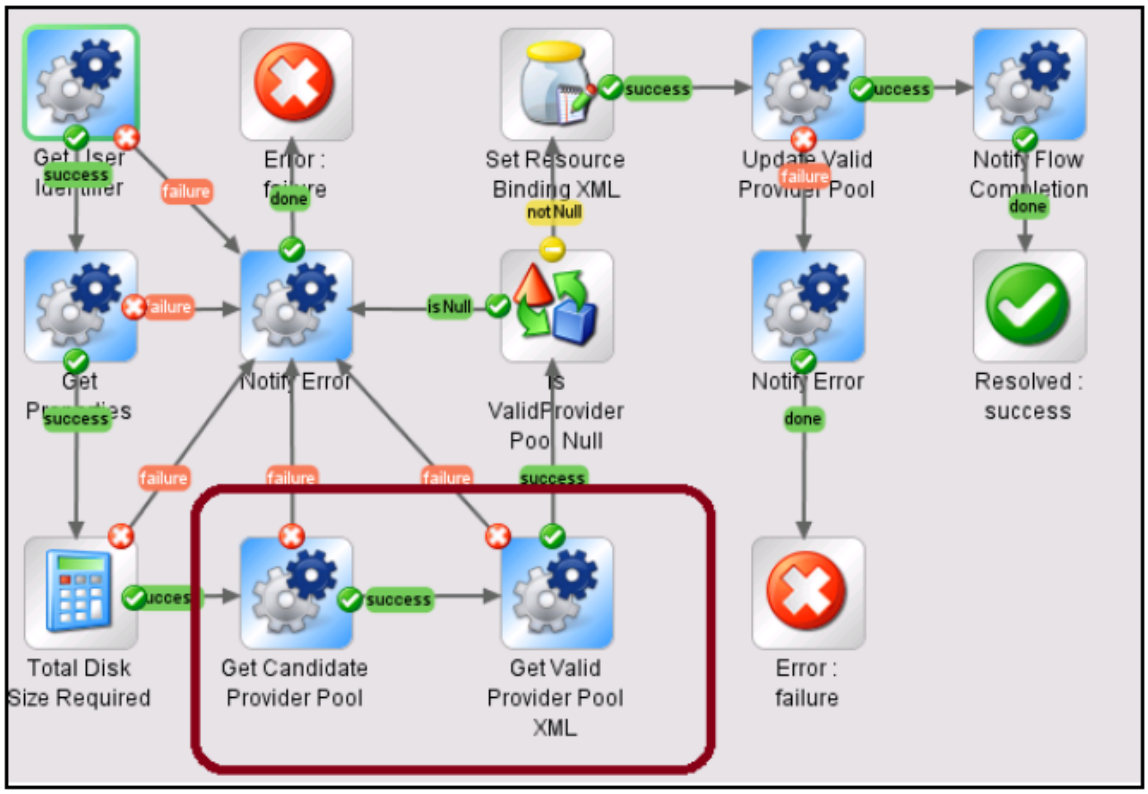
For information about configure HP Operations Orchestration for getting the flows from HP CSA, see the *HP CSA Configuration Guide* at http://h20230.www2.hp.com/selfsolve/manuals.



The above figure shows the HP CSA action used in the vCenter design for performing custom provider and pool selection. The Process Definition field shows the details of the corresponding HP OO flow.

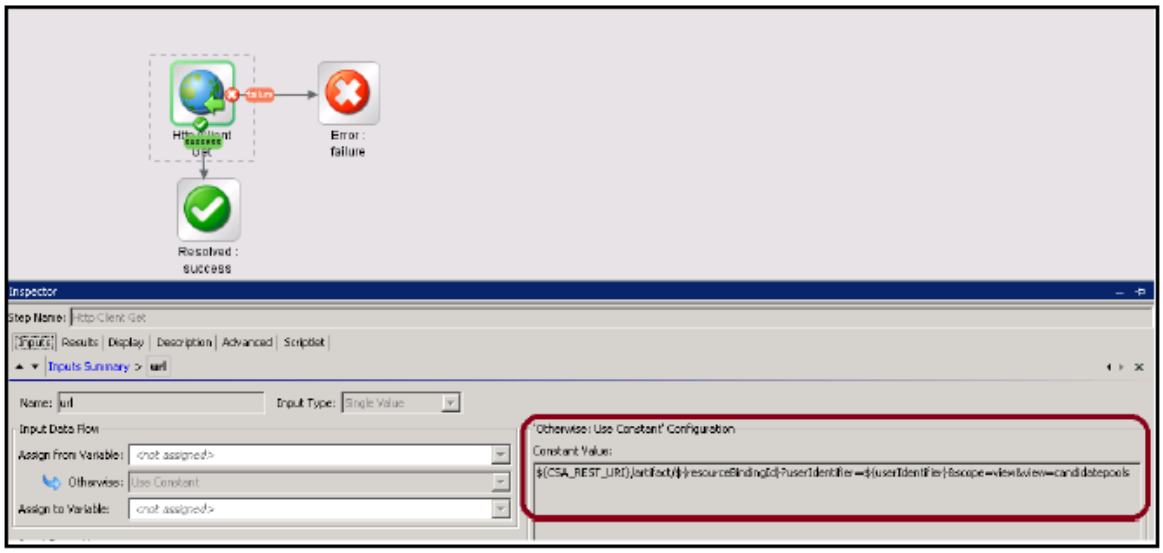


The following figure shows the HP Operations Orchestration flow invoked from HP CSA. The steps, which implement the refinement logic are shown in the red box below. For this flow, the refinement condition is based on the requesting disk size. A pool will be included in the list of valid pools only if required disk size criteria are satisfied.



Get Candidate Provider Pool

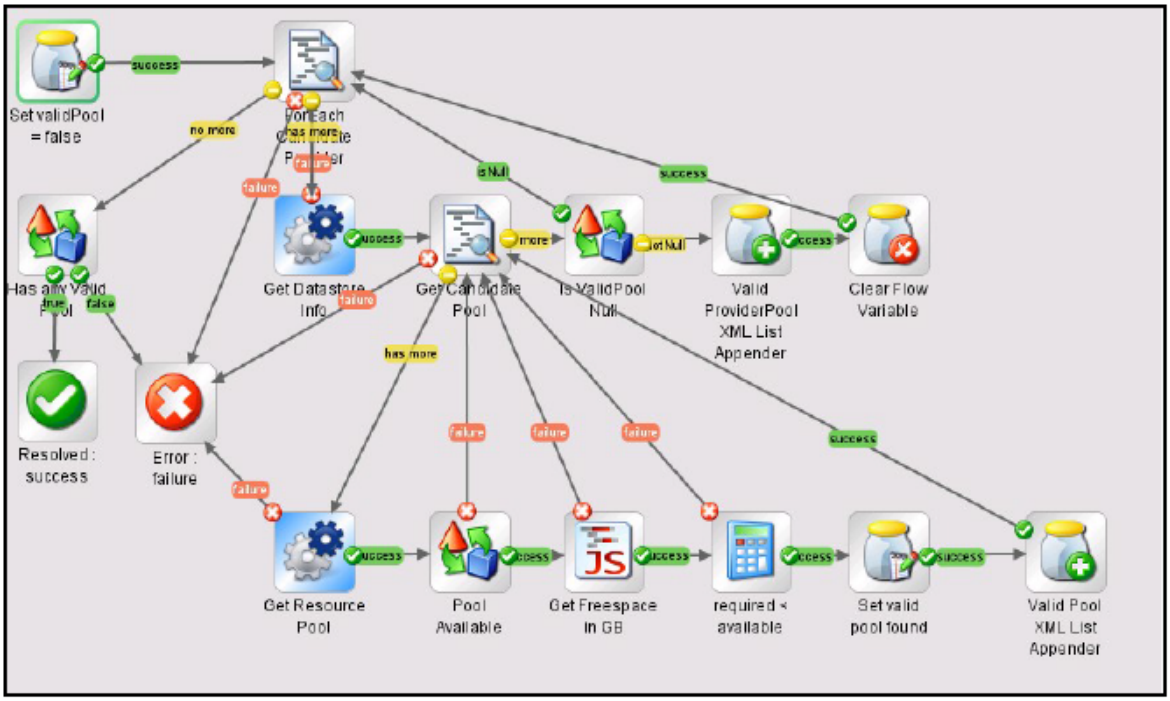
This step will retrieve all the candidate provider and pools from the HP CSA using the REST API call shown in the red box in the following figure.



Get Valid Provider Pool XML

This step will browse through the candidate providers and pools retrieved in last step and filter the pool IDs based on storage. The subflow corresponding to this step is as shown in the following figure and has following major steps:

- Get Datastore Info - Retrieves the list of data store names and free space available from VCENTER Provider.
- Get Resource Pool – Retrieves the Pool details like Pool Name.
- Valid Pool List Appender – Appends or creates the valid pool ids if the disk size requested is less than the free space available for a data store.
- Valid Provider Pool List Appender – Appends the Provider ID to the valid pool id list created in the previous step, Valid Pool List Appender.



Use case: Monitoring and configuration management using vCenter Compute

This section describes how to integrate HP CSA with VMware vCenter Server, by creating VMware vCenter provider and providing an offering to deploy Virtual Machine (VMs) from a given template. This provisioned server is monitored using Sitescope. Configuration management of the server is done by HP UCMDB.

This integration includes HP CSA service designs and HP Operations Orchestrations workflows, which can be used to create a service offering for consumers to request and manage server instance from VMware vCenter Server environment.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Configure VMware vCenter.
- Configure VMware vCenter provider in HP CSA.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	provider
vCenter Compute-Monitoring and Configuration Management	SiteScope
	UCMDB
	VMware vCenter

Prerequisites

The following table lists the SiteScope template required for this integration.

Configuration property	Description
CSA template.tmpl[1]	Import this file to the HP SiteScope server. See the `README.txt` file on the HP CSA instance in the <CSA Install Path>\CSAKit-4.5\Lib\sitescope folder for import details.
CSA templates Silver.tmpl	Import this file to the HP SiteScope server. See the `README.txt` file on the HP CSA instance in the <CSA Install Path>\CSAKit-4.5\Lib\sitescope folder for import details.
CSA templates Gold.tmpl	Import this file to the HP SiteScope server. See the README.txt file on the HP CSA instance in the <CSA Install Path>\CSAKit-4.5\Lib\sitescope folder for import details.
CSA templates autoimport.tmpl	Import this file to the HP SiteScope server. See the `README.txt` file on the HP CSA instance in the <CSA Install Path>\CSAKit-4.5\Lib\sitescope folder for import details.

[1]This file should be imported manually only when the CSA templates autoimport.tmpl fails to import on HP SiteScope server.

The following table lists the UCMDB templates required for this integration.

Configuration property	Description
CSAIntegration.zip	Deploy the package on the HP Universal CMDB server. See the README.txt file on the HP CSA instance in the <CSA Install Path>\CSAKit-4.5\Lib\ucmdb folder.

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to change options to values that are appropriate for your environment. You may also add or remove images as needed.

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and the respective service access points. You may need to change them to reflect your environment.

Provider name	Service access point
VMware vCenter	https://<vCenter-Server>:443
HP UCMDB	http://<IP address>:8080
HP SiteScope	http://<IP address>:9090

To create a resource provider, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the service design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
vCenter Compute	VMware vCenter
vCenter Compute Flex Server Resources	VMware vCenter
vCenter Compute No Operation	VMware vCenter
HPCSA UCMDB Configuration Management	HP UCMDB
HPCSA SiteScope Server Monitoring	HP SiteScope

To associate resource offerings with providers, see "Associating resource offerings with providers" on page 27.

Changing component properties

You must change the following properties for the vCenter Compute-Monitoring and Configuration Management design components:

Component	Property Name	Description
Server	customSpec	VM Template Customization Specification
Server	datacenterName	Datacenter name in the vCenter
Server	memory	Memory in MB
Server	nCPU	Total number of CPUs
Server	templateReference	VM template as in the vCenter
Server Group	serverCount	Total number of servers
Server	hostNamePrefix	Host Name Prefix
Server	vmFolder	Folder name as in VMware vCenter (Optional) If the folder name is not specified, then VMs will be deployed at the root “/”.
Server	osType	Type of the OS
Server	sitescopeTemplate	Name of the HP SiteScope template on the HP SiteScope server

The vCenter Compute-Monitoring and Configuration Management service design demonstrate the basic subscriber options for vCenter Compute.

To change component properties, complete the steps in "Changing component properties" on page 39.

Publishing service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create service offerings, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish a service offering to the Global Shared Catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23.

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

HP Operations Orchestration flows

The following table lists the flows used in this implementation and descriptions.

Flow name	Description
vCenter Restart Server	Restart the Virtual Machine
vCenter Simple Compute - Deploy	Provision a Simple Vcenter Linux VM from a VM template
vCenter Simple Compute - Undeploy	Undeploy the cloned server from vCenter
vCenter Start Server	Start the Virtual Machine
vCenter Stop Server	Stop the Virtual Machine
vCenter Suspend Server	Suspend the Virtual Machine

Flow name	Description
vCenter Simple Compute - Validate Input Properties	Validates virtual machine deployment input properties. This can be attached pre deployment state to check all the required information available to deploy.
vCenter Simple Compute - Server Group Flexin Server	Remove a Server from the Server Group. Random Server will be selected from the Server Group.
vCenter Simple Compute - Server Group Flexout Server	Provision a Server and add to the Server Group
vCenter Simple Compute - Server Flex CPU	This flow will flex up or flex down the CPU configuration of a server. The user is expected to enter the CPU in number that the servers should have. The flow will then apply this input as the final state of the CPU for the server. If the CPU of the server is less than the user input, then the server CPU will be flexed up to the input. If the CPU is lesser, then the server CPU will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.
vCenter Simple Compute - Server Flex Memory	This flow will flex up or flex down the memory configuration of a server. The user is expected to enter the memory in MB that the servers should have. The flow will then apply this input as the final state of the memory for the server. If the memory of the server is less than the user input, then the server memory will be flexed up to the input. If the memory is lesser, then the server memory will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.

Flow name	Description
uCMDB create	Creates and manages component configuration details on HP Universal CMDB
uCMDB delete	Deletes the component configuration details on HP Universal CMDB
Simple Compute Monitor - Deploy	Monitors servers using HP SiteScope
Simple Compute Monitor - UnDeploy	Removes server in HP SiteScope

Limitation

Subscription will fail if the specified vmFolder does not exist in VMware vCenter.

Use case: HP Server Automation software policies deployment on vCenter Compute

This section describes how to integrate HP Cloud Service Automation (HP CSA) with VMware vCenter Server, by creating VMware vCenter provider and providing an offering to deploy Virtual Machines (VMs) from a given template. It installs SA agent to the server and deploys Software Policies to the provisioned server.

This integration includes HP CSA service designs and HP Operations Orchestrations workflows, which can be used to create a service offering for consumers to request and manage server instance from VMware vCenter Server environment.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation:

- Install VMware vCenter.
- Configure VMware vCenter provider in HP CSA.

Configuring service offerings

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Service design	Provider
SA Software Policies Deployment on vCenter	HP Server Automation
	VMware vCenter

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to change options to values that are appropriate for your environment. You may also add or remove images as needed.

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and the service access points. You may need to change them to reflect your environment.

Provider name	Service access point
VMware vCenter	https://<vCenter-Server>:443
HP Server Automation	https://<SA core>:443

To create resource providers, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
vCenter Compute	VMware vCenter
vCenter Compute Flex Server Resources	VMware vCenter
vCenter Compute No Operation	VMware vCenter
HP SA Deploy Software policies	HP Server Automation
HP SA Install Agent	HP Server Automation

To associate resource offerings with providers, complete the steps in "Associating resource offerings with providers" on page 27.

Changing component properties

You must change the following properties for the vCenter Compute service design components:

Component	Property name	Description
Server	customSpec	VM Template Customization Specification
Server	datacenterName	Datacenter name in the vCenter
Server	memory	Memory in MB
Server	nCPU	Total number of CPUs
Server	templateReference	VM template as in the vCenter
Server Group	serverCount	Total number of servers
Server	hostNamePrefix	Host Name Prefix
Server	vmFolder	Folder name as in VMware vCenter (optional). If the folder name is not specified, then VMs will be deployed at the root “/”.

You must change the following properties for the SA Software Policies Deployment on vCenter Compute service design components.

Component	Property name	Description
Server	hostName	Host name of the Server
Server	ipAddress	IP address of the Server
Server	osFamily	OS of the Server
Server	realmName	Facility of SA
Server	serverId	Id of the server, assigned by SA after installing agent
Server	serverPassword	Password of the template
Server	serverUsername	Username of the template
Server	swPolicyNames	Software Policy Name to be deployed in the server
Server	jobId	Id of the job in SA
Server	realmDetails	Details of the facility in SA

- Facility name provided in Marketplace Portal should be <Facility Name-agents>.

  During subscription, to find the facility in SA core, log on to the instance SA client and click **Devices** > **SA Agent Installation** > **Servers**. The facilities will be listed in the **Scan** drop down.

- If customspec is used, ensure that the super Username and super Password are appropriate for the selected template.

  To get the list of available software policies in SA, log on to the instance in SA client and click **Libraries** > **Software policies**.

  Software policies for each platform will be listed from where the policy suitable for the required server can be chosen.

To change the component properties, complete the steps in "Changing component properties" on page 39.

Click the **Help** icon if you need help editing component properties.

Note: The values for nCPU, memory, ipAddress may change during the subscription lifecycle. If subscriber options directly bind to them, the modified value may not be reflected in the Marketplace Portal.

To overcome this limitation, new properties that end with Op have been introduced (CPUOp and memoryOp). Subscriber options will be bound to these properties and the flow will copy the value from the options to the actual properties.

Publishing service design

To publish the service design, complete the steps in "Publishing service design" on page 28.

Creating service offering

A service offering must be created in HP CSA before subscribers can request services based on this service design.

To create a service offering, complete the steps in "Creating service offering" on page 23.

Publishing service offering to Global Shared Catalog

To publish a service offering to the Global Shared catalog, complete the steps in "Publishing service offering to Global Shared Catalog" on page 23 .

Subscribing service

To subscribe service, complete the steps in "Subscribing service" on page 24.

Canceling a subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24

HP Operations Orchestration flows

The following table lists the flows used in this implementation and descriptions.

Flow name	Description
vCenter Restart Server	Restart the Virtual Machine
vCenter Simple Compute - Deploy	Provision a Simple Vcenter Linux VM from a VM template
vCenter Simple Compute - Undeploy	Undeploy the cloned server from vCenter
vCenter Start Server	Start the Virtual Machine
vCenter Stop Server	Stop the Virtual Machine
vCenter Suspend Server	Suspend the Virtual Machine

Flow name	Description
vCenter Simple Compute - Validate Input Properties	Validates virtual machine deployment input properties. This can be attached pre deployment state to check all the required information available to deploy.
vCenter Simple Compute - Server Group Flexin Server	Remove a Server from the Server Group. Random Server will be selected from the Server Group.
vCenter Simple Compute - Server Group Flexout Server	Provision a Server and add to the Server Group
vCenter Simple Compute - Server Flex CPU	This flow will flex up or flex down the CPU configuration of a server. The user is expected to enter the CPU in number that the servers should have. The flow will then apply this input as the final state of the CPU for the server. If the CPU of the server is less than the user input, then the server CPU will be flexed up to the input. If the CPU is lesser, then the server CPU will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.
vCenter Simple Compute - Server Flex Memory	This flow will flex up or flex down the memory configuration of a server. The user is expected to enter the memory in MB that the servers should have. The flow will then apply this input as the final state of the memory for the server. If the memory of the server is less than the user input, then the server memory will be flexed up to the input. If the memory is lesser, then the server memory will be flexed down to the input. No changes will be made if the input and the current configuration are the same. The flex up and flex down operations will execute whether the server is running, suspended or in switched off state. The maximum number that can be given as input for a flex up operation depends on the underlying configured vCenter.

Flow name	Description
Install Agent on Un Managed Server	Installs SA agent on an unmanaged Server
Deploy Using Software Policies	Deploys Software Policies on a managed Server
Undeploy Using Software Policies	Undeploys Software Policies from managed server

Limitation

If the specified vmFolder does not exist in VMware vCenter, the subscription will fail.

Use case: HP vPV Integration

The goal of this implementation is to demonstrate HP CSA integration with HP Virtualization Performance Viewer (HP vPV) to seek placement suggestions from HP vPV to place the VMs in the right data center, cluster, and data store. The placement suggestion is received before the actual provisioning of the VMs in the vCenter virtualized environments.

Compute Service powered by Cloud Optimizer

This use case enables HP CSA to use HP vPV to get insight into the provider capacity and performance parameters to make intelligent selection of the data center, cluster, and data store where VMs of standard configuration requirements (such as CPU, memory, and disk space) can be placed to ensure optimum utilization.

Outcomes of this requirement are the following:

- Allow OOTB HP CSA content to use the placement suggestions received from HP vPV to make infrastructure decisions when provisioning VMs in a cluster.
- A hyperlink to HP vPV for each VM that is getting created to show the optimization and performance view for that VM.

For information about defects and workarounds, see "Known issues" on page 239.

Configuration requirements

The following configurations must be completed and tested before you set up this implementation.

- VMware vCenter must be installed.
- HP CSA Cloud Service Management Console and Marketplace Portal must be configured. You must be able to successfully deploy the simple vCenter compute service that ships with HP CSA.
- VMware vCenter provider must be configured in the HP CSA.

Configuring service offering

Resource categories that are referenced in a service design will be automatically created when the service design archive is imported.

Adding vCenter provider configurations to HP vPV enable it to monitor and report the performance statistics of vCenter.

Service design	Provider
Compute Service powered by Cloud Optimizer	HP Virtualization Performance Viewer
	VMware vCenter

Configuring subscriber options

Subscriber options are shown to the subscriber in the service offering. You may need to change options to values that are appropriate for your environment.

To configure subscriber options:

1. Log on to the Cloud Service Management Console as an administrator.
2. Click **Designs** > **Sequenced** > **Designer**.
3. Select the 'Compute Service powered by Cloud Optimizer' service design.
4. Click **Subscriber Options**.
5. Click **OS** and then click the Show Properties icon to change the values for the options (VM Template Name, VM Customization Specification, Hostname Prefix, and VM Folder) that are appropriate as per your environment.
6. Click **Save**.

Note: If multiple vCenters are configured make sure that option values are the same across all the vCenters.

Creating resource providers

Resource providers must be created in HP CSA. The following table lists the resource providers required for this integration and the typical service access point. you may need to change them to reflect your environment.

Provider name	Service access point
VMware vCenter	https://<vCenter-Server>:443

To create a resource provider, complete the steps in "Creating resource providers" on page 20.

Associating resource offerings with providers

New resource offerings that were imported with the design archive must be associated with providers. You must associate the resource offerings and providers listed in the following table:

Resource offering	Provider
vCenter Compute	VMware vCenter
vCenter Compute Flex Server Resources	VMware vCenter
vCenter Compute No Operation	VMware vCenter

To associate resource offerings with providers, complete the steps in "Associating resource offerings with providers" on page 27.

Creating service offering

To create a service offering, complete the steps in "Creating service offering" on page 23.

Configuring vCenter provider

Adding vCenter provider configurations to HP vPV enable it to monitor and report the performance statistics of vCenter.

Add a new provider property 'vPVURL' to contain the URL of the HP vPV server that manages the vCenter.

Setting up resource environments in HP CSA

Resource environments in HP CSA allows grouping of providers based on the organization and catalog of the logged in user. This implementation uses the resource environments to provide the initial

business level filtering of providers. The selected providers are then placed in context for provisioning the requested VMs based on the resource capacity and availability.

Setting up resource environments is not a mandatory step for this requirement and only allows logical grouping of providers. If the resource environments are not set, then all the available vCenter providers in the network will be taken for placement analysis.

To set up resource environments in HP CSA, complete the following steps:

1. Log on to the HP CSA Management Console, and then click the **Provider** tab.
2. Select **By Environment** from the drop down.
3. To create new resource environments, click the  icon.
4. Add resource environments as needed. You can provide any name for resource environments.
5. Group the vCenter providers under the resource environments. To do that, complete the following steps:
   a. In the HP CSA Management Console, click **Providers** > **VMware vCenter**, and then select each vCenter provider.
   b. Click the **Environments** tab, and add the resource environment that you created. Repeat this step for all vCenter providers.
   c. Add providers to appropriate resource environments.
6. Based on the way resource environments are configured, appropriate providers will be selected for placement.
7. Next, bind the resource environments to the catalog from where you wish to select it.

   This implementation uses the General Catalog to publish the HP CSA - HP vPV integration content. The ResourceEnvironment_DEV is bound to the General Catalog in the Consumer Portal.
8. In the HP CSA Management Console, click the **Catalogs** tab.
9. Select the resource environment to add to the catalog.

Subscribing service

To subscribe service, complete the instructions in "Subscribing service" on page 24.

Canceling subscription

To cancel a subscription, complete the steps in "Canceling a subscription" on page 24.

Observing VM performance on HP vPV

Optimization & Performance View URL on the subscriber portal enables the subscriber to observe the performance and capacity parameters of the provisioned VM.

Known issues

Defect	Reason	Workaround
Displays an error message 'No Suitable Container Found Error' when requesting placement data from HP vPV.	This error occurs when the Run Optimization scheduler in HP vPV fails to work.	Log on to the HP vPV console and go to Admin > General > Optimization. Then click Run Optimization to manually run optimization. Ensure that data is collected in HP vPV before starting the tests each time.

Application designs for HP Codar

This section describes the service designs and the components that will be shipped with HP Codar 1.50.

PetClinic Application on AWS

The CODAR_BP_AWS_PETCLINIC_APPLICATION_v1.50.00 service design will be installed if you select the Install Sample content option while installing HP Codar.

Service design name: CODAR_BP_AWS_PETCLINIC_APPLICATION_v1.50.00.zip

Prerequisites

To use this design, you have to host the following files on a Web Server (Apache Server or a Maven repository), which can be accessed using HTTP.

To host the service design:

1. `Install_mysql.sh` - download this from wherever it is hosted internally.
2. `mysqldb_conf.sh` - download this from wherever it is hosted internally.
3. `install_tomcat.sh` - download this from wherever it is hosted internally.
4. `petclinic_jdbc_conf.sh` - download this from wherever it is hosted internally.

   Note: The above files can be found in `<CSA_HOME>\CSAKit-4.5\Content Archives\topology\vmware vcenter\petclinic\scripts`.

5. `petclinic.war` - download this from Jenkins or wherever it is hosted internally
6. `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` - download this from `http://ftp.kaist.ac.kr/mysql/Downloads/MySQL-5.6/` or wherever it is hosted internally.
7. `apache-tomcat-7.0.56.tar.gz` - download this from `http://tomcat.apache.org/download-70.cgi` or wherever it is hosted internally.

You must have an AWS template, which has the following tools installed:

- Template should have Ubuntu 12.04 or later
- JDK 1.7

- libaio1
- unzip
- zip
- Port 8080 should be available (if it is in use, try disabling IPv6).

Service design components

The imported service design has 6 components: Amazon Server (number of servers: 2), MySQL Database, Tomcat Application Server, PetClinicDB Conf, and PetClinic Application.

There is a 'dbDetails' relationship created between 'PetClinicDB' and 'PetClinic Application'.

PetClinic application that you deploy through this design performs the following steps:

1. Creates Amazon servers.
2. Deploys MySQL and Tomcat components on Amazon server.
3. Configures PetClinicDB Conf on MySQL.
4. Deploys PetClinic Application on Tomcat application server.

Service design customization

Amazon Server

Property	Description
availabilityZone	Enter the availabilityZone
amiId	Enter the amiId (to be obtained from admin)
instanceNamePrefix	Enter the instanceNamePrefix
keyName	Enter the keyName (for example, Codar)
subnetId	Enter the subnetId (to be obtained from admin)
instanceType	Enter the instanceType (for example: small, medium)
securityGroupIds	Enter the securityGroupIds (to be obtained from admin)
username	Enter the username
password	Enter the password
privateKey	Enter the privateKey

MySQL Database

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where MySQL database. That is where `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_mysql.sh` is located
installPath	Enter installPath (could be blank)
privatekeyPath	Enter privatekeyPath. For example, `C:\Users\Administrator\Downloads\CODAR.pem`
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_mysql.sh`
sshPort	ssh Port. It can be 22

Tomcat Application Server

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where apache-tomcat-7 is located. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_tomcat.sh` is located
installPath	Enter the Tomcat install path including the Tomcat home directory name.For example, `/opt/tomcat7`
privatekeyPath	Enter privatekeyPath. For example, `C:\Users\Administrator\Downloads\CODAR.pem`
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_tomcat.sh`
sshPort	ssh Port. It can be 22

PetClinic DB Conf

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where apache-tomcat-7is located. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where mysqldb_conf.sh is located
mysqlpassword	Enter the password for MySQL database
mysqlusername	Enter the user name for MySQL database
port	It can be 22
privatekeyPath	Enter the privatekeyPath. For example, `C:\Users\Administrator\Downloads\CODAR.pem`
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

PetClinic Application

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where apache-tomcat-7is located. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `mysqldb_conf.sh` is located
localfilepath	Enter the file name in local machine. It can be `petclinic.war`
port	It can be 22
privatekeyPath	Enter privatekeyPath. For example, `C:\Users\Administrator\Downloads\CODAR.pem`
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

Note: AWS template should not have MySQL and Tomcat installed. If it is already installed, then the design will fail because the port will be in use.

Content is validated only with IPv4.

For more information on content configuration, see *HP Codar Installation Guide* (Software version 1.50) at http://h20230.www2.hp.com/selfsolve/manuals/.

PetClinic Application with Load Balancer

The CODAR_BP_PETCLINIC_APPLICATION_LOAD_BALANCER_v1.50.00 service design will be installed if you select the Install Sample content option while installing HP Codar.

This service design demonstrates the topology scaling having Load Balancer with PetClinic Application on vCenter servers. This application has a DB component installed on MySQL and an application component installed on Tomcat server.

Service design name

CODAR_BP_PETCLINIC_APPLICATION_LOAD_BALANCER_v1.50.00.zip

Prerequisites

To use this design, you need to host the following files on a Web Server (Apache Server or a Maven repository), which can be accessed using HTTP.

To host the files:

1. `install_mysql.sh` - This has to be downloaded from wherever it is hosted internally.
2. `mysqldb_conf.sh` - This has to be downloaded from wherever it is hosted internally.
3. `install_tomcat.sh` - This has to be downloaded from wherever it is hosted internally.
4. `petclinic_jdbc_conf.sh` - This has to be downloaded from wherever it is hosted internally.
5. `loadbalancer_conf.sh` - This has to be downloaded from wherever it is hosted internally.

   Note: The above files can be found in `<CSA_HOME>\CSAKit-4.5\Content Archives\topology\vmware vcenter\petclinic\scripts.`

6. `petclinic.war` - This has to be downloaded from Jenkins or wherever it is hosted internally.
7. `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` - This can be downloaded from `http://ftp.kaist.ac.kr/mysql/Downloads/MySQL-5.6/` or wherever it is hosted internally.
8. `apache-tomcat-7.0.56.tar.gz` - This can be downloaded from `http://tomcat.apache.org/download-70.cgi` or wherever it is hosted internally.
9. `httpd-2.4.12.tar.gz, pcre-8.35.tar.gz` and `tomcat-connectors-1.2.40-src.tar.gz` should be saved in the `lb_artifact` folder. Bundle it as a `.tar.gz file` (example: `lb_artifact.tar.gz`) and this bundled file is internally hosted.

`httpd-2.4.12.tar.gz` - This can be downloaded from `https://archive.apache.org/dist/httpd/`.

`pcre-8.35.tar.gz` - This can be downloaded from `http://sourceforge.net/projects/pcre/files/pcre/8.35/`.

`tomcat-connectors-1.2.40-src.tar.gz` - This can be downloaded from `https://archive.apache.org/dist/tomcat/tomcat-connectors/jk/`.

Note: Downloaded `<httpd-2.4.12.tar.gz>` file should have the `apr` and `apr-util` folders under the `srclib` folder.

If these folders are missing, it can be downloaded from https://apr.apache.org/ and should be bundled inside the `srclib` folder of `httpd-2.4.12.tar.gz`.

To use this partial design, you also need to fill in the following micro service designs:

- CODAR_BP_MYSQL_MICROSERVICE_v1.50.00.zip
- CODAR_BP_TOMCAT_STACK_MICROSERVICE_v1.50.00.zip

Create a vCenter template, which has the following tools installed:

- Template should have Ubuntu 12.04 or later
- JDK 1.7
- libaio1
- zip
- unzip
- Port 8080 should be available (if it is in use, try disabling IPv6).

Service design components

The imported service design has 6 components: Server, Application Server, Database Server which requires composition, PetClinic DB Conf, PetClinic Application, and Apache Load Balancer.

There is a 'dbDetails' relationship created between PetClinic DB Conf and PetClinic Application.

There is a 'loadBalancer' relationship created between 'Apache Load Balancer' and 'PetClinic Application'.

A scalable topology group called 'WebServerGroup' will be created and it will contain Petclinic Application, Tomcat Server and its respective vCenter server. Instance Count can be set at WebServerGroup.

PetClinic Application that you deploy through this design performs the following steps:

1. Creates vCenter servers.
2. Deploys MySQL and Tomcat components on vCenter server.
3. Configures PetClinicDB on MySQL.
4. Deploys PetClinic Application on Tomcat Application Server.
5. Deploys Apache Load Balancer on vCenter server and Load Balancer manages the created WebServerGroup.

Service design customization

The following components are part of the imported service design CODAR_BP_PETCLINIC_APPLICATION_LOAD_BALANCER_v1.50.00

PetClinic DB Conf

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUsername	Fill in the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `mysqldb_conf.sh` is located
mysqlpassword	Enter the password for MySQL database
mysqlusername	Enter the user name for MySQL database
port	It can be 22
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

PetClinic Application

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where `petclinic.war` is located
configurationUrl	Enter the HTTP location, where `petclinic_jdbc_conf.sh` is located
localfilepath	Enter the file name in local machine. It can be `petclinic.war`

Property	Description
port	It can be 22
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/petclinic_jdbc_conf.sh`

Apache Load Balancer

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where `lb_artifact.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `loadbalancer_conf.sh` is located
installPath	This is optional property
port	It can be 22
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `bash loadbalancer_conf.sh`

Database Server

Application Server

Server

Note: vCenter template should not have MySQL and Tomcat installed. If it is already installed, then the design will fail because the port will be in use by running Tomcat server.

Remove the values in Privatekey and password (by default, the user name and password will be he same as in the template).

Content is validated only with IPv4.

For more information on content configuration, see *HP Codar Installation Guide* (software version 1.50) at http://h20230.www2.hp.com/selfsolve/manuals/.

PetClinic Application on Existing Servers

The CODAR_BP_PETCLINIC_APPLICATION_ON_AN_EXISTING_INFRA_v1.50.00.zip service design will be installed if you select the Install Sample content option while installing HP Codar.

This service design demonstrates how to deploy a two-tier PetClinic application using the Existing Infrastructure components. This two-tier application has a DB component installed on MySQL and an App component installed on Tomcat.

Service design name: CODAR_BP_PETCLINIC_APPLICATION_ON_AN_EXISTING_INFRA.zip

Prerequisites

To use this content archive, you need to host the following files on a Web Server (Apache Server or a Maven repository), which can be accessed using HTTP.

1. `install_mysql.sh` - this has to be downloaded from wherever it is hosted internally.
2. `mysqldb_conf.sh` - this has to be downloaded from wherever it is hosted internally.
3. `install_tomcat.sh` - this has to be downloaded from wherever it is hosted internally.
4. `petclinic_jdbc_conf.sh` - this has to be downloaded from wherever it is hosted internally.

   Note: The above files can be found in `<CSA_HOME>\CSAKit-4.5\Content Archives\topology\vmware vcenter\petclinic\scripts.`
5. `petclinic.war` - this has to be downloaded from Jenkins or wherever it is hosted internally.
6. `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` - this can be downloaded from `http://ftp.kaist.ac.kr/mysql/Downloads/MySQL-5.6/` or wherever it is hosted internally.
7. `apache-tomcat-7.0.56.tar.gz` - this can be downloaded from `http://tomcat.apache.org/download-70.cgi` or wherever it is hosted internally.

You must have vCenter virtual machines, which have following tools installed:

- Ubuntu 12.04 or later
- JDK 1.7
- libaio1
- unzip
- zip

Service design components

Service design imported has 6 components: Existing Infrastructure (number of existing Infrastructure: 2), MySQL Database, Tomcat, PetClinicDB Conf, and PetClinic Application.

There is a 'databaseConnection' relationship created between 'PetClinicDB' and 'PetClinic Application'.

PetClinic application that you deploy through this design performs the following steps:

1. Accesses IP Address of the existing servers.
2. Deploys MySQL and Tomcat components on Existing server.
3. Configures PetClinicDB on MySQL.
4. Deploys PetClinic Application on Tomcat Application Server.

Service design customization

Existing Infrastructure

Property	Description
IPADDRESS	Enter the IP address of a machine which has JDK 1.7, libaio1, unzip and zip
password/privateKey	Either one can be used. Enter the password of the server or the private key for secure SSH access.
username	Enter the user name for SSH access to the server deployed

MySQL Database

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where apache-tomcat-7 is located. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_tomcat.sh` is located
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_tomcat.sh`
sshPort	ssh Port. It can be 22

PetClinic DB Conf

Property	Description
configurationUrl	Enter the HTTP location where `mysqldb_conf.sh` is located
mysqlpassword	Enter the password for MySQL database
mysqlusername	Enter the user name for MySQL database
port	It can be 22
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

PetClinic Application

Property	Description
artifactUrl	artifactUrl
configurationUrl	Enter the HTTP location, where `petclinic_jdbc_conf.sh` is located
localfilepath	Enter the file name in local machine. It can be `petclinic.war`
port	It can be 22
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`

Note: The existing server should not have MySQL and Tomcat installed. If it is already installed, then the design will fail because the port will be in use.

Content is validated only with IPv4.

For more information on content configuration, see *HP Codar Installation Guide* (software version 1.50) at http://h20230.www2.hp.com/selfsolve/manuals/.

PetClinic Application on vCenter

The CODAR_BP_VCENTER_PETCLINIC_APPLICATION_v1.50.00 service design will be installed if you select the Install Sample content option while installing HP Codar.

Service design name: CODAR_BP_VCENTER_PETCLINIC_APPLICATION_v1.50.00.zip

Prerequisite

To use this design, you must host the following files on a Web Server (Apache Server or a Maven repository), which can be accessed using HTTP.

To host the files:

1. `install_mysql.sh` - this has to be downloaded from wherever it is hosted internally.
2. `mysqldb_conf.sh` - this has to be downloaded from wherever it is hosted internally.
3. `install_tomcat.sh` - this has to be downloaded from wherever it is hosted internally.
4. `petclinic_jdbc_conf.sh` - this has to be downloaded from wherever it is hosted internally.

   Note: The above files can be found in `<CSA_HOME>\CSAKit-4.5\Content Archives\topology\vmware vcenter\petclinic\scripts.`
5. `petclinic.war` - this has to be downloaded from Jenkins or wherever it is hosted internally.
6. `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` - this can be downloaded from `http://ftp.kaist.ac.kr/mysql/Downloads/MySQL-5.6/` or wherever it is hosted internally.
7. `apache-tomcat-7.0.56.tar.gz` - this can be downloaded from `http://tomcat.apache.org/download-70.cgi` or wherever it is hosted internally.

You must have a vCenter template, which has the following tools installed:

- Template should have Ubuntu 12.04 or higher
- JDK 1.7
- libaio1
- unzip
- zip
- Port 8080 should be available (if it is in use, try disabling IPv6).

Service design components

Service design imported has 6 components: vCenter Server (number of servers: 2), MySQL Database, Tomcat Application Server, PetClinicDB Conf, and PetClinic Application.

There is a 'databaseConnection' relationship created between 'PetClinicDB' and 'PetClinic Application'.

PetClinic Application that you deploy through this design performs the following steps:

1. Creates vCenter servers.
2. Deploys MySQL and Tomcat components on vCenter Server.
3. Configures PetClinicDB on MySQL.
4. Deploys PetClinic Application on Tomcat Application Server.

Service design customization

vCenter Server

Property	Description
CustomizationSpec	Enter the customization specification (to be obtained from admin)
memorySize	Enter the memory size
password	Enter the password (to be obtained from admin)
privateKey	Enter the private key (not required generally, could be blank)
username	Enter the username (to be obtained from admin)
vmFolder	Enter the vmFolder
vmNamePrefix	Enter the vm name prefix (for example, db and app)
vmTemplateReference	Enter vmTemplateReference (to be obtained from admin)
cpuCount	Enter CPU count

MySQL Database

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where MySQL database is located. That is where `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_mysql.sh` is located
installPath	Enter installPath (could be blank)
privatekeyPath	Enter privatekeyPath (could be blank)

Property	Description
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_mysql.sh`
sshPort	ssh Port. It can be 22

Tomcat Application Server

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where apache-tomcat-7 is located. That is `where apache-tomcat-7.0.56.tar.gz` is located.
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_tomcat.sh` is located
installPath	Enter the tomcat install path including the tomcat home directory name. For example, `/opt/tomcat7`
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_tomcat.sh`
sshPort	ssh Port. It can be 22

PetClinic DB

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location where apache-tomcat-7 is located. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `mysqldb_conf.sh` is located
mysqlpassword	Enter the password for MySQL database
mysqlusername	Enter the user name for MySQL database
port	It can be 22

Property	Description
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

PetClinic Application

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where `petclinic.war` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `petclinic_jdbc_conf.sh` is located
localfilepath	Enter the file name in local machine. It can be `petclinic.war`
port	It can be 22
privatekeyPath	Enter privatekeyPath (could be blank)
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/petclinic_jdbc_conf.sh`

The PetClinic Application component has modify action for Redeploy feature.

Redeploy content creation

This section explains how to enable the Modify action for a component.

Flows

The individual flows are placed under the version folder. The name of a flow is used automatically as an operation name in the new component. The flow name is important for recognition of the lifecycle phase related to the operation.

Each OO flow should have an input property defined as a constant called LIFECYCLE_PHASE. The property does not relate to the flow logic. It is used as meta-information marking the flow's purpose related to the component lifecycle.

As you can see, there is a duplicate indicator of the operation lifecycle phase. Both the flow name (beginning of the name in fact) and LIFECYCLE_PHASE input property need to be set appropriately. This duplication will be removed in a future release. Currently, the flow name and the value of the constant property should be set as follows:

Flow Purpose	Flow Name Prefix	LIFECYCLE_ PHASE
Deployment	Deploy or Create	deploying
Undeployment	Undeploy or Delete	undeploying
Modification	Modify	modifying
Undo a successful modification	Unmodify	unmodifying
Handle a failure during deployment		deploying_failure
Handle a failure during undeployment		deploying_failure
Handle a failure during modification	Modify Failure	deploying_failure
Custom public action executable on a deployed instance		deployed

Input and Output Properties

OO server automatically decorates all flows with a *Result* output property. However, it is suggested to define flow outputs explicitly as output properties.

- *response* – Mandatory property. Each OO flow used in a component operation should have a *response* output property. HP Codar relies on the *response* property to determine the state of the execution.
  - For deployment, undeployment flows and flows related to public actions, the value should be either *success* or *failure* based on flow execution response.
  - For *Modify* flow, the value should be *success*, *noop* or *failure*.

    success indicates that the attempted modification was successful.

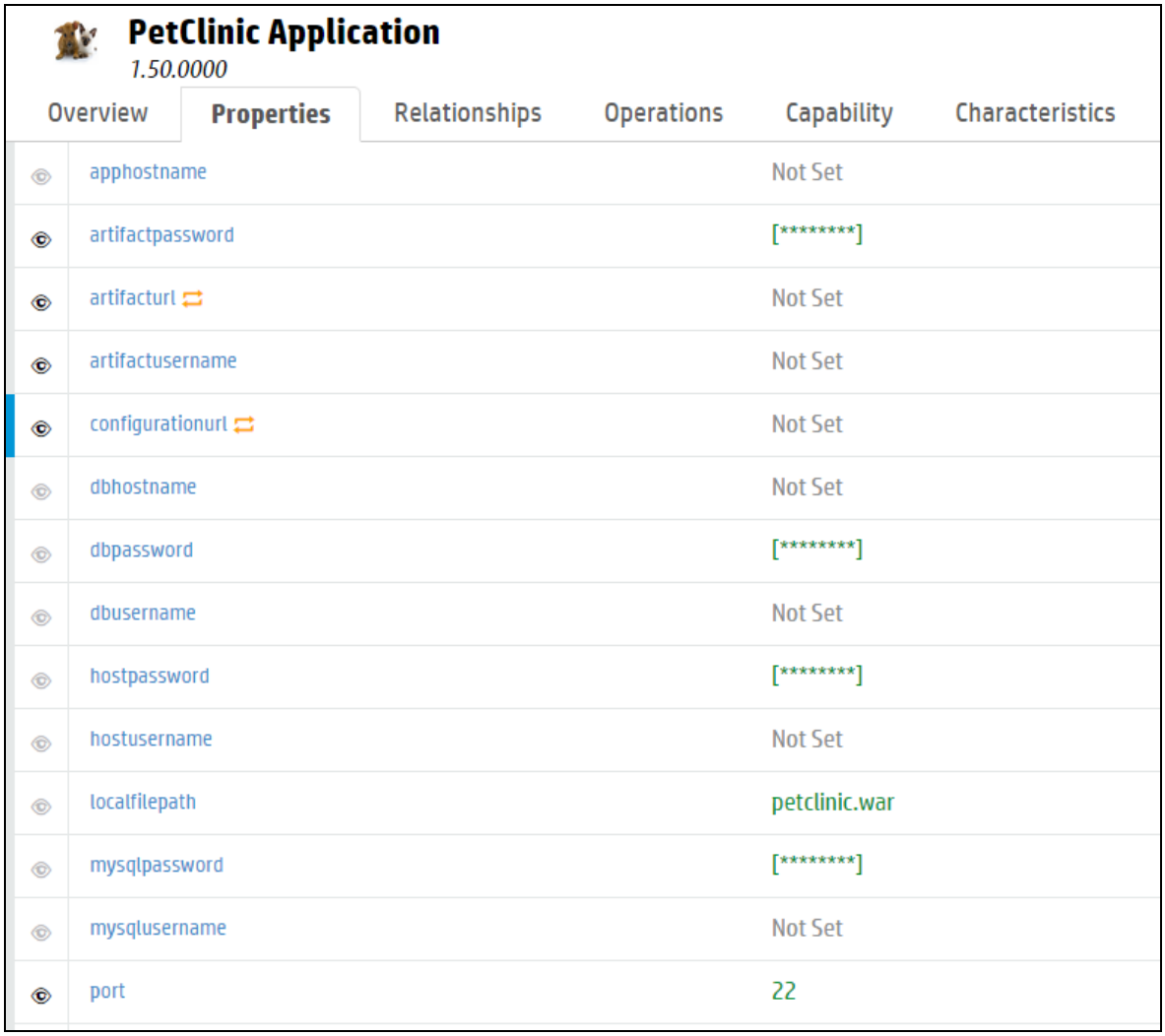
    noop indicates that no action was taken that would affect the component state or properties.

    failure indicates that the attempted modification unsuccessful.

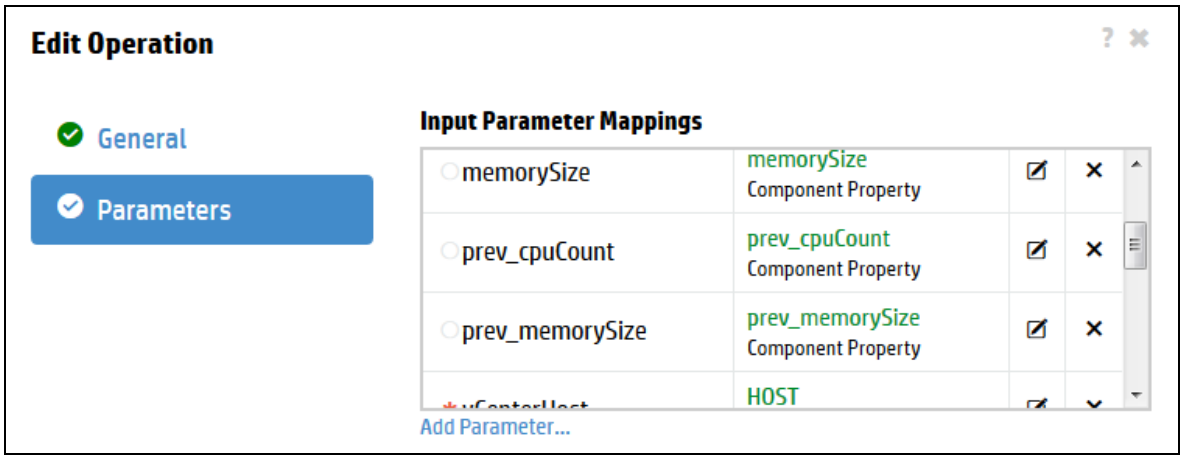
    For *Unmodify,* flow should overwrite the response property to *failure* if the unmodify failed and to *noop* if *Unmodify* succeeded to indicate that from an overall component point of view the component state and property values are unaffected due to modify transition. *Modify Failure* flow should set the *response* property to *always failure* indicate the failure to modify this component.
  - If you include the deploy failure handler and/or undeploy failure handler, make sure that the *response* is being set correctly. The fact that these actions are called should result in the *failure* response.
- *result* – Optional property. Each OO flow used in a component operation should have a *result* output property. It can hold any contextual message, like detailed info about failure.

HP Codar 1.50 supports the modification of properties on an active subscription. HP Codar will pass previous property values to modification OO flows if the flows explicitly express interest in knowing these values - by defining additional flow inputs with a *prev_ prefix*. As an example, if the modification OO flow defines an input of memorySize and is interested in knowing its previous value, it must also define an input of *prev_memorySize*.

Illustrated in the picture below are the *artifacturl* and *configurationurl* properties that the flow has expressed interest in knowing previous values. This is denoted by an icon ⇄ next to the property name in the HP Codar Topology Components view.



Note that the *prev_ OO* flow inputs do not show up as properties on the component; only their *un-prefixed* counterparts show up and are appropriately marked. However, the *prev_ OO* flow inputs do show up on Operations' Input Parameter Mapping. These mappings are used by the modification operation and must not be edited from the Component Editor.



A component's *Modify* flow may communicate the status of the modification, an error code or any other useful information to *Modify Failure* flow by placing such information in an output field called *modifyReturnValue*. This value may be received by the *Modify Failure* flow in an input field called *modifyFailureValue* and allows the *Modify Failure* flow to do cleanup the effect of failure in *Modify* flow intelligently, especially for a complex multi-step flows when failure might have occurred at any step which can be indicated by returning specific error code from the *Modify* flow via *ModifyReturnValue*. If these fields are set on the OO flows, the mapping between them is automatically handled within HP Codar and must not be modified from the Component Editor.

Note: vCenter template should not have MySQL and Tomcat installed. If it is already installed, then the design will fail because port will be in use by the already existing Tomcat server.

Remove the values in Privatekey and password (by default, the user name and password will be the same as in template).

Content is validated only with IPv4.

For more information on content configuration, see *HP Codar Installation Guide* at http://h20230.www2.hp.com/selfsolve/manuals/.

PetClinic Application

This service design demonstrates how to deploy a two-tier partial PetClinic Application using vCenter. This two-tier application has Database Server and Application Server requirement. Another service design provides the infrastructure for the partial PetClinic application, this infrastructure design has MySQL component, which serves as Database Server and Tomcat component which serves as the Application Server both hosted on vCenter servers.

Folder contents

- Service design content archive

  CSA_BP_PETCLINIC_TWO_TIER_INFRASTRUCTURE_v1.50.00.zip

  CSA_BP_PETCLINIC_APPLICATION_v1.50.00.zip

- Scripts

  Scripts path: `<CSA_HOME>\CSAKit-4.5\Content Archives\topology\vmware vcenter\petclinic\scripts`

  `install_mysql.sh`

  `install_tomcat.sh`

  `mysqldb_conf.sh`

  `petclinic_jdbc_conf.sh`

Prerequisites

To use this design, you have to host the following files on a Web Server (Apache Server or a Maven repository), which can be accessed using HTTP.

To host the service design:

1. `install_mysql.sh` - this has to be downloaded from wherever it is hosted internally.
2. `mysqldb_conf.sh` - this has to be downloaded from wherever it is hosted internally.
3. `install_tomcat.sh` - this has to be downloaded from wherever it is hosted internally.
4. `petclinic_jdbc_conf.sh` - this has to be downloaded from wherever it is hosted internally.
5. `petclinic.war` - this has to be downloaded from Jenkins or wherever it is hosted internally.
6. `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` - this can be downloaded from `http://ftp.kaist.ac.kr/mysql/Downloads/MySQL-5.6/` or wherever it is hosted internally.
7. `apache-tomcat-7.0.56.tar.gz` - this can be downloaded from `http://tomcat.apache.org/download-70.cgi` or wherever it is hosted internally.

You must have an Ubuntu 12.04 vCenter template, which has following packages installed:

- JDK 1.7
- libaio1

- unzip
- zip

You must configure the following:

1. For users other than 'root' should have home directory. This is required for logging into the target system and expects home directory to be present.
2. For sudo users the password prompt should be disabled for running the shell commands. This is required because the system will try to perform silent installation of packages and does not expect any prompts. If there is any prompts then OO flow execution will be halted and will fail.

Service design components

The imported PetClinic Application service design as 4 components: PetClinic Application, PetClinic DB Conf, Database Server, and Application Server. Database Server is the capability components with MySQL 5.6 requirement, and Application Server is the capability components with Tomcat 7 requirement.

Two Tier Infrastructure with MySQL and Tomcat service design imported has 4 components: MySQL, Tomcat, and vCenter Server (number of servers: 2).

PetClinic Application needs the infrastructure design for deployment. The test run wizard will list the matching infrastructure design and will have the PetClinic Two Tier Infrastructure service design listed.

PetClinic Two Tier Infrastructure performs the following actions:

1. Deploys the vCenter servers.
2. Deploys MySQL and Tomcat components on vCenter Server.
3. Configures PetClinic Database on MySQL.
4. Deploys PetClinic Application on Tomcat Application Server.

Service design customization

PetClinic Application

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where `petclinic.war` is located
artifactUsername	Enter the user details for accessing HTTP location

Property	Description
configurationUrl	Enter the HTTP location, where `petclinic_jdbc_conf.sh` is located
localfilepath	Enter the file name in local machine. It can be `petclinic.war`
port	SSH Port. Default is 22
privatekeyPath	Leave it blank
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/petclinic_jdbc_conf.sh`

PetClinic DB Conf

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `mysqldb_conf.sh` is located
mysqlpassword	Enter the password for MySQL database
mysqlusername	Enter the user name for MySQL database
port	SSH Port. Default is 22
privatekeyPath	Leave it blank
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh/tmp/mysqldb_conf.sh`

MySQL Database

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where MySQL database is located. That is where `mysql-server_5.6.21-1ubuntu12.04_amd64.deb-bundle.tar` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_mysql.sh` is located
installPath	Leave it blank

Property	Description
privatekeyPath	Leave it blank
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_mysql.sh`
sshPort	SSH Port. Default is 22

Tomcat Application Server

Property	Description
artifactPassword	Enter the password for accessing HTTP location
artifactUrl	Enter the HTTP location, where apache-tomcat-7. That is where `apache-tomcat-7.0.56.tar.gz` is located
artifactUsername	Enter the user details for accessing HTTP location
configurationUrl	Enter the HTTP location, where `install_tomcat.sh` is located
installPath	Enter the tomcat install path including the tomcat home directory name.For example, `/opt/tomcat7`
privatekeyPath	Leave it blank
remoteFilePath	Enter the path on the server. For example, it can be `/tmp/`
serviceCommand	It should be `sh install_tomcat.sh`
sshPort	SSH Port. Default is 22

vCenter Server

Property	Description
customizationSpec	Enter the customization spec value for the vCenter template
vmTemplateReference	Enter the Ubuntu VM Template name
vmNamePrefix	Enter the VM name prefix
password/privateKey	Either one can be used. Enter the password of the server or the private key for secure SSH access.
username	Enter the user name for SSH access to the server deployed

Note: vCenter server should not have MySQL and Tomcat installed. If it is already installed then

the design might fail because port will be in use.

Remove the values in privatekey and password (by default the user name and password is the same as in template).

Content is validated only with IPv4.

For more information on content configuration, see *HP Codar Installation Guide* (Software version 1.50) at http://h20230.www2.hp.com/selfsolve/manuals/.

Appendix A: Troubleshooting

Manual cleanup in HP OneView if automatic cleanup fails

- Remove the server profile.
- Remove all labels on the server except organization-specific labels.
- Restore the hpcsaUNASSIGNED label on the server.

Build plan deployment fails

- Validate build plans before importing them as components to HP CSA. Ensure that the network used by HP ICsp for deployment is specified in the server profile. Additional networks may be included but, this network must be present in the server profile to allow the server to register itself with HP ICsp.
- For non-blade servers, ensure that the network connectivity of the server to the HP ICsp network including vLAN configuration and physical cabling.
- RHEL6.x server deployments with boot and data disks require the “ignoredisk” setting in the HP ICsp kickstart file.

  For example, ignoredisk --only-use=sda
- Windows deployments fail with multipath configuration. Boot disk must have single path to SAN.

  For information about potential solutions, visit http://support.microsoft.com/kb/2826787.
- Failed HP ICsp OS build plans can take up to 3 hours for the HP ICsp job to timeout. HP CSA returns a failure status before the workflow fails. Canceling the OS build plan job manually in HP ICsp will allow service to clean up without having to wait for HP ICsp timeout.

Server profile copy fails

Using special characters in server profile names can cause the profile copy to fail. Rename the server profiles using only alphanumeric, dash and underscore. Reimport your profile after renaming the server.

Deployments fail due to HP CSA timeout

The default timeout for a topology design is 7200 minutes (2 hours). This value is set in the `csa.properties` file on the HP CSA server as TopologyDesignProvisioning.TIMEOUT=7200. If you modify this file, you must restart the csa service.

Missing HP Operations Orchestration content packs

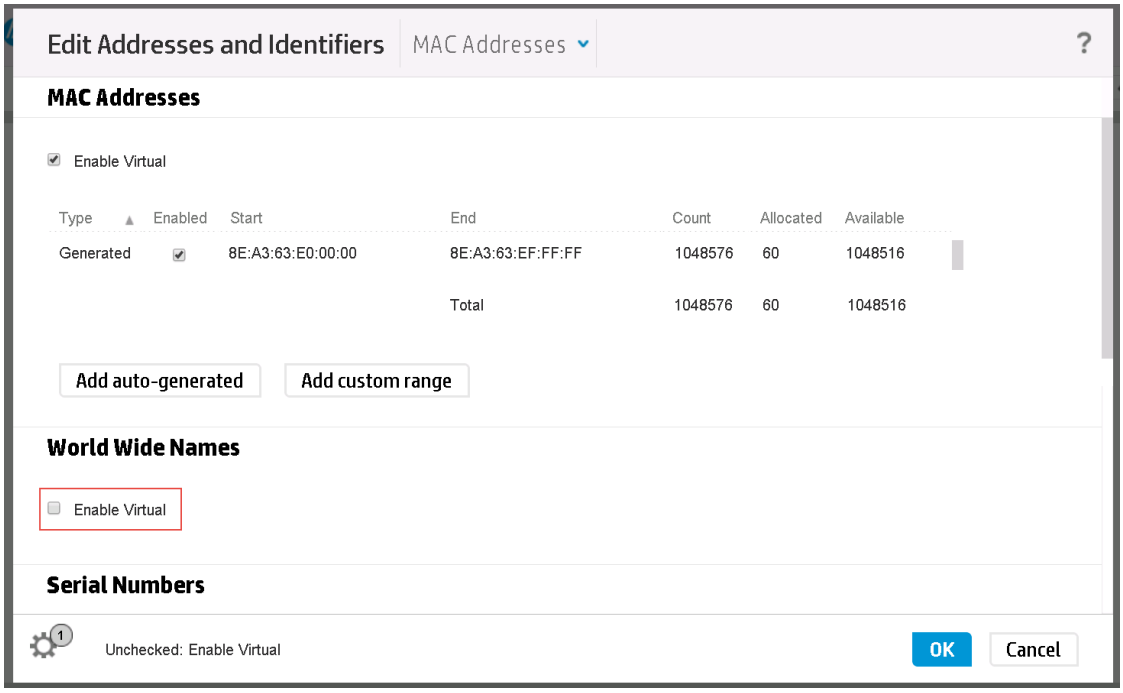
If the HP OneView and HP ICsp content are not installed automatically by the installer, verify that `OOS_URL`, `OOS_USERNAME`, and `OOS_PASSWORD` parameters are not commented out and they are properly set in the `csa.properties` file.

For more information about missing HP Operations Orchestration content packs, see *HP Cloud Service Automation Installation guide* at HP Software Support.

Appendix B: Disabling virtual WWNs in HP OneView

To disable virtual WWN allocation in HP OneView, complete the following steps:

1. Go to the OneView User Interface, and then click the OneView menu.
2. Click **Settings**, and then click **Edit** to the right side of **Addresses and Identifiers**.
3. Clear the **Enable Virtual** check box under World Wide Names as shown in the following figure.



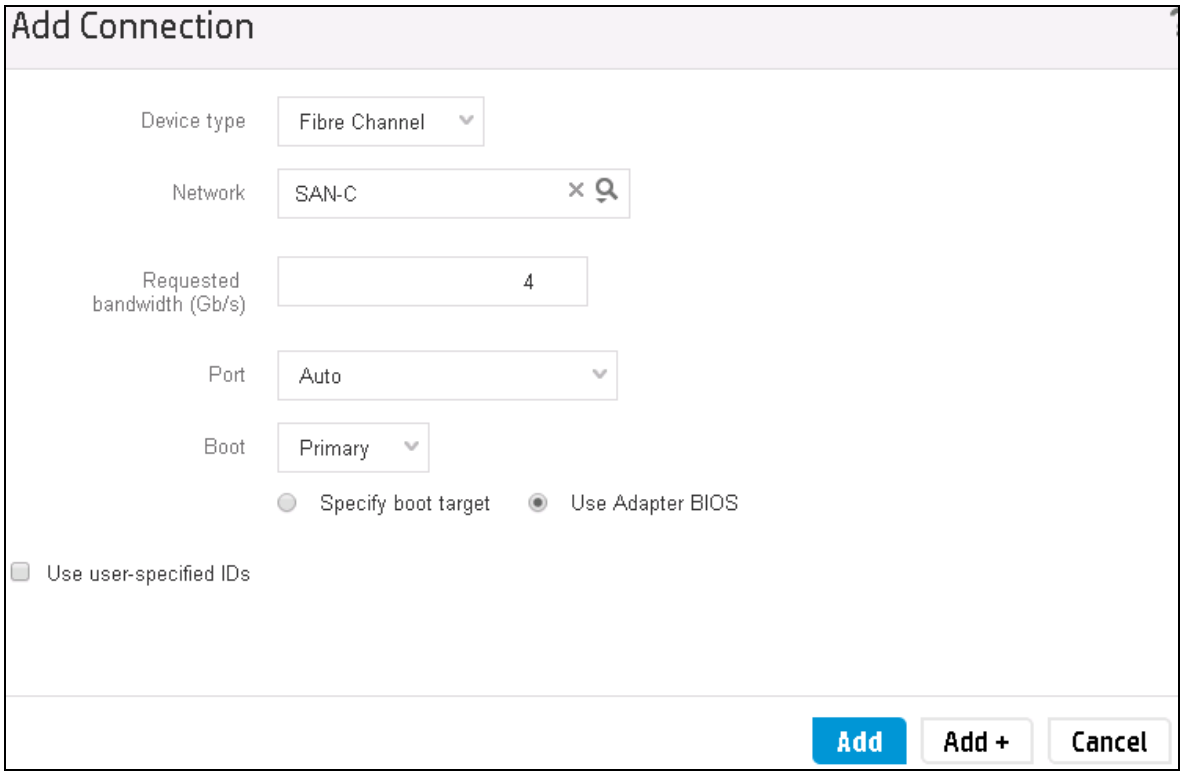
Appendix C: Creating temporary server profiles to discover WWPN of HBAs

One method to capture the physical WWPN is to create a server profile for each blade you wish to make available to HP CSA for provisioning. This server profile is temporary and is only used to determine the WWPN to use when creating and presenting the storage with your storage management tool.

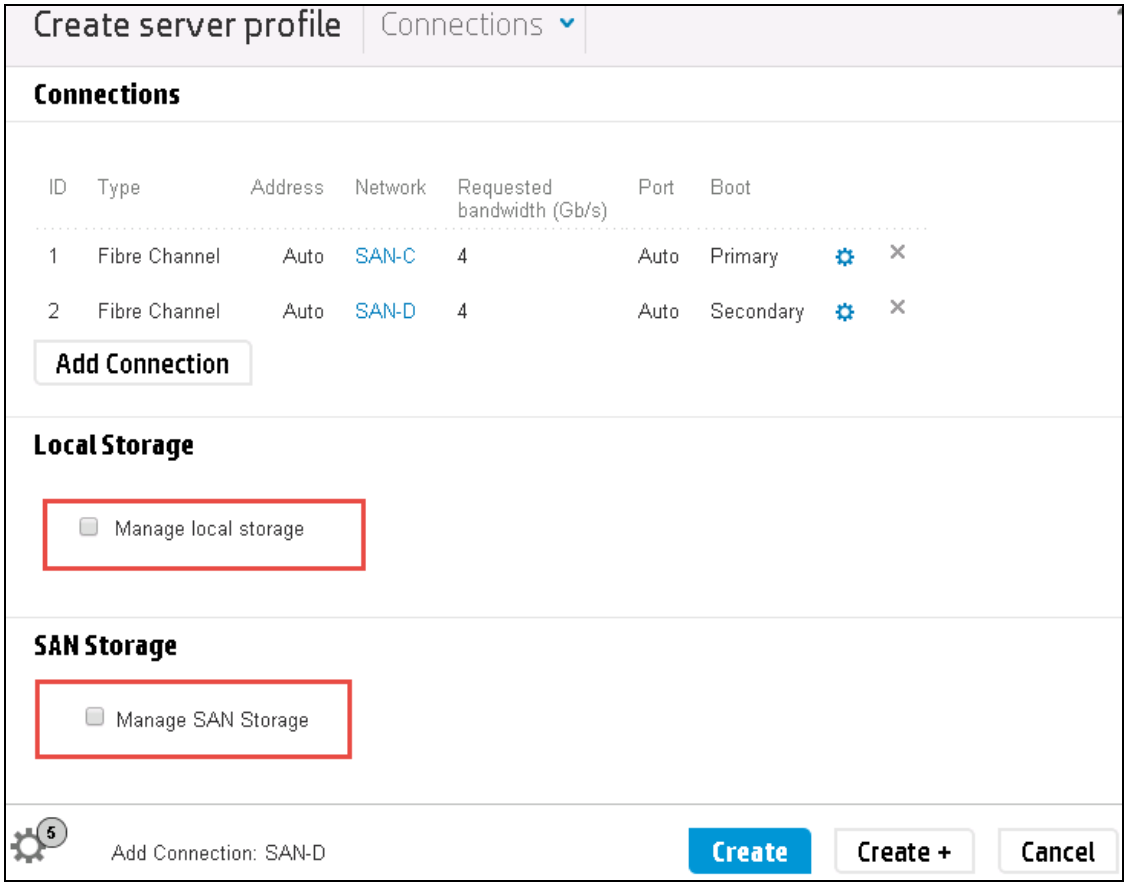
There are more direct means of obtaining the WWPN of each of your servers; however, this technique can be used to quickly create and apply profiles to servers (in bulk) without the need of catching the adapter bios during boot or other similar methods that make it difficult to perform for more than one or two servers.

The following steps explain how to create server profiles and capture the WWPN:

1. Select the firmware appropriate for your environment.
2. Assign the server profile to a specific server.
3. In the Add Connection dialog box, enter the following information:
   - Name
   - Device type
   - Network
   - Port
   - In the Boot drop down list, select Primary or Secondary
   - Select the Use Adapter BIOS option

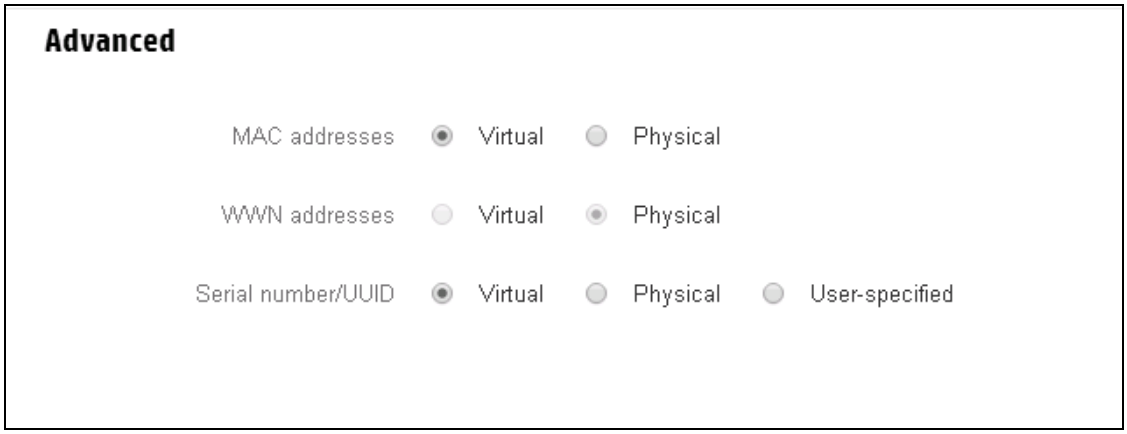

Add Connection
Device type
Fibre Channel
Network
SAN-C
Requested bandwidth (Gb/s)
4
Port
Auto
Boot
Primary
Specify boot target
Use Adapter BIOS
Use user-specified IDs
Add
Add +
Cancel

4. Click **Add** to add the connection.

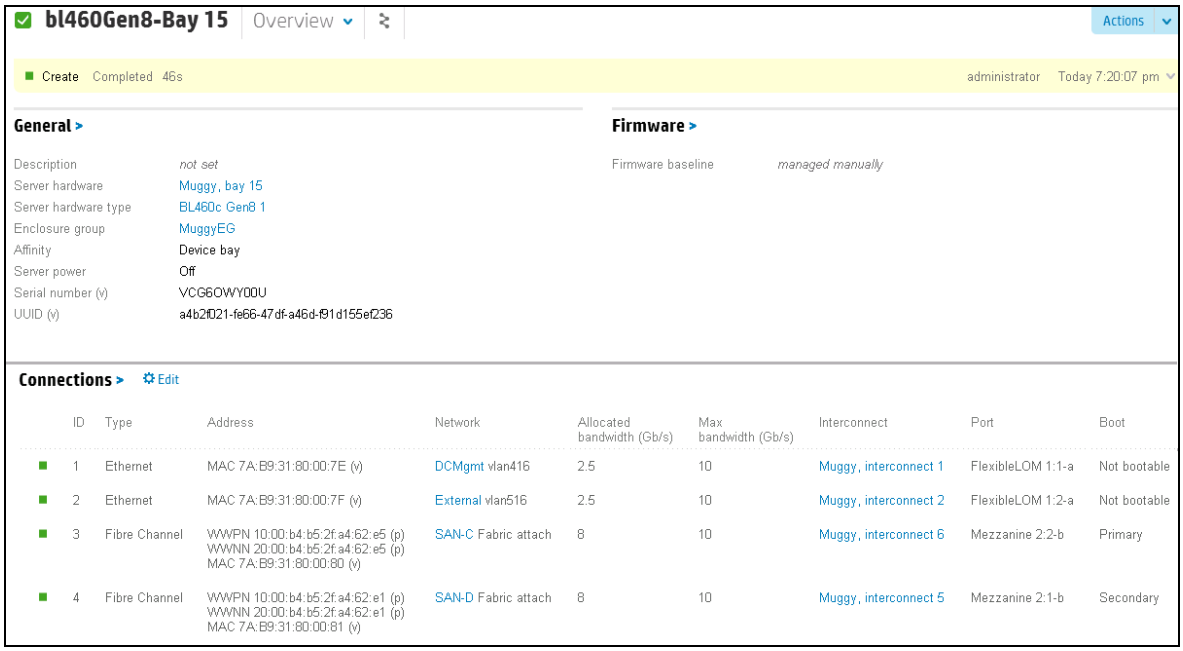


5. Leave **Local Storage** and **SAN Storage** unchecked. Make the selection as appropriate.

6. The **Advanced** option will show that WWN addresses are set to Physical.



Once the server profile has been applied to the blade, the WWPN is visible. Use your storage management tool to present a LUN to the WWPN shown for each Fibre Channel port in the Connections section as shown in the following figure.



7. Note the WWPN value and use that to present storage to the server from your externally managed storage device. After you have provisioned the storage, delete the server profile in HP OneView.

> **Note:** It is important to be sure that you delete the temporary profiles to prevent these useless profiles from appearing in the list of profiles that can be imported into HP CSA as components.

Appendix D: Prepare ICsp OS Build Plan to work with Chef

In HP CSA 4.20, Chef cookbooks could be installed on topology components that fulfilled the Server Capability such as vCenter Server, Amazon Server, or other VM type servers through the use of VM templates as discussed in the HP CSA Topology Components Guide. With the addition of the HP Insight Control server provisioning (HP ICsp) integration in HP CSA 4.50, a similar approach can be employed for physical servers provisioned by HP ICsp OS Build Plan (OSBP) components.

This section covers the process of creating and configuring a OSBP for use in a Chef environment. Typical examples of additional configuration necessary to prepare a OSBP to work with Chef include:

- proxy settings
- yum/apt-get installation and configuration
- wget installation and configuration

Currently, only Linux OS build plans are supported for use together with Chef components. Most of the Chef cookbooks are written to work with apt-get or yum, so it is recommended to use Ubuntu and RHEL OS distributions. Theoretically, any Linux OS build should work as long as it provides required tools and satisfies cookbook requirements.

Note: The HP ICsp appliance comes pre-packaged with OSBPs that perform scripted installations of Red Hat Linux and SUSE Linux. Currently, it does not have OSBPs that allow the capture of Linux system images and the deployment of those images back to target servers. If you wish to create an Image based OSBP or CentOS OSBP to work with Chef, see the following documents at http://hp.com/go/insightcontrol/docs for your respective version of HP ICsp for details:

- HP Insight Control Server Provisioning Administrator Guide
- HP Insight Control Server Provisioning Build Plans Reference
- HP Insight Control server provisioning Capturing and Installing Red Hat Enterprise Linux 7 System Images
- HP Insight Control server provisioning Capturing and Installing Red Hat Enterprise Linux 6 System Images
- HP Insight Control server provisioning Capturing and Installing SUSE Enterprise Linux 11 System Images
- HP Insight Control server provisioning How to Create an OS Build Plan for Installing CentOS

Steps to customize a scripted OS build Plan are the following:

1. First, copy the HP provided OS Build Plan and possibly the related configuration file (for example, the kickstart file for RHEL installs) associated with the build plan you would like to customize. HP provided build plans and configuration files are read-only so you must use the 'Save As' action to obtain an editable copy.

2. Add postinstall steps to perform the same types of customizations discussed for VM Templates in the *HP CSA Topology Components Guide*. Use the instructions in that guide, but instead of performing the steps manually and snapshotting a VM Template, you must script the steps in your copied build plan as (new) build plan steps or can leave the steps as-is and modify the copied configuration file (for example, in a %post section in the kickstart file).

   For example, to configure the proxy, instead of adding a line like this into the `.bashrc` file in the root home directory of a system that already has an OS installed:

   export ftp_proxy=http://your.proxy:8080/

   You would instead add a line like this to a script or to the kickstart file:

   echo “export ftp_proxy=http://your.proxy:8080/” >> /root/.bashrc

3. If you choose to create an image based OS build plan, you can follow the instructions in the *HP CSA Topology Components Guide* related to customizing VM Templates. The steps for creating an image is similar to the process of creating the VM template.

Appendix E: Deprecated contents

The following service designs and HP Operations Orchestration content packs have been deprecated. HP CSA 4.50 and HP Codar 1.50 are the last releases that will support this content. The content will not be included in future releases. The equivalent content that is available from the HP Cloud Content Capsule Installer should be used instead. You can access the HP Cloud Content Capsule Installer from the `Tools/CSLContentInstaller` directory after installing HP CSA or HP Codar.

Content	Location
CSA_BP_MOE_COMPUTE_ADM_SITESCOPE_UCMDB_v3.20.00.zip	CSAKit-4.5/Content Archives/sequenced/matrix operating environment/
CSA_BP_MOE_COMPUTE_ADM_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_CUSTOM_PROVIDER_SELECTION_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_DMA_JBOSS_SITESCOPE_UCMDB_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_DMA_JBOSS_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_MT_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_SITESCOPE_UCMDB_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_SOAPV4_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_STANDALONE_DMA_JBOSS_v3.20.00.zip	
CSA_BP_MOE_COMPUTE_v3.20.00.zip	
CSA_BP_NA_VIRTUAL_NETWORK_v3.20.00.zip	CSAKit-4.5/Content Archives/sequenced/network automation/
CSA_BP_OPENSTACK_HPCS_COMPUTE_v3.20.00.zip	CSAKit-4.5/Content Archives/sequenced/openstack/

Content	Location
CSA_BP_VCENTER_COMPUTE_ADM_SITESCOPE_UCMDB_v3.20.00.zip	CSAKit-4.5/Content Archives/sequenced/vmware vcenter/
CSA_BP_VCENTER_COMPUTE_ADM_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_CASCADED_OPTIONS_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_CUSTOM_POOL_SELECTION_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_DEPENDENT_OPTIONS_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_DMA_JBOSS_SITESCOPE_UCMDB_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_DMA_JBOSS_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_DYNAMIC_OPTIONS_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_FAILURE_HANDLING_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_MODIFY_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_SA_SOFTWARE_POLICIES_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_SITESCOPE_MODIFY_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_SITESCOPE_UCMDB_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_STANDALONE_DMA_JBOSS_v3.20.00.zip	
CSA_BP_VCENTER_COMPUTE_v3.20.00.zip	
CSA_BP_AMAZON_EC2_INFRA_v4.10.00.zip	CSAKit-4.5/Content Archives/topology/amazon ec2
CSA_BP_VCENTER_COMPUTE_v4.10.00.zip	CSAKit-4.5/Content Archives/topology/vmware vcenter/
CSA_BP_VCENTER_HPSA_LAMP_STACK_v4.10.00.zip	

Content	Location
oo10-csa-cp-4.50.0000.jar	CSAKit-4.5/OO Flow Content/10X/
CSA-4_10-ContentInstaller.jar	CSAKit-4.5/OO Flow Content/9X

Additional resources

- HP CSA, HP Server Automation, HP Network Automation, Database and Middleware Automation, Operations Orchestration, Universal CMDB, Service Manager, SieScope, HP vPV, HP Codar

  http://h20230.www2.hp.com/selfsolve/manuals

  You need to log on to HP Software Support using your HP Passport credentials. On the Home page, select **Dashboard** > **Manuals**. Select the product and in the **Search for Answers** field, enter the search criteria, and then click the **Search** icon. Matching results will be displayed.

- HP Live Network Portal

  hpln.hp.com/solutions

- VMware vCenter documentation

  http://www.vmware.com/support/pubs/

- RedHat Enterprise Linux documentation

  https://access.redhat.com/knowledge/docs/

- HP Developer Resource Center for CloudSystem (for accessing other toolkits to design and extend cloud services running on HP CloudSystem)

  http://www.hp.com/go/csdevelopers

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