

Cloud Service Automation

Software Version: 4.90 For Linux operating systems

Use

Document Release Date: May 2017 Software Release Date: May 2017



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Providers

Providers are management platforms that offer centralized control over the infrastructure and resources used in a cloud computing environment. For example, a provider such as infrastructure orchestration can deploy virtual machines, while a provider such as SiteScope can monitor applications.

A provider corresponds to the specific instance of an application that CSA can integrate with to help instantiate service designs. For example, to enable service designs that target infrastructure orchestration, you must first create a provider (with a provider type of Matrix OE) in the Cloud Service Management Console.

Provider Types

A provider type allows you to classify providers for improved filtering and identification. CSA includes some predefined, out-of-the-box provider types. Each instance of a provider can have a single provider type.

Each instance of a resource offering (used with sequenced designs) can have a single provider type. In addition, resource offerings can be associated only with providers that share the same provider type.

Topology components (used with topology designs) do not always have a provider type, but when they do, they have a single provider type.

Tasks

You can perform the following tasks in this area:

- View providers by type In the drop-down box, select to view providers By Type. Provider types are listed in the left pane. The list of providers contained by the type displays in the right pane. Disabled providers are indicated by the Disabled label and will not be selected when provisioning new services.
- Manage provider types In the drop-down box, select By Type. Click the gear icon and select Manage Provider Types. For more information, see "Manage provider types" on page 25.
- Create a Provider In the drop-down box, select By Type. In the left pane, select All Providers or select the type for which you want to create a provider. In the right pane, select the Providers tab. Click the gear icon and select Create Resource Provider. See "Creating, Editing and Deleting Providers" on the next page for more information about configuring a provider.

• See more information about a provider - Click a provider to see more information about the provider.

Note: 🔓 Locked items cannot be deleted.

Creating, Editing and Deleting Providers

You can perform the following tasks:

- Create or Edit a provider In the right pane, select the Providers tab. Click the gear icon and select Create Resource Provider. See the table below for the items you can edit.
- Delete a provider Select a provider. Click the gear icon and select Delete. Click Yes in the confirmation dialog. A provider referenced by topology designs or by topology or sequenced service instances cannot be deleted. All other providers can be deleted and their associations (to environments and to resource offerings) are automatically removed during the delete action. When you delete a provider, make sure that any resource offerings referenced by the provider and used in a service design are still associated with at least one provider that can provision the resource offering.

Item	Description
Provider Type	The type selected for this provider. Note that the Provider Type cannot be changed after a provider is created.
Display Name	The name you provide for the provider.
Description	The description you provide for the provider.
Image	Select an image to be displayed with the provider.
Service	Specify a URL for connecting to the provider.
Access Point	The following examples show how to connect to some common resource providers:
	 OpenStack (such as Helion OpenStack®) - http://<0penStack server IP>:5000
	 Matrix OE - https://<moe server<br="">IP>:51443/hpio/controller/soap/<v1 v2="" v3=""></v1></moe>
	• Server Automation - https:// <sa ip="" server="">:443</sa>
	 SiteScope-http://<sitescope ip="" server="">:8080</sitescope>
	 Universal CMDB - http://<ucmb ip="" server="">:8080</ucmb>

Item	Description
	 VMware vCenter - https://<vcenter ip="" server="">:443</vcenter> Chef - https://<chef ip="" server="">:443</chef> Operations Manager i - https://<omi ip="" server="">:443</omi> When creating or updating a provider, CSA attempts to contact the provider at the URL you specify. CSA uses a six second time-out to attempt to validate the provider URL (for HTTP and HTTPS only). If the URL is not successfully contacted before the timeout expires, a validation failure message displays, and you have the option to ignore the validation failure or to correct the URL and try again. Note: User credentials are not validated at this time.
User ID	The user ID for the specified Service Access Point.
Password	The password for the specified Service Access Point. Re-type the password in the Confirm Password field.
Enabled	This value determines whether the provider will be selected when provisioning a new service. The setting is either Enabled (when checked) or Disabled (when not checked). When Disabled , the provider will not be selected when provisioning new services. Disabling a provider will have no effect on existing services that are using that provider.
Project	Enter the project in Helion OpenStack® in which provisioning should occur when provisioning topology designs in which enableUserContext is set to False for every Helion OpenStack® component in the design. If all Helion 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. This field is available for Helion OpenStack® and CloudSystem 8.x providers only.
Domain	Enter the domain in Helion 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. This field is available for Helion OpenStack® and CloudSystem 8.x providers only.
Use domain- scoped transport token	When checked, a domain-scoped transport token will be used for communication with Helion 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. This field is available for Helion OpenStack® and CloudSystem 8.x providers only.

Best Practices

The CloudSystem 8.x provider type is used specifically for topology designs and requires that a provider property "tenant" be configured on the provider. This tenant property is automatically created

when creating a new CloudSystem 8.x provider. To set its value, navigate to the **Properties** tab of the provider after it has been created, and edit the tenant property to contain the value appropriate for your CloudSystem 8.x environment.

Provider properties

Custom properties on a provider can be used to capture additional configuration information about a particular provider. For example, you can use custom properties to model provider resources, such as datacenters, hypervisors, and datastores for a specific VMware vCenter provider. When a sequenced design is provisioned, an Operations Orchestration flow can read and write provider property values during service provisioning. Provider properties can also be read during the provisioning of topology designs. For example, an Operations Orchestration flow can read and write provider property values.

Tasks

Custom properties are optional and are needed only if the provisioning process requires them. For example, provider properties can be used by Operations Orchestration flows during service provisioning of sequenced or topology designs.

- Create provider properties Click Create. Provide the information listed in the following table.
- Edit provider properties Click the gear icon for the property and select Edit. See the following table for the items you can edit.
- Delete provider properties Click the gear icon for the property and select Delete.
- Refresh provider properties Click the gear icon for the property and select Refresh.

Item	Description
Туре	Select one of the following:
	• Boolean — A property whose value is True or False.
	 Integer — A property whose value is a positive or negative whole number or zero.
	• List — A property whose value is a list of String values.
	• String — A property whose value is a sequence of characters.
	You cannot change the type of a property after it is created.
	Configure the following items for each property type:
	• Name — A unique name for the property; may not contain

Item	Description
	spaces.Display Name — The display name for the property.
	• Description — A description of the property.
	For Boolean properties:
	• Property Value — Select True or False.
	For List properties:
	• Property Value — Click the Add Item icon to configure a list property. Click the Edit Item icon to edit the selected list item. Click the Remove Item icon to delete the selected list item.
	For Integer properties:
	• Property Value — Select or enter a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is —2147483648.
	For String properties:
	• Property Value — Enter a string of characters.
	• Confidential Data — Select this box to mask the values so that they cannot be read in the user interface. No encryption of the value is performed.

Provider environments

You can perform the following tasks:

- View environments associated with the selected provider See the list of environments.
- Select a resource environment Click Select. In the dialog box, add or remove resource environments to or from the resource provider.

Resource offerings

For information about resource providers, see "Providers" on page 15.

Note: Resource offerings are for use with sequenced designs only and are not applicable to topology designs.

Tasks

- View resource offerings associated with the selected provider See the list of resource offerings.
- Select a resource offering Click Select. In the dialog box, add or remove resource offerings to or from the resource provider.

Provider Resource Pools

Resource pools create an association between resources that can be provisioned by a provider and subscriptions. You can create a resource pool on a provider to represent a pool of resources associated with that provider. For example, you can create a resource pool on a VMware vCenter resource provider that corresponds to a VMware cluster. You can also model an infrastructure orchestration resource pool (a pool of CPU, memory, storage, and networking) as a CSA resource pool. You can decide which provider concepts, if any, you wish to model as CSA resource pools; the resource pool concept may not be applicable to all provider types.

When you model resources on a provider in resource pools, you should model them in one of the two fashions described below:

- A single resource pool on a resource provider that models all resources that can be allocated to CSA on this provider
- Multiple resource pools on a resource provider, each of which models its own portion of the total available resources on the provider. For example, if a provider has 2000 GB of Storage available, the sum of the Total Available To CSA for each resource of type Storage on all resource pools associated with the provider should be no greater than 2000 GB.

Tasks

- View resource pools for the selected provider See the list of resource pools and their descriptions. Disabled resource pools are indicated by the **Disabled** label and will not participate in resource allocation processing for new subscriptions.
- Create a resource pool Click Create. Provide the information listed in the following table.

• See more information about a resource pool - Click the resource pool whose information you want to view.

Item	Description
Display Name	The name you provide for the resource pool.
Description	The description you provide for the resource pool.
Known By Provider As	The name this resource pool is known by in the associated resource provider. For example, if this resource pool corresponds to a VMware vCenter cluster, this value would be the exact cluster name configured in VMware vCenter.
Resource Synchronization Action	An action that updates the resources in the resource pool by communicating with the associated resource provider. For example, you can use this action to update the Total Available To CSA field of each resource configured on the resource pool based on the actual capacity of each resource as configured on the associated resource provider. For more information, see "Resources for a resource pool" on the next page.
	Click Select and search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the <i>Cloud Service Automation Configuration Guide</i> for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action.
	The Last Synchronized field in the Overview tab of the resource pool indicates the last time (local client time) a resource synchronization action on a resource pool completed successfully.
Enabled	The availability is either Enabled or Disabled . When Disabled , the resource pool will not be available for allocation of resources for new subscriptions, but disabling a resource pool will have no effect on existing subscriptions.

Best practices

In the **Overview** tab of the resource pool property sheet, hover your cursor over the **Resource Synchronization Action** value to see the full path of the selected process definition in Operations Orchestration.

Resource Pool Tasks

You can perform the following tasks:

- Edit a resource pool Click the gear icon and select Edit. See the table in "Provider Resource Pools" on page 20 for the items you can edit.
- Delete a resource pool Click the gear icon and select Delete. A resource pool cannot be deleted unless the Current CSA Utilization for each resource configured on the pool is zero.
- Refresh a resource pool Click the gear icon and select Refresh.
- Synchronize a resource pool Click the gear icon and select Synchronize. This action automatically updates the Resources tab information with the latest information. The Synchronize action is available only when a Resource Synchronization Action is configured. Resource synchronization does not occur automatically and is performed only on demand. The default timeout for a resource synchronization action to complete is one hour. The timeout is not configurable.

Note: The **Last Synchronized** field in the **Overview** tab of the resource pool indicates the last time (local client time) a resource synchronization action on a resource pool completed successfully. Content in this screen does not automatically update. You must refresh this screen after the resource synchronization action completes.

Resources for a resource pool

You can associate the following types of resources with a resource pool. You can also set capacity for the resources listed in the following table:

Resource	Unit of Measurement
CPU	Number of CPUs
IPv4 Address	Number of IP version 4 addresses
IPv6 Address	Number of IP version 6 addresses
License	Number of license keys
Memory	Megabytes (MB) of memory
Physical Server	Number of physical servers
Power	Kilowatts (KW) of power
Storage	Gigabytes (GB) of disk storage
Subnet	Number of IPv4 or IPv6 subnets

Resource	Unit of Measurement
VLAN	Number of virtual LAN identifiers
Virtual Server	Number of virtual servers

Tasks

- View resources for a resource pool See the list of resources, as well as availability and capacity.
- Add a resource to a resource pool Click Add. Provide the information listed in the following table.
- Edit a resource Click the gear icon and select Edit. See the following table for the items you can edit.
- Delete a resource from a resource pool Click the gear icon for the resource andselect Delete. You cannot delete a resource that is currently in use by CSA—that is, a resource that has a Current CSA Utilization value other than zero (0).

Item	Description
Resource Type	Select a resource type to be included in this resource pool. Each resource type can be added to a resource pool one time; after a resource type is added to a pool, then it no longer appears in the drop-down list. Note that you cannot edit this value after the resource has been created.
Resource Availability	Select one of the following: Available - Resource is available for selection during provisioning of a service. Unavailable - Resource is not available for selection during provisioning of a service. Unlimited - Resource is available for use with no restrictions on the number of allocations of this resource.
Total Available to CSA	Type a whole number to indicate the maximum capacity of this resource as provided to CSA by the provider. You cannot set this value if Resource Availability is set to Unlimited .
Current CSA Utilization	Type a whole number to indicate the current CSA utilization of this resource. CSA automatically adjusts this value as allocations occur, but you can also set this value manually if desired. You cannot set this value higher than the value specified for Total Available to CSA.

Item	Description
	Note: If the Current CSA Utilization for a resource is not zero (0), you will not be able to delete this resource or its associated resource pool.
	Also, you cannot edit this value when a new resource is initially created; however, you can edit it for an existing resource.

Components (Per Provider Instance)

For information about resource providers, see "Providers" on page 15.

Note: Only topology components are shown in the **Components** tab. Sequenced components are not associated to providers or provider types.

Tasks

You can perform the following tasks in this area:

- View topology components associated with the selected provider instance See the list of topology components in the right pane.
- Launch the topology component management area of the Cloud Service Management
 Console Select a component or select Manage Components. You must have Service Designer role access to perform this task.

Components (Per Provider Type)

The components tab for a selected resource provider type shows all the topology components available for that provider type. When you import topology components, they are associated with, at most, a single provider type, and all provider instances of that type support the component.

Note: Provider components are applicable only to topology components and are not applicable to sequenced components.

Tasks

- View components associated with the selected provider type See the list of components in the right pane.
- Launch the topology component management area of the Cloud Service Management Console - Click a component or click the gear icon and select Manage Components. You must have Service Designer role access to perform this task.

Manage provider types

You can perform the following tasks in this area:

- Create a provider type Provide the information listed in the table below.
- Edit a provider type See the table below for the items you can edit.
- **Delete a provider type** A provider type cannot be deleted if any resource offerings or providers of that provider type exist. Out-of-the-box provider types also cannot be deleted.

Item	Description
Name	A name that is automatically generated, which may be needed when importing topology components.
Display Name	The display name you provide for the provider type.
Description	The description you provide for the provider type.
Image	The default image displayed for the provider type. To change the image, click Change Image select an image and upload it. Note: Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels. The images are stored in the %CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server.

Environments

Environments are optional and provide a mechanism for grouping providers. The most common grouping patterns include grouping by geographical location, organizational structure, or production readiness. For example, you may want to group providers geographically and create environments such as *East Coast* or *South America*. Or you may want to group providers by their production readiness and create environments such as *Production, Development*, and *Test*.

In addition, environments can be linked to a service catalogs to support distribution of resource provisioning.

Resource environments can be used to restrict the set of resource providers that can be chosen at subscription time. When provider selection occurs during service provisioning, only providers belonging to one or more of the environments associated with the service catalog will be eligible for selection. If no environments are associated with a service catalog, provider selection is not restricted based on environment membership.

Note: When you have resource environments associated with a catalog that contains service offerings that are created from topology designs, a subscriber option set is automatically created for the design and is called **<Provider_Type_Display_Name> Environment and Provider Selection**.

The new subscriber option set contains all environments associated with the catalog that contain enabled providers capable of provisioning the component types used in the design that are of the provider type specified in this option set. The option set also contains an option **Any Environment** that, if selected, indicates that providers in any environment may be selected.

All options except **Any Environment** contain a single **List** property (**Providers**) that includes the list of provider instances in the environment that are capable of provisioning the components used in the design that are of the provider type specified in this option set. The list also includes **Any Provider In This Environment**, which means that any provider in the selected environment can be selected.

Exposing provider selection to subscribers can be disabled if desired; for more information, see the "Cloud Service Management Console Properties" section in the *Cloud Service Automation Configuration Guide*.

Tasks

You can perform the following tasks in this area:

- View providers by environment In the drop-down box, select to view providers By
 Environment. Environments are listed in the left pane. The providers belonging to the selected
 environment are displayed in the right pane. Disabled providers are indicated by the Disabled label
 and will not be selected when provisioning new services.
- Manage environments- In the drop-down box, select By Environment. Click the gear icon and select Manage Resource Environments. For more information, see "Manage environments" below.
- Select providers to include in an environment In the drop-down box, select By Environment. Select the environment in which you want to include a provider. Click the gear icon and select
 Select. In the dialog box, add or remove resource providers to or from the environment. Tip: Use the drop-down box in the dialog to filter the resource provider list by provider type.

Note: Locked items cannot be deleted.

Manage environments

You can perform the following tasks in this area:

- Create a resource environment Provide the information listed in the table below.
- Edit a resource environment See the table below for the items you can edit.
- Delete a resource environment An environment can be deleted only if it is not associated with a service catalog. When an environment is deleted, its associations to providers are automatically removed.

Item	Description
Display Name	The display name you provide for the environment.
Description	The description you provide for the environment.
Image	An image that displays for the environment. Click Change Image . Choose the image you want, and click Select . Click Upload Image to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is

Use Environments

Item	Description
	256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss- as\standalone\deployments\csa.war\images\library folder of the CSA server.

Sequenced Designs

A sequenced service design is a blueprint for an orderable service. Each design includes service components created from component types or component templates that define what is automatically provisioned. You can use service designs to create a complex set of automated elements that support consistency and repeatability of common manual tasks. These service designs then become the basis for service offerings, which support IT Infrastructure Library (ITIL) and IT Service Management (ITSM) best practices.

A sequenced service design includes the following:

- A hierarchy of service components (see "Service components" on page 42). The hierarchy of service components, along with the **Processing Order** configured for each service component, defines the order of execution that occurs when the design is provisioned.
- Resource offerings, which can be added to service components to enable the added resource offerings to be provisioned along with the service components.
- Lifecycle actions, allow you to configure provisioning and de-provisioning actions for a service component. See "Lifecycle actions for service components" on page 100.
- Properties, allow you to configure user-defined properties for service components. See "Service Component Properties" on page 123
- Property mappings, allow you to configure the property of a component to obtain its value from the property of another component. See "Property mapping" on page 125.
- Subscriber Options, allow you to expose service design options in the Offerings area of the Cloud Service Management Console and the Marketplace Portal. See "Sequenced design subscriber options" on page 160.
- Upgradability relationships, allow you to add, configure, and remove upgradability relationships between service designs. See "Upgradability " on page 172.

To navigate to the sequenced design area

- 1. In the Cloud Service Management Console initial dashboard view, click the Design tile.
- 2. Click the **Sequenced** tile, which takes you to the landing page for sequenced designs, allowing access to the **Designer**, **Components**, and **Resource Offerings** tiles.

To design a sequenced service

Follow these high-level steps to design a sequenced service:

- 1. Based on the needs of your organization, create a plan for resource providers, components, lifecycle actions, and other design elements before you begin implementing your design.
- 2. Configure the resource providers and resource offerings to deploy the service. See "Providers" on page 15 and "Resource offerings for sequenced designs" on page 126.
- Create component types and templates (see "Create a Component Type" on page 57 and "Create component templates" on page 67) or use out-of-the-box component types and templates (see "Components (Sequenced Designs)" on page 42).
- 4. Create the service design. See "Add a service design" on page 34.
- 5. Use the **Designer** to create a hierarchy of service components. See "Sequenced Designer" on page 39 and "Create a service component" on page 94.
- 6. Associate resource offerings with service components. See "Associate resource offerings with service components" on page 112.
- Create lifecycle actions for service components. See "Lifecycle actions for service components" on page 100.
- 8. Create and map properties for service components. See "Service Component Properties" on page 123 and "Property mapping" on page 125.
- Create subscriber options for a service design. See "Sequenced design subscriber options" on page 160.
- Complete the service design (blueprint) and publish the design. This makes the service design eligible for selection as the basis of a service offering in the **Offerings** area. See "Add a service design" on page 34.

View all service designs and versions

This sequenced designs view displays a list of all service design tags, a list of all service designs, and up to five version numbers for each service design. View a list of service design tags in the left pane of the **All Designs** area. Click a tag to view the list of service designs and versions associated with the selected tag.

Use the following icons and features to navigate and perform tasks in the Design area:

Item	Description
Search box	Enter text to filter the results based on a keyword search of display name, description, and version.
٥	 Click the gear icon to select any of the following actions: Create Design — Add a new design. For more information about configuration options, see "Add a service design" on page 34.
	• Import Design — Import a service design. For more information, see "Import and export a service design" on page 35.
	Manage Design Tags — Manage tags. For more information, see "Manage tags" on page 176.
	• Refresh — Refresh the data in this view.
Design Name	Click the name of a design to navigate to the Overview tab for the design. For more information about configuration options, see "View service design and view service design version" below.
New	Click New to create a new version of a particular service design. For more information about configuration options, see the "Create New Version" task in "View service design and view service design version" below.
Version Number	View the names of the latest five versions of the design sorted by creation date. These version names are links to the Overview tab of the Service Design Version page. Click the version number of a design to display details about that version of the service design and see the layout of the design. If there are more than five versions, click the All link to open the Versions tab of the service design page, which displays a complete list of versions sorted by creation date. If there are no existing versions, only the New link displays in the Designs area. For more information about configuration options, see "View service design and view service design version" below. For more information about design versions, see "Design versions" on page 38.

For more information about sequenced designs, see "Sequenced Designs" on page 29.

View service design and view service design version

The service design page displays details about a single specific service design. The Overview tab provides a summary view of the design, and the Versions tab provides a summary view of the design versions.

The service design version page displays details about a single specific service design version. The Overview tab provides a preview of the design.

Tasks

- Edit a design version After saving a version, you can edit the version, description, and URL fields.
- Publish or unpublish a design Publish the currently displayed version of the design so it can be used to create a service offering. A published design cannot be modified. However, you can use Save As or Create New Version to create editable designs based on the published design. A published design is upgradable. You can unpublish the currently displayed version of the design so that service offerings cannot be created from it. If any service offerings have been created from the design or if the design is upgradable, it cannot be unpublished.
- Save as Creates a new initial starting version of a new design.
- Create a new version On the service design page, click the gear icon and select Create New Version to create a new version of the design. If Based on Version is set to a published design, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see "Design versions" on page 38.
- Export a version See "Import and export a service design" on page 35.
- **Delete a version** You cannot delete a version if it has an offering associated with it. Deleting a design in an upgrade path also deletes the upgrade path associated with the design.

Design tasks

- View design overview In the Overview tab of the service design page, you can see the display name, description, and tags for the design.
- View versions In the Versions tab of the service design page, you can view the design version, description, and creation date. You will also see labels for published and upgradeable designs.
- Create new version On the service design page, click the gear icon and select Create New Version to create a new version of the design. If Based on Version is set to a published design, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see "Design versions" on page 38.
- Edit a design Click the gear icon and select Edit to modify the display name, description, image, or tags of the design. For descriptions of the specific properties, see "Add a service design" on page 34.

Delete a design — Click the gear icon and select Delete to delete the design. A design can only be
deleted if no versions of it exist.

Design version tasks

The service design version page displays:

- Design Name and Version in the upper left.
- **Published** label in the upper right. If visible, the design is available for selection as the basis of a service offering in the **Offerings** area.
- **Upgradable** label in the upper right. If visible, the design is available for upgrade to the listed versions in the **Upgradable To** section of the Overview tab.

You can also see design version information in the following tabs:

- Designer tab see "Sequenced Designer" on page 39.
- Subscriber Options tab see "Sequenced design subscriber options" on page 160.
- Service Offerings tab this tab displays a list of service offerings associated with the service design. For more information, see Service Offerings.
- Upgradability tab see "Upgradability " on page 172.

View design version overview

In the **Overview** tab of the service design version page, the following information about the design version is displayed:

Item	Description
This design is part of an upgrade path and has restricted editability and actions.	This message appears when the design is part of an upgrade path. Certain functions are restricted on a design if it is part of an upgrade path. For more information, see "Upgradability " on page 172.
Display Name	Design name.
Description	Design description.
Preview	Image of the design hierarchy. Clicking on the image opens a larger image in a separate dialog. Any changes to the design made in the dialog

Item	Description
	are not saved and do not affect the design as it appears in the sequenced designer.
Version	Design version.
URL	An optional URL that can contain more information about this design.
Published	Indicates if the service design is published (Yes) or not published (No).
Upgradable From	A link to the version of a service design that this design is based on and that can be upgraded to the current design version.
Upgradable To	A link to the version(s) of a service design to which this design can be upgraded.

Add a service design

- 1. In the All Design area, click the gear icon and select Create Design.
- 2. Enter information described in the following table, and then click Create.

Item	Description
Display Name	The name provided for the design is shared by all versions of the design.
Description	The description you provide for the service design. Individual versions of a design can contain their own descriptions.
Initial Version	Provide the number or name for the initial version of the design.
Image	The default image displayed for the provider type. To change the image, click Change Image select an image and upload it. Note: Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels. The images are stored in the %CSA_HOME%\jboss- as\standalone\deployments\csa.war\images\library folder of the CSA server.
Tags	Click Select Tags to choose from a list of tags that you can define to provide a structure for organizing and grouping the service designs. For more information, see "Manage tags" on page 176. To remove a tag, click the trashcan icon.

3. Once the design has been added successfully, select the **Designer** tab to add service components to the design.

For more information, see "Service components" on page 42.

Edit service design properties

- 1. Select the design you want to edit.
- 2. Click the gear icon and select Edit.
- 3. In the Edit Design dialog, modify properties of the service design. For descriptions of the specific properties, see the topic "Add a service design" on the previous page.
- 4. Click Save.

Delete a service design

A service design cannot be deleted if any service offerings have been created from it. In addition, a service design cannot be deleted until all versions of the design have been deleted. If a service design is deleted and it is part of an upgrade path, then the upgrade path is also deleted.

To delete a service design

- 1. Select the design you want to delete.
- 2. Click the gear icon and select **Delete**.
- 3. Click **Yes** to confirm the deletion.

Import and export a service design

In this topic, artifacts refer to a service design and its associated resource offering(s).

You can import and export many of the artifacts that provide the basis for cloud automation. The export operation provides the ability to preserve the selected artifacts so they can be used to replicate the services on another system or to restore the artifacts. These exported archive files are preserved in an industry-standard zip archive file format.

Installing or replacing artifacts on the target system is supported by import and update operations. The import operation only adds artifacts, whereas the update operation replaces matching artifacts. See the *Tasks* section below for more information.

Process Information

- Custom component types If the service design you want to import has a dependency on any custom component types, these custom component types must be imported before the service design can be imported.
- Upgradability If the imported service design is in an upgrade path, all service designs
 upgradable to the service design represented by the content archive must be present on the target
 system.
- Subscriber options If a service design has active subscriber options associated with it, the subscriber options for the service design being imported must match those of the service design on the target system; otherwise, the import of the service design does not succeed.
- Update operation The update operation is destructive to existing data. You should understand
 the differences between the import operation, update operation, and update options to ensure you
 choose the operations and options that match your expectations. See the *Tasks* section below for
 more information.
- Flows During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, /Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

- Archive content The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file.
- Image files All images in the archive files must end in one of the following suffix values (for
information on adding additional suffix values, see the Cloud Service Automation Configuration Guide):

jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png

Back up your data — Create a backup of your system or data. Before proceeding, be sure to
create a backup of any artifacts you may be affecting by using the export operation to save an
archive zip file.

Note: When you import a design, any tags you have selected in the designs area do not affect the imported design. The imported design will contain the tags that were included when the design was exported, and new tags will be created on the system, as necessary, to match what was exported.

Note: If CSA has been configured to verify the authenticity of imported service design content archives (which is done by setting the property csa.security.enable), then service design content archives that were successfully imported into CSA 4.20 or earlier will no longer import properly until they have been digitally signed. See the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

Tasks

 Import option — Adds only new artifacts to the target system (the archived artifacts do no exist on the target system).

Note: The import operation identifies service designs by functional equivalence to determine if an identical service design exists on the target system. An archived service design is considered to be functionally equivalent to the service design on the target system if the archived service design has the same internal name as a service design on the target system. If the import operation identifies a functionally equivalent service design on the target system, the archived service design is not imported.

• Update option — Imports new artifacts and overwrites existing artifacts. New artifacts are created if they do not exist on the target system. Identical artifacts that exist on the target system are overwritten with changes from the archive.

There may be cases where an existing artifact on the target system cannot be updated. For example, if the existing artifact is a service offering or design and the service offering or design is published, the service offering or design will not be updated because a published service offering or design cannot be edited.

An existing service offering or design can be updated from a published offering or service design archive if the existing service offering or design is not published.

Preserve originals — Select this option to create a copy of the original artifact if the artifact exists on the target system. On import, a copy of the original artifact is created and then the original artifact is overwritten by the imported artifact. The version of the copy is appended with "Superseded on" and the date. The version of the artifacts being imported remain intact. If the artifact does not exist on the target system, a copy is not created.

- **Preview** Generate a report of prospective results for the import process, including information about the artifacts and their status.
- View Detailed Report From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.
- **Export** Create a content archive (.zip) file. The content archive contains XML documents for the artifacts you are exporting, as well as icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

The service designs are packaged in an archive file whose name is:

SERVICE_DESIGN_<service_design_display_name>_<service_design_id>.zip

For more information about importing and exporting artifacts, see the *Cloud Service Automation Content Archive Tool* document.

Design versions

Versioning duplicates an existing design and then allows you to configure and edit the new version. An initial version is automatically created when you create a new design, and you can create as many versions of the design as you wish. While a new version inherits the display name and icon from the original design, you provide a version number (or string), description, and URL that are unique to a particular service design version. Once a version is created, you can use the **Designer** to create a hierarchy of service components. See "Sequenced Designer" on the next page for more information.

Any one or all versions of a design can be published. A design cannot be edited after it is published.

Tasks

On the service design page, click the gear icon and select **Create New Version** to create a new version of the design. If Based on Version is set to a published design, the new design can be made

upgradable from the selected version.

Provide the information in the following table and click **Save**.

Item	Description
Based on Version	The version of the service design from which this new version is copied.
Version	Version of the new service design to be created.
Upgradable from <based on<br="">Version></based>	If the base version of the design (the version from which the new version is copied) has been published, select if this new design is upgradable from the base version. If the base version of the design has not been published, this property is not available.
Description	Description of the new version of the design.

Copy a service design

To copy a service design, you must select a specific service design version to copy. For more information about versions, see "Design versions" on the previous page.

- 1. Select the design version you want to copy.
- 2. Click the gear icon and select **Save As**.
- 3. In the Save As dialog, enter a new display name and version.
- 4. Click **Save**. The new service design is displayed.

All parts of a service design (such as the service component hierarchy, properties, and subscriber options) are copied. The copied service design appears in the **All** Design area. After you copy a service design, any changes you make to the original or to the copy will not affect the other.

Sequenced Designer

The Designer allows you to design your sequenced services by creating a hierarchy of service components. A service component is an element of a service design. A service component has a component type that constrains its allowed children and assignable resource offerings.

An example hierarchy of service components, as shown below, has a service composite that contains an infrastructure service, which contains a server group and a virtual network. Also, the server group contains a server (marked as a pattern), while the virtual network contains a policy enforcement point.



For more information, see "Sequenced Designs" on page 29.

To navigate to the sequenced designer

- 1. From the dashboard, click **Designs > Sequenced > Designer**.
- 2. Select a service design version. If no versions exist, click **New**. For more information about versions, see "Design versions" on page 38.
- Click the **Designer** tab. The design canvas opens with a list of palettes and list of components. You can add these components to the design canvas to create your design, as described in "Create a service component" on page 94.

Designer controls

Using zoom and reload/reset control options:

lcon		Description
€	Q	Click to zoom the display out or in.
ភំ		Click to reset the service components to their default positions.

Using service component control options:

lcon	Description
+	Click the orange dot on a service component on the canvas to display this toolbar.
	Use this toolbar to create a new child service component, edit, duplicate, or delete a component, or select a component template.
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Service design validation

Validation errors are indicated on the design canvas with an error icon (Δ) on the component and on the designer control toolbar. Validation warnings are indicated on the design canvas with a warning icon (Δ

) on the component and on the designer control toolbar. If a component has both warnings and errors, an error icon is displayed. Hover over the icon on the canvas to view details about the error or warning.

A service design with validation errors is not publishable.

A validation error indicates that your service design has one or more of the following problems:

- The service design has a component that does not have an established parent-child relationship to another component in the design.
- The service design has a pattern component that does not have a parent component.
- The service design has a pattern component whose parent component has a Clone Pattern action that does not have a value in the "Name of the Property for Service Component Count" property field or has a value that does not point to the name of a property on the component.

A validation warning indicates that your service design has one or more of the following problems:

- The service design has a pattern component whose parent component does not have the Clone Pattern action.
- The service design has one or more associated resource offerings that do not have enabled resource providers. If this service design problem is not corrected, the design cannot be successfully provisioned.

Service components

A service component is an element of a service design. A service component limits the type of child components and category of resource offerings (for more information, see "Create a Component Type" on page 57).

Components (Sequenced Designs)

Use this area of the Cloud Service Management Console to manage component palettes, component types, and component templates that will be used in sequenced service designs. A component (also known as a service component) represents one service design element required to realize a service subscription. It provides a framework to describe the actions and resource offerings required to realize, manage, and retire the service design.

Component Palettes

Component palettes are the grouping structure for component types (described below). Each palette contains a group of component types you can choose from when creating service components in a service design. CSA is installed with one palette (called **CSA**). This palette allows you to reuse the installed component types, and templates, or you can create your own component palettes, types and templates from the base set, (with some restrictions). When creating component types from other palettes, you must take care to prevent circular dependencies; however, conforming to suggested best practices can help you create palettes and component types to meet your organization's needs.

Component Types

A component type is a hierarchical classification of service components and is used in creating a service design. A component type contains rules that constrain how service designs can be constructed, helping a Service Designer to properly construct a service design. Component type constraints limit the types of service components that can be connected to components of this type within a service design. Resource category constraints limit the categories of resource offerings that can be bound to service components of this type.

CSA allows you to create your own component types and is installed with a number of component types, as listed in the following table.

Component Type	Description	Component Type Constraints	Resource Category Constraints
Application Layer	Represents a logical installation and configuration unit of an application.	No component type constraints	No resource category constraints
Delegated Topology in CSA	Delegates execution to an CSA topology-based design. Not available in CSA version 4.60 or later.	No component type constraints	No resource category constraints
Infrastructure Service	Contains a collection of infrastructure components that are needed in a service design.	Server Server Group Virtual Network	Application Compute Configuration Management Infrastructure

Out-of-the-Box Component Types

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
			Monitoring
			Network
			Storage
Load	Describes the membership of Servers in a pool that	No	Compute
Pool	Service.	type	Network
		constraints	Service Assurance
			Service Usage
Network Connection	Describes the relationship of a Server interface to a Virtual Network.	No component type constraints	Network
Platform	Represents a collection of infrastructure services	Delegated	Application
Service	that also provide middleware, databases, and other components required to host an application.	Topology (not available in	Compute
		CSA version 4.60 or later)	Configuration Management
		Infrastructure Service	Infrastructure
			Monitoring
			Network
			Storage
Policy Enforcement	Describes the implementation of access control policies for a Virtual Network	No component	Compliance
Point		type	Network
		constraints	Security
Server	A virtual or physical server that is provisioned by CSA. Provides specific provisioning attributes for	Application Laver	Application
	individual servers (can optionally be marked as	Network	Compliance
	Pattern when this service component is used in a service design).	Connection	Compute
		Software Component	Configuration Management
		Storage	Monitoring

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
		Volume	Network Service Usage Storage
Server Group	A container of identically configured Servers. Contains a single Server (marked as Pattern in a service design) that describes the shared characteristics of all Servers in the Server Group.	Load Balancing Pool Server (one Server, marked as Pattern) Software Component	Compute Configuration Management Infrastructure Monitoring Network Storage
Service Composite	Often used as the root service component for service designs.	Delegated Topology (not available in CSA version 4.60 or later) Infrastructure Service Platform Service Software Application Service	Application Compute Configuration Management Infrastructure Monitoring Service Usage Storage
Software Application Service	Represents a complex application architecture. Contains one or more Software Application Tier service components.	Software Application Tier	Application Compliance Configuration Management Monitoring
Software Application	Describes a type of software, or a collection of software, that is applied to all Servers within a	Server Group	Application

Component Type	Description	Component Type Constraints	Resource Category Constraints
Tier	Server Group.		Configuration Management Monitoring
Software Component	Describes software deployed on an individual server.	No component type constraints	Application Monitoring
Storage Volume	Describes a single accessible storage area with a single file system.	No component type constraints	Configuration Management Monitoring Service Usage Storage
Virtual Network	Models a network infrastructure to which a network connection can be associated.	Policy Enforcement Point	Network Service Usage

Out-of-the-Box Component Types, continued

CSA (CI Type based) Palette

CSA (CI Type based) palette is available for Sequenced Designs and the components in this palette are similar to the components available in the CSA palette. However, the component types in the CSA (CI Types based) palette is aligned with UCMDB's CI Type system, so that each new CSA component type is mapped to its corresponding CI Type in UCMDB, and the attributes of the corresponding CI Types are mapped to the attributes of the CSA component type.

An UCMDB provider should be configured if the new component types based on UCMDB's CI Type system needs to be created, or if the service topology provisioned by CSA should be created in UCMDB. If the UCMDB provider is configured and a service offering is subscribed or a service design is deployed in CSA, then the equivalent topology will be created in UCMDB.

For details on configuring UCMDB provider and integrating CSA with UCMDB, see the section Integrate CSA with UCMDB in the Configuration Guide.

The available CI Types in CSAfor the CSA (CI Type based) palette are listed in the below table:

Out-of-the-box CI Types

Component Type	Description	Component Constraints	Resource Category Constraints
Configuration Item ⊘	Root Component for all components derived from CI Type or equivalent.	None	None
Infrastructure Element ⊘	Contains infrastructure service components such as, individual servers or server groups that are required in a service design.	None	None
Node ⊘	Represents a general purpose machine and is a base component type from which other component types representing devices such as, Virtual Machines will be derived.	None	None
Server	Represents a general purpose machine which has an IP Address such as, Windows or Unix Servers.	Node Element Running Software	Application Compliance Compute Configuration Management IT Service Management Monitoring Service Usage Storage
CI Collection ⊘	Generic logical collection of components that are of type - Infrastructure Element or Running Software.	None	None
Infrastructure Service	It contains a collection of infrastructure service components, such as Server Groups, that are needed in a service design.	Server Server Group	Compute Configuration Management Infrastructure Monitoring

Out-of-the-box CI Types, continued

			Network
			Storage
Server Group	Represents a server group	Server	Compute
	servers.	Running Software	Configuration Management
			Infrastructure
			Monitoring
			Network Storage
Running Software ⊘	Represents the runtime aspects of a software that is running or is intended to be running on a server and is a base component type from which other component types representing various software will be derived.	None	Application Monitoring
Database ⊘	Represents a database management system.	None	None
Oracle	Represents an Oracle database server.	None	None
MS SQL Server	Represents an MS SQL Server database server.	None	None
PostgreSQL	Represents a PostgreSQL database server.	None	None
Vertica	Represents a Verica Instance.	None	None
MySQL	Represents a MySQL database server.	None	None
Application Server	Represents a server that hosts an API to expose business logic and business processes for use by third-party applications.	None	None
J2EE Server	Represents a J2EE application server.	None	None
JBoss AS	Represents a JBoss application server.	None	None

Out-of-the-box CI Types, continued

Weblogic AS	Represents a Weblogic application server.	None	None
Load Balancer Software	Represents a component type for all Load Balancer software.	None	None
F5 BIG-IP LTM	Represents a F5 BIG-IP Local Traffic Manager software.	None	None
Web Server ⊘	Represents a software that accepts http requests and delivers web pages as a response.	None	None
Apache Web Server	It represents an instance of Apache Web Server.	None	None
Apache Tomcat	Represents an instance of Apache Tomcat web server.	None	None
IIS Web Server	Represents an instance of IIS Web Server.	None	None
Application Resource ⊘	A base component type that is used to derive component types representing application resources.	None	None
WebService Resource ⊘	A base component type used to derive component types that represent web service resources.	None	None
Web Service	A component type that represents a web service.	None	None
Interface ⊘	A component type that describes a logical interface.	None	None

Notes:

- O This indicates that the CI Type Component is not visible to the end user in Designer and hence cannot used in Service Designs.
- All the CI Type Components are system critical.

Component Type and CI Type Properties

			Property
Component Type	Property Display Name	Description	Туре

Configuration Item	Name	Name is the key property, the value set for it should be unique so that each instance is uniquely identified.	String
	CI Instance ID	Configuration Item Instance ID	String
CI Collection	CI Collection ID	CI Collection ID	String
Node	Primary IP Address	Primary IP Address of the Server.	String
	NET BIOS Name	The Net Bios name is used by NetBios services running on a computer. The NetBios name of a computer is usually the same as the computer's host name.	String
	SNMP Sys Name	The name reported by a SNMP agent on a device. It is different from a DNS name.	String
Server	Disk Size	Storage capacity of the Disk in gigabytes (GB).	Integer
	Number of CPU Cores	Number of CPUs on the Server.	Integer
	Primary MAC Address	Represents the MAC address of the network.	String
	Power State	The power state of the server, either on or off.	Boolean
	Memory Size	The size of the server's memory in megabytes (MB).	Integer
	Type of OS Image	Type of Operating System installed (Windows, Linux or any other).	String
	Domain Name	Domain Name to which the server belongs.	String
	Host Name	Host name of the deployed server.	String
		Note: The host name is inherited from the property "Name" from the CI Type "Configuration Item".	
Server Group	Number of Servers	Number of servers in the server group.	Integer
	Minimum Server	Minimum Number of servers required in the server group.	Integer
	Maximum Servers	Maximum number of servers allowed	Integer

Component Type and CI Type Properties, continued

		in the server group.	
Running Software	Application Product Name	Name of the installed software product.	String
		Note: The Application Software Name is inherited from the property "Name" from the CI Type "Configuration Item".	
	Application Product Version	The version information of the software product.	String
	Application Product Vendor	Name of the product vendor.	String
	Application Protocol	The protocol used by the application, usually http or https.	String
	Application IP Address	The IP address to which the application is bound.	String
	Application Port	The port number to which the application is bound.	Integer
	Application User Name	The name of the user account used to access the application.	String
	Application Password	The password of the user account used to access the application.	String
Network Connection	Interface Name	Name assigned by a device to a network.	String
	IP Address	The IP address of the network connection.	String
	MAC Address	The entity's MAC address.	String
	Network Reference	Network Reference.	String
Storage Volume	Disk Size	Disk Size.	Integer
	Disk Type	Disk Type.	String
	RAID Type	RAID Type.	String
Web Service	Web Service Name	Name of the web service.	String
Database	Database Connect String	Database Connect String.	String
Oracle	Oracle Instance Number	The oracle instance number (relevant on RAC).	String

Component Type and CI Type Properties, continued

Application Server	Administration Domain	This attribute includes the name of an administration domain. An administration domain is formed by a group of managed systems that are administered similarly, either by the same user, group of users, or policy.	String
J2EE Server	J2EE Server Full Name	J2EE Server Full name that contains node name and server name.	String
IIS Web Server	Allow Keep Alive	Allow Keep-Alive Configuration of the web server Anonymous Password Sync Application Pool ID.	Boolean

Component Type and CI Type Properties, continued

- In addition to the above properties, all component types will also have properties inherited from its base parent component type.
- Service instances deployed from Service Management Console will be represented as Business Application in UCMDB. And service instances deployed from Marketplace Portalwill be represented as Cloud Subscription Service in UCMDB.
- For the Cloud Subscription Service CI to be visible in UCMDB tool, the UCMDB Content Pack should be imported to UCMDB from ITOM Marketplace. For details, refer to the section <u>Integrate</u> <u>CSA with UCMDB</u> in the <u>Configuration Guide</u>.

Component Templates

A component template is a specialized version of a component type and is used to simplify service design creation. Component templates include customized settings for properties, lifecycle actions, and resource offerings normally created in a service design.

View component palettes

For more information about components, see "Components (Sequenced Designs)" on page 42.

To view component palettes

In the left pane of the Sequenced Components area, view the available palettes. The list of component types contained in the selected palette displays in the right pane.

The details of icons and labels in the Sequenced Components area are given in below table:

Item	Description
	Indicates locked items, which cannot be edited or deleted. However, you can create component types and component templates from a locked component type.
Search Box	Enter search text to filter the results.
Derived	Indicates Component Type that is based on or derived from another Component Type.
СІ Туре	Indicates Component Type that is derived from CI Type or equivalent.

Create a component palette

For more information about components, see "Components (Sequenced Designs)" on page 42.

To create a component palette

- 1. Click the gear icon and select Manage Component Palettes.
- 2. Click the Create Component Palette icon.
- 3. Provide information as described in the table below and then click **Create**.
- 4. Click Done.

Field	Description
Name	A unique name for the component palette. No white space is permitted; all letters are changed to upper case for this value. This field cannot be modified after a component palette has been created.
Display Name	The name that displays, for the component palette.
Description	The description for the component palette.
Image	An image that displays for the component palette. Click Change Image . Choose the image you want, and click Select . Click Upload to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_ HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server.

Edit a component palette

You cannot edit a locked component palette, as designated by the Lock icon.

To edit a component palette

- 1. Click the gear icon and select Manage Component Palettes.
- 2. In the Component Palettes dialog, select a component you want to edit.
- 3. Click the Edit Component Palette icon.
- 4. Provide the desired information, and click **Save**. For information about the specific fields, see "Create a component palette" on the previous page.
- 5. Click **Save** and then click **Done**.

Delete a Component Palette

When you delete a palette, all of its component types (including all component properties, constraints, and templates) are deleted. The deletion can take a few minutes depending on the number of component types in the palette. Deletion of the component palette cannot be undone.

You cannot delete a component palette in the following cases:

- If the palette is locked, as designated by the Lock icon.
- If any component type contained in the palette is being used in a service design.
- If any other component palette depends on the palette. That is, if another palette contains a component type that is based on a component type from the palette.

To delete a component palette

- 1. Click the gear icon and select Manage Component Palettes.
- 2. In the Component Palettes dialog, select a component you want to delete.
- 1. Click the Delete Selected Component Palette icon.
- 2. Click Yes in the confirmation dialog.
- 3. Click Done.

Import and export a component palette

In this topic, artifacts refer to a component palette and its associated component types, templates, component type constraints, and resource offerings.

You can import and export many of the artifacts that provide the basis for cloud automation. The export operation provides the ability to preserve the selected artifacts so they can be used to replicate the services on another system or to restore the artifacts. These exported archive files are preserved in an industry-standard zip archive file format.

The import operation provides the ability to install and replace artifacts. See the *Tasks* section below for more information.

Process information

- **Resource offerings** If a component template in a component palette is associated with a resource offering, when the component palette is exported, resource offering XML files are included in the component palette archive. Therefore, when importing this archive, the resource offerings are also imported.
- Import operation The import operation is destructive to existing data (unlike the import operations for service designs and resource offerings for which there are options to only import new artifacts without overwriting existing ones). If an imported artifact exists on the target system, the existing artifact on the target system is overwritten. For example, if the imported component palette contains a resource offering that exists on the target system, the existing on the target system is overwritten by the resource offering from the archive.

Select the preview button to view prospective results for the import process.

- Import process integrity The import process for component palettes always ensures system integrity with respect to component type derivation and property propagation. For example, say you have modified properties of a component type in a palette called "Palette A," and there are component types in other palettes that are derived from this component type. When an update of "Palette A" occurs during import, changes that have been made to the component types are propagated to component types in other palettes.
- **Palette dependencies** Import multiple, dependent palettes in the order of their dependencies if these palettes exist on the target system.
- **Circular dependencies** Circular dependencies between palettes are not allowed. For example, Palette A cannot have components that are derived from Palette B while, at the same time, Palette B has components that are derived from Palette A.
- Flows During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was

exported.

During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, /Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

- Archive content The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file.
- Image files All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the Cloud Service Automation Configuration Guide):

jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png

• Back up your data — Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

Tasks

Import and export tasks are completed from the Manage Component Palettes dialog.

• **Import** - Imports new artifacts and overwrites existing artifacts. New artifacts are created if they do not exist on the target system. Identical artifacts that exist on the target system are overwritten with changes from the archive.

Note: The import operation identifies artifacts by name to determine if the artifact exists on the target system.

- **Preview** Generate a report of prospective results for the import process, including information about the artifacts and their status.
- View Detailed Report From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.
- **Export** Create a content archive (.zip) file. The content archive contains XML documents for the artifacts you are exporting, as well as icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

The component palettes are packaged in an archive file whose name is:

```
COMPONENT_PALETTE_<component_palette_display_name>_<component_palette_id>.zip
```

For more information about importing and exporting artifacts, see the *Cloud Service Automation Content Archive Tool* document.

View component Types

In the left pane of the Components area, select the palette that contains the component type you want to view. The list of component types contained in the selected palette displays in the right pane.

Item	Description
	Indicates locked items, which cannot be edited or deleted. However, you can create component types and component templates from a locked component type.
Search Box	Enter search text to filter the results.
Derived	Indicates Component Type that is based on or derived from another Component Type.
СІ Туре	Indicates Component Type that is derived from CI Type or equivalent.

The details of icons and labels in the Sequenced Components area are given in below table:

Create a Component Type

1. In the left pane of the Sequenced Components area, select the component palette in which you want to create a component type.

2. Click Create Component Type.

3. Provide the following information and then click Create.

Item	Description
Base Component Type	Select the component palette from which you want to select a base component type, and then select a base component type from which the new component type will inherit properties and constraints. Component types are not required to have a Base Component Type . The lists display only component palettes and component types that are compatible with (that is, they do not create circular dependencies with) the palette in which you are creating the component type. This field cannot be modified after a base component type has been selected.

Item	Description	
Name	A name for the component type. The component type name must be unique within a component palette. No white space is permitted; all letters are changed to upper case for this value. This field cannot be modified after a component type has been created.	
Display Name	The name that displays for the component type.	
Description	The description you provide for the component type.	
СІ Туре	The Name of the CI Type to which the created Component Type will be mapped. For example, if the Component created is Server, it will be mapped to CI Type Computer.	
	Note: This field is visible only if a CI Type Component is selected as the Base Component Type. Else, this field will be hidden and invisible to the designer.	
Image	An image that displays for the component type. Click Change Image . Choose the image you want, and click Select . Click Upload to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss-	
Default Settings	ult Select the following items as needed. These items specify the initial default values service components:	
	 Consumer Visible - Select this box to specify that, by default, the service component is visible in the Marketplace Portal. Deselect it to specify that the service component will not be visible. Properties that have been configured as consumer visible will only display in the Marketplace Portal if the associated service component itself is configured to be visible. The visibility of a service component does not affect visibility of its child service components, and it is not necessary for a parent of a service component to be visible for the child component to be visible in the Marketplace Portal. 	
	Note: The Consumer Visible check box will not be selected by default.	
	• Designer Visible - Select this box to specify that, by default, this component is visible in the Designer page while creating Sequenced Service Designs. Deselect to specify that the Component will not be visible in Designer page.	
	• Pattern - Select this box to mark the service component as a pattern by default. This indicates that the service component will not be automatically processed by the lifecycle engine. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. If the Clone Pattern action is not created in the parent service component, a validation error is displayed in the designer. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instances from this service component	

Item	Description
	 pattern. You can identify a service component that is marked as a pattern because its icon appears with a grid-like background, as shown below.

View Component Type Details

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose details you want to view.
- 2. Click the component type whose details you want to view.
- 3. In the **Overview** tab, review details of the component type. For more details, see the topic "Create a Component Type" on page 57.

Edit a component Type

You cannot edit a component type if it part of a locked palette or if the component type is locked as a system critical object. In these cases, the **Edit** button is disabled in the **Overview** tab.

To edit a Component Type

- 1. In the left pane of the Components area, select the component palette that contains the component type you want to edit.
- 2. Click the component type you want to edit.
- 3. In the Overview tab, click the gear icon and select Edit.
- 4. Edit the details of the component type. For descriptions of the specific fields, see the topic "Create a Component Type" on page 57.
- 5. Click Save.

The following fields are not editable:

- **Name** for all Components
- **CI Type** for a CI Type Component

Delete a component type

You cannot delete a component type in the following cases:

- If it is part of a locked palette or if the component type is locked as a system critical object. In these cases, the **Delete** link is disabled.
- If another component type is based on (derived from) the component type.
- If service components in service designs are based on this type.

To delete a component type

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type you want to delete.
- 2. Click the component type you want to delete.
- 3. Click the gear icon and select Delete.
- 4. Click **Yes** in the confirmation dialog.

View component type properties

Properties for component types provide a base set of attributes that can be used and edited when creating service components in a service design. The value defined for a component type property is the default value exposed in the service design unless the service design uses a template, in which case, the template's property value is set as the default value in the service design.

To view the properties of a component type

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose properties you want to view.
- 2. Click the component type whose properties you want to view.
- 3. Select the **Properties** tab.

For more information about property details, see "Create component type properties" on the next page.

Create component type properties

For more information about components, see "Components (Sequenced Designs)" on page 42. For more information about custom service components, see "Service Component Properties" on page 123.

Caution: When you create a property for a component type that has derived subtype components or existing component templates, the property is added to all associated subtypes and templates. Because service designs are considered a snapshot in time of the components, and to preserve the integrity of service designs that are provisioned, the propagation of component type properties does not affect service designs. You must manually update any service design that uses the component type, its subtypes, or its templates.

To create component type properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose properties you want to create.
- 2. Click the component type whose properties you want to create.
- 3. Select the **Properties** tab.
- 4. Click Create to open the Create Property dialog.
- 5. Select one of the following types:
 - Boolean A property whose value is true or false.
 - Integer A property whose value is a positive or negative whole number (or zero).
 - List A property whose value is a list of string values.
 - String A property whose value is a sequence of characters.

You cannot change the type once the property has been created.

Property types and values

Туре	Property information
All	Name — A unique name for the property.
	• Display Name — A unique name for the property.

Туре	Property information
	Description — A description of the property.
	 Consumer Visible — Select this option to indicate that this property will be made visible in the Marketplace Portal.
Boolean	• Property Value — Select either True or False.
Integer	 Resource Type and Unit for a Measurable Property — Select the resource type and unit, which are used to influence provider and pool selection and resource accounting. You must set this to a value other than None to make this property measurable and available for configuration on a resource offering. You can also specify the resource type and unit simply to clarify the intent of the property. Note that when creating a Source Binding for a service component, a best practice is that both the service component property you are creating and the service component property you are binding to will have the same Resource Type and Unit value. When you change this value for a component type that has derived subtype components or existing component templates, the changes you make apply to all associated subtypes and templates. Property Value — Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
List	Property Values
	 Click the Add Item icon to add a new list item, and provide the following information:
	Display Name- The label that will be displayed for the list item.
	• Value - The value of the list item. Values must be unique with a list.
	Description A description of the list item.
	Click Add to add the list item.
	• Click the Edit Item icon to edit a selected list item.
	 Click the Remove Item icon to remove a selected list item.
String	• Property Value — Type the value of the property. The value must be in string format. Click the gear icon to select a property value token. See "Select Tokens" on page 237 for a description of the tokens.

Edit component type properties

For inherited properties, you cannot edit the following fields:

Use Property types and values

- Type
- Name
- Display Name
- Description
- Confidential Data

To edit component type properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose properties you want to edit.
- 2. Click the component type whose properties you want to edit.
- 3. Select the **Properties** tab.
- 4. Click the gear icon for the property and select Edit.
- 5. In the Edit Component Type dialog, change properties of the component type. For descriptions of certain fields, see "Create component type properties" on page 61.
- 6. Click Save.

Delete component type properties

Caution: When you delete a property from a component type that has derived subtype components or existing component templates, the deletion applies to all associated subtypes and templates. Because service designs are considered a snapshot in time of the components, and to preserve the integrity of service designs that are provisioned, the propagation of component type properties does not affect service designs. You must manually update any service design that uses the component type, its subtypes, or its templates.

You cannot delete a component type property in the following cases:

- If the property is considered to be system critical.
- When property references exist to a component template property that is inherited from this component type property.

To delete component type properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose properties you want to delete.
- 2. Click the component type whose properties you want to delete.
- 3. Select the **Properties** tab.
- 4. In the Properties tab, click the gear icon for the property and select **Delete**.
- 5. Click **Yes** in the confirmation dialog.

View constraints of a component type

Service Designers can configure two kinds of constraints for a component type: component type constraints and resource category constraints. These constraints apply to service components within a service design that are created from this component type.

Component type constraints limit the types of service components that can be connected to components of this type within a service design. For example, a service component of type Server may be allowed connections only to components of types Application Layer, Network Connection, Software Component, and Storage Volume.

Resource category constraints limit the categories of resource offerings that can be bound to service components of this type. For example, a Server service component may be allowed only to resource offerings associated with service components that are assigned the categories Application, Compliance, Compute, Configuration Management, Monitoring, Network, Service Usage, and Storage.

A component type can establish constraints in the following ways:

- Defined constraints specified directly on component types.
- Inherited constraints inherited by component types from the hierarchy of types they are derived from. In the list of constraints, the path of inheritance is listed next to the name of each component type.

To view the constraints of a component type

1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose constraints you want to view.

- 2. Click the component type whose constraints you want to view.
- 3. Select the **Constraints** tab.
- 4. Select the type of constraint you want to view: Component Types or Resource Categories.
- 5. Review the list of constraints.

Add a constraint

For information about constraints, see "View constraints of a component type" on the previous page.

To add constraint

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type to which you want to add a constraint.
- 2. Click the component type to which you want to add a constraint.
- 3. Select the Constraints tab.
- 4. Select the type of constraint you want to add: Component Types or Resource Categories.
- 5. Click Add.
- 6. In the Add Constraint dialog, make your selection and then click Add.

Remove a constraint

For information about constraints, see "View constraints of a component type" on the previous page.

You cannot remove a constraint from a component type if the component type is locked. In addition, you cannot remove a constraint that is delivered by CSA; however, you can add constraints to the CSA delivered component types, and then you can remove constraints that you added.

To remove a constraint

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type from which you want to remove a constraint.
- 2. Click the component type from which you want to remove a constraint.
- 3. Select the **Constraints** tab.

- 4. Select the type of constraint you want to delete: Component Types or Resource Categories.
- 5. Click the gear icon for the constraint and select **Delete**.
- 6. Click Yes in the confirmation dialog.

View component templates

A component template is a specialized version of a component type and is used to simplify service design creation. Component templates include customized settings for the properties, lifecycle actions, and resource offerings that provide initial settings for the service design.

To view the templates that are based on a component type

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose templates you want to view.
- 2. Click the component type whose templates you want to view.
- 3. Select the **Templates** tab.
- 4. The Templates tab displays the list of templates created from the selected component type.

You can also see component template information in the following tabs:

- Overview tab See "View component template details" on page 69
- Properties tab —See "View component template properties" on page 69.
- Lifecycle tab See "Lifecycle Actions for Component Templates" on page 73
- Resource Offerings tab See "Associate resource offerings with service components" on page 112.

The details of icons and labels in the Sequenced Components area are given in below table:

Item	Description
	Indicates locked items, which cannot be edited or deleted. However, you can create component types and component templates from a locked component type.
Search Box	Enter search text to filter the results.
Derived	Indicates Component Type that is based on or derived from another Component Type.
СІ Туре	Indicates Component Type that is derived from CI Type or equivalent.

Create component templates

To create component templates

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type from which you want to create a template.
- 2. Click the component type on which you want to base the template.
- 3. Select the **Templates** tab and click **Create**.
- 4. In the Create Component Template dialog, enter the following information and click Create.

Item	Description
Base Component Type	The component type from which this template is created; this field cannot be edited.
Display Name	The name you that is displayed for the component template.
Description	The description you provide for the component template.
Image	An image that displays for the component type. Click Change Image , as desired. Choose the image you want, and click Select. Click Upload Image to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size.
Consumer Visible	Select this box to specify that the service component is visible in the Marketplace Portal. De-select it to specify that the service component will not be visible.
Pattern	Select this box to mark the service component as a pattern by default. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instance from this service component pattern.

Edit component templates

To edit component type templates

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template you want to edit.
- 2. Click the component type that contains the template you want to edit.
- 3. Select the **Templates** tab.
- 4. Click the template you want to edit.
- 5. Click the gear icon and select **Edit**.
- 6. In the Edit Component Template dialog, make your changes and click **Save**. For information about certain fields, see "Create component templates" on the previous page.

Copy component templates

To copy component type templates

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template you want to copy.
- 2. Click the component type that contains the template you want to copy.
- 3. Select the **Templates** tab.
- 4. Click the template you want to copy.
- 5. Click the gear icon and select **Save As**.
- 6. In the Copy Component Template dialog, make your changes and click **Save**. For information about certain fields, see "Create component templates" on the previous page.

Delete component templates

To delete component type templates

1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose templates you want to delete.

- 2. Click the component type whose templates you want to delete.
- 3. Select the **Templates** tab.
- 4. Select the template you want to delete
- 5. Click the gear icon and select **Delete**.
- 6. Click **Yes** in the confirmation dialog.

View component template details

To view the details of a component template

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template details you want to view.
- 2. Click the component type whose template details you want to view.
- 3. Select the **Templates** tab.
- 4. In the templates list, click the template whose details you want to view.
- 5. In the **Overview** tab, see the details of the component template. For descriptions of certain details, see "Create component templates" on page 67.

View component template properties

A component may have defined properties and inherited properties.

- **Defined Properties** Properties created directly on this component template. You can delete, edit, and update defined properties and their values. New component templates have no defined properties, unless the component type is locked. If the component type is locked, only the property value can be set in the template's properties.
- Inherited Properties Indicated by the Inherited label. Properties inherited from the base component type hierarchy. Identified in this list by the Inherited label. You can edit only the values of inherited properties.

A property may also have references, which are properties that have been mapped from a resource offering, lifecycle action, or user operation. The value of the mapped property on the referring component gets its value from this property. See "Property mapping" on page 125. To view references to a component template property, click **View References** in the properties column. See "View Component Template Property References" on page 72.

To view component template properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template properties you want to view.
- 2. Click the component type whose template properties you want to view.
- 3. Select the **Templates** tab.
- 4. In the template list, click the component template whose properties you want to view.
- 5. In the **Properties** tab, the list includes defined and inherited properties:
- 6. For more information about property details, see "Create Component Template Properties" below.

Create Component Template Properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template properties you want to create.
- 2. Click the component type whose template properties you want to create.
- 3. Select the **Templates** tab.
- 4. In the component templates list, click the component template whose properties you want to create.
- 5. Click Create.
- 6. In the Create Property dialog, select a type and enter values, and then click **Create**.

Property types and values

Туре	Property information
All	Name — A unique name for the property.
	• Display Name — A unique name for the property.
	Description — A description of the property.
	 Consumer Visible — Select this option to indicate that this property will be made visible in the Marketplace Portal.
Boolean	Property Value — Select either True or False.
Integer	Resource Type and Unit for a Measurable Property — Select the resource type

Туре	Property information
	and unit, which are used to influence provider and pool selection and resource accounting. You must set this to a value other than None to make this property measurable and available for configuration on a resource offering. You can also specify the resource type and unit simply to clarify the intent of the property. Note that when creating a Source Binding for a service component, a best practice is that both the service component property you are creating and the service component property you are binding to will have the same Resource Type and Unit value.
	• Property Value — Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
List	 Property Value Click the Add Value icon to add a new list item, and provide the following information: Display Name- The label that will be displayed for the list item.
	• Value - The value of the list item.
	Description A description of the list item.
	Click Create to add the list item.
	 Click the Edit icon to edit the selected list item.
	 Click the Remove icon to remove a selected list item.
String	• Property Value — Type a string of characters. Click the gear icon to select a property value token. See " Select Tokens" on page 237 for a description of the tokens.
	• Confidential Data — Select this box to mask the values so that they cannot be read in the Marketplace Portal; no encryption of the value is performed.

Edit component template properties

For inherited properties, you cannot edit the following fields:

- Туре
- Name
- Display Name
- Description
- Confidential Data

To edit component template properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template properties you want to edit.
- 2. Click the component type whose template properties you want to edit.
- 3. Select the **Templates** tab.
- 4. In the component templates list, click the component template whose properties you want to edit.
- 5. Click the gear icon for the property and select Edit.
- 6. In the Edit Properties dialog, make your changes to the component template properties. For descriptions of certain fields, see "Create Component Template Properties" on page 70.

Delete component template properties

You cannot delete a component template property in the following cases:

- If the property is locked, as designated by the Lock icon.
- If the property is inherited.

To delete component template properties

- 1. In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template properties you want to delete.
- 2. Click the component type whose template properties you want to delete.
- 3. Select the Templates tab.
- 4. In the templates list, click the template whose properties you want to delete.
- 5. Click the gear icon for the property and select **Delete**.
- 6. Click **Yes** in the confirmation dialog.

View Component Template Property References

To view the mappings for a component template property, go to the **Properties** tab for a component template, and then click **View References** for a property.
Reference Types

- Lifecycle Actions Go to the Lifecycle tab to view these references.
- Resource Offerings Measurable Properties Go to the Resource Offerings tab to view these references.
- Resource Offering Property Mappings Go to the Resource Offerings tab to view these references.
- Resource Offering Provider Selection Actions —Go to the Resource Offerings tab to view these references.
- User Operations Go to the User Operations tab to view these references.

See also, "Property mapping" on page 125.

Lifecycle Actions for Component Templates

What is a component template lifecycle?

A component template lifecycle is a collection of actions defined for a component template. The Lifecycle area allows you to specify the actions that are needed to provision, update, and deprovision component templates. Use the action selection wizard to add a lifecycle action to a component template from one of the available process engines.

Lifecycle actions

A lifecycle action is a function that is either run automatically at a specified lifecycle stage or phase, or that is exposed to the subscriber. Most lifecycle actions correspond to OO flows, which contain the logic for executing the function. CSA also includes actions that run internal to CSA. Many CSA internal actions relate to provider and pool selection and resource accounting. Actions include input parameters that provide configuration information to the function.

Lifecycle stages

A lifecycle stage represents a step within the CSA service lifecycle. There are three categories of lifecycle stages: Provisioning, Operational, and De-provisioning.

The Provisioning lifecycle stages are:

- **Initializing** Initializing is the first stage that is processed during provisioning. Use the Initializing stage for actions that perform any type of initialization that is required before proceeding to the Reserving stage, such as actions that perform input validation or create change request records.
- **Reserving** Reserving is the second stage that is processed during provisioning, after the Initializing stage. When a resource offering is associated to a service component, any configured provider selection and pool selection actions run during the Reserving stage. If resource accounting is enabled, actions to reserve resources from a pool run during the Reserving stage. In general, any resources needed during provisioning, such as storage or networking, can be reserved during the Reserving stage.
- Deploying— Deploying is the final stage that is processed during provisioning, after the Initializing and Reserving stages, and is the most common stage in which provisioning actions are defined. Define actions in the Initializing and Reserving stages to prepare the environment for provisioning. Define actions in the Deploying stage to perform actual provisioning. For example, you can define actions that deploy a VM or an application in the Deploying stage.

The Operational lifecycle stages are:

- **Modifying** The Modifying stage is processed when a subscription modification request is received from a subscriber and that modification results in a change to property values on a service component. Modifying actions run on any impacted service components and their associated resource offerings at this time. Define actions that are needed to process this change in property values in the Modifying stage.
- Upgrading— The Upgrading stage is processed when a request is received to upgrade a service instance to a newer version of a service offering and design. Define actions in the Upgrading stage for a service component or resource offering based on the manner in which the service component or resource offering will be used in a design in an upgrade path. For more information, see the online help.

If a service component will be added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the service component. If a service component will replace a service component that existed in the previous version of the design, the previously-existing service component will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new service component.

If a resource offering will be added to a service component that has been newly added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the resource offering. If a resource offering will be added to a service component that existed in the previous version of the design, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If a resource offering will replace a resource offering that existed in the previous version of the design, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

Note: A resource offering can also be associated to a service component that is replacing a service component that existed in the previous version of the design. If the resource offering did not exist in the service component that is being replaced, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If the resource offering existed in the service component that will be replaced, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

The De-provisioning lifecycle stages are:

- Un-deploying Un-deploying is the first stage that is processed during de-provisioning and is the most common stage in which de-provisioning actions are defined. Use the Un-deploying stage to undo or to finalize the actions that took place during the Deploying stage. For example, if actions in the Deploying stage deploy a VM, define actions in the Un-deploying stage to un-deploy the VM.
- Un-reserving Un-reserving is the second stage that is processed during de-provisioning, after the Un-deploying stage. Use the Un-reserving stage to undo or to finalize the actions that took place during the Reserving stage. For example, if resource accounting is enabled, actions to return resources to the pool run during the Un-reserving stage.
- **Un-initializing** Un-initializing is the final stage that is processed during de-provisioning, after the Un-deploying and Un-reserving stages. Use the Un-initializing stage to undo or to finalize the actions that took place during the Initializing stage. For example, if actions in the Initializing stage create a change request, define actions in the Un-initializing stage to finalize that change request.

Lifecycle phases

A lifecycle phase is a further refinement of a lifecycle stage. When defining a lifecycle action at a lifecycle stage, you can also specify the phase for the action. The phases are:

• **Before** — Actions configured in the Before phase on a service component run before all actions on child service components in a design and before all actions on any associated resource offerings. Actions configured in the Before phase on a resource offering run after all of the Before actions on

the associated service component have completed.

- During Actions configured in the During phase on a service component run after all of the
 actions have completed on child service components in a design but before any of the During
 actions run on any associated resource offerings. Actions configured in the During phase on a
 resource offering run after all of the During actions on the associated service component have
 completed.
- After Actions configured in the After phase on a service component run after all actions have completed on child service components and after all of the During actions have completed on the service component and any associated resource offerings. Actions configured in the After phase on a resource offering run after all of the After actions on the associated service component have completed.
- On Failure Actions configured in the On Failure phase on a service component or resource offering run after an action failure occurs in any of the Before, During, or After phases for that service component or resource offering. On Failure actions are not run if the Organization has been configured to Pause Subscriptions on Provisioning Errors.

Note: When deploying a Service Offering of CI Type Component, before a component enters into any of the lifecycle phase a **CI Instance ID** is assigned to each Component which is generated by the uCMDB provider. This **CI Instance ID** is used to identify the Service Component in CSA. Similarly, while canceling a Service Offering, the **CI Instance ID** is deleted from uCMDB after the component successfully completes the un-initialize phase.

Tasks

- Navigate to (the Lifecycle tab) In the left pane of the Sequenced Components area, select the palette associated with the component type of the component template you want to view. Select the component type and then select the Templates tab. Select the component template, and then select the Lifecycle tab.
- Add Action Click the Add Action or Add More Actions link in the stage and phase to which you
 want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard for
 Component Templates" on the next page.
- Edit Action Select the gear icon on the action you want to edit and select Edit. Update the information as described in "Lifecycle Action Selection Wizard for Component Templates" on the next page.
- **Delete Action** Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.

- Move Action Select the gear icon on the action or group of actions you want to move to another stage or phase and select Move. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click Move. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.
- Group Actions Click to select multiple actions in a lifecycle phase and then click Group Actions to create a parallel execution group. Actions in a parallel execution group are executed at the same time.
- Ungroup Actions Click the gear icon next to an action in a group and then select Remove from Group.
- View Lifecycle Stages The Deploying Provisioning stage, the Modifying Operational stage, the Un-deploying De-provisioning stage, and any stage that has an action, are displayed by default. Select a filter from the All Selected Stages pull-down menu to display only Provisioning Stages, Operational Stages, or De-provisioning stages. Click Select Stages to view additional stages.
- View Lifecycle Phases— The During and On Failure phases are displayed by default. Select Show All Phases to display the Before and After phases.

Lifecycle Action Selection Wizard for Component Templates

Use the action selection wizard to create or edit an action for the selected lifecycle phase.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Required parameters are indicated with an asterisk. If you don't define a value, then you will see a warning message that explains possible issues but you can still apply the change.

Tasks

• Select an action — Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. See "Lifecycle action internal actions" on page 80 for a list of internal actions. This task is only available when you create an action.

• **Configure an action** — You can configure the following properties for an action:

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error - If selected, provisioning or de-provisioning will stop if the action fails. By default, Fail on Error is not selected for actions created in the Undeploying, Un-reserving, and Un-initializing stages. Error on Timeout - If selected, provisioning or de-provisioning will stop if the time to execute the action exceeds the timeout value, configured below.
Timeout (seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out. Note that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

• **Configure parameters** — Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action.

Click **Auto-Configure** to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.

Click the gear icon next to a parameter and select **Delete Mapping** to delete a property mapping.

Click the gear icon next to a parameter and select **Auto-Select Property for Mapping** to automatically create a property mapping. If no matching property is found, it is created.

Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.

Select one of the following mapping types:

When either Prompt User or Prompt User List are selected, you can optionally select an **Input Validation** script. This script will be run to validate the user supplied value for this user operation parameter in the Marketplace Portal.

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- **Configure Parameters**: To configure the parameters that should be supplied when running the selected script, click **Configure Parameters**. For more information on Configure Parameters, see Configure Parameters for Input Validation.

When Prompt User List is selected, you can configure a Static Entry list or click **Switch to Dynamic Entry** to select a script. When a script is selected, it will determine the values that should be presented to a user for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Dynamic Entry** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Operations Orchestration Root Content Configuration

The Operations Orchestration content folders and actions that should be displayed in CSA are configurable. For information on how to configure these properties, see the <u>Operations Orchestration</u> <u>Root Content Configuration</u> section in the <u>Configuration Guide</u>.

See also "Lifecycle Action Selection Wizard for Sequenced Designs" on page 104 and "Lifecycle Action Selection Wizard" on page 148.

Lifecycle action internal actions

The following internal actions ship with CSA:

Internal action	Description	Applies to
Build Resource Provider and Pool	Builds a candidate list of resource providers and associated resource pools that meet the following requirements:	Resource Offering associated with a
	Support the resource offering.	
List	Have an Availability of Enabled.	Service
	 If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. 	Component
	• The provider's resource pool has sufficient resource capacity. To determine this, you must consider all measurable properties as configured in the Measurable Properties tab for the resource offerings, as well as the optional Multiplier Property Name field. The resource pool must have enough resource capacity to support all the properties, which requires that each necessary resource type (for example: CPU, Memory, and Storage), based on the measurable properties, be configured on the pool either with a Resource Availability of Unlimited or Available . If Available , the difference between Total Available To CSA and Current CSA Utilization must be sufficient to support the measurable property requirements.	
Build Resource Provider List	 Builds a candidate list of resource providers that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. 	Resource Offering associated with a Service Component
Clone Pattern	Clones a service component that is marked as a Pattern into one or more non-pattern service components. The number of service components created is determined by the value of the property specified in Name of the Property for Service Component Count .	Service Component
Decrease Resource Utilization	Decreases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component.	Resource Offering associated with a

Internal action	Description	Applies to
	Note: The Decrease Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Un-reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Service Component
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the csa.log file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering Resource Offering associated with a Service Component Service Component
Scale Component	Enables scale in and scale out of service components that are marked as Pattern components. Scale out adds child components to parent pattern components. Scale in removes components.	Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the Build Resource Provider List action. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected provider will, optionally, be written to a property on the associated service component if the Provider Property Name input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	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 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.	Resource Offering associated with a Service Component

Internal action	Description	Applies to
Select Resource Provider and Pool from Parent	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 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 Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Provider Property Name properties. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected resource provider will also be written to a Provider Property Name property on the associated service component.	Resource Offering associated with a Service Component

User operations for component templates

User operations are actions configured on resource offerings, component templates, or service components in a design that can be invoked by subscribers in the Marketplace Portal after a subscription has been provisioned. For example, a Restart Server user operation can be configured on a server service component or on an associated resource offering, allowing a subscriber to restart a particular provisioned server after the subscription has been provisioned. User operations can also be invoked on a service instance in the Operations area.

Tasks

- Navigate to (the User Operations tab) In the left pane of the Sequenced Components area, select the palette associated with the component type of the component template you want to view. Select the component type and then select the Templates tab. Select the template, and then select the User Operations tab.
- View a list of user operations for this component template.
- Add Action Click Add, and enter the information as described in "User Operation Action Selection Wizard" on the next page.
- Edit Action —Select the gear icon on the action you want to edit, and select Edit. Update the information as described in "User Operation Action Selection Wizard" on the next page.
- View User Operation —Click the User Operations tab to view all user operations associated with a component template.

• Delete User Operation — Click the gear icon next to the user operation you want to remove, and select Delete.

User Operation Action Selection Wizard

Use the action selection wizard to create or edit a user operation.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Tasks

• Select an action — Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action.

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error — During provisioning or de-provisioning, the Fail On Error setting indicates whether provisioning or de-provisioning should continue after an action has failed. For a user operation, the Fail on Error setting is irrelevant because there are no subsequent actions that would run after the user operation. Error on Timeout — If selected, the user operation will be considered to have failed if the time to execute the action exceeds the Timeout value (see below).
Timeout (seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out.

• **Configure Action** — Configure information about the action.

• Configure parameters — Configure the input parameters whose values are passed to the flow or

internal action prior to invoking the action.

Click **Auto-Configure** to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.

Click the gear icon next to a parameter and select **Delete Mapping** to delete a property mapping.

Click the gear icon next to a parameter and select **Auto-Select Property for Mapping** to automatically create a property mapping. If no matching property is found, it is created.

Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.

Select one of the following mapping types:

- **Not Mapped** The parameter is not mapped to a value, and no value will be provided for this parameter when the action is run.
- **Constant Value** Type a value for the parameter. Note that a subscriber will be unable to edit this value.
- **Property** Select a property.
- Not Mapped The parameter is not mapped to a value.
- **Constant Value** Type a value for the parameter.
- **Property** Select a property.
- **Prompt User** Allows the user to enter a value for the parameter when running the user operation. A default value for the parameter is required.
- **Prompt User List** Allows the user to select a value for a parameter by selecting from a list of items when running the user operation.

When either Prompt User or Prompt User List are selected, you can optionally select an **Input Validation** script. This script will be run to validate the user supplied value for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Input Validation** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.

When Prompt User List is selected, you can configure a Static Entry list or click **Switch to Dynamic Entry** to select a script. When a script is selected, it will determine the values that should be presented to a user for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Dynamic Entry** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Associate resource offerings with component templates

You can associate a resource offering with a component template. This association or link ensures that the resource offering will be provisioned when the Server service component is deployed.

Tasks

- Navigate to (the Resource Offerings tab) In the left pane of the Sequenced Components area, select the component palette that contains the component type whose template resource offerings you want to view. Click the component type. Select the Templates tab. From the templates list, click the component template whose resource offerings you want to view. Click the Resource Offerings tab to review the list of resource offerings.
- Add From the Resource Offerings tab, click the Add icon. In the Select Resource Offering dialog, select the Resource Category from the list, select Resource Offering from the list, and click Add.

A resource offering cannot be associated with a service component if the service component is part of a published design.

- Navigate to Resource Offering Click the gear icon next to the resource offering to which you want to navigate. Select Navigate to Resource Offering, which takes you to the resource offering.
- **Replace Resource Offering** Click the gear icon next to the resource offering you want to replace. Select **Replace Resource Offering**, and select the replacement resource offering. The displayed resource offerings are not bound to the service component and are of the same resource category and provider type as the resource offering being replaced.
- Delete Click the gear icon next to the resource offering you want to delete. Click Delete and click

Yes in the confirmation dialog.

A resource offering cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the resource offering existed in that prior version. Resource offerings that are newly added to the current version of the design can be deleted.

A resource offering cannot be deleted if the service component is part of a published design.

- Group Ctrl-Click to select multiple resource offerings, and click Group on the right panel to
 create a parallel processing group. You can also click and drag individual resource offerings to group
 them. Resource offerings in a parallel processing group are executed at the same time.
- **Ungroup** Click the gear icon next to a resource offering inside a group and select **Remove from Group**. You can also ungroup a resource offering by dragging it out of the parallel processing group.
 - To ungroup multiple resource offerings at one time, click and select multiple resource offerings and click **Ungroup** on the right panel.
- Set Processing Order The processing order of a resource offering specifies the order in which the associated resource offering will be provisioned relative to the other resource offerings added on this service component. The order in which you see the resource offerings are the order in which they will be provisioned. You can click and drag a resource offering or a group of resource offerings and move them around to set processing order.

Provider selection panel

For more information about associating resource offerings to service component templates, see "Associate resource offerings with component templates" on the previous page.

After adding a resource offering to a component template, you can create one or more provider selection actions for that resource offering. You can also choose not to specify provider selection actions, in which case a provider associated to the resource offering will be randomly selected, honoring any environment to catalog associations that may be configured. The provider selection actions execute during the **Before** phase of the **Reserving lifecycle** stage; the lifecycle stage cannot be changed.

CSA ships with internal actions to help with provider selection. For more information about these provider selection internal actions, see Provider Selection Internal Actions.

Tasks

- Navigate to or View (the Provider Selection panel) From the Sequenced Designs page, select a service design, and then select the design version. Click the Designer tab. Select the service component on which you want to add a provider selection action. In the right pane, click the gear icon, select Edit Component, and select the Resource Offerings tab. In the Resource Offerings tab, click the name of the resource offering, and then click Provider Selection from the panel on the right.
- Add (a provider selection action) Navigate to the Provider Selection panel and click Add. If no
 provider selection actions are configured, click the Add icon in the middle of the panel. Enter the
 information as described in the "Lifecycle Action Selection Wizard for Component Templates" on
 page 77.

A provider selection action cannot be created if the service component is part of a published design.

- Edit (a provider selection action) Navigate to the Provider Selection panel, click the gear icon next to the action you want to edit, and select Edit. Update the information as described in the "Lifecycle Action Selection Wizard for Component Templates" on page 77.
 The properties of an action cannot be edited if the service component is part of a published design.
- Delete (a provider selection action) Navigate to the Provider Selection panel, click the gear icon next to the action you want to delete, and select Delete.
- Set Processing Order The processing order of a provider selection action is relative to the other provider selection actions on this resource offering. The order in which you see the provider selection actions is the order in which they will be executed. You can click and drag a provider selection action to change its processing order.

Provider selection internal actions

For more information about provider selection actions, see "Provider selection panel" on page 86.

CSA ships with internal actions to help with provider selection.

- If you have *not* configured resource pools on a provider, then the two provider selection actions
 most likely to be configured on a resource offering are the **Build Resource Provider List** action
 and the **Select Resource Provider** action, which should run in that order. To select the provider
 already selected by the parent service component, use the **Select Resource Provider from**Parent action instead of the two previously mentioned actions.
- If you have configured resource pools on a provider, then the two provider selection actions most
 likely to be configured on a resource offering are the Build Resource Provider and Pool List
 action and the Select Resource Provider and Pool action, which should run in that order. To
 select the provider and pool already selected by the parent service component, use the Select
 Resource Provider and Pool from Parent action instead of the two previously mentioned
 actions.

For information about resource accounting actions for resource offerings, see "Select Tokens" on page 237.

Internal action	Description	Applies to
Build Resource Provider and Pool List	 Builds a candidate list of resource providers and associated resource pools that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this 	Resource Offering associated with a Service Component
	action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments.	
	• The provider's resource pool has sufficient resource capacity. To determine this, you must consider all measurable properties as configured in the Measurable Properties tab for the resource offerings, as well as the optional Multiplier Property Name field. The resource pool must have enough resource capacity to support all the properties, which requires that each necessary resource type (for	

See the following table for descriptions of the out-of-the-box internal actions that ship with CSA:

Internal action	Description	Applies to
	example: CPU, Memory, and Storage), based on the measurable properties, be configured on the pool either with a Resource Availability of Unlimited or Available . If Available , the difference between Total Available To CSA and Current CSA Utilization must be sufficient to support the measurable property requirements.	
Build Resource Provider List	 Builds a candidate list of resource providers that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. 	Resource Offering associated with a Service Component
Clone Pattern	Clones a service component that is marked as a Pattern into one or more non-pattern service components. The number of service components created is determined by the value of the property specified in Name of the Property for Service Component Count .	Service Component
Decrease Resource Utilization	 Decreases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Decrease Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Un-reserving when Resource Accounting is enabled for a resource offering associated with a service component. 	Resource Offering associated with a Service Component
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the csa.log file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering Resource Offering associated

Internal action	Description	Applies to
		with a Service Component
		Service Component
Scale Component	Enables scale in and scale out of service components that are marked as Pattern components. Scale out adds child components to parent pattern components. Scale in removes components.	Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the Build Resource Provider List action. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected provider will, optionally, be written to a property on the associated service component if the Provider Property Name input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	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 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.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	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 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 Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Provider Property Name properties. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected resource provider will also be written to a Provider Property Name property on the associated service component.	Resource Offering associated with a Service Component

Resource accounting

For more information about associating resource offerings to service components, see "Associate resource offerings with component templates" on page 85.

Resource accounting actions track the utilization of resources in a resource pool.

The following out-of-the-box accounting actions are added to the resource offerings when you enable resource accounting:

- Increase Resource Utilization This action is configured to run during the After phase of the Reserving lifecycle stage.
- Decrease Resource Utilization This action is configured to run during the After phase of the Un-reserving lifecycle stage.

Tasks

- Navigate to or View In the left pane of the All Designs area, select the tag associated with the design you want to view, and select the service design. In the Designer tab, select the service component whose resource accounting action properties you want to view. In the right pane, click the gear icon and select Edit Component. In the Resource Offerings tab, select the resource offering. The panel on the right will display information about Resource Accounting.
- Enable (Resource Accounting) Navigate to the Resource Offerings tab. Select the resource offering on which you want to enable resource accounting. Select the Enable Resource Accounting checkbox on the panel on the right. When you enable resource accounting, the two internal actions Increase Resource Utilization and Decrease Resource Utilization are automatically added to the resource offering.
- Disable (Resource Accounting) Navigate to the Resource Offerings tab. Select the resource offering on which you want to disable resource accounting. Deselect the Enable Resource Accounting checkbox on the panel on the right. When you disable resource accounting, the two internal actions Increase Resource Utilization and Decrease Resource Utilization are removed from the resource offering.

Resource accounting cannot be enabled/disabled if the service component is part of a published design.

Best practices

 Do not create resource accounting actions on group-level service components. For example, do not create a resource accounting action on a Server Group; instead, create it on a Server service component.

Measurable properties panel

For more information about associating resource offerings to service components, see "Associate resource offerings with component templates" on page 85.

A measurable property is an integer service component property that has a configured **Resource Type** and **Unit** (see "Service Component Properties" on page 123). When you configure measurable properties on a resource offering, you create references to the corresponding service component measurable properties. To view the value of a measurable property, see the corresponding service component property in the **Properties** tab.

Measurable properties are used by the following out-of-the-box actions to assist in provider and pool selection and in resource accounting:

- Build Resource Provider and Pool List
- Increase Resource Utilization
- Decrease Resource Utilization

If you configure any of these actions on a resource offering in the **Provider Selection** or enabled **Resource Accounting**, you must also configure the measurable properties for that resource offering in the **Measurable Properties** panel.

Tasks

- Navigate to or View (the Measurable Properties panel) In the left pane of the Sequenced Components area, select the tag associated with the component template. Select the component type and, in the Templates tab, select the service component template that contains the resource offering whose measurable properties you want to view. In the Resource Offerings tab, click the name of the resource offering whose measurable properties you want to view. Finally, select the Measurable Properties panel on the right.
- Add Navigate to the Measurable Properties panel and select the measurable properties you
 want to add. If the service component does not contain any measurable properties, the measurable
 properties panel will be empty.

A measurable property of a resource offering in a service component cannot be added if it is part of an upgraded or published design.

Delete — Navigate to the Measurable Properties panel and de-select the measurable properties you
want to remove.

A measurable property of a resource offering in a service component cannot be deleted if it is part of a published design or a design that is in an upgrade path, is upgradable from a previous version of the design, and the measurable property existed in that prior version.

Property mappings panel

Use the Property Mappings panel to view and configure mapping between resource offering properties and component properties. Property mappings enable property values to be passed between the component and the resource offering.

Tasks

- Navigate to or View (the Property Mappings panel) In the left pane of the Sequenced Components area, select the tag associated with the component template. Select the component type and, in the Templates tab, select the component template. In the Resource Offerings tab, click the name of the resource offering whose property mappings you want to view. Finally, select the Property Mappings panel on the right.
- **Auto-Configure** Automatically map each resource offering property to a best-match component property. If no best match is found, a new property is automatically created.
- Configure Property Mapping Click the gear icon next to a mapped resource offering property and then select Configure Mapping. Select one of the following options in the Configure Property Mapping dialog:
 - Not Mapped The resource offering property is not mapped to the property on the component.
 - **Auto-Configure** Automatically maps the resource offering property to a best-match component property. If no best match is found, a new property is created automatically.
 - Mapped to Component Property Select a component property from the list.
 - Click Save.
- Delete Mapping Click the gear icon next to a mapped resource offering property and then select Delete Mapping. Click Yes to confirm. Deleting the mapping does not delete the property on the component.

A property mapping between a resource offering and a service component cannot be deleted if it is part of a published design or a design that is in an upgrade path, is upgradable from a previous version of the design, and the property mapping existed in that prior version.

Create a service component

- 1. Complete the steps in "To navigate to the sequenced designer " on page 41 and select the **Designer** tab.
- 2. Use the list in the left pane to select a component palette. A component palette contains a group of component types from which you can choose when creating service components in a service design.
- 3. The component types available for this palette appear. Use the search box to filter the component type list by display name and description. Select a component type.
- 4. When you select a component type, the templates available for that component type appear.
 - A search box appears for component types with five or more templates. Use the search box to filter the component template list by display name and description.
 - A component template is a specialized version of a component type and is used to simplify service design creation. Component templates can include customized property values and lifecycle actions that provide initial settings for the service design. When a template is added to a design, any default properties, bindings, and lifecycle actions are automatically populated in that service component within the design. This list always includes a **Blank Template**, which uses the settings as configured for the selected component type.
- 5. Select the template of the component type you want, and add it to the design canvas on the right using any of the following methods. You can add parent or child components using these methods, and you can add as many components as you need for your design:
 - Drag and drop the template to the canvas.
 - Double click on a template to add it to the canvas.
 - Click the orange dot on a service component on the canvas to bring up the designer controls toolbar (see "Designer controls" on page 41). Click the Add icon + to add a parent or child service component.
- 6. To establish parent-child relationships between component types on the canvas, click the orange dot on a service component on the canvas, and draw a line to the parent or child component type. If a relationship is defined incorrectly, component type constraints will not allow you to create the relationship. If a component does not have an established parent-child relationship, a validation error is displayed and the design cannot be published.
- 7. Click the Automatic Layout icon 🎄 to organize and display your design in a graphical format.

For more information about component palettes, types, and constraints, see "Components (Sequenced Designs)" on page 42.

Edit a service component

Double-click a component, click the **Edit** icon *I*, or click the gear icon and select **Edit Component**.

The Edit Component dialog allows you to configure attributes such as Processing Order and Pattern, configure component properties, configure lifecycle actions, configure user operations, and configure resource offerings.

Use the functional area tabs to edit a service component:

- "Overview tab for service components" below
- "Edit Service Component Properties" on page 97
- "Lifecycle actions for service components" on page 100
- "User operations for service components" on page 109
- "Associate resource offerings with service components" on page 112

Overview tab for service components

The Edit Component Overview tab allows you to modify attributes of a service component, including its Display Name, Description, Processing Order, and Consumer Visible and Pattern settings. For more information about these properties, see "Edit a service component" above and "Create a Component Type" on page 57.

Tasks

• Edit - If a field is editable, enter data or select/clear a check box.

For a published design, you cannot edit the following attributes:

- **Display Name** The name you provide for the service component.
- **Description** The description you provide for the service component.
- Processing Order (default value is 1, minimum value is 1, maximum value is 99) Select a number to specify the deployment processing order for this service component relative to its sibling service components (that is, service components who share the same parent). Service

components are processed in ascending order during service deployment and in descending order during undeployment.

- Image An image appears for the component. Click Change Image, as desired. The Select Image dialog appears, allowing you to choose from a variety of available images or click Upload Image to add your own image.
- Consumer Visible (the default is false) Select Visible to specify that this service component is visible in the . De-select it to specify that the service component will not be visible. Service component properties and lifecycle actions that have been configured to be visible in the will only be displayed in the if the associated service component is itself configured to be visible. The visibility of a service component does not affect visibility of its child service components, and it is not necessary for a parent of a service component to be visible for the child component to be visible in the .
- Pattern (the default is false) —Select this box to mark the service component as a pattern. This indicates that the service component will not be automatically processed by the lifecycle engine. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instances from this service component pattern. A pattern component can have direct children, which are not patterns. When a pattern component contains a direct child component, the Clone Pattern action creates one or more instances of the pattern including the child component.
 - A validation error is displayed in the designer when a parent-child relationship is established between a pattern service component and its parent component if the Clone Pattern action is not created in the parent service component.
 - A validation warning is displayed when the service design has a pattern component whose parent component does not have the Clone Pattern action.
 - A validation error is displayed when the service design has a pattern component whose parent component has a Clone Pattern action that does not have a value in the "Name of the Property for Service Component Count" property field.
 - A validation error is displayed when the service design has a pattern component whose parent component has a Clone Pattern action that does not have a value in the "Name of the Property for Service Component Count" property field or has a value that does not point to the name of a property on the component.

• You can identify a service component that is marked as a pattern because its icon appears with a grid-like background, as shown below.



If a design that is in an upgrade path, is upgradable from a previous version of the design, and the component existed in that prior version, you cannot edit the following attributes:

- Processing Order
- Pattern
- Save Click Done to save any changes and exit the dialog.

Edit Service Component Properties

The following information is displayed:

Item	Description
Туре	Determines the kind of value that can be assigned to the property. The available types are: • Boolean • Integer • List
	String
	You cannot change the type once the property has been created.
Display Name	The label that will be displayed for the property. Hover the cursor over a display name to show the unique name (Name) and description (if supplied) of the property.
Value	 The value of the property. What is entered for the value depends on the property type: Boolean — A property whose value is true or false.
	• Integer — A property whose value is a positive or negative whole number (or zero). The Resource Type and Unit for a Measurable Property, if configured, is displayed in parentheses (see "Create component type properties" on page 61 for more information).
	List — A property whose value is a list of string values.
	• String — A property whose value is a sequence of characters.

Item	Description
	If the property has a property mapping, the value displayed is the component and property from which the value is mapped. Property mappings are configured from the design canvas. See "Property mapping" on page 125 for more information.
	If the property has a target binding, the value is mapped from a subscriber option at runtime (when a subscription has been created). Target bindings are configured from the Subscriber Options tab. See "Sequenced design subscriber options" on page 160 for more information.
	Note: If a property has a target binding, by default (until runtime) the value displayed is the value that was configured when the property was created.
	If the property is mapped to a token (String properties only), the value displayed is the name of the token (a token is a system value that is automatically resolved internally when the property is read). See "Select Tokens" on page 237 for a description of the tokens.
	If the property is configured as Confidential Data (String properties only), the value is masked (no encryption of the value is performed).
References	If a component has references, you can click View References to see the component properties to which this property is mapped and the subscriber option properties from which this property has a target binding. A component property that has a property mapping (its value is mapped <i>from</i> another property) is not considered a reference. See "View Component Property References" on the next page.
Attributes	The attributes configured for the property such as:
	Inherited — The property is inherited from a component type.
	Consumer Visible — The property will be made visible in the Marketplace Portal.
Actions	The gear icon, when selected, allowing you to edit or delete the property (if the action is permitted on the property). See the descriptions of these actions in the Tasks section below.

Tasks

- Navigate to (the Properties tab) Select a service design version. Click the **Designer** tab. Select the service component on which you want to complete the task. In the right pane, click the gear icon, select **Edit Component**, and select the **Properties** tab.
- Create a property Click Create. Enter the information described in the table above (see also "Create component type properties" on page 61) and click Create.

A service component property cannot be created if the service design is published.

Property mappings are configured from the design canvas. See "Property mapping" on page 125 for more information. Target bindings are configured from the **Subscriber Options** tab. See "Sequenced design subscriber options" on page 160 for more information.

• Edit a property— Click the gear icon next to the component property to be modified and select Edit.

A service component property cannot be edited if the service design is published.

The name of a property cannot be edited if the design is in an upgrade path, is upgradable from a previous version of the design, and the component existed in that prior version.

• Delete a property — Click the gear icon next to the component property to be deleted, and select Delete.

A service component property cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the component property existed in that prior version. Component properties that are newly added to the current version of the design can be deleted.

View Component Property References

To view all references to a service component property, select the component in the Sequenced Designer, click the gear icon to edit the service component, go to the **Properties** tab, locate the property in that list and then click **View References**.

Reference Types

- Lifecycle Actions Go to the Lifecycle tab to view these references.
- Resource Offerings Measurable Properties Go to the Resource Offerings tab to view these references.
- Resource Offering Property Mappings Go to the Resource Offerings tab to view these references.
- Resource Offering Provider Selection Actions Go to the Resource Offerings tab to view these references.
- Subscriber Options Go to the Subscriber Options tab to view these references.
- Service Components The path for the reference shows you which component has this reference. Select the component in the Designer to view its properties. The chain icon indicates a property that has been mapped.
- User Operations Go to the User Operations tab to view these references.

Lifecycle actions for service components

See also "Lifecycle actions for resource offerings" on page 144 or "Lifecycle Actions for Component Templates" on page 73.

What is a service component lifecycle?

A service component lifecycle is a collection of actions defined for a service component. The Lifecycle area allows you to specify the actions that are needed to provision, update, and deprovision service components. Use the action selection wizard to add a lifecycle action to a service component from one of the available process engines.

Lifecycle actions

A lifecycle action is a function that is either run automatically at a specified lifecycle stage or phase, or that is exposed to the subscriber. Most lifecycle actions correspond to OO flows, which contain the logic for executing the function. CSA also includes actions that run internal to CSA. Many CSA internal actions relate to provider and pool selection and resource accounting. Actions include input parameters that provide configuration information to the function.

Lifecycle stages

A lifecycle stage represents a step within the CSA service lifecycle. There are three categories of lifecycle stages: Provisioning, Operational, and De-provisioning.

The Provisioning lifecycle stages are:

- **Initializing** Initializing is the first stage that is processed during provisioning. Use the Initializing stage for actions that perform any type of initialization that is required before proceeding to the Reserving stage, such as actions that perform input validation or create change request records.
- **Reserving** Reserving is the second stage that is processed during provisioning, after the Initializing stage. When a resource offering is associated to a service component, any configured provider selection and pool selection actions run during the Reserving stage. If resource accounting is enabled, actions to reserve resources from a pool run during the Reserving stage. In general, any resources needed during provisioning, such as storage or networking, can be reserved during the Reserving stage.
- **Deploying** Deploying is the final stage that is processed during provisioning, after the Initializing and Reserving stages, and is the most common stage in which provisioning actions are defined. Define actions in the Initializing and Reserving stages to prepare the environment for provisioning.

Define actions in the Deploying stage to perform actual provisioning. For example, you can define actions that deploy a VM or an application in the Deploying stage.

The Operational lifecycle stages are:

- **Modifying** The Modifying stage is processed when a subscription modification request is received from a subscriber and that modification results in a change to property values on a service component. Modifying actions run on any impacted service components and their associated resource offerings at this time. Define actions that are needed to process this change in property values in the Modifying stage.
- **Upgrading** The Upgrading stage is processed when a request is received to upgrade a service instance to a newer version of a service offering and design. Define actions in the Upgrading stage for a service component or resource offering based on the manner in which the service component or resource offering will be used in a design in an upgrade path. For more information, see the online help.

If a service component will be added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the service component. If a service component will replace a service component that existed in the previous version of the design, the previously-existing service component will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new service component.

If a resource offering will be added to a service component that has been newly added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the resource offering. If a resource offering will be added to a service component that existed in the previous version of the design, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If a resource offering will replace a resource offering that existed in the previous version of the design, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

Note: A resource offering can also be associated to a service component that is replacing a service component that existed in the previous version of the design. If the resource offering did not exist in the service component that is being replaced, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If the resource offering resource offering existed in the service component that will be replaced, the previously-existing resource

offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

The De-provisioning lifecycle stages are:

- Un-deploying Un-deploying is the first stage that is processed during de-provisioning and is the most common stage in which de-provisioning actions are defined. Use the Un-deploying stage to undo or to finalize the actions that took place during the Deploying stage. For example, if actions in the Deploying stage deploy a VM, define actions in the Un-deploying stage to un-deploy the VM.
- Un-reserving Un-reserving is the second stage that is processed during de-provisioning, after the Un-deploying stage. Use the Un-reserving stage to undo or to finalize the actions that took place during the Reserving stage. For example, if resource accounting is enabled, actions to return resources to the pool run during the Un-reserving stage.
- **Un-initializing** Un-initializing is the final stage that is processed during de-provisioning, after the Un-deploying and Un-reserving stages. Use the Un-initializing stage to undo or to finalize the actions that took place during the Initializing stage. For example, if actions in the Initializing stage create a change request, define actions in the Un-initializing stage to finalize that change request.

Lifecycle phases

A lifecycle phase is a further refinement of a lifecycle stage. When defining a lifecycle action at a lifecycle stage, you can also specify the phase for the action. The phases are:

- Before Actions configured in the Before phase on a service component run before all actions on child service components in a design and before all actions on any associated resource offerings. Actions configured in the Before phase on a resource offering run after all of the Before actions on the associated service component have completed.
- During Actions configured in the During phase on a service component run after all of the
 actions have completed on child service components in a design but before any of the During
 actions run on any associated resource offerings. Actions configured in the During phase on a
 resource offering run after all of the During actions on the associated service component have
 completed.
- After Actions configured in the After phase on a service component run after all actions have completed on child service components and after all of the During actions have completed on the service component and any associated resource offerings. Actions configured in the After phase on a resource offering run after all of the After actions on the associated service component have completed.

• On Failure — Actions configured in the On Failure phase on a service component or resource offering run after an action failure occurs in any of the Before, During, or After phases for that service component or resource offering. On Failure actions are not run if the Organization has been configured to Pause Subscriptions on Provisioning Errors.

Tasks

Note: If a service design is published, its lifecycle actions are read-only and no new actions can be added.

- Navigate to (the Lifecycle tab) In the left pane of the All Design area, select the tag associated with the design you want to view. Select the service design and, in the Designer tab, select the service component on which you want to complete the task. In the right pane, click the gear icon, select Edit Component, and select the Lifecycle tab.
- Add Action Click the Add Action or Add More Actions link in the stage and phase to which you want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard for Sequenced Designs" on the next page.
- Edit Action Select the gear icon on the action you want to edit and select Edit. Update the information as described in "Lifecycle Action Selection Wizard for Sequenced Designs" on the next page.
- **Delete Action** Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.
- Move Action Select the gear icon on the action or group of actions you want to move to another stage or phase and select Move. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click Move. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.
- Group Actions Click to select multiple actions in a lifecycle phase and then click Group Actions to create a parallel execution group. Actions in a parallel execution group are executed at the same time.
- Ungroup Actions Click the gear icon next to an action in a group and then select Remove from Group.
- View Lifecycle Stages The Deploying Provisioning stage, the Modifying Operational stage, the Un-deploying De-provisioning stage, and any stage that has an action, are displayed by default.

Select a filter from the All Selected Stages pull-down menu to display only Provisioning Stages, Operational Stages, or De-provisioning stages. Click **Select Stages** to view additional stages.

• View Lifecycle Phases— The During and On Failure phases are displayed by default. Select Show All Phases to display the Before and After phases.

Lifecycle Action Selection Wizard for Sequenced Designs

Use the action selection wizard to create or edit an action for the selected lifecycle phase.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Required parameters are indicated with an asterisk. If you don't define a value, then you will see a warning message that explains possible issues but you can still apply the change.

Tasks

• Select an action — Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. See "Lifecycle action internal actions" on page 106 for a list of internal actions. This task is only available when you create an action.

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error - If selected, provisioning or de-provisioning will stop if the action

• Configure an action — You can configure the following properties for an action:

Item	Description
	fails. By default, Fail on Error is not selected for actions created in the Un- deploying, Un-reserving, and Un-initializing stages.
	• Error on Timeout - If selected, provisioning or de-provisioning will stop if the time to execute the action exceeds the timeout value, configured below.
Timeout (seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out. Note that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

• **Configure parameters** — Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action.

Click **Auto-Configure** to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.

Click the gear icon next to a parameter and select **Delete Mapping** to delete a property mapping.

Click the gear icon next to a parameter and select **Auto-Select Property for Mapping** to automatically create a property mapping. If no matching property is found, it is created.

Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.

Select one of the following mapping types:

When either Prompt User or Prompt User List are selected, you can optionally select an **Input Validation** script. This script will be run to validate the user supplied value for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Input Validation** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.

When Prompt User List is selected, you can configure a Static Entry list or click **Switch to Dynamic Entry** to select a script. When a script is selected, it will determine the values that should be presented to a user for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Dynamic Entry** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Operations Orchestration Root Content Configuration

The Operations Orchestration content folders and actions that should be displayed in CSA are configurable. For information on how to configure these properties, see the <u>Operations</u> <u>Orchestration Root Content Configuration</u> section in the <u>Configuration Guide</u>.

See also "Lifecycle Action Selection Wizard" on page 148 and "Lifecycle Action Selection Wizard for Component Templates" on page 77.

Lifecycle action internal actions

The following internal actions are available:

Internal action	Description	Applies to
Build Resource Provider and Pool List	 Builds a candidate list of resource providers and associated resource pools that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. The provider's resource pool has sufficient resource capacity. To 	Resource Offering associated with a Service Component

Internal action	Description	Applies to
	determine this, you must consider all measurable properties as configured in the Measurable Properties tab for the resource offerings, as well as the optional Multiplier Property Name field. The resource pool must have enough resource capacity to support all the properties, which requires that each necessary resource type (for example: CPU, Memory, and Storage), based on the measurable properties, be configured on the pool either with a Resource Availability of Unlimited or Available . If Available , the difference between Total Available To CSA and Current CSA Utilization must be sufficient to support the measurable property requirements.	
Build Resource Provider List	 Builds a candidate list of resource providers that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. 	Resource Offering associated with a Service Component
Clone Pattern	Clones a service component that is marked as a Pattern into one or more non-pattern service components. The number of service components created is determined by the value of the property specified in Name of the Property for Service Component Count .	Service Component
Decrease Resource Utilization	 Decreases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Decrease Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Un-reserving when Resource Accounting is enabled for a resource offering associated with a service component. 	Resource Offering associated with a Service Component
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component

Internal action	Description	Applies to
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the csa.log file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering
		Resource Offering associated with a Service Component
		Service Component
Scale Component	Enables scale in and scale out of service components that are marked as Pattern components. Scale out adds child components to parent pattern components. Scale in removes components.	Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the Build Resource Provider List action. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected provider will, optionally, be written to a property on the associated service component if the Provider Property Name input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	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 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.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	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 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 Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Provider Property Name properties. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected resource provider will also be written to a Provider Property Name property on the associated service component.	Resource Offering associated with a Service Component
User operations for service components

User operations are actions configured on resource offerings, component templates, or service components in a design that can be invoked by subscribers in the Marketplace Portal after a subscription has been provisioned. For example, a Restart Server user operation can be configured on a server service component or on an associated resource offering, allowing a subscriber to restart a particular provisioned server after the subscription has been provisioned. User operations can also be invoked on a service instance in the Operations area.

Tasks

Note: If a service design is published, its user operations are read-only.

- Navigate to (the User Operations tab) In the left pane of the All Design area, select the tag
 associated with the design you want to view. Select the service design and, in the Designer
 canvas, select the service component on which you want to complete the task. In the right pane,
 click the gear icon, select Edit Component, and select the User Operations tab. From here, you
 can:
- View a list of user operations for this service component.
- Add Action Click Add, and enter the information as described in "Action selection wizard" on page 153.
- Edit Action Click the gear icon on the action you want to edit and select Edit. Update the information as described in "Action selection wizard" on page 153.
- View User Operation Click the User Operations tab to view all user operations associated with a resource offering.
- Delete User Operation Click the gear icon next to the user operation you want to remove, and select Delete.

Action Selection wizard

Use the Action Selection wizard to create or edit a user operation.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Tasks

• Select an action — Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action.

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error — During provisioning or de-provisioning, the Fail On Error setting indicates whether provisioning or de-provisioning should continue after an action has failed. For a user operation, the Fail on Error setting is irrelevant because there are no subsequent actions that would run after the user operation. Error on Timeout — If selected, the user operation will be considered to have failed if the time to execute the action exceeds the Timeout value (see below).
Timeout (seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out.

• Configure Action — Configure information about the action.

• **Configure parameters** — Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action.

Click **Auto-Configure** to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.

Click the gear icon next to a parameter and select **Delete Mapping** to delete a property mapping.

Click the gear icon next to a parameter and select **Auto-Select Property for Mapping** to automatically create a property mapping. If no matching property is found, it is created.

Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.

Select one of the following mapping types:

- Not Mapped The parameter is not mapped to a value.
- **Constant Value** Type a value for the parameter.
- **Property** Select a property.
- **Prompt User** Allows the user to enter a value for the parameter when running the user operation. A default value for the parameter is required.
- Prompt User List Allows the user to select a value for a parameter by selecting from a list of items when running the user operation.

When either Prompt User or Prompt User List are selected, you can optionally select an **Input Validation** script. This script will be run to validate the user supplied value for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Input Validation** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.

When Prompt User List is selected, you can configure a Static Entry list or click **Switch to Dynamic Entry** to select a script. When a script is selected, it will determine the values that should be presented to a user for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Dynamic Entry** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Associate resource offerings with service components

You can associate a resource offering with a service component in a service design. For example, a resource offering for a VMware vCenter VM template can be linked to a Server service component. This association or link ensures that the resource offering will be provisioned when the Server service component is deployed.

You can also associate resource offerings with component templates.

Tasks

- Navigate to (the Resource Offerings tab) Select a service design version. Click the Designer tab. Select the service component to which you want to add, modify, or delete a resource offering. In the right pane, click the gear icon, select Edit Component, and select the Resource Offerings tab.
- Add Navigate to the Resource Offerings tab and click Add. If no resource offerings are
 associated, click the Add icon in the middle of the window. In the Select Resource Offering dialog
 box, select the Resource Category from the dropdown, select Resource Offering from the list,
 and click Add.

A resource offering cannot be associated with a service component if the service component is part of a published design.

• Delete — Click the gear icon next to the resource offering you want to delete. Click Delete and click Yes in the confirmation dialog.

A resource offering cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the resource offering existed in that prior version. Resource offerings that are newly added to the current version of the design can be deleted.

A resource offering cannot be deleted if the service component is part of a published design.

- Replace Resource Offering Click the gear icon next to the resource offering you want to
 replace. Select Replace Resource Offering, and select the replacement resource offering. The
 displayed resource offerings are not bound to the service component and are of the same resource
 category and provider type as the resource offering being replaced.
- Navigate to Resource Offering Click the gear icon next to the resource offering to which you want to navigate. Select Navigate to Resource Offering, which takes you to the resource offering.
- **Group** Ctrl-Click to select multiple resource offerings, and click **Group** on the right panel to create a parallel processing group. You can also click and drag individual resource offerings to group

them. Resource offerings in a parallel processing group are executed at the same time.

 Ungroup — Click the gear icon next to a resource offering inside a group and select Remove from Group. You can also ungroup a resource offering by dragging it out of the parallel processing group.

To ungroup multiple resource offerings at one time, click and select multiple resource offerings and click **Ungroup** on the right panel.

• Set Processing Order — The processing order of a resource offering specifies the order in which the associated resource offering will be provisioned relative to the other resource offerings added on this service component. The order in which you see the resource offerings are the order in which they will be provisioned. You can click and drag a resource offering or a group of resource offerings and move them around to set processing order.

Provider selection panel

After adding a resource offering to a component template, you can create one or more provider selection actions for that resource offering. You can also choose not to specify provider selection actions, in which case a provider associated to the resource offering will be randomly selected, honoring any environment to catalog associations that may be configured. The provider selection actions execute during the **Before** phase of the **Reserving lifecycle** stage; the lifecycle stage cannot be changed.

CSA ships with internal actions to help with provider selection. For more information about these provider selection internal actions, see "Provider selection internal actions" on page 115.

Tasks

- Navigate to or View (the Provider Selection panel) Select a service design version. Click the Designer tab. Select the service component on which you want to add a provider selection action. In the right pane, click the gear icon, select Edit Component, and select the Resource Offerings tab. In the Resource Offerings tab, click the name of the resource offering, and then click Provider Selection from the panel on the right.
- Add (a provider selection action) Navigate to the Provider Selection panel and click Add. If no
 provider selection actions are configured, click the Add icon in the middle of the panel. Enter the
 information as described in the "Lifecycle Action Selection Wizard for Sequenced Designs" on page
 104.

A provider selection action cannot be created if the service component is part of a published design.

Edit (a provider selection action) — Navigate to the Provider Selection panel, click the gear icon
next to the action you want to edit, and select Edit. Update the information as described in the
"Lifecycle Action Selection Wizard for Sequenced Designs" on page 104.

The properties of an action cannot be edited if the service component is part of a published design.

- Delete (a provider selection action) Navigate to the Provider Selection panel, click the gear icon next to the action you want to delete, and select Delete.
- Set Processing Order The processing order of a provider selection action is relative to the other provider selection actions on this resource offering. The order in which you see the provider selection actions is the order in which they will be executed. You can click and drag a provider selection action to change its processing order.

Provider selection internal actions

CSA ships with internal actions to help with provider selection.

- If you have *not* configured resource pools on a provider, then the two provider selection actions
 most likely to be configured on a resource offering are the **Build Resource Provider List** action
 and the **Select Resource Provider** action, which should run in that order. To select the provider
 already selected by the parent service component, use the **Select Resource Provider from**Parent action instead of the two previously mentioned actions.
- If you have configured resource pools on a provider, then the two provider selection actions most
 likely to be configured on a resource offering are the Build Resource Provider and Pool List
 action and the Select Resource Provider and Pool action, which should run in that order. To
 select the provider and pool already selected by the parent service component, use the Select
 Resource Provider and Pool from Parent action instead of the two previously mentioned
 actions.

For information about resource accounting actions for resource offerings, see "Select Tokens" on page 237.

Internal action	Description	Applies to
Build Resource Provider and Pool List	 Builds a candidate list of resource providers and associated resource pools that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. The provider's resource pool has sufficient resource capacity. To determine this, you must consider all measurable properties as configured in the Measurable Properties tab for the resource offerings, as well as the optional Multiplier Property Name field. The resource pool must have enough resource capacity to support all the properties, which requires that each necessary resource type (for example: CPU, Memory, and Storage), based on the measurable properties, be configured on the pool either with a Resource 	Resource Offering associated with a Service Component

See the following table for descriptions of the out-of-the-box internal actions that ship with CSA:

Internal action	Description	Applies to
	Availability of Unlimited or Available. If Available, the difference between Total Available To CSA and Current CSA Utilization must be sufficient to support the measurable property requirements.	
Build Resource Provider List	 Builds a candidate list of resource providers that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. 	Resource Offering associated with a Service Component
Clone Pattern	Clones a service component that is marked as a Pattern into one or more non-pattern service components. The number of service components created is determined by the value of the property specified in Name of the Property for Service Component Count .	Service Component
Decrease Resource Utilization	 Decreases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Decrease Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Un-reserving when Resource Accounting is enabled for a resource offering associated with a service component. 	Resource Offering associated with a Service Component
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the csa.log file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering Resource Offering associated with a Service

Internal action	Description	Applies to
		Component
		Service Component
Scale Component	Enables scale in and scale out of service components that are marked as Pattern components. Scale out adds child components to parent pattern components. Scale in removes components.	Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the Build Resource Provider List action. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected provider will, optionally, be written to a property on the associated service component if the Provider Property Name input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	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 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.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	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 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 Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Provider Property Name properties. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected resource provider will also be written to a Provider Property Name property on the associated service component.	Resource Offering associated with a Service Component

Resource accounting

Resource accounting actions track the utilization of resources in a resource pool.

The following out-of-the-box accounting actions are added to the resource offerings when you enable resource accounting:

- Increase Resource Utilization This action is configured to run during the After phase of the Reserving lifecycle stage.
- Decrease Resource Utilization This action is configured to run during the After phase of the Un-reserving lifecycle stage.

Tasks

- Navigate to or View In the left pane of the AII Designs area, select the tag associated with the design you want to view, and select the service design. In the Designer tab, select the service component whose resource accounting action properties you want to view. In the right pane, click the gear icon and select Edit Component. In the Resource Offerings tab, select the resource offering. The panel on the right will display information about Resource Accounting.
- Enable (Resource Accounting) Navigate to the Resource Offerings tab. Select the resource offering on which you want to enable resource accounting. Select the Enable Resource Accounting checkbox on the panel on the right. When you enable resource accounting, the two internal actions Increase Resource Utilization and Decrease Resource Utilization are automatically added to the resource offering.
- Disable (Resource Accounting) Navigate to the Resource Offerings tab. Select the resource offering on which you want to disable resource accounting. Deselect the Enable Resource Accounting checkbox on the panel on the right. When you disable resource accounting, the two internal actions Increase Resource Utilization and Decrease Resource Utilization are removed from the resource offering.

Resource accounting cannot be enabled/disabled if the service component is part of a published design.

Best practices

• Do not create resource accounting actions on group-level service components. For example, do not create a resource accounting action on a Server Group; instead, create it on a Server service component.

Measurable properties panel

A measurable property is an integer service component property that has a configured resource type and unit (see "Service Component Properties" on page 123). When you configure measurable properties on a resource offering, you create references to the corresponding service component measurable properties. To view the value of a measurable property, see the corresponding service component property in the Properties tab.

Measurable properties are used by the following out-of-the-box actions to assist in provider and pool selection and in resource accounting:

- Build Resource Provider and Pool List
- Increase Resource Utilization
- Decrease Resource Utilization

If you configure any of these actions on a resource offering in the **Provider Selection** or enabled **Resource Accounting**, you must also configure the measurable properties for that resource offering in the **Measurable Properties** panel.

Tasks

- Navigate to or View (the Measurable Properties panel) In the left pane of the All Design area, select the tag associated with the design you want to view. Select the service design and, in the Designer tab, select the service component that contains the resource offering whose measurable properties you want to view. In the right pane, click the gear icon and select Edit Component. In the Resource Offerings tab, click the name of the resource offering whose measurable properties you want to view. Finally, select the Measurable Properties panel on the right.
- Add a measurable property Navigate to the Measurable Properties panel and select the measurable properties you want to add. If the service component does not contain any measurable properties, the measurable properties panel will be empty.

A measurable property of a resource offering in a service component cannot be added if it is part of an upgraded or published design.

• Delete a measurable property — Navigate to the Measurable Properties panel and de-select the measurable properties you want to remove.

A measurable property of a resource offering in a service component cannot be deleted if it is part of a published design or a design that is in an upgrade path, is upgradable from a previous version of the design, and the measurable property existed in that prior version.

Property mappings

Property mappings enable property values to be passed between the component and the resource offering.

Tasks

- View property mapping In the left pane of the All Design area, select the tag associated with the design you want to view. Select the service design and, in the Designer tab, select the service component that contains the resource offering whose property mappings you want to view. In the right pane, click the gear icon and select Edit Component. In the Resource Offerings tab, click the name of the resource offering whose property mappings you want to view. Select the Property Mappings panel on the right.
- Automatically configure property mapping Automatically map each resource offering property to a best-match component property. If no best match is found, a new property is automatically created.
- **Configure property mapping** Click the gear icon next to a mapped resource offering property and then select **Configure Mapping**. Select one of the following options in the dialog:
 - **Not Mapped** The resource offering property is not mapped to the property on the component.
 - **Auto-Configure** Automatically maps the resource offering property to a best-match component property. If no best match is found, a new property is created automatically.
 - Mapped to Component Property Select a component property from the list.
- Delete a mapping Click the gear icon next to a mapped resource offering property and then select Delete Mapping. Click Yes to confirm. Deleting the mapping does not delete the property on the component template.

A property mapping between a resource offering and a service component template cannot be deleted if:

- it is part of a published design
- it is a design that is in an upgrade path (the design is upgradeable from a previous version of a design)
- if the property mapping existed in that prior version

Change the service component template

You can change the service component template after you add the component to the design. When you change the service component template, the component in the canvas is updated with the following settings from the new template:

- Resource offerings
- Lifecycle actions
- Properties and values
- Display name
- Description
- Image
- Pattern setting
- Consumer-visible setting

For more information about sequenced designs, see "Sequenced Designs" on page 29. For more information about component templates, see "Components (Sequenced Designs)" on page 42 and "Create a service component" on page 94.

To change the service component template

- 1. From the designer, select the service component to replace.
- 2. Click the Select Component Template ¹ icon.
- Select the service component template to replace the current service component. The replacement component will have the same internal name as the current component, allowing the replacement component to be used in an upgrade path (see "Service designs in an upgrade path" below).
- 4. Click Save.

Service designs in an upgrade path

When replacing a service component in a service design that is part of an upgrade path, the replacement service component template must meet the following criteria in order to replace the current

service component (if one or more of the following criteria are not met, the current service component will not be replaced):

- The *Processing Order* in the current service component must be the same in the replacement service component.
- If the component is a *pattern* in the current service component, it must remain as a pattern in the replacement service component. If the component is not a *pattern* in the current service component, it must remain as not a pattern in the replacement service component.
- All properties in the current service component must exist in the replacement service component.
- All *property names* in the current service component must be the same in the replacement service component.
- All *resource offerings* in the current service component must exist in the replacement service component.
- All *measurable properties* of all resource offerings in the current service component must exist in the replacement service component.

Duplicate a service component

Duplicating a service component creates a copy of the service component in the same design, including its properties, property mappings, resource offerings, and lifecycle actions. The new component also retains the icon image, pattern, execution order, and consumer visible field values of the original component. Any references to properties on the original component are not duplicated to the new clone component.

For information about creating components, see "Create a service component" on page 94.

To duplicate a service component

- 1. Click on the service component you want to duplicate to display the component icon menu.
- 2. Click the Duplicate Component icon
- 3. Enter a **Display Name** for the duplicate component and click **Save**.

Delete a service component

When you delete a service component, all of its subscriber option target bindings and component property mappings are also deleted.

A service component cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the component existed in that prior version. Components that are newly added to the current version of the design can be deleted.

To delete a service component

- 1. Select the service component you want to delete.
- 2. Click the trash can icon.
- 3. Click **Yes** to confirm the deletion.

Service Component Properties

For more advanced configuration of the properties on a component, including the ability to add or delete properties, use the Edit Component menu. For more information, see "Edit a service component" on page 95.

Properties for service components are user-defined properties that you may want to create in the following situations:

- When a service component receives its value from a subscriber option. For example, you may wish to receive the number of CPUs for a server after its value has been specified in the Marketplace Portal. To do this, create a property (for example, NCPU) on the server service component and create a subscriber option property (for example, NCPU). Finally, use a target binding, as described in "Sequenced design subscriber options" on page 160, to push the value from the subscriber option to the server NCPU property.
- When an action that runs on a service component or its associated resource offering expects a property value with a given name and value to exist on the service component. For example, an action may need to retrieve an IP address that is stored on a server service component.
- When you want to create a property mapping between components in a design, where the property of a component obtains its value from the property of another component in a design. For example, a software application tier service component may need to know the service component ID of a server group. You can create a property on the server group service component called SVC_ COMPONENT_ID, which has a token value of [TOKEN:SVC_COMPONENT_ID]. You would also create a property on the software application tier service component whose value contains a property mapping to the server group property (SVC_COMPONENT_ID). The property value is then pulled by the software application tier from that SVC_COMPONENT_ID property on the server group. This use of service component properties to pull a value from another service component property is called a

property mapping. Another type of relationship between properties is called a *target binding*. For more information about target bindings, see "Sequenced design subscriber options" on page 160.

• When you want to expose a property value in the Marketplace Portal. The property value can be explicitly defined on the service component, or may be set as the result of an action execution (for example, a HOSTNAME property might be set on a server service component as part of deploying the server).

Tasks

Service component properties are managed using the Properties panel and the Edit Component menu in the Designer tab.

- View Select the service component whose properties you want to view. The Properties pane opens on the right and displays the properties of the selected component. A property that is set as a measurable property is displayed with its unit in parenthesis. The component type and the palette to which the component belongs are displayed at the top of the Properties pane. Click the View References link under a property to view references to this property from other service component properties and subscriber option properties. See "View service component property references" on the next page.
- Edit Select the service component whose properties you want to edit. The **Properties** pane opens on the right and displays the properties of the selected component. You can edit the values of any property and click **Save** to persist the changes.
- Select Token Choose a token for string properties that are not mapped. Choose the Select Token option, and select from the list of available tokens. See "Select Tokens" on page 237 for a description of the tokens.
- Map properties Create a mapping between the properties of components in a design. For more information, see "Property mapping" on the next page
- Add, edit, or delete list items Add, edit, or delete list items for list properties. Use the Edit Component menu to add list properties.
- Configure advanced settings Add, edit, delete, or modify properties of a service component, configure lifecycle actions, and configure resource offerings. For more information, see "Edit a service component" on page 95.

View service component property references

To view references to a service component property, select the component in the Sequenced Designer and click **View References** in the properties panel on the right.

Note: From this view, you will only see references from other service component properties and subscriber option properties. If there are more references, they can be viewed by clicking the gear icon and editing the component. See "View Component Property References" on page 99.

Reference types

- Subscriber Options Go to the Subscriber Options tab view these references.
- Service Components Go to the Designer tab to view these references. The chain icon indicates a property that has been mapped.

Property mapping

You can create a property mapping between the properties of two components in a design when the property of one component should obtain its value from the property of another component.

Using property mapping, you can share a single property value between multiple components in a design without the need to duplicate the value of the property across those components. For example, if your design includes three components that represent servers, and you need each server to be provisioned with the same number of CPUs, you can define the number of CPUs on one component and then create a property mapping between the CPU properties of the other components and the component that stores that common value.

A property mapping can only be created between properties of the same type.

A property mapping cannot be created between two properties on the same component, or where the mapping creates a loop. For example, a property mapping where property A is mapped to obtain its value from property B, which is mapped to obtain its value from property A is not valid.

Tasks

• Create a property mapping — Select the service component to which you want to add a property mapping. In the component properties pane, click the gear icon next to the property you want to map

and then select **Map Property**. In the Select Mapping dialog, select a different component that has compatible properties to create the mapping. Select a compatible property of the selected component.

The flow of the property mapping is displayed at the bottom of the Select Mapping dialog.

- **Delete a mapping** Click the gear icon next to the mapped property you want to delete and then select **Delete Mapping**.
- View mapped properties Select the service component with the property mapping you want to view. Mapped properties are displayed with the chain icon in the properties pane on the right.
- Edit a mapping— In the properties pane, click the gear icon next to the property mapping you want to update and then select **Update Mapping**. The component with the property mapping is highlighted in the Select Mapping dialog. The properties of the mapped component are displayed in the right pane. The mapped property is displayed at the bottom of the Select Mapping dialog. Click a property on the right pane to create a mapping to a different property of the mapped component. You can also select a different component and its property to create a mapping in the Select Mapping dialog.

Delete a relationship between service components

A relationship between two service components cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the relationship between the components existed in that prior version.

A relationship between two components that is newly added to the current version of the design can be deleted.

To delete a relationship between service components

- 1. Click the relationship between two service components that you want to delete.
- 2. Click the trash can icon.
- 3. Click **Yes** to confirm the deletion.

Resource offerings for sequenced designs

Note: Resource offerings are only used with sequenced designs.

A resource offering links the capabilities of providers to the provisioning requirements of a service design. For example, you can create a resource offering that corresponds to a specific VMware vCenter VM template that can be cloned to create a VM.

A resource offering includes a user-specified set of lifecycle actions that is executed during the provisioning of the resource offering. A resource offering can also include actions that will be exposed to a subscriber in the Marketplace Portal.

A resource offering may include one or more user-created properties that can be used to pass or exchange information with Operations Orchestration during the provisioning of the resource offering.

Tasks

When you access **My Applications > Designs > Sequenced > Resources Offerings** to display the Resource Offerings landing page, you can refresh the page, and you can perform the following tasks from the gear icon:

- Create Resource Offerings
- Import Resource Offerings
- Manage Resource Category

Scenarios

The following scenarios describe a few of the ways you can use resource offerings:

- A resource offering can be used to configure a *specific* capability offered by a provider (or a group of providers of the same provider type). For example, you can create a resource offering named Red Hat 5.3 64-bit that corresponds to a specific VMware vCenter VM template named rhe153x64, which when provisioned results in a Red Hat 5.3 64-bit VM being created. Such a resource offering would likely contain a user-created property, such as VM_TEMPLATE_NAME, that specifies the precise VM template name associated with the resource offering (in this case, rhe153x64). In this use of resource offerings, you need to create a resource offering for every VM template you wish to use in a service design.
- A resource offering can be used to configure a *general* capability offered by a provider (or a group of providers). For example, you can create a resource offering named vCenter VM Template that can be used to provision any VMware vCenter VM template. Such a resource offering requires that you create service component properties in the associated service designs that specify the precise VM

template to be created. In this use of resource offerings, only a single resource offering is needed to expose VM template functionality to service designs.

A resource offering can be used for the primary purpose of selecting a provider. Most resource offerings include lifecycle actions that are used to provision the resource offering, but some resource offerings have no such lifecycle actions and exist primarily to force provider selection. Typically, you would use this style of resource offering to select a provider at a group level in a service design (for example, for a Server Group) that is shared by all child components (for example, by all Server child components).

In this approach, you create one resource offering for the Server Group (for example vCenter Server Group) and a separate resource offering for the Servers (for example, vCenter VM Template). When associating vCenter Server Group to a Server Group, specify the provider selection actions to execute. When associating vCenter VM Template to a Server, specify the **Select Resource Provider from Parent** or the **Select Resource Provider and Pool from Parent** action. In such an approach, the vCenter Server Group probably will not have lifecycle actions that are invoked automatically during provisioning; however, this resource offering may include actions to be exposed to a subscriber (for example, an action such as Restart All VMs).

A resource offering has a single provider type and a single category. For example, each of the resource offerings discussed above would have a provider type of VMware vCenter and a category of Compute.

A resource offering can be exported to a .zip file and imported to the same or different CSA installation. An exported resource offering includes all of its lifecycle actions and properties.

A resource offering can also be copied, which allows you to share a set of lifecycle actions and properties across a number of resource offerings.

Best Practices

From the Cloud Service Management Console dashboard, navigate to **Resource Offerings** by clicking **Design >Sequenced >Resource Offerings**.

Note: Don't confuse a resource offering with a service offering. A service offering is a service design that is made available to a service catalog after additional information (such as pricing) has been added.

Resource offering tabs

A resource-offering landing page has the following tabs:

- Overview tab Displays the resource offering's name and details, and allows you to edit, copy, export, or delete the resource offering.
- Providers tab Displays information about current providers associated with the resource offering. The tab also allows you to create a provider association, and to select the provider.
- Properties tab Displays information about the resource offering properties, and allows you to create, edit, and delete properties.
- Lifecycle tab Displays the resource offering lifecycles and allows you to chose or select a stage, and edit, delete, save as, or export a resource offering at a particular stage.
- User Operations tab Displays user operations associated with a resource offering, and allows you to add, edit, delete, copy, or export resource offerings associated with a user operation.
- Component Templates tab Allows you to view component templates associated with a resource offering, and edit, copy, delete, and export the resource offering associated with the template.
- Service Designs tab Allows you to view service designs associated with the resource offering, edit associated service design information, and create or delete service-design associations

Resource offerings overview tab

Tasks

- Edit a resource offering To edit the resource offering, in the resource offering's details page, click the gear icon and choose Edit. Edit the display name or description and click **Save**.
- **Delete a resource offering** To delete the resource offering, in the resource offering's details page, click the gear icon and choose **Delete**.

Caution: An offering cannot be deleted if it is used in a service design. When an offering is deleted, its associations to providers are automatically removed.

• Copy a resource offering (Save As) — To copy a resource offering, in the resource offering's details page, click the gear icon and choose **Save As**. Enter a display name and description and

click Save.

• Export a resource offering — To export a resource offering, in the resource offering's details page, click the gear icon and click Export. See Import and Export a Resource Offering.

Resource offerings providers

Providers are management platforms that offer centralized control over the infrastructure and resources that a cloud computing environment uses. One provider can deploy virtual machines, while another provider can monitor applications. A provider corresponds to the specific instance of an application, and integrates with the application help instantiate service designs.

A **provider type** allows you to classify providers for improved filtering and identification, and includes some predefined, out-of-the-box provider types.

Each instance of a resource offering can have a single provider type. In addition, resource offerings can be associated only with providers that share the same provider type.

After adding a resource offering to a service component, you must create one or more provider selection actions for that resource offering. Be sure to do this if you have configured a resource environment for a catalog in order to control which resource providers should be used when service offerings are ordered from a specific catalog. Otherwise, the default, random selection of a resource provider that occurs when provider selection actions are not called will ignore the resource environment association to a catalog. The provider selection actions execute during the Before phase of the Reserving lifecycle stage; the lifecycle stage cannot be changed.

CSA ships with internal actions to help with provider selection. For more information about these provider selection internal actions, see "Provider selection internal actions" on page 115.

Tasks

The resource offering **Provider tab** displays information about current providers associated with the resource offering, and is accessible from the resource offering's details page.

You can perform the following actions in the Provider tab gear icon:

- View details Click a provider name to view provider details.
- Delete Chose delete to delete the resource offering.
- Select Click Select Providers to display a list of available providers that you can associate to a
 resource offering.

Resource Offering Properties

From the Properties tab for a resource offering, you can perform the following tasks:

- Create a property Click Create. See property types and values below.
- Edit a property Click the gear icon next to a property and select Edit. You can edit a property's display name, description, and property value.
- View references to a property Click View References. See "View Resource Offering Property References" on page 139.
- Delete a property Click the gear icon next to a property and select Delete.

Property types and values

Туре	Property information
All	Name — A unique name for the property.
	Display Name — A unique name for the property.
	Description — A description of the property.
	Consumer Visible — Select this option to indicate that this property will be made visible in the Marketplace Portal.
Boolean	• Property Value — Select either True or False.
Integer	 Resource Type and Unit for a Measurable Property — Select this option if you want the property to be specified as a measurable unit.
	• Property Value — Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
List	 Use the icons - Add Item, Edit Item and Remove Item to add, edit and remove list items.
String	Property Value — Type a string of characters.
	• Confidential Data — Select this box to mask the values so that they cannot be read in the Marketplace Portal; no encryption of the value is performed.

Lifecycle actions for resource offerings

A resource offering lifecycle is a collection of actions defined for a resource offering. The Lifecycle area allows you to specify the actions that are needed to provision, update, and deprovision resource offerings. Use the action selection wizard to add a lifecycle action to a resource offering from one of the available process engines.

Lifecycle actions

A lifecycle action is a function that is either run automatically at a specified lifecycle stage or phase, or that is exposed to the subscriber. Most lifecycle actions correspond to OO flows, which contain the logic for executing the function. CSA also includes actions that run internal to CSA. Many CSA internal actions relate to provider and pool selection and resource accounting. Actions include input parameters that provide configuration information to the function.

Lifecycle stages

A lifecycle stage represents a step within the CSA service lifecycle. There are three categories of lifecycle stages: Provisioning, Operational, and De-provisioning.

The Provisioning lifecycle stages are:

- **Initializing** Initializing is the first stage that is processed during provisioning. Use the Initializing stage for actions that perform any type of initialization that is required before proceeding to the Reserving stage, such as actions that perform input validation or create change request records.
- **Reserving** Reserving is the second stage that is processed during provisioning, after the Initializing stage. When a resource offering is associated to a service component, any configured provider selection and pool selection actions run during the Reserving stage. If resource accounting is enabled, actions to reserve resources from a pool run during the Reserving stage. In general, any resources needed during provisioning, such as storage or networking, can be reserved during the Reserving stage.
- Deploying— Deploying is the final stage that is processed during provisioning, after the Initializing and Reserving stages, and is the most common stage in which provisioning actions are defined. Define actions in the Initializing and Reserving stages to prepare the environment for provisioning. Define actions in the Deploying stage to perform actual provisioning. For example, you can define actions that deploy a VM or an application in the Deploying stage.

The Operational lifecycle stages are:

- Modifying— The Modifying stage is processed when a subscription modification request is
 received from a subscriber and that modification results in a change to property values on a service
 component. Modifying actions run on any impacted service components and their associated
 resource offerings at this time. Define actions that are needed to process this change in property
 values in the Modifying stage.
- **Upgrading** The Upgrading stage is processed when a request is received to upgrade a service instance to a newer version of a service offering and design. Define actions in the Upgrading stage for a service component or resource offering based on the manner in which the service component or resource offering will be used in a design in an upgrade path. For more information, see the online help.

If a service component will be added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the service component. If a service component will replace a service component that existed in the previous version of the design, the previously-existing service component will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new service component.

If a resource offering will be added to a service component that has been newly added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the resource offering. If a resource offering will be added to a service component that existed in the previous version of the design, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If a resource offering will replace a resource offering that existed in the previous version of the design, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

Note: A resource offering can also be associated to a service component that is replacing a service component that existed in the previous version of the design. If the resource offering did not exist in the service component that is being replaced, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If the resource offering existed in the service component that will be replaced, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

The De-provisioning lifecycle stages are:

- Un-deploying Un-deploying is the first stage that is processed during de-provisioning and is the most common stage in which de-provisioning actions are defined. Use the Un-deploying stage to undo or to finalize the actions that took place during the Deploying stage. For example, if actions in the Deploying stage deploy a VM, define actions in the Un-deploying stage to un-deploy the VM.
- Un-reserving Un-reserving is the second stage that is processed during de-provisioning, after the Un-deploying stage. Use the Un-reserving stage to undo or to finalize the actions that took place during the Reserving stage. For example, if resource accounting is enabled, actions to return resources to the pool run during the Un-reserving stage.
- **Un-initializing** Un-initializing is the final stage that is processed during de-provisioning, after the Un-deploying and Un-reserving stages. Use the Un-initializing stage to undo or to finalize the actions that took place during the Initializing stage. For example, if actions in the Initializing stage create a change request, define actions in the Un-initializing stage to finalize that change request.

Lifecycle phases

A lifecycle phase is a further refinement of a lifecycle stage. When defining a lifecycle action at a lifecycle stage, you can also specify the phase for the action. The phases are:

- Before Actions configured in the Before phase on a service component run before all actions on child service components in a design and before all actions on any associated resource offerings. Actions configured in the Before phase on a resource offering run after all of the Before actions on the associated service component have completed.
- During Actions configured in the During phase on a service component run after all of the
 actions have completed on child service components in a design but before any of the During
 actions run on any associated resource offerings. Actions configured in the During phase on a
 resource offering run after all of the During actions on the associated service component have
 completed.
- After Actions configured in the After phase on a service component run after all actions have completed on child service components and after all of the During actions have completed on the service component and any associated resource offerings. Actions configured in the After phase on a resource offering run after all of the After actions on the associated service component have completed.
- On Failure Actions configured in the On Failure phase on a service component or resource offering run after an action failure occurs in any of the Before, During, or After phases for that service component or resource offering. On Failure actions are not run if the Organization has been configured to Pause Subscriptions on Provisioning Errors.

Tasks

- Navigate to (the Lifecycle tab) In the left pane of the Resource Offerings area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the Lifecycle tab.
- Add Action Click the Add Action or Add More Actions link in the stage and phase to which you want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard" on page 148.
- Edit Action Click the gear icon on the action you want to edit and select Edit. Update the information as described in "Lifecycle Action Selection Wizard" on page 148.
- **Delete Action** Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.
- Move Action Select the gear icon on the action or group of actions you want to move to another stage or phase and select Move. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click Move. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.
- Group Actions Click to select multiple actions in a lifecycle phase and then click Group Actions to create a parallel execution group. Actions in a parallel execution group are executed at the same time.
- Ungroup Actions Click the gear icon next to an action in a group and then select Remove from Group.
- View Lifecycle Stages The Deploying Provisioning stage, the Modifying Operational stage, the Un-deploying De-provisioning stage, and any stage that has an action, are displayed by default. Select a filter from the All Selected Stages pull-down menu to display only Provisioning Stages, Operational Stages, or De-provisioning stages. Click Select Stages to view additional stages.
- View Lifecycle Phases— The During and On Failure phases are displayed by default. Select Show All Phases to display the Before and After phases.

User operations for resource offerings

User operations are actions configured on resource offerings, component templates, or service components in a design that can be invoked by subscribers in the Marketplace Portal after a

subscription has been provisioned. For example, a Restart Server user operation can be configured on a server service component or on an associated resource offering, allowing a subscriber to restart a particular provisioned server after the subscription has been provisioned. User operations can also be invoked on a service instance in the Operations area.

Tasks

- Navigate to (the User Operations tab) In the left pane of the Resource Offerings area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the User Operations tab.
- Add Action Click Add, and enter the information as described in "Action selection wizard" on page 153.
- Edit Action Click the gear icon on the action you want to edit and select Edit. Update the information as described in "Action selection wizard" on page 153.
- View User Operation Click the User Operations tab to view all user operations associated with a resource offering.
- Delete User Operation Click the gear icon next to the user operation you want to remove, and select Delete.

Resource offerings - component template tab

Components are elements of service design, sequenced or topological. A component template is a specialized version of a component type and is used to simplify service-design creation. Component templates include customized settings for properties, lifecycle actions, and resource offerings normally created in a service design.

Sequenced components are not associated with providers or provider types. From the Components tab, you can view the topological components associated with a specific provider instance and manage the topological components.

Note: Provider components are applicable only to topology components and are not applicable to sequenced components.

Tasks

The **Component Templates tab**, in the resource-offering's details page, allows you to perform several tasks:

- View list View a list of component templates associated with a resource offering.
- Select a component template Click a component-template name to select it and display its details page.

See View Component Templates to add, edit, copy, or delete a component template.

Resource offerings Service Designs tab

To provide on-demand, automated service delivery, you create, configure, and modify service designs. A service design is a template (or blueprint) for an orderable service. Service designs include a hierarchy of service components, resource bindings, subscriber options, lifecycle actions, and custom properties, as defined by the Service Designer. Service components and their relationships in a service design define the framework for creating the service.

Service designs also provide a structure for options that consumers can select when ordering a service. You can re-use designs for multiple service offerings, with each service offering customized to meet the needs of different consumer organizations and groups. You can also leverage service designs shipped with CSA as well as exporting and importing designs between CSA systems.

Tasks

The **Service Design tab**, in the resource-offering's details page, allows you to perform several tasks:

- View list View a list of service designs that use the resource offering.
- Select a service design Click a service-design name to select it and to display its details page in My Applications > Designs > Sequenced > Designer > Sequence Designs.

See View Service Design and View Service Design Version to add, edit, copy, or delete a service design.

View Resource Offerings

You can view Resource Offerings from the Resource Offerings page by selecting either **Provider Type** or **Category**.

Note: The default options selected are - **Provider Type** and **All Resource Offerings**. So, the system displays all Resource Offerings sorted by Provider Type by default.

• **Provider Type** - When Provider Type is selected, all Providers in the system will be displayed in the left panel.

Select a Provider Type and all Resource Offerings for the selected Provider Type will be displayed.

• **Category** - When Category is selected, all categories in the system will be displayed in the left panel.

Select a Category and all Resource Offerings for the selected category will be displayed.

To view the details of a specific Resource Offering, click on the Resource Offering.

For descriptions of the specific properties, see "Create a resource offering" below.

Tip: You can easily identity if a Resource Offering is referenced with any design from the Resource Offerings page. A banner below the tabs displays the number of designs the Resource Offering is being used.

Create a resource offering

To create a resource offering, in the resource offerings summary page, click the gear icon and choose **Create Resource Offering**. Enter the following information:

Item	Description
Display Name	The name you provide for the offering.
Description	The description you provide for the offering.
Provider Type	The provider type for this offering. This field cannot be changed after an offering is created.
Resource Category	The resource category for this offering. For more information, see "Resource offering categories" on page 158. This field cannot be changed after an offering is created.
Image	The image of the provider type selected. This field cannot be changed.

Click Create.

View Resource Offering Property References

To view reference to a resource offering property, go to the **Properties** tab for a resource offering, and then click **View References** for the property.

Reference Types

- Service Designs Click the design link to view the design containing these references.
- Component Templates Click the template link to view the template containing these references.
- Lifecycle Actions Go to the Lifecycle tab to view these references.
- User Operations Go to the User Operations tab to view these references.

Import and export a resource offering

In this topic, an artifact refers to a resource offering.

You can import and export many of the artifacts that provide the basis for cloud automation. The export operation provides the ability to preserve the selected artifacts so they can be used to replicate the services on another system or to restore the artifacts. These exported archive files are preserved in an industry-standard zip archive file format.

Installing or replacing artifacts on the target system is supported by import and update operations. The import operation only adds artifacts, whereas the update operation replaces matching artifacts. See the *Tasks* section below for more information.

Process information

 Resource categories and provider types - Resource categories (such as Compute) and provider types (such as VMware vCenter) are resolved first by name and second by display name during import of a resource offering.

Out-of-the box resource categories and provider types have identical **name** values on all installations of CSA, and automatically resolve correctly during import. User-created resource

categories and provider types do not have a **name** match on different installations of CSA, and instead are resolved by **display name**.

For example, if a user created resource category with a display name of Auditing is used for a resource offering, when that resource offering is imported on another CSA installation, an attempt will be made to match a resource category with a **display name** of Auditing. This match is successful only if the user has already created this corresponding resource category on the system in which the import occurs.

If a resource category or provider type cannot be resolved by either **name** or **display name**, a new resource category or provider type is automatically created during import of the resource offering. There is no need to add user-created resource categories and provider types ahead of time on the import system; however, if you have done so, ensure the **display name** values used match those on the export system.

- Update operation The update operation is destructive to existing data. You should understand
 the differences between the import operation, update operation, and update options to ensure you
 choose the operations and options that match your expectations. See the *Tasks* section below for
 more information.
- Flows During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, /Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

- Archive content The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file.
- Image files All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the Cloud Service Automation Configuration Guide):

jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png

Back up your data — Create a backup of your system or data. Before proceeding, be sure to
create a backup of any artifacts you may be affecting by using the export operation to save an
archive zip file.

Tasks

 Import option — Adds only new artifacts to the target system (the archived artifacts do no exist on the target system).

Note: The import operation identifies resource offerings by functional equivalence to determine if an identical resource offering exists on the target system. An archived resource offering is considered to be functionally equivalent to the resource offering on the target system if the archived resource offering has the same resource category, provider type, properties, and actions as a resource offering on the target system. If the import operation identifies a functionally equivalent resource offering on the target system, the archived resource offering is not imported. See How CSA identifies matching artifacts for more information.

• Update option — Imports new artifacts and overwrites existing artifacts. New artifacts are created if they do not exist on the target system. Identical artifacts that exist on the target system are overwritten with changes from the archive.

There may be cases where an existing artifact on the target system cannot be updated. For example, if the existing artifact is a service offering or design and the service offering or design is published, the service offering or design will not be updated because a published service offering or design cannot be edited.

An existing service offering or design can be updated from a published offering or service design archive if the existing service offering or design is not published.

Preserve originals — Select this option to create a copy of the original artifact if the artifact exists on the target system. On import, a copy of the original artifact is created and then the original artifact is overwritten by the imported artifact. The version of the copy is appended with "Superseded on" and the date. The version of the artifacts being imported remain intact. If the artifact does not exist on the target system, a copy is not created.

Note: The update operation identifies resource offerings by name instead of functional equivalence to determine if the resource offering exists on the target system.

• **Preview** — Generate a report of prospective results for the import process, including information about the artifacts and their status.

- View Detailed Report From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.
- Export Create a content archive (.zip) file. The content archive contains XML documents for the artifacts you are exporting, as well as icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

The resource offerings are packaged in an archive file whose name is:

RESOURCE_OFFERING_<resource_offering_display_name>_<resource_offering_id>.zip

How CSA identifies matching artifacts

When you import a resource offering, CSA determines if a functionally equivalent resource offering already exists on the system. If a functionally equivalent resource offering exists, then the import may be skipped depending on the options selected. Functional equivalence is determined by comparing the imported resource offering with other resource offerings that exist on the system, as follows:

- At a high level, two resource offerings are functionally equivalent if they share the same Provider Type and Resource Category, the same set of user defined custom properties, and the same set of lifecycle actions.
- Properties are considered equivalent if they share the same Type, Name, and Value (or Values for List properties).
- Lifecycle actions are considered equivalent if they share the same internal action or flow, lifecycle stage and phase, execution order, and action input properties and values.
- There are some additional attributes on properties and lifecycle actions that must be identical for equivalence.

For more specifics on the precise requirements for resource offering equivalence as it relates to entries in the .zip file produced during resource offering export, see the following table:

Element	Necessary for Equivalence
property	 name valueType values confidential – only for String property types
action	 processDefinition name lifecycleState name

Element	Necessary for Equivalence
	lifecycleSubstate name
	lifecycleExecOrder
	errorOnTimeout
	• failOnError
	• timeout
	 all properties must be identical, including the consumerVisible and consumerReadOnly elements for each property
	consumerVisible
resourceCategory	 isCriticalSystemObject determines if this is an out -of-box resourceCategory. If true, name determines equivalence, otherwise displayName determines equivalence.
providerType	 isCriticalSystemObject determines if this is an out -of-box providerType. If true, name determines equivalence, otherwise displayName determines equivalence.

For more information about importing and exporting artifacts, see the *Cloud Service Automation Content Archive Tool* document.

Select or remove providers for a resource offering

For a resource offering to be successfully provisioned at subscription ordering time, at least one resource provider must be associated with the resource offering. Additional restrictions exist if resource environments are associated to service catalogs.

When you associate a resource offering with a provider, the following must be true for successful provisioning:

- The associated providers support the resource offering and can deploy it when a service instance is provisioned.
- If a resource offering is associated with multiple providers, the resource offering must be exactly the same on each of the associated providers. For example, the VMware vCenter template must be exactly the same on all the associated providers.

Select providers for a resource offering

You must select at least one provider for a resource offering if you wan to use the resource offering in service designs.

To select a provider, in the resource offering's details page, click the **Providers** tab, then click **Select Providers**. Click the provider name, then click **Select**.

Delete providers from a resource offering

To delete providers from a resource offering, in the resource offering's details page, click the **Providers** tab. Click the provider's gear icon and click **Remove**.

This action deletes the provider from the resource offering, but does not delete the provider itself from CSA.

Lifecycle actions for resource offerings

A resource offering lifecycle is a collection of actions defined for a resource offering. The Lifecycle area allows you to specify the actions that are needed to provision, update, and deprovision resource offerings. Use the action selection wizard to add a lifecycle action to a resource offering from one of the available process engines.

Lifecycle actions

A lifecycle action is a function that is either run automatically at a specified lifecycle stage or phase, or that is exposed to the subscriber. Most lifecycle actions correspond to OO flows, which contain the logic for executing the function. CSA also includes actions that run internal to CSA. Many CSA internal actions relate to provider and pool selection and resource accounting. Actions include input parameters that provide configuration information to the function.

Lifecycle stages

A lifecycle stage represents a step within the CSA service lifecycle. There are three categories of lifecycle stages: Provisioning, Operational, and De-provisioning.
The Provisioning lifecycle stages are:

- **Initializing** Initializing is the first stage that is processed during provisioning. Use the Initializing stage for actions that perform any type of initialization that is required before proceeding to the Reserving stage, such as actions that perform input validation or create change request records.
- **Reserving** Reserving is the second stage that is processed during provisioning, after the Initializing stage. When a resource offering is associated to a service component, any configured provider selection and pool selection actions run during the Reserving stage. If resource accounting is enabled, actions to reserve resources from a pool run during the Reserving stage. In general, any resources needed during provisioning, such as storage or networking, can be reserved during the Reserving stage.
- Deploying— Deploying is the final stage that is processed during provisioning, after the Initializing and Reserving stages, and is the most common stage in which provisioning actions are defined. Define actions in the Initializing and Reserving stages to prepare the environment for provisioning. Define actions in the Deploying stage to perform actual provisioning. For example, you can define actions that deploy a VM or an application in the Deploying stage.

The Operational lifecycle stages are:

- **Modifying** The Modifying stage is processed when a subscription modification request is received from a subscriber and that modification results in a change to property values on a service component. Modifying actions run on any impacted service components and their associated resource offerings at this time. Define actions that are needed to process this change in property values in the Modifying stage.
- Upgrading— The Upgrading stage is processed when a request is received to upgrade a service instance to a newer version of a service offering and design. Define actions in the Upgrading stage for a service component or resource offering based on the manner in which the service component or resource offering will be used in a design in an upgrade path. For more information, see the online help.

If a service component will be added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the service component. If a service component will replace a service component that existed in the previous version of the design, the previously-existing service component will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new service component.

If a resource offering will be added to a service component that has been newly added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the resource offering. If a resource offering will be added to a service component that existed in the previous version of the design, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If a resource offering will replace a resource offering that existed in the previous version of the design, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

Note: A resource offering can also be associated to a service component that is replacing a service component that existed in the previous version of the design. If the resource offering did not exist in the service component that is being replaced, define actions in the Upgrading stage that perform the complete provisioning of the resource offering, including all actions that are normally defined in the Initializing, Reserving, and Deploying stages. If the resource offering existed in the service component that will be replaced, the previously-existing resource offering will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new resource offering.

The De-provisioning lifecycle stages are:

- Un-deploying Un-deploying is the first stage that is processed during de-provisioning and is the most common stage in which de-provisioning actions are defined. Use the Un-deploying stage to undo or to finalize the actions that took place during the Deploying stage. For example, if actions in the Deploying stage deploy a VM, define actions in the Un-deploying stage to un-deploy the VM.
- Un-reserving Un-reserving is the second stage that is processed during de-provisioning, after the Un-deploying stage. Use the Un-reserving stage to undo or to finalize the actions that took place during the Reserving stage. For example, if resource accounting is enabled, actions to return resources to the pool run during the Un-reserving stage.
- **Un-initializing** Un-initializing is the final stage that is processed during de-provisioning, after the Un-deploying and Un-reserving stages. Use the Un-initializing stage to undo or to finalize the actions that took place during the Initializing stage. For example, if actions in the Initializing stage create a change request, define actions in the Un-initializing stage to finalize that change request.

Lifecycle phases

A lifecycle phase is a further refinement of a lifecycle stage. When defining a lifecycle action at a lifecycle stage, you can also specify the phase for the action. The phases are:

• **Before** — Actions configured in the Before phase on a service component run before all actions on child service components in a design and before all actions on any associated resource offerings.

Actions configured in the Before phase on a resource offering run after all of the Before actions on the associated service component have completed.

- During Actions configured in the During phase on a service component run after all of the
 actions have completed on child service components in a design but before any of the During
 actions run on any associated resource offerings. Actions configured in the During phase on a
 resource offering run after all of the During actions on the associated service component have
 completed.
- After Actions configured in the After phase on a service component run after all actions have completed on child service components and after all of the During actions have completed on the service component and any associated resource offerings. Actions configured in the After phase on a resource offering run after all of the After actions on the associated service component have completed.
- On Failure Actions configured in the On Failure phase on a service component or resource offering run after an action failure occurs in any of the Before, During, or After phases for that service component or resource offering. On Failure actions are not run if the Organization has been configured to Pause Subscriptions on Provisioning Errors.

Tasks

- Navigate to (the Lifecycle tab) In the left pane of the Resource Offerings area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the Lifecycle tab.
- Add Action Click the Add Action or Add More Actions link in the stage and phase to which you want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard" on the next page.
- Edit Action Select the gear icon on the action you want to edit and select Edit. Update the information as described in "Lifecycle Action Selection Wizard" on the next page.
- **Delete Action** Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.
- Move Action Select the gear icon on the action or group of actions you want to move to another stage or phase and select Move. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click Move. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.

- Group Actions Click to select multiple actions in a lifecycle phase and then click Group Actions to create a parallel execution group. Actions in a parallel execution group are executed at the same time.
- Ungroup Actions Click the gear icon next to an action in a group and then select Remove from Group.
- View Lifecycle Stages The Deploying Provisioning stage, the Modifying Operational stage, the Un-deploying De-provisioning stage, and any stage that has an action, are displayed by default. Select a filter from the All Selected Stages pull-down menu to display only Provisioning Stages, Operational Stages, or De-provisioning stages. Click Select Stages to view additional stages.
- View Lifecycle Phases— The During and On Failure phases are displayed by default. Select Show All Phases to display the Before and After phases.

Lifecycle Action Selection Wizard

Use the action selection wizard to create or edit an action for the selected lifecycle phase.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Required parameters are indicated with an asterisk. If you don't define a value, then you will see a warning message that explains possible issues but you can still apply the change.

Tasks

- Select an action Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the Cloud Service Automation Configuration Guide for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. See Lifecycle Action Internal Actions for a list of internal actions. This task is only available when you create an action.
- Configure an action You can configure the following properties for an action:

Item	Description
Process Engine	Read-only. The container of the flow or internal action.

Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error - If selected, provisioning or de-provisioning will stop if the action fails. By default, Fail on Error is not selected for actions created in the Undeploying, Un-reserving, and Un-initializing stages. Error on Timeout - If selected, provisioning or de-provisioning will stop if the time to execute the action exceeds the timeout value, configured below.
Timeout (Seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out. Note that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

- **Configure parameters** Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action.
- 1. Click Auto-Configure to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.
- 2. Click the gear icon next to a parameter and select Delete Mapping to delete a property mapping.
- 3. Click the gear icon next to a parameter and select Auto-Select Property for Mapping to automatically create a property mapping. If no matching property is found, it is created
- 4. Click the gear icon next to the parameter you want to configure and select Edit Mapping. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.
- 5. Select one of the following mapping types:
 - **Not Mapped** The parameter is not mapped to a value.
 - **Constant Value** Type a value for the parameter.
 - **Property** Select a property.
 - Token Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See Tokens for a description of the tokens.
 - **Provider Property** Select a provider property from the list. All properties defined by providers that are applicable for this resource offering are listed.

Operations Orchestration Root Content Configuration

The Operations Orchestration content folders and actions that should be displayed in CSA are configurable. For information on how to configure these properties, see the <u>Operations Orchestration</u> <u>Root Content Configuration</u> section in the <u>Configuration Guide</u>.

See also "Lifecycle Action Selection Wizard for Sequenced Designs" on page 104 and "Lifecycle Action Selection Wizard for Component Templates" on page 77.

Lifecycle action internal actions

The following internal actions ship with CSA:

Internal action	Description	Applies to
Build Resource Provider and Pool List	 Builds a candidate list of resource providers and associated resource pools that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments. The provider's resource pool has sufficient resource capacity. To determine this, you must consider all measurable properties as configured in the Measurable Properties tab for the resource offerings, as well as the optional Multiplier Property Name field. The resource pool must have enough resource capacity to support all the properties, which requires that each necessary resource type (for example: CPU, Memory, and Storage), based on the measurable properties, be configured on the pool either with a Resource Availability of Unlimited or Available. If Available, the difference between Total Available To CSA and Current CSA Utilization must be sufficient to support the measurable property requirements. 	Resource Offering associated with a Service Component
Build Resource Provider List	 Builds a candidate list of resource providers that meet the following requirements: Support the resource offering. Have an Availability of Enabled. If the service offering that references the service design with this 	Resource Offering associated with a Service Component

Internal action	Description	Applies to
	action is in a service catalog with resource environments selected, the candidate list is further restricted to only include resource providers in one or more of the selected resource environments.	
Clone Pattern	Clones a service component that is marked as a Pattern into one or more non-pattern service components. The number of service components created is determined by the value of the property specified in Name of the Property for Service Component Count .	Service Component
Decrease Resource Utilization	 Decreases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Decrease Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Un-reserving when Resource Accounting is enabled for a resource offering associated with a service component. 	Resource Offering associated with a Service Component
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. Note: The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the csa.log file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering Resource Offering associated with a Service Component Service Component
Scale Component	Enables scale in and scale out of service components that are marked as Pattern components. Scale out adds child components to parent pattern components. Scale in removes components.	Service Component
Select Resource	Selects a resource provider from the candidate list that was built by the Build Resource Provider List action. The selected resource provider	Resource Offering

Internal action	Description	Applies to
Provider	will be available to resource offering actions in the token RSC_PROVIDER_ ID. The selected provider will, optionally, be written to a property on the associated service component if the Provider Property Name input to the action is provided.	associated with a Service Component
Select Resource Provider and Pool	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 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.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	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 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 Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the Parent Component ID and Provider Property Name properties. The selected resource provider will be available to resource offering actions in the token RSC_PROVIDER_ID. The selected resource provider will also be written to a Provider Property Name property on the associated service component.	Resource Offering associated with a Service Component

User operations for resource offerings

User operations are actions configured on resource offerings, component templates, or service components in a design that can be invoked by subscribers in the Marketplace Portal after a subscription has been provisioned. For example, a Restart Server user operation can be configured on a server service component or on an associated resource offering, allowing a subscriber to restart a particular provisioned server after the subscription has been provisioned. User operations can also be invoked on a service instance in the Operations area.

Tasks

- Navigate to (the User Operations tab) In the left pane of the Resource Offerings area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the User Operations tab.
- View a list of user operations for this resource offering.
- Add Action Click Add, and enter the information as described in "Action selection wizard" below.
- Edit Action Click the gear icon on the action you want to edit and select Edit. Update the information as described in "Action selection wizard" below.
- View User Operation Click the User Operations tab to view all user operations associated with a resource offering.
- Delete User Operation Click the gear icon next to the user operation you want to remove, and select Delete.

Action selection wizard

Use the action selection wizard to create or edit a user operation.

To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information.

Tasks

- Select an action Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action.
- Configure Action Configure information about the action.

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	 Specify the following: Fail on Error — During provisioning or de-provisioning, the Fail On Error setting indicates whether provisioning or de-provisioning should continue after an action has failed. For a user operation, the Fail on Error setting is irrelevant because there are no subsequent actions that would run after the user operation. Error on Timeout — If selected, the user operation will be considered to have failed if the time to execute the action exceeds the Timeout value (see below).
Timeout (seconds)	The amount of time to wait for the action to complete. Set this field to zero (0) if you do not want the action to time out.

 Configure parameters — Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action.

Click **Auto-Configure** to automatically map any parameter that is not mapped to a corresponding property. If a matching property does not exist, it is created.

Click the gear icon next to a parameter and select **Delete Mapping** to delete a property mapping.

Click the gear icon next to a parameter and select **Auto-Select Property for Mapping** to automatically create a property mapping. If no matching property is found, it is created.

Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the name, display name, description, and mapping type of the parameter.

Select one of the following mapping types:

- Not Mapped The parameter is not mapped to a value.
- **Constant Value** Type a value for the parameter.
- **Property** Select a property.
- **Prompt User** Allows the user to enter a value for the parameter when running the user operation. A default value for the parameter is required.

• **Prompt User List** — Allows the user to select a value for a parameter by selecting from a list of items when running the user operation.

When either Prompt User or Prompt User List are selected, you can optionally select an **Input Validation** script. This script will be run to validate the user supplied value for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Input Validation** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.

When Prompt User List is selected, you can configure a Static Entry list or click **Switch to Dynamic Entry** to select a script. When a script is selected, it will determine the values that should be presented to a user for this user operation parameter in the Marketplace Portal.

You can manage the available set of **Dynamic Entry** scripts, and configure parameters to the selected script, using the **Manage Scripts** and **Configure Parameters** links:

- Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
- Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Custom resource offering properties

Custom properties for resource offerings are user-defined properties that are used for communicating properties and values to providers to customize the functional service they provide. The custom properties can be used to provide any information that is expected by an Operations Orchestration flow. For example, you can use custom properties for a resource offering to provide a specific VM_TEMPLATE_NAME value to an instance of VMware vCenter.

View custom resource offering properties

- 1. In the **Offerings** tab, click the **Display Name** of the offering whose custom properties you want to view.
- 2. In the Properties tab, review the custom properties created for the offering.

Create custom properties

To create a custom property for an offering, in the **Offerings** tab, select the offering. In the offering's **Properties** tab, click **Create**. Enter the following information in the **Create Property** wizard:

Item	Description
Property	Select one of the following:
Туре	• Boolean — A property whose value is true or false.
	List — A property whose value is a list of String values.
	 Integer — A property whose value is a positive or negative whole number or zero.
	• String — A property whose value is a sequence of characters.
	You cannot edit this value after the property has been created.
Property	For Boolean properties:
Details	• Name — A unique name for the property.
	• Display Name — The display name for the property.
	Description — A description of the property.
	• Property Value — Select true or false.
	For List properties:
	• Name — A unique name for the property.
	Display Name — The display name for the property.
	• Description — A description of the property.
	 Value Entry Method — Select Manual Entry to provide Specified Values for this field, as described below.
	 Specified Values — Click the Add Value icon to add a new value, or click the Remove Selected Value(s) icon to remove a selected value.

Item	Description
	For Integer properties:
	Name — A unique name for the property.
	• Display Name — The display name for the property.
	• Description — A description of the property.
	• Property Value — Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is —2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
	For String properties:
	Name — A unique name for the property.
	• Display Name — The display name for the property.
	Description — A description of the property.
	Property Value — Type a string of characters.
	• Confidential Data — Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed.

Delete resource offering property

For more information about resource offerings, see "Resource offerings for sequenced designs" on page 126.

The properties of a resource offering cannot be deleted if the resource offering is linked to a service component that is part of a service design, where the service design is in an upgrade path, is upgradable from a previous version of the design, and the property existed in that previous version.

The properties of a resource offering can be deleted if the resource offering is not linked to a service component, if the resource offering is linked to a service component of a design that is not upgradable from a previous version of the design, or the properties are newly added to the current version of the design.

To delete a property of a resource offering, in the resource offering's summary page click the **Properties** tab. Click the gear icon for the property to be edited and choose **Delete**, then confirm your choice.

For descriptions of certain properties, see "Create a resource offering" on page 138.

Edit properties of a resource offering

For more information about resource offerings, see "Resource offerings for sequenced designs" on page 126.

To edit properties of a resource offering, in the resource offering's summary page click the **Properties** tab. Click the gear icon for the property to be edited and choose **Edit**. Edit the property and click **Save**.

Note: You cannot edit the type or name of an existing property.

For descriptions of certain properties, see "Create a resource offering" on page 138.

Resource offering categories

Resource offering categories allow you to classify resource offerings for improved filtering and identification. CSA includes some predefined categories out-of-the-box (shown below) or you can create your own. A category is associated with a resource offering and can be used when assigning resource offerings to service designs.

Service components within a service design can accept offering assignments only for those offerings with a category that is supported by the service component type. For example, a **Server** service component can be associated with offerings from a category of *Compute* (among others), while a **Software Application Service** component can be associated with offerings with a category of *Application*.

Resource categories are available by selecting By Category from the list in the left navigation pane.

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Software Application Service component can be associated with offerings with a category of *Application*.

Resource categories are available by selecting By Category from the list in the left navigation pane.

Manage resource category

For more information about categories, see "Resource offering categories" on the previous page.

In the resource offering's landing page, click the gear icon and chose **Manage Resource Category**. Use the add, edit, or delete icons to add, edit, or delete the category.

Tasks

Create a resource category

To create a resource category, select **By Category** from the dropdown, then click the gear icon and select **Manage Resource Category**. Click the add icon, add the category properties, and then click **Create**.

Resource category properties:

Item	Description
Display Name	The display name you provide for the category.
Description	The description you provide for the category.
Image	An image that displays for the category. Click Change Image . Choose the image you want, and click Select . Click Upload Image to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server.

Edit a resource category

To edit a resource category, choose to filter **By Category**, then select the category to edit. Click the gear icon and choose **Manage Resource Category**. Click the edit icon, edit the category properties, click **Save**, and then click **Done**.

Delete a resource category

Categories cannot be deleted:

- If offerings are using them.
- If they are out-of-the-box.

To delete a category, choose to filter **By Category**, then select the category to delete. Click the gear icon and choose **Manage Resource Category**. Click the delete icon, confirm your deletion, then click **Done**.

Sequenced design subscriber options

The **Subscriber Options** tab allows you to create sets of options for a service design. Option sets are made available in the **Offerings** area of the Cloud Service Management Console, where they can be further refined by setting pricing for options, hiding options, and setting values for option properties. Subscriber options are then exposed to subscribers in the Marketplace Portal. These options allow the user to select values that customize the service offering for their personal needs.

For example, you can create an option set called Number of Servers, which is configured as follows:

- The option set has three options, Small, Medium, and Large.
- Each option has a property called NSERVERS.
- Each option has a unique, specified value for NSERVERS, either *Small* (2 servers), *Medium* (4 servers), or *Large* (8 servers).
- A binding is created from the NSERVERS property to a corresponding NSERVERS property on a Server Group service component. This use of a subscriber option to push a value to a service component property is called a *target binding*, described below.
- In the Marketplace Portal, subscribers can select the option that provides the desired number of servers.

Subscriber options workflow

As a best practice:

1. Create an option set:

You can copy and paste to create an option set. When you paste an option set, it will keep the same Display Name and will be incrementally numbered in ascending order. See "Subscriber Options Controls " below.

2. Create one or more options in the option set:

You can copy and paste to create an option. When you paste an option, it will keep the same Display Name and will be incrementally numbered in ascending order. See "Subscriber Options Controls " below.

- 3. Add properties to options.
- 4. Save your option sets, options, properties, and configurations:

Target Bindings

You may have a service component that is configured to expect a property value with a given name and specified value to be provided by a subscriber option. You can configure a binding on a subscriber option so that it sends the value to the appropriate service component property. This use of a subscriber option to push a value to a service component property is called a *target binding*.

For example, you may want to let the subscriber select the number of CPUs for a server. You can create a service component property (for example, NCPU) on the server component and specify a target binding that pushes the subscriber-entered value to the corresponding NCPU server property.

Another type of relationship between properties is called a *property mapping*. For more information about property mapping, see "Property mapping" on page 125

Note: Target bindings cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the bindings existed in that prior version. Target bindings that are newly added to the current version of the design can be deleted.

Subscriber Options Controls

Item	Description
View Outline	Click to see a tree view of all of the option sets, options, and properties that have been configured for the design and to navigate directly to an option set or option.
Image: Constraint of the second se	Click to copy an option, paste an option, or add an option to an option set.

The controls for working with subscriber options are described in the following table.

Item	Description
Add Option Set	Click to copy an option set, paste an option set, or add an option set.
音	Click to delete an option or option set, as described in "Delete subscriber option sets and options" on page 166.
Reorder	To move an option or option set up or down in the list, select it and then use <ctrl>+ the arrow keys to move the selection in the list. You can also reorder an option set or option by clicking and dragging it.</ctrl>
Add Property link	Click to create properties.
□ ∂ 前	Click to copy property to all options, configure bindings, or delete a property. See "Edit subscriber option properties" on page 171

Add subscriber option sets and options

Note: The Subscriber Options tab is read-only if the design is published.

To add a subscriber option set and options:

- 1. Select the service design version whose subscriber options you want to configure.
- 2. Select the Subscriber Options tab.
- 3. Click Add Option Set. You can also click the Copy Option Set and Paste Option Set buttons to copy option sets, both within and across designs.
- 4. Click **Add Option** to add an option to an option set. You can use this functionality to create a hierarchy of option sets that is up to three levels deep:
 - Option Set 1
 - Option
 - Option Set 2
 - Option
 - Option Set 3
 - Option

You can copy and paste option sets or options within a design, between designs, and within a tree within a design. The copy includes the entire structure, including property bindings when copied within

the same design. When pasting options or option sets into a new design, bindings will not be copied and you will need to manually configure them.

After copying and pasting an option set or option, changes to the original option set or option do not impact the newly created option set or option or vice versa.

After an option set has been created, you can configure the following values for the option set on the right side of the window:

- Display Name The display name for the option set.
- **Description** A description for the option set.
- Image An image that displays for the option set. Click Edit Image. Choose the image you want, and click Select. Click Upload Image to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server. The image you select will be displayed in the Offerings area and in the Marketplace Portal.
- Modify Options Check Modifiable during service modification to allow the subscriber to
 modify this option set in the Marketplace Portal after a subscription has been ordered. If checked,
 ensure that all property bindings from options in the option set exclusively target properties that are
 themselves modifiable during service modification. Unchecking prevents a subscriber from
 changing the selected values of this option set when modifying the subscription in the Marketplace
 Portal.

After an option has been created, you can configure the following values for the option:

- **Property Type** The property type for the option. Select List, String, Boolean, or Integer from the drop-down list.
- **Display Name** The display name for the option.
- **Description** A description for the option.
- Properties Click the tools icons to modify the properties for an option (Copy Property to All Options, Configure Bindings, or Delete Property.)
- Single-Select Select this option to present options as radio boxes in the Marketplace Portal. A subscriber is required to select a single value.
- Multi-Select Select this option to present options as check boxes in the Marketplace Portal.

For descriptions of the additional icons available on the **Subscriber Options** tab, see "Sequenced design subscriber options" on page 160.

View subscriber option sets and options

Note: The Subscriber Options tab is read-only if the service design is published.

To view subscriber option sets and options:

- 1. Select the service design version whose subscriber options and option sets you want to view.
- 2. Select the **Subscriber Options** tab to view the option sets and options for the service design.
- 3. Click **Navigate to Option Set** to view the options for an option set and add or modify option properties.
- 4. Click Navigate to Option to view the option set for an option and add or modify its properties.

Click **View Outline** to see a tree view of all of the option sets, options, and properties that have been configured for the design and to navigate directly to an option set or option.

A Validation column is added in the **Subscriber Options Outline** view. It displays validation script name (if validation is enabled) like in case of dynamic properties.

Only **not hidden** and **not locked** property will be semantically validated. If the property is **hidden**, property validation will be disabled with a warning, but the changes are saved.

Reorder subscriber option sets and options

Note: The Subscriber Options tab is read-only if the service design is published.

To change to order of option sets or options:

- 1. Select the service design version whose subscriber options and option sets you want to reorder.
- 2. Select the Subscriber Options tab.
- Select an option set and then use <Ctrl>+ the arrow keys to move the selection in the list. You can
 also reorder an option set by clicking and dragging it.
- 4. Click Navigate to Option Set to view the options for an option set.
- 5. Select an option and then use <Ctrl>+ the arrow keys to move the selection in the list. You can also reorder an option by clicking and dragging it.

For descriptions of the additional icons available on the **Subscriber Options** tab, see "Sequenced design subscriber options" on page 160.

Edit Subscriber Option Sets and Options

Note: The Subscriber Options tab is read-only if the service design is published.

To edit subscriber option sets

To edit a subscriber option set:

- 1. Select the service design version whose subscriber options and option sets you want to modify.
- 2. Select the Subscriber Options tab.
- 3. Select the option set you want to edit.
- 4. Enter your changes in the right pane.
- 5. Click Save.

You can edit the following subscriber option set options:

- **Display Name** The display name for the option set or option.
- **Description** A description for the option set or option.
- Image An image that displays for the option set. Click Edit Image. Choose the image you want, and click Select. Click Upload Image to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server. The image you select will be displayed in the Offerings area and in the Marketplace Portal.
- Modify Options Check the Modifiable during service modification box to allow the subscriber to modify this option set in the Marketplace Portal after a subscription has been ordered. If checked, ensure that all property bindings from options in the option set exclusively target properties that are themselves modifiable during service modification. Unchecking prevents a subscriber from changing the selected values of this option set when modifying the subscription in the Marketplace Portal.

To edit subscriber options

To edit a subscriber option:

- 1. Select the service design version whose subscriber options you want to modify.
- 2. Select the **Subscriber Options** tab.
- 3. Select the option set you want to edit.
- 4. Click Navigate to Option Set.
- 5. Enter your changes in the right pane.
- 6. Click Save.

You can edit the following subscriber option properties:

- **Display Name** The display name for the option set or option.
- **Description** A description for the option set or option.
- Properties Click the tools icons to modify the properties for an option (Copy Property to All Options, Configure Bindings, or Delete Property.)
- Single-Select Select this option to present options as radio boxes in the Marketplace Portal. A subscriber is required to select a single value.
- Multi-Select Select this option to present options as check boxes in the Marketplace Portal.

Delete subscriber option sets and options

Subscriber option sets and options cannot be deleted if the design is in an upgrade path, is upgradable from a previous version of the design, and the options or option sets existed in that prior version. Option sets or options that are newly added to the current version of the design can be deleted.

Note: The Subscriber Options tab is read-only if the service design is published.

To delete subscriber option sets

To delete a subscriber option set:

- 1. From the **Designer**, click the version number of the design you want to modify.
- 2. Select the Subscriber Options tab.
- 3. Click the trashcan icon of the option set to delete.
- 4. Click **Yes** to confirm the deletion.
- 5. Click Save.

To delete subscriber options

To delete subscriber options:

- 1. From the **Designer**, click the version number of the design you want to modify.
- 2. Select the Subscriber Options tab.
- 3. Click Navigate to Option Set.
- 4. Click the trashcan icon of the option to delete.
- 5. Click **Yes** to confirm the deletion.
- 6. Click Save.

Create subscriber option properties

Note: The Subscriber Options tab is read-only if the service design is published.

You can create properties on subscriber options within an option set. The option property can then be copied to the other options in the option set using the **Copy Property to All Options** icon.

You cannot copy a property to all options in an option set when the **Enable Multi-Select** setting for that option set is selected.

Create a subscriber option property

To create a subscriber option property:

- 1. Select the service design version whose subscriber option properties you want to configure.
- 2. Click the Subscriber Options tab.
- 3. Select the option set containing the option to which you want to add an option property.
- 4. Click Navigate to Option Set.
- 5. Select the option to which you want to add an option property.
- 6. In the right pane, click Add Property.
- 7. In the Add Property dialog, select the property type and details as described in the following table.

8. Click Done.

9. Click Save.

Item	Description
Property Type	Select one of the following:
	Boolean — A property whose value is True or False.
	• Integer — A property whose value is a positive or negative whole number or zero.
	• List — A property where you can define a list of values for the subscriber to select.
	• String — A property whose value is a sequence of characters.
	Configure the following items for each property type:
	Name — A unique name for the property.
	Display Name — The display name for the property.
	Description — A description of the property.
	• Editable — If selected, indicates the property is editable in a service offering created from the design and can be configured in the offering to be editable in the Marketplace Portal.
	• Required — If the property is Editable , you can select Required to require the service offering or subscriber to provide a value for the property. Boolean properties that are Editable are implicitly Required .
	• Input Validation - If the property is Editable, you can configure an Input Validation script to run and validate user input. This provides an additional level of control to ensure that user supplied values will work properly during provisioning.
	When a script is selected to be used for Input Validation, the script will be run to validate the user supplied value for this option property in the Marketplace Portal.
	You can manage the available set of scripts, and configure parameters to the selected script, using the Manage Scripts and Configure Parameters links:
	 Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
	 Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.
Property	For Boolean properties:
Details	Service Offering and Marketplace Portal Settings:
	 Editable - Indicates that this property can be made editable in the Offerings area and in the Marketplace Portal
	Default Value - Select true or false

Item	Description
	Note: Boolean properties are always required, which means that when a subscription is ordered, a value must be provided for this field. This option cannot be changed for Boolean properties.
	For Integer properties:
	Service Offering and Marketplace Portal Settings
	 Editable - Select to make this field editable in the Offerings area and in the Marketplace Portal
	 Required - Integer properties are always required, which means that when a subscription is ordered, a value must be provided for this field.
	 Value Range - If Editable is checked, configure a minimum and maximum allowed value for the property.
	 Default Value - Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
	For List properties:
	Service Offering and Marketplace Portal Settings:
	 Editable - Indicates that this property can be made editable in the Offerings area and in the Marketplace Portal. Dynamic entry properties are always editable; this field cannot be changed for dynamic entry properties.
	 Required - Select to indicate that when a subscription is ordered, a value must be provided for this field.
	List Selection Type:
	• Single-Select - Select to present options as radio boxes in the Marketplace Portal.
	 Multi-Select - Select to present options as check boxes in the Marketplace Portal.
	List Items:
	 Switch to Static Entry (default) - Enter the name and value for an entry in the list. After the value entry, a new item line is displayed automatically.
	• Switch to Dynamic Entry - Select a script that will determine the values that should be presented to a user in the Marketplace Portal.
	You can manage the available set of scripts, and configure parameters to the selected script, using the Manage Scripts and Configure Parameters links:
	 Manage Scripts - To add, download, edit, or delete scripts, click Manage Scripts. For more information, see Manage Scripts.

Item	Description
	• Configure Parameters - To configure the parameters that should be supplied when running the selected script, click Configure Parameters . For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.
	For String properties:
	Service Offering and Marketplace Portal Settings:
	 Editable - Select to make this field editable in the Offerings area and in the Marketplace Portal.
	• Required – Select to indicate that when a subscription is ordered, a value must be provided for this field.
	Input Type:
	• Single-Line - The input area is presented as and accepts only one line of text.
	 Multi-Line - The input area is presented as a text box and can accept one or more lines of content.
	 Number of Characters - Configure the minimum and maximum number of characters that can be entered for this property. These fields are available only when the Editable and Single-Line options are selected.
	 Input Restriction - Choose an Input Restriction from the following list. These fields are available only when the Editable and Single-Line options are selected.
	 (none) - No input restriction will be performed. A minimum and maximum length can still be configured.
	 Custom Regular Expression - Validates the value based on a regular expression, as specified in the Regular Expression text box.
	• Email Address - Checks that a valid email format is entered.
	• IPV4 Address - Checks that a valid IPV4 address is entered.
	IPV6 Address - Checks that a valid IPV6 address is entered.
	Non-Numeric Characters - Checks that no numeric characters are entered.
	 URL Address - Checks that a valid URL format is entered. The regular expression used for validating the URL values may allow creating some invalid URL values such as http, http:// or hhh:////. This is because the regular expression validates a wide range of official IANA-registered schemes, which may not detect some invalid URL values.
	• Default Value - Type a string of characters.
	 Confidential - Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed. Note that this field is available only when the Single-Line option is selected.

For descriptions of the additional icons available on the **Subscriber Options** tab, see "Sequenced design subscriber options" on page 160.

Edit subscriber option properties

Note: Subscriber option properties cannot be edited if the design is in an upgrade path, is upgradable from a previous version of the design, and the option property existed in that prior version. Subscriber option properties that are newly added to the current version of the design can be edited.

Perform the following steps to edit a subscriber option property:

- 1. Select the service design version whose subscriber option properties you want to modify.
- 2. Select the Subscriber Options tab.
- 3. Select the options set that contains the option property you want to modify.
- 4. Click Navigate to Option Set.
- 5. Select the subscriber option to modify.
- 6. In the right panel, under **Properties**, click the display name of the property to edit the option property details.
- Select the tool icons to Copy Property to All Options, Configure Bindings, or Delete Property.
 - Configure Bindings Binding is a link between option model properties and service component properties in a design. A property can have more than one binding. Click the Configure Bindings icon to display a working area where you can view and delete existing bindings and configure new bindings.
 - **Delete Property** Click the trashcan icon to delete the property.
 - **Copy properties** Click the Copy Property to All Options icon to copy the current property to all options in the current option set. This icon is only present for Single-Select option sets.
- 8. Click Done.
- 9. Click Save.

For descriptions of the additional icons available on the **Subscriber Options** tab, see "Sequenced design subscriber options" on page 160.

Upgradability

The **Upgradability** tab allows you to perform the following actions:

- View the upgrade paths from and to the selected version of the service design
- Navigate to those service designs
- Add an upgradability relationship between service designs
- Delete the upgrade path from a service design
- Edit the description about the differences between the selected version and a version to or from which it can be upgraded
- View the differences between the selected version and the version from or to which it can be upgraded

Tip: The Overview tab also displays Upgradable From and Upgradable To information.

Certain functions are restricted on a design if it is part of an upgrade path. See "Upgradability restrictions" on the next page for more information.

Tasks

The following options are available from the **Upgradability** tab:

- <version number> Click to display the selected version of the service design.
- Edit upgrade path description Click the gear icon and select Edit to update the description about the differences between the versions of the design in an upgrade path.
- Delete upgrade path Click the gear icon and select Delete to remove the upgrade path from the listed service design version. If an upgrade to an offering uses this upgrade path, (that is, the selected service design upgrade path is used to update the service design for an upgrade of an offering), the selected service design upgrade path cannot be deleted.
- Add upgrade path Click Add to define the upgrade path that establishes an upgradability
 relationship between two different versions of a service design. In the Add Upgrade Path dialog,
 select an eligible service design in the From Version drop-down list. Enter a brief, meaningful
 description of the upgradability relationship between the selected version of the service design and
 another version of the same service design. This action will validate whether service design

versions are upgradable to the current service design version. If service design versions are not upgradable, upgradability violations will be recorded in log files.

Review differences between versions — Click View Differences to view the differences between the versions of the design in an upgrade path. In the Differences between version dialog, design components and subscriber options that have been added, updated, or removed are listed. Changes to design components are displayed on the left and changes to the subscriber options are displayed on the right. The differences are color-coded to easily identify the types of changes, where additions are blue, updates are yellow, and removals are red.

Upgradability restrictions

When you are in the service design version page, if the message **This design is part of an upgrade path and has restricted editability and actions** is displayed at the top of the page, certain functions are restricted on the design.

The following items have restrictions when they are in a design that is in an upgrade path, is upgradable from a previous version of the design, and the item existed in that prior version:

- Resource offerings
- Service components and properties
- · Service component resource offerings and properties
- Subscriber option sets
- Subscriber options and properties

Items that are newly added to the current version of the design can be deleted.

The following actions cannot be performed on items in a design if the design is in an upgrade path, is upgradable from a previous version of the design, and the item existed in that prior version:

- Deleting a resource offering
- Deleting a service component
- Editing the processing order and pattern attributes of a service component
- Deleting a service component property
- Editing a service component property: Name
- Deleting the relationship between two service components
- Deleting a resource offering that was added to a component

- Adding or deleting measurable properties
- · Deleting a subscriber option set
- Deleting a subscriber option
- Deleting a subscriber option property
- Editing a subscriber option property: name
- Editing a subscriber option property: target binding

These actions can be performed on items that are newly added to the current version of the design.

Applying a component template - A component template cannot be applied to a component if it is part of a design that is in an upgrade path, is upgradable from a previous version of the design, and the applied template is missing measurable properties, any measurable properties are added, resource offerings associated with service components are missing, properties are missing, or if there is a mismatch in the component pattern setting between the component and the applied template.

Service design deployments

You must be in the administrator or designer role to view service design instances and deployments. The administrator can see all instances and deployments for a design; the designer can only see the instances and deployments he or she created. For more information about roles, see Cloud Service Automation Roles. For information about how to view and manage subscriptions and service instances for all consumer organizations, see "Operations" on page 213.

- Select a version of a service design (see "View service design and view service design version" on page 31).
- Click the **Deployments** tab to see all service instances and deployments for this version of the design.

Enter text in the search box to filter deployments by name or description.

3. Click on a deployment name to view additional information about the deployment. See the Operations area for additional information.

For information on the service instance information that is displayed, see "Operations" on page 213.

Create and deploy a new instance

You can create and deploy a new service instance from a service design. For more information about sequenced designs, see "Sequenced Designs" on page 29.

- 1. In the Deployments area, click **Deploy a New Instance**. The dialog appears. Enter the following general information:
 - a. Deployment Name Enter a deployment name. The service instance created from this action will have the same name as the deployment.
 - b. Description (optional) Enter a description of the deployment.
 - c. Resource Environment Filter From the list, select one or more resource environments to use for provisioning. For more information, see "Resource offerings for sequenced designs" on page 126.
- 2. Enter properties for the new instance:
 - The design associated with the instance appears on the canvas. Select a service component from the design, and modify the properties as needed. For more information, see "Service components" on page 42.
 - You can change the properties of multiple components in the design. The message icon appears next to modified components in the design. Click on the icon for details about what changes were made.
- 3. Click Deploy.

Run a user operation from a component in a deployment

You can run a user operation on a component in an active deployment.

- 1. Navigate to a deployed instance in a service design.
- 2. Click on the **Topology** tab, and select a component from the canvas or the list on the right panel.
- 3. From the bottom of the right panel, click **Actions**, and use the list to select a user operation to run.
- 4. A list of the properties for the user operation appears. Modify the properties or accept the defaults, and click **Execute Action**. You can execute another user operation when the first one completes.

See "User operations for service components" on page 109 for information on how to create a user operation.

Cancel a deployment

To cancel a deployment, click the gear icon to the right of the deployment you want to cancel, and select **Cancel Deployment**. Click **Yes** to confirm the cancellation.

A canceled deployment is moved to Offline state.

Delete a deployment

When you delete a deployment, it is removed from the list on the **Deployments** tab, and all of its references are marked internally as being in **Retired** state. Once in a **Retired** state, a deployment can be deleted permanently from the database using the purge tool. For more information about purge tool usage, see the *Cloud Service Automation Configuration Guide*.

To delete a deployment, click the gear icon to the right of the deployment in **Offline** state that you want to delete, and select **Delete Deployment**. Click **Yes** to confirm the deletion.

Manage tags

Tags are a label you can use to provide a structure for organizing and grouping related items.

- 1. From the All Designs area, click the gear icon and select Manage Design Tags.
- 2. In the Manage Tags dialog, you can create, edit, and delete tags.

Tag properties

Field name	Description
Display Name	The name you provide for this tag.
Description	The description you provide for this tag.
Image	An image that displays for the tag. Click Change Image . Choose the image you want, and click Select . Click Upload to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size. The images are stored in the %CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library folder of the CSA server.

Use Manage tags

ColorA color used to display the tag.

Use Manage tags

Topology Designs

Topology designs specify components, relationships, groups, and properties. In contrast to sequenced designs, which more explicitly define the provisioning order and the sequence of actions that will run, topology designs are declarative in nature and do not include explicit actions or sequencing. The provisioning sequence is inferred by the relationships that exist between components in a topology design.

Use topology designs for Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) deployments that are enabled via Chef, Puppet, Server Automation and Operations Orchestration flow-based components.

Each topology design component binds to a single provider for fulfillment automation. Topology designs delegate component lifecycle provisioning to providers.

Configuration Tips

Topology designs allow a subscriber in the Marketplace Portal to select an environment (which is a mechanism for grouping providers) and a set of providers (based on the components included in a design) when ordering a subscription. Environments are not mandatory. If an environment is not associated to a catalog, provider selection is not exposed to subscribers.

If you want the environment and provider to be available for the subscriber to select, the appropriate resource environments must be configured in the **Catalogs** area. For the design to provision successfully, at least one provider for each provider type that is configured in the topology design must be available in any of the environments configured in the catalog.

The subscriber selection works as described below:

- If a subscriber selects **Any Environment**, a provider that belongs to any of the resource environments configured in the catalog will be randomly selected.
- If a subscriber selects **Any Provider** within a selected environment, a provider will be randomly selected from all available providers in the selected environment.

If you do not want the resource provider selection option exposed to the subscriber for topology designs, set the following property in the csa.properties file to false:

OrchestratedTopologyDesignProvisioning.ProviderSelection.Enabled=true

See Cloud Service Automation Configuration Guide for more information about setting this property.

Browse topology designs

Use the Topology Designs area to browse, view, and manage topology designs.

Tasks

In the All Designs section you can perform the following tasks:

- View designs In the left pane, select All Designs or select a user-defined tag to display a list of the corresponding topology designs in the right pane.
- Manage design tags Click the gear icon and select Manage Design Tags. Tags are userdefined, color-coded labels and images used to provide a structure for organizing and grouping related designs. A design can be assigned to multiple tags.
- Create a design Allows you to specify the following:
 - **Palette** Select the palette for the design.
 - **Display Name** Provide the display name for the design.
 - **Description** Provide the description for the design.
 - Initial Version Provide the number or name for the initial version of the design.
 - Image Select an image that displays for the design. Click Change Image. Choose the image you want, and click Select. Click Upload to add your own image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size.
 - Tags Click Select Tags to choose from a list of tags that you can define to provide a structure for organizing and grouping the service designs. To remove a tag, hover the cursor over the tag you want to remove and click the Delete icon.
- Import a design See "Import and export a topology design" on the next page.
- Create New Version Below the design name, click New to create a new version. Each design can have multiple versions. The most recently edited version displays in bold text. The most recent five versions of a design are displayed under the design name, with links to individual versions. For designs with more than five versions, click All to see the complete version list. Specify the following to create a new version:
- Based on Version Select the version on which you want to base the new version.
- **Palette** Select the palette for the design. This field does not appear unless **Based on Version** is set to (none).
- **Version** Provide the number or name for the new version.
- **Description** Provide the description for the new version.
- Open a design or version Click the design name to open the Design Overview area, or click a version to open the Version Overview area. See "Topology design or version overview" on page 183.

Best practices

Express designs created before Cloud Service Automation 4.50 will continue to function, but no new express designs can be created. For information about the Express Design feature, see the user documentation for Cloudsystem (www.hpe.com/go/cloudsystem/docs).

Import and export a topology design

Prerequisites

Before you import a design archive, complete the following prerequisites:

The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file. By default, all images in the archive files must end in one of the following suffix values. For information on adding additional suffix values, see *Cloud Service Automation Configuration Guide*.

```
jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png|gif|
bmp|cod|ief
```

Importing and exporting

When the Option field is set to Import

The import process imports archives of designs and their supported artifacts. Designs with the same internal name are considered to be functionally equivalent and are not imported.

When the Option field is set to Update

During the update process, identical artifacts that exist on the target system are updated (overwritten) with the changes from the archive. Artifacts are created if they do not exist on the target system.

When the Option field is set to Update and Preserve Originals

This process imports all the artifacts present in an archive, whether they exist on the target system or not. During this operation, if there is a service design with the same internal name in the system, the name and description of the existing design are modified internally. The description is updated to include "Superseded on" along with the current date. A new version of the service design is then created, with a suffix such as '-1' or '-2', to contain the newly imported design.

Content archive for designs

Exporting a design creates a content archive (.zip) file. The content archive contains XML documents for the design you are exporting, as well as associated artifacts, icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

To import a design archive

If a design has active service offerings associated with it, the subscriber options for the design being imported must match that of the design on the target system; otherwise, the import of the service offerings does not succeed.

Note: When you import a design, any tags you have selected in the designs area do not affect the imported design. The imported design will contain the tags that were included when the design was exported, and new tags will be created on the system, as necessary, to match what was exported.

If CSA has been configured to verify the authenticity of imported service design, service offering, and catalog content archives (which is done by setting the property csa.security.enable), then service design, service offering, and catalog content archives that were successfully imported into CSA 4.20 or earlier will no longer import properly until they have been digitally signed. See *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

- 1. In the All Designs area, click the gear icon and select Import Design.
- 2. Select or specify the **Archive File** (.zip file) that contains the design you want to import. Archive filenames for designs begin with SERVICE_DESIGN_.
- 3. Select an **Option**:
 - a. **Import** Imports new designs. This action does not update existing service designs. You cannot import a design with the same internal name as an existing design.

- b. Update Imports new designs and updates (overwrites) existing designs. Check Preserve
 Originals to create backup copies of the original items, appending "Superseded on" and the date to the description of the service design version that is superseded.
- 4. Click **Preview** to see a report of prospective results for the import process, including information about the artifacts and their status.
- 5. Click Import.
- 6. Click **View Detailed Report** to see a summary and details of the import process, including information about the artifacts and their status.
- 7. Click Close.

To export a design archive

- 1. Select the design version you want to export.
- 2. Click the gear icon and select Export.
- 3. Save the exported design, if required by your browser.

When you export a design archive, the design and all referenced artifacts are packaged in an archive file whose name is:

SERVICE_DESIGN_<service_design_display_name>_<service_design_id>.zip

For more information about importing and exporting artifacts, see *Cloud Service Automation Content Archive Tool.*

Topology design or version overview

The **Overview** tab provides a summary view of the design or version details.

Tasks

Edit or Delete a Design

Select a design and click the gear icon to edit a design or to delete a design after all versions of the design have been deleted. See "Browse topology designs" on page 180 for more information.

Design Details

In the **Overview** tab, you can view configuration details about a design. See the "Create a Design" section in "Browse topology designs" on page 180 for more information about the configuration options.

From a design overview, you can also access the following tabs: Versions and Access Control.

Version Details

Select a design version and click the gear icon to perform the following tasks for versions:

- Edit Edit the design. See "Browse topology designs" on page 180.
- **Publish** Publish the currently displayed version of the design so it can be used to create a service offering. Published designs are indicated in the **Overview** tab by a **Published** label in the upper right of the window.
 - You can publish a design only if it has no validation errors.
 - A published design cannot be modified. However, you can use the Save As or Create New Version functions to create editable designs that are based on the published design.
 - Partial designs contain capabilities and require composition with a compatible concrete design before they can be provisioned. Partial designs cannot be directly published. These designs are indicated in the **Overview** tab by a **Requires Composition** label in the upper right of the window.
 - Only published designs can be exposed to subscribers via service offerings, but you can test deployment of an unpublished design using **Test Run**. See "Testing a topology design" on page 196.
- Save As Create a copy of the design.
- Create New Version Create a copy of the currently displayed design and assign a new version name to it. See "Topology design versions" on the next page.
- Export See "Import and export a topology design" on page 181.
- **Delete** Delete the selected version of the design.

In the **Overview** tab, you can perform the following tasks for versions:

- View configuration details See the "Create New Version" section in "Browse topology designs" on page 180 for more information about the configuration options.
- Preview Click the preview box to open a read-only view of the design layout.

Migrate CloudSystem 8.x designs to designs using OpenStack components

A migration banner displays when you view a legacy CloudSystem 8.x design. Click the **Migrate** button to migrate the legacy design to an editable design that uses OpenStack components. When you

migrate the design, the legacy components in the design are migrated to the corresponding OpenStack components.

Note: You cannot edit legacy CloudSystem 8.x designs. However, they can still be ordered by subscribers.

From a version overview, you can access the following tabs: **Designer**, **Subscriber Options**, and **Test**.

Best Practices

- Perform **Test Run** before publishing a design. See "Testing a topology design" on page 196.
- Because you cannot edit a published design, use **Save As** or **Create New Version** if you need to modify a published design.
- Deleting a design cannot be undone.

Topology design versions

After you publish a topology design, it can be used to create a service offering. The published design cannot be changed. You can create a new version of a selected design, and this new version can then be edited and configured as needed. Throughout the topology designs area, version numbers display at the top of the window next to the **Display Name**.

Tasks

View versions - The **Versions** list is sorted by creation date (with newer designs displayed above older designs) and is a read-only view of the version numbers with their creation date and time, as well as an indication if the design is published.

Create New Version - Click **Create New Version** to create a new version of the design. Each design may have multiple versions.

Topology design access control

You can configure access control for users and groups for a topology design. Groups can be configured for the Provider organization and on the LDAP server. Users must be configured on the LDAP server.

Tasks

You can perform the following tasks in the Access Control tab:

- Sort the list Select whether to sort By Roles or By Users and Groups.
- Search Use the search box to search the list for users and groups.
- Manage Access Control Click Manage to do the following:
 - \circ $\,$ Select whether to restrict access to the design.
 - Search for users or groups whose access you want to enable for this design.
 - Add Users and Groups Click the add icon. Select whether to Search Users or Search Groups, or enter a search string to find users in LDAP and add them to the list of users who can access this design.
 - Remove a user or group Click the delete icon to remove the selected user or group.

Best practices

You can use an asterisk (*) as a wildcard in your search string. Use **Shift** or **Ctrl** to select multiple users or groups.

Topology designer

In the **Designer** tab, you create a layout of components, their relationships, and groups. A single design can contain components of multiple provider types, such as VMware vCenter and SiteScope components.

Designs have their resource provider (and resource pool, when appropriate) selected at provisioning time.

Concrete Components and Capabilities

A component represents one service design element required to realize a service subscription. Components added to the design can be either concrete components, such as VMware vCenter server, or capabilities, such as Web Server.

When only concrete components are included in a design, those specific components are provisioned. When a design contains a capability, the design can be neither published nor provisioned on its own and requires a separate design, often called a microservice design. A microservice design contains concrete components that satisfy each capability expressed in a design. For example, if a design contains a **My App** component that has relationships to **Application Server**, **Database Server**, and **Web Server** (each of which is a capability), a suitable microservice design might contain **PHP**, **MySQL**, and **Apache** components. Designs containing a capability cannot be published but can be provisioned by clicking the **Test Run** button and then selecting from one or more candidate microservice designs.

Requirements (Required Characteristics)

In the topology **Designer** tab, requirements can be specified on capability components. A requirement allows you to refine which concrete designs should be selected when a partial design is provisioned. For example, Apache Web Server can be a required characteristic that is specified on a Web Server capability. In this use case, only designs that contain a component that supports the Web Server capability and has Apache Web Server as a supported characteristic of the component will be selected when a design is provisioned.

Tasks

Designs can be created from the set of topology components that are defined in the **Components** area of the Cloud Service Management Console. Many components are included with CSA. If necessary, import any additional components that you need prior to creating a design. See "Import Topology Components" on page 202.

Note: Designs are automatically saved every few seconds after a change or immediately after a significant and meaningful change is made to the design.

Add components to your design - From the set of components (based on the palette you selected for the design) in the left pane of the Designer, drag-and-drop or double-click the component you want to add. The components you select can be concrete components or capabilities. Capability components are indicated in the Designer by two less-than characters (<<) preceding the display name and two greater-than characters (>>) following the display name.

You can also click a component in the design to access a slide-out menu where you can:

- Click the Add icon to select and add a component that supports relationships to or from the selected component.
- Click the Edit icon to edit the selected component. You can edit the Display Name, or you can select a Group to which the selected component will be added. See "Groups (Topology

Designs)" on page 189.

- Click the **Delete** icon to delete the selected component and its relationships.
- Add and delete relationships between components Click a component in the design and select the Add icon to see a list of compatible component relationships, or hover over the orange dot on a component, and then click and drag the arrow to the component with which you want to create a relationship. Relationships that are not compatible with the component appear grayed-out in the Designer.
 - You can create relationships only between components that have been configured to allow such relationships. In addition, the direction of the relationship (outgoing or incoming) and the number of allowable relationships are configured per component. See "Component relationships" on page 206. After the connection is made, the arrow automatically points in the proper direction, as defined by the component relationship configuration. Capabilities support only incoming relationships. Capabilities do not support outgoing relationships when included in a design.
 - You can also click a relationship arrow or label in the design to open a menu where you can click the **Delete** icon to delete the selected relationship.
 - Set property values for components In the Properties tab, in the right pane of the Designer, you can set property values by typing in the corresponding input field.
 - Click Save to save property changes.
 - Select characteristics for capability components- In the Requirements tab, in the right pane of the Designer, click Select to select characteristics for a capability component. In the dialog box, you can :
 - Select one or more characteristics from the Available Characteristics list, and click Add. You can filter the list by Applicable Characteristics or by All Characteristics. The Applicable Characteristics list shows all characteristics supported by all concrete types that have the selected capability as a supported capability. For example, if there are concrete components Apache 2.2 Web Server and Apache 2.4 Web Server that support the Web Server capability, all characteristics supported by those 2 concrete types will be displayed when Applicable Characteristics is selected for a Web Server capability.
 - View the list of **Selected Characteristics**, or select one or more characteristics and click **Remove**.
- Manage Groups You can create, edit, and delete groups. See "Groups (Topology Designs)" on the next page.
- Assign Components to Groups See "Groups (Topology Designs)" on the next page.
- View Validation Errors Validation is a continuing process during design creation, configuration, and editing. Designs with validation errors can be saved but not published. Red error icons and red

borders display on components, relationships, and groups in the **Designer**, allowing you to identify validation errors as you work with designs. Hover over an error icon to see more information about the validation error. Common sources of validation errors include required properties on components, relationships, or groups not being defined, required relationships not being configured, or the cardinality rule of relationships being violated.

Best Practices

- Partial designs contain capabilities and require composition with a compatible concrete design before they can be published and deployed. These designs are indicated in the **Designer** tab by a **Requires Composition** icon in the upper right of the window.
- Use the icons at the bottom center of the **Designer** tab to make use of the automatic layout feature or to zoom in and out in the design.
- You can slide the component drawer open or closed to allow more room in the **Designer** window.
- Published designs are displayed in read-only mode. Some features are not available for published designs.

Groups (Topology Designs)

Groups are used to create scalable stacks of components in the **Designer** tab. Scalable stacks contain related components that can be scaled out or scaled in together. For example, you can create a Web Server group that contains the following three components in its scalable stack:

- A web application
- An Apache web server
- The server component on which the other two components are hosted

Optionally, you can expose the **Instance Count** of a group to subscribers who can specify the number of instances of the scalable stack that will be provisioned. For example, if an **Instance Count** of 2 is specified in the example above, then two instances of the Web Server group (with a combined total of six components) will be provisioned.

The groups created for a topology design are unique to that design. They are not shared across designs. A relationship can be created between two components inside a group or between a component outside a group and a component inside a group. However, relationships are not supported between components that belong to different groups.

Tasks

Manage Groups

In the **Designer** tab, click **Manage Groups** to perform the following tasks for groups:

- Create Group Click the Create icon and provide the following information for the group:
 - $\circ~$ Display Name Enter a unique display name for the group.
 - Image Select an image that will display in the Operations area of the Cloud Service Management Console and in the Marketplace Portal.
 - Color Select a color that appears as the background for the group when it displays in the Designer tab.
- Edit Group Click the Edit icon to change the Display Name, Image, or Color for a group.
- **Delete** Select the group you want to delete and click the **Delete** icon. If you delete a group that contains components, the components remain in the design and the group is removed from the design.

Add Components to Groups - In the Designer tab, click a component in the design to access the menu that slides out to the right of the component. Click the Edit icon and select a Group to which the selected component will be added. A group is displayed in the Designer as a colored rectangle, which contains all components in the group.

Configure Group Properties - Click in the group's colored background or title bar, and do the following:

- 1. In the **Properties** tab, in the right pane of the **Designer**, set **Instance Count** to indicate the number of instances of the group that will be provisioned for the topology design.
- 2. Click **Save** to save property changes.

Move a Group - Click within a group and drag the group to a new location in the Designer.

View Unused Groups - An information box displays in the lower left corner of the **Designer** when a topology design contains any groups that are unused. Unused groups are groups that have been defined, but contain no components. Click the **Show** link to see the list of unused groups. Click **Hide** to close the list of unused groups.

Topology design subscriber options

Use settings on the **Subscriber Options** tab to configure option sets and options to present to a user at subscription time. Option sets are configured in a topology design by adding options, creating option properties, and binding option properties to component or group properties in the design.

Option sets, options, and properties offer the subscriber the ability to customize the service that gets provisioned. An option set should contain one or more options and can be configured to allow the subscriber to select one or multiple options within the option set. Option properties can then be defined on an option, with the value for the property provided either by the designer, service offering manager, or subscriber. Bindings configured on option properties map the provided value to component or group properties in the design. In this use case, the user selected options and property values to customize the service that is provisioned.

After options have been entered, you can publish the design. Option Sets and Options cannot be deleted after they are published. After publishing, the option sets are made available in the **Offerings** area of the Cloud Service Management Console, where they can be further refined and configured. The subscriber options are then exposed to subscribers in the Marketplace Portal, allowing them to select values that customize the service offering for their personal needs.

Add Option Set

Use this functionality to create a hierarchy of option sets that is up to three levels deep:

- Option Set 1
 - Option
 - Option Set 2
 - Option
 - Option Set 3
 - Option

Click the Add Option Set link or click the button in the upper right panel. You can also click the Copy Option Set and Paste Option Set buttons to copy option sets, both within and across designs.

After an option set has been created, you can configure the following values for the option set on the right side of the window:

- Image Clicking the image icon allows you to change the image for the option set.
- Display Name Specify a display name for the option set.
- **Description** Specify a description for the option set.

Modify Options - Check Modifiable during service modification to allow the subscriber to
modify this option set in the Marketplace Portal after a subscription has been ordered. If checked,
ensure that all property bindings from options in the option set exclusively target properties that are
themselves modifiable during service modification. Unchecking prevents a subscriber from
changing the selected values of this option set when modifying the subscription in the Marketplace
Portal.

Managing Multiple Option Sets or Options

The selected option set or option is highlighted in blue. With the option set or option selected, you can Use <Ctrl> + the arrow keys to drag the selection up and down the list to reorder. An option set or option can also be reordered by clicking and dragging it.

Delete an Option Set or Option

With the option set or option selected, press the **Delete** key on the keyboard or click the trash can on the right.

Copy and Paste an Option Set or Option

You can copy and paste option sets or options within a design, between designs, and within a tree within a design. The copy includes the entire structure, including property bindings when copied within the same design. When pasting options or option sets into a new design, bindings will not be copied and you will need to manually configure them.

After copying and pasting an option set or option, changes to the original option set or option do not impact the newly created option set or option or vice versa.

To Add Options to an Option Set and Configure Selection Options

Click the option count button to navigate to the list of options for that option set. The name of the current option set will be displayed above the list of options. Click **Add Option** to add an option to the option set.

After selecting **Add Option**, the new Option **Display Name** is automatically generated to a unique value; you can then customize the **Display Name** and **Description** for the option.

An option set can be configured for Single-Select or Multi-Select.

• **Single-Select** - Select to present options as radio boxes in the Marketplace Portal. A subscriber is required to select a single value.

Multi-Select - Select to present options as check boxes in the Marketplace Portal. The subscriber can select 0 or more options for a Multi-Select option set.

Adding Properties to Options

Within an option, the properties panel on the right allows you to view, add, and edit properties, as well as to create bindings.

To Configure Attributes

The following attributes can be configured when creating an option property:

Item	Description
Property Type	 Select one of the following: Boolean — A property whose value is True or False.
	 Integer — A property whose value is a positive or negative whole number or zero. List — A property where you can define a list of values for the subscriber to select.
	String — A property whose value is a sequence of characters.
	 Name — A unique name for the property.
	Display Name — The display name for the property.
	Description — A description of the property.
	• Editable — If selected, indicates the property is editable in a service offering created from the design and can be configured in the offering to be editable in the Marketplace Portal.
	• Required — If the property is Editable , you can select Required to require the service offering or subscriber to provide a value for the property. Boolean properties that are Editable are implicitly Required .
	• Input Validation - If the property is Editable, you can configure an Input Validation script to run and validate user input. This provides an additional level of control to ensure that user supplied values will work properly during provisioning.
	When a script is selected to be used for Input Validation, the script will be run to validate the user supplied value for this option property in the Marketplace Portal.
	You can manage the available set of scripts, and configure parameters to the selected script, using the Manage Scripts and Configure Parameters links:
	 Manage Scripts: To add, download, edit, or delete scripts, click Manage Scripts. For more information on Manage Scripts, see Manage Scripts.
	 Configure Parameters: To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Input Validation.
Property	For Boolean properties:
Details	Service Offering and Marketplace Portal Settings:
	• Editable - Indicates that this property can be made editable in the Offerings area

Item	Description
	and in the Marketplace Portal
	Default Value - Select true or false
	Note: Boolean properties are always required, which means that when a subscription is ordered, a value must be provided for this field. This option cannot be changed for Boolean properties.
	For Integer properties:
	Service Offering and Marketplace Portal Settings
	 Editable - Select to make this field editable in the Offerings area and in the Marketplace Portal
	 Required - Integer properties are always required, which means that when a subscription is ordered, a value must be provided for this field.
	 Value Range - If Editable is checked, configure a minimum and maximum allowed value for the property.
	 Default Value - Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value.
	For List properties:
	Service Offering and Marketplace Portal Settings:
	 Editable - Indicates that this property can be made editable in the Offerings area and in the Marketplace Portal. Dynamic entry properties are always editable; this field cannot be changed for dynamic entry properties.
	 Required - Select to indicate that when a subscription is ordered, a value must be provided for this field.
	List Selection Type:
	• Single-Select - Select to present options as radio boxes in the Marketplace Portal.
	• Multi-Select - Select to present options as check boxes in the Marketplace Portal.
	List Items:
	• Switch to Static Entry (default) - Enter the name and value for an entry in the list. After the value entry, a new item line is displayed automatically.
	• Switch to Dynamic Entry - Select a script that will determine the values that should be presented to a user in the Marketplace Portal.
	You can manage the available set of scripts, and configure parameters to the selected script, using the Manage Scripts and Configure Parameters links:

Item	Description
	 Manage Scripts - To add, download, edit, or delete scripts, click Manage Scripts. For more information, see Manage Scripts.
	• Configure Parameters - To configure the parameters that should be supplied when running the selected script, click Configure Parameters . For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.
	For String properties:
	Service Offering and Marketplace Portal Settings:
	 Editable - Select to make this field editable in the Offerings area and in the Marketplace Portal.
	• Required – Select to indicate that when a subscription is ordered, a value must be provided for this field.
	Input Type:
	• Single-Line - The input area is presented as and accepts only one line of text.
	 Multi-Line - The input area is presented as a text box and can accept one or more lines of content.
	 Number of Characters - Configure the minimum and maximum number of characters that can be entered for this property. These fields are available only when the Editable and Single-Line options are selected.
	 Input Restriction - Choose an Input Restriction from the following list. These fields are available only when the Editable and Single-Line options are selected.
	 (none) - No input restriction will be performed. A minimum and maximum length can still be configured.
	 Custom Regular Expression - Validates the value based on a regular expression, as specified in the Regular Expression text box.
	• Email Address - Checks that a valid email format is entered.
	• IPV4 Address - Checks that a valid IPV4 address is entered.
	• IPV6 Address - Checks that a valid IPV6 address is entered.
	Non-Numeric Characters - Checks that no numeric characters are entered.
	• URL Address - Checks that a valid URL format is entered. The regular expression used for validating the URL values may allow creating some invalid URL values such as http, http:// or hhh:////. This is because the regular expression validates a wide range of official IANA-registered schemes, which may not detect some invalid URL values.
	• Default Value - Type a string of characters.
	 Confidential - Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed. Note that this field is available only when the Single-Line option is selected.

Item	Description
Property Bindings	Select the topology component or group to which you want to push the value of this property. Then select the appropriate property from the list of compatible properties. This is called a target binding.

Property icons

- Edit Property The Property Type cannot be changed, but any other fields related to the property type can be edited.
- Bind Property Binding is a link between option model properties and service component properties or groups in a design. A property can have more than one binding. Click the Configure Bindings icon to display a working area where you can view and delete existing bindings and configure new bindings.
- Delete Property Click the trashcan icon to delete the property.
- Copy properties Click the Copy Property to All Options icon to copy the current property to all options in the current option set. This icon is only present for Single-Select option sets.

Testing a topology design

Use the **Test** tab to test and manage topology design provisioning without having to publish the design or create a service offering. You can test the following types of topology designs:

- Partial design A partial design is any design that contains capabilities. Such a design cannot be
 provisioned on its own and requires the selection of one or more compatible microservice designs.
 The partial design and the microservice designs are then composed to form a composite design,
 which can then be provisioned. During the test run of a partial design, you will be prompted to select
 from the list of candidate microservice designs. A valid microservice design:
 - Is a concrete design. See definition of **Concrete design** below.
 - Contains either of the following:
 - Concrete components that support each of the capabilities used in the partial deign, each of which supports all of the required characteristics specified on the capability in the partial design.
 - A concrete component that supports a particular capability used in the partial design and that supports all of the required characteristics specified on the capability in the partial design. For this use of microservice designs, you must select **Custom Selection** on the Design

Composition screen during the **Test Run** wizard, and you can make a separate microservice design selection for each capability used in the partial design.

- Has property values configured for all required properties in the design.
- Is not a composite design that was created by the combination of a partial design with another concrete design, unless that composite design was subsequently saved as its own design (see the description of **Composite design** below for more information).
- Has no validation errors.

For example, consider a partial design that includes a concrete component **My App** with relationships to **Web Server**, **Application Server**, and **Database Server** components.

Assume the **Web Server**, **Application Server**, and **Database Server** have required characteristics of **Apache Web Server**, **PHP**, and **MySQL**, respectively.

The partial design could be provisioned with a single microservice design that contains **Apache 2.4 Web Server**, **PHP 8**, and **MySQL 5.5** components, respectively supporting the **Web Server**, **Application Server**, and **Database Server** capabilities, which respectively support the characteristics **Apache Web Server**, **PHP**, and **MySQL**, with each component configured to be provisioned on a **Server**. Alternatively, separate microservice designs can be selected for each of the three capabilities included in the partial design.

- **Composite design** The combination of a partial design with one or more microservice designs creates a composite design that is itself a concrete design. A composite design is typically hidden from view in the list of topology designs. It can be made visible by navigating to the **Test** tab of the associated partial design and clicking **Save Design** for the test run that created the composite design. This enables the composite design to be published and exposed to subscribers as a service offering, and also allows selection of the composite design as a microservice design when performing test runs of partial designs.
- Concrete design A design that contains no capabilities. A concrete design can include components that support a capability. However, a concrete design cannot directly contain capability components, such as Server, Web Server, Application Server, Database Server, and Platform.
- Microservice design A microservice design is a concrete design that meets all or some of the needs of a partial design. When deploying a partial design, you can either select a single microservice design that meets all the needs of a partial design or you can select separate microservice designs for each capability that exists in the partial design. Because partial designs are generally focused on applications and typically do not contain infrastructure components (such as servers), the partial design is sometimes referred to as an application design, while the concrete design (or designs) it gets deployed with is called a microservice design.

Tasks

You can view the following information in the Test tab:

- The name of the test run
- Date and time of the test run
- Current status of the test run
- The user who initiated the test run

You can perform the following tasks in the Test tab:

- Cancel the realized design so that the instance is terminated. You must cancel before you can delete.
- Delete a canceled or failed deployment instance. You must cancel before you can delete.
- Save Design Saves a new composite design, which will appear in the All Designs list for topology designs. Save Design is available only for partial designs that have successfully completed the Test Run process.
- Test Run button See Test Run Wizard.
- Click the gear icon and select Refresh to refresh data in this tab.

You can link to detailed results of test provisioning by clicking the name of the test run. You can see the following information and perform the following tasks:

- **Overview** tab shows details of the test run.
 - **Cancel** the realized design so that the instance is terminated. You must cancel before you can delete.
 - **Delete** a canceled or failed deployment instance.
- Events tab shows:
 - **Event Time** The time the event occurred.
 - Lifecycle Stage The lifecycle stage and phase of the event execution, such as Deploying or Undeploying.
 - Action Operations, such as deployment and server restart, that are executed during the test run.
 - **Source** The design component that is the source of the event.

- **Status** The current state of the test run. If you click on an event, you see details about the event in the **Overview** tab and property values used in the test run in the **Properties** tab.
- Topology tab shows:
 - The topology diagram, properties, status of the test, and an instance summary.
 - Select a server component in this tab to see properties in the right panel and available actions below. You can invoke an action to verify that it is working.
- Providers tab shows which provider instances have been used for deployment.

Test Run Wizard

Use **Test Run** on a topology design's **Test** tab to test the design directly from the Cloud Service Management Console without having to publish the design or create a service offering.

The Test Run wizard allows you to specify the following:

- **Display Name** Enter a display name or use the system proposed name of Test run of <design name>.
- Environment (Optional) Select an environment that restricts provider selection to only those providers located in the selected environment.
- Service Design (Available only for partial designs) Select a design from the list that, together with the partial design, will form a composite design that can be provisioned. The list displays concrete designs that support all capabilities and required characteristics in the partial design, as described in the **Concepts** section earlier in this topic. If the partial design contains multiple capabilities, you can also select **Custom Selection** and then select separate microservice designs for each capability in the partial design.
- **Group Property** (Available only for designs containing groups) Configure the **Instance Count** for each group used in the design.
- **Component Property** Configure property values for each component used in the design. The unit is displayed for properties that are set as measurable.

Best Practices

- After deployment cancellation, the test run is still listed in the tab. If you no longer need the entry, you can delete it.
- Select a new name for every test run so you can distinguish between them.

 Test your designs using various deployment scenarios and property configurations to ensure design stability before publishing.

Components (Topology Designs)

Use the **Components** area in topology designs to import, create, and configure components. A component represents one service design element required to realize a service subscription. CSA provides a number of components you can use for creating topology designs.

Component Types

There are three types of components:

- **Concrete components** are the most common components that you will interact with. Concrete components can contain properties, relationships, and operations. Concrete components can express support for capabilities, such as Server, Application Server, Database Server, and Web Server, and can also support characteristics. Concrete components can be included in a design.
- Abstract components provide a base type for other components and can be the target of relationships configured on a component. Abstract components can contain properties and relationships. Abstract components cannot express support for capabilities or characteristics. Abstract components cannot be included in a design. Abstract components cannot be created by the user.
- A capability is a special type of component that supports properties and relationships, but does not support operations or characteristics. When a concrete component supports a capability, the concrete component inherits the capability's relationships and must provide property mappings from the concrete component properties to the capability properties. Capabilities can be the target of relationships configured on a component. Capabilities can be included in a design, but for such a design to be successfully provisioned, another design must exist that contains a concrete component supporting the capability.

Component Palettes

Palettes are user-defined groupings of components. A component can belong to multiple palettes.

When you create a topology design, you can optionally select a palette. Selecting a palette will restrict the available components that can be used in the design to the components that exist in the palette.

Tags

Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping topology components. A component can be assigned to multiple tags.

Tasks

- Select how to view components By Palette, By Tag, or By Provider Type. Click an item in the left pane to see its components displayed in the right pane.
- Search Box Enter text in the Search box.

Click the gear icon to perform the following tasks:

- Create Component In the Create Topology Component dialog, enter the following information:
 - **Display Name** A unique display name for the component.
 - **Description** A brief description of the component.
 - Version The version number of the component.
 - Functional Type The functional type of the component can be Concrete or Capability.
 - Provider Type Select a provider type for the component. Provider Type selection is supported only for Concrete functional types.
 - Image An image that will display for the component.
 - Tags Select one or more tags that will include the component.
- Import Component Complete all steps in the Import Topology Component wizard. See "Import Topology Components" on the next page.
- Manage Component Tags In the By Tag view, click the gear icon and select Manage Component Tags. Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping topology components. A component can be assigned to multiple tags.
- Manage Component Palettes In the By Palette view, click the gear icon and select Manage Component Palettes. In the Manage Components Palettes dialog, use the toolbar to add (create), edit, or delete a component palette.
- Select Palette Components When you are in the By Palette view and when you have selected a user-created palette, click the gear icon and select Select Palette Components. In the Select Components dialog, add or remove available components. You can select one or multiple components and then click Add or Remove.
- **Navigate to component details** Click the name of a component in the list to see more information about it, such as Overview, Properties, Relationships, and Operations.

Best Practices

If you have a large number of components, use tags to organize them into meaningful groups.

Import Topology Components

Importing topology components provides you with the ability to use content from sources that are external to CSA. The topology component import options are based on the following provider types:

- Chef
- HPE Insight Control server provisioning
- HPE OneView
- Operations Orchestration
- Server Automation
- Puppet

For information about importing operations, see "Component operations" on page 207

Tasks

From the **Topology Components** area, click the gear icon and select **Import Component**. Enter the following information:

Item	Description
Content	 Import Source - Select the provider type to use as the import source for the component.
	• Provider Instance - Select the provider instance that contains the component you want to import. Provider instances must first be configured in the Providers area to enable import for Chef, Server Automation, and Puppet provider types. For Operations Orchestration, content can be imported from the instance that is configured to integrate with CSA.
	Depending on your selections above, select the content for the component:
	Chef - Select one or more Chef cookbooks to be imported as new topology components. Each selected cookbook will create a separate component.
	HPE Insight Control server provisioning - Select one or more OS Build Plans

ltem	Description
	(OSBPs) to be imported as new topology components. Each selected OSBP will create a separate component.
	• HPE OneView - Select one or more Server Profile Templates or Unassigned Server Profiles to be imported as new topology components. Each selected item will create a separate component.
	• Operations Orchestration - Browse the Operations Orchestration library and select one or more standard component elements that will be imported as new CSA topology components. Each selected item will create a separate component.
	• Server Automation - Select one or more policies to be imported as new CSA topology components. Each selected policy will create a separate component.
	• Puppet - Select one or more Puppet classes to be imported as new topology components. Each selected class will create a separate component.
General	• Change Image - Select an Image that will display for all elements you are importing.
	• Tags - Select one or more tags that will include the component. Tags are user- defined, color-coded labels and images used to provide a structure for organizing and grouping topology components.
Summary	Review your import selections, and click Import . Your imported components will appear in the Topology Components list.

Component overview

View summary information about the selected component in the **Overview** tab.

Tasks

You can perform the following tasks in this area:

- View See the following component information:
 - **Display Name** The name displayed for the component.
 - **Description** The description configured for the component.
 - Version The version configured for the component.
 - **Provider Type** The provider type configured for the component.
 - Functional Type The functional type can be Abstract, Concrete, or Capability. See "Components (Topology Designs)" on page 200.

- **Image** The image configured for the component.
- Tags- The tags configured for the component.
- Save As Save the component with a new **Display Name** and **Description**. Save As can be used only for concrete components. This action cannot be used for abstract components or capabilities.
- Edit Component Click the gear icon and select Edit Component. The following restrictions apply to editing components:
 - You cannot edit a component that is an abstract component or a capability installed with CSA.
 - For all other components, you can edit the **Display Name**, **Description**, **Image**, and **Tags**.
- Delete Component Click the gear icon and select Delete Component. You cannot delete a component that is being used in a topology design. Some components installed with CSA cannot be deleted.

Component properties

Properties provide a base set of attributes that can be used and edited when creating components in a service design. They represent configuration settings to be applied to the component during service design provisioning. The value defined for a component property is the default value exposed in the service design.

Tasks

View the following information about component properties:

- Display Name The display name of the property.
- Value The default value for the property.
- **Visible** This label displays if the property is visible to the designer. If this label does not display, the property is not visible to the designer.
- **Supports Modify Lifecycle** This label displays if the property can be modified during the modify lifecycle transition phase.

Create a component property:

- You cannot create properties of a component that is an abstract component or a capability.
- Newly created properties do not affect existing service designs. You must manually update any design that uses the component by recreating the component in the design.

• For components that are being used in a topology design, you can only add additional properties, and the new properties cannot be **Required**. You cannot modify existing properties, except to change the default values for **Display Name**, **Description**, and **Default Value**.

Click **Create** and enter the following information for a property:

Item	Description
Туре	Boolean - True or False.
	• Integer - A positive or negative whole number or zero.
	List - A list of string values.
	• String - A sequence of characters.
Name	A unique name for the property. This value cannot be changed after the component is created.
Display Name	The name that displays for the property.
Description	The description that displays for the property.
Resource Type and Unit for a Measurable Property	Available for Integer properties only. Select a resource type and unit (other than None) to make this property measurable and to enable automatic accounting of resource usage in a provider's resource pool.
Default Value	The default value exposed in the service design.
Confidential Data	Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed.
Consumer Visible	Use the check box to indicate if the property will be visible in the Marketplace Portal.
Designer Visible	Use the check box to indicate if the property is visible in the topology design.
Required	Use the check box to indicate if the property is required in the topology design. Required can only be selected for Designer Visible Properties

Edit a component property:

You cannot create properties of a component that is an abstract component or a capability.

Click the gear icon and select Edit.

Delete a component property:

You cannot delete properties that are being used in a design.

Click the gear icon and select **Delete**.

Component relationships

Relationships in topology designs define dependencies between components and also impact how a design is provisioned. For example, imported Chef components require a server in order to be provisioned. Therefore, all imported Chef components are created with an outgoing relationship to the server capability, ensuring that a server is provisioned before the Chef component.

When importing new components, you might need to define new relationships. Some relationships are created for you automatically at import time, such as the Chef component dependency on a server discussed above. If there are additional dependencies, define them manually in this tab.

Tasks

View the following information about the relationships:

- Direction Outgoing or Incoming.
- **Target or Source Component** The component icon, name, and version of the target or source component to open the **Overview** tab for that component.
- Display Name The display name of the relationship.

Use the corresponding icon or button to:

- Create or Edit a relationship:
 - You cannot create or edit incoming relationships.
 - You cannot create or edit a relationship on an abstract component.
 - You can create or edit a relationship on capabilities that you create yourself, but you cannot create or edit a relationship on capability components installed with CSA.
 - Until a component is used in a design, relationships can be added and edited. After a component is used in a design, relationships can still be added and edited, but adding new required relationships (or editing an existing relationship to make it required) is not supported. When a relationship is already used in a design, only **Display Name** and **Description** edits to that relationship are allowed.

Provide the following information for a relationship:

Item	Description
Target Component	Select the target component for the relationship from the Select Component dialog box, which provides a list of available components.
Display Name	The name for the relationship.
Description	The description for the relationship.
Maximum Outgoing Relationships From Source	Enter a number to indicate the number of instances of the target component that a single instance of the source component can be connected to.
Maximum Incoming Relationships To Target	Enter a number to indicate the number of source components that can be connected to a single instance of the target component.
Required Relationship	Use the check box to indicate if the relationship is required when the component is used in a design. If selected, the source component will display a validation error when a relationship to the target component is not present in the design.

 Delete a relationship - Click the gear icon and select Delete. You cannot delete incoming relationships.

Component operations

Tasks

View the following information about the operations:

- Display Name The display name of the operation.
- **Parameters** The parameters associated with the operation.
- Visible This label displays if the operation is visible to the subscriber. If this label does not display, the operation is not visible to the subscriber.

Use the corresponding icon or button to:

• Import an operation — Click Import. You can import an operation, assign a lifecycle action (for example, Deploy or Undeploy), and edit operation parameter mappings. For example, you can

import a new Operations Orchestration operation into an existing Chef component.

To import, select one or more Operations Orchestration flows to import as new operations. Each item you select will create a separate operation on the topology component.

• Edit an operation — Click the gear icon for the operation and select Edit.

Note: You cannot edit operations on an abstract component or a capability component.

Complete all steps in the Edit Operation wizard:

• Delete an operation — Click the gear icon for the operation and select Delete.

Item	Description
General	• ID - A unique identifier for the operation. You cannot edit this field.
	Display Name - The name that displays for the operation.
	Description - The description that displays for the operation.
	• Visible - Use the check box to indicate if the action is visible in the Marketplace Portal.
	 Lifecycle Action - Select (none) for user operations that will be exposed to subscribers in the Marketplace Portal. Otherwise, select a lifecycle action that will be used during provisioning or de-provisioning: Deploy – Actions specified in this lifecycle phase realize a component during the provisioning of a design that is using the component.
	 Deploy failure handler – Actions specified in this lifecycle phase handle failures that occur during the execution of the Deploy lifecycle phase action on a component as part of provisioning a design.
	 Undeploy – Actions specified in this lifecycle phase deprovision a component during the deprovisioning of a service instance that is using the component.
	 Undeploy failure handler – Actions specified in this lifecycle phase handle failures that occur during the execution of the Undeploy lifecycle phase action on a component as part of deprovisioning a design.
	 Modify – Actions specified in this lifecycle phase are executed on a component during the modification of a realized component in a service instance, when the service instance is modified by the Modify Subscription operation.
	 Modify failure handler – Actions specified in this lifecycle phase are executed for the cleanup of failed Modify actions on a component during the modification of a service instance.
	 Unmodify – Actions specified in this lifecycle phase revert the effect of modification on a successfully modified component. This action occurs during the rollback of an unsuccessful overall modification transition of the service instance due to failure occurring on another component that is also subject to

Item	Description
	modification. The result is that the service instance reverts to the state it was in prior to the modification operation.
Parameters	• Input Parameter Mappings - The list of input parameters and their configured parameter mappings for this operation. Click the appropriate icon to edit an input parameter. See below for more information about editing.
	• Output Parameter Mappings - The list of output parameters and their configured parameter mappings for this operation. Click the appropriate icon to edit an output parameter. See below for more information about editing.
Edit	To edit an existing parameter mapping, click the Edit Parameter Mapping icon.
Parameter Mapping	Name - The unique name for the parameter.
	Display Name - The name that displays for the parameter.
	Description - The description for the parameter.
	• Required - Use the check box to indicate if the parameter is required.
	 Mapping Type - Select the mapping type for the parameter mapping. Component Property - Select to map the parameter to or from a property on this component. Select the component property in the Value list.
	 Constant Value - Select to provide a constant value for the parameter. Enter the constant value in the Value field. This is not available for output parameters.
	 Context Property Token - Select to map the parameter to an execution context-dependent value. Tokens represent values that are not known at design time; the value depends on the context of the action execution. For example, the execution may require information about a subscriber, or it may require session information. Select the token in the Value list.
	 Multiple Properties - Map to multiple properties. Click Add Parameter to create additional parameters.
	• Not Mapped - Select to provide no parameter mapping.
	 Provider Property - Select to map the parameter from a property on the resource provider that is used to provision the component. Enter the name of the resource provider property in the Value input field.
	 Relationship Target Property - Select to map the parameter from a property on a different component that this component has a relationship to. Select the proper relationship in the Relationship list, and then select the component property in the Value list.
	 User Value - Select to prompt the user for a value during design execution. This mapping is valid for user operations only. When a user operation is executed, the user is asked to provide values for all parameters mapped to the User Value.
	• User Value List - Select to map the parameter to a list item.
	• Switch to Static Entry (default) - Enter the name and value for an entry in

Item	Description
	the list. After the value entry, a new item line is displayed automatically.
	Switch to Dynamic Entry - Enter or select a JavaScript.
	 Manage Scripts - To add, download, edit, or delete scripts, click Manage Scripts. For more information, see Manage Scripts.
	Configure Parameters - To configure the parameters that should be supplied when running the selected script, click Configure Parameters. For more information on Configure Parameters, see Configure Parameters for Dynamic Entry List.

Component capability

The Capability tab is visible for concrete components.

Concrete components can claim support for a capability component. A supported capability includes a reference to the capability component, including property mappings between the capability component and the concrete component. A single capability, such as Web Server, can be supported by multiple concrete components. However, a concrete component can only support a single capability.

A capability component can be included in a design to indicate that a concrete component supporting that capability is required in order to successfully provision the design. Designs that include capabilities are referred to as partial designs and require composition with one or more other designs in order to be provisioned. For additional information on partial designs, see "Testing a topology design" on page 196.

Tasks

View the following information about the capability:

- **Supported Capability** The display name of the supported capability, if any. Supported capabilities are provided out-of-the-box for some concrete components.
- Property mappings A list of each Capability Property and the Component Property from which it gets its value.

Note: To use **Provider Type** mapping property in the **Operations** tab, for Parameter Mapping, you must associate the component with a provider type.

Perform the following tasks:

- Add Supported Capability Click this link or Add to enter information in the Add Supported Capability dialog. You cannot add a capability if the component is being used by a topology design.
- Edit a supported capability Click Edit to modify capability and component properties. You cannot edit a capability if the component is being used by a topology design.
- **Remove** a selected capability. Click **Remove** to remove the supported capability and all property mappings from this component. You cannot remove a capability from a component if the component is being used by a topology design.

Item	Description
Selected Capability	Choose a capability to add to this concrete component. You cannot edit this field after a supported capability has been added.
Property Mappings	 For each Capability Property in the list, do one of the following: Select a Component Property from which the Capability Property gets its value. Leave the Component Property as Not Set.
	Any capability property that has the same 'property name' as a concrete component property (using a case-sensitive string match) is automatically mapped.

Component characteristics

The Characteristics tab is visible for concrete components.

Characteristics describe a component and must be used in combination with capabilities. For example, an Apache 2.4 Web Server concrete component can define support for the following characteristics:

- Apache Web Server
- Apache Web Server 2.x
- Apache Web Server 2.4

If this component supports the Web Server capability, a service designer can include a Web Server capability in a design and specify that the design requires the "Apache Web Server 2.4" characteristic. This allows a design containing the Apache 2.4 Web Server component (or any other Web Server components supporting this characteristic) to be chosen as part of provisioning the design.

A component should be associated with a capability when supported characteristics are configured. For more information, see "Component capability" on the previous page.

Tasks

View the following information about the characteristics:

• Supported Characteristics — See a list of the characteristics supported by the component.

Perform the following tasks:

• Select characteristics for this component — Click this link or click Select.

Item	Description
Available Characteristics	Select one or more characteristics in the list and click Add.
Selected Characteristics	View the list of selected characteristics or select one or more, and click Remove .
Manage Characteristics	Create a characteristic - If this is your first characteristic, click Create your first characteristic now.
	Provide a Display Name for the characteristic.
	Provide a Description for the characteristic.
	When characteristics already exist, you can:
	Click the Create icon to create a new characteristic.
	Click the Edit icon to edit a selected characteristic.
	 Click the Delete icon to delete a selected characteristic. You cannot delete a characteristic that is a required characteristic in a partial design.

Operations

Use the Operations area of the Cloud Service Management Console to view and manage subscriptions and service instances for all consumer organizations. A subscription originates with a subscription request, which is a request for delivery of cloud services that is initiated by the subscriber (end user) using a service catalog in the Marketplace Portal. After a subscription request is approved, a service instance is created.

View subscriptions for an organization

1. In the left pane of the Operations area, select the name of the organization whose subscription information you want to view. Subscription information is displayed by user in the **Users** tab and by service offerings in the **Offerings** tab.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. Use the drop-down list to select an option for sorting. Use the search box to filter the subscriber information. Only the User Name and associated email address are included in the search.
- 3. Review the following information for each user:

Item	Description
User Name	This column appears only in the Users tab. The user name (and associated email address) that the Subscriber uses to log into the Marketplace Portal. Note: Only subscriptions submitted by the subscriber are included in the list of subscriptions. Subscriptions submitted for a group the subscriber belongs to (that were not submitted by the subscriber) are not included in the list. Subscriptions submitted for a group are identified by the group icon
Offering Name	This column appears only in the Offerings tab. The service offering name (and version) of an offering published in the organization's catalog.
Subscription Summary	The number of subscriptions with the status:

Item	Description
	Active
	Pending
	Paused
	Canceled
	C Expired
	Failed
	For a more detailed description of each status, see "View subscriptions for a user" below.
Request Summary	The number of requests in the following state:
	E Pending Approval
	Last Request Date -The date of the most recent subscription request made by this subscriber.

View subscriptions for a user

To view all subscriptions for a user

Note: Only subscriptions submitted by the subscriber are included in the list of subscriptions. Subscriptions submitted for a group the subscriber belongs to (that were not submitted by the subscriber) are not included in the list. Subscriptions submitted for a group are identified by the group icon

- 1. In the left pane of the Operations area, select the name of the organization whose subscriber information you want to view.
- 2. Click the Users tab.

Note: The list of subscribers shown in the Users tab is the list of users who have logged in to

the Marketplace Portal at least once.

- 3. Select the user whose subscriptions you want to view.
- 4. In the top of the **Subscriptions** tab, review the user name and a subscription status summary for this user.
- 5. By default, the table is sorted by the Submitted On date. To change the sort option, select an option from the drop-down list. Use the search box to filter the subscriptions. Only the Display Name, Service Offering Name, Subscription Status, Service Instance Status, and Service Instance Health Status (when available) are included in the search.
- 6. For each subscription, review the following information:

Item	Description
User Name	This column is available only in the Offerings tab. The user name (and associated email address) that the Subscriber uses to log into the Marketplace Portal and who has subscribed to this offering.
	Note: Only subscriptions submitted by the subscriber are included in the list of subscriptions. Subscriptions submitted for a group the subscriber belongs to (that were not submitted by the subscriber) are not included in the list. Subscriptions submitted for a group are identified by the group icon
Subscription Details	The subscription details include the following:
	 Display Name (Service Offering Version) - The name of the subscription, as entered by the subscriber at order time, and the version of the service offering used for the subscription.
	 Service Offering Name (Service Catalog Name) - The name of the service offering from which this subscription was created, followed by (in parentheses) the name of the service catalog from which the subscription was ordered (only the service catalog name appears in the Offerings tab). If the service offering is associated with Global Service Catalog, then the resulting subscriptions will be part of the default catalog for that organization. In the Overview tab of a selected subscription, the version of the service offering is also displayed.
	• Upgrade Available - This label is visible if the subscription can be upgraded.
Design Name	This field is available in the Overview tab of a selected subscription only. The name and version number of the design from which this subscription is created.
Submitted On	The date the subscription was submitted by the Subscriber.

Item	Description
Subscription Period	The date the subscription deployment began, followed by the date the subscription ends.
Subscription Cost	This field is available in the Overview tab of a selected subscription only. The total cost of the subscription.
Subscription Status	The subscription status, as described below:
	Active - The subscription is active.
	Pending - The subscription was approved but has not started for one of the
	following reasons:
	• The start date is a future date
	 The subscription has not yet been deployed
	 The subscription was modified, and the modification has been approved but has not yet completed.
	 The subscription was upgraded but has not yet completed. The upgrade was started by the Administrator or Service Operations Manager.
	 An action affecting the service was requested for the service instance, and the action has not completed.
	Paused - The subscription has experienced an error during initial
	provisioning.
	 For a subscription to pause when a failure occurs, the Organization in which the subscription exists must be configured to pause on failures.
	 Subscriptions can be paused only when a failure occurs during the following lifecycle stages: Initializing, Reserving, and Deploying.
	 When a subscription is paused, any On Failure phase actions are not run in CSA; the provisioning stops at the first action of the failed phase.
	 To resume the subscription provisioning, you must first fix the issues that caused the failure, and then click Resume Provisioning, as described in "View topology for a subscription" on page 226. The subscription provisioning then resumes by re-running any actions that failed and continuing with the remainder of the provisioning.
	 The Marketplace Portal displays paused subscriptions with a subscription status of Pending.
	Expired - The subscription period has expired.
Item	Description
---------------------	--
	Canceled - The subscription has been canceled.
	Failed - The subscription was terminated because the deployment failed or timed out.
Service Instance	The status of the service instance created from this subscription, as described below:
Status	Online - The service instance is active.
	Offline - The service instance is no longer available because the
	subscription was canceled or expired.
	Transitioning - The service instance is being reserved for deployment.
	Reserved - The service instance has not started because the start date for
	the subscription is in the future.
	Deploying - The service instance is being deployed.
	Modifying - A modification or action affecting the service instance has not
	yet been completed.
	Modification Failed - A modification or action affecting the service instance
	Upgrading - An upgrade affecting the service instance has not yet been
	completed.
	Upgrade Failed - An upgrade affecting the service instance failed.
	Failed - The service instance deployment failed.
	Canceling - The service instance is being canceled.
	Cancellation Failed - The service instance cancellation has failed.

Item	Description			
	Expiring - The service instance is expiring.			
	Expiration Failed - The service instance expiration has failed.			
Service Instance Health Status	See "Health Status" on page 233.			
Upgradable to	This field is available in the Overview tab of a selected subscription only. A list of the version(s) of a service offering to which this subscription is upgradable.			
Compliance	Compliance column is displayed when compliance integration is enabled. Compliance score of the subscription can be either number (0 to 100) or N/A. It displays compliance score for the subscription as N/A if compliance score is not available.			
	Note: The UIs of ITOC and CSA are not integrated.			

For more information, see "View Subscription Summary" on the next page and "Transfer subscriptions" on page 221.

View subscriptions for a service offering

To view all subscriptions for an offering:

- 1. In the left pane of the Operations area, select the name of the organization whose subscription information you want to view.
- 2. Click the **Offerings** tab.

Note: The list of offerings shown is the offerings that are published in the selected organization's catalogs.

- 3. Select the offering whose subscriptions you want to view.
- 4. In the top of the **Subscriptions** tab, review the offering name and a subscription status summary for this offering.
- 5. By default, the table is sorted by the **Submitted On** date. To change the sort option, select an option from the drop-down list. Use the search box to filter the subscriptions. Only the User Name,

Display Name, Subscription Status, Service Instance Status, and Service Instance Health Status (when available) are included in the search.

6. For each subscription, review the information. The overview provides the same information as described in "View subscriptions for a user" on page 214.

View Subscription Summary

To see a subscription overview:

1. In the left pane of the Operations area, select the name of the organization whose subscription overview you want to see.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. In the **Users** tab, select the user whose subscription overview you want to see. Or, in the **Offerings** tab, select the offering whose subscription overview you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose overview you want to see.
- 4. In the **Overview** tab, review information for the selected subscription. The overview provides the same information as described in "View subscriptions for a user" on page 214.

Tip: From this view, you can upgrade, retry upgrade, transfer, or cancel subscriptions. See "Upgrade subscriptions" below, "Retry upgrade for a subscription" on the next page, "Transfer subscriptions" on page 221, and "Cancel subscriptions" on page 222.

Upgrade subscriptions

A subscription can be upgraded if the **Upgrade Available** label is visible in the Subscription Details in the **Subscriptions** tab of a selected user or in the **Overview** tab of a selected subscription.

When a subscription is upgraded based on the selection of a service offering in an upgrade path, its associated service instance is updated based on the changes made to the service design configured for that service offering. When an upgrade is requested, the total cost of the upgraded subscription (the cost of the subscription after it has been upgraded) and a description of the changes between the original service offering and the selected service offering to which the original service offering is upgradable is displayed.

The following actions are performed when a subscription is upgraded:

- A token (ACTION_EXECUTION_RETRY) is set to false when an upgrade is attempted for the first time.
- Lifecycle actions configured to occur during the Upgrading stage are executed.

If the initial attempt to upgrade fails, the upgrade may be retried. See "Retry upgrade for a subscription" below for more information.

Tasks

To upgrade a subscription:

1. In the left pane of the Operations area, select the name of the organization whose subscription you want to upgrade.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. In the **Users** tab, select the user whose subscription you want to upgrade. Or, in the **Offerings** tab, select the offering whose subscription you want to upgrade.
- 3. In the Subscriptions tab, select the subscription you want to upgrade.
- 4. Click the gear icon and select Upgrade.
- 5. Select the Upgrade To Version, the version of the offering to which the subscription is upgraded.
- 6. Review the total cost of the upgraded subscription and description to verify the changes that will be made upon upgrade.
- 7. Click Upgrade.
- 8. Click **Yes** in the confirmation dialog.

Retry upgrade for a subscription

If an upgrade to a subscription has failed (a lifecycle action failed during the upgrading state), an upgrade to the subscription can be retried. That is, any lifecycle actions that have successfully completed for the upgrade will not be re-executed, the lifecycle action that failed will be re-executed, and any lifecycle actions that have not yet run will be executed.

The Service Operations Manager can investigate the failure by viewing the service instance topology for the subscription to determine the node that failed (see "View topology for a subscription" on page 226). A node that is in a Failure phase means that a lifecycle action has failed on the node and must be

fixed (see "View events for a subscription" on page 223 for information on how to review event information on the node to determine the event that caused the failure). A node that is in a Before, During, or After phase means that there are lifecycle actions for the node that need to be executed to complete the upgrade.

The following actions are performed when an upgrade to a subscription is retried:

- The lifecycle action that caused the upgrade to fail is re-executed.
- A token (ACTION_EXECUTION_RETRY) is set to true to indicate the lifecycle action is being executed as part of a retry of an upgrade.
- Upon successful execution of the lifecycle action that previously failed, the rest of the lifecycle execution for the upgrade (if any) is completed.

When an upgrade to a subscription fails, all subscribers to that subscription receive a notification that the upgrade failed. In the My Service Details view of the Marketplace Portal, service components will only show an Upgrading status. The subscriber may click **View Service Topology** to display the topology diagram with the lifecycle phase of each service component. The lifecycle phase indicates which service component has failed. Note that the subscriber has a limited view of the components (nodes) that make up a subscription. That is, the node that failed may not display in the subscriber's topology diagram in the Marketplace Portal.

Tasks

To retry an upgrade for a subscription:

- In the left pane of the Operations area, select the name of the organization whose subscription upgrade you want to retry. The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.
- 2. In the **Users** tab, select the user whose subscription upgrade you want to retry. Or, in the **Offerings** tab, select the offering whose subscription upgrade you want to retry.
- 3. In the **Subscriptions** tab, select the subscription for which you want to retry the upgrade.
- 4. Click the gear icon and select **Retry Upgrade**.
- 5. Click **OK** in the confirmation dialog.

Transfer subscriptions

For more information about the Operations area, see "Operations" on page 213.

You can transfer subscriptions from one subscriber to another subscriber in the same organization, with the following restrictions:

- You cannot transfer subscriptions that have group ownership.
- The subscribers you want to transfer the subscription from and to must have logged into the Marketplace Portal at least one time.
- Subscriptions with requests that are Approved but still in progress cannot be transferred. Subscriptions with requests that are Approved and have completed can be transferred.
- Subscriptions with requests that are Paused cannot be transferred.
- Subscriptions with requests that are Pending and awaiting approval can be transferred; the pending requests will be canceled.
- Subscriptions with requests in any other state can be transferred.
- The initial service request that created the subscription is transferred with the subscription; however, subsequent service requests for the subscription are not transferred.

To transfer subscriptions from one subscriber to another

- In the left pane of the Operations area, select the name of the organization whose subscription you
 want to transfer. The list of subscribers shown in the Users tab is the list of users who have
 logged in to the Marketplace Portal at least once. The list of offerings shown in the Offerings tab is
 the offerings that are published in the selected organization's catalogs.
- 2. In the **Users** tab, select the user whose subscription you want to transfer. Or, in the **Offerings** tab, select the offering whose subscription you want to transfer.
- 3. In the Subscriptions tab, select the subscription you want to transfer.
- 4. Click the gear icon and select **Transfer**.
- 5. Select the **User Name** of the subscriber to whom the subscriptions will be transferred.
- 6. Click Transfer.

Cancel subscriptions

You can cancel subscriptions when the service instance status is one of the following:

- Online
- Modification Failed
- User Operation Failed

- Reserved
- Failed

To cancel a subscription

- In the left pane of the Operations area, select the name of the organization whose subscription you
 want to cancel. The list of subscribers shown in the Users tab is the list of users who have logged
 in to the Marketplace Portal at least once. The list of offerings shown in the Offerings tab is the
 offerings that are published in the selected organization's catalogs.
- 2. In the **Users** tab, select the user whose subscription you want to cancel. Or, in the **Offerings** tab, select the offering whose subscription you want to cancel.
- 3. In the **Subscriptions** tab, select the subscription you want to cancel.
- 4. Click the gear icon and select **Cancel**.
- 5. Click **Yes** in the confirmation dialog.

View events for a subscription

1. In the left pane of the Operations area, select the name of the organization whose subscription events you want to see.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. In the **Users** tab, select the user whose subscription events you want to see. Or, in the **Offerings** tab, select the offering whose events you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose events you want to see.
- 4. Select the **Events** tab.
- 5. In the **Events** tab, review event details for subscription, as described in the following table. Select an event to see more details, as described in "Subscription events overview" on the next page.

Item	Description
Event Time	The time the event occurred.
Lifecycle Stage and Phase	The lifecycle stage and phase in which the event occurred.

Item	Description				
Action	The name of the action.				
Source	The source of the event, which can be a service component, resource offering, or a resource subscription.				
Status	 The current status of the event, which can be one of the following: Initialized Active Completed Error Canceled Failure Timeout 				

Subscription events overview

1. In the left pane of the Operations area, select the name of the organization whose subscription events you want to see.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. In the **Users** tab, select the user whose subscription events you want to see. Or, in the **Offerings** tab, select the offering whose events you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose events you want to see.
- 4. Select the **Events** tab.
- 5. Select the event whose overview information you want to view.
- 6. In the **Overview** tab, review the following information for the action:

Item	Description
Event Time	The time the event occurred.
Event ID	The internal identifier of the event.

Item	Description
Action	The name of the action.
Source	The source of the event, which can be a service component, resource offering, or a resource subscription.
Process Engine	The process engine that contains the process definition that created the action.
Process Engine Type	The type of process engine that contains the process definition that created the action.
Process URI	The URI of the action.
Process ID	The process identifier of the event. In the case of an Operations Orchestration process engine type, the Process ID corresponds to the OO Run ID of the flow execution. For process IDs that are based on Operations Orchestration 10.00 or greater the text in this field will appear as a link, which opens Operations Orchestration to the detailed page for the selected process.
Additional Details	Other important information about the event.

View subscription event properties

- In the left pane of the Operations area, select the name of the organization whose subscription event properties you want to see. The list of subscribers shown in the Users tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the Offerings tab is the offerings that are published in the selected organization's catalogs.
- 2. In the **Users** tab, select the user whose subscription event properties you want to see. Or, in the **Offerings** tab, select the offering whose subscription event properties you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose event properties you want to see.
- 4. Select the **Events** tab.
- 5. Select the event whose properties you want to view.
- 6. In the **Properties** tab, review properties for the event, which are the property values supplied to the action when it executed.

View topology for a subscription

For topology designs, the **Topology** tab shows the current set of components (nodes) that make up the service instance. In the graphical view, arrows indicate the relationships between the service instance components.

For sequenced designs, the **Topology** tab shows the current service instance topology for a deployed subscription. In the graphical view, arrows indicate the relationships between the following types of nodes:

- Service components A service component is defined in the associated service design and may also be created during the provisioning of the subscription
- **Resource bindings** A resource binding is a link in a service design between a resource offering and a service component. A resource binding includes user-defined, provider-selection actions that run during the provisioning of the resource binding. The lifecycle actions defined on the resource offering run during the provisioning of the associated resource subscription.
- **Resource subscriptions** A resource subscription is created from a resource offering at the time a subscription is ordered, and it can be thought of as a subscription to a resource offering. When a subscription (and its associated service design) is provisioned, a service instance topology is created from the service design. This topology includes copies of every service component in the associated service design. Resource offerings that are included in the service design are copied into the service topology as resource subscriptions. Changes made to the original resource offering after a resource subscription has been created from it do not affect the resource subscription or the associated user subscription. During resource subscription provisioning, the lifecycle actions that were configured on the source resource offering are executed.
- Resource providers A resource provider is used to provision a subscription. Resource provider selection occurs during the resource offering provisioning process. See "View providers for a subscription" on page 230.

To view topology for a subscription

lcon	Description
Drop- down list	Select an instance type to filter the content in this view.

Use the following icons and features to navigate and perform tasks in the **Topology** tab:

Icon	Description
Search	Enter search text to filter results based on:
Box	Node type
	Lifecycle stage
	Lifecycle phase
	Node label
	Health status
	Nodes that match the search criteria are highlighted in the topology diagram.
	Click to display a list view.
÷.	Click to display a graphical view of the content. For topologies that exceed 100 nodes, it is recommended to use the list view. The graphical view display may not be legible for topologies that contain more than 100 nodes.

1. In the left pane of the Operations area, select the name of the organization whose subscription topology you want to see.

Note: The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.

- 2. In the **Users** tab, select the user whose subscription topology you want to see. Or, in the **Offerings** tab, select the offering whose subscription topology you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose topology you want to see.
- 4. Select the **Topology** tab. In the **Topology** tab, you see the service topology for the subscription, which shows the following information:
 - Each service component, resource offering, and subscription in the topology has icons that show the current lifecycle stage and transition phase for the node if applicable. If the service component is a server, you will see a health status icon once the component is provisioned.
 - If a subscription or service instance is in a **Failed** state, the icons represent the stage and phase (if applicable) at the time of the failure.
 - Nodes with a pattern icon (^{**}), and whose labels are surrounded by brackets (note that brackets are displayed only in the graphical view), indicate that the nodes are specified as **Patterns**. For example, the following label indicates the node is a pattern:
 - [2. Windows Server]

- Component order is displayed only in the graphical view: Nodes that have a specified
 Component Order (which defines the lifecycle execution order) are preceded by a number indicating the specified order. For example, the following label indicates that this node has a
 Component Order of two (2):
 - 2. Windows Server

Due to layout algorithms, nodes are not sortable by **Component Order**.

 A health status icon is displayed for provisioned server components if Cloud Optimizer is configured. See "Health Status" on page 233.

Note: In some cases, you might see an Updated stage. Updated is a stage (which immediately precedes the start of the Modifying transition stage) for a resource subscription, resource offering, or service component that is undergoing a subscription modification. The Updated stage does not display in the lifecycle diagram, and actions cannot be configured at this stage.

Note: When a timeout occurs during the provisioning or de-provisioning of a subscription that is created from a topology design, the status of the components in the service instance indicates the component status just before the timeout occurred.

lcon	Description	lcon	Description
*	Node is specified as a pattern	•	Before phase
	Described lifecycle stage	•	During phase
P	Initializing lifecycle stage	•	After phase
P	Initialized lifecycle stage	•	Before phase, paused provisioning
	Reserving lifecycle stage	•	During phase, paused provisioning

The icons in this view are described in the following table:

lcon	Description	lcon	Description
Ļ	Reserved lifecycle stage	•	After phase, paused provisioning
Ŧ	Deploying lifecycle stage	•	On Failure phase
¥	Deployed lifecycle stage	<	Health status - Normal
Ŧ	Un-deploying lifecycle stage	0	Health status - Warning
₽	Un-reserving lifecycle stage	•	Health status - Major
Q	Un-initializing lifecycle stage	•	Health status - Minor
2	Finalized lifecycle stage	8	Health status - Critical
¥	Modifying lifecycle stage		Health status - Suspended
4	Upgrading lifecycle stage	Θ	Health status - Powered off
		?	Health status - Unknown

To view a topology summary

Review the Instance Summary section in the right pane of the Topology tab.

To view properties for a topology node

Click on any node to see all configured properties and values for the node displayed in the right pane of the **Topology** tab. This pane includes properties, actions, health status, and capacity information.

Graphical view controls

The graphical view provides the following controls to help you properly display the topology:

lcon	Description
Ð	Zoom the display in.
Q	Zoom the display out
Ж	Automatically fit the diagram within the display area.
53	Return to default size
Q	Reset nodes to their default positions.

View providers for a subscription

The **Providers** tab shows information about the providers used by a subscription. Resource provider selection occurs during the resource offering provisioning process for sequenced designs and is determined at design time for topology designs.

To view providers for a subscription

- In the left pane of the Operations area, select the name of the organization whose subscription
 providers you want to see. The list of subscribers shown in the Users tab is the list of users who
 have logged in to the Marketplace Portal at least once. The list of offerings shown in the Offerings
 tab is the offerings that are published in the selected organization's catalogs.
- 2. In the **Users** tab, select the user whose subscription providers you want to see. Or, in the **Offerings** tab, select the offering whose subscription providers you want to see.
- 3. In the **Subscriptions** tab, select the subscription whose providers you want to see.
- 4. Select the Providers tab.
- 5. In the **Providers** tab, you review resource provider information for the subscription.

Resume or cancel a paused subscription

A paused subscription is a subscription that has stopped being provisioned in response to an error occurring during the initial order of the subscription. For more information about paused subscriptions, see "View subscriptions for a user" on page 214.

To resume a paused subscription

- 1. When a subscription is paused, a notice displays below the **Overview**, **Events**, **Topology**, and **Provider** tabs.
- 2. To resume the subscription provisioning, you must first fix the issues that caused the provisioning to fail and then click **Resume**.

To cancel a paused subscription

If the root cause of the provisioning failure cannot be resolved, you can cancel a paused subscription.

- 1. When a subscription is paused, a notice displays below the **Overview**, **Events**, **Topology**, and **Provider** tabs.
- 2. To cancel the paused subscription, click the gear icon and select **Cancel**.

The following actions are performed in response to a request to cancel a paused subscription:

- 1. Invokes On Failure phase actions on any service component, resource offering, or resource subscription that failed and had caused the subscription to be paused.
- 2. Sends a notification to the subscriber indicating that the paused subscription cannot be resumed because the underlying cause has not been resolved, and the subscription is being canceled.
- 3. Submits a cancel subscription request on behalf of the subscriber, canceling the user's subscription.

Use View subscriptions for an organization

Cloud Optimizer can provide health status information for server components in CSA. You must have a provider configured and enabled for Cloud Optimizer.

You will see health status indicators for server components throughout the Cloud Service Management Console and Marketplace Portal. You can also view capacity details and a graph of the health status history in the Topology view for a deployed server component.

Status level	lcon	What to do
Normal	0	No action required.
Warning	٥	Click Show Performance Graph to open Cloud Optimizer and find the details and resolution information.
Major	•	Click Show Performance Graph to open Cloud Optimizer and find the details and resolution information.
Minor	0	Click Show Performance Graph to open Cloud Optimizer and find the details and resolution information.
Critical	⊗	Click Show Performance Graph to open Cloud Optimizer and find the details and resolution information.
Suspended		The server is suspended. Health status will change when the server is resumed.
Powered off	Θ	The server is powered off.
Unknown	?	Cloud Optimizer does not yet have data for the server.
Not monitored		The component is not supported for health monitoring.

Tasks

• Configure Cloud Optimizer — You must complete the following steps to enable health status in CSA and Cloud Service Management Console:

- a. Configure Cloud Optimizer for CSA. See Cloud Service Automation Configuration Guide.
- b. Create a provider for Cloud Optimizer. See "Providers" on page 15. If the Cloud Optimizer provider is enabled, then you will see health status indicators for server components.
- **Refresh health status** If a status indicators includes a refresh icon, you can click this icon to update the current status information from Cloud Optimizer.
- **Open Cloud Optimizer** From the Topology view for a deployment, select a server component and then open the Health Status tab in the panel on the right. Click the link to go to Cloud Optimizer.

Script Management

The scripts are stored in the database. This means that any script you change (add, modify or delete) on one node in a clustered environment, will be changed on all nodes. For details about the dynamic list properties and developing JavaScripts, see the *Dynamic Options and Cascading Lists* white paper.

- Upload Click to upload a script.
- Download Click the script name to download the script to your system.
- **Delete** Click the trashcan icon to delete a script. A confirmation dialog displays. If the script is being used by other functions, such as a service design, the dialog shows the function and number of occurrences that use the script. Click **Show details** to see where the scripts are being used.
- Modify a script You can modify the script in the inbuilt script editor. To do this, click the Configure Parameters link in the Edit Property window. Modify the script in the Script editor.

Caution: In a clustered environment the script is removed or modified on all nodes.

Use

Select Tokens

A token is a system value that is automatically resolved internally when the property is read. Token values are available only for the following:

- String property for a component type, component template, service component in a design, or resource offering
- Parameter when a topology component operation has a mapping type of Context Property Token
- String parameter input for an action
- A parameter value to a script that is configured on a subscriber option property that is configured for Input Validation
- A parameter value to a script that is configured on a subscriber option property of type List that is Dynamic Entry
- A parameter value to a script that is configured on a user operation input parameter that is configured for Input Validation
- A parameter value to a script that is configured on a user operation input parameter that has a mapping type of Prompt User List with the list configured for Dynamic Entry

The following tables provide all available tokens, their descriptions, and to which area they apply.

Token	Description	Applies to
Action Execution Retry [TOKEN:ACTION_EXECUTION_ RETRY]	Resolves to false on the first attempt of an action. Resolves to true for subsequent action attempts after the initial action failed.	 Component Templat e Provider Selection Resource Offering Service Component
Action Name [TOKEN:ACTION_NAME]	Resolves to the value of ORDER when initially ordering a subscription and to the value of MODIFY_SUBSCRIPTION when modifying an existing subscription.	 Sequenced Subscriber Options Topology Subscriber Options

Server-side tokens

Token	Description	Applies to
Keystone Trust ID [TOKEN:KEYSTONE_TRUST_ID]	Resolves to the Keystone Trust ID.	 Component Templat e Provider Selection Resource Offering Service Component Topology Componen t
Parent Service Component ID [TOKEN:PRN_COMPONENT_ID]	Resolves to the Service Component ID of the parent service component. For resource offerings, the Service Component ID refers to the service component that the resource offering is associated with in a service design.	 Component Templat e Provider Selection Resource Offering Service Component
Resource Binding ID [TOKEN:RSC_BINDING_ID]	Resolves to the Resource Binding ID that was created at subscription time.	 Provider Selection Resource Offering
Resource Subscription ID [TOKEN:RSC_SUBSCRIPTION_ ID]	Resolves to the Resource Subscription ID that was created from the resource offering at subscription time.	 Provider Selection Resource Offering
Selected Provider ID [TOKEN:RSC_PROVIDER_ID]	Resolves to the Provider ID that was selected at subscription time.	 Provider Selection Resource Offering Topology Componen t
Selected Resource Pool ID [TOKEN:RSC_POOL_ID]	Resolves to the Resource Pool ID that was selected at subscription time.	 Provider Selection Resource Offering Topology Componen t
Service Blueprint ID [TOKEN:SVC_BLUEPRINT_ID]	Resolves to the Service Blueprint ID.	 Component Templat e Provider Selection Resource Offering Service Component Sequenced Subscriber Options

Token	Description	Applies to
		Topology Subscriber Options
Service Catalog ID [TOKEN:SVC_CATALOG_ID]	Resolves to the Service Catalog ID used at subscription time.	 Component Templat e Provider Selection Resource Offering Service Component Topology Component t
Service Component ID [TOKEN:SVC_COMPONENT_ID]	Resolves to the Service Component ID of the component associated with this action. For resource offerings, the Service Component ID refers to the service component that the resource offering is associated with in a service design.	 Component Templat e Provider Selection Resource Offering Service Component
Service Component Type [TOKEN:SVC_COMPONENT_ TYPE]	Resolves to the Service Component Type (for example, Server) of the component associated with this action. For resource offerings, the Service Component Type refers to the service component that the resource offering is associated with in a service design.	 Component Templat e Provider Selection Resource Offering Service Component
Service Instance ID [TOKEN:SVC_INSTANCE_ID]	Resolves to the Service Instance ID created at subscription time.	 Component Templat e Provider Selection Resource Offering Service Component Sequenced Subscriber Options Topology Subscriber Options Topology Componen t
Service Offering ID	Resolves to the Service Offering	Component Templat

Token	Description	Applies to
[TOKEN:SVC_OFFERING_ID]	ID.	e Provider Selection Resource Offering Service Component Sequenced Subscriber Options Topology Subscriber Options
Service Request Organization ID [TOKEN:REQ_ORG_ID]	Resolves to the Organization ID associated with the service request.	 Component Templat e Provider Selection Resource Offering Service Component Sequenced Subscriber Options Topology Subscriber Options Topology Componen t
Service Request User ID [TOKEN:REQ_USER_ID]	Resolves the User ID associated with the service request.	 Component Templat e Provider Selection Resource Offering Service Component Sequenced Subscriber Options Topology Subscriber Options Topology Componen t
Subscriber's Email Address [TOKEN:SVC_SUBSCRIPTION_ EMAIL]	Resolves to email address of the subscriber.	 Component Templat e Provider Selection Resource Offering Service Component Topology Componen

Token	Description	Applies to
		t
Subscriber's Organization ID [TOKEN:USR_ORG_ID]	Resolves to the Organization ID associated with the subscriber.	 Component Templat e Provider Selection Resource Offering Service Component
Subscription ID [TOKEN:SVC_SUBSCRIPTION_ ID]	Resolves to the Subscription ID created at subscription time.	 Component Templat e Provider Selection Resource Offering Service Component Sequenced Subscriber Options Topology Subscriber Options Topology Componen t

Client-side Tokens

Token	Description	Applies to
[CLIENT: <property_name>]</property_name>	Allows you to have a dependency on a value of another property in the same option. This allows, for example, a parameter to a script on a Site option property (of type List, configured for Dynamic Entry) to reference the value of a Region option property on the same option. Note that <property_name> refers to the property Name, and not its Display Name.</property_name>	 Sequenced Subscriber Options Topology Subscriber Options
[CLIENT: <parameter_name>]</parameter_name>	Allows you to have a	User Operations

Token	Description	Applies to
	dependency on a value of a user operation input parameter. This allows, for example, an input validation script to retrieve the value of an action parameter input for validation.	
[PROVIDER: <provider_name>:ID]</provider_name>	The ID of the provider with the specified name that was selected by the subscriber when ordering the subscription.	Topology Subscriber Options

Portal Tokens

When a subscription is owned by a group, a requesting user can be different than the user who made the initial subscription request. Use portal tokens to retrieve the context of the requesting user.

Token	Description	Applies to
Catalog ID [PORTAL:CATALOG_ID]	The ID of the catalog where a consumer user submits an initial subscription request or a request to modify an existing subscription.	 Sequenced Subscriber Options Topology Subscriber Options Component Template - User Operation Resource Offering - User Operation
Organization ID [PORTAL:ORG_ID]	The ID of the Organization to which the consumer user who submits a subscription request belongs.	 Sequenced Subscriber Options Topology Subscriber Options Component Template - User Operation Resource Offering - User Operation

Token	Description	Applies to
Organization Name [PORTAL:ORG_NAME]	The name of the Organization to which the consumer user who submits a subscription request belongs.	 Sequenced Subscriber Options Topology Subscriber Component Template - User Operation Resource Offering - User Operation
User Email [PORTAL:USER_EMAIL]	The email address of the consumer user who submits an initial subscription request or a request to modify an existing subscription.	 Sequenced Subscriber Options Topology Subscriber Options Component Template User Operation Resource Offering - User Operation
User ID [PORTAL:USER_ID]	The ID of the consumer user who submits an initial subscription request or a request to modify an existing subscription.	 Sequenced Subscriber Options Topology Subscriber Options Component Template User Operation Resource Offering - User Operation
User Name [PORTAL:USER_NAME]	Resolves to the User Name.	 Sequenced Subscriber Options Topology Subscriber Options Component Template User Operation Resource Offering - User Operation

Use Portal Tokens

Catalogs

Use the **Catalogs** area of the Cloud Service Management Console to create and manage service catalogs. These service catalogs allow you to publish service offerings to the Marketplace Portal.

In **Catalogs**, you can configure the automatically created, default Global Shared Catalog or you can create a new catalog and associate it with an organization. Multiple catalogs can be associated with the same organization. Any changes made to the Global Shared Catalog are visible in every organization's Marketplace Portal. The Global Shared Catalog cannot be deleted or imported, and excludes **Access Control** and **Approval Policies**.

Catalogs support the following roles:

- As an Organization Administrator, you will see your own catalogs and the Global Shared Catalog.
 You will see service offerings that are published in your catalogs and you can publish service offerings that are created by users in your organization.
- As a Consumer Organization Administrator, you will see only your organization's catalogs and have the ability to hide them or make them read-only. You have the ability to self-manage catalogs and create your own service offerings and publish them.
- As a Tenant Administrator, you will have the ability to modify any service offering that belongs to your organization. You can also publish or unpublish to your organization's catalogs and to the Global Shared Catalog.

Tasks

- Create a catalog Click the gear icon and select Create Catalog. In the Create Catalog dialog, select the organization to which the catalog will be associated, along with the name, description, and image. Then configure the catalog by providing information in the following areas:
 - "Access control for catalogs" on page 249
 - "Approval policies" on page 250
 - "Categories" on page 253
 - "Offerings" on page 253
 - "Environments" on page 254
- Import a catalog Click the gear icon and select Import Catalog. This action will import a

catalog from the selected archive file. This import action is not available to a tenant administrator. See "Import catalogs".

Import catalogs

In this topic, artifacts refer to a catalog and its associated service offerings, service designs, resource offerings, and resource environments.

You can import and export many of the artifacts that provide the basis for cloud automation. The export operation provides the ability to preserve the selected artifacts so they can be used to replicate the services on another system or to restore the artifacts. These exported archive files are preserved in an industry-standard zip archive file format.

Installing or replacing artifacts on the target system is supported by import and update operations. The import operation only adds artifacts, whereas the update operation replaces matching artifacts. See the *Tasks* section below for more information.

Process information

- **Upgradability** If the imported catalog contains a service offering or design that is in an upgrade path, those service offerings or designs are not imported nor updated.
- Update operation The update operation is destructive to existing data. You should understand the differences between the import operation, update operation, and update options to ensure you choose the operations and options that match your expectations. See the *Tasks* section below for more information.
- Flows During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, /Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone

Server/Actions/vCenter Simple Compute - Deploy). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

- Archive content The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file.
- Image files All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the Cloud Service Automation Configuration Guide):

jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png

Back up your data — Create a backup of your system or data. Before proceeding, be sure to
create a backup of any artifacts you may be affecting by using the export operation to save an
archive zip file.

Note: If CSA has been configured to verify the authenticity of imported service offering content archives (which is done by setting the property csa.security.enable), then service offering content archives that were successfully imported into CSA 4.20 or earlier will no longer import properly until they have been digitally signed. See the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

Tasks

• **Import** option — Adds only new artifacts to the target system (the archived artifacts do no exist on the target system).

Note: The import operation identifies catalogs by functional equivalence to determine if an identical catalog exists on the target system. An archived catalog is considered to be functionally equivalent to the catalog on the target system if the archived catalog has the same internal name and organization ID as a catalog on the target system. If the import operation identifies a functionally equivalent catalog on the target system, the archived catalog is not imported.

• Update option — Imports new artifacts and overwrites existing artifacts. New artifacts are created if they do not exist on the target system. Identical artifacts that exist on the target system are overwritten with changes from the archive.

There may be cases where an existing artifact on the target system cannot be updated. For example, if the existing artifact is a service offering or design and the service offering or design is

published, the service offering or design will not be updated because a published service offering or design cannot be edited.

An existing service offering or design can be updated from a published offering or service design archive if the existing service offering or design is not published.

Preserve originals — Select this option to create a copy of the original artifact if the artifact exists on the target system. On import, a copy of the original artifact is created and then the original artifact is overwritten by the imported artifact. The version of the copy is appended with "Superseded on" and the date. The version of the artifacts being imported remain intact. If the artifact does not exist on the target system, a copy is not created.

Note: If you are updating a catalog that has a large number of service offerings and service designs, it is recommended that this operation be performed during off-peak hours. This will prevent degradation of subscriber request response time.

- **Preview** Generate a report of prospective results for the import process, including information about the artifacts and their status.
- View Detailed Report From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.

For more information about importing and exporting artifacts, see the *Cloud Service Automation Content Archive Tool* document.

Overview Tab

The **Overview** tab provides a detailed summary of the selected catalog, including information about access control, default approval policy, and published offerings.

Tasks

- Edit a catalog Click the gear icon and select Edit Catalog to edit the name, description, and image associated to the catalog.
- Export a catalog Click the gear icon and select Export Catalog to create a content archive (.zip) file of the service catalog. This file contains XML documents, associated artifacts, icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files. If you export the Global Shared Catalog, it will become a non-global catalog.

The catalogs are packaged in an archive file whose name is:

CATALOG_<catalog_display_name>_<catalog_id>.zip

• Delete a catalog — Click the gear icon and select Delete Catalog to delete a catalog. Click Yes in the confirmation window to delete the catalog.

Access control for catalogs

Access Control is used to assign LDAP groups to a catalog. You choose whether a service catalog is visible to all authenticated users of a consumer organization or just a subset of users.

To make a catalog visible to all authenticated users of a consumer organization, identify the LDAP groups that have been added to the organization roles (in the **Organizations** area of the Cloud Service Management Console) and make sure that all of the same LDAP groups appear in the Access Control area of the service catalog. This action happens automatically when a manually created service catalog is created. For an organization's automatically created catalog, you must manually add these LDAP groups.

Tasks

- Edit a catalog Click the gear icon and select Edit Catalog. See "Overview Tab" on the previous page.
- Export a catalog Click the gear icon and select Export Catalog. See "Overview Tab" on the previous page.
- Delete a catalog Click the gear icon and select Delete Catalog.
- Add a group LDAP groups must be configured in the Cloud Service Management Console Organizations area. Groups are defined in Access Control in the Organizations area or in Catalogs. Click Add Group to manage access control by adding LDAP groups to the catalog. You can select from existing named DNs or enter your own name for the group or organization unit DN. You can either select the CSA Service Consumer Role or Other Roles. When you select Other Roles you can add or select multiple roles from the list of roles displayed. For an existing DNS, the role list shows the roles that have already been assigned as selected. For more information on the Other Roles, see Roles.

Note: You can edit the LDAP groups visible in the Access Control area of the service catalog.

To do this, click the gear icon and select Edit to edit the group or organization unit DN or edit the name for the group or organization unit DN.

Approval policies

This tab is available only when configuring a user-defined catalog, not the Global Shared Catalog.

Approval policies are based on one of four template types (see table below). These templates are not pre-configured because they are LDAP dependent. When a catalog is first created, an approval policy is automatically created from the **User Context Template**.

Template type	Description
Delegated Template	Use this template to set up third-party approvals, which are configured by designating a process definition that will be used to communicate about the approval process requirements.
	If selected, provide the following information:
	• External Approval Action - Select an action that will be used to communicate with Operations Orchestration. To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the <i>Cloud Service Automation Configuration Guide</i> for more information.
	Click Select and search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the csa.properties file; see the "Action Selection Wizard" property description section in the <i>Cloud Service Automation Configuration Guide</i> for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action.
	 Check Automatic Approval and provide the following information:
	 Automatic Approve/Deny - Select one of the following replies: Approved - Automatically approve the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	 Denied - Automatically deny the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	 Wait Time for Automatic Approval (in days) - Select the number of days after which, if no response is made, the automatic approval or rejection will occur.
Named Approver	Use this template to assign one or more users from the organization as approvers for all subscription requests. You can also set the number of approvals required

Template type	Description
Template	for a subscription request to be fulfilled.
	 If selected, provide the following information: Add Approver - Provide the LDAP user name of the approver you want to add, and click Add Approver. Repeat to add more approvers.
	 Minimum Approvals/Denials - Select the minimum number of approvers required to either approve or reject an approval request. Check Automatic Approval, if desired, and provide the following information: Automatic Approve/Deny - Select one of the following replies: Approved - Automatically approve the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	 Denied - Automatically deny the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	 Wait Time for Automatic Approval (in days) - Select the number of days after which, if no response is made, the automatic approval or rejection will occur.
Named Group Template	Use this template to base approvals on an LDAP group. By default, csa.properties is set to csa.group.numberOfApprovers=10, which restricts the size of the group that can be selected as a named group for approval. This property validates the minimum number of approvals and denials that are filed. If you specify a number that is greater than the number of group users, or a number that is greater than what is specified in csa.group.numberOfApprovers=10 (where the group has more users than this setting), the approval will not be created. If you want to use groups with more members, you can change the value. However, if you select a very large group (such as thousands of members), you might experience performance problems interacting with LDAP.
	 If selected, provide the following information: Add Group - Select or type the DN for the LDAP group or organizational unit you want to use for approvals. The members of the selected group (at the time of the request) will be set as approvers of the request.
	• Minimum Approvals/Denials - Select the minimum number of approvers required to either approve or reject an approval request.
	• Check Automatic Approval and provide the following information:
	 Automatic Approve/Deny - Select one of the following replies: Approved - Automatically approve the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	 Denied - Automatically deny the request when the specified Wait Time for Automatic Approval (in days) period has elapsed.
	• Wait Time for Automatic Approval (in days) - Select the number of days after which, if no response is made, the automatic approval or

Template type	Description
	rejection will occur.
User Context Template	 Use this template to base approvals on LDAP membership settings and structure, as configured in the Organizations area of the Cloud Service Management Console. If selected, provide the following information: Approval Levels - Select the number of managers in the organization chain who will be asked to approve the request. For example, if you select two, the subscriber's first and second-level manager will be required to approve the request. Take care when configuring multi-level approvals. If the approval level is configured so that the last approver in the approval chain is the top-level manager who is still at a lower level than the configured approval level, it is important that the manager attribute of that top level manager is set to himself or herself to indicate the end of approval chain.
	 Check Automatic Approval, if desired, and provide the following information: Automatic Approve/Deny - Select one of the following replies: Approved - Automatically approve the request when the specified Wait Time for Automatic Approval (in days) period has elapsed. Denied - Automatic Approval (in days) period has elapsed. Wait Time for Automatic Approval (in days) period has elapsed. Wait Time for Automatic Approval (in days) - Select the number of days after which, if no response is made, the automatic approval or rejection will occur.

Tasks

- Add a policy In the Add Approval Policy dialog, enter a name, select one of the four template types, and use the check box if the policy should be automatically approved.
- Set the default policy In the Set Default Policy dialog, select the default policy that will be used when publishing service offerings.
- Edit a policy All fields are editable, except for the Approval Policy Template. For a certain approval policy, click the gear icon and select Edit.
- Delete a policy Deletes the policy that the user created, but the template persists. For a certain approval policy, click the gear icon and select **Remove**.
Best practices

When you create an approval policy, make sure that all approvers are granted access to the catalogs for which they will be approving subscription requests.

Categories

The Categories tab allows you to manage the categories for this catalog.

Tasks

- Add a category In the Add Category dialog, enter a name for the new category.
- Edit a category Allows you to change the Display Name. For a certain category, click the gear icon and select Edit.
- **Delete a category** —You cannot delete a category that has any service offerings assigned. For a certain category, click the **gear icon** and select **Delete**.

Offerings

The **Offerings** tab shows the service offerings that have been published into the selected catalog, including the date and category. A published service offering displays in the Marketplace Portal in the category to which it was assigned. By default, a service offering inherits its approval process and approval policy from the default set in the service catalog.

Tasks

- Make a selection from the All Categories list to filter the categories.
- Add an offering Allows you to add a service offering into a catalog and then publish it. Choose an offering from the Select Service Offering list. You can also use search to find a specific offering. Then select a category from the In Category drop down list into which the offering will be

published. Optionally, you can select an **Approval Policy** if an offering requires manager approval. Click **Publish**.

- **Change an approval policy** Allows you to change the approval policy for a published offering. For a certain category, click the gear icon and select **Change Approval**. Optionally, when you are preparing to publish a service offering design, you can also change the setting from No Approval.
- Unpublish service offering Unpublishing removes the service offering from the category. For a certain offering, click the gear icon and select Unpublish.
- Link to the offering Click the offering name to link to the Offerings area of the Cloud Service Management Console.

Environments

You can specify one or more resource environments for a catalog. Resource environments restrict the set of resource providers that can be chosen at subscription time.

When associating environments with a catalog, make sure that all providers necessary to deploy the service offerings in the catalog exist within at least one of the environments associated with the catalog. If you do not associate any environments with a service catalog, provider selection is not restricted by environments.

Tasks

- View a list of resource environments for the catalog.
- Select environments Allows you to add or remove resource environments.
- Remove a resource environment Click the gear icon next to a resource environment and select Remove. Click Yes in the confirmation window.

Service Offerings

Use the Offerings area of the Cloud Service Management Console to configure and manage service offerings. You create a service offering from a sequenced or topology service design when you are ready to expose the design to subscribers in a catalog in the Marketplace Portal. Service designs are the recipes for automating the cloud, where each design includes service components that define what is automatically provisioned.

An offering can be created from a sequenced or topology design. Pricing is configured on a service offering and supports initial, recurring, unit, as well as option-specific and property-based pricing. You can also attach sections to a standard service offering (such as service level agreements, terms and conditions) and screenshots, which are images and captions that provide a visual representation of the offering in the Marketplace Portal.

On the Offerings page, you can browse all service offerings, manage tag categories to organize offerings, and create and import offerings.

Tasks

Specific tasks available on the Offerings page are:

- Search box In the search box, enter text to filter the results based on a keyword search of display name, description, and version.
- Create Offering Select a Standard Offering type. Click the gear icon and select Create Offering. See "Create offerings".
- Import Offering The import process imports archives of service offerings and their supported artifacts. Supported artifacts for service offerings include associated service designs and resource offerings. Click the gear icon and select Import Offering. This action is not available to the Consumer Organization Administrator role. See "Import offerings".
- Manage Offering Tags Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping service offerings. Once created and associated to an offering, tags display with the offering name in Browse Designs. The only pre-created category is labeled AII, which is where all offerings are stored if you do not create any tags. You cannot edit, delete, or assign the AII category. An offering can be assigned to multiple tag categories. Click the gear icon

Use

and select **Manage Offering Tags**. This action is not available to the Consumer Organization Administrator role.

- Link to latest offering version Click the offering name to display details about the most recently created version of the offering.
- Link to offering version Click an offering version number to display details about the selected version of the offering.

When a specific offering version is selected, the following information displays:

- Published label Appears if the offering has been published in one or more catalogs.
- Offering display name
- Offering version number
- Update Available label Appears if updates to the service design on which this offering is based have been published but an upgrade path from this offering to a new version of this offering has not been created.
- Upgradable label Appears if updates to the service design on which this offering is based have been published and a new version of this offering with an upgrade path from this offering has been created. It also means that any subscriptions based on this offering version is upgradable to the new offering.

You can use the functional area tabs when a specific offering version is selected to configure settings:

- "Overview Tab"
- "Publishing Tab"
- "Options Tab"
- "Pricing Tab"
- "sections Tab"
- "Screenshots Tab"
- "Versions Tab"
- "Upgradability Tab"
- "Policies Tab" on page 272

Create offerings

You create offerings from the **Offerings** page. An offering can be created using either a topology or sequenced service design.

Tasks

- 1. From the Cloud Service Management Console, click the **Offerings** tile. From the Marketplace Portal dashboard, click the **Offering Management** tile in the **Administration** section.
- 2. Click the gear icon and select Create Offering.
- 3. In the Create Offering dialog, enter the following information:
 - a. **Display Name** of the new offering.
 - b. **Offering Version** of the new offering.
 - c. Browse to select a topology or sequenced Service Design.
 - d. (Optional) Select an existing offering to use as a template for your new offering in the **Base Offering On** field.
 - Browse to select an offering. All configuration settings from the selected offering will be copied into the new offering.
 - Click Done.
 - e. (Optional) Description for the new offering.
- 4. (Optional) Select an image from the available icons in the image library or import your own image. If you import your own image, the image must meet the following criteria:
 - File type: PNG, JPG
 - Recommended image size: 256x256
 - File size: Maximum 1 MB

To select an icon from the image library:

- a. Click the Change Image button.
- b. Select an icon from the image library. The selected icon will display a highlighted background.
- c. Click Select. Your icon will appear under Image.

To upload your own image:

- a. Click the Change Image button.
- b. Click Upload.
- c. Select the new image and click **Open.**
- d. Click Select to upload the icon to the image library.
- 5. (Optional) Select a **Tag**, which is a label you can use to provide a structure for organizing and grouping related items.
- 6. Click Create. The new offering appears in the All Offerings page list.

Best Practices

Use the **Search** function to filter offerings by entering a search string containing either the version number or name.

Import offerings

In this topic, artifacts refer to a service offering and its associated service designs and resource offerings.

You can import and export many of the artifacts that provide the basis for cloud automation. The export operation provides the ability to preserve the selected artifacts so they can be used to replicate the services on another system or to restore the artifacts. These exported archive files are preserved in an industry-standard zip archive file format.

Installing or replacing artifacts on the target system is supported by import and update operations. The import operation only adds artifacts, whereas the update operation replaces matching artifacts. See the *Tasks* section below for more information.

Process information

- **Upgradability** If the imported service offering or design is in an upgrade path, all service offerings and designs upgradable to the service offering and design represented by the content archive must be present on the target system.
- **Update operation** The update operation is destructive to existing data. You should understand the differences between the import operation, update operation, and update options to ensure you

choose the operations and options that match your expectations. See the *Tasks* section below for more information.

• Flows — During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, /Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

- Archive content The archive (.zip) file can only reference files or content contained within the .zip file itself, or that are already contained in the csa.war file.
- Image files All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the Cloud Service Automation Configuration Guide):

jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png

• Back up your data — Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

Note: When you import a service offering, any tags you have selected in the offerings area do not affect the imported service offering. The imported service offering will contain the tags that were included when the service offering was exported, and new tags will be created on the system, as necessary, to match what was exported.

Note: If CSA has been configured to verify the authenticity of imported service offering content archives (which is done by setting the property csa.security.enable), then service offering content archives that were successfully imported into CSA 4.20 or earlier will no longer import properly until they have been digitally signed. See the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

Tasks

• **Import** option — Adds only new artifacts to the target system (the archived artifacts do no exist on the target system).

Note: The import operation identifies service offerings by functional equivalence to determine if an identical service offering exists on the target system. An archived service offering is considered to be functionally equivalent to the service offering on the target system if the archived service offering has the same internal name as a service offering on the target system. If the import operation identifies a functionally equivalent service offering on the target system, the archived service offering is not imported.

Note: Use the **Update** option rather than **Import** when importing a service offering based on a sequenced design with delegated topology components.

A delegated topology service component is only available if you have upgraded from CSA version 4.50 or earlier AND a delegated topology service component was configured in version 4.50 or earlier.

• Update option — Imports new artifacts and overwrites existing artifacts. New artifacts are created if they do not exist on the target system. Identical artifacts that exist on the target system are overwritten with changes from the archive.

There may be cases where an existing artifact on the target system cannot be updated. For example, if the existing artifact is a service offering or design and the service offering or design is published, the service offering or design will not be updated because a published service offering or design cannot be edited.

An existing service offering or design can be updated from a published offering or service design archive if the existing service offering or design is not published.

Preserve originals — Select this option to create a copy of the original artifact if the artifact exists on the target system. On import, a copy of the original artifact is created and then the original artifact is overwritten by the imported artifact. The version of the copy is appended with "Superseded on" and the date. The version of the artifacts being imported remain intact. If the artifact does not exist on the target system, a copy is not created.

• **Preview** — Generate a report of prospective results for the import process, including information about the artifacts and their status.

• View Detailed Report - From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.

For more information about importing and exporting artifacts, see the *Cloud Service Automation Content Archive Tool* document.

Modify offerings

Tasks

To edit, save as, export, delete or create a new version of an offering:

- 1. Select an offering.
- 2. Perform any of the following actions:
 - a. Click the gear icon and select **Edit**. In the Edit Offering dialog, you can change the **Display Name**, **Offering Version**, **Description**, and **Image** of the offering.
 - b. Click the gear icon and select Save As to create an exact copy of the offering with a new name. This new version can be edited. See "Copy Offering Versions".
 - c. Click the gear icon and select **Export** to export the offering, which sends all files and details related to the offering to a zip file. The Export Zip file appears in the lower left hand side of the screen as a downloadable zip file. In Windows, it also appears in your Downloads folder.
 - d. Click Delete to delete the selected offering.
 - e. To create a new version, see "Create offering versions".

Best practices

• Make sure you know the path and file name of the archive file when exporting an offering.

Copy Offering Versions

Copying an offering involves making a copy of the original offering, including the sequenced or topology service design and properties. You can select a new display name and version name for the offering.

You can create multiple versions from one offering. Use the version list to view and track versions over time.

Tasks

- 1. Select an offering from the All Offerings page list to open the Overview page.
- 2. Click the gear icon and select **Save As**.
- 3. Enter a new Display Name and Offering Version (version name).
- 4. Select the offering version.
- 5. (Optional) Enter a brief description.
- 6. To change the image used as your version icon,
 - a. Click the Change Image button.
 - b. Select a new image, then click Select.
 - c. To upload an image of your choice, click **Upload**. Selecting an image file here copies it into the image library. Click **Select**.
- 7. Click **Select Tags** if you want to associate tags to the offering. Select the desired tags and click **Done**.
- 8. Click Save.
- 9. Go to the **Versions** tab to view a list of all versions of the offering. See "Versions Tab" on page 271.

Create offering versions

Creating a new version of an offering involves making a copy of the original offering, including the sequenced or topology service design and properties. After creation, you can select a new display name, service design, and version name for the offering. You can also use existing offerings as a basis for creating new offering versions by using the **Base Offering On** option.

You can create multiple versions from one offering. Use the version list to view and track versions over time.

Tasks

- 1. Select an offering from the **All Offerings** page list to open the **Overview** page.
- 2. Click the gear icon and select **Create New Version**.
- 3. In the New Version dialog, enter a new **Offering Version**.
- Specify if the new offering is Upgradable from <selected_offering_version> where <selected_ offering_version> (also referred to as the base offering) is the version of the offering from which the new version is created.
 - a. Select **Yes** if the new offering is upgradable from the base offering (enabling subscriptions belonging to the base offering to be upgradable to the new offering).
 - Select No if the new offering is not upgradable from the base offering (subscriptions belonging to the base offering are not upgradable to the new offering) or if the selected offering contains a topology design (topology designs are not upgradable).

This selection also determines the service designs that can be used by this offering.

The **Upgradable from** field is not available to the Consumer Organization Administrator role. If this dialog is accessed from the Marketplace Portal, the offering cannot be configured by the Consumer Organization Administrator to be upgradable from the base offering.

- 5. Browse to select the topology (if the new offering is not in an upgrade path) or sequenced **Service Design**, and then click **Select**.
 - a. If the offering being created is upgradable from the base offering, the service designs that are selectable are published service designs that are upgradable from the service design of the base offering.
 - b. If the offering is not upgradable from the base offering, the service designs that are selectable are published versions of the service design of the base offering.

For example, there are three published service design versions(1.0.0, 2.0.0, and 2.0.1) and one unpublished service design (3.0.0). The base offering uses service design 1.0.0, service design 2.0.0 is upgradable from service design 1.0.0, and service design 2.0.1 is upgradable from service design 2.0.0. If the new offering is upgradable from the base offering, the selectable service design would be service design 2.0.0. If the new offering is not upgradable from the base offering, the selectable service design 2.0.0. If the new offering is not upgradable from the base offering, the selectable service designs would be service designs 1.0.0, 2.0.0, and 2.0.1.

6. If the new offering is upgradable from the base offering and the selected service design has been configured with a description of the upgrade path, the upgrade path of the service design is

displayed. You can also click **View Service Design Upgrade Description** to display the description of the upgrade path. This link displays only if the upgrade description is defined in the design.

- 7. Enter the offering version description.
- 8. To change the image used as your version icon,
 - a. Click the Change Image button.
 - b. Select a new image, then click **Select**.
 - c. To upload an image of your choice, click **Upload**. Selecting an image file here copies it into the image library. Click **Select**.
- 9. Click **Select Tags** if you want to associate tags to the offering. Select the desired tags and click **Done**.
- 10. Click Create to finish. The new version page opens for editing.
- 11. Use the Versions tab to view a list of all versions of the offering. See "Versions Tab" on page 271.

Overview Tab

The **Overview** tab enables you to view, edit details, copy an offering version, create a new version, export, or delete the selected offering. The name of the service design used to create the offering is displayed, along with any associated images and tags. You can also create a new version of the offering. Note that not all functionality is available to the Consumer Organization Administrator role.

Tasks

The following information about the offering is displayed:

Item	Description
Display Name	Offering name.
Version Name	Offering version.
Description	Offering description.
Selected Service Design	A link to the version of the service design from which the current offering is created.
Upgradable from	A link to the version of an offering whose subscriptions are upgradable to the

Item	Description
	current offering.
Upgradable to	A link to the version(s) of an offering to which subscriptions belonging to the current offering are upgradable.
Image	Image associated with the offering.
Tags	Group(s) to which the offering belongs.

The following options are available from the **Overview** details page, in the gear icon drop-down list:

- Edit You can edit all attributes of a saved service offering except the service design (sequenced or topology) that was associated during creation.
- Save As Creates a copy of the selected offering. Only the name can be changed in the copy.
- Create New Version Allows you to create a new version of the offering. See "Create offering versions".
- **Export** Exporting a service offering creates a content archive (.zip) file. The content archive contains XML documents and associated artifacts for the service offering you are exporting, icons for customizing the artifacts, and the Manifest XML document that contains meta-information about the archive files. This action is not available to the Consumer Organization Administrator role.

The service offerings are packaged in an archive file whose name is:

SERVICE_OFFERING_<offering_display_name>_<offering_id>.zip

• **Delete** - Avoid deleting service offerings that have been published to a catalog or are currently in use by active subscriptions.

Publishing Tab

Offerings are published into one or more catalogs so that they are available in the Marketplace Portal. Offerings can be published into the Global Shared Catalog, which is shared among all organizations, or into an organization-specific catalog. Within a catalog, **Categories** reflect logical groupings of related services. Service offerings can be published more than once in a single catalog provided a different category and approval policy are selected.

Tasks

- 1. With the offering selected, click the **Publishing** tab.
- 2. Click Publish and enter the following information in the Publish Service Offering dialog:
 - **To Catalog** Select from the list of available catalogs or click **Search** to filter the list.
 - In Category Categories are filtered according to your catalog selection.
 - Approval Policy Used to configure approvals for user operations that exist in the design that is associated with the offering. Changing the approval policy here does not change the default catalog approval policy. You cannot configure an approval policy for offerings published in the Global Shared Catalog. The default approval policy is No Approval. To change this setting, select an offering and click Change Approval.
 - Unpublish Service offerings cannot be edited after they are published. If you want to change the attributes of a published service offering, click Unpublish to unpublish the offering from this catalog.

Options Tab

Use settings in the **Options** tab to refine the subscriber options configured in the sequenced or topology service design. You can set property values and/or option selections and hide properties, options, or option sets that you do not want to expose to subscribers in the Marketplace Portal.

You define a hierarchy of option sets and options. When creating an option set, the option you set becomes the default option. You can create properties on either an entire option set or on a specific option within the set. When you create a property on the entire option set, the property is added to each option within the set.

Tasks

Within the **Options** tab, you can perform the following tasks.

- Show or hide properties within an option set.
- Collapse the option set and options.
- Expand the option set and options.

- Show or hide an option set, option, or property; determines visibility in the Marketplace Portal.
- Lock or unlock an option set to disallow or allow the subscriber to modify the default option selections within an option set. When an option set or property is locked, all options within the option set are also locked.
- Edit the option set name or option name.
- Add or update the image associated with the option set or option.
- Move the option down within an option set.
- Move the option up within an option set.
- Drag and drop the option within an option set.
- Collapse the entire option set, including options and properties.

Best practices

Conditions for Locking/Unlocking option sets, options, and properties

User Action	Result
Locks or unlocks any property.	An independent action that does not affect any option sets or options.
Locks at the option set level.	All options in this option set are locked <i>except</i> any sub-option sets found under the option set.
Locks at the option set level and then Unlocks just a single option underneath.	The lock at the option set level is removed. Any other options at the same level remain locked.
Locks a single option.	Has no effect on any option sets or other options.

Pricing Tab

Any property visible in a service offering can have both initial and recurring prices. You can assign a static price for the setup fee for any property in the service offering pricing view. A positive number can be assigned for either price. As prices are added to the properties within an option, the prices of these properties must roll up and support a summary for the option so the pricing details can be hidden from the consumer, or also viewed if needed.

Pricing is shown to the subscriber in the subscription invoice view in the Marketplace Portal, but subscribers are not able to modify any property price. Subscribers can view the price for the setup fee

for any property in the subscription invoice view, as well as the price for the recurring subscription. Subscribers can view a summary price for all the setup fees of the properties for an option reflected in the invoice total and the recurring subscription price for all the recurring prices of the option properties.

You can enable external pricing. See Cloud Service Automation External Pricing Guide.

You can configure the pricing model from two options:

- Flat A standard, single price for the Integer Property, regardless of the number of units.
- **Per Unit** Pricing that applies to each unit. For example, you can configure pricing per number of CPUs. Unit pricing is applicable to only Integer type option properties.

You can also set a quantity multiplier, which changes the price for this property when another property is increased. For example, you can increase the price for CPUs and memory when the number of servers is increased.

You can set pricing for the following with up to five-digit precision:

- The base, initial configuration of a service offering, without additional service options.
- Each service option and static properties in the service offering. You can also set pricing for service options that are not currently visible (as configured in the Options area for the service offering).
- A recurring period and price for a continuing subscription (for example, each week or each month).

Tasks

Within the Pricing tab, you can enter pricing information for your offering and its options.

Change settings

You can set the following:

- Externalized Prices
- Currency
- Recurring Period
- Hide initial price in Marketplace Portal for Approvers, or Subscribers, or both
- Hide recurring price in Marketplace Portal for Approvers, or Subscribers, or both

Service offering pricing

Item	Description
Initial Price	The base price for the service offering, excluding the price of all selected options.
Recurring Price	The price charged for each recurring period and the period interval.
Currency	The desired currency for the service offering.
Quantity Multiplier	Change the price of this property when the quantity for another property is changed.

Hide or Show Pricing in the Marketplace Portal

Initial or recurring pricing can be hidden for an option and its properties or on an option property in the Marketplace Portal for Approvers, or Subscribers, or both. Select the appropriate boxes to choose whether to hide or show pricing, and who can view the proicing.

When checked, the checkmark will appear in the Hide Initial column for every row in the table or in the Recurring Price column. To support a common use case, detailed subscription pricing fees are hidden because they are typically used for department bill-back purposes. Click **Show Pricing Details** to display all hidden subscription pricing fees.

If you click **Show Pricing Details**, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation.

Note: Price-hiding choices are reflected in notifications.

Use external prices

If you enable external pricing, you will enter a key for the price of an option rather than a numeric value. The key must exist in the JSON file from your external pricing system and must be assigned to the same organization as the offering. See *Cloud Service Automation External Pricing Guide*.

sections Tab

In the **sections** tab, you can attach documents of any type to the selected offering, such as service level agreements or terms and conditions. File size per document cannot exceed 15 MB and the total size of all documents attached cannot exceed 100 MB.

Tasks

After a document is added, you have the following options:

- Visibility Click the eye icon if you want this document visible to users in the Marketplace Portal.
- **Delete** Click the trashcan icon to delete the document.
- Edit Document Name Click the pencil to edit the name of the document. The caption defaults to the associated document name but can be edited, including removing the file extension.

Best practices

- You can add multiple documents at one time by dragging and dropping into the **Documents** area or by selecting multiple files after clicking **Add Document**.
- You can rearrange the order of multiple documents by dragging and dropping.
- Click **Reset** to revert back to any unsaved edits (such as a file name change) or to completely reset the form and clear out all unsaved documents.

Screenshots Tab

Screenshots are images and captions associated with a service offering that provide visual representations of the offering's views exposed in the Marketplace Portal. File size per image cannot exceed 15 MB. The total size of all images attached cannot exceed 100 MB. Images must be in JPG or 24-bit PNG format with a maximum size of 5000 x 5000 pixels.

Tasks

After a screenshot is added, you have the following options:

- Visibility Click the eye icon if you want this image visible to users in the Marketplace Portal.
- Delete Click the trashcan icon to delete the screenshot.
- Edit Screenshot Name Click the pencil icon to edit the name of the screenshot. The caption defaults to the associated screenshot name, but can be edited, including removing the file extension.

Best practices

- You can add multiple screenshots at one time.
- You can rearrange the order of multiple screenshots by dragging and dropping.
- Click **Reset** to revert back to any unsaved edits (such as a file name change) or to completely reset the form and clear out all unsaved images.

Versions Tab

Use the Versions tab to view and modify multiple versions of an offering.

A version is a copy of an existing offering that uses the service design and properties of the original. The **Versions** tab allows you to visually track offering changes over time.

Tasks

In the **Versions** tab, you can view and modify multiple versions of an offering. You can also use the Versions edit mode to make a copy of an offering, export an offering to an archive file, update an existing offering, or delete an offering. To create a version, see "Create offering versions" on page 262.

Upgradability Tab

The **Upgradability** tab allows you to view the upgrade paths from and to the selected version of the offering, navigate to those offerings, add an upgrade path from an offering, delete the upgrade path from or to an offering, or edit the description about the differences between the selected version and the version from which or to which it is upgradable.

This tab is not available to the Consumer Organization Administrator role.

Tasks

The following options are available from the **Upgradability** tab:

- Add upgrade path Click Add to define an upgrade path that establishes an upgradability
 relationship between two different versions of an offering. In the Add Upgrade Path dialog, select a
 service offering in the From Version drop-down list (the listed service offerings are any versions of
 the current service offering that have been created from a service design that are upgradable to the
 current service offering's service design). Enter a description of the upgradability relationship
 between the offerings, such as the differences between the offering versions.
- <version number> Click to display the selected version of the offering.
- Edit upgrade path description Click the gear icon and select Edit to update the description about the differences between the selected offering version and the version from or to which it is upgradable.
- **Delete upgrade path** Click the gear icon and select **Delete** to remove the upgrade path from the listed offering version.

Policies Tab

A Service Offering Manager will configure ITOC policies (multi-select) and maintenance windows (multi-select) from policies available on the ITOC server.

Note: If there are no policies defined on this offering, a message appears on the User interface:Here are no policies defined on this offering. To add new policy, select the "Add" below.

To add a new policy, select the **Add** button.

Note: Following message appears, if there are no defined or already defined policies: There are no policies available for this offering. Either no policies are defined, or all available ones have been assigned.

After configuring the ITOC policies, configure the maintenance window to be used for the defined policies by selecting the required option.

Marketplace Portal

If you are new to the Marketplace Portal, start here!

- "Prerequisites" below
- "User Interface Customization" on the next page
- "Adaptive Content" on the next page
- "Language Display" on the next page
- "Log In" on page 275
- "Log Out" on page 276
- "Sidebar Menu" on page 276
- "Back Navigation" on page 277
- "Contextual Search" on page 277
- "Global Search" on page 278
- "Keyboard Navigation" on page 278
- "Online Help " on page 279

Prerequisites

To use the Marketplace Portal, review the following requirements:

- The Marketplace Portal uses https and runs on port 8089, which is the default. If you customize the Marketplace Portal, contact your CSA Administrator to determine whether the port or protocol has changed.
- You must use a browser that supports the Marketplace Portal. A minimum screen resolution of 1024x768 is supported. As a best practice, a screen resolution of 1280x1024 will give the best results. For information about supported browsers, see the Cloud Service Automation System and Software Support Matrix.
- Use the following default Marketplace Portal URL: https://<CSA_HOST>:8089/org/<ORG_ID>

User Interface Customization

As an end user, you might want to use your organization's branding in the Marketplace Portal user interface.

To support your organization's branding styles and standards, you can customize certain user interface elements in the Marketplace Portal, such as the portal icon, the portal title, the portal welcome message, the portal footer message, themes, tiles, and security classifications. For instructions on how to customize these user interface elements, see the Customizing the Marketplace Portal whitepaper or contact your CSA Administrator.

Adaptive Content

The Marketplace Portal user interface layout is designed to adapt to various screen sizes, where the content adjusts to the size, and where all functionality persists. As a service consumer, you can use the Marketplace Portal on your desktop, tablet, or other mobile devices. Across these device screens, the Marketplace Portal displays an intuitive user interface that includes all functionality. For screen resolution requirements and best practices, see "Prerequisites" on the previous page.

Language Display

By default, the Marketplace Portal user interface displays in a left-to-right direction. For certain languages, such as Arabic and Hebrew, you can configure supported browser for a right-to-left user interface display. Right-to-left language display supports all out-of-the box Marketplace Portal organization themes: Simplified, Enterprise, and Playful. Right-to-left language display does not support custom themes.

- Several navigation components in the Dashboard, such as the organization logo, sidebar menu =, shopping cart , user name , and the <u>Need Help?</u> link, display on the right or left side, depending on the language you configure in your browser.
- In the input fields, you can also enter text in a right-to-left direction.
- In the Pick Date fields, the back arrow \checkmark advances the calendar and the forward arrow \checkmark moves the calendar backwards.

Setting the Language Display in Google Chrome

To configure the language setting in your Chrome browser:

- 1. From the Chrome drop-down menu \equiv , select **Settings**.
- 2. In the Settings window, select "Show advanced settings".
- 3. In the Languages section, click Language and input settings.
- 4. In the Languages pane, click **Add**.
- 5. In the Add Language window, select Arabic or Hebrew from the drop-down list.
- 6. Click OK.
- 7. In the Languages window, click **Done**.
- 8. Log out and then log back in to the Marketplace Portal for the selected language display. This language setting persists in your browser until you change it.

Setting the Language Display in Mozilla Firefox

To configure the language setting in your Firefox browser:

- 1. From the Firefox drop-down menu, select **Options**.
- 2. In the Options window, select the Content tab.
- 3. In the Languages section, click **Choose** to select your preferred language for displaying views in the Marketplace Portal.
- 4. In the Languages window, in the "Select a language to add" drop-down list, select a language, such as Arabic or Hebrew, and then click **Add**.
- 5. For the language that you want the views displayed in, select it and then click Move Up to move that selection to the top of the list.
- 6. Click **OK** to save your changes.
- 7. Log out and then log back in to the Marketplace Portal for the selected language display. This language setting persists in your browser until you change it.

Log In

To log in to the Marketplace Portal:

- 1. Open a browser window.
- 2. Enter the URL for the Marketplace Portal. The CSA Marketplace Portal landing page displays.

- 3. Click Log In. The Marketplace Portal login page displays.
- 4. Enter your **Username** and **Password** to display the Marketplace Portal Dashboard.
 - If the login request token is invalid or has expired, you will see the following warning. You will then be returned to the landing page that is explained in step 2.

A The request token for this page is invalid. It may have already been used, or expired because it is too old. Please go back to the site or application that sent you here and try again.

- The Marketplace Portal supports single sign-on and multi-factor authentication, which might change the login experience that is based on your organization's settings. Contact your CSA Administrator for additional information.
- For portal customization, security classification is configured in the Cloud Service Management Console. Contact your CSA Administrator for more information.
- For portal customization, security classification is configured in the Organization Administration Console. In this console, go to the Customization view for an organization and then modify the securityLevel and themeName values, as needed.

Log Out

To log out of theMarketplace Portal:

• In the Marketplace Portal Dashboard, upper right corner, in the account username drop-down list, select Log Out.

Sidebar Menu

For quick and direct navigation to and from any view in the Marketplace Portal, use the Sidebar Menu. You can show or hide this menu in the views. By default, the Sidebar Menu is hidden.

Excluding the top selection in the menu (Dashboard), the navigation selections are the same as the tiles in the Dashboard.

To show the Sidebar Menu, in the upper left sub-heading, select the $\overline{-}$ icon.

To hide the Sidebar Menu, click Dashboard in the sub-heading.

Back Navigation

In each Marketplace Portal view, click the $\boldsymbol{\zeta}$ icon in the sub-heading to go back to the previous view.

Contextual Search

In a Marketplace Portal view, click the magnifying glass \bigcirc to find a certain object by a meaningful keyword. Search results display in the selected object's view, such as Browse Catalog, Notifications, Review Requests, Requests, Subscriptions, and My Services. This search icon displays in the content area of each Marketplace Portal view.

Objects	Text or Keyword
Browse Catalog	Names and descriptions of service offerings.
Notifications	Notification names and notification messages.
Review Requests	Names and descriptions of all approval requests, including requests that require approval, denied requests, and approved requests.
Requests	Names and descriptions that you assigned to subscription requests.
Subscriptions	Names and descriptions assigned to subscriptions, when the subscriptions were created.
My Services	Names and descriptions assigned to the service instances. This is the actual service behind a subscription—the realized service instance. This is the actionable part of the service in the subscription management.
New Releases	Names and descriptions assigned to new services in the catalog that were created within the last seven days in your organization.
Popular Services	Names and descriptions assigned to popular services in the catalog that your organization is currently promoting.
Featured Services	Names and descriptions assigned to featured services in the catalog that your organization is currently promoting.
Services Expiring Soon	Names and descriptions assigned to services that will expire in 30 days.

In individual Marketplace Portal views, you can search for text in the following objects:

Objects	Text or Keyword
(Status) Requests	Requests that have a certain status, such as Submitted, Pending, Rejected, Approved, In Progress, Completed, and Canceled.
(Status) Subscriptions	Subscriptions that have a certain status, such as Pending, Active, Expired, Canceled, Terminated, and Paused.
(Status) My Services	My Services that have a certain status, such as Online, Offline, Transitioning, Reserved, Deploying, Modifying, Modification Failed, Failed, Canceling, Cancellation Failed, Expiring, and Expiration Failed.

Global Search

From any view in the Marketplace Portal, click the magnifying glass 2 to find a certain service offering, service instance, or subscription by a meaningful keyword. This search icon displays in the top header in the Marketplace Portal.

- For service offerings, global search finds the keyword in the name, description, option sets, options, and properties.
- For service instances and subscriptions, global search finds the keyword in the name, description, and instance properties (name and value).

Note: The Search Results view displays the keyword found only in service offerings, service instances, and subscriptions within your organization. In the Search Results view, click on an object for more detailed information about a service offering or subscription.

Keyboard Navigation

The following hotkeys to allow you to use your keyboard to easily navigate within the Marketplace Portal:

Hotkey	Marketplace Portal View	Usage
Ctrl+Shift+1	Dashboard	From any view in the Marketplace Portal, use this hotkey to go back to the Dashboard. Make sure your cursor is not in the Search box. Press the Tab key to exit the Search box, and then press Ctrl+Shift+1.

Hotkey	Marketplace Portal View	Usage
Ctrl+Shift+2	Cart	From any view in the Marketplace Portal, use this hotkey to go to your shopping cart.
Ctrl+Shift+3	Browse Catalog	From the Dashboard, use this hotkey to go to the Browse Catalog view.
Ctrl+Shift+4	Notifications	From the Dashboard, use this hotkey to go to the Notifications view.
Ctrl+Shift+5	Review Requests	From the Dashboard, use this hotkey to go to the Review Requests view.
Ctrl+Shift+6	Requests	From the Dashboard, use this hotkey to go to the Requests view.
Ctrl+Shift+7	Subscriptions	From the Dashboard, use this hotkey to go to the Subscriptions view.
Ctrl+Shift+8	My Services	From the Dashboard, use this hotkey to go to the My Services view.

Note: When you are in a Marketplace Portal view and want to navigate to a different view, you must always go back to the Dashboard first and then use the hotkey to go directly to another view. Make sure your cursor is not in the Search box. Press the Tab key to exit the Search box, and then press Ctrl+Shift+1 to return to the Dashboard.

Online Help

You can access the online Help from any view in the Marketplace Portal.

Review the context-sensitive online Help for instructions on how to perform tasks, such as how to browse and filter the service catalog, how to request a subscription to a service offering, how to approve subscription requests, and how to run actions on service instances.

To access the online Help:

- 1. From any view, click Need Help? or, in the user **L** drop-down list, select **Help** to open the online Help.
- 2. In the left navigation pane, select the **Welcome** topic to expand the table of contents. Select subfolders to further expand the table of contents.
- 3. In the Search text box, enter keywords to search for topics that apply. Within the topics found, the keyword displays in yellow highlights.

Use Online Help

- 4. (Optional) Use your browser to save Favorites or Bookmarks for topics. In the left navigation pane, select **Favorites** to find or search your saved favorites or bookmarks.
- 5. (Optional) At the bottom of a topic, click the Send documentation feedback to HPE link to help us improve the information you need!

Introduction to the Marketplace Portal

The Marketplace Portal is a one-stop shop for all of your IT service needs—where you can order, track, and manage your IT services!

The Marketplace Portal is a self-service web interface that retrieves service offerings for IT applications from the HPE Cloud Service Automation server and displays them in an intuitive view.

User Roles

The Marketplace Portal supports the following user roles:

- Consumer: In this role, you:
 - Can subscribe to and manage service offerings
 - Can manage service subscriptions
 - Can perform actions on service instances
- Consumer Organization Administrator: In this role, you:
 - Can create, edit, and delete catalogs in your organization
 - Can manage service offerings in your organization's catalogs
 - Can manage a user's subscriptions in a certain organization by performing actions on a subscription *on behalf* of the original subscriber
 - Can use HPE IT Business Analytics to measure and optimize the cost, risk, quality, and value of IT services and processes
- CSA Subscription Creator: In this role, you:
 - Can create subscriptions
 - Can reorder services
 - Cannot cancel or modify subscriptions
 - · Cannot perform any user operations
 - Cannot delete a request
- CSA Subscription Modifier: In this role, you:
 - Can modify subscriptions
 - Cannot subscribe or reorder services

- Cannot perform any user operations
- Cannot delete a request
- CSA Subscription Operator: In this role, you:
 - Can perform user operations
 - Cannot subscribe or reorder services
 - Cannot modify or cancel subscriptions
 - Cannot delete a request
- • CSA Subscription Canceler: In this role, you:
 - Can cancel subscriptions
 - Can delete a request
 - Cannot subscribe or reorder services
 - Cannot perform any user operations

Workflow

In the Marketplace Portal, the service offering workflow consists of:

Configuration Checkout and Delivery Request Confirmation

This workflow includes subscription requests, a scheduling process for service offering deployment, and a notification process for subscribers and approvers.

In the Marketplace Portal, you can filter, sort, and search service offerings. This view grants users services configured in the administration area.

The Marketplace Portal provides a user interface that adapts and scales views to optimize the display within the available screen size.

For more information about the Marketplace Portal, CSA, and other HPE products, visit the HPE web site at www.hpe.com.

Related Topics

"Marketplace Portal" on page 273

"The Dashboard" on the next page

The Dashboard

The Dashboard is the hub of the Marketplace Portal. The look and feel of the Dashboard allows you to quickly start shopping and place orders for service offerings. The Dashboard is considered dynamic because you can configure tiles you want displayed to support your organization.

The Dashboard layout is designed to help you easily and intuitively navigate within the Marketplace Portal.

From anywhere in the Marketplace Portal:

- Click the organization logo to return to the Dashboard.
- Click the magnifying glass to find a certain service offering, service instance, or subscription by a meaningful keyword. The Search Results view displays the keyword found only in service offerings, service instances, and subscriptions within your organization. This search action finds the keyword in the name, description, and properties of service offerings, services instances, and subscriptions. In the Search Results view, click on an object for more detailed information about a service offering or subscription. See "Global Search" in "Marketplace Portal" on page 273.
- L Click the user name to display a drop-down list of the following navigation options:
 - **Help**: Open the online Help for the Marketplace Portal.
 - About: Display the UI Version and Server Version.
 - Log Out: Close and exit the Marketplace Portal.
- $\bullet \equiv$ Click the sidebar menu to display a list of all navigation links within the Marketplace Portal.
- Need Help? Click this link to open the online Help for the Marketplace Portal.

Note: These navigation components display on either the right or left side of the Dashboard, depending on the language that is configured in your browser. See "Language Display" in "Marketplace Portal" on page 273.

Start Shopping

The Dashboard home page provides a variety of ways you can shop for service offerings and manage your requests and subscriptions.

- In the Dashboard banner, click Start Shopping to open the Shop Dashboard view. In this view, you can browse the catalog of available service offerings and then place your order. See "Shop for Services" below.
- In the Dashboard, scroll up and down the rows of tiles to select service offerings by a category, such as Shop for Services, Manage Subscriptions, More Actions, and Discover More.

Tip: If you do not want to go directly to the Shop Dashboard view and want to collapse the Dashboard banner, click **C**. To expand the Dashboard banner, click **S**.

Tip: Click \oplus to display all tiles in a row. Click Θ to hide all tiles in a row.

Tip: Use your keyboard to navigate sections, rows, and tiles in the Dashboard. See the hotkeys described in "Keyboard Navigation" in "Marketplace Portal" on page 273.

Shop for Services

In the Dashboard, you can shop for service offerings by browsing the following categories:

- . All Services: These are all of the available service offerings in the catalog.
- Xew Releases: These are services that have been recently added to the service catalog within the last 30 days. If you want to change the default, contact your CSA Administrator.
- Featured Services: These are services that your organization is currently promoting. During organization creation, any category can be set as a featured service. Service offerings published under that category are treated as featured service offerings and will be populated in the Featured Services view. Contact your CSA Administrator for more information.
- **Popular Services:** These are service offerings that are popular with other members of your organization. These are services that are in the top 10 service offerings for which a subscription

request was submitted during the previous 30-day time period. Click the **See More** link to open the Popular Services view.

Tip: Click \oplus to show service categories. Click Θ to hide service categories.

Shop Dashboard

Click **Shop Dashboard** to browse and order services by certain categories, by keyword search, and by quick links to service offering filters.

You can browse services by categories, such as:

- New Releases: These are services that have been recently added to the service catalog within the last 30 days. If you want to add or remove services in this category, contact your CSA Administrator.
- **Most Requested**: These are service offerings that are frequently requested by other members of your organization. These are services that are in the top 10 service offerings for which a subscription request was submitted during the previous 30-day time period.

To shop and place your order, click the service offering image or name to open the Browse Catalog Details view. See "Browse Catalog Details" in "Service Offerings" on page 300

Quick Links

Use these links to filter service offerings in the Browse Catalog view:

Offerings for Review: Show All Items, Show Items That Require Review, and Show Items That Do Not Require Review.

Categories: Show All Items, and categories defined for your organization, such as Application Servers, Application Services, Backup Services, CRM, and so on.

Manage Subscriptions

Use this row of Dashboard tiles to go directly to views that help you manage your own subscriptions.

• All Subscriptions: Manage service contracts you requested and view a detailed change history. The number in the upper right corner is the total number of subscriptions for all statuses.

• Expiring Soon: View a list of subscriptions that are scheduled to end 30 days after the subscription started.

Most Requested

These are services that are based on the highest number of subscriptions. These are service offerings that have been requested the most by other members of your organization. Click the **See More** link to open the Popular Services view.

More Actions

Use this row of Dashboard tiles to go directly to views that help you perform other actions.

- A Notifications: View a list of your subscriptions and requests that are active and expired, including the date and time they became active or expired. If you are an approver of requests, you receive notifications about requests that require your approval. The number in the upper right corner is the total count of notifications.
- My Services: Access, monitor, and perform actions on services you own. The number in the upper right corner is the total number of services you own.
- **My Orders:** View a detailed list of all orders you submitted and their associations. The number in the upper right corner is the total number of orders for all statuses.
- GReview Requests: Approve requests for users you manage in your organization. The number in the upper right corner is the pending count of approval requests. Requests for new subscriptions and for modifications to existing subscriptions might require your approval before they can be deployed. If you are designated as an approver of requests, you are responsible for approving or denying requests made for a predetermined set of service offerings.

Administration

You must log in as the Consumer Organization Administrator to access this section in the Marketplace Portal Dashboard:

- **A** Manage User Subscriptions: Use this tile to manage a user's subscriptions in a certain organization. Select this tile to perform actions on a subscription *on behalf of* the original subscriber. For more information, see Manage User's Subscriptions.
- **Catalog Management**: Use this tile to view, create, edit, and delete catalogs in your organization. For more information, see the *CSA Management Console Help*.
- **Offering Management**: Use this tile to manage service offerings in your organization's catalogs. You can view, create, delete, publish, and unpublish services offerings. For more information, see the CSA Management Console Help.
- Showback Report: Use this tile to go to HPE IT Business Analytics, which automatically gathers metrics from CSA to build key performance indicators. HPE IT Business Analytics provides scorecards and dashboards so that a Consumer Organization Administrator has insight into how to measure and optimize the cost, risk, quality, and value of IT services and processes. See the HPE IT Business Analytics Administrator Guide and the "Cloud Analytics" topic in the CSA Management Console Help for more information.

Discover More

Use this row of Dashboard tiles for hyperlinks to URLs customized for your organization by your CSA Administrator.

Pre-configured content will be visible in this tile, as specified for your organization by your CSA Administrator. This content can include your own custom code (HTML, CSS, or JavaScript) or an iframe.

Related Topics

- "Service Catalog" on page 293
- "Review Requests" on page 336
- "Requests" on page 323
- "Subscriptions" on page 310
- " Notifications" on the next page
- " Shopping Cart" on page 302

Notifications

The **Notifications** tile provides an easy way to monitor your notifications. To manage your subscription notifications, select the **Notifications** tile in the Dashboard **More Actions** section. By default, the list of notifications displays **Newest First**.

Notification Type	Description
Pending approval	If you are an approver of requests, a request needs your approval.
Request approved or rejected	A request you submitted has been approved or rejected. This notification is also created when a subscription request is automatically approved.
Subscription status change	 The status of one of your subscriptions has changed: An approved subscription is now active. A subscription was canceled. A subscription has expired. A subscription has failed.
Custom Notifications	A custom notification created by your system administrator.

Notifications are issued for the following reasons:

In the Notifications view, notifications are displayed with the most recent notification at the top of the list.

Information in a notification includes:

- The reason for the notification.
- The name of the related service offering or subscription.
- The date and time the notification was created.

When a subscription-related event occurs—such as when a request for a subscription is approved or canceled, or a subscription fails or expires—the user who requested the subscription is notified about the change of status. Users who approve requests are notified when subscriptions needing their approval are requested or modified.

Additional notifications can also be generated, depending on the offering you have subscribed to.

Tip: Click the magnifying glass ^Q to find a certain notification by a meaningful keyword. Search results display in the selected Notifications view.
Use Notifications

Related Topics

"Browse Notifications" below "Filter Notifications" below

"View Notification Details" on the next page

Browse Notifications

You can view your notifications in the Notifications view and in email messages sent to the email address associated with your login account.

Tip: Click the magnifying glass to find a certain notification by a meaningful keyword. Search results display in the selected Notifications view.

To browse notifications:

1. In the Dashboard, in the **More Actions** section, select the **Notifications** tile to open the Notifications view.

By default, all notifications are displayed by date order (Timestamp), with the newest subscriptions listed first. This list includes notification summary information and subscription names.

- 2. Scroll up or down the list to browse notifications.
- 3. When you find a notification that you are interested in, select the name of the notification to display the Notification Details view.

Related Topics

"Filter Notifications" below

"View Notification Details" on the next page

Filter Notifications

By default, the Notifications view displays all notifications with the most recent notifications listed first.

Tip: In the Notifications view, use the Search filter Enter text that represents what you are looking for so that the user interface filters out these specific items. Use the following filters to change the display order of notifications:

Newest First

By default, the Notifications view displays the most recent notifications first. Select **Oldest First** to change the order of notifications in this view.

Option	Description
Newest First	The most recent notification, based on the date the notification was created, is the first notification in the list. This is the default.
Oldest First	The oldest notification, based on the date the notification was created, is the first notification in the list.

All Notifications

By default, the Notifications view displays all notifications. To change the display order, select one of the following filter values: Past Day Notifications, Past Week Notifications, Past Month Notifications, or Past Year Notifications.

Related Topics

"Browse Notifications" on the previous page

"View Notification Details" below

View Notification Details

You can view information about notifications in the Notifications view.

To view notification details:

 In the Dashboard, in the More Actions section, select the A Notifications tile to open the Notification List view.

By default, all notifications are displayed by date order, with the newest notifications listed first. This list includes notification descriptions and subscription names.

- 2. Scroll up or down the list to browse notifications.
- 3. When you find a notification that you are interested in, select the name of the notification to display the Notification Details view. This view displays the date when the notification was created, the subscription name and its expiration date, the subscription status and a brief description of the service subscription, the owner, and the associated offering name.

Use Notifications

Related Topics

"Browse Notifications" on page 289

"Filter Notifications" on page 289

Use Notifications

Service Catalog

You can go directly to the service offerings catalog by using the All Services tile in the Marketplace Portal Dashboard Shop for Services section and in the Browse Catalog option in the sidebar menu. Use this catalog to view individual offerings that are available in your organization.

Tip: Click the magnifying glass \bigcirc to find a certain service offering by a meaningful keyword. Search results display in the Browse Catalog view.

Service Offerings

Offerings listed in the **Browse Catalog** view are derived from multiple catalogs. In this view, the name of the catalog from which the service offering originated is displayed. When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of each offering listed in the **Browse Catalog** view.

Note: If the same service offering is available from more than one catalog, the cost of the service offering is the same, regardless of the catalog it came from. However, the requirement for management approval might be different.

Service offerings are presented in a unified view that is configured in CSA. This view also displays the total number of service offerings in the catalog.

You can view the service catalog by a list of offerings and by a grid of offerings. By default, the **Browse Catalog** view initially displays all available offerings in a list view, alphabetically.

A list display that includes information about the service, such as the name of the service, the service image, a brief description, the published date, pricing, and whether it requires approval.

A grid display that includes the name of the service, the service image, pricing, and indicates whether it requires approval.

In both types of displays:

- In the upper left part of the **Browse Catalog** view, the number in parenthesis is the total count of all available offerings.
- You can scroll down to browse all available services, search by keyword, and set filters to customize the display.

Note: For each service offering, pricing precision displays up to five digits.

In the **Browse Catalog** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog**, **Browse Catalog Details**, **Requests**, **Request Details**, **Request Confirmation**, **Subscriptions**, **and Subscription Details**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Increasing the quantity for a service option may also increase the price for other options. For example, if you add a server then the number of CPUs and memory will increase, potentially increasing the price of each. For more information, see the *CSA Management Console Help*.

Related Topics

" Browse the Service Catalog" below

"Filter the Service Catalog" on the next page

"Search the Service Catalog" on page 297

Browse the Service Catalog

In the Marketplace Portal, you can browse the service catalog in the **Browse Catalog** view by a list display or by a grid display.

A list display that includes information about the service, such as the name of the service, the service icon, a brief description, the published date, pricing, and whether it requires approval.

A grid display that includes the name of the service, the service icon, pricing, and indicates whether it requires approval.

Note: For each service offering, pricing precision displays up to five digits.

In the **Browse Catalog** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog**, **Browse**

Use

Catalog Details, Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass \bigcirc to find a certain service offering by a meaningful keyword. Search results display in the Browse Catalog view.

To browse the service catalog:

1. In the Dashboard, in the Shop for Services section, select the All Services tile to open the

Browse Catalog view. By default, this view displays an alphabetical list = of all available services in the catalog. If you prefer a grid display, click the grid icon.

 Scroll up or down the list to browse available offerings in the service catalog. A service offering can have documents, such as service level agreements and terms and conditions, attached to it. Per each document, the file size must not exceed 15 MB. The total size of all attached documents must not exceed 100 MB.

Note: You must use Internet Explorer 10.0 or higher to attach documents to a service offering.

3. When you find a service offering that you are interested in, select its icon or name to display the **Browse Catalog Details** view.

Note: Increasing the quantity for a service option may also increase the price for other options. For example, if you add a server then the number of CPUs and memory will increase, potentially increasing the price of each. For more information, see the *CSA Management Console Help*.

Related Topics "Service Catalog" on page 293 "Filter the Service Catalog" below "Service Offerings" on page 300 " Requests" on page 323

Filter the Service Catalog

In the Marketplace Portal Browse Catalog view, you can change the order in which service offerings are displayed. By default, service offerings are sorted alphabetically, by all categories, and by all

service types. Use the following filters to display certain service offerings:

- "All Categories" below
- "All Service Types" below
- "Alphabetical" on the next page

All Categories

By default, service offerings are sorted by all categories. To meet the needs of your organization, category types are customizable.

The following, out-of-the-box, sample categories are provided: Accessory, Application Servers, Application Services, backup Services, Database Servers, Hardware, Infrastructure Services, Platform Services, Simple System, and Software.

Note: Excluding **All Categories**, these categories depend on the configuration of the current CSA installation. Only categories with active service offerings will display. New categories can be added to the current CSA instance.

To sort the service catalog by a certain category

• From the All Categories drop-down list, select a category that you want to sort by.

All Service Types

By default, service offerings are displayed by all service types. You can also display service offerings that require approval or that do not require approval.

To sort the service catalog by a certain service type

Sort Value	Description
All Service Types	Includes all service types described in this table. This is the default.
Approval Required	Service offerings that require approval.
No Approval Required	Service offerings that do not require approval.

• From the All Service Types drop-down list, select one of the following sort values:

By default, service offerings are sorted alphabetically. You can also sort offerings by newest, oldest, most expensive, least expensive, or reverse alphabetical.

To sort the service catalog by a certain order

From the drop-down list, select one of the following sort values:

Sort Value	Description
Newest First	The service offering that has the most recent published date.
Oldest First	The service offering that has the oldest published date.
Most Expensive	The service offering that has the highest initial price. The cost of the service offering that is used to sort this list excludes the periodic fee.
Least Expensive	The service offering that has the lowest initial price. The cost of the service offering that is used to sort this list excludes the periodic fee.
Alphabetical	Service offerings are sorted alphabetically, from A to Z. This is the default.
Reverse Alphabetical	Service offerings are listed by reverse alphabetical order, from Z to A.

Related Topics

"Search the Service Catalog" below

Search the Service Catalog

In the Browse Catalog view, click the magnifying glass keyword. Enter text that represents what you are looking for so that the user interface filters out these specific items.

To search the service offering catalog:

- 1. In the Search text box $^{Q_{i}}$, enter text.
- 2. Press Enter.

Related Topics

" Browse the Service Catalog" on page 294

"Filter the Service Catalog" on page 295

Featured Services

From the Dashboard, you can view services in the catalog that your organization is currently promoting

in the - Featured Services tile in the Shop for Services section.

Your CSA Administrator can assign one of the categories as a Featured Services category in the service catalog. This is configured in the Cloud Service Management Console. Contact your CSA Administrator for more information.

Note: During organization creation and configuration, any category can be set as a featured category in the Management Console. Service offerings published under that category are treated as featured service offerings and will be included in the **Featured Services** tile.

To view services that your organization is promoting:

- 1. In the Dashboard, in the **Shop for Services** section, select the **H Featured Services** tileto display a list of service offerings your organization is currently promoting.
- 2. In the Featured Services view, select a service offering to review its detailed information.

Related Topics

- "New Releases" below
- " Popular Services" on the next page
- "Subscriptions Expiring Soon" on the next page

New Releases

To view service offerings that were most recently added:

- 1. In the Dashboard, in the **Shop for Services** section, select the *** New Releases** tile to display a list of service offerings that were recently added by an administrative user. This list displays all service offerings sorted by the published date, beginning with the most recent date.
- 2. In the New Releases view, select a service offering to review its detailed information.

Related Topics

" Popular Services" on the next page

- "Featured Services" on the previous page
- " Subscriptions Expiring Soon" below

Popular Services

From the Dashboard, you can view service offerings that are most frequently requested by members of your organization in the **Popular Services** tile. These are service offerings that you are authorized to access.

To view services that are most frequently requested:

In the Dashboard, in the **Shop for Services** section, select the **Popular Services** tile to display a list of service offerings that are being tracked as most frequently requested.

In the Popular Services view, select a service offering to review its detailed information.

Related Topics

- " New Releases" on the previous page
- "Featured Services" on the previous page
- " Subscriptions Expiring Soon" below

Subscriptions Expiring Soon

From the Dashboard, you can view subscriptions that are scheduled to end 30 days after the subscription started.

To view subscriptions that are scheduled to expire soon:

- 1. In the Dashboard, in the **Manage Subscriptions** section, select the **A** Expiring Soon tile to display a list of your subscriptions that are scheduled to end 30 days after the subscription started.
- 2. In the Subscriptions Expiring Soon view, select a subscription to review its detailed information.

Related Topics

- " Popular Services" above
- "New Releases" on the previous page
- "Featured Services" on the previous page

Service Offerings

There are three basic steps in the Marketplace Portal workflow:

- 1. Service offering configuration.
- 2. Service checkout and delivery.
- 3. Request confirmation.

Service offerings are located in the All Services tile in the Dashboard Shop for Services section or in Browse Catalog in the sidebar menu.

Tip: Click the magnifying glass to find a certain service offering by a meaningful keyword. Search results display in the Browse Catalog view.

Browse Catalog Details

In the **Browse Catalog Details** view, the following information about a selected service offering displays:

Note: The buttons and options displayed in the **Browse Catalog Details** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

- The name of the service offering and its image.
 - A brief description of the service offering. This description is visible when you view all categories, except Featured Services.
 - A service offering typically has two prices: the initial price of the subscription and the recurring fee of the subscription.
 - For example, a subscription with an initial price of \$1000 might also have a periodic fee of \$200 a month for the duration of the subscription.
 - If you change the options associated with the subscription (such as increasing the size of the hard drive or the amount of memory), the initial price, recurring fee, or both, might change to reflect the additional costs.
 - The recurring fee can be hourly, daily, weekly, monthly or yearly (/yr).
 - The number format for pricing is based on your browser's locale.

- Show Pricing Details: By default, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription do not display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation. To support a common use case, detailed subscription pricing fees are hidden because they are typically used for department bill back purposes. Click Show Pricing Details to display all hidden subscription pricing fees.
- Hide Pricing Details: If you clicked Show Pricing Details, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation. To hide these detailed subscription pricing fees, click Hide Pricing Details.

Note: For each service offering, pricing precision displays up to five digits.

- **Published on:** The date the service offering was published. The date format is based on your browser's locale. This date is visible when you view all categories, except **Featured Services**.
- Show More Details is On/Off: This slider button allows you to hide or display information about a service offering. The default is set to On. To change this toggle by using your keyboard, tab through the Browse Catalog Details view and then stop tabbing when the toggle is lassoed by a blue rectangle. Use the directional arrows on your keyboard to slide the toggle to Off.
- **Option Sets and Profiles:** This information includes the available option sets (if any) and the cost of the different options.
 - If you want to subscribe to the service offering you are viewing, configure your subscription request in this section. For example, if the service offering includes a server, the server might include options you select to configure the number of CPUs and the amount of RAM for the server.
 - For sequenced-based offerings, select options to configure your offering request.
 - For topology-based offerings, select profiles to make changes.
- Total Initial Price: The initial price of the subscription. The periodic fee of the subscription.
- Total Recurring Price: The periodic fee of the subscription.
- The Click Add To Cart when you want to place a single order for more than one item.

- Click Checkout to open the Service Checkout view. Enter your order information and then click Submit Request.
- **Requires Approval:** Indicates whether your request for the service offering must be approved. When **Requires Approval** is displayed in the service offering description, it means that a subscription to the service offering requires management approval before it can be finalized. When you request a service offering that requires approval, the person who is the designated approver is automatically notified by email.
- Validation Execution: When user selects Checkout, Add To Cart, or Recalculate (if external pricing is enabled), then semantic validation is executed. Validation blocks User Interface until the result is calculated and if it fails, then same validation report is used as for property restrictions.

NOTE: Only not hidden and not locked properties are semantically validated.

When semantic validation identifies a failed input field, following error message is displayed: Click to resolve errors.

NOTE: When you click on the link Click to resolve errors, the failed input field is highlighted in the user interface with the possible error message.

Note: Increasing the quantity for a service option may also increase the price for other options. For example, if you add a server then the number of CPUs and memory will increase, potentially increasing the price of each. For more information, see the *CSA Management Console Help*.

Related Topics

"View Request Details" on page 328

"View Checkout Details" on page 333

"Approved and Rejected Requests" on page 331

" Shopping Cart" below

Shopping Cart

In the Marketplace Portal, you can browse for service offerings in the catalog and then add them to the shopping cart for a single checkout transaction. This transaction is recorded as one order confirmation number.

The total number of offerings (items) that you add to the shopping cart is displayed at the top of each view. All items are based on their service designs. Shopping cart contents remain in the cart, even after you log out. To empty the shopping cart, remove each item.

Note: For each service offering in your shopping cart, pricing precision displays up to five digits. This pricing is based on the original service offering configuration.

During the shopping cart checkout process, you can:

- Add Subscription Names—Enter meaningful, custom names for each item in your shopping cart. As a best practice, create names that easily identify them as services in your organization. If you do not want to customize the subscription names, accept the default subscription names.
- **Provide Order Information**—Configure the subscription period for all items in your shopping cart. Attach documents that provide more information for the approval process, such as a purchase order.

Note: You must use Internet Explorer 10.0 or higher to attach documents to a service offering.

To complete a shopping cart checkout:

- 1. In the Dashboard, in the Shop for Services section, select the All Services tile.
- 2. Select an offering, review its details, and then click Add to Cart.
- 3. While in the shopping cart, you can do the following:
 - a. Click **Edit Configuration** to change information about an offering. Click **Update** to save your changes.
 - b. Change the **Quantity** number. Click **Update** to save your changes.
 - c. Click **Remove Item** if you want to remove this offering from your shopping cart. In the Remove Item dialog, click **Yes**.
 - d. Click **Continue Shopping** to exit the shopping cart and browse the catalog to add more offerings to your shopping cart.
 - e. Use the browser's print option to print or save a copy of the contents of the shopping cart.
- 4. Click **Checkout** to display the Add Subscription Names view. Accept the default names or enter meaningful names for items in your shopping cart.

If the Checkout button cannot be selected, review your cart for the following messages:

• *This offering is no longer available*—The offering has been unpublished or removed from the catalog. You must remove this item from the shopping cart before you can check out.

- Offering has changed since it was added to the cart. Choose 'Edit Configuration' to validate offering before Checkout.—The offering has been updated after you added it to your shopping cart. Click Edit Configuration and verify the changes to the offering. To accept the changes, click Update. If you do not want to accept the changes, return to the shopping cart and remove the item from your shopping cart.
- 5. Click **Continue** to display the Provide Order Information view:
 - a. Accept the subscription period or make changes.
 - b. Attach documents that provide more information for the approval process.
 - c. Review the terms and conditions and then check the check box to confirm your agreement.
- 6. Click **Submit Cart**. The Shopping Cart Confirmation view displays detailed request information, including the total cost of all items in your cart and the order number. This order number also displays in the **Requests** view.

Related Topics

"View Request Details" on page 328

"View Checkout Details" on page 333

"Approved and Rejected Requests" on page 331

My Services

When your subscription to a service offering is approved, a service instance is created. The service instance is composed of the service components that you customized when you created the subscription request. It might also include additional components, if they are included as part of the service offering.

To manage your services, select the My Services tile in the Dashboard More Actions section.

When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of each offering listed in the **My Services** view.

Tip: Click the magnifying glass to find a certain subscribed service by a meaningful keyword. Search results display in the My Services view.

Related Topics

"Browse My Services" on the next page

"Filter My Services" on page 306

Use

"View My Service Details" on page 308

Browse My Services

You can browse services in the **My Services** view. This view displays a list of services that have a certain status, such as Online, Reserved, Deploying, Transitioning, Modifying, Modify Failed, Failed, Offline, Cancelling, Cancellation Failed, Expiring, Expiration Failed, Upgrading, Upgrade Failed, and Public Action Failed.

Health status icons will be displayed for services that are online. Health status and capacity information is displayed for active subscriptions and services if the CSA administrator has it configured.

Tip: Click the magnifying glass to find a certain subscribed service by a meaningful keyword. Search results display in the My Services view.

To browse your services

1. In the Dashboard, in the **More Actions** sections, select the **My Services** tile to open the **My Services** view.

By default, all services are displayed in date order, with the newest services listed first.

- 2. Scroll up or down the list to browse services.
- 3. (Optional) Use the **Search** tool to browse services by keyword or the filters to browse certain types of services.
- 4. When you find a service that you are interested in, select its icon or name to display the My Service Details view. When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of the offering in the My Service Details view.

Related Topics

"Filter My Services" on the next page

"View My Service Details" on page 308

By default, the My Services view displays all categories, your newest services first, and all service states. Use the following filters to display certain services:

- "All Categories" below
- "All Service States" below
- "Newest First" on the next page

Tip: In the My Services view, use the Search filter \bigcirc to find a certain service by keywords. Enter text that represents what you are looking for so that the user interface filters out these specific items.

All Categories

You can subscribe to a variety of services, such as application servers, email servers, or web hosting services. You can filter by these services, as categories, to easily navigate to and review your subscriptions.

All Service States

From the All Service States drop-down list, select one of the following filter values.

Note: The following table describes the service instance statuses and their corresponding subscription statuses.

Service Instance Status	Description	Corresponding Subscription Status
Online	The service instance is active.	Active
Reserved	The service instance has not started because the start date for the subscription is in the future.	Pending
Deploying	The service instance is being deployed.	Pending
Transitioning	The service instance is being reserved for deployment.	Pending
Modifying	A service instance–affecting modification that was made to the subscription or a service-	Pending (The subscription returns to

Service Instance Status	Description	Corresponding Subscription Status
	affecting action that was requested for the service instance has not been completed.	the Active state after the modification is completed.)
Modify Failed	A service instance–affecting modification that was made to the subscription or a service- affecting action that was requested for the service instance failed.	Active
Failed	The service instance deployment failed.	Failed
Offline	The service instance is no longer available because the subscription was canceled or expired.	Canceled or Expired
Canceling	The service instance is being canceled.	Pending
Cancellation Failed	The service instance cancellation has failed.	Active
Expiring	The service instance is expiring.	Pending
Expiration Failed	The service instance expiration has failed.	Active
Upgrading	The service instance is being upgraded.	Pending
Upgrade Failed	The service instance upgrade has failed.	Active
Public Action Failed	The action could not be completed due to a software or hardware issue. Public actions (reboot, start, or stop) only apply if the subscription is Active.	Active (The service might not be available.)

Newest First

From the Newest First drop-down list, select one of the following filter values:

Option	Description
Newest First	Your most recent service, based on the date the subscription started, is the first service in the list. This is the default.
Oldest First	Your oldest service, based on the date the subscription started, is the first service in the list.
Most Expensive	Your most expensive service.
Least Expensive	Your least expensive service.
Alphabetical	The list is ordered alphabetically, from A to Z.

Option	Description
Reverse Alphabetical	The list is ordered in reverse alphabetical order, from Z to A.

Related Topics

"Browse My Services" on page 305

"View My Service Details" below

View My Service Details

In the My Service Details view, you can see information about a service instance and request actions for a service instance.

Note: The buttons and options displayed in the **My Service Details** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

Information displayed in the My Service Details view varies because it is based on the service offering to which you subscribed. This information might include the IP address, version, and uptime data for the service instance and component information, such as the number of registered and active users on an LDAP server and the date the LDAP server was last backed up, if your service instance includes an LDAP server.

You can execute actions on, or issue commands to, many of the components of a service instance. The actions you can execute on a service instance vary and are based on the service offering to which you subscribed. For example, if your subscription is for a server, you might be able to execute commands that start, stop, reboot, suspend, pause, unpause, and resume the server.

The My Service Details view provides information in the following sections:

Manage Subscription—This link redirects you to detailed information about the subscription, where you can request actions for a subscription.

Service Details—This section shows information about the offering that fulfills the service, such as the name of the service offering, the name of the service design, the expiration date and time, and the owner. You can also click **View Service Topology** to see the topology diagram. Health status and capacity information is displayed for active subscriptions and services if the CSA administrator has it configured.

Service Components—These are the individual services that compromise your overall service delivery. Click the **Refresh** button to reload information about service components. In this section, for a certain service component, select its corresponding settings icon to request an action on a

service, such as reboot, pause, resume, and so on. Click the **Open Console** button to access the provisioned virtual machine from the browser.

To view service details

1. In the Dashboard, in the **More Actions** section, select the **My Services** tile to open the My Services view.

By default, all services are displayed in date order, with the newest services listed first.

- 2. Scroll up or down the list to browse services.
- 3. When you find a service that you are interested in, select its icon or name to display the My Service Details view.
- 4. (Optional) Click **Manage Subscription** to open the Subscriptions Details view for the service. See "View Subscription Details" on page 316.
- 5. (Optional) Click **View Service Topology** to show a topology diagram of the service instance, including summary information.
- In the Service Components section, for a certain service component, select its corresponding settings icon to request an action on a service, such as Clone Pattern, Build Resource Provider List, and Log Messages.
- 7. In the Service Action dialog, click **Execute**. A service request will be filed and will be subject to approval. After it is approved, your service will show the action performed.

When user clicks **Execute** then semantic validation is executed.

Validation blocks User Interface until the result is calculated and if it fails, then similar validation report is used as for parameter restrictions in Marketplace Portal.

8. Wait for the Success dialog and then click **OK**.

Related Topics

"Browse My Services" on page 305

"Filter My Services" on page 306

Subscriptions

A subscription originates with a subscription request, which is a request for delivery of cloud services that is initiated by the subscriber (end user) using a service catalog in the Marketplace Portal. After a subscription request is approved, a service instance is created. For more information, see the Cloud Service Automation Concepts Guide and the CSA Management Console Help.

To manage your service offering subscriptions, select the All Subscriptions tile in the Dashboard Manage Subscriptions section. By default, the list of Subscriptions displays All Categories, All Subscription Statuses, and Newest First.

Note: If you are an authorized Consumer Business Manager, you can manage all user's subscriptions in your organization. See "Manage User's Subscriptions" on page 315.

The buttons and options displayed in the **Subscriptions** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

The **Subscriptions** view lists your subscriptions for the last month. This is the default list order. To customize your view, you can sort and filter the list of subscriptions. You can also view only the subscriptions for service offerings from a specific category by using the **All Categories** drop-down filter. When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of each offering listed in the **Subscriptions** view.

The All Subscriptions tile also displays the total number of subscriptions for each status.

Note: For each subscription, pricing precision displays up to five digits. This pricing is based on the original service offering configuration.

In the **Subscriptions** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog, Browse Catalog Details**, **Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass , to find a certain subscription by a meaningful keyword. Search

results display in the Subscriptions view.

In the Subscriptions view, you can perform the following tasks:

- Check the state of your subscriptions.
- Set filters to find certain subscriptions. These filters display in the user interface only when your browser resolution it set to more than 992 pixels wide. If your browser resolution is set to 992 pixels or less, these filters do not display and only the Search box displays. This is known as adaptive content in the Marketplace Portal. See "Adaptive Content" in "Marketplace Portal" on page 273.
- Monitor a list of subscriptions that are expiring soon.
- View detailed subscription information. In the **Subscription Details** view, you can run actions on your service instances and, if necessary, modify subscriptions.
- Cancel subscriptions, one at a time or all at the same time. After you cancel a subscription, you can delete it from the catalog.
- Delete subscriptions, one at a time or all at the same time. You must cancel a subscription before you can delete it.

Related Topics

"Browse Subscriptions" below "Filter Subscriptions" on the next page "View Subscription Details" on page 316 "Modify a Subscription" on page 317 "Cancel a Subscription" on page 319 "Delete a Subscription" on page 320

Browse Subscriptions

You can browse and filter subscriptions in the Subscriptions view.

Note: For each subscription, pricing precision displays up to five digits. This pricing is based on the original service offering configuration.

In the **Subscriptions** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog, Browse Catalog Details, Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Health status and capacity information is displayed for active subscriptions and services if the CSA administrator has it configured.

Tip: Click the magnifying glass to find a certain subscription by a meaningful keyword. Search results display in the Subscriptions view.

To browse subscriptions:

1. In the Dashboard, in the Manage Subscriptions section, select the III Subscriptions tile to open the Subscriptions view.

By default, all subscriptions are displayed in date order, with the newest subscriptions listed first.

- 2. Scroll up or down the list to browse subscriptions.
- 3. When you find a subscription that you are interested in, select its icon or name to display the Subscription Details view. When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of the offering in the Subscription Details view.

Related Topics

"Filter Subscriptions" below "View Subscription Details" on page 316

"Modify a Subscription" on page 317

"Cancel a Subscription" on page 319

"Delete a Subscription" on page 320

Filter Subscriptions

By default, the Subscriptions view displays all categories, the newest subscriptions first, and all subscription states. Use the following filters to display certain subscriptions:

Use Subscriptions

- All Categories
- All Subscription Statuses
- Newest First
- Health Status

Note: These filters are displayed in the user interface only when your browser is set to more than 992 pixels wide. If your browser is set to 992 pixels or less than 992 pixels wide, these filters are not displayed and only the magnifying glass \bigcirc is displayed.

Tip: In the Subscriptions view, click the magnifying glass \bigcirc to find a certain subscription by keywords. Enter text that represents what you are looking for so that the user interface filters out these specific items.

All Categories

You can subscribe to a variety of services, such as application servers, email servers, or web hosting services. You can filter by these services, as categories, to easily navigate to and review your subscriptions.

All Subscription Statuses

Subscription State	Description
All Subscription Statuses	Includes all subscription states described in this table.
Active	Subscriptions that are active.
Pending	Subscriptions that are waiting to be approved.
Expired	Subscriptions that have expired.
Canceled	Subscriptions that have been canceled.
Terminated	Subscriptions that have been terminated.
Paused	Subscriptions that failed to deploy and have been paused for troubleshooting.

From the All Subscription Statuses drop-down list, select one of the following filter values:

Newest First

From the Newest First drop-down list, select one of the following filter values:

Option	Description
Newest First	The most recent subscription, based on the date the subscription started, is the first subscription in the list. This is the default.
Oldest First	The oldest subscription, based on the date the subscription started, is the first subscription in the list.
Most Expensive	The most expensive subscription.
Least Expensive	The least expensive subscription.
Alphabetical	The list is ordered alphabetically, from A to Z.
Reverse Alphabetical	The list is ordered in reverse alphabetical order, from Z to A.

Health Status

You can filter by the following health status values:

- Normal
- Warning
- Major
- Minor
- Critical
- Suspended
- Powered off
- Unknown

Related Topics

"Browse Subscriptions" on page 311

"View Subscription Details" on page 316

"Modify a Subscription" on page 317

"Cancel a Subscription" on page 319

"Delete a Subscription" on page 320

Manage User's Subscriptions

As an authorized Consumer Business Manager, you can manage all user's subscriptions in your organization.

In manager mode, you can perform actions on a subscription *on behalf of* the original subscriber, such as:

- Modify, cancel, or delete a user's subscription.
- Go to the Request Details view to review information about the user's original subscription request.
- Go to the **My Service Details** view to review information about the offering that fulfills the service, including service components and service topology.
- Review the subscription history and notifications for a user's subscription.

To manage a user's subscriptions in your organization:

1. In the Dashboard, in the Administration section, select the Manage User Subscriptions tile to open the User Lookup view.

The **User Lookup** view lists all users in your organization. By default, all users in an organization are displayed in alphabetical order. Use the Search tool Q to find a certain user by name.

- In the User Lookup view, select a user whose subscriptions you want to manage. The service
 offerings that the selected user subscribes to display in the Subscriptions view. In the
 Subscriptions view:
 - The user account name **L** that you are managing subscriptions *on behalf of* displays below your management mode account name **L**.
 - Click the close icon × next to the user account name to exit management mode for that user and return to the Dashboard.
- 3. When you find a subscription want to manage, select its icon or name to display the Subscription Details view.
- In the Subscriptions Details view, select an action you want to perform on this subscription, on behalf of its user, such as View Request, View Linked Service, Modify Subscription, Cancel Subscription, and Delete Subscription.

Use Subscriptions

Related Topics

"View Subscription Details" below "Modify a Subscription" on the next page "Cancel a Subscription" on page 319 "Delete a Subscription" on page 320

View Subscription Details

The Subscriptions Details view displays the following information:

Note: The buttons and options displayed in the **Subscription Details** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

- The image for the service offering to which you subscribed.
- The name you entered for the subscription when you configured it.
- The name of the service offering to which you subscribed.
- The status of the subscription.
- Health status and capacity information is displayed for active subscriptions and services if the CSA administrator has it configured.
- The order number.
- The initial price and recurring price.

In the **Subscription Details** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog, Browse Catalog Details, Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

To view subscription details

 In the Dashboard, in the Manage Subscriptions section, select the All Subscriptions tile to open the Subscriptions view.

By default, all subscriptions are displayed by date order, with the newest subscriptions listed first.

- 2. Scroll up or down the list to browse subscriptions.
- 3. When you find a subscription that you are interested in, select the name of the subscription to display its Subscriptions Details view. This view displays the subscription name and a brief description, subscription history and notifications. Use the filter to customize the display of history events and notifications.
- 4. (Optional) If you want to see the original service request, click View Request.
- 5. (Optional) If you want to place another order for this service, click **View Linked Service** to open the **My Service Details** view.

Related Topics

"Browse Subscriptions" on page 311 "Filter Subscriptions" on page 312 "Modify a Subscription" below "Cancel a Subscription" on page 319 "Delete a Subscription" on page 320 "View Request Details" on page 328

Modify a Subscription

Note: You can only modify active subscriptions.

To modify a subscription:

 In the Dashboard, in the Manage Subscriptions section, select the All Subscriptions tile to open the Subscriptions view.

By default, all subscriptions are displayed by date order, with the newest subscriptions listed first.

- 2. Scroll up or down the list to browse subscriptions.
- 3. When you find a subscription that you want to modify, select the name of the subscription to display its Subscriptions Details view.
- 4. In the Subscription Details view, click **Modify Subscription** to open the Modify Subscription Details view.
- 5. In the Modify Subscription Details view, click Modify Subscription to open the Modify Subscription Details view. In this view, you can change the subscription name and description, group ownership, option parameters for service configuration, and the End Date of the subscription period. You cannot edit the Start Date of the subscription period.
- 6. Click **Submit Subscription** to save your changes.
- 7. Wait for the confirmation view to see the order details, including the request number. Your request is subject to an approval process before it can be fulfilled and delivered.
- 8. (Optional) If you want to see the original service request, click **View Request** to see detailed information about the original request.
- 9. (Optional) In the confirmation view, click **View Request** to open the Request Details view for detailed information about the subscription you modified.
- 10. (Optional) In the confirmation view, click Your Subscriptions to open the Subscriptions view.
- 11. (Optional) In the confirmation view, click **Reorder Service** to open the Service Offering Details view for this subscription and place another order.
- 12. (Optional) You can also modify a subscription during the checkout process. See "Reorder a Service" on page 330.

When a user clicks **Modify Subscription** or **Recalculate** (if external pricing is enabled), then **semantic validation** is executed. Validation blocks User Interface until the result is calculated and if it fails, then same validation report is used as for property restrictions.

NOTE: Only not hidden and not locked properties are semantically validated.

When semantic validation identifies a failed input field, following error message is displayed: Click to resolve errors.

NOTE: When you click on the link Click to resolve errors, the failed input field is highlighted in the user interface with the possible error message.

Related Topics

"Browse Subscriptions" on page 311

Use Subscriptions

"Filter Subscriptions" on page 312 "View Subscription Details" on page 316 "Cancel a Subscription" below "Delete a Subscription" on the next page

Cancel a Subscription

You can only cancel subscriptions if the \bigotimes cancel icon is displayed. You cannot cancel a subscription if this icon does is not displayed.

In the Subscriptions list view, you can:

- Cancel a single subscription, one at a time, in the Subscription Details view and from the Subscriptions list view.
- Cancel all subscriptions, all at the same time, from the Subscriptions list view.

To cancel a subscription in the Subscription Details view

- 1. In the Dashboard, in the **Manage Subscriptions** section, select the **All Subscriptions** tile to display the Subscriptions view.
- 2. In the Subscriptions view, scroll up or down the list to find and select the subscription you want to cancel.
- 3. In the Subscription Details view, click **Cancel Subscription**.
- 4. In the Cancel Subscription dialog, click **Yes** to confirm that you want to cancel the subscription.
- 5. (Optional) In the Cancel Subscription dialog, click **No** if you decide you do not want to delete the subscription.

To cancel a single subscription in the Subscriptions list view

1. In the Dashboard, in the **Manage Subscriptions** section, select the **All Subscriptions** tile to display the Subscriptions view.

- 2. In the All Subscription States filter, select Active.
- 3. In the Subscriptions view, scroll up or down the list to find the subscription you want to cancel.
- 4. Click the cancel icon 🔯 next to the subscription you want to cancel.
- 5. In the confirmation dialog, click Yes to confirm that you want to cancel the selected subscription.
- 6. (Optional) In the confirmation dialog, click **No** if you decide you do not want to cancel the subscription.

To cancel all subscriptions in the Subscriptions list view

- 1. In the Dashboard, in the **Manage Subscriptions** section, select the **All Subscriptions** tile to display the Subscriptions view.
- 2. In the All Subscription States filter, select Active.
- 3. Select List Actions.
- 4. In the List Actions dialog, click **Cancel All** to cancel all active subscriptions that are visible in the list. **Caution:** This action cannot be undone.
- 5. (Optional) If you really do not want to cancel all subscriptions, click the close icon × to close the List Actions dialog. Or, press the **Esc** key or click outside the dialog window to dismiss the cancel action.
- 6. In the confirmation dialog, click **Yes** to confirm that you want to cancel all subscriptions in the list. A message displays, confirming that all subscriptions were canceled.

Related Topics

"Filter Subscriptions" on page 312

"Delete a Subscription" below

Delete a Subscription

When you no longer need information about subscriptions that have expired, been canceled, or failed,

you can remove them from the Subscriptions view. In the Subscriptions view, the trashcan icon \square indicates a deletable subscription.

Caution: When you delete a subscription, it will no longer be visible in the Marketplace Portal.

In the Subscriptions list view, you can:

- Delete a single subscription, only if it has already been canceled, one at a time, in the Subscription Details view and in the Subscriptions list view.
- Delete all subscriptions, all at the same time, in the Subscriptions list view.

Before you delete a subscription, be aware of the following requirements and conditions:

- Subscriptions must be canceled first before they can be deleted.
- Deletable and cancelable subscriptions cannot be concurrently acted on.
- Cancelable subscriptions take precedence.

To delete a subscription in the Subscription Details view

- 1. In the Dashboard, in the **Manage Subscriptions** section, select the **All Subscriptions** tile to display the Subscriptions view.
- In the Subscriptions view, scroll up or down the list to find and select the subscription you want to delete. The trashcan icon indicates a deletable subscription.
- 3. In the Subscription Details view, click **Delete Subscription**.
- 4. In the Delete Subscription dialog, click Yes to confirm that you want to delete the subscription.
- 5. (Optional) In the Delete Subscription dialog, click **No** if you decide you do not want to delete the subscription.

To delete a single subscription in the Subscription Detailt view

- In the Dashboard, in the Manage Subscriptions section, select the All Subscriptions tile to display the Subscriptions view.
- 2. In the All States filter, select **Canceled**.
- 3. In the Subscriptions view, scroll through the list to find the canceled subscription you want to delete.
- 4. Select the trashcan icon \square for the subscription.

- 5. In the Delete Subscription dialog, click **Yes** to confirm that you want to delete the selected subscription.
- 6. (Optional) In the Delete Subscription dialog, click **No** if you decide you do not want to delete the selected subscription.
- 7. Go back to the Subscriptions view to confirm that the subscription is excluded from the list.

To delete all subscriptions from the list view

- 1. In the Dashboard, in the **Manage Subscriptions** section, select the **All Subscriptions** tile to display the Subscriptions view.
- 2. In the All States filter, select **Canceled**.
- 3. Select List Actions.
- 4. In the List Actions dialog, click **Delete All** to delete all subscriptions that are visible in the list. **Caution:** This action cannot be undone.
- 5. (Optional) If you decide you do not want to delete all subscriptions, click the close icon × to close the List Actions dialog.
- 6. In the confirmation dialog, click **Yes** to confirm that you want to delete all subscriptions in the list. A message displays, confirming that all subscriptions were deleted.

Related Topics

"Cancel a Subscription" on page 319

Requests

A new request is created when you:

- Submit an order for a subscription to a service offering.
- Make a change to an existing service offering subscription.
- Request that a service offering subscription be canceled.
- Cancel an active request.
- Cancel an active subscription.
- Delete an active subscription.

Note: The buttons and options displayed in the **Requests** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

Before you create a request, be aware of the following approval requirements:

- Requests for new subscriptions and for modifications to existing subscriptions might require management approval.
- Requests for the cancellation of subscriptions do not require approval.

Note: Depending on the approval policy for the service offering you are requesting, approval might be required from more than one approver.

To manage your requests, select the **Solution** My Orders tile in the Marketplace Portal Dashboard More Actions section to see a list of all requests submitted. By default, the list of Requests displays All Request Types, All Request States, and Newest First.

Note: For each service request, pricing precision can display up to five digits. This pricing is based on the original service offering configuration.

When you select the \checkmark My Orders tile, the **Requests** view displays a scrollable list of your requests submitted during the last month. This is the default list order. To customize your view, you can sort and filter the list of requests. You can also view only the requests for service offerings from a specific category by using the **All Request Types** drop-down filter. When there are multiple versions of a

Use Requests

service offering, the version number displays in parenthesis next to the name of each offering listed in the **Requests** view.

In the **Requests** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog**, **Browse Catalog Details**, **Requests**, **Request Details**, **Request Confirmation**, **Subscriptions**, and **Subscription Details**. As a best practice, your Consumer Organization Administrator Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass to find a certain request by a meaningful keyword. Search results display in the Requests view.

In the Requests view, you can perform the following tasks:

- View detailed request information. In the **Request Details** view, you can perform actions, such as reorder a service.
- Cancel requests, one at a time or all at the same time. When you cancel requests all at the same time, only requests that are currently loaded in the **Requests** list view will be canceled.
- Delete requests, one at a time or all at the same time. When you delete requests all at the same time, only requests that are currently loaded in the **Requests** list view will be deleted.

Related Topics

"Browse Requests" on the next page "Filter Requests" on page 326 "View Request Details" on page 328 "View Checkout Details" on page 333 "Approved and Rejected Requests" on page 331 "Cancel a Request" on page 333 "Delete a Request" on page 335 "Reorder a Service" on page 330
Browse Requests

You can browse requests in the **Requests** view. In the Dashboard, select the **Solution My Orders** tile in the in the **More Actions** section to browse requests in the **Requests** view.

In the **Requests** view, some service offerings display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog, Browse Catalog Details, Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details**. As a best practice, your Consumer Organization Administrator Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass \bigcirc to find a certain request by a meaningful keyword. Search results display in the Requests view.

To browse requests:

 In the Dashboard, in the More Actions section, select the ^S My Orders tile to open the Requests view.

By default, all requests are displayed in date order, with the newest request listed first.

Note: If you are an approver of requests, by default, all requests that require approval are displayed.

2. Scroll up or down the list to browse requests.

Note: For each service request, pricing precision displays up to five digits. This pricing is based on the original service offering configuration.

- 3. When you find a request that you are interested in, select its icon or name to display the **Request Details** view. When there are multiple versions of a service offering, the version number displays in parenthesis next to the name of the offering in the **Request Details** view.
- (Optional) If the request you are looking for is not displayed, select a status in the All Request States drop-down filter. A list of requests with the selected status is displayed.

Use Requests

Related Topics "Filter Requests" below "View Request Details" on page 328 "View Checkout Details" on page 333 "Approved and Rejected Requests" on page 331 "Cancel a Request" on page 333 "Delete a Request" on page 335

Filter Requests

By default, the Requests view displays all request types, the newest requests first, and all request states. Use the following filters to display certain requests:

- "All Request Types" below
- "All Request States" below
- "Newest First" on the next page

Tip: In the Requests view, click the magnifying glass \bigcirc to find a certain request by keywords. Enter text that represents what you are looking for so that the user interface filters out these specific items.

All Request Types

From the **All Request Types** drop-down list, select one of the following filter values: All Request Types (default), Service Request, Modify Subscription, or Cancel Subscription.

All Request States

From the All Request States drop-down list, select one of the following filter values:

Request State	Description
All Request States	Includes all request states described in this table.
Pending	Requests that require approval.

Request State	Description
Canceled	Requests that have been canceled.
Approved	Requests that have been approved.
Rejected	Requests that have been rejected.
Cancelable	Requests that can be canceled.
Deletable	Requests that can be deleted.

Newest First

From the Newest First drop-down list, select one of the following filter values:

Option	Description
Newest First	The most recent request, based on the date the request was submitted, is the first request in the list. This is the default.
Oldest First	The oldest request, based on the date the request was submitted, is the first request in the list.
Most Expensive	The most expensive request.
Least Expensive	The least expensive request.
Alphabetical	The list is ordered alphabetically, from A to Z.
Reverse Alphabetical	The list is ordered in reverse alphabetical order, from Z to A.

Related Topics

"Browse Requests" on page 325

"View Request Details" on the next page

"View Checkout Details" on page 333

"Approved and Rejected Requests" on page 331

"Cancel a Request" on page 333

"Delete a Request" on page 335

View Request Details

In the **Request Details** view, some service offerings display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog**, **Browse Catalog Details**, **Request Details**, and **Request Confirmation**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Note: The buttons and options displayed in the **Request Details** view depend on your user role. Different user roles have different set of permissions to perform actions. For more information on user roles and their associated permissions, see "User Roles" on page 281.

The **Request Details** view displays the following information about the request you selected:

- The image represents the service offering for which the request was created.
- The name of the subscription for which the request was created. If the request is for a modification to a subscription and the modification includes a change to the subscription name, this is the new name of the subscription.
- The initial price and the recurring price of the subscription.
- Below the name of the subscription is the name of the service offering.
- Below the name of the service offering is the status that indicates and whether it has been approved.
- Checkout information, such as the subscription name, group ownership, and the subscription term.
- Detailed pricing information for the initial subscription price and its recurring price.
 - $_{\circ}$ Scroll down to Price Breakdown and then click Expand igodot .

Show Pricing Details: By default, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription do not display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation. To support a common use case, detailed subscription pricing fees are hidden because they are typically used for department bill back purposes. Click Show Pricing Details to display all hidden subscription pricing fees.

✓ Hide Pricing Details: If you clicked Show Pricing Details, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation. To hide these detailed subscription pricing fees, click Hide Pricing Details.

To view request details:

In the Dashboard, in the More Actions section, select the SMy Orders tile to open the Requests view.

By default, all requests are displayed by date order, with the newest requests listed first. This list includes subscription names.

- 2. Scroll up or down the list to browse requests.
- 3. When you find a request that you are interested in, select the name of the request to display the **Request Details** view. This view displays the service request name and a brief description, group ownership, the subscription term, attached documents, and a cost breakdown of configuration selections.
- 4. (Optional) If you want to delete this service request, select the trashcan icon $\overline{\mathbb{II}}$.
- 5. (Optional) If you want to place another order for this service, click **Reorder Service**.

Related Topics

"Browse Requests" on page 325

"Filter Requests" on page 326

"View Checkout Details" on page 333

"Approved and Rejected Requests" on page 331

"Cancel a Request" on page 333

"Delete a Request" on page 335

"Reorder a Service" on the next page

Reorder a Service

You can reorder the service offering that originated this request. The **Request Details** view will be populated with the values you provided for the initial request.

To reorder a service:

1. In the Dashboard, in the **More Actions** section, select the **▼ My Orders** tile to open the Requests view.

By default, all requests are displayed by date order, with the newest requests listed first. This list includes subscription names.

- 2. Scroll up or down the list to browse requests.
- 3. When you find a request that you are interested in, select the name of the request to display the Request Details view. This view displays the service request name and a brief description, group ownership, the subscription term, attached documents, and a cost breakdown of configuration selections.
- 4. Click **Reorder Service** to open the **Reorder Service** view.
- 5. Click Checkout to open the Service Checkout view.
- 6. Enter a subscription name and description.
- 7. Specify the subscription period (recurring or term, and start and end dates).
- 8. (Optional) Click **Make Changes** to modify the option sets. The original option models persist unless you change them.
- 9. (Optional) Click **Attach File** to attach documents that provide more information for the approver, such as a purchase order. **Note:** You must use Internet Explorer 10.0 or higher to attach documents to a service offering.
- 10. Click Submit Request.
- 11. Wait for the **Request Confirmation** view to see the order details, including the request number. Your request is subject to an approval process before it can be fulfilled and delivered.
- 12. (Optional) In the **Request Confirmation** view, click **View Request** to open the Request Details view for detailed information.
- 13. (Optional) In the **Request Confirmation** view, click **Shop More** to open the Service Offerings view to continue shopping.

14. (Optional) In the **Request Confirmation** view, click **Reorder Service** to open the Service Offerings view and reorder again.

Note: In the **Review Confirmation** view, some service offerings display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog Details**, **Requests, Request Details**, and **Request Confirmation**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Related Topics

"View Request Details" on page 328

"View Checkout Details" on page 333

Approved and Rejected Requests

When your request for a new subscription or a modification to a subscription is approved or rejected, its status changes and other events occur as described in the following sections:

- "When Your Request is Approved" below
- "When Your Request is Rejected" on the next page

Tip: To see the most current status information, refresh the browser.

When Your Request is Approved

Within a short period of time after your request is approved, the following occurs:

- The status of the request changes in the **Requests** view:
 - If the start date is today or earlier, the status is changed to **Approved**.
 - If the start date is a future date, the status remains as **Pending** until the start date arrives, at which time the status changes to **Approved**.
 - When a request is automatically approved, it briefly has the status of **Pending**. The status then changes to **Approved**.

Use Requests

- A notification that indicates the status of your request is displayed in the Notifications view.
- An email message is sent to you with the new status of the request.
- The requested subscription is added to the **Subscriptions** view, with one of the following statuses:
 - The status is **Active** if the start date is today or earlier, and the subscription has been deployed.
 - The status is **Pending** if the subscription is waiting to be deployed or if the start date is in the future.

Note: If the request is for the modification of a subscription, the original subscription is replaced with the modified subscription in the **Subscriptions** view when the request for the modification is approved.

The subscription starts as follows:

- If the start date is today and the request is approved today (manually or automatically), the subscription starts within several minutes of the final approval.
- If the start date is today and the request is approved on a future date, the subscription starts within several minutes of the final approval.
- If the start date is a future date and the request is approved before the start date, the subscription starts several minutes after midnight on the start date.

When Your Request is Rejected

When your request is rejected, the following occurs:

- The status of the request changes to **Rejected** in the **Requests** view.
- A notification giving the status of your request is displayed on the dashboard.

Related Topics

"Browse Requests" on page 325

"Filter Requests" on page 326

"View Request Details" on page 328

"View Checkout Details" on the next page

"Cancel a Request" on the next page

"Delete a Request" on page 335

View Checkout Details

To review checkout details for a request:

- 1. In the Dashboard, in the More Actions section, select the My Orders tile.
- 2. In the Requests view, select a request to display the Request Details view.
- Scroll down to the Checkout Details section to review information about the request, such as the subscription name and a brief description, group ownership, the subscription term, attached documents, a cost breakdown of configuration selections, the initial base cost, and the recurring base cost.
- 4. (Optional) If you want to reorder this service, click Reorder Service.

Related Topics
"Reorder a Service" on page 330
"Browse Requests" on page 325
"Filter Requests" on page 326
"View Request Details" on page 328
"Approved and Rejected Requests" on page 331
"Cancel a Request" below
"Delete a Request" on page 335

Cancel a Request

You can cancel a request only if the status of the request is Cancelable.

In the Requests list view, you can:

- Cancel a single request, one at a time.
- Cancel all requests, all at the same time. This action cancels only the requests that are currently loaded in the Requests view.

Before you cancel a request, be aware of the following requirements and conditions:

- Requests must be canceled first before they can be deleted. Canceling a request might take some time to complete. Refresh the view several times until it does not show the requests as still being **Cancelable**.
- Cancelable and deletable requests cannot be concurrently acted on. Cancelable requests take
 precedence.
- When you cancel a request for a pending subscription modification, only the request for the modification is canceled. The subscription is not changed.
- If the request for a subscription has already been approved, you cannot cancel the request. However, you can cancel the subscription in the Subscriptions view.
- If you need to make a change to a request, you must first cancel the original request and then submit a new request with the correct configuration.

To cancel a single request in the list view:

- 1. In the Dashboard, in the **More Actions** section, select the **▼ My Orders** tile to display the Requests view.
- 2. In the All Requests States filter, select Cancelable.
- 3. In the Requests view, scroll up or down the list to find the request you want to cancel.
- 4. Click the cancel icon 8 next to the request you want to cancel.
- 5. In the confirmation dialog, click **Yes** to confirm that you want to cancel the selected request. A message displays, confirming that your selected request was canceled.

To cancel all requests in the list view:

- 1. In the Dashboard, in the **More Actions** section, select the SMy Orders tile to display the Requests view.
- 2. In the All Requests States filter, select Cancelable.
- 3. Select List Actions.
- 4. In the List Actions dialog, click **Cancel All** to cancel all items that are visible in the list. **Caution:** This action cannot be undone.
- 5. (Optional) If you decide you do not want to cancel all items, click the close icon × to close the List Actions dialog.
- 6. In the confirmation dialog, click **Yes** to confirm that you want to cancel all requests in the list. A message displays, confirming that all requests were canceled.

Use Requests

Related Topics
"Browse Requests" on page 325
"Filter Requests" on page 326
"View Request Details" on page 328
"View Checkout Details" on page 333
"Approved and Rejected Requests" on page 331
"Delete a Request" below

Delete a Request

When you no longer need to maintain a record of a request, you can remove it from the Requests view. In the Requests view, the trashcan icon \square indicates a deletable request.

Caution: When you delete a request, it will no longer be visible to you.

In the Requests list view, you can:

- Delete a request if it has been approved, denied, or canceled.
- Delete a single request, one at a time.
- Delete all requests, all at the same time.

Before you delete a request, be aware of the following requirements and conditions:

- Requests must be canceled first before they can be deleted.
- Deletable and cancelable requests cannot be concurrently acted on.
- Cancelable requests take precedence.

To delete a single request from the list view:

- 1. In the Dashboard, in the **More Actions** section, select the **My Orders** tile to display the Requests view.
- 2. In the All Requests States filter, select Deletable.
- 3. In the Requests view, scroll up or down the list to find the request you want to delete.

- 4. Select the trashcan icon \square for the request.
- 5. In the Delete Request dialog, click Yes to confirm that you want to delete the selected request.
- 6. (Optional) In the Delete Request dialog, click **No** if you decide you do not want to delete the selected request.
- 7. Go back to the Requests view to confirm that the request is excluded from the list.

To delete all requests from the list view:

- 1. In the Dashboard, in the **More Actions** section, select the SMy Orders tile to display the Requests view.
- 2. In the All Request States filter, select Deletable.
- 3. Select List Actions.
- 4. In the List Actions dialog, click **Delete All** to delete all items that are visible in the list. **Caution:** This action cannot be undone.
- 5. (Optional) If you decide you do not want to delete all requests, click the close icon × to close the List Actions dialog.
- 5. In the confirmation dialog, click **Yes** to confirm that you want to delete all requests in the list. A message displays, confirming that all requests were deleted.

Related Topics

"Browse Requests" on page 325 "Filter Requests" on page 326 "View Request Details" on page 328 "View Checkout Details" on page 333 "Approved and Rejected Requests" on page 331

"Cancel a Request" on page 333

Review Requests

Requests for new subscriptions and for modifications to existing subscriptions might require your approval before they can be deployed. If you are designated as an approver of requests, you are

responsible for approving or denying requests made for a predetermined set of service offerings.

You can approve requests for users you manage in your organization. In the Review Requests view, the number in the upper right corner is the pending count of approval requests.

Note: More than one approver might be required to approve a request for a subscription to a service offering. This depends on the approval policy for the service offering.

As a service consumer (approver), select the **Review Requests** tile in the Dashboard **More Actions** section to display the Approvals view. You must have valid approver credentials to access the Approvals view.

When a user submits a request for a new subscription or a modification to a subscription for which you are the approver, the following occurs:

- A request for your approval is added to the Approvals list as **Pending.** Select the **Review Requests** tile in the Dashboard to open the Approvals list view.
- You are sent an email message that notifies you that the request needs your approval.
- A notification indicating that a request needs your approval is displayed in the Notifications view. Select the **Notifications** tile in the Dashboard to open the Notifications list.

The status of the request changes, based on the action you take:

- If you approve the request, the status of the request changes to Approved.
- If you reject the request, the status of the request changes to **Rejected**.

Note: Requests for subscriptions to some service offerings might be automatically approved or denied after a certain number of days, if the approver has not approved or denied the request. This is based on the approval policy for the service offering and how it is configured for catalog publishing in the CSA Management Console.

To manage your approvals, select the **Review Requests** tile in the Dashboard to see a list of all pending approvals. By default, the list in the Approvals view displays All Request Types, Newest First, and Pending.

Note: For each service request, pricing precision can display up to five digits. This pricing is based on the original service offering configuration.

In the **Review Requests** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will

not display in several views within the Marketplace Portal, such as **Browse Catalog**, **Browse Catalog Details**, **Requests**, **Request Details**, **Request Confirmation**, **Subscriptions**, **and Subscription Details**. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass ^Q to find a certain object by a meaningful keyword. Search results display in the Review Requests view.

In the **Approvals** view, you can perform the following tasks:

- View detailed approval information.
- Approve requests. Requests that require approval are marked approval needed.
- Deny requests.

Related Topics "Browse Approvals" below "Filter Approvals" on the next page "View Approval Details" on page 341 "Approve a Request" on page 342 "Reject a Request" on page 343 "Approved and Rejected Requests" on page 331

Browse Approvals

As a service consumer (approver), you can view a list of all pending requests and then browse and sort by the approval status, request date, requested action, and price. From this list, you can directly approve or reject requests.

Note: For each service request, pricing precision displays up to five digits. This pricing is based on the original service offering configuration.

In the **Requests** view, some service offerings in this list display the initial price of the subscription and the recurring fee for the subscription, and some service offerings do not display these prices. Your Consumer Organization Administrator configures the option to show or hide this pricing information in Marketplace Portal views. Depending on the configuration setting, these prices will or will not display in several views within the Marketplace Portal, such as **Browse Catalog, Browse Catalog Details**,

Requests, Request Details, Request Confirmation, Subscriptions, and Subscription Details. As a best practice, your Consumer Organization Administrator might want to hide these prices if they will be used for department bill back purposes. For more information, see the CSA Management Console Help.

Tip: Click the magnifying glass to find a request approval by a meaningful keyword. Search results display in the Review Requests view.

To browse approvals

1. In the Dashboard, in the **More Actions** section, select the **bo Review Requests** tile to open the Approvals view.

By default, all requests are displayed by date, with the newest request listed first.

Note: If you are an approver of requests, by default, all requests that require approval are displayed.

- 2. Scroll up or down the list to browse for requests marked approval needed.
- 3. When you find a request that you are interested in, select its icon or name to display the Approval Details view.

Related Topics

```
"View Approval Details" on page 341
```

"Approve a Request" on page 342

"Reject a Request" on page 343

Filter Approvals

By default, the Review Requests view displays all request types, the newest requests first, and pending request state. Use the following filters to display certain requests:

- "All Request Types" on the next page
- "Newest First" on the next page
- "All Approval Statuses" on the next page

Tip: In the Review Requests view, use the Search filter \bigcirc to find a certain request by keywords.

Enter text that represents what you are looking for so that the user interface filters out these specific items.

All Request Types

From the **All Request Types** drop-down list, select one of the following filter values: All Request Types (default), Service Action, Service Request, Modify Subscription, or Cancel Subscription.

Newest First

Option	Description
Newest First	The most recent request, based on the date the request was submitted, is the first request in the list. This is the default.
Oldest First	The oldest request, based on the date the request was submitted, is the first request in the list.
Most Expensive	The most expensive request.
Least Expensive	The least expensive request.
Alphabetical	The list is ordered alphabetically, from A to Z.
Reverse Alphabetical	The list is ordered in reverse alphabetical order, from Z to A.

From the **Newest First** drop-down list, select one of the following filter values:

All Approval Statuses

From the All Approval Statuses drop-down list, select one of the following filter values:

Request State	Description
All Approval Statuses	Includes all request states described in this table.
Approved	Requests that have been approved.
Pending	Requests that require approval.
Rejected	Requests that have been rejected.

Related Topics

"Browse Approvals" on page 338

"View Approval Details" on the next page

"Approve a Request" on the next page

"Reject a Request" on page 343

View Approval Details

The **Approval Details** view displays the following information about the request order you selected, including a summary of checkout and configuration information you provide when the request is made.

- The request name, user, and date the request was made.
- The service request name and a brief description.
- The subscription term.
- Attached documents that provide the approver with more information.
- A cost breakdown of configuration selections.
- The image represents the service offering for which the request was created.

To view approval details

1. In the Dashboard, in the **More Actions** section, select the **bo Review Requests** tile to open the Approvals view.

By default, all requests are displayed by date, with the newest request listed first.

Note: If you are an approver of requests, by default, all requests that require approval are displayed.

- 2. Scroll up or down the list to browse for requests marked **approval needed** or select **Pending** in the **All Approval Statuses** drop-down filter.
- 3. When you find a request that you are interested in, select its icon or name to display the Approval Details view.

Related Topics

"Browse Approvals" on page 338

"Filter Approvals" on page 339

"Approve a Request" on the next page

"Reject a Request" on page 343

"Approved and Rejected Requests" on page 331

Approve a Request

You can approve a request from the list of pending requests. This list includes the following information about the request:

- Approval Status (This includes the personal approver status and the Overall Approval Status.)
- Requester Name
- Request Date
- Requested Action
- Initial and Recurring Prices

To approve a request

- In the Dashboard, in the More Actions section, select the bd Review Requests tile to open the Approvals view. By default, all requests are displayed by date, with the newest request listed first. If you are an approver of requests, all requests that require approval are displayed.
- 2. Scroll up or down the list to browse for requests that show the approve icon 🗹.
- 3. Click the ^{Sol} icon to approve the selected request.
- 4. In the **Approve this request?** dialog, click **Yes**. This action will start the fulfillment process and generate a service subscription.

Note: The subscription you approved might not immediately show the status of Approved to the requester.

Approved Notifications

Dashboard: Select the **Notifications** tile to open the Notifications view and verify the new (**Approved**) status of the request.

Email: An email message that provides the new (**Approved**) status of the request is sent to the submitter.

Note: If multiple approvers are required, the notification and email message are not issued until

Use Requests

after the approval policy is satisfied.

Related Topics

"Browse Approvals" on page 338

"Filter Approvals" on page 339

"View Approval Details" on page 341

"Reject a Request" below

"Approved and Rejected Requests" on page 331

"Notifications" on page 288

Reject a Request

You can reject a request from the list of pending requests. This list includes the following information about the request:

- Approval Status (This includes the personal approver status and the Overall Approval Status.)
- Requester Name
- Request Date
- Requested Action
- Initial and Recurring Prices

To reject a request

- 1. In the Dashboard, in the **More Actions** section, select the **b Review Requests** tile to open the Approvals view. By default, all requests are displayed by date, with the newest request listed first. If you are an approver of requests, all requests that require approval are displayed.
- 2. Scroll up or down the list to browse for requests that show the reject icon $^{ extsf{80}}$.
- 3. Click the 8 icon to reject the selected request.
- 4. In the **Deny this request?** dialog, enter a brief explanation about why you are rejecting this request. This explanation will be visible to anyone who views this request.
- 5. Click Yes.

Note: The subscription you denied might not immediately show the status of **Rejected** to the requester.

Rejected Notifications

Dashboard: Select the **Notifications** tile to open the Notifications view and verify the new (**Rejected**) status of the request.

Email: An email message that provides the new (**Rejected**) status of the request is sent to the submitter.

Note: If multiple approvers are required, the notification and email message are not issued until after the approval policy is satisfied.

Related Topics

- "Browse Approvals" on page 338
- "Filter Approvals" on page 339
- "Approve a Request" on page 342
- "Approved and Rejected Requests" on page 331
- "Notifications" on page 288

OO Designer

This section shows how to set up your OO Designer workspace and how to use OO Designer for authoring.

Use

Get Started with OO Designer

Welcome to OO Designer!

OO Designer is a web-based environment for authoring flows, which is available as a standalone product that can be deployed either on a Windows or Linux server and is also embedded in the Cloud Service Automation (CSA) user interface. Flows are authored in the CloudSlang language and run in Operations Orchestration (OO) Central.

What is CloudSlang?

CloudSlang (CloudSlang.io) is an open source environment for process automation, which provides a textual language (YAML over Python), a lightweight engine (which can be embedded in a Java process or run via a command line), and a content library. All the CloudSlang code, including documentation and content, are available in GitHub CloudSlang repositories.

Score is a general-purpose Java-based open-source orchestration engine, which is process-based, embeddable, lightweight, scalable, and multilingual.

The CloudSlang language is a YAML (version 1.2) based language for describing a workflow that can be run by Score engine. The supported file extensions are: .sl, .sl.yaml and .sl.yml.

For more information about CloudSlang, see:

http://www.cloudslang.io

https://github.com/cloudslang/cloud-slang

https://github.com/cloudslang/score

What is YAML?

YAML is a human-friendly data-serialization standard for all programming languages.

For more information about YAML, see http://www.yaml.org/

What is a Flow?

A flow is a composition of steps that forms a set of actions that are linked by decision-making logic in order to automate tasks. For example, health checks, troubleshooting, remediation, or any other repetitive IT tasks.

See "Create or Edit a Flow" on page 374.

Flows are actions in structured sequences, which can be used to provision, maintain, troubleshoot, and repair your Information Technology (IT) resources by:

- Checking, diagnosing, and repairing networks, servers, services, software applications, and individual workstations
- Deploying applications, patching, and maintaining them by checking client, server, and virtual machines for required software and updates, and, if needed, performing the necessary installations, updates, and distributions
- Performing repetitive tasks, such as checking status on internal or external web site pages

How are flows deployed?

Projects in OO Designer include CloudSlang flows and operations, and are packaged into OO content packs, which are deployed to OO Central.

The CloudSlang flows are managed, run, reported, and troubleshot in OO Central, side-by-side with the OO flows (which were created in OO Desktop Studio).

What is a Content Pack?

A Content Pack is a file containing operations, flows, actions (Java-based or .Net based), localization data, and configuration items. Content packs are deployed to the OO Central server and stored in the database.

A Content Pack can be created in OO Designer, in OO Desktop Studio, or it can be provided by HPE, OO Shell for Authoring, or a third party.

See "Create and Deploy a Content Pack" on page 451.

What is the difference between OO Designer and OO Desktop Studio?

OO Designer is an environment for authoring, creating, and modifying CloudSlang flows.

OO Desktop Studio is a separate authoring environment that is used to create OO flows. Note that OO Designer cannot be used to read or modify flows that were created in OO Desktop Studio, or vice-versa.

OO Designer	OO Desktop Studio
Web-based	Installed on each user's desktop
Authors can create flows from content that was authored in CloudSlang	Authors can create flows from content that they design in Studio
Embedded in CSA	Standalone

What is OO Central?

OO Central is the web-based runtime environment of OO. It is used for running flows, monitoring the various runs, and generating reports.

What is an Operation?

An operation holds the inputs, outputs, responses, and other properties that are required to perform a certain action. Operations are available for the flow author to use as steps inside a flow. A rich set of out-of-the-box operations are available with OO Designer.

For example, one operation checks a web page to see whether it contains specific text, and another operation copies a file.

See "Author Operations" on page 438.

What is a Step?

Steps are the building blocks of a flow. A flow author creates a step by dragging an operation, decision, or flow onto the authoring pane.

A step is an instance of an operation, decision, or flow, and it inherits the inputs, outputs, and other properties of the operation/decision/flow. A step can be modified without affecting the original operation/decision/flow.

See "Create Steps in a Flow" on page 375.

What are Results?

Results are the possible outcomes of an operation. For example, a **Read Web Page** operation may have three possible responses:

- The web page can't be found (failure)
- The page is there and the desired text is present (success)
- The page is there but the text isn't present (partial success needs another action)

See "Results" on page 395

What is a Navigation line?

A Navigation Line is the connection from an operation's response to one of the possible next steps.

See "Create Navigation Lines between Steps in a Flow" on page 379.

What is an Input?

Inputs give the operation the data that it needs to act upon. For example, an operation to check a web page needs to know which page to check and what text to look for.

Inputs can be:

- Set to a specific value
- Obtained from information gathered by another step

• Entered by the person running the flow, at the start of the flow

See "Inputs" on page 390.

What is an Output?

Outputs are data produced by steps—for example, success code, output string, error string, or failure message.

See "Outputs" on page 393.

Benefits of OO Designer

1. Web-based

OO Designer provides web access, which minimizes time-to-value and allows for simple management.

Flow authors don't need to install and maintain a Studio application for authoring flows. They can simply log in to CSA and author the flows from there.

Administrators can easily upgrade OO Designer when upgrading the CSA instance. There's no need to upgrade every author's environment separately.

2. Hybrid authoring – Textual and Graphical

OO Designer provides a graphical interface on top of the CloudSlang textual language. Every graphical change is immediately reflected in the underlying source code. This source code can be preserved in a GIT repository and is visible from the OO Designer UI.

OO Designer allows collaboration via Git. This means that different authors (Central IT, line of business, operator, or application developer) can contribute to the authoring, while they can each work using their preferred tool. This can be either the OO Designer in which the authoring is graphical, or via ATOM with the CloudSlang plugin which allows authoring the source files directly in a textual manner.

3. Enhanced Usability

OO Designer and CloudSlang provide enhanced usability for authoring flows, with features such as default errors, sensitive system properties, decisions, input bindings, and direct deployment to OO Central.

Navigate OO Designer

The OO Designer UI includes several sections:

Projects Pane	351
Dependencies Pane	352
Authoring Pane	352
Properties Pane	353
Graph Pane	355
Debugger Pane	355
SCM Pane	356



Projects Pane

The **Projects** pane on the top-left shows the project you are currently working on. It displays the editable flows and configuration items that you can use in the project.

For more information about how to work with the OO Designer panes, see "Set up the OO Designer Project" on page 366

Dependencies Pane

The **Dependencies** pane on the bottom-left shows the imported content packs. You can import existing content packs and use its flows, operations and configuration items in your flows.

Dependencies	?
Filter the tree	∇
Click to import content packs	

For more information on how to work with the OO Designer panes, see "Set up the OO Designer Project" on page 366.

Authoring Pane

The **Authoring** pane is a rectangular box in the middle. It contains the canvas to work on flows. You can launch a flow onto the canvas area by double-clicking a flow from the **Projects** pane.

If you are working on multiple flows, they are indicated in tabs with the corresponding flow names. Some of these tabs are hidden from view and are displayed in the top-right corner of the authoring pane with a number indicating a number of hidden tabs

Click the arrow to view a list of hidden tabs, and then point and click to select a hidden flow to open.

I	flow7		flow8	×	•2
		1	Graph	Properties	?

You can close a flow by clicking the **x** displayed next to the flow name.

flow1	\times

For more information about how to work with the OO Designer panes, see "Set up the OO Designer Project" on page 366.

Properties Pane

The **Properties** pane contains the **Description/Inputs/Outputs/Results** tabs about the current flow. For details, see "Define Flow Properties" on page 386.

flow1* ×								
□ ■ ₽ ⊘ ₫ ↓ C,						🕹 🖁 Graph	Properties	?
folder1.flow1								
	Inputs	Outputs	1 Result	s	Description			
+ 茴 ↑ ↓								
Name	Default Value		Private	Sensitive	Required	Description		

- Click the Inputs tab to display the Inputs pane. This is where you can add and configure inputs for the flow.
- Click the Outputs tab to display the Outputs pane. This is where you can add and configure outputs for the flow.
- Click the **Results** tab to display the **Results** pane. This is where you can view the results for the flow, and also configure the descriptions.
- Click the **Description** tab to display the **Description** pane. This is where you can enter the description for the flow.

Use Navigate OO Designer

For more information about how to work with the OO Designer panes, see "Set up the OO Designer Project" on page 366.

Graph Pane

	WORKFLOW DESIGNER	⑦ CustomUse
Projects Image: Constraint of the section of the s	Test_flow ⁴ × □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □	E Properties
Dependencies <u> <u> </u> <u> </u></u>	Test_flow PAILURE PAILURE PAILURE PAILURE PAILURE	puts
Configuration	Drag a flow or an operation	Outputs

The Graph pane is the graphical representation of a flow with the Inputs and Outputs in tabs.

Select the relevant step on the canvas, and:

- Click the **Inputs** tab at the bottom of the right pane to display the **Inputs** pane. This is where you can view the inputs for the step that correspond to the step operation inputs.
- Click the **Outputs** tab at the bottom of the right pane to display the **Outputs** pane. This is where you can add and configure outputs for the step.

The selected flows, success, and failures appear with a green outline.

For more information about how to work with the OO Designer panes, see "Set up the OO Designer Project" on page 366.

Debugger Pane

The Debugger pane enables you to test the Flows.

To open the Debugger pane:

1. Select the relevant Flow on the canvas.

By default, the Debugger pane is in a collapsed state.

- 2. Click or inverted **Debug** text to expand or collapse the pane with the **Run Tree** that has expandable nodes of the flow in a graphical mode.
- 3. Select a node in the tree to display the context of that Flow in the Context Inspector

诡 Debug	?
 debug_test (2s) string_equals (0s) sleep (2s) SUCCESS 	* •
品 sleep	
Inputs (1)	\sim
seconds 2	
Outputs	\sim
N/A	
Flow Variables (1)	\sim
flow_input_0 s	

For more information about how to Debug the Flow or Step, see "Debug the Flow" on page 449

SCM Pane

This is where you save your project in a centralized location and share content with other authors. For details, see "Set up and work with Source Control Management" on page 357.

Set up the Workspace

Before you begin to use the OO Designer, you need to set up your workspace.

To set up your workspace, complete the following tasks:

• Set up **Source Control Management** (SCM) to allow multiple authors to collaborate on the same project. See "Set up Source Control Management for the Project" on the next page.

Note: If you do not want to use Source Control Management, you can work on a local project. All changes and modifications will be saved only in the database, and you will not be able to recover or revert any of the changes.

- Import **Content Packs** into the workspace to use the content in your projects. See "Import Content Packs to the Dependencies Pane" on page 370.
- Create one or more Projects. See "Set up the OO Designer Project" on page 366.
- Set up the System Properties for your projects. See "Author System Properties" on page 445

The access to the workspace and the project in OO Designer is user-specific. For example, if authors A and B are using a common computer, and if A logs into the computer, only A's workspace and projects are displayed.

Set up and work with Source Control Management

If you work in a multi-author environment, working with a Source Control Management (SCM) enables you to manage your project in a centralized location and collaborate on it with other authors. It also enables you to recover or revert changes.

Using the Git functionality, you can connect to a remote repository on a server (such as Github, for example) or connect to a shared file system.

Note: Working with Source Control Management is not mandatory, but it is recommended.

To set up a repository, see "Set up Source Control Management for the Project" on the next page.

To work with SCM, see "Work with Source Control Management (SCM)" on page 364.

You can attach only one repository per workspace. Within that repository, it is possible to have multiple projects.

Git Terminology

Pulling Changes

In Git, downloading the latest version of the files from the remote repository is known as a "Pull" action.

After you complete a "Pull" action, new files are added to your projects and files that were modified in Git are updated in your project.

It is recommended to pull the latest version each day, before starting to work on the files.

Committing and Pushing Changes

In some Git applications, there are two steps to syncing your modified files into the repository: "committing" them to a local repository in preparation for upload and "pushing" them to the remote repository.

In OO Designer, there is a single action "commit and push", which you use to sync your files into the remote repository.

Set up Source Control Management for the Project

Using the Git functionality, you can either connect to a remote repository on a server (recommended), such as, *Stash*, or connect to a shared file system.

Why do this? If you work in a multi-author environment, working with a source control management tool enables you to save your project in a centralized location and share content with other authors. It also enables you to recover or revert changes.

In order to set up Source Control Management (SCM) for OO Designer, you need to import a Git repository to your workspace. There are several protocols that you can use to import the repository:

- HTTPS (secured)
- SSH (secured)
- File System (not secured) use this protocol if you do not have a Git server account

Note: If you already have an unversioned project in your workspace (i.e., saved locally and not part of the Git repository), when you import a repository, this project will be added to your local version of the repository. You will be able to commit and push this project to the remote repository. For more information about committing and pushing, see "Work with Source Control Management (SCM)" on page 364.

Note: If the projects in the repository do not have the right structure, they will not appear in the project pane and you will not be able to edit them in OO Designer.

Import a Git repository using the HTTPS protocol

- In the **Projects** pane, click the **Git** button, and then select **Import Repository**. The Import Git repository dialog is displayed.
- 2. Select **HTTPS** as the SCM protocol type.

Import Git repository		0 ×
Protocol Type	HTTPS 👻	
• Git URL:	https://domain/username/repository.git	
	Verify	0
• Email Address:	MyEmail@emailserver.com	
Full Name:	Your Name	
• User Name:	Line News	
· Oser Hame.	User Name	
• Password:		
	Close	nport

- 3. In the **Git URL** field, enter the URL of the Git repository in the format: https://<domain>/<username>/<repository_name>.git.
- 4. Enter your Email Address and Full Name.
- 5. Click Verify to check that the Git server you are connecting to is trusted.
- 6. After the verification is complete, enter your user name and password and click **Import**.

OO Designer verifies that the repository exists in the location, and imports the repository.

7. When the import has been completed successfully. click **Close**.

The imported repository appears. All the projects in the repository are added to the Projects pane.

Import a Git repository using the SSH protocol

- 1. In the **Projects** pane, click the **Git** button, and then select **Import Repository**.
- 2. Select **SSH** as the SCM protocol type.

Import Git repository		@ ×
Protocol Type	SSH 🗸	
• Git URL:	git@domain:username/repository.git	
	Verify	0
• Email Address:	MyEmail@emailserver.com	
Full Name:	Your Name	
	Close	nport

- In the Git URL field, enter the URL of the Git repository in the format: git@<domain>:<username>/<repository_name>.git.
- 4. Enter your Email Address and Full Name.
- 5. Click the **Verify** button.
- 6. After the verification is complete, the **Generate** button appears. Click **Generate** to create an SSH public key.
| Import Git repository | | × |
|----------------------------------|--|---|
| Protocol Type: | SSH 👻 | |
| *Git URL: | git@domain:username/repository.git | |
| *Email Address: | MyEmail@mailserver.com | |
| Full Name: | Your Name | |
| Public key: | Generate | 0 |
| Click the Generate button to gen | erate a key pair and to display the public key here. | |
| | | |
| | Close | |

7. After the key has been generated, copy the key. For example:

Import Git repository			×
Protocol Type:	SSH	v	
• Git URL:	git@domain:username/repository.git]
Email Address:	MyEmail@mailserver.com		
Full Name:	Your Name		
Public Key:			0
ssh-rsa AAAAB3NzaC1yc2EAAAADAOABAA ZHokYYFM4CweK18nb0NF9N18X0 tmmjAEHH4Luc6d51%B7lliNKNEnD UTPU2aTG0g4fd3KkcNaAWJKLMs0 6qV10Gkh0/rBAuz21 lisa.amitai@hpe	ABAODnvJt4vJarzcctD7JR1tOvbya+sOvhZf7PIO3+VnD7. UGa&RMbBIw8ObYOHxVE6WgmKHUVBaP9aFTkWSUr2 ivj7P5bsqRqL1YYgtWRR/SJ10T075ChxH5IxuNUUoips vi+aYgXdaCv+UHxa+kgttbuCiAB6cWmw3ufElKfYw9U+U .com	AqVjw3FZjJ+3VO5OYR W9qEn48FmGo3pe8At d+uWFDerTqlomwNoD u6iAizDcKGOaAw+hQA	
	Cle	ose Imp	ort

8. Go to your Git server and copy the SSH public key to your user account.

9. Go back to the Git Import Repository dialog box and click Import.

OO Designer verifies that the repository exists in the location, and that authentication is successful via the public\private key pair, and then imports the repository.

10. When the import is completed successfully, click **Close**.

The imported repository is displayed. All the projects in the repository are added to the **Projects** pane.

Import a Git repository using the File System protocol

Use this protocol, if you do not have a Git server account.

Note: The File System protocol is not as secured as HTTPS and SSH protocols.

If you don't already have a local Git repository, you must create one using the following file:

- For Windows: {00 Designer root folder}/designer/bin/git-create-repo.bat
- For Linux: {00 Designer root folder}/designer/bin/git-create-repo.bin

If you already have a local Git repository, start from step 3.

- 1. Use the **git-create-repo.bat** file to create a local Git repository, as described in "Creating a Git Repository" in the *OO Designer Administration Guide*.
- 2. Make a note of the URL of the local Git repository.
- 3. In the **Projects** pane in OO Designer, click the **Git** \$ button and then select **Import Repository**.
- 4. Select File System as the SCM protocol type.

Import Git repository			@ ×
Protocol Type	File System	-	
•Git URL:	file://hostname/repository.git	The value is	equired
•Email Address:			
Full Name:			
		Close	Import

- 5. In the **Git URL** field, enter the URL of the Git repository that you created: **file:**//<**hostname or** IP>/<shared folder>/<repository_name>.git
- 6. Enter your Email Address and Full Name.
- 7. Click the **Import** button.

OO Designer verifies that the repository exists in the location, and imports the repository.

8. When the import is completed successfully, click **Close**.

The imported repository appears. All the projects in the repository are added to the Projects pane.

Delete a Git repository from the workspace

- 1. In the **Projects** pane, click the **Git** button, and then select **Delete Repository**.
- 2. Click **OK** to confirm the deletion.

All the imported projects from your workspace and data not pushed will be removed. The files that you created and were not pushed to the remote repository will be lost.

Edit a Git repository in the workspace

- 1. In the **Projects** pane, click the **Git** button, and then select **Edit Repository Settings**.
- The Edit Git Repository dialog box fields vary according to the protocol type that was used to import the repository. Before you edit, review the fields that are read-only and editable for three protocols.
 - File System protocol you can edit the full name and email address.
 - SSH protocol you can edit the full name and email address.

Tip: To generate a new SSH public key, you must re-import the Git repository.

 HTTPS protocol - you can edit the full name, email address, user name, and provide a new password.

Note: You cannot edit the repository path. To change this, you need to delete the existing repository and import the new one.

3. Click Save.

Work with Source Control Management (SCM)

Track local changes

- 1. Click the **SCM** DCM button to open the **SCM** pane.
- 2. Click the **Changes** tab to see the changes that were made to the folders and files. Items that were modified, deleted, or added appear in distinct colors.

Changes	Messages	@ \/
Ø 13 39 0		
BNewFlow.sl project2/Content/Library/fsdfsd		
& dsdsd.sl project2/Content/Library/fsdfsd		
B flow4.sl project2/Content/Library/slang-deployment-cp-4		
各f1.sl project2/Content/Library/fsdfsd		

- Green indicates that a new item has been added to the project, locally.
- Grey indicates that an item has been removed from the project, locally.
- Blue indicates that an item has been edited.
- **Red** indicates that an item is in conflict.

Pull the most recent changes from the repository

Before starting to work, you must import the most recent changes from the repository to your workspace.

To import, complete the following steps:

- 1. Click the SCM ICM SCM button to open the SCM pane.
- 2. Click the **Pull** $\overline{\mathbf{V}}$ button to download the most recent changes to your workspace.

Commit and push your changes to a remote repository

After you make changes locally, you must upload these changes to the remote repository.

To upload, complete the following steps:

Note: In some applications, there are two steps: "committing" files to a local repository in preparation for upload and "pushing" them to the remote repository. In OO Designer, these steps are merged into a single action.

- 1. Make sure you have saved all your changes.
- 2. Click the SCM COM SCM button to open the SCM pane.
- 3. Click the **Commit and Push** \triangle button to upload your most recent changes to the remote repository.

Note: All changes will be committed and pushed to the remote repository.

4. In the **Commit and Push Changes to the Remote Repository** dialog box, enter a description for the changes that were made, and then click **Commit & Push**.

The changes are saved to the remote repository.

Resolve conflicts

Conflicts may arise if another author has made change to a file you are currently modifying. If the changes occur in different lines in the file, Git is able to automatically merge the two versions. If there are two sets of changes in the same line, they cannot be merged and you need to decide which of the 2 versions you want to keep.

Note: Items that are in conflict appear in red in the Changes pane.

When there is a conflict, you can solve it in the **Resolve Conflicts** dialog box, by choosing whether to keep your version of the file (**Use mine**) or the version that it is in conflict with (**Use theirs**).

1. When a conflict occurs (for example, when you try to pull a file from Git and another user has pushed a conflicting version of that file), the **Resolve Conflicts** dialog box appears.

Re	solve Conflicts			×
	File	Resolution Strategy	Кеер Сору	
	f1.sl P1/Content/Library/fol	Use mine 🔻	V	
			Close	Done

- 2. Under Resolution Strategy, select one of the following:
 - **Use mine** to use your version of the file to the repository
 - **Use theirs** to keep the file that the other user created

- 3. Select the **Keep Copy** check box to save a local copy of the version that was not selected under **Resolution Strategy**.
- 4. Click Done.

Revert to a previous version

You can revert changes that you made to an individual file or revert everything to a previous version. This action discards the changes that you have made.

- To revert changes for one file: Select the file in the SCM pane and click the Revert changes for the selected file button.
- To revert all changes, click the **Revert all changes** 🗃 button.

Note: In case you Revert from a state of conflict (conflict dialog was closed without resolving), you will get the version of the file prior to triggering the conflict. You can then also Revert once again to discard your not pushed changes.

View the SCM message history

The **Console** tab is a console that displays a record of all the SCM actions that were taken in this session.

- 1. Click the **SCM** ICM button to open the **SCM** pane.
- 2. Click the **Console** tab.



3. To clear the console, click **Delete** .

Set up the OO Designer Project

Before starting to create flows, you need to set up a project in which to work.

Naming Projects and Folders

Names must be unique within their folders.

Names are not case-sensitive, so names such as "Ping" and "ping" are considered duplicates. However, when calling an item, make sure to use the correct case.

Names can contain alphanumeric characters (A-Z, a-z, 0-9), hyphens (-), and underscores (_).

Project names and Folder names cannot contain white spaces, parentheses (()), square brackets ([]), and curly braces ({).

Names cannot be identical to the following Windows reserved words: CON, PRN, AUX, CLOCK\$, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, NUL, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9.

Create a project

1. In the **Projects** pane, click the **Create New Project** ^L button.

Projects	
▙ ┿, ۞ @ @ ፼ ‰,	
Filter tree	∇
To start working, either create a project or import a repository from SCM	

2. Enter a name for the project and click **OK** or press the **Enter** key.

Note: See Naming Projects and Folders.

The new project is displayed in the **Projects** pane.

Note: The new project already includes the basic folder hierarchy: the **Library** folder, where you will store your flows decisions, and operations and the **Configuration/System Properties** folder for the project's system property files.



To delete an existing project, select the project in the **Projects** pane and click **Delete**.
 Click OK in the confirmation dialog box.

Manage the folders in the project

Before you can create flows, you must create at least one folder under Library.

It is recommended to set up and organize the folders in your project before you start creating flows.

- 1. To add a folder to the project, select Library or an existing folder.
- 2. Click New + and select Folder.
- 3. Enter a name for the folder and click **OK** (or press the **Enter** key).



You can now add subfolders or create flows in the folder.



4. To delete a folder, select it and click the **Delete** button, and then click **OK** to confirm.

Note: Deleting a folder will delete all of its contents including subfolders and their contents, and will close all open tabs of files that were under that folder.

Manage the flows, decisions, and operations in the project

1. To delete flows, decisions, or operations: Select the item, and then click **Delete**. Click **OK** to confirm.

Deleting a flow will invalidate any other flows that depend on it.

Note: If you copied an item from a content pack and then deleted the item from the project, this does not affect the content pack that it was copied from.

2. To filter the specific items to be displayed in the project pane, enter some text into the **Filter** box in the **Projects** pane.

Filter tree	∇
-------------	----------

For example, enter "ping" to display only flows, decisions, operations, folders, and system properties files containing "ping".

Note: If the text is part of a folder name, all the contents of that folder, including sub-folders, are displayed.

3. To remove a filter, click **x** at the corner of the **Filter** box.

ping	\times
------	----------

Check for errors in the project

If there is an error or invalid content anywhere in the **Project** pane (in a flow, operation, decision. or system property), the item with the error is displayed with a red underline. All flows that use this item and the folders above it are also displayed with a red underline.

Projects	
ŀ:+, ŷ ü @ ≧ ‰,	
Filter tree	∇
→ Project1	
- ELibrary	
- Elfolder1	
Flow1	
Configuration	

When you fix the error, the relevant red lines disappear.

For more information about errors and invalid content, see "Check for errors in the content" in "Create and Deploy a Content Pack" on page 451.

Import Content Packs to the Dependencies Pane

You must import each Content Pack (CP) that you want to use even if it was imported by another author connected to the same OO Designer.

A content pack is a collection of operations, flows, actions (Java-based or .Net based), decisions, configuration items (such as selection lists, domain terms, and so on) and resource bundles.

You can import content packs containing content that was authored using CloudSlang.

See Create a content pack with CloudSlang content for how to prepare the content packs to be imported into OO Designer.

After importing a content pack

Once you have imported a content pack, these items are available in the **Dependencies** pane as readonly, and you can use them in your flows. For details, see "Dependencies Pane" on page 352.

Important! If you modify and then import a content pack that was already imported to OO Designer (for example, by a different user), it *must* have an updated version number in order for the changes to take effect. If you import a content pack with the same name and version number as one that was already imported, the new content pack will reference the original one and *will not replace it*.

After you have imported the desired content packs into the workspace, you can copy flows and system properties into the project (by copying from the **Dependencies** pane and pasting into the **Projects** pane).

Once flows are copied into the project, you can edit them in the OO Designer Authoring pane.

Why do this? When you create a step from an operation/flow, the step is an instance of that operation/flow.

Items in the **Dependencies** pane are read-only. If you create a step from a flow from there, you will be able to modify that step only. If you want to make changes to a flow, in order to use the modified version for multiple steps, you need to copy it from the **Dependencies** pane and paste it into the **Projects** pane.

How to use CloudSlang files created outside OO Designer in OO Designer

See "How to use CloudSlang files created outside OO Designer in OO Designer" on page 455.

Import content packs to the workspace

- 1. Locate your required Content Packs:
 - Use the content packs that were included when you installed OO Designer.
 - Download additional content packs from ITOM Marketplace.
 - Create content packs from existing CloudSlang content, as described in Create a content pack with CloudSlang content.

Important! Make sure that before importing a content pack, all content packs it depends on are already imported. Specifically, import the Base content pack first, because other content packs depend on it.

- 2. Click the Import Content Pack $\stackrel{\checkmark}{\rightharpoonup}$ button in the Dependencies pane.
- 3. In the Import Content Pack dialog box, click New +.
- 4. In the browse dialog, select one or more content packs and click **Open**.

Tip: You can also drag and drop from the browse dialog.

5. If all selected content packs are successfully uploaded, the Import button is enabled.

If any of the content packs were not uploaded successfully, the **Import** button is not disabled.

Import Content Pack	>	<
+ 🖻 C		
Name	Upload Status	
My WS Project-cp-1.0.0.jar	Success	
My WS Project-cp-1.0.0.jar	X The content pack was already uploaded	
tutorial-cp-0.9.60.jar	X The content pack was already imported	

In this situation, you will need to remove the failed ones from the dialog box. Do one of the following:

- Select a content pack that was not uploaded successfully and click the **Delete** button to remove it.
- Click the **Clear** ^C button to clear all displayed content packs from the dialog box and restart the process of uploading content packs.

Note: The default size limit of content packs that can be uploaded to OO Designer is 200 MB. However, you can configure this size limit. See "Configuring Content Pack Import Size" in the *OO Designer Administration Guide*.

6. After the content packs are successfully uploaded, click the Import button.



7. Click **Close** to close the Import Content Pack dialog box. The successfully imported content packs are displayed in the **Dependencies** pane.

Filter the dependencies

1. To filter the specific items to be displayed in the dependencies pane, enter some text into the **Filter** box in the **Dependencies** pane.

Filter tree	7
-------------	---

For example, enter "ping" to display only flows, decisions, operations, folders, and system properties files containing "ping".

Note: If the text is part of a folder name, all the contents of that folder, including sub-folders, are displayed.

2. To remove a filter, click the x at the side of the **Filter** box.

ping	\times
------	----------

View the details of a read-only item from the Dependencies pane

While you cannot edit a flow/operation from the **Dependencies** pane, you can view its details in the Authoring pane.

- 1. Select the flow/operation in the **Dependencies** pane.
- 2. Double-click the flow/operation to display it as read-only in the Authoring pane. A **Read-only** icon appears in the tab, next to the name.

Author in OO Designer

Authoring is the process of creating and editing content.

In OO Designer, you can author:

- Operations See "Author Operations" on page 438
- Flows See "Author Flows" on page 374
- System properties See "Author System Properties" on page 445

Use

Author Flows

The major steps in creating a flow are:

- 1. Create a new flow in the project. See "Create or Edit a Flow" below.
- 2. Add steps to the flow. Each step is an instance of an operation or another flow. See "Create Steps in a Flow" on the next page.
- 3. Create navigation lines to connect between steps. See "Create Navigation Lines between Steps in a Flow" on page 379.
- 4. Add result steps (success, failure, custom) to the end points of the flow. See "Add Result Steps to a Flow" on page 381.
- 5. Set up inputs and outputs for the flow. See "Define Flow Properties" on page 386.
- 6. Set up the values of inputs and outputs for steps. See "Define Step Properties" on page 395.
- 7. Change the start step. See "Change the Start Step" on page 420.
- 8. Create flows with loops. See "Create Flows with Loops" on page 421.

Create or Edit a Flow

A flow is a composition of steps that forms a set of actions that are linked by decision-making logic in order to automate tasks. For example: Health checks, troubleshooting, remediation, or any other repetitive IT tasks.

Creating flows is the main function of OO Designer.

You can also display and edit a flow that was created externally from OO Designer, for example in ATOM. However, if the flow contains errors, OO Designer may not be able to display it in the Authoring pane. In such a case, you will need to fix the flow in the editor in which it was created and import it to OO Designer again.

Naming Flows

The name of a flow is limited to 128 characters.

The combined name and path of a flow (under the Library folder) is limited to 220 characters.

Names must be unique within their folders.

Names are not case-sensitive, so names such as "Ping" and "ping" are considered duplicates. However, when calling an item, make sure to use the correct case. Flow names must contain alphanumeric characters (A-Z, a-z, 0-9), hyphens (-), and underscores (_).

Flow names cannot contain white spaces, parentheses (()), square brackets ([]), curly braces ({), and only digits (0-9).

Names cannot be identical to the following Windows reserved words: CON, PRN, AUX, CLOCK\$, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, NUL, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9.

Create a new flow

- 1. In the **Projects** pane, select the folder in which you want to locate the new flow.
- 2. Click the **New** + button and select **Flow**.
- 3. In the New Flow dialog box, enter a name for the flow and click OK.

Note: When naming a flow, make sure the naming conventions are followed. See Naming Flows. To change a flow name, copy it as a new flow with the correct name.

A new tab opens in the **Authoring** pane with the name of the new flow.

- Click the Properties button Froperties to display the flow's Properties pane.
- 5. Click the **Description** tab. You can enter a summary of what the flow does.

	Inputs	Outputs	Results	Description
Flow Description				
This flow checks if a URL is accessible				

Create Steps in a Flow

When you create a step from an operation, decision, or flow, the step is an instance of that operation or flow and so inherits the inputs, outputs, and other characteristics.

Create a step from a flow, operation, or decision

- 1. In the **Projects** pane, double-click the flow in which you want to create the step, so that it opens in the authoring pane.
- Drag a flow/operation/decision to the authoring pane, from either the Projects pane or the Dependencies pane.

Note: The step icon reflects whether the step was created from an operation, a flow, or a decision operation.

3. To copy, cut, paste, and rename a step, select it and use appropriate buttons from the Authoring pane toolbar
 Image: I

You can also right-click the step and choose the following actions: Set as Start Step, Rename, Drill Down, Copy, Cut, Set as Loop, Set as Parallel Loop, and Delete.



a. To copy a step, click the **Copy** button in the authoring pane toolbar or press CTRL+C keys, then click **Paste** button or press CTRL+V keys to paste.

b. To cut a step, click the Cut button in the authoring pane toolbar or press CTRL+X, then click Paste button or press CTRL+V keys to paste.

Note:

You can copy and paste steps on the canvas multiple times as per your requirement.



c. To rename a step, click the **Edit** O button in the authoring pane toolbar. Enter a name for this step and click **OK**.

For example: you may want to rename a step to reflect its function within the flow.

Note:

- A name of a renamed step must be unique in the flow. This applies to names with different case—for example, you cannot name one step to "Ping" and another to "ping".
- A renamed step cannot have an blank name.
- 4. To delete a step from the canvas, select it and click the **Delete** button in the authoring pane toolbar.

Note: When you delete a step, any navigation lines linking this step to other steps are also deleted.

5. To reorganize the steps and results on the canvas, click the auto arrange icon the authoring pane toolbar.

6. To zoom-in or zoom-out of the canvas, you can use mouse-click and drag or scroll on the slider
 . To reset the zoom, click ^Q.

Note: The auto arrange, zoom and reset zoom icons are active and enabled in graph view only.

7. Click Save 🖽.

View the step properties

1. Click a step in the authoring pane. The **Step Properties** pane appears at the right side of the canvas.

The **Properties** pane contains the **Input/Output** tabs, with information about the selected step.

> flow1	0
+	
date	÷ □
date_format	
	▼ >
Inputs	Outputs

For more information about the Inputs/Outputs tabs, see "Define Step Properties" on page 395.

Drill down to view a subflow/operation within a step

To drill down within a step to see the details of the flow, decision, or operation that was used to create

it:

• Click the **Drill Down into the Step** \downarrow button in the authoring pane toolbar.

Create Navigation Lines between Steps in a Flow

You must connect any two steps in a flow with a navigation line.

About navigation lines

A navigation line starts from one of a step's response ports and connects to another step or to a result step.



- Every **Success** or **Custom** response in a flow must have a navigation line either to a subsequent step or to a result step.
- It is optional to connect Failure responses to a subsequent step or result step. For more information
 about result steps, see "Add Result Steps to a Flow" on page 381.

The response ports that appear in a step are in accordance with the responses that were defined for the operation or flow that the step instantiates. For example, if a step instantiates a subflow with three responses: success, failure, and a custom response, the step will have three corresponding response ports.



If a flow already has a navigation line from a step's response port, and that response is deleted from the flow or operation instantiated in the step, in the flow the response port is grayed-out and navigation line appears as a dotted gray line.

Create and Delete the navigation lines between steps

1. On each step that you want to connect to the next step (or to a result step), click the icon that represents one of the response ports, and drag a line to the destination step for that response.



- 2. Repeat the process for the other response icons on the step.
- 3. To add, move, and remove a vertex from the navigation line, follow the below steps:
 - a. To add or move a vertex on the navigation line, click the navigation line and drag it to the desired position.

A small vertex with **x** icon appears on the navigation line as shown below.



b. To delete a vertex from the navigation line, hover over the navigation line with the vertex and click **x** icon.

Use

The vertex is removed and the original navigation line without a vertex is displayed.



4. To delete a navigation line, hover over the navigation line and click the x that appears on the line.



Add Result Steps to a Flow

Result steps return an outcome for the entire flow and end the flow. To create a result step, drag it from the **Results** toolbar.



All Success and Custom response ports must be connected either to another step or to a result step.

Options for Failure response ports

There are two options for Failure response ports:

• If you don't connect a step's Failure response port to a step, the response icon will remain with

grounding 🤒 and will end the flow with a default failure step.

The default failure step can be configured to run a specific step/flow before failing.

Use this option if there are a lot of fail points in a flow and you want the same action to occur on each failure.

You can also use this option if you want the flow to be readable and clean, as it removes the failures from the graph and promotes the successful path of the flow.



• If you connect a step's **Failure** response port to any step, the grounding disappears, the flow depends on what it is connected to, and does not run the default failure step.

Use this option if you want to configure the action for a specific fail point separately.





Example of multiple option of how to handle failure in a flow.

Add Results to the flow

1. To add **Success** and **Custom** result points to the flow, drag result steps from the **Results** toolbar, and place them next to the step connected to it.



2. Click the icon that represents one of the response ports, and drag a line to the result step for that response.



- To copy, cut, paste, and rename a result step, select it and use appropriate buttons from the authoring pane toolbar
 Image: Content of the select it and use appropriate buttons from the select
 - a. To copy a result step, click the **Copy** button in the authoring pane toolbar or press CTRL+C keys, then Click S or press CTRL+V keys to paste.
 - b. To cut a result step, click the **Cut** button in the authoring pane toolbar or press CTRL+X, then Click or press CTRL+V keys to paste.

Note:

• You can copy and paste result steps on the canvas multiple times as per your requirement.



4. To rename a result step, select it and click the **Edit** *b* button in the authoring pane toolbar.

Note:

- If you rename a **Success/Failure** step, the new name must start with the prefix **Success/Failure**.
- A **Custom** step can have any name.
- A renamed step must be unique in the flow. This applies to names with different case—for example, you cannot name one step to "Success_All" and another to "success_all".
- A renamed step cannot have a blank name.
- You cannot change the type of a response step by renaming.
- A Failure step cannot be named "on_failure".

(Optional) Set up a default failure step for the flow

You can set up a default failure step, to run by default for steps that go to the default failure. For example, you might want an email to be sent to the administrator for every failed step.

Every step whose **Failure** response is grounding will run the default failure step before the flows ends in failure.

- 1. Open the flow for which you want to create a default failure step.
- 2. If the **Default Failure** pane on the canvas is contracted, click the arrow to expand it.



3. Drag an operation or flow from the **Projects** pane or **Dependencies** pane into the **Default Failure** pane.



- 4. Bind the step inputs for this new step (and outputs if needed).
- 5. Save the flow.

Note: If all the **Failure** response ports are connected to a step, the default failure step is inactive and the icon in the top right corner of the **Default Failure** pane appears in gray.



- To change the default failure step, drag a different operation or flow from the Projects pane or Dependencies pane into the Default Failure pane.
- 7. To remove the default failure step, select it and click the **Delete** button from the authoring pane toolbar.
- 8. To rename the default failure step, select it and click the **Edit** *b* button in the authoring pane toolbar.

The FAILURE results in the default error cannot be renamed.

 If a step is based on a subflow that previously had a Failure result step, and this Failure result step was deleted, the step based on it will have an upgraded Failure result port. If this occurs, click the small x button to remove that result port.



• If a Failure result is added, the step will have a small black grounding icon next to the new failure port, to connect it to **on_failure**.

Define Flow Properties

You can view a flow graph or properties. Use the **Graph** and **Properties** tabs, at the top of the Authoring pane, to switch between the two views.

🔏 Graph 🛛 🗄 Properties

About the Properties pane

Click **Properties** The properties to display the flow's **Properties** pane. These properties include:

• Inputs - flow inputs specify the data required by the flow.

You define flow inputs when you want to use their value throughout the whole flow and various steps or if you want the inputs to get values from outside (from the user or when other flows use it). Step inputs are the inputs that the contained flow/operation/decision needs.

If this flow is used as a subflow in another flow, the flow inputs are exposed as step inputs.

See "Inputs" on page 390.

• Outputs - you can set up outputs for a flow.

Once outputs have been set up for the flow, you will be able to choose flow outputs to be published as step outputs when this flow is used as a step.

See "Outputs" on page 393.

Results - the Results tab displays the results that were dragged to the canvas for the flow. You can
enter descriptions for these results.

See "Results" on page 395.

• **Description** - you can enter a summary of what the flow does. It is recommended to include in this summary only the flow level description and not the input/output level description.

						& Graph
.diskspace_health_check						
	Inputs	Outputs	Results	Descr	iption	
+ @ ↑ ↓						
Name	Default Value		Private	Sensitive	Required	Description
docker_host					~	Docker machine host
docker_username					~	Docker machine username
docker_password				~		optional - Docker machine password
private_key_file						optional - path to the private key file
percentage					~	Example: 50%
timeout						optional - time in milliseconds to wait for the
						Back to graph $ \mathcal{D} $

Notes about expressions in OO Designer:

In the Expression Editor, if there is a multi-line description, each additional line should not start with
 @. For example, the following is an invalid description:

@input input_name: this is the first line
 @this is the second line
 this is the third line

About the Graph pane

The **Graph** pane contains the graphic representation of the flow.

For details, see "Graph Pane" on page 355.

Set up inputs for the flow

Flow inputs are available for the entire flow. For example, you can set the value of a flow variable and use this in various steps in the flow.

1. Click the **Properties** button Froperties to display the **Flow Properties** pane for the current flow.

The inputs of the flow are displayed under the **Inputs** tab.

Note: If you open a flow from the **Dependencies** pane, the **Flow Properties** pane is in readonly mode. If you want to edit the flow, first copy it to the **Projects** pane and edit the copy.

- 2. To add a new input, click the **New Input** + button.
- 3. In the new row that appears, enter the details of the input:

	Inputs	Outputs	Result	s	Description	
+ 🖻 🕆 🤟						
Name	Default Value		Private	Sensitive	Required	Description
flow_input_0		• 🖉				Description

See "Inputs" on page 390.

- 4. To delete an input, select the input row and click the **Delete** \square button.
- 5. To move an input up or down in the list, click the **Up** and **Down** \uparrow \downarrow arrows.

Set up outputs for a flow

Flow outputs are available for the entire flow. A flow output can be used as inputs to other flows.

1. Click the **Properties** button Froperties to display the **Flow Properties** pane for the current flow.

The outputs of the flow are displayed under the **Outputs** tab.

Note: If you open a flow from the **Dependencies** pane, the **Flow Properties** pane is in readonly mode. If you want to edit the flow, first copy it to the **Projects** pane and edit the copy.

- 2. To add a new output, click the **New Output** + button.
- 3. In the new row that appears, enter the details of the output. For example:

	Inputs	Outputs	Results	Descri	ption
+ 🖻 🕆 🗸					
Name	Value			Sensitive	Description
output_message	[e] ** if atte	mpts > 0 else "Url is n	ot accessible"		timeout exceeded and url was not accessible

See"Outputs" on page 393.

- 4. To delete an output, select the output row and click the **Delete** button.
- 5. To move an output up or down in the list, click the **Up** and **Down** \uparrow \downarrow arrows.

Adding a description to flow results

On the **Results** tab, you can add description to the results that were added to the flow.

Note: You cannot add new results in this tab. To do that, drag a result step to the canvas from the **Results** toolbar.

- Click the Properties button Froperties to display the Flow Properties pane for the current flow.
- 2. Click the **Results** tab to display the results that have been dragged to the canvas for the flow.

		Inputs	Outputs	Results	Description
Name	Туре	Description			
SUCCESS	0	disk space less than percentage			
FAILURE	8	error occurred			
NOT_ENOUGH_DISKSPACE	8	disk space more than pe	ercentage		

3. (Optional) Enter a description of the results in the **Description** column.

Check for errors in a flow

Flow errors

If a flow or its properties contain errors, an error flag is displayed in the **Graph** and/or **Properties** buttons at the top of the Authoring pane. This flag includes a number, representing the number of errors.



Click the error flag to display a tooltip with information about the errors.

After you fix the errors, numbers in the error flag are adjusted, and when all are fixed, the flag disappears.

Error in the flow properties

If errors exist in the flow properties, the error flag appears on the relevant tab and in the rows that are affected. Also at these levels, you can click the error flag to display a tooltip with information about the error.

 Inputs
 Outputs
 Results
 Description

 Name
 Type
 Description

 SUCCESS
 Impute
 Impute
 Impute

 FAILURE
 Impute
 Impute
 Impute

 FAILURE
 Impute
 Impute

 FAILURE
 Impute
 Impute

If the value being entered is not correct from CloudSlang point-of-view, an error will be displayed. If the error causes the corresponding YAML to be corrupted, the value will be reset after removing the focus from the item.

View the CloudSlang code

1. You can see information about the input, output, and result CloudSlang code.

To view the code defining the flow, operation, decision, or system property, click the **Show as Text** button in the Authoring pane toolbar. A text box appears. This text is the CloudSlang code that will actually run. For details, see "YAML File Textual Representation" on page 431.

Note: CloudSlang (CloudSlang.io) is an open source environment for process automation, which provides a textual language (YAML over Python), a lightweight engine (which can be embedded in a Java process or run via a command line), and a content library. All the CloudSlang code, including documentation and content, are available in GitHub CloudSlang repositories.

Score is a general-purpose Java-based open-source orchestration engine, which is processbased, embeddable, lightweight, scalable, and multilingual.

The CloudSlang language is a YAML (version 1.2) based language for describing a workflow that can be run by Score engine. The supported file extensions are: .sl, .sl.yaml and .sl.yml.

For more information about CloudSlang, see:

http://www.cloudslang.io

https://github.com/cloudslang/cloud-slang

https://github.com/cloudslang/score

Inputs

Inputs are defined for steps, operations, decisions, or flows.

Under the **Inputs** tab, you can view the inputs that the steps, operations, decisions, or flows receive. The Inputs tab for the steps are on the right side of the canvas. Each input has a value that can be set in a number of ways. It may be a constant value, a python expression, the value of a flow variable or system property, and more.

🔆 http_client_ac	tion \times						
						🔅 Java Action	6
user.versioning.ht	ttp.ops.h	ttp_client_action					
		Inputs	Outputs	Results	Description		
+ 茴 ↑ ↓							
Name	Defa	ult Value	Private	Sensitive	Required	Description	
url					~		^
auth_type							
authType	[e] g	jet("auth_type", "	~		~		
preemptive_au	uth						
							*
						Back to actio	n 🖵

For example, you can set the value of a flow variable and use this in various steps in the flow.

• Name. Displays the name of the input.

The combined input name, flow name, and folder path of the input (under the **Library** folder) must add up to no more than 255 characters.

Input names must start with a letter or an underscore (_) and must contain only the characters (A-Z, a-z, 0-9) or _.

The Input name cannot contain white spaces.

Note: For localized characters, this limit is even lower. For example, in Japanese, the 255 characters need to be divided by 4, so the number of characters is only 64.

• **Default value.** A user can add a default value to the input. If no value is passed for this input, the default value is used instead.

(Optional) You can directly edit the expression of a value. Open the Expression Editor by clicking the **Edit** button next to the value.

> Default_value	0
+	
* default_value	
[C] '22'	▼ >>

For more information, see "Edit the Expression of a Value for an Input or Output" on page 404.

• **Private.** Click the check box if the input needs to be private. This means that it cannot be overridden. This cannot be seen when this flow is triggered or when this flow is referenced as a step

Note: If a flow input is marked as private, it *must* have a default value. If there is no default value, this is flagged as an error.

• Sensitive. Click the check box if the input contains sensitive data. During runtime, the value will be encrypted. See "Sensitive Flow Input, Output, and System Properties " on page 394.

Tip: It is not recommend to set a default constant value when an input is marked as sensitive. The values are displayed as asterisks in the file.

- Required. This check box is selected if this input is mandatory for the operation/flow to function.
- **Description.** Displays a description of the input.

When the flow is used as a step (subflow) in another flow, an **Info** (1) button will appear when a mouse is rolled over the input (under **Step Properties** > **Inputs**).

> 9	get (i)		?
+			
*fl	ow_input_0		
[C]] '22'	•	>

When this **Info** button is clicked, a smart tooltip will display the description that you entered.

Use

	> get (i)	0
Time to wait between attempts, measu seconds.	red in	
	* TIOW_INPUT_0	
	[C] '22'	▼

Outputs

Under the **Output** tab, a user can put any information to be send back to the calling flow.

Output values can have complicated expressions, such as trimming, parsing etc. Output expressions must evaluate to strings.

After you set up the outputs for a flow, you can use the flow as a step and add outputs to that step whose value will be taken from the outputs defined in the original flow.

Step Outputs can be used in the flow outputs. For example, if a user adds a step output called 'vacant', the step can be used in a flow output by choosing it from the drop down under the flow variable list

Default_value \times							
□ ■ <i>P /</i> 0 ↓ C ₁ ×	BB & ⊂				🖧 Graph	F Properties	?
test.Default_value							
	Inputs	Outputs	Results	Descript	tion		
+ 🛍 🛧 🗸			_				
Name	Value			Sensitive [Description		
flow_output_0	占 output_)					
error_result	[C] '23'						
						Back to grap	oh Ə

Name. Displays the name of the output. A default name is provided, but you can change this.
 Output names must start with a letter or an underscore (_) and must contain only the characters (A-Z, a-z, 0-9) or _.

The Output name cannot contain white spaces.

• **Value.** Displays how to obtain the flow output value. This may be a constant value, a flow input, published outputs from any of the steps, or any expression.

(Optional) You can directly edit the expression of a value. Click the **Edit** button to open the expression editor.



For more information, see "Edit the Expression of a Value for an Input or Output" on page 404.

• Sensitive. Select this check box if you want the value to be encrypted at runtime.

See "Sensitive Flow Input, Output, and System Properties " below.

Tip: It is not recommended to set a constant value when an output is marked as sensitive. The values are displayed as asterisks in the file.

• **Description** Enter a meaningful description of the output.

Sensitive Flow Input, Output, and System Properties

The following can be set as **Sensitive**: an input field, an output field, and a system property.

Note: It is not recommended to set a default constant value when an Input, Output, or System Property is marked as sensitive. The values are displayed as asterisks in the file.

	Name	Default Value	Private	Sensitive	Required	Description
!	flow input 0	[c] '22'		~		
	 Warning: This input (flow_input_0 not recommended to assign it a v. clear text 	i) is flagged as sensitive. It is alue, as the value will appear in				

Handle Sensitive Information at Back-end - API

You cannot access the flows and system property files of the content that supports sensitive data through an API using non-secured channel such as HTTP protocol. You are prompted to use secured protocol (HTTPS) as displayed in the below image.



Rules and limitations:

- When an **Input** is defined as **Sensitive**, it flags the system to protect its value when this flow is executed. By extension, any input or expression that refers to it will be treated as **Sensitive**.
- If an **Output** refers to another output that is defined as **Sensitive**, then the resulting **Output** is treated as **Sensitive**.

Results

Under the **Results** tab, view the results that will be returned from the current item.

- Name. Displays the name of the result.
- Type. Displays the type of the result. The options are Success \heartsuit , Failure \bigotimes , and Custom B.
- Rule.Rules can be used to define a result. Rules are relevant only in operations and decisions.
- **Description.** Displays a description of the result.

Define Step Properties

View inputs in a step that was created from another flow

If you include flow inputs in one flow (Flow A) and you use this flow as a subflow step in another flow

(Flow B), these inputs are available as step inputs for the step in Flow B.

You can also view the descriptions that were given to the flow inputs in the original flow (Flow A).

1. Create a flow with flow inputs (Flow A), and give these inputs descriptions. For more information about creating flow inputs, see "Define Flow Properties" on page 386.

For example:

						& Graph 🗮 Properties	0	
diskspace_health_check								
	Inputs	Outputs	Results	Descr	ription			
+ ⊡ ↑ ↓								
Name	Default Value		Private	Sensitive	Required	Description		
docker_host					~	Docker machine host		
docker_username					~	Docker machine username		
docker_password				~		optional - Docker machine passwo	ord	
private_key_file						optional - path to the private key	file	
percentage					~	Example: 50%		
timeout						optional - time in milliseconds to v	vait for the	
						Back to	graph 💭	

- 2. Create a second flow (Flow B) and use Flow A as a step.
- 3. In Flow B, select that step.

In the Step Properties pane, the inputs of the step are displayed under the Inputs tab.

4. Roll a mouse over an input, to display the Info ① button.

> get (i)	0
+	
* flow_input_0	
[C] '22'	▼

5. Click the **Info** ① button to display a smart tooltip showing the description that was entered for the
original flow input.

	> get (i)	?
Time to wait between attempts, mean seconds.	sured in	
	* tiow_input_0	
	[C] '22' V	

Add and Edit the Inputs of a step

Step inputs are defined for a single step. To add and edit the inputs in a step.

1. Click on the step in the authoring pane. The **Step Properties** pane appears at the right side of the canvas.

The **Step Properties** pane has two tabs where you can view the inputs and outputs of the selected step.

- 2. To add a new input for a single step:
 - a. Click the New Step Input + button. The new step input field is displayed. For example: input_0, input_1 etc.

nput_0		
	•	\
[C] Constant		
Enter the constant		

- b. Click the Value arrow and enter appropriate values (constant or expression)
- c. Click **Save** button in the authoring pane to save the step input.

- 3. To rename a newly added input for a single step:
 - a. Hover over the selected step input field to view the step input toolbar as shown below.
 - **举** 向 十
 - b. Click Edit 🏁 icon to enter the editing mode as shown below.

[input_0	6
	Sensitive	

c. Click inside the **Step Input** box and rename as required. For example: From input_0 to input_1

Note: If you select an existing step input name, a red indicator is displayed warning of a duplicate name.

d. To set a step input as sensitive, select the **Sensitive** check box.

Note Only the custom added step input is editable. The input text box of the step input having a dependency is set to read-only state and is not editable.

e. Press ENTER key or Click **Save** 🖽 icon from the step input toolbar to save.

Note The values of sensitive steps are replaced and displayed with asterisks in both Input field and YAML source. However, the values are cleared when a step input is removed off its sensitive state.

- f. Click **Cancel** icon or press ESC key to cancel.
- 4. To edit an input value in the selected step, click the down arrow next to the input value and select a value from the list.

The default value of the origin flow/operation appears in gray italic text, but you can enter a different value.

Note: Required inputs appear with an asterisk*.



Each input in a step has a value that can be set in the following ways:

- A constant value.
- A default value as defined in the flow/operation that the step is based on.
- A system property system properties can be defined under Configuration > System Properties, as described in "Author System Properties" on page 445.
- A python expression.
- A flow variable flow variables can be defined in the flow inputs, as described in Creating Inputs, Outputs, and Results for a Flow. Flow variables also contain published output data from steps in the workflow.

Note:

- If you choose to define the value from a system property, the content pack or project from which the system property originates is displayed.
- An empty string value for a required step input is invalid.

 (Optional) You can directly edit the expression of a value. Open the Expression Editor by clicking the Edit button next to the value.



In the Expression Editor, enter the value that you want to assign, and click **Save**. The value will appear in the value box without quotation marks.

Expression Editor	×
1 "df -kh " + mount + " grep -v 'Filesystem' awk '{print \$5}'"	

For more information about the Expression Editor, see "Edit the Expression of a Value for an Input or Output" on page 404.

 (Optional) If you select a system property or a flow variable, you can add an **Otherwise** option. At runtime, if the flow variable or system property does not exist or is empty, the Expression Editor will use the Otherwise value

Click the + button to add an Otherwise option.

inpu	1.0		₩
	-		尚
ጽ	default_value	\$	Ŧ

7. Click the drop-down of the Otherwise option and select a value from the list.

	inpu	0_1		举 命
	ጹ	default_value 🔻	>	+
	Othe	rwise		
×		•	\	

You can assign the value from a flow variable, a constant, an expression, or a system property.

Note: If you do not click the **New**⁺ button, the **Otherwise** field does not appear and this option remains disabled.

8. To delete an input from a single step:

- a. Hover over the selected **Step Input** box to view the step input toolbar.
- b. Click the trash icon to delete the step input.



Note: Only the custom added step input can be deleted. A step input coming from a dependency is set to read-only state; if it was not edited, and cannot be deleted. Otherwise the input value will be reset to the default value.

	flow_input_0			*
8	[C] '22'	•	\$	

Publish outputs for a step

When setting up step outputs, you choose which information you want to use, from the data that was received in the various flows and operations.

This output will be available to be used as input in other steps and is available to be a flow output:

1. To add outputs to a step, click the step in the Authoring pane. The Step Properties pane appears at the right side of the canvas.

The outputs of the selected step are displayed under the **Outputs** tab.

- 2. If the Step Properties pane is hidden, click the **Expand** button to display it.
- 3. To add a new output to the selected step, click the **New** + button or click \checkmark to choose from the list that opens.
- 4. To edit the name of an output value in the selected step, click in the **Name** field and edit the text.

Note: While you are entering the output name, if the characters entered cause the underlying YAML file to be corrupted, for example, an empty value, the value is reset to its previous value after focusing out.

5. To edit an output value in the selected step, click the drop-down of the output value and select a

value from the list.

> Default_value	0
+ •	
Name	Value
output_0	[C] 'output_0' ▼ 〈/>
Name	Value
output_1	□ input_1 ▼ 〈>
Name	Value
output_2	[€] error_re ▼ 〈♪
Name	Value
output_3	[C] 'output_3'▼ <∕>
Inputs	Outputs

You can assign the value of an output from one of the following:

- Constants.
- Current step input.
- An Underline output the most common use case is to use outputs received from an operation or flow.
- A system property system properties can be defined under Configuration>System Properties, as described in "Author System Properties" on page 445.
- Directly edit the expression of a value. Open the Expression Editor by clicking the Edit button next to the value. For more information about the Expression Editor, see "Edit the Expression of a Value for an Input or Output" on page 404.

Note: You can extract and modify parts of an output, using Python. See "Extract and Modify Output Values" on page 404.

For example, if you have a step that counts the number of servers that are online, this output

is published as a flow variable, which can be added to an email that is sent to the system administrator.

6. To delete an output from a step, hover over that output to view the **Delete** button, and then click to delete.

Name	Value	Ů
output_2	[e] error_re 🔻 🌾	

Check for errors in a step

In the Authoring pane, if there is an error in a step operation, for example, missing information, the error appears with a red error flag in the top left corner.



Errors in decisions appear as a red flag covering the top left corner.

Tip: Click the error flag to display a tooltip with information about the error.

If there is a step with a missing dependency (for example, a step that is based on a flow that was deleted), that step appears with a gray, striped background.



In the **Step Properties** pane, if there are fields with errors in the **Inputs** and **Outputs** tabs, these fields appear with an error flag.

	* retries
• The required input must have a value	▼

The tabs at the bottom of the **Step Properties** pane also appear with an error flag, which includes a number, representing the number of errors.



When you fix the errors, these error signs disappear.

For more information about errors and invalid content, see "Check for errors in the content" in "Create and Deploy a Content Pack" on page 451.

Edit the Expression of a Value for an Input or Output

You access the Expression Editor by clicking the Edit \checkmark button available from the Step Properties pane, on the Inputs and Outputs tabs, and in the Flow Properties pane, on the Inputs and Outputs tabs.

The Expression Editor displays the python value of the selected input or output value. For example, if you selected a system property named 'sp1' as the input value, this will be displayed as the python expression: get_sp('sp1') in the Expression Editor. It can include any valid python expression.

About the Expression Editor

You can directly edit the expression of this value in the Expression Editor.



Extract and Modify Output Values

You can extract and modify parts of an output, using python.

For example, if you only want the maximum, minimum, and average round-trip times for a ping operation to a server, you can isolate and extract all three pieces of information from the operation's raw output.

Another example is to extract the HTTP code from an HTTP response.

See https://github.com/CloudSlang/cloud-slang-content/tree/master/content/io/cloudslang/base/xml.

- 1. In the **Step Properties** pane, under **Outputs**, or in the **Flow Properties** pane, under **Outputs**, select the output and click the Edit button.
- 2. In the Expression Editor, enter the python expression to manipulate the output value.

Example: To convert the output to lowercase, you just need to copy the following expression in the OO Designer UI:

```
output1.lower()
if the original expression was:
pub1: ${output1.lower()}
```

3. Click Save.

Examples of Using Python to Manipulate Outputs

Diff Case

Diff Case changes all the characters in the string either to upper case or to lower case.

```
Example:
# to change to lowercase
output1.lower()
# to change to uppercase
output1.upper()
```

Extract Number

Extract Number extracts the first number found in the result. It treats an unbroken series of integers as a single number.

Example:

To extract the number "123" from the strings "123Test" or "Test123":

```
text: ${var_name}
publish:

first_number: ${match_text}
navigate:

MATCH: MATCH
NO MATCH: NO MATCH
```

Format

Format attaches text to a result or output or replaces the original content of the result or output with the text that you specify.

• To attach the text to the front of the existing text, use prepend.

Example:

prepend
'xyz' + output1

• To add the text to the back of the existing text, use **append**.

Example:

append output1 + 'xyz'

• To replace the output with the text, use **replace**.

Example:

```
# replace
output1.replace('old', 'new')
```

Line Count

Line Count outputs the total number of lines of the result.

Example:

```
# string line count
len(output1.split('\n'))
```

Loop

Loop is synchronous. It will act like ordinary loop in other languages (such as java). It runs over a collection of items and executes the step mentioned inside (operation or flow).

• For

The variable name that is assigned the current value from the collection that is defined in the **In** section. This variable is available in the current running of the inner step as flow variable. In case of iterating map there will be two variable names, for the key and value. This variable is required.

Supported characters: A to Z, a to z, 0 to 9, _ variable name starting with letter or underscore.

Example:

```
for: "value in '1','2','3'"
or
for: "value in '1,2,3'"
to actually enter a constant in the expression editor
```

for: 'k,v in {"key1":"val1","key2":"val2"}'

• In

The collection to be iterated on. You can use any python expression that results in a list or map. The **In** section contains dropdowns that contain SP and flow variables. Click the Edit button to open the expression dialog where you can insert any string. This variable is required.

Example:

- Array: ['1','2','3','4'] or ['a','b','c','d']
- Python expression: map(str, range(1,5)) to return a string collection.
- Map: {"key1":"value1","key2":"value2"}
- Comma delimited strings: which would be split automatically into a list: "1,2,3"
- Flow variable: select it from the drop down (all step published outputs and flow inputs).
- System property: select it from the drop down.

• Break

A loop exits when either the collection being looped has been exhausted or the operation or subflow called returns one of the results mentioned in the **break** section. The **break** section is a property of a loop, which is mapped to a list of results on which to break out of the loop. The list of results is a subset of the results of the inner step.

When the operation or subflow of the iterative task returns a result in the break list, the iteration halts and the iterative task navigation logic is run.

If there is no break section in the YAML, by default FAILURE breaks the loop. In Java-based operations and in Python, FAILURE result is added by default to the Break list. You can delete FAILURE.

• Publish

The publish output is set like a regular step (In the step properties). At runtime, it will contain the value from the last iteration of the loop (make sure the 'publish' key is inside the loop).

You can also aggregate outputs from a loop. To do so, put a python expression that will aggregate the outputs.

Example:

The sum is calculated in each iteration and at the end provides the sum of all iterations.

```
- aggregate:
    loop:
    for: "value in '1','2','3'"
    do:
        square:
        - to_square: ${value}
        - sum
    publish:
        - sum: ${sum + squared}
```

• Navigate

The navigation logic runs when the last iteration of the step is completed or after exiting the iteration due to a break. The navigation runs according to the last iteration of the loop.

For keys, the supported characters: A to Z, a to z, 0 to 9.

For values, restricted to step/result names.

Example:

```
- custom3:
loop:
for: "value in '1','2','3','4','5'"
do:
    custom3:
        - text: ${value}
    do:
        break:
        - CUSTOM
        publish:
```

- CUSTOM: aggregate - SUCCESS: skip this

You can also use: for: "value in '1,2,3,4,5'"

Parallel Loop

A Parallel loop runs over a collection in an asynchronous way, meaning that each execution of the step is run simultaneously and in a different context. A new branch is created for each value in a list and the branches run in parallel. The various branches running the flow will run in parallel and the rest of the flow will continue only after all the branches have completed.

• For

The variable name that is assigned the current value from the collection that is defined in the **In** section. This variable is available in the current running of the inner step as flow variable. In case of iterating map there will be two variable names, for the key and value. This variable is required.

Supported characters: A to Z, a to z, 0 to 9, _ variable name starting with letter or underscore.

Example:

```
for: "value in '1','2','3'"
or
for: "value in '1,2,3'"
to actually entering a constant in the expression editor.
```

for: 'k,v in {"key1":"val1","key2":"val2"}'

• In

The collection to be iterated on. You can use any Python expression that results in a list or map. The **In** section contains drop downs that contain SP and flow variables. Click the Edit button to open the expression dialog where you can insert any string. This variable is required.

Example:

- Array: ['1','2','3','4'] or ['a','b','c','d']
- Python expression: map(str,range(1,5))
- Map: {"key1":"value1","key2":"value2"}
- Comma delimited strings: which would be split automatically into a list: "1,2,3"

- Flow variable: select it from the drop down (all step published outputs and flow inputs).
- System property: select it from the drop down.

• Publish

The publish mechanism defines the step aggregation logic, generally making use of the **branches_context** construct.

The branches context is a list that includes all the contexts of all the iterations. It is set according to the order of execution, meaning that the execution that finishes first gets the first place in the list and so on.

After all branches of a Parallel Loop have completed, the execution of the flow continues with the publish section. The expression of each output pair is evaluated and published to the flow scope.

In Parallel Loops, the publish keyword is at the loop level in the YAML and not as in a Loop where it is inside the loop, in line with the **do** keyword.

In a Parallel Loop, there is no publish section inside the inner step. Instead, it publishes all the outputs of the inner step by default to the **branches_context**, allowing for aggregation.

The aggregation syntax should be a python expression.

Example:

• Retrieves the name variable from the first branch to finish:

```
- publish:
    - first_name: '${str(branches_context[0]["name"])}'
```

• Publishes an aggregate output (it iterates over the :', which contains a list of all the iterations of the Parallel Loop, and takes the value of 'name' from each branch):

• Creates a list of branch results (as branches of a Parallel Loop complete, branch results get placed into the branches_context list under the branch_result key):

• Navigate

The navigation logic runs after the last branch has completed. If any of the branches return a

result of FAILURE, the flow will follow the navigation path of FAILURE. Otherwise, the flow will follow the SUCCESS navigation path. Any other result beside SUCCESS and FAILURE will be evaluated as SUCCESS.

For keys, the supported characters: A to Z, a to z, 0 to 9.

For values, restricted to step/result names.

- If the inner step does not contain a FAILURE result, the navigation (ports) do not contain a FAILURE port, but only a SUCCESS port.
- If a step has a custom result, after setting it in a parallel loop, the ports change to be SUCCESS and FAILURE. After removing the step from the parallel loop, the original ports of the step is returned.

Example:

Regular Expression

Regular Expression filters the raw results using a regular expression (regex).

Example:

```
# regular expression
# as above, requires another step
base.string.match_regex:
    - regex: '<expression>'
    - text: ${output1}
```

Replace

Replace replaces the first or last instance or all instances of one string with another string.

do:

• Use First, All, or Last, to define which instances of the target string to replace.

Example:

```
# replace first
output1.replace('old', 'new', 1)
```

• To make the search not case-sensitive, use Ignore case.

Example:

```
'abcabdAb'.lower().replace('ab'.lower(), 'XX')
```

Round Number

Round Number rounds numbers up or down.

 Use Number of Decimal Places to define the number of decimal places the number should be rounded to.

Example:

```
# round
# note: float function call is not always needed
# note: python rounding of floats sometime returns
# unexpected results
# see https://docs.python.org/2/library/functions.html#round
round(float(output1), <number_of_decimal_places>)
```

• Round rounds the number up if the last significant digit is 5 or more, and down otherwise

Example:

```
round(2.734) -> 2.73
round(2.734, 2) -> 2.73
```

Select Range

Select Range defines a string that you want to extract from the input data. The two criteria for defining the string are its length in characters and the position of its first character from the start of the input data.

- Use Start to specify the zero-based start position of the string.
- Keep in mind that a new line may count as one or two characters, depending on the operating system from which you obtain the data you're filtering.

Example:

```
# select range
```

note: <end> is not included in the selection

```
output1[<start>:<end>]
```

Sorted

Sorted orders the lines of input data by the first character in each line.

- To specify the direction of the sort, use **Ascending**.
- To order the data by ASCII order, use **Treat as Numbers**.

Note that ascending ASCII order is roughly as follows, for English characters:

- White space
- Symbols
- Numbers
- · Alphabetic characters

Example:

```
# sort lines
# note: returns a list, can be joined to a single string using join function
sorted(output1.split('\n'))
```

Strip

Strip strips characters from the beginning or end of the raw results.

- Use Strip Method to specify how you want the filter to strip the raw results:
 - All Characters Up To the string.
 - All Characters Up To And Including the string.
 - All Characters After the string.
 - All Characters After And Including the string .
- Use Characters to Strip to specify the string to find.

Example:

```
# strip other characters
# note: can also be used with lstrip and rstrip
output1.strip(<characters_to_strp>)
```

Strip Whitespace

Strip Whitespace removes all the whitespace characters from the front and the end of the raw results.

Example:

```
# strip whitespace from both sides
output1.strip()
# strip whitespace from left side
output1.lstrip()
# strip whitespace from right side
output1.rstrip()
```

Table

Table does not convert the raw results into a table, but enables you to manipulate the raw results as if they were a table, including sorting columns and selecting columns, rows, and blocks.

- Use **Column Delimiter** to specify the character that will serve to divide the data into columns in a meaningful way.
- Use Row Delimiter to specify the character that will serve to divide the data into rows in a meaningful way.

Note: Two or more consecutive whitespaces count as a single whitespace, so a column may be occupied by data that you expected to find in a column to the right. For example, this behavior will appear if you apply this filter to the output of a "dir" command-line command with whitespace specified as the column delimiter.

- Use First Row is Header to treat the members of the first row as column headers, .
- Use Strip First Row of Result to remove the first row.
- Use Sort On Column to sort on a column, by specifying the (1-based) column number.

Tip: The value -1 means do not sort on any column.

- Use Ascending to specify the ascending order. By default, the sort order is descending.
- To select the row that you want the filter to extract, specify the row number with Select Row (-1 selects all the rows) and specify the number of columns in that row that you want extracted using Select Width (-1 selects all the remaining columns to the right of the column specified by Select Col).
- To select the column that you want the filter to extract, specify the column number with Select
 Col (-1 selects all the columns) and specify the number of rows in that column that you want

extracted using **Select Height** (-1 selects all the remaining columns to the right of the column specified by **Select Row**)

Example:

To extract the first 5 rows of the 2nd through 4th columns, you would specify the following:

```
Select Row= 0
Select Height= 5
Select Col= 2
Select Width= 3
```

In these settings, the first two settings define the selected rows, and the last two settings define the selected rows.

• XML

XML enables you to parse XML within a step, the XML being obtained from the step's input or output. The **XML Get Attribute** filter extracts the value for each of one or more instances of the attribute that you specify. You can control which instance of the attribute the filter is applied to by specifying an element path to the attribute.

You can obtain the value for a single instance of the attribute or for multiple instances, returned in a table. In such a table, the columns are comma-delimited and the rows are new line-delimited.

• Using **Element Path**, specify the path of the element that contains the attribute whose value you want to extract. Use forward slashes to separate the parts of the path to the element.

To control which instance of the element the filter gets the attribute's value from, add a specification such as [2] or [3]. The numbering of elements is 1-based (starts with [1]). Thus to specify the second instance of an element, you would use [2].

- To search child elements of the element you've specified, use **Include sub-elements**.
- Using Attribute Name, specify the name of the attribute whose value you want.
- For **Result**, use one of the following:
 - To restrict the result extracted to the value of a single instance of an attribute, use **Single Match**.
 - To extract the value of all the instances of the attribute you have named, use As Table.

Example:

xml
requires another step
base.xml.xpath_query:

```
- xml_document: ${output1}
- xpath query: <query>
```

- query_type: <node|value|nodelist>

• XML Get Element

XML Get Element enables you to extract an element in its entirety (including child elements, values, and attributes) by describing it in any of the following ways:

• Use **Element Path** to specify an absolute path to the element.

- ... specifies the parent of the last-named element.
- ./ specifies the last-named element.

You can specify a particular instance of any element in the path with an integer inside square brackets.

Example:

/tickets/ticket/details/comment specifies all the comments in the details for all the tickets.

/tickets/ticket/details/comment[2] specifies the second comment for each ticket.

/tickets/ticket[2]/details/comment specifies all the comments for the second ticket.

- Use Child Named to specify the name of an element that is a child of the element (or elements) that you want to extract. If the child element has a value, you can narrow the results by specifying that value using Value.
 - **Child Named** works for only one level of child elements. The filter only returns the direct parent of the child element that you specify.
 - Value is intended for brief values. The value that you type there must be an exact match of the value of the child element of the element that you want to extract.
- Using **Attribute Named**, specify the name of an attribute that is unique to the element you want to extract. To further narrow the results, you can give a value of the attribute for **Value**.

Example:

• XML Get Element Value

XML Get Element Value enables you to get the value of a specific element.

Use **Element Path** to specify the path to the element whose value you're interested in.

As with the other filters, if there are multiple instances of an element, the filter returns the first one, unless you specify a different instance.

Example:

XPath Query

XPath Query enables you to extract data from the result with queries that use the standard XPath syntax, which you define for **XPath Query**.

- The path that precedes the square brackets identifies the scope of the query with which you are narrowing the results.
- Square brackets contain the filtering portion of the query. There can be more than one set of filters in a query.

Example:

```
# xml
# requires another step
base.xml.xpath_query:
    - xml document: ${output1}
```

```
- xpath_query: <query>
```

- query_type: <node|value|nodelist>

Add Decisions to a Flow

A Decision is a step that serves as a gateway for a decision in a flow. A Decision performs a calculation and then controls the direction of the flow, based on rules that are used to calculate the result. Decisions do not perform actual operations but only calculate where to navigate next.

More about decisions

For example, a Decision might compare two values and return the difference between them. If the

result is higher than a specified value, the flow will branch to one direction and if the result is lower, it will branch to another direction.

It is optional to add Decisions to a flow.

Decision names can contain alphanumeric characters, and underscores (_).

Decision names cannot contain parentheses (()), square brackets ([]), curly braces ({}), hypens (-), spaces (), and dots (.).

Decisions are read-only and cannot be created and edited in OO Designer, or copied to the **Projects** pane.

You can use them as steps in flows by dragging them from the Dependencies pane.

Add a decision step to a flow

1. Drag a Decision from the **Dependencies** pane to a flow in the **Authoring** pane.

Decisions appear in the **Dependencies** pane with an icon in the shape of a badge $^{\textcircled{0}}$.

In the **Authoring** pane, they appear in the shape of a diamond.

2. Drag navigation lines from the decision step's response ports to other steps.



- 3. Click the decision step to open the **Step Properties** pane at the right side of the canvas.
- 4. Under **Inputs**, enter any relevant inputs. For example, if the action is to compare two values, specify how these values will be assigned to the inputs.

For more information about assigning values to inputs, see "Define Step Properties" on page 395.

5. Under **Outputs**, enter any relevant outputs.

View the details of a Decision

You can view their details in the Editor.

1. Double-click a **Decision** in the **Dependencies** pane, in order to display its details in the Editor.

Decisions appear in the **Dependencies** pane with an icon in the shape of a badge $^{\textcircled{0}}$.

2. Under **Inputs**, view the inputs that were defined for this decision. For example, if the action is to compare two values, these are included as inputs.

See "Inputs" on page 390.

3. Under **Outputs**, view any outputs that were defined for this decision.

See "Outputs" on page 393.

4. Under **Results**, view the results that were defined for this decision.

See "Results" on page 395.

5. Under the **Description** tab, view a description of what the Decision does, if one was entered.

	Inputs	Outputs	Results	Description	
Decision Description					
Compares two numbers as floatin	ng point values.				

6. To view the code behind the Decision, click the **Show as Text** button. A text box appears,

displaying the code.



If there is an error in the decision step, a red error flag is displayed. Click the flag to display a tooltip with information about the error.



Change the Start Step

By default, the first step that is dragged onto the canvas for a flow is flagged as the start step for that flow. The start icon appears in the corner of the step.



However, you can assign another step to be the one that starts the flow.

Change the start step in a flow

To assign a step as the starting point of a flow:

- Right-click the step and choose Set as start Step option from the list or
- Select the step, and then click the Set as Start Step \Join button in the Authoring pane



The start icon appears in the corner of the step icon, and is removed from the default start step.



Remove the start step in a flow

It is impossible to have a flow with no start step.

The only way to remove the start icon from a step is to assign a different step as the start step.

Create Flows with Loops

You can set a step as a loop, in order to create an iterative task. A loop step can be based on an operation or flow.

OO Designer supports two kinds of loops:

Loop

A loop step runs over a collection of items in a **synchronous** way.

Steps that have been set as a loop appear with a circular arrows icon.



Parallel loop

A parallel loop step runs over a collection of items in an asynchronous way. This means that the

step can run simultaneously and in different contexts.

Steps that have been set as a parallel loop appear with a branch icon.



Create a flow with a loop

1. Create a flow and select the step that you want to use as a loop step.

2. Click the **Create Loop** $\stackrel{\bigcirc}{\sim}$ button in the authoring pane toolbar.

3. From the menu that appears, select **Set as loop**.

ß	
	Set as loop
	Set as Parallel loop

For a step that has been set as a loop, the Step Properties > Inputs tab has an extra Loop
Details section, where you can define the collection that the input will be iterated on and the break
points of the loop.

> ⇔ javaMulOfSum	?
Loop Details	^
* For:	
value	
*In:	
[C] '1,2,3,4,5'	•
Break On 🕂	
*var1	
A value	•

• **For**: Enter the name of the variable that will be assigned the current value from the collection that is defined under **In**. This step is compulsory.

This variable will be available while the loop step is running.

• In: Define the collection to be iterated on. This step is compulsory.

You can define the collection using a flow variable or system property. For example, you can create a system property with a comma delimited string ('1,2,3,4,5') as the value and use this to define the collection.

Note: The evaluation of the flow variable or system properties must be a string as CloudSlang supports only strings. For example. 'Range(1,6)' will work inline only if the **for** variable (which will be a digit) isn't assigned to an inner step input (which requires string). It will not work if passed as a value of system property or flow variable.

You can also open the Expression Editor and write a Python expression that results in a list or map. For example:

- An array: ['1','2','3','4'] or ['a','b','c','d']
- A Python expression: map(str,range(1,5))

- A comma delimited string, which will be split automatically into a list: '1,2,3'.
- **Break On**: A loop ends either when the list that it is looping on is finished or when the looped step returns one of the results defined as a break point.

Click the **Select break result to add** + button to choose one of the step results as a break point. There can be multiple break points.

Note: To remove a break point, roll over it so that the **Remove** \times button is displayed, and click the **Remove** \times button.



- 5. In the **Step Properties** > **Outputs** tab, define how the output will be published. At run time, the output will contain the value from the last iteration of the loop.
 - a. Click the Add a Step Output + button to add a new output to the step.
 - b. Choose one of the underline outputs to define the output.
 - c. Under **Value**, open the Expression Editor and enter a Python expression to aggregate all the iterations.
 - d. Set up the navigation logic for the loop step.

The navigation to the next step in the flow occurs when the last iteration of the step is completed or after the loop exits the iteration due to a break. The navigation will run according to the last iteration of the loop.

Note: If you want to use the **for** value inside the step, you must add it as the value to one of the step inputs.

Aggregation of Loop Outputs

To aggregate the results of a specific loop step, proceed as in the following example, where we add the numbers generated in the loop's iterations:

1. Import a base content pack onto dependencies pane and choose the **random_number_ generator** operation.

- 2. Drag the **random_number_generator** operation to the flow and set the resulting step as a loop.
- 3. Define the collection that the loop will run on as shown in the following example image.

> ¢ random_num	ber_genera 🛈 🕜
+	
Loop Details	^ ^
*for:	_
value	
*In:	
[C] '1.2,3'	▼ >
Break On +	
S FAILURE	
	_ _
Inputs	Outputs

4. Enter the values for **min** and **max** Step Inputs as shown in the following example image.

* min	(D 🛱
[C] '1'	▼ </th <th>> +</th>	> +
* max	(Ð
[c] 'o'	▼	>

test_flow* ×		
⊟ ≞ ? ∥ û ↓ Ç % @ Ճ क़ ⊄ —_●	& Graph	2
8 8 8	> C random_number_generator ()	2
	+ •	
	Name Value sum_random [e] str(int(sum_random)+int(random_number))	
random_number_genera SUCCESS	Name Value random_number Ⅰ 𝑘 𝑘	
Default Failure	Inputs Outputs	

5. Define the aggregated output for the loop step as shown below.

Note: The random_number output shown in the above image is optional.

The Python expression for the **sum_random** output using (aggregating) the outputs from the iterations is:

Expression Editor	@ ×
<pre>1 str(int(sum_random)+int(random_number))</pre>	

6. Add a new Step Input and rename it as the Output. For example the following image shows the Step Input name as **sum_random**. This **sum_random** step input is assigned from itself, or with **0**

test_flow* ×		
⊟ ≞ ♡ ∕ ü ↓ Ç % @ Ճ & q	ස් Graph	Properties
8 🛛 🙆	〉 C random_number_generator ①	0
	+	
Success	* min	()
	[C] 'I'	▼
random_number_genera SUCCESS tor	* max	0
	[C] '9'	▼
	sum_random	
	Sum_random	▼
	Otherwise Fed Lio	- ()
		• (V)
Default Failure 🕜 🔨	Inputs O	utputs

when it has no value yet (at the first iteration).

7. Click Save 🖽. The flow is saved.

Create a flow with a parallel loop

In a parallel loop step, a new branch is created for each value in the collection and the branches run in parallel. The rest of the flow will continue only after all the branches have finished running.

- 1. Create a flow and select the step that you want to use as a parallel loop step.
- 2. Click the **Create Loop** $\stackrel{\bigcirc}{\sim}$ button in the Authoring pane toolbar.
- 3. From the menu that appears, select **Set as a parallel loop**.



arallel	Loop Details			1
* for:				
suf	fix			
*In:				
[e]	range(1, int(get("num_of_directories"))+1)	٠	Ø	
tep Inc	puts			
* fol	der_name		0	
			_	

• **For**: Enter the name of the variable that will be assigned the current value from the collection that is defined under **In**. This step is compulsory.

This variable will be available while the loop step is running.

• In: Define the collection to be iterated on. This step is compulsory.

You can define the collection using a flow variable or system property. For example, you can create a system property with a comma delimited string (1,2,3,4,5) as the value and use this to define the collection.

You can also open the Expression Editor and write a Python expression that results in a list or map. For example:

- An array: ['1','2','3','4'] or ['a','b','c','d']
- A Python expression: map(str,range(1,5))
- A map: {"key1":"value1","key2":"value2"}
- A comma delimited string, which will be split automatically into a list: '1,2,3'.
- 5. In the **Step Properties > Outputs** tab, define how the output will be published.

- a. Click the Add a step output + button to add a new output to the step.
- b. Choose one of the underline outputs to define the output:



c. Under **Value** for the output, open the Expression Editor and enter a Python expression to aggregate the outputs.

> -∉ get_time	G
+ •	
Name	Value
iteration_size	[e] str(len(🔻 🖉

To define the step aggregation logic, you can use the **branches_context** construct. This is a list that includes the context of all the iterations. The **branches_context** is set according to the order of the executions, so that the execution that finishes first takes the first place in the list, and so on.

After all the branches of the parallel loop have completed, the execution of the flow continues with the output that is published. The expression of each output pair is evaluated and

published to the flow's scope. The out-of-the-box outputs are **name** (first branch), **name_list**, **iteration_size**, **result_status_list**, and **num_of_failures**.

Examples:

• To retrieve the name variable from the first branch to finish:

```
branches_context[0]['name']
```

 To publish aggregated output: (this iterates over the branches_context, which contains a list of all the iterations of the parallel flow, and takes the value of 'name' from each branch)

```
str([str(x["name"]) for x in branches_context])
```

• To create a list of branch results: (as branches of a parallel flow complete, the branch results get placed into the **branches_context** list under the **branch_result** key)

```
str([str(x["branch_result"]) for x in branches_context])
```

• To configure the iteration size.

```
str(len(branches_context))
```

• To configure the number of failures, use num_of_failures:

```
str([x["branch_result"] for x in branches_context].count("FAILURE"))
```

Remove the loop from a step

- 1. Select the loop step.
- 2. Click the **Create Loop** $\stackrel{\bigcirc}{\sim}$ button in the Authoring pane toolbar.
- 3. From the menu that appears, click the selected option to clear it.

ß	
	Set as loop
	Set as Parallel loop

View the CloudSlang Code

View the CloudSlang code about the inputs, outputs, and results of the step.

You can see information about the step's inputs, outputs, and navigation steps in the CloudSlang code

for the flow.

To view the code, click the **Show as Text** button in the Authoring pane toolbar.. A text box appears, displaying the code. The details of the steps are displayed in the "workflow:" section. For details, see "YAML File Textual Representation" below.

YAML File Textual Representation

You can view the YAML file corresponding to a selected flow, operation, decision, or system property, by clicking the **Show as Text** button in the Authoring pane toolbar.

The YAML file includes the textual representation of the UI editor, so that each action done in the UI editor, such as, for example, adding inputs, editing outputs, adding steps, is reflected in the YAML file.

It is not recommend to set a default constant value when an input and output is marked as sensitive. The values are displayed as asterisks in the file.

Example of a typical file:



The first part (in green) displays the contents of the description of the item (flow, operation, decision, system property), as well as the description of input, output, and result.

#!!
#! @description: This flow does something.

```
#! @input flow_input_0: This input is for something...
#! @output flow_output_0: This output is for something...
#!!#
```

The second part (in blue), starting with **namespace:**, provides the CloudSland code that corresponds to the information about the selected flow or system property that were entered in the UI editor.

```
namespace: sss
flow:
  name: flow1
  inputs:
    - flow_input_0: "${get_sp('io.cloudslang.base.from')}"
    - flow_input_1: "${get_sp('io.cloudslang.base.hostname')}"
  workflow:
    - get time:
        do:
          io.cloudslang.base.datetime.get_time: []
        navigate:
          - FAILURE: CUSTOM
          - SUCCESS: SUCCESS
  outputs:
    - flow output 0
  results:
    - SUCCESS
    - CUSTOM
```

The third part (in blue), starting with **extensions:** provides the CloudSlang code that enables the graphical representation of the flow in the **Graph** tab. At run time, this section is ignored.

```
extensions:
  graph:
    steps:
      get time:
       x: 64
        y: 132
        navigate:
          dd888147-9fbf-25ef-bee5-d9946ce91bef:
            targetId: 519f1a15-eeb9-65f8-c115-bb0d96faff02
            port: SUCCESS
          56ba3221-c9f9-6dc5-689a-ffbd26643467:
            targetId: 54582fee-d5e9-315e-149a-5c2a884c0297
            port: FAILURE
    results:
      SUCCESS:
        519f1a15-eeb9-65f8-c115-bb0d96faff02:
          x: 384
          y: 75
      CUSTOM:
        54582fee-d5e9-315e-149a-5c2a884c0297:
```
x: 360 y: 230

Validate Flows

There are a number of built-in validation errors and warning in OO Designer.

It is highly recommended to check that your flows are valid before exporting your content to a content pack, as invalid content will **not** be exported to content packs.

This section provides the location of errors and warnings appearing in the UI.

Viewing Errors

• Projects or Dependencies pane. If there is an error anywhere in the Project pane or Dependencies pane, (in a flow, operation, or system property), the item with the error is displayed with a red underline. All flows that use this item and the folders above it are also displayed with a red underline.



When you fix the error, the red lines disappear under that item and under the folders that contain it or flows that use it.

As soon as you add or create a flow, OO Designer automatically runs the validation and displays all errors underlined. There is no need to do anything to start this process.

- Authoring pane.
 - **Flow tabs.** If there is any error on the flow\operation, an error flag appears on the tab. Click the error flag to display a tooltip with a detailed list of errors.



• Flow inner Graph or Properties tabs.

If a flow or its properties contain errors, an error flag is displayed in the **Graph** and/or **Properties** tabs at the top of the Authoring pane. This flag includes a number, representing the number of errors.

Click the error flag to display a tooltip with a detailed list of errors.

7 👃 Graph	Properties	0
• Input "flow_input_1" is duplicated		

• Error indications on the step. if there is an error in a step, that step appears with an error flag in the top left corner.

Tip: Click an error flag to display a tooltip with information about the error.



If there is a step with a missing dependency (for example, a step that is based on a flow that was deleted), that step appears with a gray, striped background.



• Errors on the step properties tabs.

If there is an error at the step inputs or outputs, a red error sign is displayed in the Step Properties pane, on the **Inputs** and/or **Outputs** tabs. This includes a number, representing the number of input or output errors in the step.



• Errors inside step inputs tab and step outputs tab.

Errors in a specific input or output appear as a red error sign in the top left corner. Click to display the detailed error tooltip.

	* retries
• The required input must have a value	▼ \$

While you are entering text in a field (for example, entering a flow input), if the value being entered will cause the underlying YAML file to be corrupted, OO Designer shows a red warning on the text field. If you focus out of the field at this point, the value will be reset to the previous value.

• Error indication on the flow inputs, inputs, or results.

If there is an error at the flow inputs, outputs, or results, a red error sign is displayed in the **Inputs**, **Outputs**, or **Results** tabs in the flow **Properties** tab. This includes a number, representing the number of errors. Click the error flag to display the detailed error tooltip.

Inside each tab, the elements with errors appear with a red error sign in the top left corner. Click the error flag to display the detailed error tooltip.

2	Inputs	1	Outputs	1	Results		Description		
Default	Value			Private	Se	ensitive	Required	Description	
							~		
							~		
put with the s	ame name								
	2 Default	2 Inputs Default Value put with the same name	Default Value	Inputs Outputs Default Value	Inputs Outputs Default Value Private	Inputs Outputs Results Default Value Private Set	Inputs Outputs Results Default Value Private Sensitive	Inputs Imputs Imputs Imputs Imputs Imputs Imputs Default Value Private Sensitive Required Imput with the same name Imputs Imputs Imputs	Inputs Imputs Imputs

• Errors on flow identifier.

If the flow identifier already exists in the workspace, an error is issued and appears at the top left corner of the flow identifier. Click the error flag to display the detailed error tooltip.

2					_		👃 Graph	1 F Properties	0
1 folde	er1.flow1]							
• The	e identifier "folder1.flow1" is duplicated	Inputs	Outputs	Result	s	Description			
+ 🗇	1 1 4								
Nam	ne Defau	It Value		Private	Sensitive	Required	Description		

Check for errors in the step properties inputs\outputs\results tabs

1. Click a step in the Authoring pane. The **Step Properties** pane appears at the right side of the canvas.

The **Step Properties** pane contains the **Inputs** and **Outputs** tabs, with information about the selected step.

> handle_session_recov	very (i)	?
*enabled		
[C] 'True'	▼ >>	
! * retries		
	▼ >	
return_result		
	▼ >	
* return_code		
	▼ >	
exit_status		
	▼ >	
Inputs	Outputs	

- 2. Expand or collapse this pane by clicking the **Expand** or **Collapse** button.
- 3. The tabs display any relevant warnings in the inputs, outputs, or results.

	* retries	
• The required input must have a value	▼]

Warnings

Warnings are issued if there is a problem, but it does not prevent the relevant operation to be performed. For example, if there is invalid content in a content pack that you try to download, the dialog box displays a warning message that there are invalid flows, which will not be packed inside the content pack.

Download as content pack			@ ×
6 items are invalid and will no	ot be packed inside the content pack		
Project Name:	project		
*Content Pack Version:	1.0.0		
Content Pack Name:	project-cp-undefined.jar		
		Close	Download

Author Operations

An operation is an executable that performs a single action. It has metadata like a flow (inputs, outputs and results). For example, one operation checks a web page to see whether it contains specific text, and another operation copies a file.

More about operations

The action in an operation can be Java-based or Python-based.

There are two types of actions in CloudSlang:

- Python-based actions. See "Using Python Operations" on page 443.
- Java-based actions. See "Using Java Operations" on page 440.

Operations must be created externally . They can then be imported:

- As part of content packs, they are displayed in the **Dependencies** panel. They are read-only. They cannot be copied.
- Via Source Control Management (SCM), they are displayed in the **Projects** panel. They are readonly. They cannot be copied.

In OO Designer, you can use operations in flows by dragging the operation from the relevant content pack from the **Dependencies** pane. You can also import a repository that includes the operation by dragging it from the **Projects** panel. In both cases, the operation is read-only.

Operation File Structure

An operation file must end with the .sl extension and start with a namespace.

```
Example of an operation file with its namespace.
namespace: io.cloudslang.base.comparisons
operation:
    name: less_than_percentage
    inputs:
        - first_percentage
        - second_percentage
        python_action:
        script: |
        error_message = ""
        result = ""
        first_percentage_nr = first_percentage.replace("%", "")
```

```
second_percentage_nr = second_percentage.replace("%", "")
try:
    int_value1 = int(first_percentage_nr)
    int_value2 = int(second_percentage_nr)
    result = int_value1 < int_value2
    except ValueError:
        error_message = "Both inputs have to be integers"
outputs:
    - error_message
results:
    LESS: ${error_message == "" and result}
    MORE: ${error_message == "" and not result}
    FAILURE</pre>
```

All CloudSlang files start with a namespace, which mirrors the folder structure in which the files are found. The namespace can be used by flows that call this operation.

Validating Operations

Operations are validated and will not work when:

- Missing action. Operations must contain an action.
- Corrupted YAML.
- **Duplicate inputs.** When an input is duplicated, or two inputs have the same name but use different cases (for example: Ping and ping).
- Input\output\result name or value.
 - Name cannot be empty
 - The combined input name, flow name, and folder path of the input (under the **Library** folder) must add up to no more than 255 characters.

Note: For localized characters, this limit is even lower. For example, in Japanese, the 255 characters need to be divided by 4, so the number of characters is only 64.

• Name must be unique.

It is recommended to manually validate the inputs that your operation will receive. For example, if you expect a number, make sure that the input is a string representing a number. If you expect an email address, check that the format complies with an email address format.

• **Missing rules in operation results.** Operation with more than one empty result (with no defined rule).

Operations can have multiple expression results, but can have only one mandatory empty default result, and it must be the last one.

• Incorrect operation name. When the name of the operation does not comply with the rules below:

Name cannot be identical to the following reserved word: "on_failure".

Names must be unique within their folders.

Names are not case-sensitive, so names such as "Ping" and "ping" are considered duplicates. However, when calling an item, make sure to use the correct case.

Names can contain alphanumeric characters, and underscores (_).

Names cannot contain parentheses (()), square brackets ([]), curly braces ({}), hypens (-), spaces (), and dots (.).

Names cannot be identical to the following Windows reserved words: CON, PRN, AUX, CLOCK\$, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, NUL, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9.

Decisions

A Decision is a step that serves as a gateway for a decision in a flow. A Decision performs a calculation and then controls the direction of the flow, based on rules that are used to calculate the result. Decisions do not perform actual operations but only calculate where to navigate next. They are read-only. Their inputs, outputs and results can be viewed but not edited.

For details, see "Add Decisions to a Flow" on page 417.

Using Java Operations

A Java-based operation includes inputs, outputs, results, and one action.

Java-based actions are read only and you cannot add\copy\edit them. They can only be found under the Dependencies panel, or imported using Source Control Management (SCM) (you cannot edit and copy them even if they are located in the Projects panel). You can use them as steps in flows by dragging them from the **Dependencies** or the **Projects** pane.

Use the Operation Editor to display information about an operation.

Java Actions

Java action contain the following elements:

- GAV. GAV is short for "Group, Artifact, Version". The GAV coordinate standard is the foundation for how Maven manages dependencies.
 - A group identifier groups a set of artifacts into a logical group
 - An artifact is an identifier for a software component
 - The version of a project follows the established convention of Major, Minor, and Point release versions.
- Class Name. This is the class within the GAV where the running method can be found.
- Method Name. This is the method to run within the action.

View the properties of a Java operation

1. Double-click an operation in the **Projects** or **Dependencies** pane to open it in the Operation Editor as read-only.

The **Java Action** view displays the GAV (group, artifact, version), class name, and method name that define the Java action in the operation.

8	http_client_action $ imes$				
	Ē		E	Properties	?
	GAV	io.cloudslang.content:score-http-client:0.1.65		?	
	Class Name	io.cloudslang.content.httpclient.HttpClientAction		0	
	Method Name	execute		0	

2. Click the **Properties Properties** button to display the **Properties** view.

You can return to the Java Action view, by clicking either the Java Action O Java Action button or the Back to Action Back to action O button.

3. Under the **Inputs** tab, view the inputs that the operation receives. Each input in an operation has a value that can be set in a number of ways. It may be a constant value, a python expression, the value of a flow variable or system property, and more.

See "Inputs" on page 390.

4. Under the Outputs tab, view the values returned from the Java code. They will be sent back to the

Use

calling step.

The Outputs tab lists any information that needs to be sent back to the calling step. The outputs are a list of key:value pairs where the key is the name of the output and the value is the expression to be returned, blank, constant, or more.

See "Outputs" on page 393.

5. Under the **Results** tab, view the results that will be returned to the calling flow.

See "Results" on page 395.

- 6. Under the **Description** tab, view a description of what the operation does, if one was entered.
- To view the code behind the operation, click the Show as Text button. A text box appears, displaying the code.

```
get_time.sl
                                                                                                        0 ×
                                                                                                            *
    10 #! @description: retrieves the current date and time according to the given locale
    11 #! @input locale_lang: optional - the locale language
    12 #! @input locale_country: optional - the locale country
    13 #! @output return_result: contains the current date and time according to the given locale, excepti
                                  Example: 'July 1, 2016 2:32:09 PM EEST'
    14 #!
    15 #! @result SUCCESS: the current date/time was obtained successfully
    16 #! @result FAILURE: failed to obtain the current date/time
    17
        #!!#
    19
    20 namespace: io.cloudslang.base.datetime
    21 - operation:
    22 name: get_time
23 → inputs:
    24 -
            - locale_lang:
                required: false
    25
    26 -
            - localeLang:
            default: '${get("locale_lang", "en")}'
private: true
    27
28
           - locale_country:
    29 -
           required.
- localeCountry:
    '-feult: '${
    30
                required: false
    31 -
            default: '${get("locale_country", "US")}'
    32
33
                private: true
    34 - java_action:
          gav: 'io.cloudslang.content:cs-date-time:0.0.3'
class_name: io.cloudslang.content.datetime.actions.GetCurrentDateTime
    35
    36
    37
            method_name: execute
    38 - outputs:
             - return_result: '${returnResult}'
    39
    40 -
         results:
            - SUCCESS: "${returnCode == '0'}"
    41
    42
            - FAILURE
    43
                                                                                                        ОК
```

8. Click **OK** to close the text box.

Using Python Operations

Python-based operations include inputs, outputs, results, and actions.

About python operations

Python operations can be copied from both the Projects panel and the Dependencies panel. You can import them. They are read-only.

Example:

```
namespace: io.cloudslang.base.comparisons
operation:
  name: less_than_percentage
 inputs:
   - first_percentage
   - second percentage
  python action:
   script: |
     error_message = ""
      result = ""
     first_percentage_nr = first_percentage.replace("%", "")
      second percentage nr = second percentage.replace("%", "")
      try:
          int_value1 = int(first_percentage_nr)
          int value2 = int(second percentage nr)
          result = int_value1 < int_value2</pre>
      except ValueError:
          error message = "Both inputs have to be integers"
  outputs:
    - error_message
  results:
    - LESS: ${error_message == "" and result}
   - MORE: ${error message == "" and not result}
    - FAILURE
```

You can use operations as steps in flows by dragging them from the **Dependencies** pane or from the **Projects** pane.

Use the Operation Editor to display information about an operation.

View the properties of a Python operation

1. Double-click an operation in the **Projects** or the **Dependencies** pane to open it in the Operation

Editor as read-only.

The Python Action view displays the python action script.

2. Click the **Properties Properties** button to display the **Properties** view.

You can return to the **Python Action** view, by clicking either the **Python Action** Python Action button or the **Back to Action** $\textcircled{Back to action} \supsetneq$ button.

3. Under the **Inputs** tab, view the inputs that the operation takes. Each input in an operation has a value that can be set in a number of ways. It may be a constant value, a python expression, the value of a flow variable or system property, and more.

See "Inputs" on page 390.

a. Under the **Outputs** tab, view the values returned from the python script, which will be sent back to the calling step.

The outputs are a list of key:value pairs where the key is the name of the output and the value is the expression to be returned, blank, constant, or more.

For example:

'outputs:

- available: \${vacant}'

will return the value of a variable called 'vacant' in the python code, with the name of 'available' to the calling flow. More complicated expressions can be passed, such as trimming, parsing etc. Output expressions must evaluate to strings.

If the value is blank, the output result will be the name of the output, which will translate to a python variable that is declared inside a python code. For example, 'outputs: -vacant' will return the value of the variable vacant under its' original name as declared inside the python code.

See "Outputs" on page 393.

4. Under the **Results** tab, view the results that will be returned to the calling step.

See "Results" on page 395.

- 5. Under the **Description** tab, view a description of what the operation does, if one was entered.
- 6. To view the code behind the operation, click the **Show as Text** button. A text box appears, displaying the code.

Note: Python scripts are not validated inside OO Designer.

```
get_values.sl
                                                                                                (c) Copyright 2014 Hewlett-Packard Development Company, L.P.
     1 + #
     2 #
           All rights reserved. This program and the accompanying materials
           are made available under the terms of the Apache License v2.0 which accompany this distribution.
     3 #
     4 #
     5
       # The Apache License is available at
        # http://www.apache.org/licenses/LICENSE-2.0
     6
     8
       9
       #!!
    10 #! @description: Gets values from a map.
    11 #!@input map: map - Example: {'laptop': 1000, 'docking station':200, 'monitor': 500, 'phone': 100}
12 #!@output result: values from map
    13 #!!#
    14
       *******
    15
    16 namespace: io.cloudslang.base.maps
    17 - operation:
    18 name: get_values
19 → inputs:
    20
           - map
    21 - python_action:
          script:
    22 -
    23
            values=[]
            for key, value in map.items():
    if isinstance(value, basestring):
    24 -
    25 -
    26
                   values.append(str(value))
    27 -
               else:
    28
                   values.append(value)
    29 - outputs:
           - result: '${values}'
    30
    31
                                                                                                 ОК
```

7. Click **OK** to close the text box.

Author System Properties

System Properties are global variables with values that do not change. Once created, you can use these system properties in any flow without having to recreate a flow variable each time. The flow referenced to a system property obtains the value of the system property.

More about system properties

For example, you can set a system property whose value is the URL of a server, and then use this property in a flow that runs a series of actions on the server. Rather than entering the URL each time, you can just select the property.

System properties are stored in system properties files located in the **Configuration/System Properties** folder.

company ×			
Identifier	Name	Value	Sensitive
domain	domain	bcompany.com	
hostname	hostname	host	
port	port	25	
system_address	system_address	test@test.com	
hr_address	hr_address	test@test.com	

(Optional) You can add extra folders, to organize the system properties files.

Naming System Property Files

- The name of a system property is limited to 128 characters.
- Valid characters for system property names are: a-z A-Z, 0-9, underscore (_), and hyphen (-).

Period (.) can be used as delimiter (only in the middle of the name).

- The combined name and path of a system property (under the **Configuration/System properties** folder) is limited to 220 characters.
- Names must be unique within their folders.
- Names are not case-sensitive, so names such as "Ping" and "ping" are considered duplicates. However, when calling an item, make sure to use the correct case.
- A system property name cannot include spaces.
- Names cannot be identical to the following Windows reserved words: CON, PRN, AUX, CLOCK\$, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, NUL, LPT1, LPT2, LPT3, LPT4, LPT5, LPT6, LPT7, LPT8, LPT9.

• If you enter a name with an error, an error indication is displayed. When you focus out of the field, the value will be reset and a default name assigned.

In certain cases, if the change is causing the YAML to be corrupted (for example name too long) the name will be reset. Otherwise, it will not be reset and an error indication is displayed.

Create a system properties file containing system properties

- 1. In the **Projects** pane, expand the **Configuration** folder.
- 2. From the System Properties folder or a subfolder within the System Properties folder, click the

New +- button and select System Properties File.

Note: You can also click the **New** + button to create folders in which to store the system properties files.

- 3. Enter a name for the system properties file and click OK.
- 4. In the **Authoring** pane, under the **system properties file** tab, click the **New** + button to add a new system property to the system properties file.
- 5. Enter the details of the system property in the columns:
 - Identifier: Generated automatically, based on the namespace and the name that you provide in the Name column.
 - **Name**: Enter a unique name.
 - Value: Enter a value for the system property.
 - **Sensitive**: Select the check box, if the system property contains sensitive data. During runtime, the value will be encrypted.

Tip: It is recommend not to set a value when a system property is marked as sensitive. The sensitive values appear as asterisks in the file.

As you enter text in a field, if the value being entered will cause the underlying YAML file to be corrupted, OO Designer shows a warning on the text field. If you select a different field at this point, the value will be reset to the previous value.

- 6. Repeat to add more system properties to the system properties file.
- 7. Click the **Save** 🖽 button in the **Authoring** pane.

8. Click **Show as Text** to display the system properties file information in YAML code and click **OK** to close.

Manage individual system properties

- 1. To edit a System Property:
 - a. Open a system properties file containing it, and then double-click the cell you want to edit.

You can use the **Tab** key to move between cells in a row.

company ×					
Identifier	Name		Value		Sensitive
domain	domain		bcompany.com		
hostname	hostname		host		
port		port		25	
system_address	system_address		test@test.com		
hr_address	hr_address		test@test.com		
4					۰.

- b. After making changes, click the **Save** 🖽 button in the **Authoring** pane.
- 2. To delete a **System Property** from within a system properties file:
 - a. Click on the system property row to select.
 - b. Click the **Delete** button.
 - c. Click the **Save** 🖽 button in the **Authoring** pane.

Note: If you delete a system property that is used in a flow, this system property will still be shown as selected in the flow. You need to replace this in the flow.

Debug the Flow

To debug the a Flow, perform the following steps:

- 1. Open an existing Flow from the project pane or from an imported Content Pack.
- 2. Click or inverted **Debug** text to expand the Debugger pane. testflow 🗶 🖪 📳 👘 🏹 8 🏱 🖉 🖞 🗸 🖧 Graph ? ? string_equals (i) > 8 +SUCCESS SUCCESS first_string () Debug ▼ </>></>> [C] 'a' second_string **(i)** ▼ </>></>> [C] 'ab' string_equals Ø FAILURE ignore_case ▼ </>></> [C] 'false sleep **Default Failure** ? Inputs Outputs
- 3. Click Start [>] or press Alt + F11 in the keyboard to begin the debug process.

Note: The start debug icon is disabled for an invalid flow. A relevant message is also displayed when pointing the cursor on the Debug icon.

Note: The debugging of Operations, Decisions, and System Properties are not enabled in this version.

In the multi-author environment:

- A user can debug multiple flows at the same time.
- A user cannot debug the same flow while it is still in the debugging process.
- Multiple users connected to one Designer can debug the same flow in their work-spaces.

- 4. Click Cancel U or press Alt + F12, if you want to cancel the debug process.
- 5. After debugging the flow, you can view the outputs and results of the flow in a **Run Tree** pane as displayed in the following example image.



The following icons are displayed in the Run Tree pane to indicate the status of a debug process:

lcon	Description
0	Flow is currently in debugging process
8	Failure result
0	Success result
Θ	Debug canceled or terminated abruptly
*	Runtime exception
8	Custom result

6. Select any node in the **Run Tree** to check the context of that step in the **Context Inspector**. The following image displays the *input*, *output*, and *flow variables* for *sleep* node.

秔 Debug	?
\triangleright	
▼ 🕑 debug_test (2s)	
😣 string_equals (Os)	
Sleep (2s)	
SUCCESS	*
品 sleep Inputs ⑴	~
seconds 2	
Outputs	\sim
N/A	
Flow Variables (1)	\sim
flow_input_0 s	

Create and Deploy a Content Pack

When you have finished authoring your content, you can export it as a content pack.

What is a content pack? A content pack is the outcome of your project. It is collection of valid flows, decisions, operations, and system properties. It is packaged as a .jar file that is ready to be deployed in OO Central or imported as a dependency into OO Designer.

Get the project ready to be exported to a content pack

- 1. Make sure that you have saved all changes in the workspace.
- 2. Check that the content in the project is valid and that there are no errors.

Before exporting your content to a content pack, it is strongly recommended to check that your flows are valid. If the project contains invalid flows, decisions, operations, or system properties, a warning message is displayed, listing the number of invalid items that will be excluded from the content pack. If this occurs, it is recommended to fix the errors and then to try again as invalid content will **not** be exported. For details, see "Validate Flows" on page 433.

Download a project as a content pack

- 1. In the **Projects** pane, select the project from which you want to create a content pack.
- Click the arrow next to the Create Content Pack ⁽¹⁾ button and select Download as content pack.

Note: The Create Content Pack 🗇 button is only enabled when a project is selected.

If there are unsaved editors open, the Save Changes dialog box gives you the option to save the changes. Click **Save All** to save all changes in the open editors.

- 3. OO Designer validates the project before creating a content pack. If the project contains invalid flows, operations, or system properties, these are not included.
- 4. In the dialog box, enter the content pack version number.

Note: Version numbers can be a maximum of 50 characters long. Make sure that the version number does not include invalid characters, such as: V:*?"<>|

5. Click **Download** to download the content pack locally.

Download as content pack			0 ×
Project Name:	test		
*Content Pack Version:	1.0.x		
Content Pack Name:	test-cp-1.0.x.jar		
		Close	Download

If there is invalid content in the project, the dialog box displays a warning that there are invalid items, which will not be packed inside the content pack.

Create a content pack and deploy it to OO Central

Note: To do this you must have the Manage Content permission in OO Central.

- 1. In the **Projects** pane, select the project from which you want to create and deploy a content pack.
- 2. Click the arrow next to the Create Content Pack ^(C) button and select Deploy as content pack to OO Central.

Note: The **Create Content Pack** button is only enabled when a project is selected.

If there are unsaved editors open, the Save Changes dialog box gives you the option to save the changes. Click **Save All** to save all changes in the open editors.

- 3. OO Designer validates the project before creating a content pack. If the project contains invalid flows, decisions, operations, or system properties, these are not included.
- 4. In the dialog box, enter the content pack version number.

Deploy as content pack to OO Cent	al	@ ×	,	
Project Name:	test			
*Content Pack Version:	1.0.0			
Content Pack Name:	test-cp-undefined.jar			
*OO Central URL:	protocol://hostname:port/oo			
OO Central credentials (only available for HTTPS connections):				
Username:				
Password:				
	Close	Deploy		

Note: Version numbers can be a maximum of 50 characters long. Make sure that the version number does not include invalid characters, such as: V:*?"<>|

- 5. Enter the URL of OO Central.
 - If the URL uses the HTTP protocol, a warning message displays that HTTPS is recommended, for security reasons. The OO Central Username and Password credential

fields are disabled. However, you are still able to deploy the content pack. The validation only checks the format of the URL, not its existence. The format should be: cprotocol>://<hostname>:<port>/oo.

- If the URL uses the recommended HTTPS protocol, the OO Central **Username** and **Password** credential fields are enabled for inputs.
- 6. Enter the OO Central **Username** and **Password** credentials, and then Click **Deploy**.

If there is invalid content in the project, the dialog box displays a warning that there are invalid items, which will not be packed inside the content pack.

If the operation fails before the deployment to Central, for example, during the creation of the content pack, an error is displayed in the dialog box.

If the operation fails during the deployment in Central, the list of problematic items is shown in the dialog box.

Deployment failed ×
Deployment of the content pack: rtrttr-cp-1.0.0.jar to OO Central: http://myd-vm17476.hpeswlab.net:7005/oo failed
Missing 'operation'/'flow' with ID operations.send_mail_java, which is required by the 'flow': 'Library/tytuui/rrrr.sl'.
Missing 'operation'/'flow' with ID operations.equals, which is required by the 'flow': 'Library/tytuui/rrrr.sl'.
Missing 'operation'/'flow' with ID operations.less_than_percentage, which is required by the 'flow': 'Library/tytuui/rrrr.sl'.
Missing 'operation'/'flow' with ID operations.send_mail_java_no_result, which is required by the 'flow': 'Library/tytuui/rrrr.sl'.
Missing 'operation'/'flow' with ID decisions.compare, which is required by the 'flow': 'Library/tytuui/rrrr.sl'.
Click to download the content pack
Close

You can still download the content pack locally by clicking Click to download the content pack.

7. If the content pack is deployed successfully to OO Central, you can also click **Click to download the content pack**.

Note: If you are deploying to OO Central using a HTTPS URL, and the Central server certificate is not trusted, a dialog box opens showing the certificate details. The deployment

process starts only if you approve the certificate.

How to use CloudSlang files created outside OO Designer in OO Designer

Before importing CloudSlang content to OO Designer, you need to create a content pack.

You can also create content packs with OO Shell for Authoring (OOSHA) and use it in OO Designer as a dependency if it is has a CloudSlang content. After running OOSHA, you import the content pack to OO Designer; the content pack then appears in the Dependencies section on the lower left. For details, see the relevant documentation.

Note: Before creating the content pack, it is recommended to run the build tool in CloudSlang. The build tool validates the content so it doesn't fail during import to OO Designer.

1. Create a folder with the name of your content pack, and create the folder structure inside it, as follows:

<Content Pack folder name>\Content\Library

<Content Pack folder name>\Lib

- 2. Place your CloudSlang content in the **Library** folder. You can organize it into sub-folders inside the **Library** folder.
- 3. Create a text file and name it **contentpack.properties**.
- 4. Add the following properties to the file:

content.pack.name=slang-content-master content.pack.version=1.0.0 content.pack.description=HP 00 slang-content-master content.pack.publisher=00

5. Store the **contentpack.properties** file at the top level of the content pack folder, at same level as the **Content** and **Lib** folders.



6. Create a .jar file from the content pack folder.

Note: You can do this using any tool that creates zip files. Create the file as a **zip** file and rename the suffix to **jar**.

7. Continue with the steps in Import content packs to the workspace.

Keyboard Shortcuts for OO Designer

To enhance productivity and accelerate navigation and common repetitive actions, OO Designer offers keyboard shortcuts as alternatives to clicking buttons and selecting options in the UI.

The main operation key for shortcuts is Alt, together with one letter.

Tip: Print this section for easy access to the keyboard shortcuts.

Global	
Click OK	Enter
Click Cancel	Esc
Projects Pane	
Open the selected tree node in the Authoring pane	Enter
Copy the selected tree node	Ctrl + C
Paste the selected tree node	Ctrl + V
Delete the selected tree node	Delete
Create a new project	Alt + P
Create a new folder	Alt + L
Create a new flow	Alt + W

Global	
Create a new system property	Alt + S
Create a content pack	Alt + C
Dependencies Pane	
Import a content pack	Alt + I
Graph Pane	
Copy a selected step	Ctrl + C
Cut a selected step	Ctrl + X
Paste a selected step	Ctrl + V
Debug Pane	
Start debug	Alt + F11
Cancel debug	Alt + F12

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