Hewlett Packard
Enterprise

Cloud Service Automation

Software Version: 4.60
Windows ® and Linux operating systems

Cloud Service Management Console Help

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Contents

Welcome to Cloud Service Automation

HPE Cloud Service Automation (CSA) orchestrates the deployment of infrastructure compute resources and complex multi-tier application architectures. CSA integrates and leverages the strengths of several HPE data center management and automation products, adding resource modeling, service offering design, service design, and a self-service customer portal to create a comprehensive service automation solution. CSA integrates with number of popular cloud providers such as AWS, OpenStack, and VMWare vCenter, as well as open source configuration management tools, such as Chef and Puppet allowing hybrid, multi-tier service topologies.

The Cloud Service Management Console help is designed to answer questions you may have while using the Cloud Service Management Console. For information about CSA concepts, see the *Cloud Service Automation Concepts Guide*. For information about installation and initial configuration of CSA, see the *Cloud Service Automation Installation Guide* and the *Cloud Service Automation Configuration Guide*.

Based on your role, specific areas of the Cloud Service Management Console are available to you.

CSA Roles

Provider Organization Roles

Provider organization roles authorize members to perform specific tasks, access specific parts of the Cloud Service Management Console, and are typically configured by the CSA Administrator.

- **Administrator** - The Administrator has access to all functionality in the Cloud Service Management Console.
- **Consumer Service Administrator** - The Consumer Service Administrator configures and manages consumer organizations.
- **Resource Supply Manager** - The Resource Supply Manager creates and manages cloud resources, such as resource providers and resource pools.
- **Service Business Manager** - The Service Business Manager creates and manages service offerings and service catalogs.
- **Service Designer** - The Service Designer designs, implements, and maintains service designs (also referred to as blueprints), component palettes, component types, component templates, and resource offerings.
- **Service Operations Manager** - The Service Operations Manager views and manages subscriptions and service instances.

Consumer Organization Roles

The Marketplace Portal supports the following roles:

- **Consumer Organization Administrator** - The Consumer Organization Administrator can do the following:
  - Create, edit, and delete catalogs for your organization.

  - Manage service offerings in your organization's catalogs.

- Manage access control, approval policies, and categories for catalogs in your organization.

- Manage user's subscriptions in your organization by performing actions on a subscription *on behalf of* the original subscriber.

- Use HPE IT Business Analytics to measure and optimize the cost, risk, quality and value of IT services and processes.

- **Service Consumer** - The service consumer can subscribe to and manage service offerings, manage service subscriptions, and perform actions on service instances.

CSA Functions

Use the initial dashboard view to navigate to the area of the Cloud Service Management Console where you can complete your tasks.

To navigate to and from views in CSA:

- Click **Cloud Service Automation** in the title bar to return to the dashboard.
- Click the grid icon in the title bar to directly launch a certain application from My Applications in the Cloud Service Management Console. The list of applications will be customized, based on your role and permission.

Depending on your role, the following areas and functionality are available to you:

Organizations	
Summary	Manage organizations.
Details	**General Information** - Customize an organization. **Portal Customization** - Customize the Marketplace Portal. **Dashboard Widgets** - Customize widgets for the Marketplace Portal. **LDAP** - Configure LDAP for an organization. **Access Control** - Configure membership to predefined roles. **Email Notifications** - Configure the mail server used to send email notifications and some email source settings. **Operations** - Configure operational settings for your organization. **Catalogs** - View the catalogs associated with an organization.
Role Access	Administrator, Consumer Service Administrator, Consumer Organization Administrator

Providers	
Summary	Manage providers.
Details	**Providers** - View, create, or edit a provider, associate or dissociate providers with an environment, view or edit properties of a provider, associate or dissociate offerings with a provider, associate or dissociate environments with a provider, manage custom provider

Providers	
	properties, manage provider types, manage environments, and manage resource pools.
Role Access	Administrator, Resource Supply Manager

Designs	
Summary	Manage service designs, components, and resource offerings for designs.
Details	**Service Designs** **Sequenced Designs** - View, create, edit, copy, import, export, or delete a service design, components, and resource offerings. **Topology Designs** - View, edit, copy, import, export, publish, test or delete a service design, components, profiles, and palettes.
Role Access	Administrator, Service Designer

Offerings	
Summary	Manage service offerings.
Details	View, create, edit, import, export, or delete service offerings. Configure options and pricing for service offerings. Associate documents and screenshots with service offerings. Create new versions of service offerings. Publish and unpublish service offerings.
Role Access	Administrator, Service Business Manager

Catalogs	
Summary	View, create, edit, import, export, or delete service catalogs and publish service offerings to the Marketplace Portal.
Details	**Overview** - Customize a catalog. **Access Control** - Configure who can access a catalog. **Approval Policies** - Add or edit an approval policy. **Categories** - Create, edit, or delete categories. **Offerings** - View service offerings by category, publish or unpublish service offerings to a category, or edit the approval process or policy for a service offering. **Environments** - View or select an environment for a catalog.
Role Access	Administrator, Service Business Manager

Operations	
Summary	View and manage subscriptions and service instances for all consumer organizations.
Details	- View user subscriptions for an organization - View subscriptions for a user - Transfer subscriptions

Operations	
	• Cancel subscriptions • View topology for a subscription • View providers for a subscription
Role Access	Administrator and Service Operations Manager

Cloud Analytics	
Summary	Integrate with HPE IT Business Analytics.
Details	If integration is configured, a place to view scorecards and dashboards so that Resource Supply Managers and Service Business Managers have insight into how to measure and optimize the cost, risk, quality and value of IT services and processes.
Role Access	Administrator, Resource Supply Manager, and Service Business Manager

Orchestration	
Summary	Integrate with Operations Orchestration.
Role Access	Administrator, Consumer Service Administrator, Resource Supply Manager, Service Business Manager, Service Designer, and Service operations Manager

Cloud Transformation	
Summary	Integrate with HPE Enterprise Maps.
Role Access	Administrator, Service Designer, and Business Service Manager

Custom	
Summary	Optional area for accessing customized content.
Details	If enabled, displays content that is customized for this instance of the Cloud Service Management Console (for information on how to enable this area, see the *Cloud Service Automation Configuration Guide.*
Role Access	All provider roles (Consumer Service Administrator, Administrator, Resource Supply Manager, Service Business Manager, Service Designer, Service Operations Manager)

Managing the Software License

You can use the Cloud Service Management Console to view, add, or remove software licenses if you are logged in as Administrator (other users can view licensing information, but cannot add or remove software licenses). CSA licensing is based on the number of operating system instances (OSIs) being used in current, active subscriptions. You can add more licenses at any time to increase your OSI capacity.

When users log into the Cloud Service Management Console, a licensing status banner will appear in the following situations:

> **Note:** Expiration information is displayed only for the trial license.

- The trial license is the only valid license. The banner displays the number of days remaining on the trial license.

- When you upgrade your product, a banner displays the number of days remaining on the trial license.

- The trial license has expired, there is no valid license, and you have exceeded the allowed number of operating system instances. The banner informs you that you have exceeded the allowed number of licenses.

- The trial license has expired, and there is no valid license. The banner displays the number of operating system instances allowed for an unlicensed version of the software. Any existing subscriptions will continue to work normally, except that flex up operations on existing subscriptions will not be supported.

- One or more valid licenses are installed, and you have exceeded the allowed number of operating system instances. The banner displays the number of active operating system instances by which you are exceeding the allowable license count.

The banner information updates when you refresh your view, log into the Cloud Service Management Console, or navigate to a new section of the Cloud Service Management Console by clicking a tile in the Dashboard.

You must be logged in as Administrator to access the software licensing area and add and remove licensing.

> **Note:** The **Manage Software License** dialog box cannot be viewed in areas of the product that use Flash Player. It is recommended that you open the dialog box from the Dashboard.

Tasks

To perform the following tasks, go to the Cloud Service Management Console masthead, click the arrow next to the user name, and select **Licensing**.

- **View the following information about your software license:**
  - Cumulative count of purchased operating system instances.

  - Current number of operating system instances being used in CSA active subscriptions.

  - Current license key(s).

- **Add a license:**
  - When you add a new license (one that is not a trial license), existing subscriptions will not be affected. If you exceed your OSI limit, a banner displays the number of active operating system instances by which you are exceeding the allowable license count.

- **Delete a license:**
  - When you delete a license (one that is not a trial license), a banner displays the number of operating system instances allowed. Any existing subscriptions will continue to work normally, except that flex up operations on existing subscriptions will not be supported.

  - You cannot delete the trial license.

Organizations

In the Cloud Service Management Console, use the **Organizations** tile to manage organizations. This includes the configuration of CSA integration to LDAP for authentication and access control. It is also where you configure customizations to the Marketplace Portal for each organization. From this section, in the upper left corner, you can view the total number of organizations created, including the provider organization.

Informational Icons

Icon	Description
((•))	When this icon is adjacent to an organization, it indicates the provider organization. There can be only one provider organization and it is automatically configured. You can modify the provider organization, as needed. You cannot delete the provider organization.
	When this icon is adjacent to a catalog, it denotes the global catalog. There can be only one global catalog and it is visible to all organizations. You may modify the global catalog, as needed. However, you cannot delete it.
∗	Indicates the field is required, and you must enter information in order to successfully complete the organization's configuration.

What are Organizations?

An organization determines a member's entry point into the cloud system and associates its members with services and resources. An organization can be a company, business unit, department, or group.

Membership in an organization is determined by the organization's LDAP (Lightweight Directory Access Protocol) directory. When a user logs in to the Cloud Service Management Console or Marketplace Portal, LDAP authenticates the login credentials by verifying that the user name and password match an existing user in the LDAP directory. The LDAP server used to authenticate users to the Cloud Service Management Console or Marketplace Portal must be set up and configured before authorization can be given to specific roles within CSA. See the *Cloud Service Automation Configuration Guide* for more information.

Configuring the organization's LDAP setting is done in the LDAP tab.

Authorization or abilities of a member of an organization (such as creating a service design or managing cloud resources) are determined by predefined roles in CSA that require assigning group DNs in the LDAP directory. Membership to these group DNs in LDAP automatically gives permission to that role in CSA. These permissions are assigned in the **Access Control tab** for the organization.

There are two types of organizations in CSA:

- **Provider Organization** - The provider organization hosts CSA, manages consumer organizations, and manages resources and services, including those offered by third-party or public clouds.

  Using the Cloud Service Management Console, members of the provider organization can create one or more consumer organizations, manage configured organizations, and manage resources and services (such as designing, offering, and publishing resources and services for consumption).

The organizations, resources, and services that can be managed are determined by the role(s) assigned to the members of the provider organization. For example, the CSA Administrator manages all organizations, resources, and services, while the Consumer Service Administrator manages only consumer organizations. Additional roles include the Resource Supply Manager who manages resource providers and resource offerings, the Service Designer who manages service components and service designs, the Service Business Manager who manages service offerings and service catalogs, and the Service Operations Manager who manages subscriptions and service instances. All of these roles can be found in the Provider Organization's **Access Control** tab.

There is only one provider organization for each instance of CSA and it is automatically set up during installation. You can modify the provider organization, as needed. You cannot delete the provider organization.

- **Consumer Organization** - The consumer organization, using the Marketplace Portal, subscribes to or consumes the resources and services provided by the provider organization. There can be multiple consumer organizations configured by the provider organization. However, each consumer or subscriber sees only the information in the consumer organization of which he is a member. Membership to a consumer organization is determined by the LDAP configuration of the consumer organization.

  At installation, a single consumer organization is set up. Use the **Organizations** tile in the Cloud Service Management Console to modify this default consumer organization, as needed.

See "LDAP" on page 25 and the *Cloud Service Automation Configuration Guide* for more information about configuring LDAP for the provider and consumer organizations.

Create an Organization

For more information about organizations, see "What are Organizations?" on the previous page

To create an organization

Only consumer organizations may be created.

1. In the left navigation frame, click the **Create Organization** button.
2. Provide the following information:

Item	Description
Organization Name	A unique name that identifies the organization.

3. Click **Create**.
4. Configure the organization. See the following topics that describe how to provide information in the following areas:

   - "General Information" on page 20

   - "Portal Customization" on page 21

   - "Dashboard Widgets" on page 23

- "LDAP" on page 25

- "Access Control" on page 28

- "Email Notifications" on page 30

- "Operations" on page 31

- "Catalogs" on page 33

5. Additional steps might be required to configure the Marketplace Portal for this organization. Refer to the *Cloud Service Automation Configuration Guide* for more information.

View an Organization

For more information about organizations, see "What are Organizations?" on page 17

This summary view shows each of the basic areas of configuration for an organization, including which areas need configuration and which have already been configured.

To view an organization

1. In the left navigation frame, select the organization.
2. In the organization's navigation frame, select **Summary** to view a summary of the organization. Select any of the other sections to view more detailed information.

Configure an Organization

For more information about organizations, see "What are Organizations?" on page 17

To configure an organization

1. In the left navigation frame, select the organization.
2. In the organization's navigation frame, select a section in which you can configure information about the organization.

Summary

View a summary of the selected organization's configuration. To configure or update this information, in the organization's navigation frame, select the appropriate section such as Portal Customization, LDAP, Access Control, or Email Notifications.

Viewable Summary Information

Section	Displayed Summary Information
Portal Customization	Application Name- The name of the organization that appears in the Marketplace Portal. This section is not available to the provider organization.
LDAP	• Hostname - The hostname used to connect to the LDAP server. This can be the fully qualified domain name of the server, the IP address, or the hostname needed for the CSA server to resolve the host where the LDAP service is running. • Port - The port used to connect to the LDAP server.
Access Control	• List of roles - Roles in the organization to which group DNs can be assigned.
Email Notifications	• Sender Email Address - Email address that appears as the sender of email notifications. • Port - The port used to connect to the mail server when sending email notifications.

General Information

General information appears at the top of the organization's page in the Cloud Service Management Console. To change the appearance of the Marketplace Portal, click the **Portal Customization** section (see "Portal Customization" on the next page).

For more information about organizations, see "What are Organizations?" on page 17

To configure general information about an organization

1. In the organization's navigation frame, select **General Information**.
2. Provide or update the following information:

Item	Description
Organization Identifier	A unique name that CSA assigns to the organization. For a consumer organization, this name is based on the name entered when the organization was created. This identifier is used in the URL used to access the Marketplace Portal, as seen in the next field. See the *Cloud Service Automation Configuration Guide* for more information.
Organization URL	A URL for connecting to the Marketplace Portal for the organization.
Organization Display Name	A unique name that identifies the organization. If you change the **Organization Display Name** of the out-of-the-box consumer organization (CSA Consumer), then you must also update the `seededorgs.properties` file. For more information, see the "Configure Seeded Authentication" section in the *Cloud Service Automation Configuration Guide*.

Item	Description
Description	A description of the organization.
Organization Logo	An image that represents the logo of the organization. The logo may appear in the following locations: • The **Cloud Service Management Console** - Top left of an organization's page. • The **Marketplace Portal** - Top left of the login screen and top left of each portal page. From the **Select Image** screen, 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.

3. Click **Save**.

Portal Customization

For more information about organizations, see "What are Organizations?" on page 17

Portal customization allows you to customize an organization's Marketplace Portal.

> **Note:** This section is not available to the provider organization.

To customize the Marketplace Portal

1. In the organization's navigation frame, select **Portal Customization**.
2. Provide or update the following information for portal customization:

Application Labeling

Item	Description
Application Name	Type a name that displays on the login screen and header of your organization's Marketplace Portal.
Portal Welcome Message	Type a welcome message that displays below the Application Name when a user logs into your organization's Marketplace Portal.
Copyright Statement	Type a copyright statement that displays on the login page below the Log In button of your organization's Marketplace Portal.

External Organization Links

Item	Description
Privacy Statement Link	Type the link to your organization's privacy statement that appears on the login page below the copyright statement.
Show Privacy Statement on Marketplace Portal	Check the box to display the privacy statement link on the login page of your organization's Marketplace Portal.
Terms and Conditions Link	Type the link to your organization's terms and conditions statement that appears when a subscriber is ordering a service.
Show Terms and Conditions on Marketplace Portal	Check the box to display the terms and conditions link when a subscriber is ordering a service.

Application Enhancements

Item	Description
Featured Category	Select a featured category to use when displaying service offerings in the Marketplace Portal. Service offerings in this category will display in the Featured Services tile of the Marketplace Portal.
Subscription End Date Options	• **Allow Recurring Subscriptions** - Check the box to allow recurring subscriptions, rather than requiring all subscriptions to be term subscriptions. • **Max Term Subscription Period (months)** - Select the maximum number of months (between 1 and 12) allowed for term subscriptions. When subscribers request a term subscription, they will not be able to specify an end date that is more than this number of months past the start date. For example, if the subscriber selects a requested start date of June 15 2014, and **Max Term Subscription Period (months)** is set at its default value of 12, the requested end date cannot be later than June 14, 2015. This setting has no impact on recurring subscriptions.
History Details	Select the **Show Verbose Errors** box to display the status of the actions executed during the lifecycle of a service.

Themes

Item	Description
Theme	Select a theme or type the name of a customized theme for your organization's Marketplace Portal. Themes define colors, fonts and the general look-and-feel of the Marketplace Portal. The following themes are shipped out-of-the-box: • HPE Simplified • HPE Enterprise • HPE Playful • Custom - Select **Custom**, and type a custom theme name in the text box. This name must match the name used to create the custom theme outlined in the guidelines for creating a custom theme. See the "Custom Themes" section in the *Customizing the*

Themes, continued

Item	Description
	Marketplace Portal guide for specific information about configuring a custom theme.

Security Settings

Item	Description
Security Classification	Select from the following security banner options: **No Banner** - no banner displays in the Marketplace Portal. **Unclassified** - The banner is light green and contains no content. **Unclassified FOUO** - For official use only. The banner is light green and displays the text "FOUO." **Unclassified NOFORN** - Not releasable to foreign nationals. The banner is light green and displays the text "NOFORN." **Confidential** - The banner is light blue and displays the text "CONFIDENTIAL." **Confidential FOUO** - The banner is light blue and displays the text "CONFIDENTIAL-FOUO." **Confidential NOFORN** - The banner is light blue and displays the text "CONFIDENTIAL-NOFORN." **Secret** - The banner is red and displays the text "SECRET. **Top Secret** - The banner is orange and displays the text "TOP SECRET."
Disclaimer	Type text for the disclaimer for your organization's Marketplace Portal. The disclaimer appears on the login page of the Marketplace Portal.

3. Click **Save**.

Dashboard Widgets

For more information about organizations, see "What are Organizations?" on page 17

Create and edit custom tiles for your organization's Marketplace Portal dashboard. These tiles appear only in the **Discover More** section of the Marketplace Portal.

> **Note:** This section is not available to the provider organization.

To create or update dashboard widgets

1. In the organization's navigation frame, select **Dashboard Widgets**.

2. To create a widget, click a button listed in the following table. Or click **edit** for the item you want to update. The edit and disable buttons are only visible when you select or hover over the widget.

3. Provide or update the following information:

Button	Description
Add Link	Provide or change the following: • Name - The name associated with this link in the Cloud Service Management Console. • Title - The text that displays for the link in the Marketplace Portal. • URL - The URL that the link references in the Marketplace Portal. • Icon URL - The URL of an icon that displays near the center of the widget in the Marketplace Portal. • Background Image URL - The URL of an image that fills the background of the widget in the Marketplace Portal. • Target - The target attribute of the `<link>` element that appears in the Marketplace Portal and that controls the browser window in which the link will open. Valid values for the target attribute are defined in the HTML specification.

Add Mashup	Provide or change the following:
	
	• Name - The name associated with this widget in the Cloud Service Management Console.
	
	• Content - The HTML and JavaScript code for the mashup.
	
	When using iFRAME in a mashup widget, note the following:
	
	• iFrames that serve HTML pages that have the same URL structure as the Marketplace Portal will work properly. The same URL structure means that the pages are placed in the following directory:
	
	`%CSA_HOME%\portal\node_modules\mpp-ui\dist`
	
	For example, to correlate to the following URL structure:
	
	`https://server:8089/widgets/sample/index.html`
	
	You would place your pages in the following location:
	
	`%CSA_HOME%\portal\node_modules\mpp-ui\dist\widgets\sample\index.html`
	
	• iFrames that serve external NON-HTTPS content will be blocked by the browser. The specific error will vary based on client browser security.
	
	• iFrames that serve external HTTPS content that contains mixed HTTP and NON-HTTPS content will be blocked by the browser. The specific error will vary based on client browser security.
	
	• iFrames that serve external HTTPS content will work only if the following are true:
	    • The remote site must not specify `x-frame-options` DENY in the response header.

Button	Description
	• If the content is not of the same origin domain, and the remote site has not `specified` `x-frame-options SAMEORIGIN`, the content will display properly.
Add Featured Service	Adds a tile to the Marketplace Portal dashboard that contains a random service offering in the featured category configured for your organization. Provide or change the following: • Name - The name associated with this widget in the Cloud Service Management Console.

LDAP

LDAP (Lightweight Directory Access Protocol) used by CSA is configured in the Cloud Service Management Console.

LDAP is used to:

- Authenticate a user's login to the Cloud Service Management Console or Marketplace Portal
- Authenticate a user's access to information
- Authorize a user's access to information

To completely configure access to CSA, you must configure LDAP to authenticate a user's login, configure LDAP for an organization to authenticate a user's access to information, and configure access control for an organization to authorize a user's access to information.

From this page you can:

- Configure LDAP for authentication to log in to CSA.
- Configure LDAP to access information in CSA.

When you configure LDAP for the provider organization, you are configuring the set of users who can log in and be authenticated to perform actions in the Cloud Service Management Console. And, when you configure LDAP for the consumer organization, you are configuring the set of users who can log in and be authenticated to perform actions in the Marketplace Portal.

To configure authorization to access information in CSA for organizations, see .

For more information about organizations, see

To configure LDAP

> **Note:** If you are configuring CSA to be compliant with FIPS 140-2, configure CSA for FIPS 140-2 compliance before configuring this item. Refer to the *Configure HPE CSA for FIPS 140-2 Compliance* section of the *Cloud Service Automation Configuration Guide* for more information.

1. In the organization's navigation frame, select **LDAP**.
2. Provide or update the following information:

   > **Note**: The LDAP configuration fields are unavailable for editing when the `csa.ldapReadOnly`

property is enabled. For information about the property, see the *Cloud Service Automation Configuration Guide*. For information about the LDAP Configuration Tool, used to configure the LDAP access point from the command line, see the *Cloud Service Automation LDAP Configuration Tool* guide.

LDAP Server Information

Configure the LDAP server and a user with access to the server.

Item	Description
Hostname	The fully-qualified LDAP server domain name (server.domain.com) or IP address. Example: `ldap.xyz.com`
Port	The port used to connect to the LDAP server (by default, 389). Example: `389`
Connection Security	If the LDAP server is configured to require ldaps (LDAP over SSL), select the **SSL** checkbox.
Base DN	Base distinguished name. The Base DN is the top level of the LDAP directory that is used as the basis of a search. Example: `o=xyz.com`
User ID (Full DN)	The fully distinguished name of any user with authentication rights to the LDAP server. If the LDAP server does not requre a User ID or password for authentication, this value can be omitted. Example: `uid=admin@xyz.com,ou=People,o=xyz.com`
Password	Password of the User ID. If the LDAP server does not requre a User ID or password for authentication, this value can be omitted.

LDAP Attributes

Enter the names of the attributes whose values are used for email notifications, authentication, and approvals in CSA.

Item	Description
User Email	The name of the attribute of a user object that designates the email address of the user. The email address is used for notifications. If a value for this attribute does not exist for a user, the user does not receive email notifications. Default: `mail`
Group Membership	The name of the attribute(s) of a group object that identifies a user as belonging to the group. If multiple attributes convey group membership, the attribute names should be separated by a comma. Default: `member,uniqueMember`
Manager Identifier	The name of the attribute of a user object that identifies the manager of the user.

Item	Description
	Default: `manager`
Manager Identifier Value	The name of the attribute of a user object that describes the value of the Manager Identifier's attribute. For example, if the value of the Manager Identifier attribute is a distinguished name (such as `cn=John Smith, ou=People, o=xyz.com`) then the value of this field could be `dn` (distinguished name). Or, if the Manager Identifier is an email address (such as `admin@xyz.com`) then the value of this field could be `email`. Default: `dn`
User Avatar	LDAP attribute whose value is the URL to a user avatar image that will display for the logged in user in the Marketplace Portal. If no avatar is specified, a default avatar will be used.

User Login Information

CSA uses a user search-based login method to authenticate access to information.

Item	Description
User Name Attribute	The name of the attribute of a user object that contains the username that will be used to log into the Cloud Service Management Console or Marketplace Portal. The value for this field can be determined by looking at one or more user objects in the LDAP directory to determine which attribute consistently contains a unique user name. Often, you will want a **User Name Attribute** whose value in a user object is an email address. Examples: `userPrincipalName` or `sAMAccountName` or `uid`
User Search Base	The location in the LDAP directory where users' records are located. This location should be specified relative to the Base DN. If users are not located in a common directory under the Base DN, leave this field blank. Examples: `cn=Users` or `ou=People`
User Search Filter	Specifies the general form of the LDAP query used to identify users during login. It must include the pattern `{0}`, which represents the user name entered by the user when logging in to the Cloud Service Management Console or Marketplace Portal. The filter is generally of the form `<attribute>= 0}`, with `<attribute>` typically corresponding to the value entered for **User Name Attribute**. Examples: `userPrincipalName={0}` or `sAMAccountName={0}` or `uid={0}`
Search Option (Search Subtree)	When a user logs in to the Cloud Service Management Console or Marketplace Portal, the LDAP directory is queried to find the user's account. The **Search Subtree** setting controls the depth of the search under **User Search Base**. If you want to search for a matching user in the **User Search Base** and all subtrees under the **User Search Base**, leave the **Search Subtree** checkbox selected. If you want to restrict the search for a matching user to only the **User Search Base**, excluding any subtrees, unselect the **Search Subtree** checkbox.

3. Click **Save**.

Example LDIF Content Record

The following is a sample LDIF (LDAP Data Interchange Format) content record that shows the `uniqueMember` group membership attribute being used to define users `cn=User1,ou=providers,ou=users,ou=system` and `cn=Manager1,ou=managers,ou=users,ou=system` as members of the group `cn=ResourceSupplyManagers,ou=providergrp,ou=groups,ou=system`.

```
dn: cn=ResourceSupplyManagers,ou=providergrp,ou=groups,ou=system
objectclass: groupOfUniqueNames
objectclass: top
cn: ResourceSupplyManagers
uniqueMember: cn=User1,ou=providers,ou=users,ou=system
uniqueMember: cn=Manager1,ou=managers,ou=users,ou=system
```

To assign this group or DN to the Resource Supply Manager Role, go to the Access Control section of the Organizations area and add the `cn=ResourceSupplyManagers,ou=providergrp,ou=groups,ou=system` DN to the Resource Supply Manager role.

Look Up User

The **Look Up User** button allows for the displaying of common LDAP attribute values for a specified user. Also, this button validates the User Login Information (User Name Attribute, User Search Base, and User Search Filter).

Provide the user name attribute value of a user to display that user's DN, common name, display name, email address, and manager.

The lookup also validates the User Name Attribute, User Search Base, and User Search Filter (if attribute information is displayed, these fields are correctly defined).

To look up a user

1. In the organization's navigation frame, select **LDAP**.
2. Provide all the required LDAP service access information.
3. Click **Save**.
4. Click **Look Up User**.
5. Provide the user name attribute value of a user to look up.
6. Click **Search**.

Access Control

Roles control what a user can access in CSA. For more information about available roles, see the *Welcome to Cloud Service Automation* topic in this help system. Adding a DN to the roles authorizes members of the LDAP directory organizational units access to the Cloud Service Management Console or Marketplace

Portal. If a user has access to the Cloud Service Management Console, a user may have access to one or more of the functional areas in the console. If a user has access to the Marketplace Portal, a user has access to all areas in the portal.

Access control allows you to add or remove directory service groups or organizational units (ou) to a CSA role by associating the ou's distinguished name (DN) to the desired role. Authenticated LDAP users, who are members of a group or organizational unit that is assigned to a predefined role, can perform specific tasks and access specific parts of the Cloud Service Management Console or access the Marketplace Portal.

Only members of a group or organizational unit are assigned to the role. To ensure secure role assignment, access control inheritance stops at the assigned organizational unit. This does not follow the traditional directory service pattern where inheritance flows down the organizational unit's hierarchy. Instead, assignments to roles must be assigned to individual organizational units (ou).

A group or organizational unit DN can be assigned to more than one role.

LDAP must be configured in order to authenticate users so that they can log in to the Cloud Service Management Console and Marketplace Portal. Refer to "LDAP" on page 25 for more information.

For more information about organizations, see "What are Organizations?" on page 17

To add a DN to a role

1. Locate the role to which you want to add a DN.
2. Below the role, click **Add DN**.
3. Provide the following information, and click **Save**:

   To select an existing named DN:

Item	Description
Select from existing named DNs	Select an existing named DN (that identifies a group or organizational unit DN) to add to the role. If there are no existing named DNs, this item is not selectable.

   To add a new named DN:

Item	Description
Enter a name for the group or organizational unit DN	Enter a name to identify the DN.
Enter a group or organizational unit DN	Enter the group or organizational unit DN to add to the role. This DN must be relative to the Base DN you configured in the LDAP section of this organization. If the base DN is empty, supply the full DN of the group.

To update a name or DN in a role

1. Locate the role whose DN you want to update.
2. Below the role, locate the DN you want to update.
3. Move your cursor over the DN and click the **Edit** button.

4. In the **Update DN** dialog, update the DN name and/or the DN.

5. Click **Update**.

To remove a named DN from a role

> **Note:** The named DN (group) is not deleted; instead, it is disassociated from the role. You will still see the group when you click **Add DN** and then click **Select from existing named DNs**.

1. Locate the role from which you want to remove a named DN.

2. Below the role, locate the group you want to remove.

3. Click the **Remove DN** icon.

4. Click **Yes**.

Email Notifications

An email notification is sent when there is a change to the subscription status, when a request needs to be approved or denied, or when a request has been approved or denied. The automatically-generated email message is sent to users who have been configured to receive notifications. The same email notification is also sent to the Marketplace Portal and can be viewed in the **Notifications** area of the Marketplace Portal. In order for these email notices to be sent, the SMTP Server Setting must be configured for the organization.

From the Email Notifications page, configure the SMTP server used to send email notifications. You can also configure the sender for the organization email notifications and text added to the beginning of the subject line of the notification.

For more information about organizations, see "What are Organizations?" on page 17

To configure the mail server for CSA

> **Note:** If you are configuring CSA to be compliant with FIPS 140-2, configure CSA for FIPS 140-2 compliance before configuring this item. Refer to the *Configure HPE CSA for FIPS 140-2 Compliance* section of the *Cloud Service Automation Configuration Guide* for more information.

1. In the organization's navigation frame, select **Email Notifications**.

2. Provide or update the following information:

   SMTP Server Settings

Item	Description
Hostname	The fully-qualified domain name (server.domain.com) or IP address of the SMTP-compliant mail server that acts as the gateway for email notifications.
Port	The port used to connect to the mail server when sending email notifications. The default SMTP port number of 25 should be changed only if your email server has been specifically configured using a non-standard port.

Connection Security

Item	Description
SSL	If the mail server is configured to require https (http over SSL), select the **SSL** checkbox.
Requires Authentication	If the mail server requires you to log in before accessing it, select the **Requires Authentication** checkbox and provide the following information: • **User ID**: User whose account is used to email notifications from the mail server. • **Password**: Password of the user account.

Email Source Settings

Item	Description
Sender Email Address	Email address to be used as the sender of the email notification.
Subject Prefix	Text added to the beginning of the subject line of the email notification.

Subscription Expiration Notification

Item	Description
Notification Before a Subscription Expires	From the drop-down list, select how far in advance a subscriber will be notified before a subscription expires.

3. Click **Save**.

Operations

The operations section allows you to configure operational settings and notifications for your organization.

> **Note:** This section is not available to the provider organization.

To configure operations settings for an organization

1. In the organization's navigation frame, select **Operations**.

2. Provide or update the following information and then click **Save**.

Item	Description
Provisioning Error Handling	Select one of the following: • **Fail Subscriptions On Provisioning Errors** - When an error occurs during provisioning, the configured Failure substate actions run, and the subscription is marked as Failed in both the Marketplace Portal and the Operations area of the Cloud Service Management Console. • **Pause Subscriptions On Provisioning Errors** - When an error occurs during provisioning, the provisioning process stops, and the subscription is marked as Pending

Item	Description
	in the Marketplace Portal and as Paused in the Operations area of the Cloud Service Management Console. You can troubleshoot the cause of the failure and then resume or cancel the paused subscription. For more information, see the topic "View Service Topology for a Subscription" in the Operations Help. **Note:** The resume behavior is different for subscriptions depending on how the underlying service design was created: • Most sequence based designs contain fine-grained lifecycle actions; therefore, the provisioning is able to resume from the specific lifecycle action that failed during deployment, and actions that have already succeeded are not repeated. • For topology designs, the behavior is always Fail Subscriptions on Provisioning Errors, regardless of the organization setting.
Paused Subscription Notifications	Select any of the following that apply: • **Notify Subscribers** - The first time a subscription is paused, subscribers receive an email message (as configured in "Email Notifications" on page 30 for the consumer organization), and a notification displays in the Marketplace Portal. • **Notify Operators** - Whenever a subscription is paused, operator users receive an email notification (as configured in "Email Notifications" on page 30 for the CSA-Provider organization).
Operator Users To Notify When Paused	This section lists the user names and email addresses of operator users who have been configured to be notified when a subscription is Paused. To add operator users to notify when a subscription is paused: 1. Click **Add Operator Users**, and do one of the following: • Select one or more operator users, which are members of the Service Operations Manager role as configured for the CSA-Provider organization in "Access Control" on page 28. This list shows users who have logged into the Cloud Service Management Console at least one time, are LDAP users, and are members of the Service Operations Manager role as configured for the CSA-Provider organization in "Access Control" on page 28. Note that if a user has logged in and has been recently added to the role, it may take 30 minutes (based on the default LDAP cache configuration value in the `csa.properties` file) for the user to appear in the selection list. If the user you want to add has not yet logged in to the Cloud Service Management Console or is recently added to the Service Operations Manager role, you can manually add the user by typing a user name, as described below. • Or, enter a user name manually by typing a user name in the text field. 2. Click **Save**.

Catalogs

View the catalogs that are associated with this organization. If you manage more than one organization, this view filters the catalogs you manage by organization. This is a read-only view.

The global catalog is visible to all organizations, including the provider organization.

Delete an Organization

For more information about organizations, see "What are Organizations?" on page 17

To delete an organization

Only consumer organizations may be deleted. In order to successfully delete a consumer organization, its catalogs must not contain any published service offerings.

1. In the left navigation frame, select the organization to delete.
2. In the organization's navigation frame, select **General Information**.
3. Click **Delete**.
4. In the **Delete Organization?** dialog, click **Yes** to delete the organization.

Providers

This topic contains the following sections:

- Concepts
- Tasks
- Best Practices

Concepts

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 Matrix Operating Environment 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 Matrix Operating Environment 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 the next page.

- **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 "Provider Overview" on page 36 for more information about configuring a provider.

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

Best Practices

🔒 Locked items cannot be deleted.

Components (Per Provider Type)

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

Concepts

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

Tasks

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	An image that displays for the provider type. 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.

Provider Overview

Concepts

For more information about resource providers, see "Providers" on page 34.

Tasks

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.

Item	Description
Service Access Point	Specify a URL for connecting to the provider. The following examples show how to connect to some common resource providers: • OpenStack (such as Helion OpenStack®) - `http://<OpenStack server IP>:5000` • Matrix OE - `https://<MOE server IP>:51443/hpio/controller/soap/<v1/v2/v3>` • Server Automation - `https://<SA server IP>:443` • SiteScope - `http://<SiteScope server IP>:8080` • Universal CMDB - `http://<UCMB server IP>:8080` • VMware vCenter - `https://<vCenter server IP>:443` • Chef - `https://<Chef Server IP>:443` 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

Concepts

For more information about resource providers, see .

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
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 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.

Item	Description
	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.
	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

Concepts

For information about resource providers, see "Providers" on page 34.

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

Concepts

For information about resource providers, see "Providers" on page 34.

> **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.

Resource Pools

Concepts

For more information about resource providers, see "Providers" on page 34.

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 Matrix Operating Environment 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. The process definitions available in the list are process definitions that have been imported using the process definition tool with the access point type of RESOURCE_POOL_SYNC. For instructions about how to do this, see the section "Import HPE Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*. 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.

Overview for a Resource Pool

Concepts

For more information, see "Resource Pools" on the previous page.

Tasks

- **Edit a resource pool** - Click the gear icon and select **Edit**. See the table in "Resource Pools" on the previous page 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

Concepts

For more information about resource pools, see "Resource Pools" on page 40.

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.
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. See "Resources for a Resource Pool" on the previous page for a list of resources and their associated units of measurement. 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**. See "Resources for a Resource Pool" on the previous page for a list of resources and their associated units of measurement. **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)

Concepts

For information about resource providers, see "Providers" on page 34.

> **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.

Environments

This topic contains the following sections:

- Concepts
- Tasks
- Best Practices

Concepts

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.

Best Practices

🔒 Locked items cannot be deleted.

Manage Environments

Tasks

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.

Item	Description
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 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.

Designs

Use the **Designs** area of the Cloud Service Management Console to manage service designs, which are the recipes for automating the cloud. You can create the following types of designs:

- **Sequenced Design** - Sequenced designs specify directed execution of service component lifecycles. Use sequenced designs for complex services and services that rely on run book automation, such as integrations with legacy data center systems. Create a sequenced design as a directed component hierarchy to define lifecycle execution. Sequenced designs use components to group multiple automation providers within a single entity. Sequenced designs permit explicit specification of lifecycle actions.
- **Topology Design** - Topology designs specify components, relationships, groups, and properties. 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. 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.

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 ITIL and ITSM best practices.

A sequenced service design includes the following:

- A hierarchy of service components (see "Service Components" on page 60). The hierarchy of service components defines the execution process. The hierarchy defines the connection rules, but the **Component Order** configured for each service component defines the order of execution that occurs when this design is provisioned.
- Resource bindings, which allow resource offerings to be assigned to service components. See "Resource Bindings" on page 71.
- Lifecycle actions, which are needed to provision and de-provision service components. See "Lifecycle Actions for Service Components" on page 82.
- Properties, which allow you to configure user-defined properties for service components. See "Custom Service Component Properties" on page 64
- Subscriber Options, which 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 92.
- Upgradability relationships, which allow you to add an upgradability relationship between service designs, delete the upgrade path from a service design, or edit the description about the differences between the selected version and the version from which it is being upgraded. See "Upgradability" on page 105.

To navigate to the sequenced design area

1. In the Cloud Service Management Console initial dashboard view, click the **Designs** 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. Make sure the resource providers and resource offerings (with lifecycle actions, as required) that are needed to deploy the service have been set up. See the topic "Providers" in the Providers Help and "Resource Offerings (Sequenced Designs)" in the Designs Help.
3. Create component types, as needed (see in the Components Help) or use out-of-the-box component types (see t in the Components Help).
4. Create the service design. See "Add a Service Design" on page 53.
5. Use the **Designer** to create a hierarchy of service components. See "Sequenced Designer" on page 58 and "Create a Service Component" on page 60.
6. Add resource bindings, as needed. See "Create a Resource Binding" on page 71.
7. Create lifecycle actions for service components, as needed. See "Create a Lifecycle Action for a Service Component" on page 86.
8. Create custom properties for service components, as needed. See "Create Custom Service Component Properties" on page 65.
9. Create subscriber options for a service design, as needed. See "Sequenced Design Subscriber Options" on page 92.
10. 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 53.

View All Service Designs and Versions

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

To view 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 Designs area:

Item	Description
Search box	Enter text to filter the results based on a keyword search of display name, description, and version.

Item	Description
⚙	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 53. • **Import Design** - Import a service design. For more information, see "Import and Export a Service Design" on page 55. • **Manage Design Tags** - Manage tags. For more information, see "Manage Tags" on page 108. • **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 the selected 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 Service Design Versions page. Click the version number of a design to display details about that version of the service design. If there are more than five versions, click the **All** link to open the **Versions** tab of the Service Design Overview 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 57.

View Service Design and View Service Design Version

Design Tasks

Design Version Tasks

Concepts

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 summary view of the design. The "Sequenced Designer" on page 58 tab allows you to design your sequenced services. The "Sequenced Design Subscriber Options" on page 92 tab allows you to create sets of options for a service design (this tab is available only for sequenced designs). The "Upgradability" on page 105 tab allows you to view the upgrade paths from and to the selected version of the service design (this tab is available only for sequenced designs).

Design Tasks

View Design Overview

View Versions

Create New Version

Edit a Design

Delete a Design

View Design Overview

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

Item	Description
Display Name	Design name.
Description	Design description.
Tags	Tags associated with this design.

View Versions

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

Item	Description
Version	Design version.
Published label	Appears if the design has been published.
Upgradable label	Appears if the design has been published and can be upgraded to another version.
Description	Design description.
Creation date	Date and time the design was created.

Create New Version

Click the gear icon and select **Create New Version** to create a new version of the design. If the selected (base) version of the design has been published, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see the topic "Design Versions" on page 57.

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 the topic "Add a Service Design" on page 53.

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

View Design Version Overview

Edit a Design Version

Publish/Unpublish a Design

Save As

Create New Version

Export a Version

Delete a Version

The service design versions 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.

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

- **Designer** tab - for more information see the topic "Sequenced Designer" on page 58.
- **Subscriber Options** tab - for more information see the topic "Sequenced Design Subscriber Options" on page 92.
- **Upgradability** tab - for more information see the topic "Upgradability" on page 105. This tab is available only for sequenced designs.

View Design Version Overview

In the **Overview** tab of the service design versions 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 the topic "Upgradability" on page 105.
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 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.

Item	Description
Published	Indicates if the service design is published (Yes) or not published (No).
Upgradable To	A link to the version(s) of a service design to which this design can be upgraded.
Upgradable From	A link to the version of a service design from which this design has been upgraded.

Edit a Design Version

After saving a version, the following fields can be edited:

- **Version**
- **Description**
- **URL**

Publish/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.

The Published status on the **Overview** tab is **No** until you click **Publish**.

After publishing, the **Published** status on the **Overview** tab displays **Yes** and the **Published** label appears in the upper right of the window. The **Published** label is also displayed in the **Versions** tab.

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

Using **Save As** creates a new initial starting version of a new design

Create New Version

Click the gear icon and select **Create New Version** to create a new version of the design. If the selected (base) version of the design has been published, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see the topic "Design Versions" on page 57.

Export a Version

See "Import and Export a Service Design" on page 55.

Delete a Version

You cannot delete a version if it has an offering associated with it. Deleting an upgradable or upgraded design also deletes the upgrade path associated with the design.

Add a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 47.

To add a service design

1. In the **All Designs** area, click the gear icon and select **Create Design**.
2. Enter information described in the following table and then click **Create.**
3. When you access the **Designer** tab to begin structuring the service design, click **Create Root Component**. For more information, see "Create a Service Component" on page 60.

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 image that displays for the service design. The image selected for the design is shared by all versions of 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. The images are stored in the `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\images\library` folder of the CSAserver.
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 108. To remove a tag, click the trashcan icon.

Service Design Validation

For more information about sequenced designs, see "Sequenced Designs" on page 47.

The validation warning banner indicates that your service design has the following problem:

- The service design has at least one resource binding to a resource offering that has no enabled associated provider. For more details, click **View Warnings**. You can then click an **Associated Service Component** display name, which takes you to that component in the service design hierarchy. If this service design problem is not corrected, the design cannot be successfully provisioned.

Edit Service Design Properties

For more information about sequenced designs, see "Sequenced Designs" on page 47.

To edit properties of a service design

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**.

Copy a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 47.

To 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 page 57.

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, resource bindings, properties, and subscriber options) are copied. The copied service design appears in the **All Designs** area. After you copy a service design, any changes you make to the original or to the copy will not affect the other.

Delete a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 47.

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

For more information about sequenced designs, see "Sequenced Designs" on page 47.

Prerequisites

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

1. Import all process definitions that are referenced by the service design, including any referenced by resource offerings that are part of the service design. The process definitions must be imported to the CSA installation in which the service design will be imported. During import, process definitions are resolved by **name**. For process definitions that are associated with the Operations Orchestration process engine, the **name** corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA/3.2/Providers/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). Make sure that these flows have identical signatures and identical paths as the flows on the system from which the service design was exported. For instructions about how to import OO flows, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

2. 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.

3. If the imported service design is part of an upgrade path, all service designs upgradable to the service design represented by the content archive must be present on the target system.

The archive (`.zip`) file can only reference files or content contained within the `.zip` file itself, or files 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 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|gif|bmp|cod|ief`

Importing and Exporting

When the Option field is set to Import:

The import process imports archives of service designs and their supported artifacts. Supported artifacts for service designs include associated resource offerings. Service designs with the same internal name are considered to be functionally equivalent and are not imported.

> **Note:** If the service design you want to import is part of an upgrade path and is also upgradable to another service design, it will not be imported.

When the Option field is set to Update:

This is an import-by-update option. 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.

Note: If the service design you want to import-by-update is part of an upgrade path and is also upgradable to another service design, it will not be imported.

When the Option field is set to Update and Preserve Originals is selected:

This is an update-by-preserve-original option that applies only to service offerings that do not have an upgrade path. This action imports all 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, then the name is modified internally, and the description and version of that service design are updated with "Superseded on" and the date. The internal name, display name, description, and version of the artifact being imported remain intact. Other artifacts referenced by the service design are handled similarly, with superseded items identified by "Superseded on" and the date.

Note: When the **Option** field is set to **Update** and **Preserve Originals** is checked, you cannot import an archive if the service design is part of an upgrade path.

Content archive for service designs

Exporting a service design creates a content archive (`.zip`) file. The content archive contains XML documents for the service 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 service design version archive

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

Notes: 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 Cloud Service Automation 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 the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

1. In the Sequenced Designs view where All Designs displays, click the gear icon and select **Import Design**.
2. In the Import Design dialog, select or specify the **Archive File** (.zip file) that contains the service design you want to import. Archive filenames for service designs begin with SERVICE_DESIGN_.
3. Select an **Option**:
   a. **Import** - Imports a new service design and its associated resource offerings from the selected archive file, if it does not already exist. This action does not update existing service designs. You cannot import a service design if it has the same internal name as the existing service design.
   b. **Update** - Imports an existing service design and its associated resource offerings from the selected archive file. If the service design already exists, this action updates (overwrites) existing service design versions. If the service design does not exist, this action will add it to CSA. Check **Preserve**

> **Originals** to create a backup copy of the existing service design. The backup copy will be saved with "Superseded" and the date appended to the display name of the service design.

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** and wait for the confirmation message. Click **View Detailed Report** to see a summary and details of the import process, including information about the artifacts and their status.

6. Click **Close**. The new version is listed in the **All Designs** area.

Exporting

1. Select the design version you want to export.

2. Click the gear icon and select **Export**.

When you export a service design archive, the service design and all referenced resource offerings are packaged in an archive file named:

```
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

For more information about sequenced designs, see .

Concepts

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 for more information.

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

Tasks

Click the gear icon and select **Create New Version** to create a new version of the design. If the selected (base) version of the design has been published, 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 cloned.
Version	Version of the new service design to be created.

Item	Description
Upgradable from *<Based on Version>*	If the base version of the design (the version from which the new version is cloned) 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.

Sequenced Designer

For more information about sequenced designs, see "Sequenced Designs" on page 47.

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. A service design starts with a root service component (Service Composite, in the image below).

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.
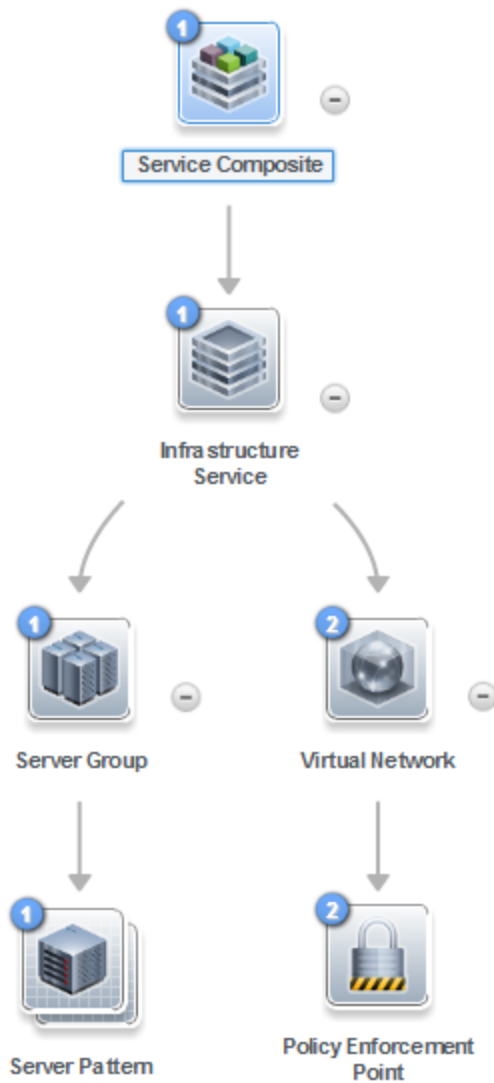
To see the component type of a service design element, hover your cursor over the icon for that element. Also, the icon for the element corresponds to the image specified for the component type.

To navigate to the sequenced designer:

1. In the Cloud Service Management Console dashboard, click **Designs**, and then click **Sequenced**.

2. Click the **Designer** tile.

3. Select a tag or select **All Designs**.

4. Select the design and then the **Version** tab. If no versions exist, click **New**. For more information about versions, see "Design Versions" on page 57.

5. Select a version number.

6. Click the **Designer** tab.

To use the designer controls

The **Designer** provides the following controls to help you properly display your service design.

Icon	Description
Open Preview	Click to display the preview dialog.
	Zoom the display out or in: • To zoom out, click the left controller box. • To zoom in, click the right controller box. • Move the slider control from left to right to zoom out and in. You can also use your mouse scroll wheel to zoom out and in.
	Click to reload the service design and reset the service components to their default positions.
	Click to automatically fit the service design within the display area.
	Use this toolbar to create a new child service component, edit a component, select a component template, or delete a component.

Service Components

For more information about sequenced designs, see "Sequenced Designs" on page 47.

A Service Component is an element of a service design. A Service Component has a component type that constrains its allowed children and category of resource offerings (for more information, see the topic "Create a Component Type" in the Components Help.).

See the following related topics:

- "Create a Service Component" below
- "Edit Properties of a Service Component" on page 62
- "Replace a Service Component" on page 62
- "Delete a Service Component" on page 63
- "Lifecycle Actions for Service Components" on page 82
- "Custom Service Component Properties" on page 64

Create a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 47.

You can add children to the root service component or to any component that has one or more supported children configured for it.

To create a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design to which you want to add a child service component.

2. Select the service design.

3. In the **Designer** tab, select the service component to which you want to add a child.

4. Click the **Create New Child Service Component** icon.

5. Provide the following information:

Item	Description
Component Palette	Select the component palette that contains the component type you want to select for this service component and then click **Next**. The list of component palettes displays only those palettes that are applicable to the service component for which you are creating a child. A component palette contains a group of component types from which you can choose when creating service components in a service design. To create additional palettes, see the topic "Create a Component Palette" in the Components Help.
Component Type	Select a component type for the service component you are creating and then click **Next**. The list of component types displays only those types that are applicable to the service component for which you are creating a child. Component type properties provide a base set of attributes for the service component. For more information, see the topic "Components" in the Components Help.
Component Template	Select a component template for the service component you are creating and then click **Next**. A component template is a specialized version of a component type and is used to simplify service design creation. A component template can also have resource binding, which allows you to create a reusable component. Component templates include customized settings for the properties and lifecycle actions that provide initial settings for the service design. When a template is added to a design, any default properties and lifecycle actions are automatically populated in that service component within the design. This list always includes a **Default Template**, which uses the settings as configured for the selected component type. For more information, see the topic "View Component Templates" in the Components Help.
Identification Details:	
Display Name	The name you provide for the service component.
Description	The description you provide for the service component.
Component Order	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.
Marketplace Portal Options	Select **Visible** to specify that this service component is visible in the Marketplace Portal. De-select it to specify that the service component will not be visible.

Item	Description
	Custom service component properties and lifecycle actions that have been configured to be visible in the Marketplace Portal will only be displayed in the Marketplace Portal 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 Marketplace Portal.
Pattern	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.
	The root service component in a service design cannot be marked as a pattern. As a result, if you select a pattern as the root node, it will no longer function as a pattern.
	You can identify a service component that is marked as a pattern because its icon appears as a stacked, double image with a grid-like background, as shown below.
	※

Edit Properties of a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 47.

To edit properties of a service component

1. Select the service component whose properties you want to edit.

2. Click the **Edit** icon ✎ .

3. Edit the properties of the service component.

   The Component Order and Pattern properties of a service component cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the Component Order and Pattern properties of the component in the upgraded design cannot be edited.

4. For descriptions of the specific properties, see the topic "Create a Service Component" on page 60.

Replace a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 47.

To replace a service component

1. From the Designer, select the service component to replace.

2. Click the **Select Component Template** icon ⇄ .

3. Select the service component template to replace the current service component. The replacement component will have the same name as the current component.

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 *Component 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 bindings* in the current service component must exist in the replacement service component.

- The *Binding Order* of all resource bindings in the current service component must be the same in the replacement service component.

- All *measurable properties* of all resource bindings in the current service component must exist in the replacement service component.

Delete a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 47.

When you delete a service component, all of its child service components are also deleted.

A service component cannot be deleted if it is part of an upgraded design and the component originated in the upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the component cannot be deleted from the upgraded design.

A service component can be deleted from the current design (upgraded or not upgraded) if the component originated in the current design (the component was initially added to the current design).

To delete a service component

1. Select the service component you want to delete.

2. Click the **Delete** icon ✕ .

3. Click **Yes** to confirm the deletion.

Custom Service Component Properties

For more information about service components, see "Service Components" on page 60.

Custom service component properties are managed using the **Properties** pane (shown below) in the **Designer** tab.
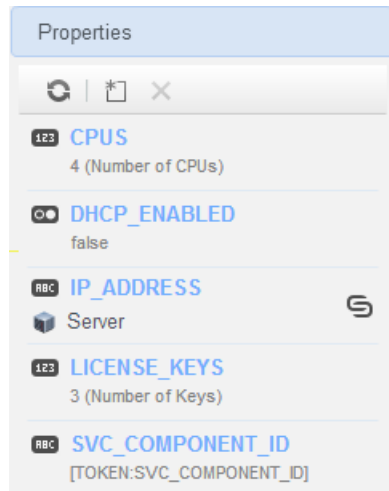
Custom properties for service components are user-defined properties that you may want to create in the following situations:

- When a service component receives its value from a subscriber option. For example, you may want to get the number of CPUs for a server after its value has been specified in the Marketplace Portal. To do this, create a custom 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 92, 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/value to exist on the service component. For example, an action may need to retrieve an ipAddress that is stored a Server service component.

- When a service design needs to receive the value of a property that is stored on another service component. 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 source binding 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 custom service component properties to pull a value from another service component property is called a *source binding*. Another type of value binding is called *target binding*. For more information about target bindings, see "Sequenced Design Subscriber Options" on page 92.

- 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).

See the following related topics:

- "View Custom Service Component Properties" below
- "Create Custom Service Component Properties" below
- "Delete Custom Service Component Properties" on page 70
- "Edit Custom Service Component Properties" on page 70

View Custom Service Component Properties

For more information about custom service components, see "Custom Service Component Properties" on the previous page.

To view custom properties of a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design that contains the service component.
2. Select the service design.
3. In the **Designer** tab, select the service component whose custom properties you want to view.
4. In the right pane, select **Properties**.
5. The **Properties** pane displays the custom properties of the selected component.

Create Custom Service Component Properties

For more information about custom service components, see "Custom Service Component Properties" on the previous page.

To create custom service component properties

1. In the left pane of the **All Designs** area, select the tag associated with the design that contains the service component.
2. Select the service design.
3. In the **Designer** tab, select the service component to which you want to add a custom property.
4. In the right pane, select **Properties**.
5. In the **Properties** pane tool bar, click the **Create New Property** icon.
6. Provide the following information:

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.
Property Details	*For Boolean properties:* • **Name** - A unique name for the property. • **Display Name** - The display name for the property.

Item	Description
	Description - A description of the property. **Marketplace Portal & Service Offering Options**: **Editable** - Indicates that this property can be made editable in the **Offerings** area and in the Marketplace Portal. **Required** - 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. **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. **Marketplace Portal & Service Offering Options**: **Editable** - Indicates that this property can be made 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. Note that this field is available only when the **Enable Multi-Select** option is selected. Single-select list properties are always required; this field cannot be changed for single-select properties. **Value Entry Method:** **Manual Entry** - Click the **Add Value** icon to add a new value, or click the **Remove Selected Value(s)** icon to remove a selected value. After adding a List property, you can choose a default value (or values, for multi-select lists) by selecting one or more values from the drop down list for the property in the **Subscriber Options** tab. Click **Save** to save the default value selection. **Select Dynamic Query**: - Click the **Script Selection** icon to select a **Script Name**. To add new scripts, place them in the folder: `%CSA_HOME%\jboss-as\standalone\deployments\csa.war\propertysources` **Note:** The script is invoked at subscription ordering or modification time by the out-of-the-box CSA user `csaReportingUser`, who has read-only access to CSA. For more information on this user, see the *Cloud Service Automation Configuration Guide*. - Specify an HTTP Request Body to be passed to the script. The contents of the HTTP Request Body need to include the information required by the selected script to return the appropriate set of dynamic values. To include a token in the HTTP Request Body, click the **Token Request** icon and select from the available tokens. The token is a CSA system value that is automatically resolved internally when the property is read. Click **Test Query** to test the dynamic query results (note that tokens are resolved only at subscription time, and this test will pass literal values).

Item	Description
	Note: The script is invoked at subscription ordering or modification time by the out-of-the-box CSA user `csaReportingUser`, who has read-only access to CSA. For more information on this user, see the Cloud Service Automation Configuration Guide. ○ You can select from the following server-side tokens: • 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. • Service Blueprint ID - Resolves to the Service Blueprint ID. • Service Instance ID - Resolves to the Service Instance ID. • Service Offering ID - Resolves to the Service Offering ID. • Service Request Organization ID - Resolves to the Organization ID associated with the Service Request. • Service Request User ID - Resolves to the User ID associated with the Service Request. • Subscription ID - Resolves to the Subscription ID created at subscription time. ○ You can also select the following client-side token: • `[CLIENT:<property_name>]` - Allows you to have a dependency on a value from another list property, which means that if a value is selected in "Property A", for example, the list of values in "Property B" will change based on that selection. "Property A" and "Property B" must exist within the same Subscriber Option. Note that `<property_name>` refers to the property **Name**, and not its **Display Name**. For the **Test Query** functionality to work for the above example, you must first create and save "Property A" in the Cloud Service Management Console before you create its dependent property, "Property B." • **Enable Multi-Select** - Select to present options as check boxes in the Marketplace Portal. *For Integer properties*: • **Name** - A unique name for the property. • **Display Name** - The display name for the property. • **Description** - A description of the property. • **Marketplace Portal & Service Offering Options**: • **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. This option cannot be changed for Integer properties. • **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

Item	Description
	bounds the value will be automatically converted to the closest maximum or minimum value. • **Input Validation** • Select **Enable Input Validation** to validate the value that the user enters for this property. When selected, the following fields are available: ○ **Minimum Value** - Enter a number for the minimum value allowed, which means the value for the property must be greater than or equal to the number you enter. ○ **Maximum Value** - Enter a number for the maximum value allowed, which means the value for the property must be less than or equal to the number you enter. *For String properties:* • **Name** - A unique name for the property. • **Display Name** - The display name for the property. • **Description** - A description of the property. • **Marketplace Portal & Service Offering Options**: • **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. Note that this field is available only when the **Editable** option is selected. • **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. • **Input Validation** • Select **Enable Input Validation** to validate the value that the user enters for this property. • Choose an **Input Restriction** from the following list: ○ **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. • **Minimum Length** - Enter a number for the minimum length allowed for the value, which means the length of the value must be greater than or equal to the number you enter. • **Maximum Length** - Enter a number for the maximum length allowed for the value, which means the length of the value must be less than or equal to the number you enter.

Item	Description
Property Bindings	Select the service component 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. For more information about target bindings, see "Sequenced Design Subscriber Options" on page 92.

The following tokens are available for custom service component properties:

Token	Description
Parent Service Component ID ([TOKEN:PRN_COMPONENT_ID])	Resolves to the Service Component ID of the parent service component.
Service Blueprint ID ([TOKEN:SVC_BLUEPRINT_ID])	Resolves to the Service Blueprint ID.
Service Catalog ID ([TOKEN:SVC_CATALOG_ID])	Resolves to the Service Catalog ID used at subscription time.
Service Component ID ([TOKEN:SVC_COMPONENT_ID])	Resolves to the Service Component ID of the component associated with this action.
Service Component Type ([TOKEN:SVC_COMPONENT_TYPE])	Resolves to the Service Component Type (for example, Server) of the component associated with this action.
Service Instance ID ([TOKEN:SVC_INSTANCE_ID])	Resolves to the Service Instance ID created at subscription time.
Service Offering ID ([TOKEN:SVC_OFFERING_ID])	Resolves to the Service Offering ID.
Service Request Organization ID ([TOKEN:REQ_ORG_ID])	Resolves to the Organization ID associated with the service request.
Service Request User ID ([TOKEN:REQ_USER_ID])	Resolves the User ID associated with the service request.
Subscriber's Email Address ([TOKEN:SVC_SUBSCRIPTION_EMAIL])	Resolves to email address of the subscriber.
Subscriber's Organization ID ([TOKEN:USR_ORG_ID])	Resolves to the Organization ID associated with the subscriber.
Subscription ID ([TOKEN:SVC_SUBSCRIPTION_ID])	Resolves to the Subscription ID created at subscription time.
Subscription Upgrade Retry ([TOKEN:ACTION_EXECUTION_RETRY])	Resolves to **false** on the first attempt of an upgrade. Resolves to **true** for subsequent upgrade attempts after the initial upgrade failed.

Edit Custom Service Component Properties

For more information about custom service components, see "Custom Service Component Properties" on page 64.

To edit custom properties of a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design that contains the service component.

2. Select the service design.

3. In the **Designer** tab, select the service component whose custom properties you want to edit.

4. In the right pane, select **Properties**.

5. Click the name of the custom property you want to edit.

   The Name custom property cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a custom property is added to a component in a design and that design is upgradable, when the design is upgraded, the Name custom property of the component in the upgraded design cannot be edited.

   For descriptions of the specific properties, see the topic "Create Custom Service Component Properties" on page 65.

Delete Custom Service Component Properties

For more information about custom service components, see "Custom Service Component Properties" on page 64.

A custom service component property cannot be deleted if other properties are bound to it. For more information about source bindings, see "Custom Service Component Properties" on page 64. For more information about target bindings, see "Sequenced Design Subscriber Options" on page 92.

A custom service component property cannot be deleted if it is part of an upgraded design and the property originated in the upgradable design (the design from which this design is an upgrade). That is, if a component with a custom service component property is added to a design and that design is upgradable, when the design is upgraded, the custom service component property of the component cannot be deleted from the upgraded design.

A custom service component property can be deleted from the current design (upgraded or not upgraded) if the custom service component property originated in the current design (the custom service component property was initially added to the current design).

To delete custom properties from a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design that contains the service component.

2. Select the service design.

3. In the **Designer** tab, select the service component from which you want to delete a custom property.

4. In the right pane, select **Properties**.

5. In the **Properties** pane, select the custom properties you want to delete.

6. Click the **Delete** icon.

7. Click **Yes** to confirm the deletion.

Resource Bindings

For more information about sequenced designs, see "Sequenced Designer" on page 58.

A resource binding is a link in a service design between a resource offering and a service component. For example, a resource offering for a VMware vCenter VM template can be linked to a Server service component. The resource binding ensures that the resource offering will be provisioned when the Server service component is deployed.

You can also create resource bindings on component templates. For more information, see the topic "View Component Template Resource Bindings" in the Components Help.

See the following related topics:

- "Create a Resource Binding" below
- "Delete a Resource Binding" on the next page
- "Create Provider Selection Actions for Resource Bindings" on page 76
- "Edit Properties of a Provider Selection Action for Resource Bindings" on page 75
- "View Properties of a Resource Binding" on the next page
- "Edit Properties of a Resource Binding" on page 73

Create a Resource Binding

For more information about resource bindings, see "Resource Bindings" above.

This topic describes how to create a resource binding on a service component. You can also create resource bindings on component templates (for more information, see the topic "View Component Template Resource Bindings" in the Components Help).

To create a resource binding on a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design that contains the service component.

2. Select the service design or version.

3. In the **Designer** tab, select the service component to which you want to add a resource binding.

4. In the right pane, select **Resource Bindings**.

5. In the toolbar, click the **Create New Resource Binding** icon.

6. In the **Create New Resource Binding** wizard, enter the following information:

Item	Description
Resource Category	Select the category of the resource offering you want to bind to the service component. For more information, see the topic "Components" in the Components Help) and the topic "View Constraints of a Component Type" in the Components Help.

Item	Description
Resource Offering	Select the resource offering you want to bind to the service component. You cannot edit this selection after a resource binding has been created. For more information about Resource Offerings, see the topic "Resource Offerings" in the Resources Help.
Provider Type	You see this field when you view the properties of a resource binding. The provider type is determined by the selected resource offering; you cannot edit the provider type.
Binding Order	When a resource binding is created, it is automatically assigned a binding order number. The binding order specifies the order in which the associated resource offering will be provisioned relative to other resource bindings configured for the service component. Resource bindings are processed in ascending order during service deployment and in descending order during undeployment. The number automatically assigned is the next available number, starting with 1, 2, 3, etc. After a resource binding has been created, you can edit it to reset the binding order by selecting a number from 1 to 99. You are allowed to create duplicate binding orders, which will be processed in an indeterminate order.

7. Click **Create**.

Delete a Resource Binding

For more information about resource bindings, see "Resource Bindings" on the previous page.

A resource binding in a service component cannot be deleted if it is part of an upgraded design and the resource binding originated in the upgradable design (the design from which this design is an upgrade). That is, if a component with a resource binding is added to a design and that design is upgradable, when the design is upgraded, the resource binding of the component cannot be deleted from the upgraded design.

A resource binding can be deleted from a component in a design (upgraded or not upgraded) if the resource binding originated in a component of the current design (the resource binding was initially added to a component of the current design).

To delete a resource binding

1. In the left pane of the **All Designs** area, select the version of the design you want to delete.
2. Select the service design.
3. In the **Designer** tab, select the service component whose resource binding you want to delete.
4. In the right pane, select **Resource Bindings**.
5. Select the resource binding you want to delete.
6. Click the **Delete** icon ✕.
7. Click **Yes** in the confirmation dialog.

View Properties of a Resource Binding

For more information about resource bindings, see "Resource Bindings" on the previous page.

To view the properties of a resource binding

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to view.

2. Select the service design.

3. In the **Designer** tab, select the service component whose resource binding you want to view.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding you want to view.

Select one of the following tabs for more information:

- **Summary** tab - View the properties of the resource binding. For descriptions of the specific properties, see the topic "Create a Resource Binding" on page 71.

- **Provider Selection** tab - View and create resource provider selection actions, which execute as part of the Pre-Transition substate of the Reserving lifecycle state. For more information, see "Create Provider Selection Actions for Resource Bindings" on page 76.

- **Resource Accounting** tab - View and create accounting actions that execute during the Reserving and Un-reserving states when the resource binding is provisioned. For more information, see "Create Resource Accounting Actions" on page 80.

- **Measurable Properties** tab - View and create measurable properties on a resource binding. For more information, see "View Measurable Properties" on page 81.

- **Offering Lifecycle** tab - See a read-only view of the lifecycle actions associated with the resource offering used for this resource binding. For more information about Resource Offerings, see the topic "Resource Offerings" in the Resources Help.

- **Offering Properties** tab - View a read-only list of properties for the resource offering used for this resource binding. For more information about Resource Offerings, see the topic "Resource Offerings" in the Resources Help.

Edit Properties of a Resource Binding

For more information about resource bindings, see "Resource Bindings" on page 71.

This topic describes how to edit properties of a resource binding in the following ways:

- On a component template.
- On a service component.

To edit properties of a resource binding on a component template

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template resource binding you want to edit.

2. Click the component type whose template resource binding properties you want to edit.

3. Select the **Templates** tab.

4. In the component templates list, click the component template whose resource binding properties you want to edit.

5. Click the **Resource Bindings** tab.

6. Select the display name of the resource binding you want to edit.

7. In the Summary tab, click the **Edit** icon .

8. Edit the properties of the resource binding, as desired. For descriptions of the specific properties, see the topic "Create a Resource Binding" on page 71.

To edit properties of a resource binding on a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design.

3. In the **Designer** tab, select the service component whose resource binding you want to edit.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding you want to edit.

6. In the **Summary** tab, click the **Edit** icon 📝 .

7. Edit the properties of the resource binding, as desired.

   The Binding Order of a service component cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the Binding Order of the component in the upgraded design cannot be edited.

   For descriptions of the specific properties, see the topic "Create a Resource Binding" on page 71.

You can also see read-only information regarding resource bindings by clicking the **Lifecycle** and **Properties** tabs.

Replace a Resource Offering in a Resource Binding

For more information about resource bindings, see "Resource Bindings" on page 71.

This topic describes how to replace a resource offering in a resource binding in the following ways:

- On a component template.
- On a service component.

To replace a resource offering in a resource binding on a component template

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template resource binding contains the resource offering you want to replace.

2. Click the component type whose template resource binding contains the resource offering you want to replace.

3. Select the **Templates** tab.

4. In the component templates list, click the component template whose resource binding contains the resource offering you want to replace.

5. Click the **Resource Bindings** tab.

6. Select the display name of the resource binding that contains the resource offering you want to replace.

7. In the Summary tab, click the **Replace Resource Binding** icon ⇄ .

8. Select the replacement resource offering, as desired. The displayed resource offerings are not bound to another service component and are of the same resource category and provider type as the resource offering being replaced.

To replace a resource offering in a resource binding on a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design.

3. In the **Designer** tab, select the service component whose resource binding contains the resource offering you want to replace.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding that contains the resource offering you want to replace.

6. Click the **Replace Selected Resource Binding** icon ⇄ .

7. Select the replacement resource offering, as desired. The displayed resource offerings are not bound to another service component and are of the same resource category and provider type as the resource offering being replaced.

View Properties of a Provider Selection Action for Resource Bindings

For more information about resource bindings, see "Resource Bindings" on page 71.

To view properties of a provider selection action for resource bindings

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to view.

2. Select the service design.

3. In the **Designer** tab, select the service component whose provider selection action properties you want to view.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding.

6. Select the **Provider Selection** tab.

7. Click the name of the action whose properties you want to view.

8. For descriptions of the specific properties in the **Summary** tab, see the topic "Create Provider Selection Actions for Resource Bindings" on the next page.

9. Review the **Properties** section for action inputs that will be passed to the process definition. For more information about the specific properties, see the topic "Edit Properties of a Lifecycle Action for a Service Component" on page 90. **Note:** Provider selection actions for resource bindings always execute during the Pre-Reserving lifecycle state.

Edit Properties of a Provider Selection Action for Resource Bindings

For more information about resource bindings, see "Resource Bindings" on page 71.

To edit properties of a provider selection action for resource bindings

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design.

3. In the **Designer** tab, select the service component whose provider selection action properties you want to edit.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding.

6. Select the **Provider Selection** tab.

7. Click the name of the action whose properties you want to edit.

8. For descriptions of the specific properties in the **Summary** tab, see the topic "Create Provider Selection Actions for Resource Bindings" below.

9. Select the **Properties** tab to edit the action inputs that will be passed to the process definition.

Create Provider Selection Actions for Resource Bindings

For more information about resource bindings, see "Resource Bindings" on page 71.

You must create one or more provider selection actions for a resource binding. 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 Pre-Transition substate of the Reserving lifecycle state; the lifecycle state cannot be changed.

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 binding 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 binding 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 creating resource accounting actions for resource bindings, see "Create Resource Accounting Actions" on page 80.

See the following table for descriptions of the out-of-the-box internal actions that 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 referenced in a resource binding. - 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 bindings, 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),	Resource Binding

Internal Action	Description	Applies To
	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 referenced in a resource binding. • 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 Binding
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
Deploy Topology Based Service Component	Initiates the deployment of a delegated topology service component. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	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 binding. This action should be configured in the **Un-reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 binding. This action should be configured in the **Reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 Binding, or Resource Offering for use in troubleshooting.	Resource Binding Resource Offering Service Component
Select Resource Pool from	This internal action is deprecated and may be removed in a future CSA release. Use the **Select Resource Provider and Pool** action in conjunction with the **Build Resource Provider and Pool List** action in place of this	Resource Binding

Internal Action	Description	Applies To
Provider	action. Selects a resource pool from the set of resource pools associated with the selected resource provider. A resource pool must have an **Availability** of **Enabled** to be selected. The selected resource pool will be available to resource offering actions in the token `RSC_POOL_ID`.	
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 Binding
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 Binding
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 Binding
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 Binding
Undeploy Topology Based Service Component	Initiates the undeployment of a delegated topology service component. The service component must have a property named `topologyId`, with a value that is the id of the topology design to be undeployed. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	Service Component

To create a provider selection action for resource bindings

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.
2. Select the service design.
3. In the **Designer** tab, select the service component to which you want to add a provider selection action.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding.

6. Select the **Provider Selection** tab.

7. Select the **Create** icon.

8. Provide the following information:

Item	Description
Process Engine	Select a process engine, which is a container for process definitions. You can select either the CSA internal process engine or an Operations Orchestration (OO) engine.
Process Definition	Select a process definition, which is configured to run a specified internal action (see the table above for the list of internal actions) or external action.
Display Name	The name you provide for the lifecycle action.
Description	The description you provide for the lifecycle action.
Execution Order	The execution order for the lifecycle action, which is relative to other provider selection actions on this resource binding, if applicable. Lifecycle actions are executed in ascending order.
Execution Properties	Specify the following: • Fail on Error - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action fails. • Error on Timeout - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action times out.
Timeout (seconds)	The time to wait until a timeout occurs for the lifecycle action. Set this field to zero (0) if you do not want the action to timeout, but realize that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

View Resource Accounting Actions

For more information about resource bindings, see "Resource Bindings" on page 71.

Resource accounting actions track the utilization of resources in a resource pool. You see two lists of accounting actions in the **Resource Accounting** tab:

• **Reserve** - actions that record the usage of resources during provisioning.

• **Un-reserve** - actions that record the release of resources during de-provisioning.

To view resource accounting

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to view.

2. Select the service design.

3. In the **Designer** tab, select the service component whose resource accounting action properties you want to view.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding.

6. Select the **Resource Accounting** tab.

For more information about the fields in this tab, see "Create Resource Accounting Actions" below

Create Resource Accounting Actions

For more information about resource bindings, see "Resource Bindings" on page 71.

If you want to enable resource accounting, you must create one or more resource accounting actions for a resource binding. The following out-of-the-box accounting actions are provided:

- **Increase Resource Utilization** - Configure this action in the **Reserve** section of the **Resource Accounting** tab so that it runs during the Reserving lifecycle state.

- **Decrease Resource Utilization** - Configure this action in the **Un-reserve** section of the **Resource Accounting** tab so that it runs during the Un-reserving lifecycle state.

You can also create your own resource accounting actions and configure them in the **Resource Accounting** tab. As a best practice, 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.

To create a resource accounting action for resource bindings

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design

3. In the **Designer** tab, select the service component to which you want to add a resource accounting action.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding.

6. Select the **Resource Accounting** tab.

7. Determine if you want to add an action to the **Reserve** or **Un-reserve** sections.

8. In the desired section, select the **Create New Action** icon to launch the wizard.

9. Provide the information as described in "Create Provider Selection Actions for Resource Bindings" on page 76, being sure to specify the following if you want to use the out-of-the-box resource accounting actions:

   - **Process Engine** - Select the **CSA Internal** process engine.

   - **Process Definition** - Select one of the following out-of-the-box process definitions, depending on whether you want to record the usage or release of the resource:

     ○ **Increase Resource Utilization**

     ○ **Decrease Resource Utilization**

> **Tip:** You can also create and select your own custom actions for resource accounting.

10. Click **Create**.

View Measurable Properties

For more information about resource bindings, see "Resource Bindings" on page 71.

A measurable property is an integer service component property that has a configured **Resource Type** and **Unit** (see "Create Custom Service Component Properties" on page 65). When you configure measurable properties on a resource binding, 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 **Designer** 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 binding in the **Provider Selection** or **Resource Accounting** tabs, you must also configure the measurable properties for the binding in the **Measurable Properties** tab.

To view measurable properties on a resource binding

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to view.
2. Select the service design.
3. In the **Designer** tab, select the service component that contains the resource binding whose measurable properties you want to view.
4. In the right pane, select **Resource Bindings**.
5. Click the name of the resource binding whose measurable properties you want to view.
6. Select the **Measurable Properties** tab.

For more information about the fields in this tab, see "Add and Remove Measurable Properties" below.

Add and Remove Measurable Properties

For more information about resource bindings, see "Resource Bindings" on page 71.

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

To add measurable properties to resource bindings

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.
2. Select the service design.
3. In the **Designer** tab, select the service component that contains the resource binding to which you want to add measurable properties.

4. In the right pane, select **Resource Bindings**.

5. Click the name of the resource binding to which you want to add measurable properties.

6. Select the **Measurable Properties** tab.

7. Click the **Add additional measurable properties to this resource binding** icon.

8. Select the measurable properties you want to add.

9. Click **Add**.

To remove measurable properties from resource bindings

1. In the left pane of the **All** Designs area, select the tag associated with the design you want to modify.

2. Select the service design.

3. In the **Designer** tab, select the service component that contains the resource binding from which you want to remove measurable properties.

4. Click the name of the resource binding from which you want to remove measurable properties.

5. Select the **Measurable Properties** tab.

6. Select the measurable properties you want to remove.

7. Click the **Remove selected measurable properties from this resource binding** icon.

8. Click **Yes** in the confirmation dialog.

Lifecycle Actions for Service Components

For more information about service components, see "Service Components" on page 60.

What is a service component lifecycle?

The **Lifecycle** window allows you to specify the lifecycle actions that are needed to provision and de-provision service components. A lifecycle action provides a link from a service component to an internal or external process definition, which runs to perform a specified action. The collection of actions defined for a service component is known as its lifecycle. In the following diagram you can see the service component lifecycle states, which are discussed in more detail below.

Image legend:

- 1 - Currently selected state

- 2 - Transition states

- 3 - Stable states

- 4 - Modifying and Upgrading states
- 5 - Substates

What is a lifecycle action?

A lifecycle action is a function that is either run automatically at a specified lifecycle state or substate, or that is exposed to the subscriber. Lifecycle actions contain the following information:

- A reference to a process definition, which contains the logic for executing the function.
- The property values that are inputs to the process definition.

What are lifecycle states?

A lifecycle state represents a step within the CSA service provisioning and de-provisioning lifecycles. States are either transition states or stable states.

- The following *transition states* are represented in the diagram as curved, arrow icons:
  - Initializing

  - Reserving

  - Deploying

  - Un-deploying

  - Un-reserving

  - Un-initializing

- The following *stable states* (except for Described and Finalized) are represented in the diagram as shaded, oval icons:
  - Described - lifecycle actions cannot be specified at this state

  - Initialized

  - Reserved

  - Deployed

  - Finalized - lifecycle actions cannot be specified at this state

What is a modifying state?

The modifying state is a special transition state that indicates a subscriber has chosen to modify a subscription, and the changes are being processed by the lifecycle engine. The modifying state is shown in the diagram to the right of the other lifecycle states.

The only service components that are processed during the modifying state are those service components that have a Subscriber Option property that gets its value directly from a target binding, or those service components that have a source binding that gets its value indirectly from such a target binding and whose property value is changed as a result of a different option selection during the Modify Subscription Request action. There may be many components with the component property target bound with the option property, but only the components whose property values are changed through different option selections will undergo the Modifying state transition.

The only resource offerings that are processed during the modifying state are those associated with service components that are processed during the modifying state.

What is an upgrading state?

The upgrading state is a special transition state that indicates a Service Operations Manager has chosen to upgrade a subscription, and the changes are being processed by the lifecycle engine. The upgrading state is shown in the diagram to the right of the other lifecycle states.

When the Service Designer creates an upgrade service design to a published service design, service components or resource offerings common to both designs can be updated by adding actions in the upgrading state. These actions are necessary to provide additional capability to existing components in service instances. Those service components or resource offerings will undergo the Upgrading state transition.

What are lifecycle substates?

A lifecycle substate is a further refinement of a lifecycle transition state. Stable states do not have substates. When defining a lifecycle action at a transition state, you must also specify the substate for the action. Substates are represented in the diagram as tabs just beneath the lifecycle diagram. The *substates* are:

- Pre-Transition
- Transition
- Post-Transition
- Failure

To see the list of all lifecycle actions for a service component:

1. In the left navigation pane, select **Service Designs**.
2. In the **Service Designs** tab select the **Display Name** of the service design for which you want to see a list of lifecycle actions.
3. In the **Designer** tab, select the service component whose lifecycle actions you want to see.
4. In the right pane (shown below), select **Offering Lifecycle**.
5. In the right pane tool bar, click the **Expand All** icon. In the list, you can see all lifecycle actions configured for each state and substate.
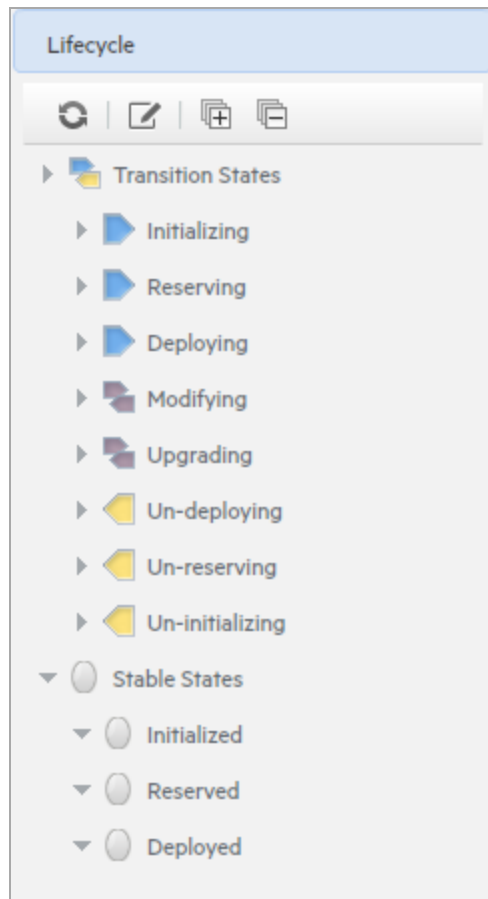
See the following related topics:

- "View Properties of a Lifecycle Action for a Service Component" below
- "Create a Lifecycle Action for a Service Component" on the next page
- "Delete a Lifecycle Action from a Service Component" on page 89
- "Edit Properties of a Lifecycle Action for a Service Component" on page 90
- "Move a Lifecycle Action for a Service Component" on page 91

View Properties of a Lifecycle Action for a Service Component

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 82.

To view the properties of a lifecycle action for a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to view.
2. Select the service design.
3. In the **Designer** tab, select the service component for which you want to view the properties of a lifecycle action.
4. In the right pane, select **Offering Lifecycle**.
5. In the right pane toolbar, select the **Modify Lifecycle Actions** icon.

6. In the **Offering Lifecycle** view, on the lifecycle state diagram, select the lifecycle state for which you want to view the properties of an action. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.

7. Select the lifecycle substate (located below the lifecycle state diagram), if applicable.

8. From the list of actions, select the **Display Name** of the action whose properties you want to view.

9. For descriptions of the properties in the **Summary** tab, see the topic "Create a Lifecycle Action for a Service Component" below. For descriptions of the properties in the **Properties** tab, see the topic "Edit Properties of a Lifecycle Action for a Service Component" on page 90.

Create a Lifecycle Action for a Service Component

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 82.

Before you create lifecycle actions, be sure you have the latest process definitions from Operations Orchestration. For instructions about how to do this, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

To create a lifecycle action for a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design and then a version, if applicable.

3. In the **Designer** tab, select the service component for which you want to create a lifecycle action.

4. In the right pane, select **Lifecycle**.

5. In the **Lifecycle** pane toolbar, select the **Modify Lifecycle Actions** icon.

6. In the **Offering Lifecycle** view, on the lifecycle state diagram, select the lifecycle state for which you want to create an action. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.

7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable.

8. In the **Offering Lifecycle** pane toolbar, select the **Create New Action** icon.

9. Enter the information described in the table below.

10. After creating a new lifecycle action, specify values for the action input properties as described in "Edit Properties of a Lifecycle Action for a Service Component" on page 90.

Item	Description
Process Engine	Select a process engine, which is a container for process definitions. You can select either the Internal process engine or one of the Operations Orchestration (OO) engines.
Process Definition	Select a process definition, which is configured to run a specified internal action (see the table below for the list of internal actions) or external action.
Complete the following Identification fields:	
Display Name	The name you provide for the lifecycle action.
Description	The description you provide for the lifecycle action.
Marketplace	These options are available only for actions created in stable lifecycle states (Initialized,

Item	Description
Portal Options	Reserved, Deployed). • Visible - When checked, this indicates that the lifecycle action will be available to be run in the Marketplace Portal. The box is checked by default for actions created in stable lifecycle states.
Execution Order	The execution order for the lifecycle action, which is relative to other lifecycle actions for this lifecycle state or substate, if applicable. Lifecycle actions are executed in ascending order.
Execution Properties	Specify the following: • Fail on Error - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action fails. The default selection is **false** for actions created in the Un-deploying, Un-reserving, and Un-initializing states. • Error on Timeout - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action times out.
Timeout (seconds)	The time to wait until a timeout occurs for the lifecycle action. Set this field to zero (0) if you do not want the action to timeout, but realize that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

See the following table for descriptions of the out-of-the-box internal actions that 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 referenced in a resource binding. • 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 bindings, 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 Binding
Build Resource Provider	Builds a candidate list of resource providers that meet the following requirements:	Resource Binding

Internal Action	Description	Applies To
List	• Support the resource offering referenced in a resource binding. • 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.	
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
Deploy Topology Based Service Component	Initiates the deployment of a delegated topology service component. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	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 binding. This action should be configured in the **Un-reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 binding. This action should be configured in the **Reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 Binding, or Resource Offering for use in troubleshooting.	Resource Binding Resource Offering Service Component
Select Resource Pool from Provider	This internal action is deprecated and may be removed in a future CSA release. Use the **Select Resource Provider and Pool** action in conjunction with the **Build Resource Provider and Pool List** action in place of this action. Selects a resource pool from the set of resource pools associated with the selected resource provider. A resource pool must have an **Availability** of **Enabled** to be selected. The selected resource pool will be available to resource offering actions in the token `RSC_POOL_ID`.	Resource Binding
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	Resource Binding

Internal Action	Description	Applies To
	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.	
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 Binding
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 Binding
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 Binding
Undeploy Topology Based Service Component	Initiates the undeployment of a delegated topology service component. The service component must have a property named `topologyId`, with a value that is the id of the topology design to be undeployed. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	Service Component

Delete a Lifecycle Action from a Service Component

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 82.

To delete a lifecycle action from a service component:

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.
2. Select the service design.
3. In the **Designer** tab, select the service component from which you want to delete a lifecycle action.
4. In the right pane, select **Lifecycle**.
5. In the **Lifecycle** pane toolbar, select the **Edit** icon.

6. In the **Lifecycle** view, on the lifecycle state diagram, select the lifecycle state from which you want to delete an action. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.

7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable.

8. From the list of actions, highlight the action you want to delete.

9. In the toolbar, select the **Delete** icon.

10. Click **Yes** in the confirmation dialog.

Edit Properties of a Lifecycle Action for a Service Component

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 82.

To edit the properties of a lifecycle action for a service component:

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.

2. Select the service design.

3. In the **Designer** tab, select the service component for which you want to edit the properties of a lifecycle action.

4. In the right pane, select **Lifecycle**.

5. In the **Lifecycle** pane toolbar, select the **Modify Lifecycle Actions** icon.

6. In the **Lifecycle** window, on the lifecycle state diagram, select the lifecycle state for which you want to edit the properties of an action. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.

7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable.

8. From the list of actions, select the **Display Name** of the action whose properties you want to edit.

9. In the **Summary** tab, you can edit properties as described in the topic "Create a Lifecycle Action for a Service Component" on page 86.

10. In the **Properties** tab, you can specify action input properties whose values are passed to the process definition prior to invoking the action. Either type an input value or click the **Token** icon to select a token, which is a system value that is automatically resolved internally when the property is read. Token values are available only for string and are not available for Boolean or integer properties. See the table below for a description of the tokens available for service component lifecycle actions.

11. The following properties are available only for each action input that is created in a stable lifecycle state:
    a. Visible - indicates that this action input property can be made visible in the Marketplace Portal.

    b. Editable - indicates that this action input property can be edited in the Marketplace Portal.

The following tokens are available for service component lifecycle actions:

Token	Description
Parent Service Component ID ([TOKEN:PRN_COMPONENT_ID])	Resolves to the Service Component ID of the parent service component.
Service Blueprint ID ([TOKEN:SVC_BLUEPRINT_ID])	Resolves to the Service Blueprint ID.

Token	Description
Service Catalog ID ([TOKEN:SVC_CATALOG_ID])	Resolves to the Service Catalog ID used at subscription time.
Service Component ID ([TOKEN:SVC_COMPONENT_ID])	Resolves to the Service Component ID of the component associated with this action.
Service Component Type ([TOKEN:SVC_COMPONENT_TYPE])	Resolves to the Service Component Type (for example, Server) of the component associated with this action.
Service Instance ID ([TOKEN:SVC_INSTANCE_ID])	Resolves to the Service Instance ID created at subscription time.
Service Offering ID ([TOKEN:SVC_OFFERING_ID])	Resolves to the Service Offering ID.
Service Request Organization ID ([TOKEN:REQ_ORG_ID])	Resolves to the Organization ID associated with the service request.
Service Request User ID ([TOKEN:REQ_USER_ID])	Resolves the User ID associated with the service request.
Subscriber's Email Address ([TOKEN:SVC_SUBSCRIPTION_EMAIL])	Resolves to email address of the subscriber.
Subscriber's Organization ID ([TOKEN:USR_ORG_ID])	Resolves to the Organization ID associated with the subscriber.
Subscription ID ([TOKEN:SVC_SUBSCRIPTION_ID])	Resolves to the Subscription ID created at subscription time.
Subscription Upgrade Retry ([TOKEN:ACTION_EXECUTION_RETRY])	Resolves to **false** on the first attempt of an upgrade. Resolves to **true** for subsequent upgrade attempts after the initial upgrade failed.

Move a Lifecycle Action for a Service Component

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 82.

To move a lifecycle action for a service component

1. In the left pane of the **All Designs** area, select the tag associated with the design you want to modify.
2. Select the service design.
3. In the **Designer** tab, select the service component for which you want to move a lifecycle action.
4. In the right pane, select **Lifecycle**.
5. In the **Lifecycle** pane toolbar, select the **Modify Lifecycle Actions** ( ) icon.

6. In the **Lifecycle** window, on the lifecycle state diagram, select the lifecycle state that contains the action you want to move. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.

7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable

8. From the list of actions, highlight the action you want to move.

9. In the toolbar, select the **Move Selected Action to New Lifecycle State** icon.

10. Provide the following information:

Item	Description
Target Lifecycle State	Select the new state for the lifecycle action.
Target Lifecycle Substate	Select the new substate, if applicable, for the lifecycle action. For more information about states and substates, see "Lifecycle Actions for Service Components" on page 82.
Target Lifecycle Execution Order	Specify the execution order for the lifecycle action relative to other lifecycle actions for this lifecycle state. Lifecycle actions are executed in ascending order.

Sequenced Design Subscriber Options

For more information about sequenced designs, see "Sequenced Designs" on page 47.

Concepts

- "Sequenced Design Subscriber Options" above
- "Option Model Workflow" on the next page
- "Target Bindings" on the next page
- "Subscriber Options Controls " on the next page

Subscriber Options Tab

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 custom 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.

Option Model 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.** If you have not saved your items, **Unsaved Changes** displays in the bottom right to remind you.

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 custom 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 custom 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 value binding is called *source binding*. For more information about source bindings, see "Custom Service Component Properties" on page 64.

> **Note:** Target bindings cannot be deleted if the design is part of an upgrade path and the bindings were added to the design from which this design is upgraded. If a target binding has been added to the current design (whether or not the design is part of an upgrade path), those bindings can be deleted.

Subscriber Options Controls

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

Subscriber Options Controls

Item	Description
Add Option button	Click to add a new option.
Add Option Set button	Click to add a new option set.
Add Property link	Click to create properties. See "Sequenced Design Subscriber Options" on the previous page.
🗑	Click to delete one of the following: • Option or option set, as described in "Delete Subscriber Option Sets and Options" on page 98. • Property, as described in "Delete Subscriber Option Properties" on page 104.
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.

Subscriber Options Controls, continued

Item	Description
	You can also reorder an option set or option by clicking and dragging it.
🗐 🔗 🗑	Click to copy property to all options, configure bindings, or delete a property. See "Edit Subscriber Option Properties" on page 103
🗐 📋 **Add Option Set**	Click to copy an option set, paste an option set, or add an option set.
🗐 📋 **Add Option**	Click to copy an option, paste an option, or add an option to an option set.

Tasks

See the following topics for sequenced design subscriber option tasks:

- "Add Subscriber Option Sets and Options" below
- "View Subscriber Option Sets and Options" on page 96
- "Reorder Subscriber Option Sets and Options" on page 96
- "Edit Subscriber Option Sets and Options" on page 97
- "Delete Subscriber Option Sets and Options" on page 98
- "Create Subscriber Option Properties" on page 99
- "Edit Subscriber Option Properties" on page 103
- "Delete Subscriber Option Properties" on page 104

Add Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

> **Note:** The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design.

To add a subscriber option set and options:

1. In the middle pane of the **All Designs** area, select the version associated with the design you want to modify.
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:

- **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 92.

See the following related topics:

- "View Subscriber Option Sets and Options" on the next page
- "Reorder Subscriber Option Sets and Options" on the next page
- "Edit Subscriber Option Sets and Options" on page 97
- "Delete Subscriber Option Sets and Options" on page 98
- "Create Subscriber Option Properties" on page 99

- "Edit Subscriber Option Properties" on page 103
- "Delete Subscriber Option Properties" on page 104

View Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

> **Note:** The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design. Option sets and options can be created in a hierarchy of options sets and options. This provides a way to group the layout of options to be more meaningful to the subscriber.

To view subscriber option sets and options:

1. In the middle pane of the **All Designs** area, select the version associated with the design 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.
4. Click **Navigate to Option** to view the option set for an option.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92
- "Add Subscriber Option Sets and Options" on page 94
- "Reorder Subscriber Option Sets and Options" below
- "Edit Subscriber Option Sets and Options" on the next page
- "Delete Subscriber Option Sets and Options" on page 98
- "Create Subscriber Option Properties" on page 99
- "Edit Subscriber Option Properties" on page 103
- "Delete Subscriber Option Properties" on page 104

Reorder Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

> **Note:** The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design. Option sets and options can be created in a hierarchy of options sets and options. This provides a way to group the layout of options to be more meaningful to the subscriber.

To change to order of option sets or options:

1. In the middle pane of the **All Designs** area, select the version associated with the design you want to modify.
2. Select the **Subscriber Options** tab.
3. 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 92.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92
- "Add Subscriber Option Sets and Options" on page 94
- "View Subscriber Option Sets and Options" on the previous page
- "Edit Subscriber Option Sets and Options" below
- "Delete Subscriber Option Sets and Options" on the next page
- "Create Subscriber Option Properties" on page 99
- "Edit Subscriber Option Properties" on page 103
- "Delete Subscriber Option Properties" on page 104

Edit Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

> **Note:** The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design.

Edit Subscriber Option Sets

To edit a subscriber option set:

1. In the middle pane of the **All Designs** area, click the version number of the design 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.

Edit Subscriber Options

To edit a subscriber option:

1. In the middle pane of the **All Designs** area, click the version number of the design 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** - Selection this option to present options as check boxes in the Marketplace Portal.

See the following related topics:

Delete Subscriber Option Sets and Options

For more information about subscriber options, see .

Note: The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design.

Note: Subscriber option sets and options cannot be deleted if the design is part of an upgrade path and the option sets or options were added to the design from which this design is upgraded. If an option set or option has been added to the current design (whether or not the design is part of an upgrade path), those option sets or options can be deleted.

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**.

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**.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92
- "Add Subscriber Option Sets and Options" on page 94
- "View Subscriber Option Sets and Options" on page 96
- "Reorder Subscriber Option Sets and Options" on page 96
- "Edit Subscriber Option Sets and Options" on page 97
- "Create Subscriber Option Properties" below
- "Edit Subscriber Option Properties" on page 103
- "Delete Subscriber Option Properties" on page 104

Create Subscriber Option Properties

For more information, see "Sequenced Design Subscriber Options" on page 92.

> **Note:** The **Subscriber Options** tab is read-only if any service offerings have been created using the selected service design.

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. In the middle pane of the **All Designs** area, select the version associated with the design you want to modify.

2. Click the **Subscriber Options** tab.

3. Select the option set to which you want to add an option property.

4. Click **Navigate to Option Set**.

5. In the right pane, click **Add Property**.

6. In the Add Property dialog, select the property type and details as described in the following table.

7. Click **Done**.

8. 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**.

Property Details	*For Boolean 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.
	
	• **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. This option cannot be changed for

Item	Description
	Integer properties.

- **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. Note that this field is available only when the **Enable Multi-Select** option is selected.

- **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 name. To add new scripts, place them in the folder:
    `%CSA_HOME%\jbossas\standalone\deployments\csa.war\propertysources`
    - Specify the HTTP parameters to use when executing the script. The required input parameters are dependent on the script that has been selected; contact the script developer if necessary to determine the necessary input parameters.

    - **Parameter Name** - For each **Parameter Name** you enter, supply a **Parameter Value**, which can be a token or a constant value. For example, to supply a **Parameter Value** that will contain the ID of the OpenStack provider that was selected during provisioning, enter or select a **Parameter Value** of [PROVIDER:OPENSTACK:ID]. Note that tokens are resolved only at subscription time and are not resolved when the script is run from the Subscriber Options area. When the script is run from the Subscriber Options area, the literal value of the token will be passed to the script.

      Note: The script is invoked at subscription ordering or modification time by the out-of-the-box CSA user `csaReportingUser`, who has read-only access to CSA. For more information on this user, see the *HPE Cloud Service Automation Configuration Guide*.

Item	Description
	○ You can select from the following tokens as the parameter value: **Server-side tokens**: • **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. • **Service Blueprint ID** - Resolves to the Service Blueprint ID. • **Service Instance ID** - Resolves to the Service Instance ID. • **Service Offering ID** - Resolves to the Service Offering ID. • **Service Request Organization ID** - Resolves to the Organization ID associated with the Service Request. • **Service Request User ID** - Resolves to the User ID associated with the Service Request. • **Subscription ID** - Resolves to the Subscription ID created at subscription time. **Client-side tokens**: • [CLIENT:<property_name>] - Allows you to have a dependency on a value from another list property, which means that if a value is selected in "Property A", for example, the list of values in "Property B" will change based on that selection. "Property A" and "Property B" must exist within the same Subscriber Option. Note that <property_name> refers to the property **Name**, and not its **Display Name**. • [PROVIDER:<provider_name>:ID] - The ID of the provider with the specified name that was selected by the subscriber when ordering the subscription. ○ Click the **Refresh Data** button to run the script and display the results. *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. Note that this field is available only when the **Editable** option is selected. • **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.

Item	Description
	○ **(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:/`, `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 92.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92
- "Add Subscriber Option Sets and Options" on page 94
- "View Subscriber Option Sets and Options" on page 96
- "Reorder Subscriber Option Sets and Options" on page 96
- "Edit Subscriber Option Sets and Options" on page 97
- "Delete Subscriber Option Sets and Options" on page 98
- "Edit Subscriber Option Properties" below
- "Delete Subscriber Option Properties" on the next page

Edit Subscriber Option Properties

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

Note: Subscriber option sets and options cannot be edited if the design is part of an upgrade path and the option sets or options were added to the design from which this design is upgraded. If an option set or option has been added to the current design (whether or not the design is part of an upgrade path), those option sets or options can be edited.

Perform the following steps to edit a subscriber option property:

1. From the **Designer**, click the version number of the design 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.

7. Select the tool icons to **Copy Property to All Options**, **Configure Bindings**, or **Delete Property**.

   - **Bind Property** - Binding is a link between option model properties and design properties. A property can have more than one binding. Clicking Bind displays a working area where you can view and delete existing bindings and configure new bindings. You can bind an option property to a property on a component or group.

   - **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.

   For more information about deleting a property, see "Delete Subscriber Option Properties" below.

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 92.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92

- "Add Subscriber Option Sets and Options" on page 94

- "View Subscriber Option Sets and Options" on page 96

- "Reorder Subscriber Option Sets and Options" on page 96

- "Edit Subscriber Option Sets and Options" on page 97

- "Delete Subscriber Option Sets and Options" on page 98

- "Create Subscriber Option Properties" on page 99

- "Delete Subscriber Option Properties" below

Delete Subscriber Option Properties

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 92.

Note: Subscriber option properties cannot be deleted if the design is part of an upgrade path and the option properties were added to the design from which this design is upgraded. If an option property has been added to the current design (whether or not the design is part of an upgrade path), those option properties can be deleted.

To delete a subscriber option property:

1. From the **Designer**, click the version number of the design you want to modify.

2. Select the **Subscriber Options** tab.

3. Select the option set from which you want to delete the option property.

4. Click **Navigate to Option Set**.

5. Select the option from which you want to delete a property.

6. In the right pane, under **Properties**, click the trashcan icon of the option property to delete.

7. Click **Yes** to confirm the deletion.

8. Click **Save**.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 92
- "Add Subscriber Option Sets and Options" on page 94
- "View Subscriber Option Sets and Options" on page 96
- "Reorder Subscriber Option Sets and Options" on page 96
- "Edit Subscriber Option Sets and Options" on page 97
- "Delete Subscriber Option Sets and Options" on page 98
- "Create Subscriber Option Properties" on page 99
- "Edit Subscriber Option Properties" on page 103

Upgradability

For more information about sequenced designs, see "Sequenced Designs" on page 47.

Concepts

The **Upgradability** tab allows you to 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 the version from which it is being upgraded, or view the differences between the selected version and the version from or to which it is being upgraded.

Tip: In a sequenced design, the **Overview** tab also displays **Upgradable From** and **Upgradable To** 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 selected version and the version from which it is being upgraded.

- **Publish upgrade service design** - After you edit or add an upgrade path, click the gear icon and select **Publish** to publish the service design as part of an upgrade path. This action validates upgradability rules compliance.

- **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 selected service design version and the version from or to which it is being upgraded. 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.

This design is part of an upgrade path and has restricted editability and actions

When you are in the service design versions 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 a design if it is part of an upgrade path. The following is a list of items and descriptions of functions that are restricted:

- Resource Offerings

  - *Deleting a resource offering* - The properties of a resource offering cannot be deleted if the resource offering is linked to a service component that is part of an upgraded service design (a service design to which another design can be upgraded). That is, if a resource offering has been configured for a resource binding of a service component that is part of an upgraded service design, the properties of the resource design cannot be deleted.

    The properties of a resource offering can be deleted if the resource offering is not linked to a service component or if the resource offering is linked to a service component of a design that is not upgraded. A property of a resource offering can also be deleted if the property originated in the current design (upgraded or not upgraded). That is, if the property was initially added to the resource offering that is linked to a service component in the current design, it can be deleted.

- Service Components and Properties

  - *Deleting a service component* - A service component cannot be deleted if it is part of an upgraded design and the component originated in the upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the component cannot be deleted from the upgraded design.

    A service component can be deleted from the current design (upgraded or not upgraded) if the component originated in the current design (the component was initially added to the current design).

- *Editing service component properties: Component Order and Pattern* - The Component Order and Pattern properties of a service component cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the Component Order and Pattern properties of the component in the upgraded design cannot be edited.

- *Deleting a custom service component property* - A custom service component property cannot be deleted if it is part of an upgraded design and the property originated in the upgradable design (the design from which this design is an upgrade). That is, if a component with a custom service component property is added to a design and that design is upgradable, when the design is upgraded, the custom service component property of the component cannot be deleted from the upgraded design.

  A custom service component property can be deleted from the current design (upgraded or not upgraded) if the custom service component property originated in the current design (the custom service component property was initially added to the current design).

- *Editing a service component custom property: Name* - The Name custom property cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the Name custom property of the component in the upgraded design cannot be edited.

- Service Component Resource Bindings and Properties

  - *Deleting a resource binding* - A resource binding in a service component cannot be deleted if it is part of an upgraded design and the resource binding originated in the upgradable design (the design from which this design is an upgrade). That is, if a component with a resource binding is added to a design and that design is upgradable, when the design is upgraded, the resource binding of the component cannot be deleted from the upgraded design.

    A resource binding can be deleted from a component in a design (upgraded or not upgraded) if the resource binding originated in a component of the current design (the resource binding was initially added to a component of the current design).

  - *Editing a resource binding property: Binding Order* - The Binding Order of a service component cannot be edited if the component originated in an upgradable design (the design from which this design is an upgrade). That is, if a component is added to a design and that design is upgradable, when the design is upgraded, the Binding Order of the component in the upgraded design cannot be edited.

  - *Adding or deleting measurable properties* - A measurable property of a resource binding in a service component cannot be added or deleted if it is part of an upgraded design.

- Subscriber Option Sets

  - *Deleting a subscriber option set* - Subscriber option sets cannot be deleted if the design is part of an upgrade path and the option sets were added to the design from which this design is upgraded. If an option set has been added to the current design (whether or not the design is part of an upgrade path), those option sets can be deleted.

- Subscriber Options and Properties

  - *Deleting a subscriber option* - Subscriber options cannot be deleted if the design is part of an upgrade path and the options were added to the design from which this design is upgraded. If an option has been added to the current design (whether or not the design is part of an upgrade path), those options can be deleted.

- *Deleting a subscriber option property* - Subscriber option properties cannot be deleted if the design is part of an upgrade path and the option properties were added to the design from which this design is upgraded. If an option property has been added to the current design (whether or not the design is part of an upgrade path), those option properties can be deleted.

- *Editing a subscriber option property: name* - The subscriber option property name cannot be edited if the design is part of an upgrade path and the option properties were added to the design from which this design is upgraded. If an option property has been added to the current design (whether or not the design is part of an upgrade path), the option property name can be edited.

- *Editing a subscriber option property: target binding* - Target bindings cannot be edited if the design is part of an upgrade path and the bindings were added to the design from which this design is upgraded. If a target binding has been added to the current design (whether or not the design is part of an upgrade path), those bindings can be deleted.

Manage Tags

To 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 a Tag" below
- "Edit a Tag" on the next page
- "Delete a Tag" on the next page

Create a Tag

For more information about tags, see "Manage Tags" above.

To create a tag

1. In the Manage Tags dialog, click the **Add** icon.
2. In the Create Tag dialog, enter the following information:
    a. **Display Name** - The name you provide for this tag.
    b. **Description** - The description you provide for this tag.
    c. **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.

    d. **Color** - A color that displays for the tag.

3. Click **Create**.

Edit a Tag

For more information about tags, see "Manage Tags" on the previous page.

To edit a tag

1. In the Manage Tags dialog, click the **Edit** icon.
2. Make your changes and then click **Save**. For information about certain fields, see "Create a Tag" on the previous page.

Delete a Tag

For more information about tags, see "Manage Tags" on the previous page.

To delete a tag

1. In the Manage Tags dialog, select the tag you want to delete.
2. Click the **Delete** icon.
3. Click **Yes** in the confirmation dialog.

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.

Out-of-the-Box Component Types

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 Monitoring Network Storage
Load Balancing Pool	Describes the membership of Servers in a pool that serves a load-balanced Software Application Service.	No component type constraints	Compute Network Service Assurance Service Usage
Network Connection	Describes the relationship of a Server interface to a Virtual Network.	No component type constraints	Network
Platform Service	Represents a collection of infrastructure services that also provide middleware, databases, and other components required to host an application.	Delegated Topology (not available in CSA version 4.60 or later)	Application Compute Configuration Management

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
		Infrastructure Service	Infrastructure Monitoring Network Storage
Policy Enforcement Point	Describes the implementation of access control policies for a Virtual Network.	No component type constraints	Compliance Network Security
Server	A virtual or physical server that is provisioned by CSA. Provides specific provisioning attributes for individual servers (can optionally be marked as **Pattern** when this service component is used in a service design).	Application Layer Network Connection Software Component Storage Volume	Application Compliance Compute Configuration Management Monitoring 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	Application Compute Configuration Management Infrastructure Monitoring Service Usage

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
		Software Application Service	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 Tier	Describes a type of software, or a collection of software, that is applied to all Servers within a Server Group.	Server Group	Application 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

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 bindings normally created in a service design.

View Component Palettes

For more information about components, see "Components (Sequenced Designs)" on page 109.

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.

Use the following icons and features to navigate and perform tasks in the **Sequenced Components** area:

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.

Create a Component Palette

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

Import process for component palettes

- The import process imports component palettes, including their associated component types, templates, and component type constraints.
- If the component palette already exists on the system (meaning that it has the same internal name as another palette on the system), it is updated with any added or removed component types, component templates, and component type constraints.
- 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.

- When importing multiple, dependent component palettes that already exist on the target system, it is recommended that you import the palettes in the order of their dependencies.

- 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 derive 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.

- If component templates in a component palette have resource bindings on resource offerings, when the component palette is exported, resource offering XML files are included in the component palette archive.

- At component palette import, resource offerings are either created when a resource offering with same name does not exist on the system, or updated when a resource offering with the same name exists. This resource offering import behavior occurs because the import option for a component palette is always Update.

Content archive for component palettes

Exporting a component palette creates a content archive (.zip) file. The content archive contains XML documents for the component palette and its associated component types, component templates, and component type constraints. It also contains icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

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 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`

The import and export processes allow you to do the following:

To import a component palette

1. Click the gear icon and select **Manage Component Palettes**.
2. Click the **Import Component Palette** icon.
3. Select or specify the **Archive File** (.zip file) that contains the palette you want to import.
4. Select **Update** to import the palette and its component types (including properties, component type constraints, and templates). If a component type already exists on the target system, it is overwritten.
5. Click **Preview** to see a report of prospective results for the import process, including information about the artifacts and their status, as well as information about palette dependencies.
6. Click **Import**.
7. Click **View Detailed Report** to see a summary and details of the import process, including information about the artifacts and their status.
8. Click **Yes** to confirm the import.

To export a component palette

1. Click the gear icon and select **Manage Component Palettes**.
2. Click the **Export Selected Component Palette** icon.

3. Click **Yes**.

4. Save the exported component palette, if required by your browser.

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

View Component Types

For more information about components, see "Components (Sequenced Designs)" on page 109.

To view component types

In the left pane of the **Sequenced 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.

Use the following icons and features to navigate and perform tasks in the **Sequenced Components** area:

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.

Create a Component Type

For more information about component types, see "Components (Sequenced Designs)" on page 109.

To 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.
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

Item	Description
	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.
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-as\standalone\deployments\csa.war\images\library` folder of the CSA server.
Default Settings	Select the following items as needed. These items specify the initial default values for 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 and lifecycle actions 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. • **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 CSA 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. • You can identify a service component that is marked as a pattern because its icon appears as a stacked, double image with a grid-like background, as shown below. ※

View Component Type Details

For more information about components, see

To view the details of a component type

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 descriptions of the specific properties, see the topic "Create a Component Type" on page 116.

See the following related topics:

- "View Component Type Properties" on the next page
- "View Constraints of a Component Type" on page 122
- "View Component Templates" on page 124

Edit a Component Type

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 **Sequenced 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 116.

5. Click **Save**.

Delete a Component Type

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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.

4. In the **Properties** tab, the properties are grouped into two lists:
   - **Defined Properties** - Properties created directly on this component type. You can delete, edit, and update defined properties and their values, unless the component is locked. In which case, only the property value can be set and the **Delete** action will be disabled for the property that is part of the locked component type.

   - **Inherited Properties** - Properties inherited from base parent and grandparent component types. Inherited properties cannot be deleted, and you can edit only the following for inherited properties:
     - Property values
     - **Consumer Visible** property
     - **Confidential Data** property
     - **Resource Type and Unit** property (for Integer property types only)

5. For more information about property details, see "Create Component Type Properties" below.

See the following related topics:

- "View Component Type Details" on page 117.

- "View Constraints of a Component Type" on page 122

- "View Component Templates" on page 124

Create Component Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

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. Enter the following information and then click **Create**.

Item	Description
Type	Select one of the following: • **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 change the value of this field once the property has been created.
Depending on the **Type** selected above, provide the following information:	
Boolean	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **Property Value** - Select either **True** or **False**. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal.
String	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **Property Value** - Type the value of the property. The value must be in string format. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal. • **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.
Integer	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **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.

Item	Description
	You must set this to a value other than **None** to make this property measurable and available for configuration on a resource binding. 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** - Type the value of the property. The value must be an integer. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal.
List	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **Property Values** • 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. Values must be unique with a list. ◦ **Description** A description of the list item. ◦ Click **Create** to add the list item. • Click the **Edit** icon to edit a selected list item. • Click the **Remove** icon to remove a selected list item. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal.

Edit Component Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

For inherited properties, you cannot edit the following fields:

- 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 119.

6. Click **Save**.

Delete Component Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

> **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 part of the original locked component type. In this case, in the component property **Defined Properties** list, the **Delete** action will be disabled. A locked property can also be identified when in the edit view. The locked icon will appear in the lower left hand corner of the edit dialog.

- If the property is inherited from another component type.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 resource bindings only to resource offerings 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.

See the following related topics:

- "View Component Type Details" on page 117
- "View Component Type Properties" on page 119
- "View Component Templates" on the next page

Add a Constraint

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 more information about components, see "Components (Sequenced Designs)" on page 109.

For information about constraints, see "View Constraints of a Component Type" on page 122.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 bindings 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 127.
- **Properties** tab - See "View Component Template Properties" on page 127.
- **Lifecycle** tab - See "View Component Template Lifecycle Actions" on page 130.
- **Resource Bindings** tab - See "View Component Template Resource Bindings" on page 135.

Use the following icons and features to navigate and perform tasks in the **Sequenced Components** area:

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.

Create Component Templates

For more information about components, see "Components (Sequenced Designs)" on page 109.

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.
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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 125.

See the following related topics:

- "Create Component Template Properties" on the next page.
- "View Component Template Lifecycle Actions" on page 130.
- "View Component Template Resource Bindings" on page 135

View Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

To view the properties 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 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:
   - **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.

6. For more information about property details, see "Create Component Template Properties" on the next page.

See the following related topics:

- "View Component Template Details" above
- "View Component Template Lifecycle Actions" on page 130

- "View Component Template Resource Bindings" on page 135

Create Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

To 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, enter the following information and then click **Create**.

Item	Description
Type	Select one of the following: • **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.
Depending on the **Type** selected above, provide the following information:	
Boolean	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **Property Value** - Select either **true** or **false**. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal.
Integer	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **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 binding. 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** - Type the value of the property. The value must be an integer. • **Consumer Visible** - Select this box to indicate that this property will be made visible in

Item	Description
	the Marketplace Portal.
List	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **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. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal.
String	• **Name** - A unique name for the property. • **Display Name** - The label that will be displayed for the property. • **Description** - A description of the property. • **Property Value** - Type the value of the property. The value must be in string format. • **Consumer Visible** - Select this box to indicate that this property will be made visible in the Marketplace Portal. • **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 more information about components, see "Components (Sequenced Designs)" on page 109.

For inherited properties, you cannot edit the following fields:

- Type
- 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 128.

Delete Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 109.

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 Lifecycle Actions

For more information about components, see "Components (Sequenced Designs)" on page 109.

For more information about lifecycle actions, see the topic "Lifecycle Actions for Service Components" in the Designs Help.

To view the lifecycle actions 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 lifecycle actions you want to view.

2. Click the component type whose template lifecycle actions you want to view.

3. Select the **Templates** tab.

4. In the template list, click the component template whose lifecycle actions you want to view.

5. In the **Lifecycle** tab, click the **Expand All** icon. In the list, you can see all lifecycle actions configured for each state and substate.

See the following related topics:

- "View Component Template Details" on page 127
- "View Component Template Properties" on page 127
- "View Component Template Resource Bindings" on page 135

Create a Lifecycle Action for a Component Template

For more information about components, see "Components (Sequenced Designs)" on page 109.

Before you create lifecycle actions, be sure you have the latest process definitions from Operations Orchestration. For instructions about how to do this, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

To create a lifecycle action for a component template

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template lifecycle actions you want to create.
2. Click the component type whose template lifecycle actions you want to create.
3. Select the **Templates** tab
4. In the template list, click the component template whose lifecycle actions you want to create.
5. Click the **Lifecycle** tab.
6. On the lifecycle state diagram, select the lifecycle state for which you want to create an action. For more information about states and substates, see the topic "Lifecycle Actions for Service Components" in the Designs Help.
7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable.
8. Select the **Create New Action** icon.
9. Enter information described in the table below.

Item	Description
Process Engine	Select a process engine, which is a container for process definitions. You can select either the Internal process engine or one of the Operations Orchestration (OO) engines.
Process Definition	Select a process definition, which is configured to run a specified internal action (see the table below for the list of internal actions) or external action.
Complete the following Identification fields:	
Display Name	The name you provide for the lifecycle action.
Description	The description you provide for the lifecycle action.
Marketplace Portal Options	These options are available only for actions created in stable lifecycle states (Initialized, Reserved, Deployed). - Visible - When checked, this indicates that the lifecycle action will be available to be run in the Marketplace Portal. The box is checked by default for actions created in stable

Item	Description
	lifecycle states.
Execution Order	The execution order for the lifecycle action, which is relative to other lifecycle actions for this lifecycle state or substate, if applicable. Lifecycle actions are executed in ascending order.
Execution Properties	Specify the following: • Fail on Error - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action fails. The default selection is **false** for actions created in the Un-deploying, Un-reserving, and Un-initializing states. • Error on Timeout - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action times out.
Timeout (seconds)	The time to wait until a timeout occurs for the lifecycle action. Set this field to zero (0) if you do not want the action to timeout, but realize that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

See the following table for descriptions of the out-of-the-box internal actions that 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 referenced in a resource binding. • 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 bindings, 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 Binding
Build Resource Provider List	Builds a candidate list of resource providers that meet the following requirements: • Support the resource offering referenced in a resource binding. • Have an **Availability** of **Enabled**. • If the service offering that references the service design with this action is in	Resource Binding

Internal Action	Description	Applies To
	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
Deploy Topology Based Service Component	Initiates the deployment of a delegated topology service component. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	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 binding. This action should be configured in the **Un-reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 binding. This action should be configured in the **Reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 Binding, or Resource Offering for use in troubleshooting.	Resource Binding Resource Offering Service Component
Select Resource Pool from Provider	This internal action is deprecated and may be removed in a future CSA release. Use the **Select Resource Provider and Pool** action in conjunction with the **Build Resource Provider and Pool List** action in place of this action. Selects a resource pool from the set of resource pools associated with the selected resource provider. A resource pool must have an **Availability** of **Enabled** to be selected. The selected resource pool will be available to resource offering actions in the token `RSC_POOL_ID`.	Resource Binding
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 Binding

Internal Action	Description	Applies To
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 Binding
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 Binding
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 Binding
Undeploy Topology Based Service Component	Initiates the undeployment of a delegated topology service component. The service component must have a property named `topologyId`, with a value that is the id of the topology design to be undeployed. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	Service Component

Delete a Lifecycle Action from a Component Template

For more information about components, see "Components (Sequenced Designs)" on page 109.

To delete a lifecycle action from a component template

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template lifecycle action you want to delete.
2. Click the component type whose template lifecycle action you want to delete.
3. Select the **Templates** tab
4. In the template list, click the component template whose lifecycle action you want to delete.
5. Click the **Lifecycle** tab.

6. On the lifecycle state diagram, select the lifecycle state from which you want to delete an action. For more information about states and substates, see the topic "Lifecycle Actions for Service Components" in the Designs Help.

7. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable.

8. In the toolbar, select the **Delete** icon.

9. Click **Yes** in the confirmation dialog.

View Component Template Resource Bindings

For more information about components, see "Components (Sequenced Designs)" on page 109.

To view the resource bindings 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 resource bindings you want to view.

2. Click the component type whose template resource bindings you want to view.

3. Select the **Templates** tab.

4. In the templates list, click the component template whose resource bindings you want to view.

5. In the **Resource Bindings** tab, review the list of resource bindings for the component template.

To create a resource binding on a service component

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template resource binding you want to create.

2. Click the component type whose template resource binding you want to create.

3. Select the **Templates** tab.

4. In the component templates list, click the component template whose resource binding you want to create.

5. In the **Resource Bindings** tab, click **Create**. If no resource bindings exist, click the **Create Resource Binding** icon in the middle of the window.

6. In the **Create New Resource Binding** wizard, enter information described in the topic "Create a Resource Binding" in the Designs Help.

See the following related topics:

- "View Component Template Details" on page 127
- "View Component Template Properties" on page 127
- "View Component Template Lifecycle Actions" on page 130

To edit properties of a resource binding on a component template

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose template resource binding you want to edit.

2. Click the component type whose template resource binding properties you want to edit.

3. Select the **Templates** tab.

4. In the component templates list, click the component template whose resource binding properties you want to edit.

5. Click the **Resource Bindings** tab.

6. Select the display name of the resource binding you want to edit.

7. In the Summary tab, click the **Edit** icon.

8. Edit the properties of the resource binding, as desired. For descriptions of the specific properties, see the topic "Edit Properties of a Resource Binding" in the Designs Help.

Delete a Component Template Resource Binding

For more information about components, see "Components (Sequenced Designs)" on page 109.

To delete a resource binding from a component template

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

2. Click the component type whose template resource binding you want to delete.

3. Select the **Templates** tab.

4. In the templates list, click the component template whose resource binding you want to delete.

5. In the **Resource Bindings** tab, select the resource binding you want to delete, and click **Delete**.

6. Click **Yes** in the confirmation dialog.

See the following related topics:

- "View Component Template Details" on page 127
- "View Component Template Properties" on page 127
- "View Component Template Lifecycle Actions" on page 130

Resource Offerings (Sequenced Designs)

Concepts

Note: Resource Offerings are used only with sequenced designs. They are not applicable to topology 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.

Resource offerings are associated with service designs through resource bindings. When a service design is provisioned, each resource binding (and associated resource offering) is processed through the lifecycle. A provider that supports the resource offering is selected during the resource binding provisioning.

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.

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 `rhel53x64`, 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, `rhel53x64`). 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 in a resource binding. 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 in the Resource Binding. 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 the Resource Binding. 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 **Designs**-->**Sequenced**-->**Resource Offerings**.

> **Note:** Be sure you do not 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.

View Resource Offerings

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

To view resource offerings

1. In the **By Provider Type** or **By Category** tab, select a **Provider Type** or **Category** whose list of offerings you want to see. For example, select **SiteScope** to see all offerings associated with that provider type or select **Application** to see all offerings associated with that category.

2. For descriptions of the specific properties, see "Create a Resource Offering" below.

Create a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

To create a resource offering

1. In the **By Provider Type** or **By Category** tab, select the provider type or category for the resource offering you want to create.

2. In the **Offerings** tab toolbar, click the **Create New Offering** icon.

3. In the Create New Offering dialog, enter the following information:

Item	Description
Display Name	The name you provide for the offering.
Description	The description you provide for the offering.
Type	The provider type for this offering. This field cannot be changed after an offering is created.
Category	The category for this offering. For more information, see "Categories" on page 156. This field cannot be changed after an offering is created.

4. Click **Create**.

Import and Export a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

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 system is supported by import and update operations. The import behavior only adds artifacts, whereas the update operation replaces matching artifacts. See the **Importing and Exporting** section below for more information.

Before you import a resource offering

Recommended best practices

1. 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.

2. Since some of the import and update options are destructive to existing data, make sure you understand the differences between the options available to ensure you choose the option that matches your expectations.

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 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`

Import requirements and prerequisites

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.

Process Definitions

During an import operation, required dependencies may not exist on the system, which produces an import error that identifies the missing dependencies. For resource offerings this can include missing process

definitions. These process definitions must be imported to the CSA installation in which the resource offering will be imported. During import, process definitions are resolved by **name**. For process definitions that are associated with the Operations Orchestration process engine, the **name** corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA/3.2/Providers/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). Make sure that all these flows have been imported prior to importing resource offerings. Make sure that these flows have identical signatures and identical paths as the flows on the system from which the resource offering was exported. For instructions about how to import Operations Orchestration flows, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

Importing and Exporting

Import process for resource offerings

Resource offerings that have the same resource category, provider type, properties, and actions are considered to be functionally equivalent and are not imported.

Update process for resource offerings

During the update process, identical resource offerings that exist on the target system are updated (overwritten) with changes from the archive. New resource offerings are created if they do not exist on the target system. Note that resource offerings are identified by name instead of functional equivalence for the update operation.

Update preserving original process for resource offerings

This process imports the resource offering, whether it exists on the target system or not. During this operation, if there is a resource offering with the same name in the system, the name, the display name, and the description of the resource offering are modified internally; the display name and the description are appended with "Superseded on" and the date. The name, display name, and description of the artifact being imported remain intact.

Content archive for resource offerings

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

To import a resource offering

1. In the **Offerings** tab, click the **Import Resource Offering** icon.

2. Select or specify the **Archive File** (.zip file) that contains the resource offering you want to import. Archive filenames for resource offerings begin with `RESOURCE_OFFERING_`.

3. Select an **Option**:

   a. **Import** - imports new resource offerings; does not update existing resource offerings.

   b. **Update** - imports new resource offerings and updates (overwrites) existing resource offerings. The **Update** process uses the resource offering name to determine if the resource offering already exists on the target system. Check **Preserve Originals** to create a backup copy of the original items, appending "Superseded on" and the date to the artifact display names and descriptions.

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 **Yes**.

To export a resource offering

1. In the **By Provider Type** or **By Category** tab, select a **Provider Type** or **Category**.

2. In the **Offerings** tab, highlight the resource offering you want to export and click the **Export Resource Offering** icon.

3. Save the exported resource offering, if required by your browser.

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 process definition, lifecycle state and substate, 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 - lifecycleSubstate name - lifecycleExecOrder - errorOnTimeout - failOnError - timeout - all properties must be identical, including the consumerVisible and consumerReadOnly elements for each property

Element	Necessary for Equivalence
	• 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 CSA artifacts, see the *HPE CSA Content Archive Tool* document.

Delete a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

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.

To delete a resource offering

1. In the **By Provider Type** or **By Category** tab, select a **Provider Type** or **Category**.
2. In the **Offerings** tab, select the offering you want to delete.
3. Select the **Delete** icon.
4. Click **Yes** in the confirmation dialog.

View Properties of a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

To view the properties of a resource offering

Click one of the following the tabs for a resource offering to see more information about it.

- Summary
- Providers
- Lifecycle
- Properties
- Service Designs

Edit Properties of a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

To edit a resource offering

1. In the **Summary** tab, click the **Edit Properties** icon.
2. For descriptions of certain properties, see "Create a Resource Offering" on page 138.

Copy a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

To copy a resource offering

1. In the **Offerings** tab, highlight the resource offering you want to copy.
2. Click the **Create Copy of Selected Offering** icon.

Note: After you copy a resource offering, any changes you make to the original or to the copy will not affect the other.

Associate or Dissociate Providers with a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

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 an offering with a provider, the following must be true for successful provisioning:

- The associated providers support the offering and can deploy it when a service instance is provisioned.
- If an offering is associated with multiple providers, the 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.

To associate providers with a resource offering

For an offering to be used in service designs, it must be associated with at least one provider.

1. In the **Offerings** tab, select the **Display Name** of the offering.
2. In the **Providers** tab, click the **Associate additional providers with this offering** icon.

3. From the list of providers, select one or more you want to associate with the offering.

4. Click **Associate**.

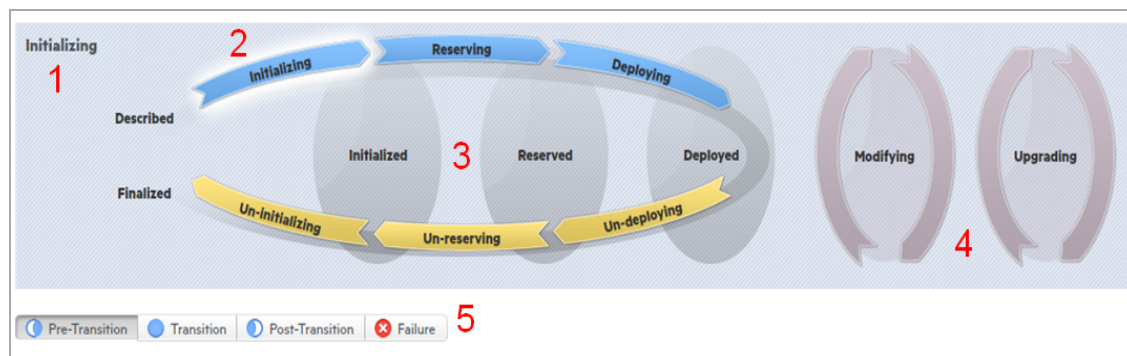## To dissociate providers from a resource offering

1. In the **Offerings** tab, select the **Display Name** of the offering.

2. In the **Providers** tab, highlight the row of one or more providers to be dissociated.

3. Click the **Dissociate providers from this offering** icon.

4. Click **Yes** in the confirmation dialog.

Lifecycle Actions for Resource Offerings

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

What is a resource offering lifecycle?

The **Lifecycle** tab allows you to specify the lifecycle actions that are needed to provision and de-provision resource offerings. A lifecycle action provides a link from a resource offering to an internal or external process definition, which runs to perform a specified action. The collection of actions defined for a resource offering is known as its lifecycle. In the following diagram,review the resource offering lifecycle states, which are discussed in more detail below

Image legend:

- 1 - Currently selected state
- 2 - Transition states
- 3 - Stable states
- 4 - Modifying and Upgrading states
- 5 - Substates

What is a lifecycle action?

A lifecycle action is a function that is either run automatically at a specified lifecycle state or substate, or that is exposed to the subscriber. Lifecycle actions contain the following information:

- A reference to a process definition, which contains the logic for executing the function.
- The property values that are inputs to the process definition.

What are lifecycle states?

A lifecycle state represents a step within the CSA service provisioning and de-provisioning lifecycles. States are either transition states or stable states.

- The following *transition states* are represented in the diagram as curved, arrow icons:
  - Initializing

  - Reserving

  - Deploying

  - Un-deploying

  - Un-reserving

  - Un-initializing

- The following *stable states* (except for Described and Finalized) are represented in the diagram as shaded, oval icons:
  - Described - lifecycle actions cannot be specified at this state

  - Initialized

  - Reserved

  - Deployed

  - Finalized - lifecycle actions cannot be specified at this state

What is a modifying state?

The modifying state is a special transition state that indicates a subscriber has chosen to modify a subscription, and the changes are being processed by the lifecycle engine. The modifying state is shown in the diagram to the right of the other lifecycle states.

The only service components that are processed during the modifying state are those service components that have a Subscriber Option property that gets its value directly from a target binding, or those service components that have a source binding that gets its value indirectly from such a target binding and whose property value is changed as a result of a different option selection during the Modify Subscription Request action. There may be many components with the component property target bound with the option property, but only the components whose property values are changed through different option selections will undergo the Modifying state transition.

The only resource offerings that are processed during the modifying state are those associated with service components that are processed during the modifying state.

What is an upgrading state?

The upgrading state is a special transition state that indicates a Service Operations Manager has chosen to upgrade a subscription, and the changes are being processed by the lifecycle engine. The upgrading state is shown in the diagram to the right of the other lifecycle states.

When the Service Designer creates an upgrade service design to a published service design, service components or resource offerings common to both designs can be updated by adding actions in the upgrading state. These actions are necessary to provide additional capability to existing components in service instances. Those service components or resource offerings will undergo the Upgrading state transition.

What are lifecycle substates?

A lifecycle substate is a further refinement of a lifecycle transition state. Stable states do not have substates. When defining a lifecycle action at a transition state, you must also specify the substate for the action. Substates are represented in the diagram as tabs just beneath the lifecycle diagram. The *substates* are:

- Pre-Transition
- Transition
- Post-Transition
- Failure

To see the list of all lifecycle actions for a resource offering:

1. In the **Offerings** tab select the **Display Name** of the offering for which you want to see a list of lifecycle actions.

2. In the **Lifecycle** tab, click the **Expand All** icon. In this list, you can see all lifecycle actions configured for each state and substate.
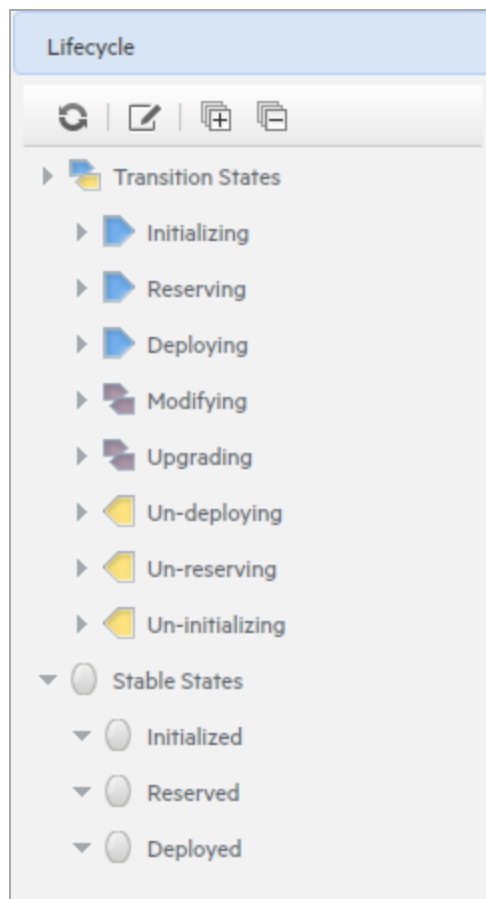
View Properties of a Lifecycle Action for a Resource Offering

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 144.

To view the properties of a lifecycle action for a resource offering

1. In the **Offerings** tab select the **Display Name** of the resource offering whose lifecycle action properties you want to view.

2. In the **Lifecycle** tab, select the lifecycle state that contains the lifecycle action whose properties you want to view. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.

3. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable, that contains the lifecycle action whose properties you want to view.

4. From the list of actions, select the **Display Name** of the lifecycle action whose properties you want to view.

For descriptions of properties in the **Summary** tab, see "Create a Lifecycle Action for a Resource Offering" below.

For descriptions of the properties in the **Properties** tab, see "Edit Properties of a Lifecycle Action for a Resource Offering" on page 151.

Create a Lifecycle Action for a Resource Offering

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 144.

Before you create lifecycle actions, be sure you have the latest process definitions from Operations Orchestration. For instructions about how to do this, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

To create a lifecycle action for a resource offering

1. In the **Offerings** tab select the **Display Name** of the offering for which you want to create a lifecycle action.

2. In the **Lifecycle** tab, on the lifecycle state diagram, select the lifecycle state in which you want to create an action. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.

3. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable, in which you want to create an action.

4. In the toolbar, select the **Create New Action** icon.

5. In the Create New Action wizard, enter information described in the table below.

6. After creating a new lifecycle action, specify values for the action input properties as described in "Edit Properties of a Lifecycle Action for a Resource Offering" on page 151.

Item	Description
Process Engine	Select a process engine, which is a container for process definitions. You can select either the Internal process engine or one of the Operations Orchestration (OO) engines.
Process Definition	Select a process definition, which is configured to run a specified internal action (see the table below for the list of internal actions) or external action.

Item	Description
Complete the following Identification fields:	
Display Name	The name you provide for the lifecycle action.
Description	The description you provide for the lifecycle action.
Marketplace Portal Options	These options are available only for actions created in stable lifecycle states (Initialized, Reserved, Deployed). • Visible - When checked, this indicates that the lifecycle action will be available to be run in the Marketplace Portal. The box is checked by default for actions created in stable lifecycle states.
Execution Order	The execution order for the lifecycle action, which is relative to other lifecycle actions for this lifecycle state or substate, if applicable. Lifecycle actions are executed in ascending order.
Execution Properties	Specify the following: • Fail on Error - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action fails. The default selection is **false** for actions created in the Un-deploying, Un-reserving, and Un-initializing states. • Error on Timeout - If selected, this indicates that provisioning or de-provisioning will stop if the lifecycle action times out.
Timeout (seconds)	The time to wait until a timeout occurs for the lifecycle action. Set this field to zero (0) if you do not want the action to timeout, but realize that this creates the potential of an action not finishing, which may cause the underlying subscription to remain in the Pending state.

See the following table for descriptions of the out-of-the-box internal actions that 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 referenced in a resource binding. • 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 bindings, 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 Binding

Internal Action	Description	Applies To
	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 referenced in a resource binding. • 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 Binding
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
Deploy Topology Based Service Component	Initiates the deployment of a delegated topology service component. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	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 binding. This action should be configured in the **Un-reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 binding. This action should be configured in the **Reserve** section of the **Resource Accounting** tab on a resource binding.	Resource Binding
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 Binding, or Resource Offering for use in troubleshooting.	Resource Binding Resource Offering Service Component
Select Resource Pool from Provider	This internal action is deprecated and may be removed in a future CSA release. Use the **Select Resource Provider and Pool** action in conjunction with the **Build Resource Provider and Pool List** action in place of this action. Selects a resource pool from the set of resource pools associated with	Resource Binding

Internal Action	Description	Applies To
	the selected resource provider. A resource pool must have an **Availability** of **Enabled** to be selected. The selected resource pool will be available to resource offering actions in the token `RSC_POOL_ID`.	
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 Binding
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 Binding
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 Binding
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 Binding
Undeploy Topology Based Service Component	Initiates the undeployment of a delegated topology service component. The service component must have a property named `topologyId`, with a value that is the id of the topology design to be undeployed. For more information, see the *Application Deployment on Realized Topology Instance using Sequenced Design* white paper. **Note:** 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.	Service Component

Delete a Lifecycle Action from a Resource Offering

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 144.

To delete a lifecycle action from a resource offering

1. In the **Offerings** tab select the Display Name of the offering from which you want to delete a lifecycle action.

2. In the **Lifecycle** tab, on the lifecycle state diagram, select the lifecycle state from which you want to delete an action. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.

3. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable, from which you want to delete an action.

4. From the list of actions, highlight the action you want to delete.

5. In the toolbar, select the **Delete Action** icon.

6. Click **Yes** in the confirmation dialog.

Edit Properties of a Lifecycle Action for a Resource Offering

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 144.

To edit a lifecycle action for a resource offering

1. In the **Offerings** tab select the Display Name of the offering whose lifecycle action you want to edit.

2. In the **Lifecycle** tab, select the lifecycle state that contains the action you want to edit. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.

3. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable, that contains the action you want to edit.

4. From the list of actions, select the **Display Name** of the action whose properties you want to edit.

5. In the **Summary** tab, you can edit properties as described in "Create a Lifecycle Action for a Resource Offering" on page 147.

6. In the **Properties** tab, you can specify action input properties whose values are passed to the process definition prior to invoking the action. Either type an input value or click the **Token** icon to select a token, which is a CSA system value that is automatically resolved internally when the property is read. Token values are available only for string properties and are not available for Boolean or integer properties. See the table below for a description of the tokens available for resource offering lifecycle actions.

7. Input properties for actions defined on stable states can also be marked as **Visible** or **Editable**:
   a. Visible - indicates that this input property can be made visible in the Marketplace Portal.

   b. Editable - indicates that this input property can be edited in the Marketplace Portal.

The following tokens are available for resource offering lifecycle actions:

Token	Description
Parent Service Component ID ([TOKEN:PRN_COMPONENT_ID])	Resolves to the Service Component ID of the parent service component. The Service Component ID refers to the service component that the resource offering is associated with in a service design.
Resource Binding ID	Resolves to the Resource Binding ID that was created at subscription time.

Token	Description
([TOKEN:RSC_BINDING_ID])	
Resource Subscription ID ([TOKEN:RSC_SUBSCRIPTION_ID])	Resolves to the Resource Subscription ID that was created from the resource offering at subscription time.
Selected Provider ID ([TOKEN:RSC_PROVIDER_ID])	Resolves to the Provider ID that was selected at subscription time.
Selected Resource Pool ID ([TOKEN:RSC_POOL_ID])	Resolves to the Resource Pool ID that was selected at subscription time.
Service Blueprint ID ([TOKEN:SVC_BLUEPRINT_ID])	Resolves to the Service Blueprint ID.
Service Catalog ID ([TOKEN:SVC_CATALOG_ID])	Resolves to the Service Catalog ID that was used at subscription time.
Service Component ID ([TOKEN:SVC_COMPONENT_ID])	Resolves to the Service Component ID. The Service Component ID refers to the service component that the resource offering is associated with in a service design.
Service Component Type ([TOKEN:SVC_COMPONENT_TYPE])	Resolves to the Service Component Type (for example, Server). The Service Component Type refers to the service component that the resource offering is associated with in a service design.
Service Instance ID ([TOKEN:SVC_INSTANCE_ID])	Resolves to the Service Instance ID created at subscription time.
Service Offering ID ([TOKEN:SVC_OFFERING_ID])	Resolves to the Service Offering ID.
Service Request Organization ID ([TOKEN:REQ_ORG_ID])	Resolves to the Organization ID associated with the service request.
Service Request User ID ([TOKEN:REQ_USER_ID])	Resolves to the User ID associated with the service request.
Subscriber's Email Address ([TOKEN:SVC_SUBSCRIPTION_EMAIL])	Resolves to the subscriber's email address.
Subscriber's Organization	Resolves to the Organization ID associated with the subscriber.

Token	Description
ID ([TOKEN:USR_ORG_ID])	
Subscription ID ([TOKEN:SVC_SUBSCRIPTION_ID])	Resolves to the Subscription ID created at subscription time.
Subscription Upgrade Retry ([TOKEN:ACTION_EXECUTION_RETRY])	Resolves to **false** on the first attempt of an upgrade. Resolves to **true** for subsequent upgrade attempts after the initial upgrade failed.

Move a Lifecycle Action for a Resource Offering

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 144.

To move a lifecycle action for a resource offering

1. In the **Offerings** tab select the **Display Name** of the offering whose you lifecycle action you want to move.

2. In the **Lifecycle** tab, select the lifecycle state that contains the action you want to move. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.

3. Select the lifecycle substate (located directly beneath the lifecycle state diagram), if applicable, that contains the action you want to move.

4. From the list of actions, highlight the action you want to move.

5. In the toolbar, select the **Move Selected Action To New Lifecycle State** icon.

6. Provide the following information:

Item	Description
Target Lifecycle State	The new state for the lifecycle action.
Target Lifecycle Substate	The new substate, if applicable, for the lifecycle action. For more information about states and substates, see "Lifecycle Actions for Resource Offerings" on page 144.
Target Lifecycle Execution Order	The execution order for the lifecycle action relative to other lifecycle actions for this lifecycle state. Lifecycle actions are executed in ascending order.

Custom Resource Offering Properties

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 136.

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.

See the following related topics:

- "View Custom Resource Offering Properties" below
- "Create Custom Resource Offering Properties" below
- "Delete Custom Resource Offering Properties" on the next page
- "Edit Custom Resource Offering Properties" on page 156

View Custom Resource Offering Properties

For more information about custom offering properties, see "Custom Resource Offering Properties" on the previous page.

To view custom properties for a resource offering

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 Resource Offering Properties

For more information about custom offering properties, see "Custom Resource Offering Properties" on the previous page.

To create a custom property for a resource offering

1. In the **Offerings** tab, click the **Display Name** of the offering whose custom properties you want to create.
2. In the **Properties** tab, click the **Create New Property** icon.
3. In the Create New Property wizard, enter the following information:

Item	Description
Property Type	Select one of the following: • **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 Details	***For Boolean properties:*** • **Name** - A unique name for the property.

Item	Description
	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. *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 Custom Resource Offering Properties

For more information about custom properties for offerings, see "Custom Resource Offering Properties" on page 153.

The properties of a resource offering cannot be deleted if the resource offering is linked to a service component that is part of an upgraded service design (a service design to which another design can be

upgraded). That is, if a resource offering has been configured for a resource binding of a service component that is part of an upgraded service design, the properties of the resource design cannot be deleted.

The properties of a resource offering can be deleted if the resource offering is not linked to a service component or if the resource offering is linked to a service component of a design that is not upgraded. A property of a resource offering can also be deleted if the property originated in the current design (upgraded or not upgraded). That is, if the property was initially added to the resource offering that is linked to a service component in the current design, it can be deleted.

To delete custom properties from a resource offering

1. In the **Offerings** tab, click the **Display Name** of the offering whose custom properties you want to delete.
2. In the **Properties** tab, select the custom properties you want to delete.
3. Click the **Remove Selected Property** icon.
4. Click **Yes** in the confirmation dialog.

Edit Custom Resource Offering Properties

For more information about custom offering properties, see "Custom Resource Offering Properties" on page 153.

To edit custom properties for a resource offering

1. In the **Offerings** tab, click the **Display Name** of the offering whose custom properties you want to edit.
2. In the **Properties** tab, click the **Name** of the property you want to edit.
3. Make your changes and click **Save**. For descriptions of certain fields, see "Create Custom Resource Offering Properties" on page 154.

Categories

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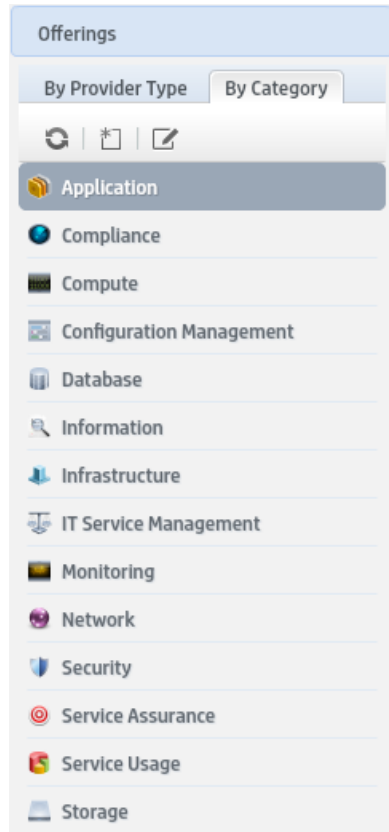
Service components within a service design can accept offering assignments only for those offerings with a category that is supported by the service component type. For example, a **Server** service component can be associated with offerings from a category of *Compute* (among others), while a **Software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

Categories are available by selecting the **By Category** tab in the left navigation pane.

View Categories

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

1. Select the **By Category** tab.
2. The categories list is displayed.

Create a Category

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

To create a category

1. In the left navigation pane, select the **By Category** tab.
2. In the left navigation pane toolbar, click the **Create New Category** icon.

3. Provide the following information:

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.

Delete a Category

For more information about categories, see "Categories" on page 156.

A category cannot be deleted if any offerings are using it. Out-of-the-box categories also cannot be deleted.

To delete a category

1. In the **By Category** toolbar, click the **Edit Categories** icon.
2. In the **Edit Categories** properties sheet, select the category you want to delete.
3. Click the **Delete Selected Category** icon.
4. Click **Yes** in the confirmation dialog.

Edit Properties of a Category

For more information about categories, see "Categories" on page 156.

To edit a category

1. In the **By Category** toolbar, click the **Edit Categories** icon.
2. In the **Edit Categories** properties sheet, click the **Display Name** of a category.
3. Make your changes and click **Save**. For descriptions of the specific properties, see the topic "Create a Category" on the previous page.

Topology Designs

Concepts

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

Create Design

Create New Version

Concepts

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 user-defined, 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 162.

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 is selected:

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.

> **Notes:** 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 159 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 159 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 159.
- **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 172.

- **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 161.
- **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 159 for more information about the configuration options.
- **Preview** - Click the preview box to open a read-only view of the design layout.

Migrate HPE CloudSystem 8.x designs to designs using OpenStack components

A migration banner displays when you view a legacy HPE 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 172.

- 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

Concepts

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

Concepts

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:
  - 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

Select or Edit Component

Select Relationship

Select Characteristic

Concepts

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 177.

> **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 the next page.

  - 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 180. 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)" below.
- **Assign Components to Groups** - See "Groups (Topology Designs)" below.
- **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)

Manage Groups

Add Components to Groups

Concepts

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:
  - **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

Concepts

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
Type	Select one of the following: - **Boolean** - A property whose value is **True** or **False**. - **List** - A property where you can define a list of values for the subscriber to select. - **Integer** - A property whose value is a positive or negative whole number or zero. - **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**.

Details	*For Boolean properties:*
	
	- **Default Value** - The default value for this property, which can be overridden in the service offering or Marketplace Portal if **Editable** is selected.
	
	For List properties:
	
	- **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:**

Item	Description
	Switch to Static Entry - 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 name. - Specify the HTTP parameters to use when executing the script. The required input parameters are dependent on the script that has been selected; contact the script developer if necessary to determine the necessary input parameters. **Parameter Name**. - For each **Parameter Name** you enter, supply a **Parameter Value**, which can be a token or a constant value. For example, to supply a **Parameter Value** that will contain the ID of the OpenStack provider that was selected during provisioning, enter, or select, a **Parameter Value** of [PROVIDER:OPENSTACK:ID]. Note that tokens are resolved only at subscription time and are not resolved when the script is run from the Subscriber Options area. When the script is run from the Subscriber Options area, the literal value of the token will be passed to the script. **Note**: The script is invoked at subscription ordering or modification time by the out-of-the-box CSA user, csaReportingUser, who has read-only access to CSA. - You can select from the following tokens as the parameter value: **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. **Service Blueprint ID** - Resolves to the Service Blueprint ID. **Service Instance ID** - Resolves to the Service Instance ID. **Service Offering ID** - Resolves to the Service Offering ID. **Service Request Organization ID** - Resolves to the Organization ID associated with the Service Request. **Service Request User ID** - Resolves to the User ID associated with the Service Request. **Subscription ID** - Resolves to the Subscription ID created at subscription time. [CLIENT:<property_name>] - Allows you to have a dependency on a value from another list property, which means that if a value is selected in "Property A", for example, the list of values in "Property B" will change based on that selection. "Property A" and "Property B" must exist within the same Subscriber Option. Note that <property_name> refers to the property **Name**, and not its **Display Name**. [PROVIDER:<provider_name>:ID] - The ID of the provider with the specified name that was selected by the subscriber when ordering the subscription. *For Integer properties*: **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. *For String properties:*

Item	Description

	• **Input Restriction** - An optional restriction that can be configured for **Editable** properties.
	   • Choose an **Input Validation** from the following list:
	
	    ○ **(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:/`, `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.
	
	• **Number of Characters** - If **Editable** is checked, configure the minimum and maximum number of characters that can be entered for this property.
	• **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.

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.

- **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 design properties. A property can have more than one binding.

- Clicking **Bind** displays a working area where you can view and delete existing bindings and configure new bindings. You can bind an option property to a property on a component or group.

- **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

Concepts

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 State** - The state 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.

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)

Create Topology Component

Concepts

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" below.

- **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

Concepts

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 182

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

Item	Description
	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 (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 175.

- **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

Create or Edit a Property

Concepts

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
Type	- **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. **Q FOR REVIEWERS:** I don't see this filed in the Create Property dialog. Was it deprecated?
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

Create or Edit a Relationship

Concepts

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	Enter a number to indicate the number of source components that can be connected to

Item	Description
Incoming Relationships To Target	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

Import an Operation

Edit Operation

Edit Parameter Mapping

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:

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 public actions that will be exposed to subscribers in

Item	Description
	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 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 Parameter Mapping	To edit an existing parameter mapping, click the **Edit Parameter Mapping** icon. **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

Item	Description
	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 public actions only. When a public action is executed, the user is asked to provide values for all parameters mapped to the **User Value**.

- **Delete** an operation. Click the **gear icon** for the operation and select **Delete**.

Component Capability

Add Supported Capability

Edit Supported Capability

Concepts

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 172.

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.

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

Select Characteristics

Manage Characteristics

Create a Characteristic

Concepts

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 page 184.

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.

Offerings

Concepts

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 documents 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.

- **CreateOffering** - 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 **All**, which is where all offerings are stored if you do not create any tags. You cannot edit, delete, or assign the **All** category. An offering can be assigned to multiple tag categories. Click the gear icon 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 (that is, the service design from which this offering was created is upgradable), but a new version of this offering with an upgrade path from this offering has not been created.

- Upgradable label - Appears if updates to the service design on which this offering is based have been published (that is, the service design from which this offering was created is upgradable), 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 upgradable offering version can be upgraded 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
- Documents Tab
- Screenshots Tab
- Versions Tab
- Upgradability Tab

Create Offerings

Concepts

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

Import Option

The import process imports archives of service offerings and their supported artifacts. Supported artifacts for offerings include associated service designs and resource offerings. The import process only imports new offerings, offerings that do no exist in CSA on the target system. That is, if an archived offering has the same internal name as an offering on the target system, the archived offering is considered to be functionally equivalent to the offering on the target system and is not imported.

> **Note:** Use the **Update** option rather than **Import** when importing an 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

The update process imports archives of service offerings and their supported artifacts. Supported artifacts for offerings include associated service designs and resource offerings. If identical artifacts exist on the target system, they are updated (overwritten) with changes from the archive. Artifacts are created if they do not exist on the target system.

Update Option, Preserve Originals

The update process with Preserve Originals selected imports all the artifacts present in an archive, whether they exist on the target system or not. During this operation, if there is an offering with the same internal name on the target system, then a backup copy of the existing offering and its artifacts is created on the target system, with "Superseded on" and the date added to the internal name, display name, description, and version. The internal name, display name, description, and version of the offering being imported remain intact. Other artifacts referenced by the offering are handled similarly, with superseded items identified by "Superseded on" and the date.

> **Caution:** You cannot import an archive using the Update and Preserve Originals options if the offering or service design is part of an upgrade path.

Tags

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

Archive File Contents and Images

The archive (`.zip`) file can only reference files or content contained within the `.zip` file itself, or files 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:

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

For information on adding additional suffix values, see the *Cloud Service Automation Configuration Guide*.

Authentication

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 the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

Prerequisites

Before you import a service offering archive, complete the following prerequisites:

1. Import all process definitions that are referenced by the service design within the service offering, including any referenced by resource offerings that are part of the service design. The process definitions must be imported to the CSA installation in which the service design will be imported. During import, process definitions are resolved by **name**. For process definitions that are associated with the Operations Orchestration process engine, the **name** corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA/3.2/Providers/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). Make sure that these flows have identical signatures and identical paths as the flows on the system from which the service design was exported.

For instructions about how to import OO flows, see the section "Import Operations Orchestration Flows" in the *Cloud Service Automation Configuration Guide*.

2. If a service design within the service offering you want to import has a dependency on any custom component types, these custom component types must be imported before the service offering can be imported.

3. If the imported offering or design is part of an upgrade path, all offerings and designs upgradable to the offering and design represented by the content archive must be present on the target system before the service offering can be imported.

Tasks

- Click the gear icon and select **Import Offering**.

- **Import** option - Imports new service offerings. This action does not update existing service offerings. Click the gear icon and select **Import Offering**.

- **Update** option - Imports new service offerings and updates (overwrites) existing service offerings. Select **Preserve Originals** to create backup copies of the original items, appending "Superseded on" and the date to the artifact display names and descriptions.

- **Preview** - View a report of prospective results for the import process such as information about the artifacts and their status including missing dependencies or conditions that would cause the import to fail. This feature does not modify the database or initiate the importing of the archive content.

- **View Detailed Report** - View a report of the results for the import process, including details about matching and reusing existing artifacts, importing new artifacts, or any missing dependencies that might cause the import to fail.

Best Practices

- After importing, you may have to click **All** to view the newly imported offerings if you have a tag category selected.

- If the service offering already exists, re-import the archive using the update option to overwrite it. Select **Preserve Originals** to create a backup copy.

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

Concepts

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 200.

Create Offering Versions

Concepts

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**.
4. 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 an upgrade of the base offering (enabling subscriptions belonging to the base offering to be upgraded to the new offering).

   b. Select **No** if the new offering is not an upgrade of the base offering (subscriptions belonging to the base offering cannot be upgraded 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 an upgrade of the base offering.

5. Browse to select the topology (if the new offering is not upgradable) or sequenced **Service Design**, and then click **Select**.

   a. If the offering being created is an upgrade of the base offering, the service designs that are selectable are published service designs that are upgrades of the service design of the base offering.

   b. If the offering is not an upgrade of 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 an upgrade of service design 1.0.0, and service design 2.0.1 is an upgrade of service design 2.0.0. If the new offering is an upgrade of the base offering, the selectable service design would be service design 2.0.0. If the new offering is not an upgrade of 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 and the selected service design has a description of the upgrade path configured, 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 already defined in the designer.

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 .

Overview Tab

Concepts

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 can be upgraded to the current offering.
Upgradable to	A link to the version(s) of an offering to which subscriptions belonging to the current offering can be upgraded.
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.
- **Delete** - Avoid deleting service offerings that have been published to a catalog or are currently in use by active subscriptions.

Publishing Tab

Concepts

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 public actions 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

Concepts

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, option sets, or profiles that you do not want to expose to subscribers in the Marketplace Portal. Property values in the **Options** tab are populated dynamically, according to the selected provider.

The Option Model contains three option sets:

- one with properties
- one for attaching metadata (display name and image) to each possible value of the images property
- one for metadata for the flavor property

Options vary, depending on whether a sequenced or topology service design was used to create the offering:

- **Sequenced design** - 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.
- **Topology design** - You define a hierarchy of option sets and options.

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 an offering with a sequenced design:

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 *except* 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
- Hide recurring price in Marketplace Portal

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.

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.

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. will be checked before you publish the offering. See *Cloud Service Automation External Pricing Guide*.

Documents Tab

Concepts

In the **Documents** 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

Concepts

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

Concepts

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 193.

Upgradability Tab

Concepts

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 being upgraded.

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 being upgraded.

- **Delete upgrade path** - Click the gear icon and select **Delete** to remove the upgrade path from the listed offering version.

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 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, descri ption, and image. Then configure the catalog by providing information in the following areas:

  - "Access Control" on page 204

  - "Approval Policies" on page 205

  - "Categories" on page 207

  - "Offerings" on page 208

  - "Environments" on page 208

- **Import Catalog** - Click the gear icon and select **Import Catalog**. This action will import a catalog from the selected archive file if it does not already exist. This import includes supported service catalog artifacts, such as resource offerings, service offerings, and resource environments. If the catalog already exists, the catalog is updated with any added or removed artifacts. Catalogs with the same internal name and organization ID of an existing catalog are considered functionally equivalent and are not imported. This import action is not available to a tenant administrator.

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. All images in the archive files must end in one of the following suffix values:

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

> If you are importing a catalog that has a large number of service offerings and service designs using the **Update** option, it is recommended that this operation be performed during off-peak hours. This will prevent degradation of subscriber request response time.

> If CSA has been configured to verify the authenticity of the import of 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 the *Cloud Service Automation Configuration Guide* for information on how to digitally sign a content archive.

To import a service catalog:

1. In the Catalogs view where All Catalogs displays, click the gear icon and select **Import Catalog**.

2. In the Import Catalog dialog, select or specify the **Archive File** (.zip file) that contains the catalog you want to import. Archive filenames for service designs begin with SERVICE_DESIGN_.

3. Select an organization from the **Choose Organization** drop-down list.

4. Select an **Option**:
   a. **Import** - Imports a catalog and its associated resource offerings from the selected archive file, if it does not already exist. This action will skip the update of all upgradable service offerings and all upgradable service designs. Click **View Detailed Report** to see detailed results of the catalog import. In this report, service offerings and service designs (blueprints) are notated as Imported or Skipped (not imported).

   b. **Update** - Imports an existing catalog and its associated resource offerings from the selected archive file. If the catalog already exists, this action updates (overwrites) existing catalog versions. If the catalog does not exist, this action will add it to CSA. This action allows upgradable service offerings and upgradable service designs to be excluded from the catalog import process. Click **View Detailed Report** to see detailed results of the catalog import. In this report, service offerings and service designs (blueprints) are notated as Imported or Skipped (not imported). Check **Preserve Originals** to create a backup copy of the existing catalog. The backup copy will be saved with "Superseded" and the date appended to the display name. During the **Preserve Originals** process, all service offerings and service designs that are in an upgrade path will be skipped (not imported).

5. Click **Preview** to see a report of prospective results for the import process, including information about the artifacts and their status.

6. Click **Import** and wait for the confirmation message. 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**. The new version is listed in the **All Catalogs** area.

Best Practices

During import, you can view a summary and details of the process, including information about the artifacts and their status. Click **Preview** to view a prospective results report for the import.

Overview

The **Overview** tab provides a detailed summary of the selected catalog, including information about access control, default approval policy, and published offerings.

Tasks

- **Edit Catalog** - Click the gear icon and select **Edit Catalog** to edit the name, description, and image associated to the catalog.

- **Export 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.

- **Delete 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

Concepts

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 Service Consumer role of the organization (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 Catalog** - Click the gear icon and select **Edit Catalog**. See "Overview" above.

- **Export Catalog** - Click the gear icon and select **Export Catalog**. See "Overview" above.

- **Delete Catalog** - Click the gear icon and select **Delete Catalog**.

- **Add 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.

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 Types:

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:
	  • **Process Definition** - Select the process definition that will be used to communicate with Operations Orchestration. Be sure you have the latest process definitions from Operations Orchestration. For instructions about how to do this, see the section "Import Operations Orchestration Flows" in the CSA.
	
	• 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 Template	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 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

Template Type	Description
	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 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** - Automatically deny the request when the specified **Wait Time**

Template Type	Description
	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 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 Default Policy** - In the Set Default Policy dialog, select the default policy that will be used when publishing service offerings.
- **Edit** - All fields are editable, except for the **Approval Policy Template**. For a certain approval policy, click the gear icon and select **Edit**.
- **Delete** - 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

Concepts

The **Categories** tab allows you to manage the categories for this catalog.

Tasks

- **Add Category** - In the Add Category dialog, enter a name for the new category.
- **Edit** - Allows you to change the **Display Name**. For a certain category, click the gear icon and select **Edit**.
- **Delete** - You cannot delete a category that has any service offerings assigned. For a certain category, click the **gear icon** and select **Delete**.

Offerings

Concepts

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 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 Approval** - 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 -** 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

Concepts

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.

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.

See the following related topics:

- "View Subscriptions for an Organization" below
- "View Subscriptions for a User" on the next page
- "View Subscriptions for a Service Offering" on page 214
- "Subscription Overview" on page 215
- "Transfer Subscriptions" on page 217
- "View Topology for a Subscription" on page 220
- "View Providers for a Subscription" on page 224
- "View Subscriptions for a User" on the next page

View Subscriptions for an Organization

For more information about the **Operations** area, see "Operations" above.

To view subscriber information 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** 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 box to select an option for sorting.

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 .

Item	Description
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: Active Pending Paused Canceled 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: Pending Approval **Last Request Date** -The date of the most recent subscription request made by this subscriber.

View Subscriptions for a User

For more information about the **Operations** area, see "Operations" on the previous page.

For information about viewing subscription details, see "Subscription Overview" on page 215.

For information about transferring subscriptions from one subscriber to another, see "Transfer Subscriptions" on page 217.

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, select another option from the drop-down list.

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.
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.

Item	Description
	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 states: Initializing, Reserving, and Deploying. - When a subscription is paused, any failure substate actions are not run in CSA; the provisioning stops at the first action of the failed substates. - 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 220. 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. **Canceled** - The subscription has been canceled. **Failed** - The subscription was terminated because the deployment failed or timed out.
Service Instance Status	The status of the service instance created from this subscription, as described below: **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.

Item	Description
	![icon] Deploying - The service instance is being deployed.
	![icon] Modifying - A modification or action affecting the service instance has not yet been completed.
	![icon] Modification Failed - A modification or action affecting the service instance failed.
	![icon] Upgrading - An upgrade affecting the service instance has not yet been completed.
	![icon] Upgrade Failed - An upgrade affecting the service instance failed.
	![icon] Failed - The service instance deployment failed.
	![icon] Canceling - The service instance is being canceled.
	![icon] Cancellation Failed - The service instance cancellation has failed.
	![icon] Expiring - The service instance is expiring.
	![icon] Expiration Failed - The service instance expiration has failed.
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 can be upgraded.

View Subscriptions for a Service Offering

For more information about the **Operations** area, see "Operations" on page 210.

For information about viewing subscription details, see "Subscription Overview" on the next page.

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, select another option from the drop-down list.

6. For each subscription, review the information. The overview provides the same information as described in "View Subscriptions for a User" on page 211.

Subscription Overview

For more information about the **Operations** area, see "Operations" on page 210.

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 211.

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 217, and "Cancel Subscriptions" on page 218.

Upgrade Subscriptions

For more information about the **Operations** area, see "Operations" on page 210.

Concepts

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 an upgrade service offering, its associated service instance is updated based on the changes made to the service design configured for the upgrade service offering. 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 new service offering selected for upgrade is displayed when an upgrade is requested.

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 state 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

For more information about the **Operations** area, see "Operations" on page 210.

Concepts

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 220). A node that is in a Failure substate means that a lifecycle action has failed on the node and must be fixed (see "View Events for a Subscription" on page 218 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 Pre-Transition, Transition, or Post-Transition substate 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 substate of each service component. The lifecycle substate 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:

1. In the left pane of the **Operations** area, select the name of the organization whose subscription upgrade you want to retry. **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 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 210.

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

1. In the left pane of the **Operations** area, select the name of the organization whose subscription you want to transfer. **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 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

For more information about the **Operations** area, see "Operations" on page 210.

You can cancel subscriptions when the service instance status is one of the following:

- Online
- Modification Failed
- Public Action Failed
- Reserved
- Failed

To cancel a subscription

1. In the left pane of the **Operations** area, select the name of the organization whose subscription you want to cancel. **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 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

For more information about the **Operations** area, see "Operations" on page 210.

To see 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" below.

Item	Description
Event Time	The time the event occurred.
Lifecycle State	The lifecycle state and substate in which the event occurred.
Action	The name of the action.
Source	The source of the event, which can be a service component, resource binding, 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

For more information about the **Operations** area, see "Operations" on page 210.

To see subscription event overview information

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.

Item	Description
Event ID	The internal identifier of the event.
Action	The name of the action.
Source	The source of the event, which can be a service component, resource binding, 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

For more information about the **Operations** area, see "Operations" on page 210.

To see subscription event properties

1. In the left pane of the **Operations** area, select the name of the organization whose subscription event properties 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 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 more information about the **Operations** area, see "Operations" on page 210.

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 binding provisioning process. See also, "View Providers for a Subscription" on page 224.

To view topology for a subscription

Use the following icons and features to navigate and perform tasks in the **Topology** tab:

Icon	Description
Drop-down list	Select an instance type to filter the content in this view.
Search Box	Enter search text to filter results based on: - Node type - Lifecycle state - Lifecycle substate - Node label Nodes that match the search criteria appear 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 suggested that you use either the tile or 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, where you can see the following information:

5. In the **Topology** tab, you see the service topology for the subscription, which shows the following information:
   - Each service component, resource binding, and subscription in the topology has one or two icons that show 1) the current lifecycle state and 2) the transition substate (if applicable) for that node. If a node has a transition substate icon, it is displayed directly beneath the lifecycle state icon (see state icons in table below).

   - If a subscription or service instance is in a **Failed** state, the icons represent the state and substate (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**.

 Note: In some cases, you might see an Updated state. Updated is a stable state (which immediately precedes the start of the Modifying transition state) for a resource subscription, resource binding, or service component that is undergoing a subscription modification. The Updated state does not display in the lifecycle diagram, and actions cannot be configured at this state.

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.

The icons in this view are described in the following table:

Icon	Description
	Node is specified as a pattern

Icon	Description
	Described lifecycle state
	Initializing lifecycle state
	Initialized lifecycle state
	Reserving lifecycle state
	Reserved lifecycle state
	Deploying lifecycle state
	Deployed lifecycle state
	Un-deploying lifecycle state
	Un-reserving lifecycle state
	Un-initializing lifecycle state
	Finalized lifecycle state
	Modifying lifecycle state
	Upgrading lifecycle state
	Pre-Transition substate
	Transition substate
	Post-Transition substate

| Icon	Description
	Pre-transition substate, paused provisioning
	Transition substate, paused provisioning
	Post-Transition substate, paused provisioning
	Failure substate

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.

Graphical view controls

The graphical view provides the following controls to help you properly display the topology:

Icon	Description
	Zoom the display in.
	Zoom the display out
	Automatically fit the diagram within the display area.
	Return to default size
	Reset nodes to their default positions.

View Providers for a Subscription

For more information about the **Operations** area, see "Operations" on page 210.

The **Providers** tab shows information about the providers used by a subscription. Resource provider selection occurs during the resource binding provisioning process for sequenced designs and is determined at design time for topology designs.

To view providers for a subscription

1. In the left pane of the **Operations** area, select the name of the organization whose subscription providers 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 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 211.

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 Failure substate actions on any service component, resource binding, 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.

Cloud Analytics

Concepts

HPE IT Business Analytics automatically gathers metrics from CSA to build key performance indicators. It provides scorecards and dashboards so that Resource Supply Managers and Service Business Managers have insight into how to measure and optimize the cost, risk, quality and value of IT services and processes.

In CSA, the Administrator, Resource Supply Manager, and Service Business Manager roles have access to the Cloud Analytics tile in the dashboard. Clicking on the tile displays the next level of tiles, which are displayed based on user roles:

- Administrators and Resource Supply Managers see the "Resource Analytics" below tile.
- Administrators and Service Business Managers see the "Service Analytics" on the next page tile.
- Administrators and Service Business Managers see the "Showback Report" on the next page tile.
- Administrators, Resource Supply Managers, and Service Business Managers see the **Advanced Reporting** tile, which launches a standalone version of HPE IT Business Analytics in a separate window and allows for more advanced operations, such as running custom reports and drilling down into additional details about information provided in the report.

Tasks

Prerequisites

- You must have HPE IT Business Analytics installed and properly configured in your CSA environment. See *Cloud Service Automation Configuration Guide* for more information on how to enable HPE IT Business Analytics in your CSA environment.

Resource Analytics

Concepts

For more information, see "Cloud Analytics" above .

Tasks

Click this tile to launch a report that measures the cost and usage of resource providers in CSA.

Service Analytics

Concepts

For more information, see "Cloud Analytics" on the previous page.

Tasks

Click this tile to launch a report that measures the revenue, cost, and profit margin for business services in CSA.

Showback Report

Concepts

For more information, see "Cloud Analytics" on the previous page.

Tasks

Click this tile to view a showback report for an organization.

Cloud Transformation

HPE Enterprise Maps manages a centralized Business Model that links to CSA. To bring the highest cost savings, improved agility, and quality using CSA, the right applications and services need to be selected. The HPE Enterprise Maps Cloud Assessment process will identify the most suitable applications and services, and register them in CSA. Management can continuously evaluate the actual Cloud migration progress to ensure that the IT infrastructure capabilities and Cloud providers are optimally used to meet the cloud transformation goals.

Cloud Migration Process

HPE Enterprise Maps consolidates information about the existing application portfolio and sends out surveys to appropriate stakeholders using data from tools such as Universal CMDB, HPE PPM, HPE APM, or spreadsheets. Based on the collected information, HPE Enterprise Maps calculates scores showing suitability of the systems from business, technical and financial points of view. The results are visualized using a set of predefined reports.

For selected services and applications, HPE Enterprise Maps creates initial service designs in CSA using information consolidated in the first phase.

Click the **Cloud Transformation** tile to see the next level of tiles:

- **Cloud Assessment** tile – starts and manages data collection and surveys.
- **Reports** tile – displays the cloud migration dashboard.

Tasks

Prerequisites

- You must have HPE Enterprise Maps installed and properly configured in your CSA environment. See the *Cloud Service Automation Configuration Guide* for more information on how to enable HPE Enterprise Maps in your CSA environment.