Cloud Service Automation

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For Microsoft Windows and Linux operating systems

Cloud Service Management Console Help

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Getting Started

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, Microsoft Azure, 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.

Integrated Infrastructure Monitoring with Cloud Optimizer

- Use Cloud Optimizer to monitor VMs in the Operations area and Marketplace Portal.
- Cloud Optimizer can provide health status and sizing information for server components in theCloud Service Management Console and Marketplace Portal. You must have a provider configured and enabled for Cloud Optimizerr.

Authentication and SSO support with SAML v2

Authenticate access to CSA only once using Identity Provider with SAML support (no need to enter a password again during that session).

Simplified Service Authoring

- Use the HTML5 service designer to author sequenced designs with a guided, simplified experience and improved performance. Use the simplified user experience to associate resource offerings with components. Test sequenced designs without creating an offering using the deployments capability. With a drag-and-drop experience of selecting components across multiple palettes with search capability, proactive validation, ability to copy and paste components in the design canvas, and ability to test the design while authoring a service design, a designer achieves increased time to value during the service authoring experience.
- The new simplified Lifecycle Action Designer exposes the service designer to the advanced lifecycle concepts gradually, and allows creating a simple service lifecycle with basic lifecycle phases only and with a guided user experience.
- The Process Definition Tool has been removed from CSA. Use the Action Selection Wizard to create an action and associate workflows by quickly searching actions based on flows and internal CSA actions. Browse flows from folders by configuring starting folders to eliminate clutter, and import component palettes and service designs without having to explicitly import flow definitions into CSA.

Content Store

Use the Content Store single-click deployment feature (available in the Cloud Service Management Console through the Content Manager or Administrator role):

- Browse, search, and install the latest capsule offerings.
- Attain visibility into the larger ecosystem for both standard and community-level content capsules.
- Connect to HPE Live Network.

HPE Propel integration

Integrate with Propel as the CSA marketplace and catalog management layer as an alternative to the CSA Marketplace Portal and catalog management.

- Use Identity Management component 1.10 for shared organization management, organization definitions, and authentication.
- Use Propel 2.20 service model with My Services to manage subscriptions, approve public and instance actions, and transfer ownership (including group ownership).
- Employ user operation dynamic properties to define both static and dynamic public action lists that contain values.
- Enable the shopping cart to contain one item of a given quantity.
- Use OpenStack Horizon integration (based on OO content HOS-project creation) to enable the "cancellation with the possibility to reset credentials" feature.

LDAP group

Nest an LDAP group for authentication and authorization.

SSO configurations

Configure SSO for each organization separately and the SSO configurations can be different for each organization (for example, one organization uses SAML for SSO and another organization uses LWSSO).

Shopping cart

- Offerings added to a shopping cart are persisted between Marketplace Portal sessions. A user can add items to the shopping cart, log out of the Marketplace Portal, and, upon logging back in to the Marketplace Portal, view all items added to the shopping cart from previous sessions (if an item has been ordered, it does not appear in the shopping cart).
  Additionally, if the Service Business Manager makes changes to an offering that exists in a shopping cart, the user must either update the existing offering to the updated offering or remove the existing offering (if the offering is no longer available or if the updated offering is not desired) before an order can be placed.
- Using the browser's built-in print function, the shopping cart contents can be printed or saved to a file. The output is in a readable format that contains the information that is displayed in the shopping

cart such as the total number of items, total price of all items, and a list of individual items that includes the offering name, one-time price, recurring price (with time period), and quantity ordered.

Operations

The list of users, subscriptions for users, and subscriptions for services offerings displayed in the Operations area of the Cloud Service Management Console is paginated.

Service offering price

Configure the ability to hide a service offering price from consumers and/or approvers.

Static and dynamic list input for user operations

User operations have static and dynamic list type parameters in addition to other basic parameter types, such as integer, string, and Boolean.

Cloud Service Automation Roles

CSA roles represent the people responsible for performing particular tasks in the HPE CSA workflow.

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.

Content Manager

	The Content Manager has access to the Content Store to search for and download content offerings from HPE Live Network.

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 and troubleshoots issues with provisioning or de-provisioning services.

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 and troubleshoots any issues with provisioning or de-provisioning services.

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 service offerings, manage service subscriptions, and perform actions on service instances.

Cloud Service Automation 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 functional areas are available to you:

Functional Area	Role	Major Tasks
Organizations	**Administrator** **Consumer Service Administrator** **Consumer Organization Administrator**	• Customize an organization • Customize the Marketplace Portal • Customize widgets for the Marketplace Portal • Configure LDAP for an organization • Configure membership to predefined roles • Configure the mail server used to send email notifications and some email source settings • Configure operational settings for your organization • View the catalogs associated with an organization

Functional Area	Role	Major Tasks
Providers	**Administrator**	• View, create, or edit a provider

Functional Area	Role	Major Tasks
	Resource Supply Manager	• Associate or dissociate providers with an environment • View or edit properties of a provider • Associate or dissociate resource offerings with a provider • Associate or dissociate environments with a provider • Manage custom provider properties • Manage provider types • Manage environments • Manage resource pools

Functional Area	Role	Major Tasks
Service Designs 	**Administrator** **Service Designer**	**Sequenced Designs** View, create, edit, copy, import, export, or delete: • Components • Component palettes • Resource offerings • Service designs **Topology Designs** View, edit, copy, import, export, publish, test or delete: • Service designs • Components • Palettes

Functional Area	Role	Major Tasks
Offerings	**Administrator** **Service Business Manager**	• Create service offerings • Modify service offerings • Import service offerings • Export service offerings • View or delete service offerings • Configure options for service offerings • Configure pricing for service offerings • Associate documents and screenshots with service offerings • Create new versions of service offerings • Publish and unpublish service offerings

Functional Area	Role	Major Tasks
Catalogs	**Administrator** **Service Business Manager**	• Customize a catalog • Configure who can access a catalog • Add or edit an approval policy • Create, edit, or delete categories • View service offerings by category, publish or unpublish service offerings to a category, or edit the approval process or policy for a service offering • View or select an environment for a catalog

Functional Area	Role	Major Tasks
Operations	**Administrator** **Service Operations Manager**	• View user subscriptions for an organization • View subscriptions for a user • Transfer subscriptions • Cancel subscriptions • View topology for a subscription • View providers for a subscription

Functional Area	Role	Major Tasks
Content Store	**Administrator** **Content Manager**	• Search for content capsules from HPE Live Network • Install an existing capsule • Install a capsule from a file • Update a capsule

Functional Area	Role	Major Tasks
Cloud Analytics	**Administrator** **Resource Supply Manager** **Service Business Manager**	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. • Integrate with HPE IT Business Analytics • Launch a report that measures the cost and usage of resource

Functional Area	Role	Major Tasks
		providers in CSA • Launch a report that measures the revenue, cost, and profit margin for business services in CSA • View a showback report for an organization or for a consumer user

Functional Area	Role	Major Tasks
Orchestration 	**Administrator** **Consumer Service Administrator** **Resource Supply Manager** **Service Business Manager** **Service Designer** **Service Operations Manager**	• Integrate with Operations Orchestration

Functional Area	Role	Major Tasks
Cloud Transformation 	**Administrator** **Service Business Manager**	• Integrate with HPE Enterprise Maps

Functional Area	Role	Major Tasks
	Service Designer	

Functional Area	Role	Major Tasks
Cloud Optimizer	**Administrator** **Service Business Manager** **Service Designer**	• Integrate with Cloud Optimizer

Functional Area	Role	Major Tasks
Settings	**Administrator**	• "Configure Content Store Settings" on page 77

Functional Area	Role	Major Tasks
Marketplace	**Consumer Service Administrator** **Service Consumer**	The Marketplace Portal is a self-service web interface that retrieves service offerings for IT applications from the HPE Cloud Service Automation (CSA) server and displays them in an intuitive view.

Functional Area	Role	Major Tasks
Custom	**Administrator** **Consumer Service Administrator** **Resource Supply Manager** **Service Business Manager** **Service Designer** **Service Operations Manager**	Optional area for accessing customized content. 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.*

Concepts overview

This document describes conceptual information for the HPE Cloud Service Automation (CSA) key terminology, significant functionality, and important processes. CSA is a unique platform that orchestrates the deployment of computer and infrastructure resources, and complex multi-tier application architectures. CSA integrates and leverages the strengths of several datacenter management and automation products, adding resource management, service offerings, service design, and a customer portal to create a comprehensive service automation solution.

The CSA subscription, service design, and resource utilization capabilities address three key challenges:

- The CSA Marketplace Portal provides a customer interface for requesting new cloud services and for monitoring and managing existing services, with subscription pricing to meet your business requirements.
- The CSA graphical service design and content portability tools simplify developing, leveraging, and sharing an array of service offerings that can be tailored to your customers' needs.

- The CSA lifecycle framework and resource utilization features ease the complexity of mapping your cloud fulfillment infrastructure into reusable, automated resource offerings for on-time and on-budget delivery.

"CSA Organizations". An organization in CSA determines a member's entry point into the cloud system and associates its members with services and resources.

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

"Access Control" on page 42. You can add or remove directory service groups or organization units to a role by associating the organization unit's distinguished name to the desired role.

"Resource Providers" on page 42. Resource providers are management platforms that offer centralized control over the infrastructure and resources used in a cloud computing environment.

"Components" on page 42. Components are elements of service design, sequenced or topological.

"Service Designs" on page 42. To provide on-demand, automated service delivery, you create, configure, and modify service designs, which are the recipes for automating the cloud, and which are comprised of reusable service components. Service components and their relationships in a service design define the framework for creating the service.

"Service Offerings" on page 44. Service offerings encapsulate all the information consumers need to select the most appropriate services. Each service offering references a service design, which defines the service options and components of the service.

"Service Instances" on page 45. Service instances encapsulate all the details of the deployed service and its components.

The following concepts are described in the Cloud Service Automation Configuration Guide:

- **Operations Orchestration** . Operations Orchestration (OO) is a process engine whose flows are executed by CSA. OO must be integrated with CSA. The flows that can be executed within CSA are imported automatically when an action is created.
- **Cloud Service Management Console**. The Cloud Service Management Console dashboard is made up of predefined tiles that launch predefined pages.
- **Common CSA Tasks**. Common tasks include launching the Cloud Service Management Console and Marketplace Portal, starting, stopping, or restarting CSA and the Marketplace Portal, encrypting a CSA password, and uninstalling CSA.

- **Marketplace Portal** . Configure the Marketplace Portal to enable/disable global search, configure the Showback Report tile, encrypt a Marketplace Portal password, and configure security warning messages.
- **User Administration**. User administration includes tasks such as allowing non-administrator users to start and stop CSA services and changing the out-of-the-box users.
- **Configure IPv6**. Configure CSA to support IPv6 (both dual-stack and IPv6-only).
- **Common Access Card**. Common access cards are used for user authentication and allow users to log in to CSA using a Personal Identity Verification card.
- **Single Sign-On**. You can enable or disable single sign-on that is included with CSA. You can configure single sign-on for the Cloud Service Management Console and Marketplace Portal with almost any single sign-on solution. A specific solution for CA SiteMinder is also provided.
- **Database Administration**. Database administration includes tasks such as configuring the CSA reporting database user if you did not configure it during installation, updating CSA database system or users and passwords, importing large archives, purging service subscriptions, installing the CSA database schema, and configuring CSA to mitigate frequently dropped database connections.
- **Operations Orchestration Manual Configuration for Designs**. You can configure Operations Orchestration manually for topology and sequential designs without using the Cloud Content Capsule Installer.

See the following guides for more information about CSA:

- Supported components and versions: *Cloud Service Automation System and Software Support Matrix*
- Installation: *Cloud Service Automation Installation Guide*
- Configuration: Cloud Service Automation Configuration Guide
- Configuring CSA in a clustered environment: *Configuring a CSA Cluster for High Availability*
- Sample service designs and resource offerings: *Cloud Service Automation Content Pack User's Guide*
- Complete list of documentation, see the *Cloud Service Automation Documentation Library*.

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"Components" on page 42. Components are elements of service design, sequenced or topological.

"Service Designs" on page 42. To provide on-demand, automated service delivery, you create, configure, and modify service designs, which are the recipes for automating the cloud, and which are comprised of reusable service components. Service components and their relationships in a service design define the framework for creating the service.

"Service Offerings" on page 44. Service offerings encapsulate all the information consumers need to select the most appropriate services. Each service offering references a service design, which defines the service options and components of the service.

"Service Instances" on page 45. Service instances encapsulate all the details of the deployed service and its components.

The following concepts are described in the Cloud Service Automation Configuration Guide:

- **Operations Orchestration** . Operations Orchestration (OO) is a process engine whose flows are executed by CSA. OO must be integrated with CSA. The flows that can be executed within CSA are imported automatically when an action is created.
- **Cloud Service Management Console**. The Cloud Service Management Console dashboard is made up of predefined tiles that launch predefined pages.
- **Common CSA Tasks**. Common tasks include launching the Cloud Service Management Console and Marketplace Portal, starting, stopping, or restarting CSA and the Marketplace Portal, encrypting a CSA password, and uninstalling CSA.
- **Marketplace Portal** . Configure the Marketplace Portal to enable/disable global search, configure the Showback Report tile, encrypt a Marketplace Portal password, and configure security warning messages.
- **User Administration**. User administration includes tasks such as allowing non-administrator users to start and stop CSA services and changing the out-of-the-box users.
- **Configure IPv6**. Configure CSA to support IPv6 (both dual-stack and IPv6-only).
- **Common Access Card**. Common access cards are used for user authentication and allow users to log in to CSA using a Personal Identity Verification card.
- **Single Sign-On**. You can enable or disable single sign-on that is included with CSA. You can configure single sign-on for the Cloud Service Management Console and Marketplace Portal with almost any single sign-on solution. A specific solution for CA SiteMinder is also provided.
- **Database Administration**. Database administration includes tasks such as configuring the CSA reporting database user if you did not configure it during installation, updating CSA database system or users and passwords, importing large archives, purging service subscriptions, installing the CSA database schema, and configuring CSA to mitigate frequently dropped database connections.
- **Operations Orchestration Manual Configuration for Designs**. You can configure Operations Orchestration manually for topology and sequential designs without using the Cloud Content Capsule Installer.

See the following guides for more information about CSA:

- Supported components and versions: *Cloud Service Automation System and Software Support Matrix*
- Installation: *Cloud Service Automation Installation Guide*
- Configuration: Cloud Service Automation Configuration Guide
- Configuring CSA in a clustered environment: *Configuring a CSA Cluster for High Availability*
- Sample service designs and resource offerings: *Cloud Service Automation Content Pack User's Guide*
- Complete list of documentation, see the *Cloud Service Automation Documentation Library*.

CSA Organizations

An organization in CSA determines the entry point of a member into the cloud system and associates its members with services and resources.

An organization typically represents a business entity, such as a company, business unit, department, or group. CSA queries the identity management system of the organization to determine the members and groups of the organization and uses this information to authenticate and authorize CSA users and their actions.

CSA defines one provider organization for every CSA instance. You can assign provider organization roles to control access to administrative functions. 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 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 the organizations. The consumer organizations use the Marketplace Portal to subscribe to or consume the resources and services set up by the provider organization. There may be multiple consumer organizations configured; however, each consumer or subscriber sees only the information for the consumer organization of which he or she is a member. CSA uses consumer organizations and catalogs, along with identity management system data, to map service offerings to the appropriate subscribers.

Cloud Service Automation Roles

CSA roles represent the people responsible for performing particular tasks in the HPE CSA workflow.

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.

Content Manager

	The Content Manager has access to the Content Store to search for and download content offerings from HPE Live Network.

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 and troubleshoots issues with provisioning or de-provisioning services.

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 and troubleshoots any issues with provisioning or de-provisioning services.

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.

Consumer Organization Administrator, continued

	• 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 service offerings, manage service subscriptions, and perform actions on service instances.

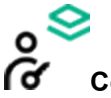
Cloud Service Automation Functions

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 functional areas are available to you:

Functional Area	Role	Major Tasks
Organizations	**Administrator** **Consumer Service Administrator**  **Consumer Organization**	• Customize an organization • Customize the Marketplace Portal • Customize widgets for the Marketplace Portal • Configure LDAP for an organization

Functional Area	Role	Major Tasks
	Administrator	• Configure membership to predefined roles • Configure the mail server used to send email notifications and some email source settings • Configure operational settings for your organization • View the catalogs associated with an organization

Functional Area	Role	Major Tasks
Providers	**Administrator** **Resource Supply Manager**	• View, create, or edit a provider • Associate or dissociate providers with an environment • View or edit properties of a provider • Associate or dissociate resource offerings with a provider • Associate or dissociate environments with a provider • Manage custom provider properties • Manage provider types • Manage environments • Manage resource pools

Functional Area	Role	Major Tasks
Service Designs	**Administrator** **Service Designer**	**Sequenced Designs** View, create, edit, copy, import, export, or delete: • Components • Component palettes • Resource offerings • Service designs **Topology Designs** View, edit, copy, import, export, publish, test or delete: • Service designs • Components • Palettes

Functional Area	Role	Major Tasks
Offerings	**Administrator** **Service Business Manager**	• Create service offerings • Modify service offerings • Import service offerings • Export service offerings • View or delete service offerings • Configure options for service offerings • Configure pricing for service offerings • Associate documents and screenshots with service offerings • Create new versions of service offerings • Publish and unpublish service offerings

Functional Area	Role	Major Tasks
Catalogs	**Administrator** **Service Business Manager**	• Customize a catalog • Configure who can access a catalog • Add or edit an approval policy • Create, edit, or delete categories • View service offerings by category, publish or unpublish service offerings to a category, or edit the approval process or policy for a service offering • View or select an environment for a catalog

Functional Area	Role	Major Tasks
Operations	**Administrator** **Service Operations Manager**	• View user subscriptions for an organization • View subscriptions for a user • Transfer subscriptions • Cancel subscriptions • View topology for a subscription • View providers for a subscription

Functional Area	Role	Major Tasks
Content Store	**Administrator** **Content Manager**	• Search for content capsules from HPE Live Network • Install an existing capsule • Install a capsule from a

Functional Area	Role	Major Tasks
		file • Update a capsule

Functional Area	Role	Major Tasks
Cloud Analytics 	**Administrator** **Resource Supply Manager** **Service Business Manager**	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. • Integrate with HPE IT Business Analytics • Launch a report that measures the cost and usage of resource providers in CSA • Launch a report that measures the revenue, cost, and profit margin for business services in CSA • View a showback report for an organization or for a consumer user

Functional Area	Role	Major Tasks
Orchestration 	**Administrator** **Consumer Service Administrator**	• Integrate with Operations Orchestration

Functional Area	Role	Major Tasks
	Resource Supply Manager Service Business Manager Service Designer Service Operations Manager	

Functional Area	Role	Major Tasks
Cloud Transformation	Administrator Service Business Manager Service Designer	• Integrate with HPE Enterprise Maps

Functional Area	Role	Major Tasks
Cloud Optimizer	Administrator Service Business Manager Service Designer	• Integrate with Cloud Optimizer

Functional Area	Role	Major Tasks
Settings	**Administrator**	• "Configure Content Store Settings" on page 77

Functional Area	Role	Major Tasks
Marketplace	**Consumer Service Administrator** **Service Consumer**	The Marketplace Portal is a self-service web interface that retrieves service offerings for IT applications from the HPE Cloud Service Automation (CSA) server and displays them in an intuitive view.

Functional Area	Role	Major Tasks
Custom	**Administrator** **Consumer Service Administrator** **Resource Supply Manager** **Service Business Manager** **Service Designer** **Service Operations Manager**	Optional area for accessing customized content. 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.*

Access Control

You can add or remove directory service groups or organization units to a role by associating the distinguished name of the organization unit to the desired role. The authenticated users, who are members of a group or organization unit that is assigned to a role, can perform specific tasks, and can access specific areas of the Cloud Service Management Console. You can assign group or distinguished name of the organization unit to more than one role.

Resource Providers

Resource 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 monitors 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, you must first define and create a provider (with a provider type of Matrix Operating Environment) in the Cloud Service Management Console. During this provider definition, you specify details such as user credentials and the URL for your Matrix Operating Environment service access point.

Components

Components are elements of service design. Only topology components are displayed in the Components tab. Sequenced components are not associated with providers or provider types. From the Components tab, you can view the topology components associated with a specific provider instance and manage the topological components.

Service Designs

Create, configure, and modify service designs to provide on-demand, automated service delivery. Service designs are the recipes for automating the cloud, and include reusable service components.

Service components and their relationships in a service design define the framework for creating the service.

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

You can create topology and sequenced designs.

Topology design

Topology designs specify components, relationships, 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 using Chef, Puppet, Server Automation, and Operations Orchestration flow-based components.

Sequenced design

Sequenced designs specify directed execution of the service component lifecycle and provide mechanisms for controlling resource selection as each component is deployed. When creating sequenced designs, associate one or more resource offerings on a service component to constrain provider selection. This association or link ensures that the resource offering will be provisioned when the service component is deployed. You can also associate resource offerings with component templates.

Use sequenced designs for complex services and services that rely on runbook 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, and they permit explicit specification of lifecycle actions.

Subscriber options

Subscriber options enable you to expose service design options in the Offerings area. Subscriber options are sets of options for a service design. The options sets are made available in the Offerings area. You can refine subscriber options by setting pricing for options, hiding options, and setting values for option properties. The subscriber options are then available to subscribers.

Service Offerings

Service offerings provide the information consumers need to select the most appropriate services. Each service offering references a service design, which defines the service options and components of the service. You can tailor service offerings for each consumer group with details such as customized terms and conditions, option visibility, and pricing. Create a service offering from a sequenced or topology service design. When you are ready to expose the design to subscribers, publish the service offering in a catalog in the Marketplace Portal. You can create an offering from a sequenced or topology design. Pricing is configured on a service offering and supports initial, recurring, and option-specific pricing. You can choose to show or hide the initial or recurring price details to a subscriber or an approver in the Marketplace Portal. 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 the user with a visual representation of the offering in the Marketplace Portal.

Customize service offerings

You can customize service offerings for different target groups. You can base customized service offerings on the same service design using different attributes for each group. You publish a customized service offering in a catalog that is visible to its target group.

You can configure the following service offering attributes:

- Offering name, description, image, and tags
- Option visibility for offerings based on sequenced designs
- Subscription pricing
- Attached documents such as service level agreements or terms and conditions

- Associated screenshots or other images
- Multiple versions per service offering

You link each service offering to its target group by publishing the service offering in a catalog for that group. CSA uses catalogs to constrain the service offerings displayed for each user. The Marketplace Portal only displays offerings published in catalogs associated with one of the user groups. Pricing details can be hidden from the subscriber or approver in the Marketplace Portal if configured in the service offering.

CSA manages catalog access through group memberships as configured in the organization's identity management system. CSA does not directly manage the creation or maintenance of individual users or organizational groups. You specify an identity management system for each CSA organization you create. You then configure the groups that can access the organization user interface. You also configure catalog access for specific groups within an CSA organization. Each organization group memberships must exist or be created in its identity management system. Often, existing groups naturally correspond to CSA access control needs. Sometimes you will need to create new groups for specific needs.

Catalogs

Catalogs map service offerings to specific groups within a consumer organization. Publishing a service offering in a catalog makes the offering visible in the Marketplace Portal to the groups associated with the catalog. You can configure each catalog as visible to specific groups within the organization associated with the catalog, and you can also specify the default approval process and the available approval policies for each catalog. In addition, you can publish a service offering in multiple catalogs to make it visible to more than one set of consumers.

You can start by configuring the automatically created, default catalog (Global Shared Catalog), or you can manually create a new catalog and associate it with an organization. Multiple catalogs can be associated with the same organization, and any changes made to the Global Shared Catalog will be visible in the Marketplace Portal of every organization.

Service Instances

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. CSA constructs service instance artifacts during service deployment and updates service instances during service management. Service instances provide all details of the deployed service and its components; for example, provisioned IP details for a network segment component. CSA bases service instances on the service design configured for the service offering, and on consumer demand.

Documentation Library

The Cloud Service Automation (CSA) Documentation Library provides links to download all version 4.xx documents that are available on the HPE Software Support portal. An HPE Passport login is required for all documentation downloads.

Get the latest: This CSA Documentation Library is updated when white papers or videos are made available. Download the latest.

Note: If the file download cell is blank for a release, the documentation for the previous release applies. "«" indicates a new document.

Read these documents first

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Concepts Guide	go		go	go	go	go	go
What's New	go		go		go	go	go
System and Software Support Matrix	go	go	go	go	go	go	go
Release Notes	go	go	go	go	go	go	go
All Manuals Download «							go

Installation and upgrade guides

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Installation Guide	go		go	go	go	go	go
Upgrade Guide	go	go	go	go	go	go	go

Configuration guides

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Configuration Guide – Linux and Windows (Note: formerly two guides for Linux and Windows. See Discontinued documents.)						go	go
Configuring a CSA Cluster for High Availability (Note: formerly four guides for Load Balancer and Apache, Linux and Windows. See Discontinued documents.)							go
FIPS Compliance Configuration Guide					go	go	go
FIPS 140-2 Compliance Statement	go		go	go	go	go	go

Help

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Cloud Service Management Console Help (PDF)	go	go	go	go	go	go	go
Marketplace Portal Help (PDF)	go	go	go	go	go	go	go

Reference guides

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
API Guide (formerly API Reference & API Quick Start)	go / go	go / go	go / go	go / go	go	go	go
Health Tool					go	go	go
Troubleshooting Guide	go		go	go	go	go	go

Content guides

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Content Installation Guide					go	go	go
Content Pack At a Glance (formerly, Content User Guide & Integration Pack Guide)	go		go		go	go	go
Software Development Kit				go	go	go	go

White papers

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Application Deployment on Realized Topology Instance Using Sequenced Design		go	go			go	
Content Archive Tool Guide	go		go	go	go	go	
Marketplace Portal Customization	go				go	go	
Dynamic Options and Cascading Lists						go	go
Externalizing Pricing Integration						go	
Integrated Billing Solutions	go						
Integration with ArcSight Logger			go		go		
Integration with Operations Orchestration	go						
LDAP Configuration Tool					go		
Monitoring CSA Applications «						go	
Monitoring CSA Database «						go	
Oracle RAC Configuration	go	go	go	go	go	go	go
Propel-CSA Integration						go	go
Provider Configuration Tool	go		go		go	go	
Reporting and Auditing	go		go		go	go	

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Resource Management in CSA					go	go	
Service Instance Upgrade						go	go
Topology Components Guide				go	go	go	

Additional information

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Open Source and Third-Party Software License Agreements	go		go	go	go	go	go

Discontinued documents

Document	4.00	4.01	4.10	4.20	4.50	4.60	
Configuration Guide – Linux (single manual for Linux and Windows in 4.6)	go		go	go	go		
Configuration Guide – Windows (single manual for Linux and Windows in 4.6)	go		go	go	go	go	
Configuring a CSA Linux Cluster for Server Failover	go						
Configuring a CSA Windows Cluster for Server Failover	go						
Configuring a CSA Cluster for High Availability Using a Load Balancer – Linux (single manual for LB and Apache, Linux and Windows in 4.7)			go	go	go	go	
Configuring a CSA Cluster for High Availability Using a Load Balancer – Windows (single manual for LB and Apache, Linux and Windows in 4.7)			go	go	go	go	
Configuring a CSA Cluster for High Availability Using an Apache Web Server as a Proxy – Linux (single manual for LB and Apache, Linux and Windows in 4.7)			go	go	go	go	

Document	4.00	4.01	4.10	4.20	4.50	4.60	
Configuring a CSA Cluster for High Availability Using an Apache Web Server – Windows (single manual for LB and Apache, Linux and Windows in 4.7)			go	go	go	go	
Configuring Intelligent Resource Management Note: Replaced by the new Resource Management in CSA white paper in 4.50.			go				
Custom Resource Provider and Pool Selection Note: Replaced by the new Resource Management in CSA white paper in 4.50.	go		go				
Custom Resource Provider Selection Note: Replaced by the new Resource Management in CSA white paper in 4.50.	go		go				
Language Support Readme Note: Language support table provided in the System and Software Support Matrix in 4.6.	go	go	go	go	go		
Open Source and Third-Party Software License Agreements Converged Cloud User Experience Licenses	go	go					
Process Definition Tool (See CSA 4.7 What's New.)	go		go			go	n/a

Video library

The following videos are available on HPE Live Network.

Videos on the HPLN

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Advanced Marketplace Portal Customization					go		
Approve a Subscription			go				

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Automate Deployment			go			go	
Cancel a Subscription			go			go	
Catalogs Overview				go		go	
Configure a Service Design			go				
Create a Component Palette «						go	
Create a Component Type«						go	
Create a Resource Offering «						go	
Create a Sequenced Design «						go	
Create a Service Offering «						go	
Create a Topology Component «						go	
Create a Topology Design «						go	
Create and Manage a Service Design.			go				
Import and Export a Sequenced Design «						go	
Import and Export a Topology Design «						go	
Manage a Component Palette «						go	
Manage a Component Type «						go	
Manage a Resource Offering «						go	
Manage a Sequenced Design «						go	
Manage a Subscription			go			go	
Manage a Topology Component «						go	
Manage a Topology Design «						go	
Manage Sequenced Design Tags «						go	
Manage Topology Design Tags «						go	
Management of Cloud Services			go			go	
Modify a Subscription			go			go	
Monitor and Control Service Environments			go			go	
Offerings Overview				go		go	

Document	4.00	4.01	4.10	4.20	4.50	4.60	4.70
Order a Subscription			go			go	
Publish a Service Design			go			go	
Publish a Service Offering «						go	
Select a Subscription			go			go	
Service Design Overview «						go	
Setting up an Organization				go		go	
Simple Marketplace Portal Customization					go		

Additional videos available on the CSA HPLN under Resources.

Configuration

Configuration Guide Overview

The *CSA Configuration Guide* provides information on how to set up CSA. Some tasks must be completed before you can start using CSA.

In the following diagram, the example cluster configuration consists of: seven different physical (or virtual) hosts:

Configuring a CSA Cluster for High Availability Guide overview

The *Configuring a CSA Cluster for High Availability Guide* uses JBoss clustering technology to enable you to configure an active/active (high-availability) cluster and run CSA on several parallel servers called *nodes*. Cluster configuration handles higher user loads and provides greater scalability and server failover features.

Administration

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 65 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 60
   - "Portal Customization" on page 61
   - "Dashboard Widgets" on page 64
   - "LDAP" on page 65
   - "Access Control" on page 70
   - "Email Notifications" on page 72
   - "Operations" on page 74
   - "Catalogs" on page 76
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 56

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 56

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

Viewable Summary Information, continued

Section	Displayed Summary Information
	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 56

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	A URL for connecting to the Marketplace Portal for the organization.

Item	Description
URL	
Organization Display Name	A unique name that identifies the organization.
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 56

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 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 56

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:**

Button	Description
	• 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. ◦ 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 "Access Control" on page 70.

For more information about organizations, see "What are Organizations?" on page 56

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 *Cloud Service Automation FIPS 140-2 Compliance 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	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**

Item	Description
(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**.

SAML

SAML (Security Assertion Markup Language) used by CSA is configured in the Cloud Service Management Console.

SAML is used to enable Single Sign-On, which is important for implementing scalable, secure, centralized identities across organizations.

To add SAML support for an organization, click the Organization tile and select an organization. In the organization console, select SAML. Enter the SAML URL defined during SAML configuration and save the setting.

For more information about configuring SAML, see the *Cloud Service Automation Configuration Guide*.

For more information about organizations, see "What are Organizations?" on page 56

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 65 for more information.

For more information about organizations, see "What are Organizations?" on page 56

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	Enter the group or organizational unit DN to add to the role. This DN must be

To add a new named DN:, continued

Item	Description
organizational unit DN	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 56

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 *Cloud Service Automation FIPS 140-2 Compliance 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 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,

Item	Description
	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 72 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 72 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 70. 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 70. 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 56

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.

Settings

Concepts

Use the **Settings** tile in the Cloud Service Management Console to manage the Content Store settings for the HPE Live Network **Content Store** tile. The CSA Administrator is the only role that can access the Settings tile.

Tasks

You can perform the following task in this area:

- **Configure the Content Store** - in the left pane select **Content Store** to configure the HPE Live Network connection in order to activate the Content Store tile. See "Configure Content Store Settings" below.

Informational Icon

Icon	Description
*	Indicates the field is required, and you must enter information in order to successfully complete the configuration.

Configure Content Store Settings

The **Content Store** section of the **Settings** tile allows you to configure a valid HPE Live Network (HPE LN) connection to enable the HPE LN connection from the Content Store tile. You must have the Administrator role to access and configure these settings.

When this configuration is validated, the CSA Content Manager role can access the Content Store tile. See "Content Store" on page 79.

To configure the Content Store settings for CSA:

1. In the Settings navigation frame, select **Content Store**.
2. Provide or update the following information:

HPE Passport Credentials

Item	Description
User Name	The HPE Passport account user ID. To register for a Passport ID, go to: https://hpp12.passport.hp.com/hppcf/createuser.do.
Password	The password for the HPE Passport account.

Connection to HPE Live Network

Item	Description
Service Access Point	The URL for connecting to the HPE Live Network service: https://api.hpln.hpe.com/hpln
Connection Timeout (s)	The time in seconds that the connection remains until a timeout occurs. **Default**: 10
Proxy Server	Specify a proxy server URL, including the port number, only if a proxy is needed to reach the HPE Live Network.
Proxy User Name	The proxy server user name, if the proxy server needs to be authenticated.
Proxy Password	The password for the proxy server.

3. Click **Validate**.

   The validations pass/fail message appears at the top of the window.

   Validation passed - the settings are all valid and the Content Store tile can be enabled.

   Validation failed - one or more settings are not valid and the Content Store remains disabled.

   > **Note:** If the validation fails, check the following:
   >
   > - You have access to the internet through the proxy information you provided.
   > - Your HPE Passport credentials are correct.
   > - You have permission to access the CSA product page on the HPE Live Network portal.

4. Click **Save** when the configuration is validated to enable the Content Store tile. See "Content Store" on the next page.

Content Store

Concepts

Use the **Content Store** tile in the Cloud Service Management Console to consume and deploy the content from the CSA platform directly, instead of downloading the Content SDK available in the HPE Live Network.

The content store has access to the latest CSA content offerings published by HPE Software on HPE Live Network and the extended community, the same way you access them externally.

Roles

The Content Store tile is available for the Content Manager and Administrator.

Capsule Display

The capsules are displayed by the latest updated content offering. Capsules that were updated in the last 30 days have a **New** tag.

The capsules shown in the Content Store depend on which of the following Content Types are selected:

Content Type	Description
HPE	Created by HPE and supported via HPE Software Support, with a ticket filed against the associated product.
Partner	Created and supported by Partners.
Community	Created by Community Contributor and supported by HPE Software customers.

> **Note:** The HPE Content Type is selected by default. The capsules are filtered to be compatible to your version of CSA.

Each Capsule tile shows the following detail:

- Name of the Capsule
- Description about the capsule
- Provider Name (HPE)

- Rating by the user
- Number of Downloads

Prerequisites

The Content Store tile is only available with the validation of the HPE Passport credentials and proxy connection details (if any). Go to the "Configure Content Store Settings" on page 77

Tasks

You can perform the following tasks in this area:

- **Search for capsules:** Enter the **Keyword** (name of the capsule/version) in the **Keywords** text box in the left panel. Matching capsules are displayed. If no capsules match the keyword, a **No results found** message is displayed.
- **Install an existing capsule**: Click **Install** in the capsule you want to download, select the version from **Available versions** and click **Install**. After the download and install process completes the installed version appears on the tile.

  > **Note:** The **Available versions** drop-down displays the capsule versions published in HPE Live Network. Once you have installed a particular version of the capsule, you will not be able to re-install the same version or downgrade to a lower version.

- **Install a capsule from a file:** Click **Browse** to select an appropriate file to upload it. The selected capsule must be compatible with the 4.70 installer.
- **Update a capsule:** Click **Update**, select the version from **Available versions** and click **Update**.

  > **Note:** The **Update** button is visible only for capsules that have later versions available.

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" on the next page 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" on the previous page .

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 Optimizer

Cloud Optimizer is a web-based analysis and visualization tool that analyzes performance trends of elements in virtualized environments. When Cloud Optimizer is integrated with CSA, you can monitor the performance and analyze the capacity, usage, and forecast trends of the virtualized infrastructure.

In CSA, the Administrator, Service Designer, Service Business Manager, Resource Supply Manager, and Service Operations Manager roles have access to the Cloud Optimizer tile in the dashboard.

Tasks

Prerequisites

- You must have Cloud Optimizer installed and properly configured in your CSA environment. See the *Cloud Service Automation Configuration Guide* for more information on how to enable Cloud Optimizer in your CSA environment.

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.

Design

Providers

Providers are management platforms that offer centralized control over the infrastructure and resources used in a cloud computing environment. For example, a provider such as 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 the next page for more information about configuring a provider.
- **See more information about a provider** - Click a provider to see more information about the provider.

Best Practices

Locked items cannot be deleted.

Components (Per Provider Type)

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

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

Tasks

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

Manage Provider Types

You can perform the following tasks in this area:

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

Item	Description
Name	A name that is automatically generated, which may be needed when importing topology components.
Display Name	The display name you provide for the provider type.
Description	The description you provide for the provider type.
Image	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

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	The name you provide for the provider.

Item	Description
Name	
Description	The description you provide for the provider.
Image	Select an image to be displayed with the provider.
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

Item	Description
	which this provider will be used. This field is available for Helion OpenStack® and CloudSystem 8.x providers only.
Use domain-scoped transport token	When checked, a domain-scoped transport token will be used for communication with Helion OpenStack®. When unchecked, a project-scoped transport token will be used. The provider user must have administrative rights on the domain in order to use domain-scoped transport tokens. This field is available for Helion OpenStack® and CloudSystem 8.x providers only.

Best Practices

The CloudSystem 8.x provider type is used specifically for topology designs and requires that a provider property "tenant" be configured on the provider. This tenant property is automatically created when creating a new CloudSystem 8.x provider. To set its value, navigate to the **Properties** tab of the provider after it has been created, and edit the tenant property to contain the value appropriate for your CloudSystem 8.x environment.

Provider Properties

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

Tasks

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

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

- **Delete provider properties** - Click the gear icon for the property and select **Delete**.
- **Refresh provider properties** - Click the gear icon for the property and select **Refresh**.

Item	Description
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.
	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.

Item	Description
	• **Confidential Data** - Select this box to mask the values so that they cannot be read in the user interface. No encryption of the value is performed.

Provider Environments

You can perform the following tasks:

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

Resource Offerings

For information about resource providers, see "Providers" on page 85.

> **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

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 page 94. Click **Select** and search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the `csa.properties` file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or

Item	Description
	action. Then, locate and select the flow or action. The **Last Synchronized** field in the **Overview** tab of the resource pool indicates the last time (local client time) a resource synchronization action on a resource pool completed successfully.
Enabled	The availability is either **Enabled** or **Disabled**. When **Disabled**, the resource pool will not be available for allocation of resources for new subscriptions, but disabling a resource pool will have no effect on existing subscriptions.

Best Practices

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

Overview for a Resource Pool

You can perform the following tasks:

- **Edit a resource pool** - Click the gear icon and select **Edit**. See the table in "Resource Pools" on page 91 for the items you can edit.
- **Delete a resource pool** - Click the gear icon and select **Delete**. A resource pool cannot be deleted unless the **Current CSA Utilization** for each resource configured on the pool is zero.
- **Refresh a resource pool** - Click the gear icon and select **Refresh**.
- **Synchronize a resource pool** - Click the gear icon and select **Synchronize**. This action automatically updates the **Resources** tab information with the latest information. The **Synchronize** action is available only when a **Resource Synchronization Action** is configured. Resource synchronization does not occur automatically and is performed only on demand. The default timeout for a resource synchronization action to complete is one hour. The timeout is not configurable.

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

Resources for a Resource Pool

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

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

For information about resource providers, see "Providers" on page 85.

> **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

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

You can perform the following tasks in this area:

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

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

Resource Offerings (Sequenced Designs)

This topic contains the following sections:

- Concepts
- Tasks
- Scenarios
- Best Practices

Concepts

> **Note:** Resource Offerings are only used with sequenced designs.

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

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

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

Tasks

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

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

Scenarios

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

- A resource offering can be used to configure a *specific* capability offered by a provider (or a group of providers of the same provider type). For example, you can create a resource offering named `Red Hat 5.3 64-bit` that corresponds to a specific VMware vCenter VM template named `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. Typically, you would use this style of resource offering to select a provider at a group level in a service design (for example, for a Server Group) that is shared by all child components (for example, by all Server child components).

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

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

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

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

Best Practices

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

Resource Offerings Overview Tab

The **Overview** tab displays the following information about the offering:

Item	Description
Display Name	Resource offering name.
Description	Resource offering description.

Item	Description
Provider type	Provider associated with the resource offering.
Resource category	Category associated with the resource offering.
Image	Image associated with the resource offering.

The following options are also available from the **Overview** details page, in the gear icon list:

Edit a resource offering

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

Delete a resource offering

To delete the resource offering, in the resource offering's details page, click the gear icon and choose **Delete**.

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

Copy a resource offering (Save As)

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

Export a resource offering

To export a resource offering, in the resource offering's details page, click the gear icon and click **Export**.

See Import and Export a Resource Offering for more information on the Export option.

Resource Offering - Tabs

A resource-offering landing page has the following tabs:

- Overview tab - Displays the resource offering's name and details, and allows you to edit, copy, export, or delete the resource offering.
- Provider tab - Displays information about current providers associated with the resource offering. The tab also allows you to create a provider association, and to select the provider.
- Lifecycle tab - Displays the resource offering lifecycles and allows you to chose or select a stage, and edit, delete, save as, or export a resource offering at a particular stage.

- User Operations tab - Displays user operations associated with a resource offering, and allows you to add, edit, delete, copy, or export resource offerings associated with a user operation.
- Component Templates tab - Allows you to view component templates associated with a resource offering, and edit, copy, delete, and export the resource offering associated with the template.
- Service Designs tab - Allows you to view service designs associated with the resource offering, edit associated service design information, and create or delete service-design associations

Resource Offerings Overview Tab

The **Overview** tab displays the following information about the offering:

Item	Description
Display Name	Resource offering name.
Description	Resource offering description.
Provider type	Provider associated with the resource offering.
Resource category	Category associated with the resource offering.
Image	Image associated with the resource offering.

The following options are also available from the **Overview** details page, in the gear icon list:

Edit a resource offering

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

Delete a resource offering

To delete the resource offering, in the resource offering's details page, click the gear icon and choose **Delete**.

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

Copy a resource offering (Save As)

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

Export a resource offering

To export a resource offering, in the resource offering's details page, click the gear icon and click **Export**.

See Import and Export a Resource Offering for more information on the Export option.

Resource Offerings - Provider Tab

This topic is divided into **Concepts** and **Tasks**.

Concepts

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

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

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

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

CSA ships with internal actions to help with provider selection. For more information about these provider selection internal actions, see "Provider Selection Internal Actions" on page 223.

Tasks

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

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

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

Resource Offerings Properties Tab

In the Properties tab, in the resource offering's details page gear, you can perform the following actions:

- **Create a property** - Click **Create**.

In addition to a name and display name, enter the following information in the **Create Property** wizard:

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. • **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

Item	Description
	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.

- **Edit a property** - Chose **Edit**. You can edit a property's display name, description, and property value. Click **Save**.
- **Delete a property** - Chose **Delete**.

Lifecycle Actions for Resource Offerings

This topic has two sections: **Concepts** and **Tasks**.

Concepts

What is a resource offering lifecycle?

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

What is a lifecycle action?

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

What are lifecycle stages?

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

The Provisioning lifecycle stages are:

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

The Operational lifecycle stages are:

- **Modifying** - The Modifying stage is processed when a subscription modification request is received from a subscriber and that modification results in a change to property values on a service component. Modifying actions run on any impacted service components and their associated resource offerings at this time. Define actions that are needed to process this change in property values in the Modifying stage.

- **Upgrading** - The Upgrading stage is processed when a request is received to upgrade a service instance to a newer version of a service offering and design. Define actions in the Upgrading stage for a service component or resource offering based on the manner in which the service component or resource offering will be used in a design in an upgrade path. For more information, see the online help.

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

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

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

The De-provisioning lifecycle stages are:

- **Un-deploying** - Un-deploying is the first stage that is processed during de-provisioning and is the most common stage in which de-provisioning actions are defined. Use the Un-deploying stage to undo or to finalize the actions that took place during the Deploying stage. For example, if actions in the Deploying stage deploy a VM, define actions in the Un-deploying stage to un-deploy the VM.

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

What are lifecycle phases?

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

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

Tasks

- **Navigate to** (the Lifecycle tab) - In the left pane of the **Resource Offerings** area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the **Lifecycle** tab.

- **Add Action** - Click the **Add Action** or **Add More Actions** link in the stage and phase to which you want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard" on page 122.
- **Edit Action** - Select the gear icon on the action you want to edit and select **Edit**. Update the information as described in "Lifecycle Action Selection Wizard" on page 122.
- **Delete Action**- Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.
- **Move Action**- Select the gear icon on the action or group of actions you want to move to another stage or phase and select **Move**. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click **Move**. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.
- **Group Actions** - Click to select multiple actions in a lifecycle phase and then click **Group Actions** to create a parallel execution group. Actions in a parallel execution group are executed at the same time.
- **Ungroup Actions** - Click the gear icon next to an action in a group and then select **Remove from Group**.
- **View Lifecycle Stages** - The Deploying Provisioning stage, the Modifying Operational stage, the Un-deploying De-provisioning stage, and any stage that has an action, are displayed by default. Select a filter from the All Selected Stages pull-down menu to display only Provisioning Stages, Operational Stages, or De-provisioning stages. Click **Select Stages** to view additional stages.
- **View Lifecycle Phases** - The During and On Failure phases are displayed by default. Select **Show All Phases** to display the Before and After phases.

User Operations for Resource Offerings

This topic has two sections: **Concepts** and **Tasks**.

Concepts

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

particular provisioned server after the subscription has been provisioned. User operations can also be invoked on a service instance in the Operations area.

Tasks

- **Navigate to** (the **User Operations** tab) - In the left pane of the **Resource Offerings** area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the **User Operations** tab.
- **Add Action** - Click **Add**, and enter the information as described in "User Operation Action Selection Wizard" on page 173.
- **Edit Action** - Select the gear icon on the action you want to edit and select **Edit**. Update the information as described in "User Operation Action Selection Wizard" on page 173.
- **View User Operation** - Click the **User Operations** tab to view all user operations associated with a resource offering.
- **Delete User Operation** - Click the gear icon next to the user operation you want to remove, and select **Delete**.

Resource Offerings - Component Template Tab

This topic contains two sections: **Concepts** and **Tasks**.

Concepts

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

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

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

Tasks

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

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

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

Resource Offerings - Service Design Tab

This topic consists of the following sections: **Concepts** and **Tasks**.

Concepts

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

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

Tasks

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

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

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

View Resource Offerings

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

To view resource offerings

1. Select **Provider Type** or **Category** from the list on the left to see all the resource offerings in the system.
2. **Provider Type** is selected by default. The left panel shows all provider types in the system. All resource offerings for the provider types appear in the right panel.
3. When **Category** is selected, the left panel shows all categories in the system. All resource offerings for the categories appear in the right panel.
4. For descriptions of the specific properties, see "Create a Resource Offering" below.

Create a Resource Offering

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

Item	Description
Display Name	The name you provide for the offering.
Description	The description you provide for the offering.
Provider Type	The provider type for this offering. This field cannot be changed after an offering is created.
Resource Category	The resource category for this offering. For more information, see "Resource Offering Categories" on page 133. This field cannot be changed after an offering is created.
Image	The image of the provider type selected. This field cannot be changed.

Click **Create**.

Import and Export a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

Concepts

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

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

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

Process Information

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

  Out-of-the box resource categories and provider types have identical **name** values on all installations of CSA, and automatically resolve correctly during import. User-created resource categories and provider types do not have a **name** match on different installations of CSA, and instead are resolved by **display name**.

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

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

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

  During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.
- **Archive content** - The archive (`.zip`) file can only reference files or content contained within the `.zip` file itself, or that are already contained in the `csa.war` file.
- **Image files** - All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the *Cloud Service Automation Configuration Guide*):

  `jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png`
- **Back up your data** - Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

Tasks

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

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

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

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

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

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

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

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

artifacts you are exporting, as well as icons for customizing the artifacts, and the Manifest XML document, which contains meta-information about the archive files.

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

```
RESOURCE_OFFERING_<resource_offering_display_name>_<resource_offering_id>.zip
```

How CSA identifies matching artifacts

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

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

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

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

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

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

Select or Remove Providers with a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

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

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

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

Select providers for a resource offering

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

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

Delete providers from a resource offering

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

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

Lifecycle Actions for Resource Offerings

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

Concepts

What is a resource offering lifecycle?

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

What is a lifecycle action?

A lifecycle action is a function that is either run automatically at a specified lifecycle stage or phase, or that is exposed to the subscriber. Most lifecycle actions correspond to OO flows, which contain the

logic for executing the function. CSA also includes actions that run internal to CSA. Many CSA internal actions relate to provider and pool selection and resource accounting. Actions include input parameters that provide configuration information to the function.

What are lifecycle stages?

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

The Provisioning lifecycle stages are:

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

The Operational lifecycle stages are:

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

  If a service component will be added to a design in an upgrade path, you do not need to define Upgrading actions. The standard Initializing, Reserving, and Deploying lifecycle will be followed for the service component. If a service component will replace a service component that existed in the

previous version of the design, the previously-existing service component will have already been provisioned. In this scenario, define actions in the Upgrading stage that perform any additional provisioning required for the new service component.

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

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

The De-provisioning lifecycle stages are:

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

What are lifecycle phases?

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

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

Tasks

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

actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.

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

Lifecycle Action Selection Wizard

See also Lifecycle Action Selection Wizard (for service components) or Lifecycle Action Selection Wizard (for service component templates).

Concepts

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

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

Tasks

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

Internal Actions" on the next page for a list of internal actions. This task is only available when you create an action.

- **Configure Action** - Configure information about the action.

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action. Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

  Select one of the following Mapping Types:

  ◦ Not Mapped - The parameter is not mapped to a value.

  ◦ Constant Value - Type a value for the parameter.

  ◦ Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Lifecycle Action Internal Actions

For more information about lifecycles, see "Lifecycle Actions for Resource Offerings" on page 118

The following internal actions ship with CSA:

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

Internal Action	Description	Applies To
	is enabled for a resource offering associated with a service component.	
Increase Resource Utilization	Increases the utilization of one or more resources in a resource pool by the values of the measurable properties configured on a resource offering associated with a service component. **Note:** The Increase Resource Utilization action cannot be added to a component, component template, or resource offering. This action runs automatically during Reserving when Resource Accounting is enabled for a resource offering associated with a service component.	Resource Offering associated with a Service Component
Log Messages	Writes the user-specified Boolean Input, Integer Input, and String Input property values to the `csa.log` file. You can include this as an action on a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering Resource Offering associated with a Service Component Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the **Build Resource Provider List** action. The selected resource provider will be available to resource offering actions in the token `RSC_PROVIDER_ID`. The selected provider will, optionally, be written to a property on the associated service component if the `Provider Property Name` input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	Selects a resource pool and provider from the candidate list that was built by the **Build Resource Provider and Pool List** action. The selected resource provider and pool will be available to resource offering actions in the token `RSC_PROVIDER_ID` and `RSC_POOL_ID`, respectively. The selected pool will, optionally, be written to a property on the associated service component if the `Pool Property Name` input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	Selects the resource pool and provider already chosen by a service component's parent service component, as identified by the `Parent Component ID` and `Pool Property Name` properties. The selected resource provider and pool will be available to resource offering actions in the token `RSC_PROVIDER_ID` and `RSC_POOL_ID` respectively. The selected pool will also be written to a `Pool Property Name` property on the associated service component.	Resource Offering associated with a Service Component

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

User Operations for Resource Offerings

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

Tasks

- **Navigate to** (the **User Operations** tab) - In the left pane of the **Resource Offerings** area, select the category or provider type associated with the resource offering you want to view. Select the resource offering and then select the **User Operations** tab.
- View a list of user operations for this resource offering.
- **Add Action** - Click **Add**, and enter the information as described in "User Operation Action Selection Wizard" on page 173.
- **Edit Action** - Select the gear icon on the action you want to edit and select **Edit**. Update the information as described in "User Operation Action Selection Wizard" on page 173.
- **View User Operation** - Click the **User Operations** tab to view all user operations associated with a resource offering.
- **Delete User Operation** - Click the gear icon next to the user operation you want to remove, and select **Delete**.

Action Selection Wizard

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

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

Tasks

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

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action. Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

  Select one of the following Mapping Types:

  ◦ Not Mapped - The parameter is not mapped to a value.

  ◦ Constant Value - Type a value for the parameter.

- Prompt User - Allows the user to enter a value for the parameter when running the user operation. A default value for the parameter is required.
- Prompt User List - Allows the user to select a value for a parameter by selecting from a list of items when running the user operation.

List Items	
Switch to Static Entry (default)	Enter the display name and value for a list item. After entering a name or value, input boxes for a new list item automatically display.

Switch to Dynamic Entry	• Select a script from the List Items.
	  • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315.
	  • **HTTP Parameters** - 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.
	  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*.
	  • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316.
	  • **Refresh Data** - Click the Refresh Data icon ( ) to run the script and display the results.

- Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Custom Resource Offering Properties

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

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 Properties" below
- "Delete resource-offering property" on page 131
- "Edit Properties of a Resource Offering" on page 131

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 Properties

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

Item	Description
Property Type	Select one of the following: • **Boolean** - A property whose value is true or false.

Item	Description
	• **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. • **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:***

Item	Description
	• **Name** - A unique name for the property. • **Display Name** - The display name for the property. • **Description** - A description of the property. • **Property Value** - Type a string of characters. • **Confidential Data** - Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed.

Delete resource-offering property

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

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

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

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

For descriptions of certain properties, see "Create a Resource Offering" on page 112.

Edit Properties of a Resource Offering

For more information about resource offerings, see "Resource Offerings (Sequenced Designs)" on page 98.

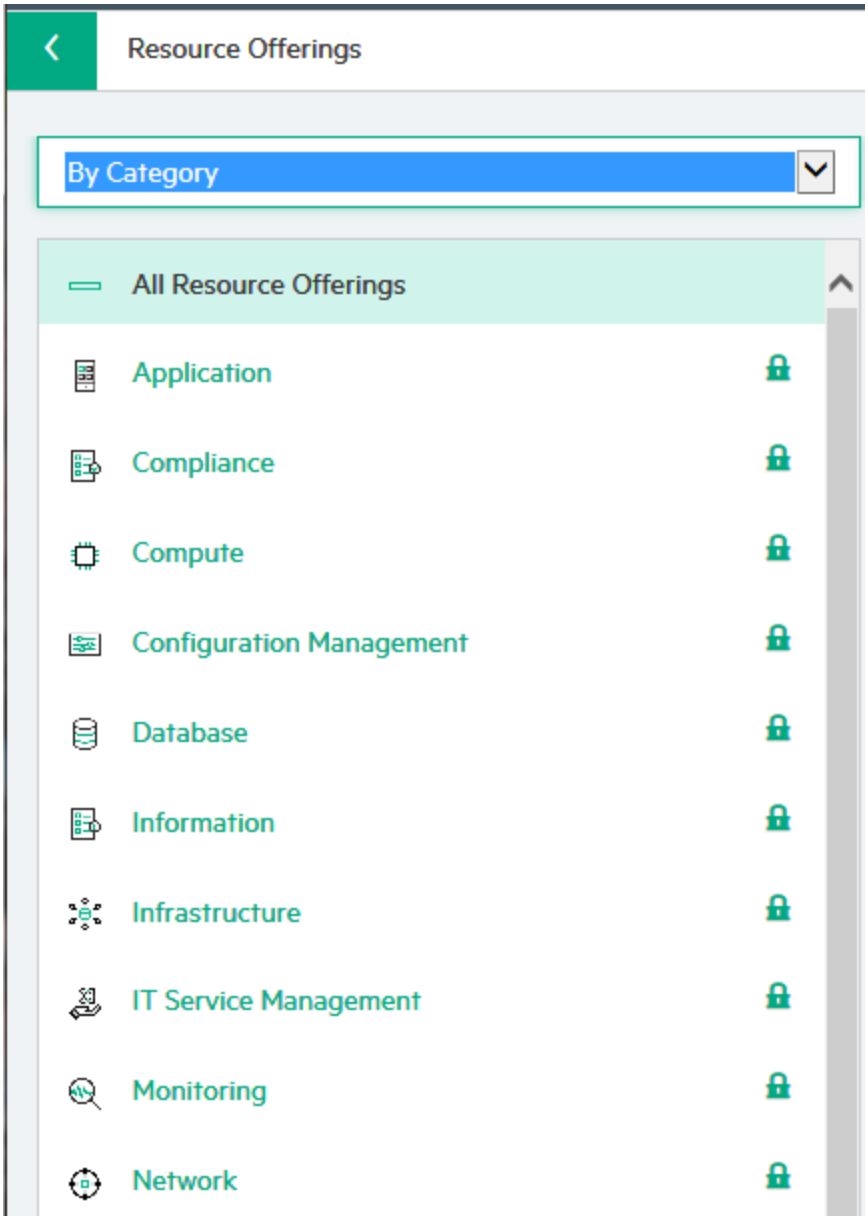
To edit properties of a resource offering, in the resource offering's summary page click the **Properties** tab. Click the gear icon for the property to be edited and choose **Edit**. Edit the property and click **Save**.

> **Note:** You cannot edit the Type or Name of an existing property.

For descriptions of certain properties, see "Create a Resource Offering" on page 112.

Resource Offering Categories

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

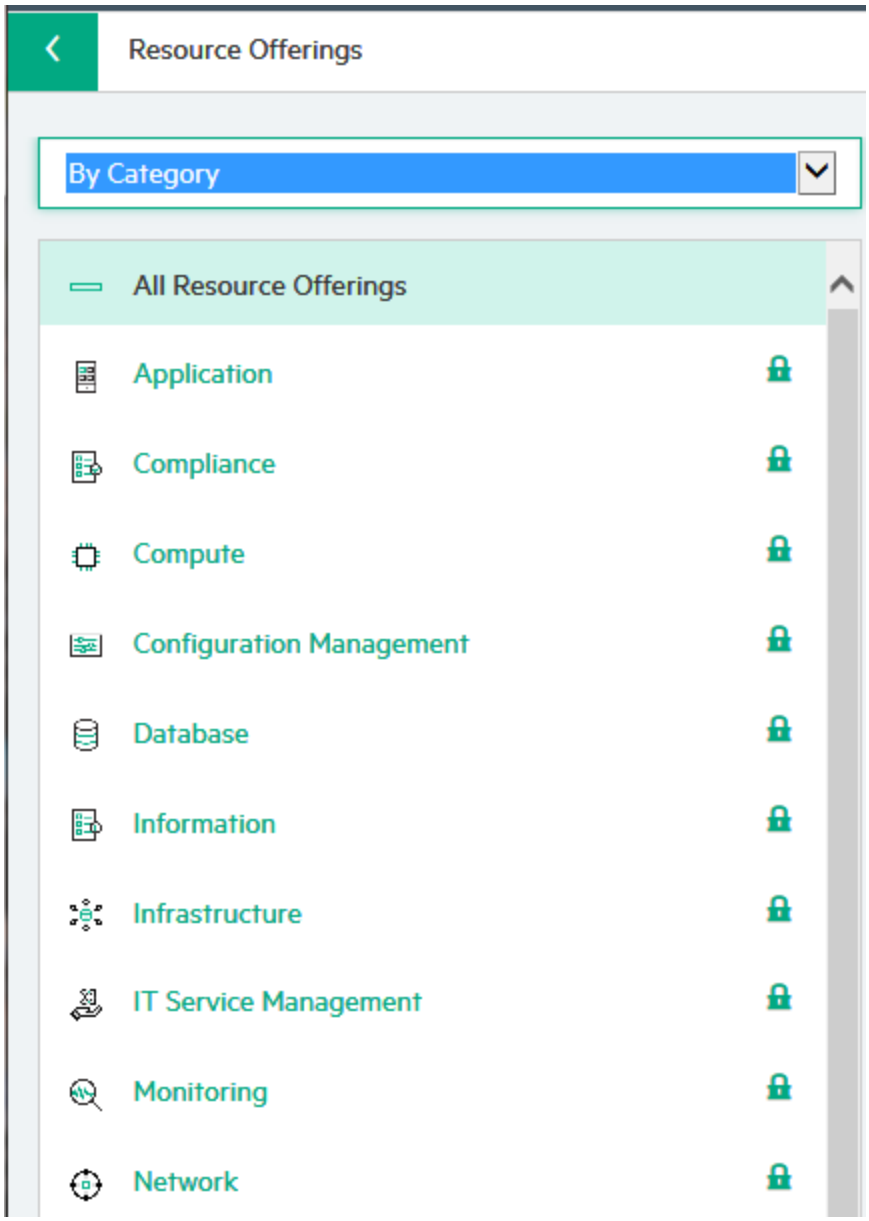


Service components within a service design can accept offering assignments only for those offerings with a category that is supported by the service component type. For example, a **Server** service component can be associated with offerings from a category of *Compute* (among others), while a **Software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

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

Resource Offering Categories

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



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

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

Manage Resource Category

For more information about categories, see "Resource Offering Categories" on page 133.

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

This topic contains the following sections:

- "Create a resource category" below
- "Edit a resource category" below
- "Delete a resource category" on the next page

Create a resource category

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

Resource category properties:

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

Edit a resource category

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

Delete a resource category

Categories cannot be deleted:

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

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

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) Infrastructure Service	Application Compute Configuration Management Infrastructure Monitoring

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
			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	Application Compute Configuration Management Infrastructure Monitoring

Out-of-the-Box Component Types, continued

Component Type	Description	Component Type Constraints	Resource Category Constraints
		Platform Service Software Application Service	Service Usage Storage
Software Application Service	Represents a complex application architecture. Contains one or more Software Application Tier service components.	Software Application Tier	Application Compliance Configuration Management Monitoring
Software Application 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 offerings normally created in a service design.

View Component Palettes

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 136.

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 136.

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 136.

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 136.

Concepts

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

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

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

Process Information

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

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

  During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA Content`

`Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.

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

  `jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png`
- **Back up your data** - Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

Tasks

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

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

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

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

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

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

View Component Types

For more information about components, see "Components (Sequenced Designs)" on page 136.

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.

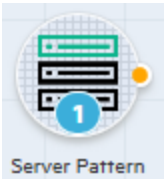
Create a Component Type

For more information about component types, see "Components (Sequenced Designs)" on page 136.

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 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 lifecycle engine. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. If the Clone Pattern action is not created in the parent service component, a validation error is displayed in the designer. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instances from this service component pattern.

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

View Component Type Details

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 145.

See the following related topics:

- "View Component Type Properties" on page 149
- "View Constraints of a Component Type" on page 154
- "View Component Templates" on page 156

Edit a Component Type

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 145.
5. Click **Save**.

Delete a Component Type

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 136.

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" on the next page.

See the following related topics:

- "View Component Type Details" on page 147.
- "View Constraints of a Component Type" on page 154

- "View Component Templates" on page 156

Create Component Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 136. For more information about custom service components, see "Service Component Properties" on page 233.

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

To create component type properties

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

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

4. Depending on the **Type** selected above, provide the following property information and then click **Create**:

Type	Property 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 offering. You can also specify the resource type and unit simply to clarify the intent of the property. Note that when creating a **Source Binding** for a service component, a best practice is that both the service component property you are creating and the service component property you are binding to will have the same **Resource Type and Unit** value. When you change this value for a component type that has derived subtype components or existing component templates, the changes you make apply to all associated subtypes and templates. ◦ **Property Value** - 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. ◦ **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 Item** icon to add a new list item, and provide the following information: • **Display Name**- The label that will be displayed for the list item. • **Value** - The value of the list item. Values must be unique with a list. • **Description** A description of the list item.

Type	Property Information
	• Click **Add** to add the list item. • Click the **Edit Item** icon to edit a selected list item. • Click the **Remove Item** icon to remove a selected list item. ◦ **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. Click the gear icon to select a property value token. See " Tokens" on page 316 for a description of the tokens. ◦ **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 Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 150.
6. Click **Save**.

Delete Component Type Properties

For more information about components, see "Components (Sequenced Designs)" on page 136.

> **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 136.

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

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

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

A component type can establish constraints in the following ways:

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

To view the constraints of a component type

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type whose constraints you want to view.
2. Click the component type whose constraints you want to view.
3. Select the **Constraints** tab.
4. Select the type of constraint you want to view: Component Types or Resource Categories.
5. Review the list of constraints.

See the following related topics:

- "View Component Type Details" on page 147
- "View Component Type Properties" on page 149
- "View Component Templates" on the next page

Add a Constraint

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 136.

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

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

To remove a constraint

1. In the left pane of the **Sequenced Components** area, select the component palette that contains the component type from which you want to remove a constraint.
2. Click the component type from which you want to remove a constraint.
3. Select the **Constraints** tab.
4. Select the type of constraint you want to delete: Component Types or Resource Categories.
5. Click the gear icon for the constraint and select **Delete**.
6. Click **Yes** in the confirmation dialog.

View Component Templates

For more information about components, see "Components (Sequenced Designs)" on page 136.

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

To view the templates that are based on a component type

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

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

- **Overview** tab - See "View Component Template Details" on page 159
- **Properties** tab - See "View Component Template Properties" on page 160.

- **Lifecycle** tab - See "Lifecycle Actions for Component Templates" on page 164
- **Resource Offerings** tab - See "Associate Resource Offerings with Service Components" on page 219.

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 136.

To create component templates

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

Item	Description
Base Component Type	The component type from which this template is created; this field cannot be edited.
Display Name	The name you that is displayed for the component template.
Description	The description you provide for the component template.
Image	An image that displays for the component type. Click **Change Image**, as desired. Choose the image you want, and click Select. Click Upload Image to add your own

Item	Description
	image. Supported file extensions include .jpg, .jpeg, .gif, and .png. The recommended image size is 256 by 256 pixels, and the image will be scaled to the appropriate size.
Consumer Visible	Select this box to specify that the service component is visible in the Marketplace Portal. De-select it to specify that the service component will not be visible.
Pattern	Select this box to mark the service component as a pattern by default. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instance from this service component pattern.

Edit Component Templates

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 136.

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 page 157.

Delete Component Templates

For more information about components, see "Components (Sequenced Designs)" on page 136.

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 136.

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 157.

See the following related topics:

- "Create Component Template Properties" on the next page
- "Lifecycle Actions for Component Templates" on page 164

View Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 136.

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" below.

See the following related topics:

- "View Component Template Details" on page 159
- "Lifecycle Actions for Component Templates" on page 164

Create Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 136.

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.

Item	Description
	• **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 offering. You can also specify the resource type and unit simply to clarify the intent of the property. Note that when creating a **Source Binding** for a service component, a best practice is that both the service component property you are creating and the service component property you are binding to will have the same **Resource Type and Unit** value. • **Property Value** - 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 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.

Item	Description
	• **Property Value** - Type the value of the property. The value must be in string format. Click the gear icon to select a property value token. See " Tokens" on page 316 for a description of the tokens. • **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 136.

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 161.

Delete Component Template Properties

For more information about components, see "Components (Sequenced Designs)" on page 136.

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.

Lifecycle Actions for Component Templates

For more information about component templates, see "View Component Templates" on page 156

Concepts

What is a component template lifecycle?

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

What is a lifecycle action?

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

What are lifecycle stages?

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

The Provisioning lifecycle stages are:

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

The Operational lifecycle stages are:

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

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

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

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

The De-provisioning lifecycle stages are:

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

actions that took place during the Initializing stage. For example, if actions in the Initializing stage create a change request, define actions in the Un-initializing stage to finalize that change request.

What are lifecycle phases?

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

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

Tasks

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

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

Lifecycle Action Selection Wizard

See also Lifecycle Action Selection Wizard (for service components) or Lifecycle Action Selection Wizard (for resource offerings).

Concepts

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

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

Tasks

- **Select Action** - Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the

`csa.properties` file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. See "Lifecycle Action Internal Actions" on the next page for a list of internal actions. This task is only available when you create an action.

- **Configure Action** - Configure information about the action.

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action. Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

  Select one of the following Mapping Types:

  ◦ Not Mapped - The parameter is not mapped to a value.

  ◦ Constant Value - Type a value for the parameter.

  ◦ Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Lifecycle Action Internal Actions

For more information about lifecycles, see "Lifecycle Actions for Component Templates" on page 164.

The following internal actions ship with CSA:

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

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

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

User Operations for Component Templates

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

Tasks

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

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

User Operation Action Selection Wizard

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

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

Tasks

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

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or

internal action prior to invoking the action. Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

Select one of the following Mapping Types:

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

List Items	
Switch to Static Entry (default)	Enter the display name and value for a list item. After entering a name or value, input boxes for a new list item automatically display.

Switch to Dynamic Entry	• Select a script from the List Items.
	  • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315.
	  • **HTTP Parameters** - 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.
	  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*.
	  • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316.
	  • **Refresh Data** - Click the Refresh Data icon ( ) to run the script and display the results.

- Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Associate Resource Offerings with Component Templates

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

Tasks

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

  A resource offering cannot be associated with a service component if the service component is part of a published design.
- **Navigate to Resource Offering** – Click the gear icon next to the resource offering to which you want to navigate. Select **Navigate to Resource Offering**, which takes you to the resource offering.
- **Replace Resource Offering** - Click the gear icon next to the resource offering you want to replace. Select **Replace Resource Offering**, and select the replacement resource offering. The displayed resource offerings are not bound to the service component and are of the same resource category and provider type as the resource offering being replaced.
- **Delete** - Click the gear icon next to the resource offering you want to delete. Click **Delete** and click **Yes** in the confirmation dialog.

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

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

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

Provider Selection Panel

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

Concepts

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

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

Tasks

- **Navigate to** or **View** (the Provider Selection panel) - From the **Sequenced Designs** page, select a service design, and then select the design version. Click the **Designer** tab. Select the service component on which you want to add a provider selection action. In the right pane, click the gear icon, select **Edit Component**, and select the **Resource Offerings** tab. In the **Resource Offerings** tab, click the name of the resource offering, and then click **Provider Selection** from the panel on the right.
- **Add** (a provider selection action) - Navigate to the **Provider Selection** panel and click **Add**. If no provider selection actions are configured, click the **Add** icon in the middle of the panel. Enter the information as described in the "Lifecycle Action Selection Wizard" on page 168.
  A provider selection action cannot be created if the service component is part of a published design.
- **Edit** (a provider selection action) - Navigate to the **Provider Selection** panel, click the gear icon next to the action you want to edit, and select **Edit**. Update the information as described in the "Lifecycle Action Selection Wizard" on page 168.
  The properties of an action cannot be edited if the service component is part of a published design.
- **Delete** (a provider selection action) - Navigate to the **Provider Selection** panel, click the gear icon next to the action you want to delete, and select **Delete**.
- **Set Processing Order** – The processing order of a provider selection action is relative to the other provider selection actions on this resource offering. The order in which you see the provider selection actions is the order in which they will be executed. You can click and drag a provider selection action to change its processing order.

Provider Selection Internal Actions

For more information about provider selection actions, see "Provider Selection Panel" on page 221.

Concepts

CSA ships with internal actions to help with provider selection.

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

- If you have configured resource pools on a provider, then the two provider selection actions most likely to be configured on a resource offering are the **Build Resource Provider and Pool List** action and the **Select Resource Provider and Pool** action, which should run in that order. To select the provider and pool already selected by the parent service component, use the **Select Resource Provider and Pool from Parent** action instead of the two previously mentioned actions.

For information about resource accounting actions for resource offerings, see " Tokens" on page 316.

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

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

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

Resource Accounting

For more information about associating resource offerings to service components, see "Associate Resource Offerings with Component Templates" on page 175.

Concepts

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

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

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

Tasks

- **Navigate to** or **View** - In the left pane of the **All Designs** area, select the tag associated with the design you want to view, and select the service design. In the **Designer** tab, select the service

component whose resource accounting action properties you want to view. In the right pane, click the gear icon and select **Edit Component**. In the **Resource Offerings** tab, select the resource offering. The panel on the right will display information about **Resource Accounting**.

- **Enable** (Resource Accounting) – Navigate to the **Resource Offerings** tab. Select the resource offering on which you want to enable resource accounting. Select the **Enable Resource Accounting** checkbox on the panel on the right. When you enable resource accounting, the two internal actions **Increase Resource Utilization** and **Decrease Resource Utilization** are automatically added to the resource offering.
- **Disable** (Resource Accounting) – Navigate to the **Resource Offerings** tab. Select the resource offering on which you want to disable resource accounting. Deselect the **Enable Resource Accounting** checkbox on the panel on the right. When you disable resource accounting, the two internal actions **Increase Resource Utilization** and **Decrease Resource Utilization** are removed from the resource offering.
  Resource accounting cannot be enabled/disabled if the service component is part of a published design.

Best Practices

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

Measurable Properties Tab

For more information about associating resource offerings to service components, see "Associate Resource Offerings with Component Templates" on page 175.

Concepts

A measurable property is an integer service component property that has a configured **Resource Type** and **Unit** (see "Service Component Properties" on page 233). When you configure measurable properties on a resource offering, you create references to the corresponding service component measurable properties. To view the value of a measurable property, see the corresponding service component property in the **Properties** tab.

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

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

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

Tasks

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

  A measurable property of a resource offering in a service component cannot be added if it is part of an upgraded or published design.
- **Delete** - Navigate to the Measurable Properties panel and de-select the measurable properties you want to remove.

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

Sequenced Designs

A sequenced service design is a blueprint for an orderable service. Each design includes service components created from component types or component templates that define what is automatically provisioned. You can use service designs to create a complex set of automated elements that support consistency and repeatability of common manual tasks. These service designs then become the basis

for service offerings, which support IT Infrastructure Library (ITIL) and IT Service Management (ITSM) best practices.

A sequenced service design includes the following:

- A hierarchy of service components (see "Service Components" on page 199). The hierarchy of service components, along with the **Processing Order** configured for each service component, defines the order of execution that occurs when the design is provisioned.
- Resource offerings, which can be added to service components to enable the added resource offerings to be provisioned along with the service components.
- Lifecycle actions, which allow you to configure provisioning and de-provisioning actions for a service component. See "Lifecycle Actions for Service Components" on page 206.
- Properties, which allow you to configure user-defined properties for service components. See "Service Component Properties" on page 233
- Property mappings, which allow you to configure the property of a component to obtain its value from the property of another component. See "Create a Property Mapping" on page 231.
- 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 235.
- Upgradability relationships, which allow you to add, configure, and remove upgradability relationships between service designs. See "Upgradability" on page 249.

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 "Providers" on page 85 and "Resource Offerings (Sequenced Designs)" on page 98.

3. Create component types and templates, as needed (see "Create a Component Type" on page 145 and "Create Component Templates" on page 157) or use out-of-the-box component types and templates (see "Components (Sequenced Designs)" on page 136).
4. Create the service design. See "Add a Service Design" on page 190.
5. Use the **Designer** to create a hierarchy of service components. See "Sequenced Designer" on page 196 and "Create a Service Component" on page 200.
6. Associate resource offerings with service components, as needed. See "Associate Resource Offerings with Service Components" on page 219.
7. Create lifecycle actions for service components, as needed. See "Lifecycle Actions for Service Components" on page 206.
8. Create properties for service components, as needed. See "Service Component Properties" on page 233.
9. Map properties for service components, as needed. See "Create a Property Mapping" on page 231.
10. Create subscriber options for a service design, as needed. See "Sequenced Design Subscriber Options" on page 235.
11. 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 190.

View All Service Designs and Versions

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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.
	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 190. • **Import Design** - Import a service design. For more information, see "Import and Export a Service Design" on page 192. • **Manage Design Tags** - Manage tags. For more information, see "Manage Tags" on page 254. • **Refresh** - Refresh the data in this view.
Design Name	Click the name of a design to navigate to the **Overview** tab for the design. For more information about configuration options, see "View Service Design and View Service Design Version" below.
New	Click **New** to create a new version of a particular service design. For more information about configuration options, see the "Create New Version" task in "View Service Design and View Service Design Version" below.
Version Number	View the names of the latest five versions of the design sorted by creation date. These version names are links to the **Overview** tab of the Service Design Version page. Click the version number of a design to display details about that version of the service design and see the layout of the design. If there are more than five versions, click the **All** link to open the **Versions** tab of the service design page, which displays a complete list of versions sorted by creation date. If there are no existing versions, only the **New** link displays in the Designs area. For more information about configuration options, see "View Service Design and View Service Design Version" below. For more information about design versions, see "Design Versions" on page 195.

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 preview of the design.

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 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 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.

Item	Description
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

On the service design page, click the gear icon and select **Create New Version** to create a new version of the design. If Based on Version is set to a published design, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see the topic "Design Versions" on page 195.

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 190.

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 version page displays:

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

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

- **Designer** tab - for more information see the topic "Sequenced Designer" on page 196.
- **Subscriber Options** tab - for more information see the topic "Sequenced Design Subscriber Options" on page 235.
- **Service Offerings** tab - this tab displays a list of service offerings associated with the service design. For more information, see Service Offerings.
- **Upgradability** tab - for more information see the topic "Upgradability" on page 249.

View Design Version Overview

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

Item	Description
This design is part of an upgrade path and has restricted editability and actions.	This message appears when the design is part of an upgrade path. Certain functions are restricted on a design if it is part of an upgrade path. For more information, see the topic "Upgradability" on page 249.
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.
Published	Indicates if the service design is published (Yes) or not published (No).
Upgradable From	A link to the version of a service design that this design is based on and that can be upgraded to the current design version.

Item	Description
Upgradable To	A link to the version(s) of a service design to which this design can be 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 of the service design page.

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

On the service design page, click the gear icon and select **Create New Version** to create a new version of the design. If Based on Version is set to a published design, the new design can be made upgradable from the selected version. For descriptions of the specific properties, see the topic "Design Versions" on page 195.

Export a Version

See "Import and Export a Service Design" on page 192.

Delete a Version

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

Add a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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**.

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 CSA server.
Tags	Click **Select Tags** to choose from a list of tags that you can define to provide a structure for organizing and grouping the service designs. For more information, see "Manage Tags" on page 254. To remove a tag, click the trashcan icon.

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

For more information about service components, see "Service Components" on page 199.

Edit Service Design Properties

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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**.

Delete a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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 182.

Concepts

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

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

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

Process Information

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

(dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

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

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

  `jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png`
- **Back up your data** - Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

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

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

Tasks

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

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

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

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

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

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

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

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

  ```
  SERVICE_DESIGN_<service_design_display_name>_<service_design_id>.zip
  ```

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

Design Versions

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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 "Sequenced Designer" on the next page for more information.

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

Tasks

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

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

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

Copy a Service Design

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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 the previous page.

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

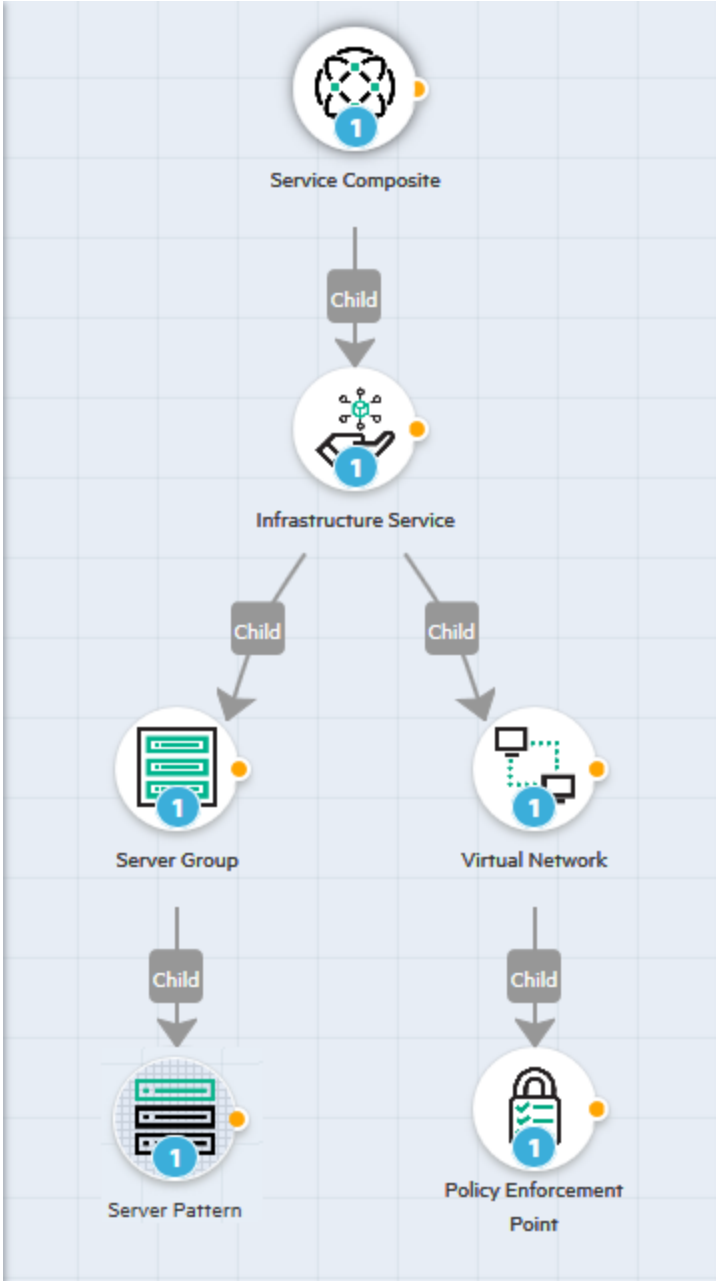
All parts of a service design (such as the service component hierarchy, properties, and subscriber options) are copied. The copied service design appears in the **All Designs** area. After you copy a service design, any changes you make to the original or to the copy will not affect the other.

Sequenced Designer

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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

An example hierarchy of service components, as shown below, has a Service Composite that contains an Infrastructure Service, which contains a Server Group and a Virtual Network. Also, the Server Group contains a Server (marked as a Pattern), while the Virtual Network contains a Policy Enforcement Point.



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. The **Sequenced Designs** page appears.

3. Select a service design version. If no versions exist, click **New**. For more information about versions, see "Design Versions" on page 195.
4. Click the **Designer** tab. The design canvas appears, with a list of palettes and list of components in the left pane. You can add components from the left pane to the design canvas to create your design, as described in "Create a Service Component" on page 200.

To use the designer controls

The **Designer** provides the following controls to help you create and view your service design.

Icon	Description
	Click to zoom the display out or in.
	Click to reset the service components to their default positions.
	Use this toolbar to create a new child service component, edit, duplicate, or delete a component, or select a component template. Click the orange dot on a service component on the canvas to display this toolbar.

Service Design Validation

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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

A service design with validation errors is not publishable.

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

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

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

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

Service Components

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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 "Create a Component Type" on page 145).

See the following related topics:

- "Create a Service Component" on the next page
- "Edit a Service Component" on page 201
- "Create a Property Mapping" on page 231
- "Change the Service Component Template" on page 229
- "Delete a Relationship between Service Components" on page 232
- "Delete a Service Component" on page 231
- "Service Component Properties" on page 233

Create a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 182.

To create a service component

1. Complete the steps in "To navigate to the sequenced designer " on page 197 and select the **Designer** tab.
2. Use the list in the left pane to select a component palette. A component palette contains a group of component types from which you can choose when creating service components in a service design.
3. The component types available for this palette appear. Use the search box to filter the component type list by display name and description. Select a component type.
4. When you select a component type, the templates available for that component type appear.
   - A search box appears for component types with five or more templates. Use the search box to filter the component template list by display name and description.
   - A component template is a specialized version of a component type and is used to simplify service design creation. Component templates can include customized property values and lifecycle actions that provide initial settings for the service design. When a template is added to a design, any default properties, bindings, and lifecycle actions are automatically populated in that service component within the design. This list always includes a **'Blank Template**,' which uses the settings as configured for the selected component type.
5. Select the template of the component type you want, and add it to the design canvas on the right using any of the following methods. You can add parent or child components using these methods, and you can add as many components as you need for your design:
   - Drag and drop the template to the canvas.
   - Doubleclick on a template to add it to the canvas.
   - Click the orange dot on a service component on the canvas to bring up the designer controls toolbar (see "To use the designer controls" on page 198). Click the **Add** icon + to add a parent or child service component.
6. To establish parent-child relationships between component types on the canvas, click the orange dot on a service component on the canvas, and draw a line to the parent or child component type. If a relationship is defined incorrectly, component type constraints will not allow you to create the relationship. If a component does not have an established parent-child relationship, a validation error is displayed and the design cannot be published.

7. Click the Automatic Layout icon to organize and display your design in a graphical format.

For more information about component palettes, types, and constraints, see "Components (Sequenced Designs)" on page 136.

Edit a Service Component

For more information about service components, see "Components (Sequenced Designs)" on page 136.

Double-click a component, click the **Edit** icon , or click the gear icon and select **Edit Component** to bring up the **Edit Component** dialog.

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

Use the functional area tabs to edit a service component:

- "Overview Tab for Service Components" below
- "Properties Tab for Service Components" on page 203
- "Lifecycle Actions for Service Components" on page 206
- "User Operations for Service Components" on page 215
- "Associate Resource Offerings with Service Components" on page 219

Overview Tab for Service Components

For more information about service components, see "Components (Sequenced Designs)" on page 136.

Concepts

The Edit Component Overview tab allows you to modify attributes of a service component, including its Display Name, Description, Processing Order, and Consumer Visible and Pattern settings. For more information about these properties, see "Edit a Service Component" above and "Create a Component Type" on page 145.

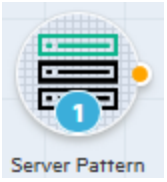
Tasks

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

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

  - **Display Name** - The name you provide for the service component.
  - **Description** - The description you provide for the service component.
  - **Processing Order** (default value is 1, minimum value is 1, maximum value is 99) - Select a number to specify the deployment processing order for this service component relative to its sibling service components (that is, service components who share the same parent). Service components are processed in ascending order during service deployment and in descending order during undeployment.
  - **Image** - An image appears for the component. Click **Change Image**, as desired. The **Select Image** dialog appears, allowing you to choose from a variety of available images or click **Upload Image** to add your own image.
  - **Consumer Visible** (the default is false) - Select Visible to specify that this service component is visible in the . De-select it to specify that the service component will not be visible. Service component properties and lifecycle actions that have been configured to be visible in the will only be displayed in the if the associated service component is itself configured to be visible. The visibility of a service component does not affect visibility of its child service components, and it is not necessary for a parent of a service component to be visible for the child component to be visible in the .
  - **Pattern** (the default is false) - Select this box to mark the service component as a pattern. This indicates that the service component will not be automatically processed by the lifecycle engine. When you create a pattern service component, you must also create a Clone Pattern action in the parent service component. For example, the out-of-the-box component type, Server, is typically marked as a pattern, and its parent service component, Server Group, includes the Clone Pattern action. At subscription time, the Clone Pattern action creates one or more service component instances from this service component pattern. A pattern component can have direct children, which are not patterns. When a pattern component contains a direct child component, the Clone Pattern action creates one or more instances of the pattern including the child component.

- A validation error is displayed in the designer when a parent-child relationship is established between a pattern service component and its parent component if the Clone Pattern action is not created in the parent service component.
- A validation warning is displayed when the service design has a pattern component whose parent component does not have the Clone Pattern action.
- A validation error is displayed when the service design has a pattern component whose parent component has a Clone Pattern action that does not have a value in the “Name of the Property for Service Component Count” property field.
- A validation error is displayed when the service design has a pattern component whose parent component has a Clone Pattern action that does not have a value in the “Name of the Property for Service Component Count” property field or has a value that does not point to the name of a property on the component.
- You can identify a service component that is marked as a pattern because its icon appears with a grid-like background, as shown below.



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

  - Processing Order
  - Pattern

- **Save** - Click **Done** to save any changes and exit the dialog.

Properties Tab for Service Components

For more information about modifying the attributes of a service component, including its Display Name, Description, Processing Order, and Consumer Visible and Pattern settings, see "Overview Tab for Service Components" on page 201.

Concepts

The following information is displayed:

Item	Description
Type	Determines the kind of value that can be assigned to the property. The available types are: • Boolean • Integer • List • String You cannot change the type once the property has been created.
Display Name	The label that will be displayed for the property. Hover the cursor over a display name to show the unique name (**Name**) and description (if supplied) of the property.
Value	The value of the property. What is entered for the value depends on the property type: • **Boolean** - A property whose value is true or false. • **Integer** - A property whose value is a positive or negative whole number (or zero). The **Resource Type and Unit for a Measurable Property**, if configured, is displayed in parentheses (see "Create Component Type Properties" on page 150 for more information). • **List** - A property whose value is a list of string values. • **String** - A property whose value is a sequence of characters. If the property has a property mapping, the value displayed is the component and property from which the value is mapped. Property mappings are configured from the design canvas. See "Create a Property Mapping" on page 231 for more information. If the property has a target binding, the value is mapped from a subscriber option at runtime (when a subscription has been created). Target bindings are configured from the **Subscriber Options** tab. See "Sequenced Design Subscriber Options" on page 235 for more information. To determine if a property has a target binding, there should be at least one reference shown in the References column and, when the link in the References column is selected, one or more subscriber option properites are displayed. **Note:** If a property has a target binding, by default (until runtime) the value displayed is the value that was configured when the property was created. If the property is mapped to a token (String properties only), the value displayed is the name of the token (a token is a system value that is automatically resolved internally when the property is read). See " Tokens" on page 316 for a description of the tokens. If the property is configured as **Confidential Data** (String properties only), the value is masked (no encryption of the value is performed).
References	The total number of component properties using this property as the source (the value of this property is mapped *to* another component property) and target bindings. A

Item	Description
	component property that has a property mapping (its value is mapped *from* another property) is not considered a reference. Click the reference to display the component properties to which this property is mapped and the subscriber option properties from which this property has a target binding.
Attributes	The attributes configured for the property such as: • **Inherited** - The property is inherited from a component type. • **Consumer Visible** - The property will be made visible in the Marketplace Portal.
Actions	The gear icon, when selected, allowing you to edit or delete the property (if the action is permitted on the property). See the descriptions of these actions in the Tasks section below.

Tasks

- **Navigate to** (the Properties tab) -Select a service design version. Click the **Designer** tab. Select the service component on which you want to complete the task. In the right pane, click the gear icon, select **Edit Component**, and select the **Properties** tab.
- **Create** - Navigate to the Properties tab. Click **Create**. Enter the information described in the table above (see also "Create Component Type Properties" on page 150) and click **Create**.

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

  > **Note:** Property mappings are configured from the design canvas. See "Create a Property Mapping" on page 231 for more information. Target bindings are configured from the **Subscriber Options** tab. See "Sequenced Design Subscriber Options" on page 235 for more information.

- **Edit** - Navigate to the Properties tab. Click the gear icon next to the component property to be modified and select **Edit**.

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

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

- **Delete** - Navigate to the Properties tab. Click the gear icon next to the component property to be deleted, select **Delete**, and click **Yes** in the confirmation dialog.

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

If a property has references, CSA removes these references before deleting the property.

Lifecycle Actions for Service Components

For more information about service components, see "Service Components" on page 199.

See also "Lifecycle Actions for Resource Offerings" on page 118 or "Lifecycle Actions for Component Templates" on page 164.

Concepts

What is a service component lifecycle?

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

What is a lifecycle action?

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

What are lifecycle stages?

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

The Provisioning lifecycle stages are:

- **Initializing** - Initializing is the first stage that is processed during provisioning. Use the Initializing stage for actions that perform any type of initialization that is required before proceeding to the Reserving stage, such as actions that perform input validation or create change request records.
- **Reserving** - Reserving is the second stage that is processed during provisioning, after the Initializing stage. When a resource offering is associated to a service component, any configured

provider selection and pool selection actions run during the Reserving stage. If resource accounting is enabled, actions to reserve resources from a pool run during the Reserving stage. In general, any resources needed during provisioning, such as storage or networking, can be reserved during the Reserving stage.

- **Deploying** - Deploying is the final stage that is processed during provisioning, after the Initializing and Reserving stages, and is the most common stage in which provisioning actions are defined. Define actions in the Initializing and Reserving stages to prepare the environment for provisioning. Define actions in the Deploying stage to perform actual provisioning. For example, you can define actions that deploy a VM or an application in the Deploying stage.

The Operational lifecycle stages are:

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

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

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

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

The De-provisioning lifecycle stages are:

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

What are lifecycle phases?

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

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

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

Tasks

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

- **Navigate to** (the Lifecycle tab) - In the left pane of the **All Designs** area, select the tag associated with the design you want to view. Select the service design and, in the **Designer** tab, select the service component on which you want to complete the task. In the right pane, click the gear icon, select **Edit Component**, and select the **Lifecycle** tab.
- **Add Action** - Click the **Add Action** or **Add More Actions** link in the stage and phase to which you want to add an action. Enter the information as described in "Lifecycle Action Selection Wizard" on page 211.
- **Edit Action** - Select the gear icon on the action you want to edit and select **Edit**. Update the information as described in "Lifecycle Action Selection Wizard" on page 211.
- **Delete Action**- Click the gear icon next to the action you want to delete and select **Delete**. You can also delete an action that is in a group.
- **Move Action**- Select the gear icon on the action or group of actions you want to move to another stage or phase and select **Move**. In the Move dialog, select the Target Stage and Target Phase from the pull-down menus and then click **Move**. You can also click and drag to move an action or group of actions. To move an action or group of actions using the keyboard, press the tab key to provide focus on the action or group and then press Ctrl and the up or down keys to move the action or group within a phase.
- **Group Actions** - Click to select multiple actions in a lifecycle phase and then click **Group Actions** to create a parallel execution group. Actions in a parallel execution group are executed at the same time.

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

Lifecycle Action Selection Wizard

See also Lifecycle Action Selection Wizard (for resource offerings) or Lifecycle Action Selection Wizard (for service component templates).

Concepts

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

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

Tasks

- **Select Action** - Search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the `csa.properties` file; see the "Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. See "Lifecycle Action Internal Actions" on page 213 for a list of internal actions. This task is only available when you create an action.
- **Configure Action** - Configure information about the action.

Item	Description
Process Engine	Read-only. The container of the flow or internal action.
Locator	Read-only. The location of the flow or internal action.
Display Name	The name you provide for the action.
Description	The description you provide for the action.
Execution Properties	Specify the following:

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action. Click the gear icon next to the parameter you want to configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

  Select one of the following Mapping Types:

  ◦ Not Mapped - The parameter is not mapped to a value.

  ◦ Constant Value - Type a value for the parameter.

  ◦ Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Lifecycle Action Internal Actions

For more information about lifecycles, see "Lifecycle Actions for Service Components" on page 206.

The following internal actions are available with CSA:

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

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

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

User Operations for Service Components

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

Tasks

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

- **Navigate to** (the **User Operations** tab) - In the left pane of the **All Designs** area, select the tag associated with the design you want to view. Select the service design and, in the **Designer** canvas, select the service component on which you want to complete the task. In the right pane, click the gear icon, select **Edit Component**, and select the **User Operations** tab. From here, you can:
- View a list of user operations for this service component.

- **Add Action** - Click **Add**, and enter the information as described in "User Operation Action Selection Wizard" on page 173.
- **Edit Action** - Select the gear icon on the action you want to edit and select **Edit**. Update the information as described in "User Operation Action Selection Wizard" on page 173.
- **View User Operation** - Click the **User Operations** tab to view all user operations associated with a resource offering.
- **Delete User Operation** - Click the gear icon next to the user operation you want to remove, and select **Delete**.

Action Selection Wizard

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

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

Tasks

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

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

- **Configure Parameters** - Configure the input parameters whose values are passed to the flow or internal action prior to invoking the action. Click the gear icon next to the parameter you want to

configure and select **Edit Mapping**. From the Edit Parameter Mapping dialog, edit the Name, Display Name, Description, and Mapping Type of the parameter.

Select one of the following Mapping Types:

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

List Items	
Switch to Static Entry (default)	Enter the display name and value for a list item. After entering a name or value, input boxes for a new list item automatically display.

Switch to Dynamic Entry	• Select a script from the List Items.
	  • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315.
	  • **HTTP Parameters** - 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.
	  > **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*.
	  • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316.
	  • **Refresh Data** - Click the Refresh Data icon ( ) to run the script and display the results.

- Token - Select a token, which is a system value that is automatically resolved internally when the parameter is read. Tokens are not available for Boolean or Integer parameters. See " Tokens" on page 316 for a description of the tokens.

Associate Resource Offerings with Service Components

For more information about sequenced designs, see "Sequenced Designer" on page 196.

Concepts

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

You can also associate resource offerings with component templates.

Tasks

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

  A resource offering cannot be associated with a service component if the service component is part of a published design.
- **Delete** - Click the gear icon next to the resource offering you want to delete. Click **Delete** and click **Yes** in the confirmation dialog.

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

  A resource offering cannot be deleted if the service component is part of a published design.
- **Replace Resource Offering** - Click the gear icon next to the resource offering you want to replace. Select **Replace Resource Offering**, and select the replacement resource offering. The displayed resource offerings are not bound to the service component and are of the same resource category and provider type as the resource offering being replaced.

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

Provider Selection Panel

For more information about associating resource offerings to service components, see "Associate Resource Offerings with Service Components" on page 219.

Concepts

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

CSA ships with internal actions to help with provider selection. For more information about these provider selection internal actions, see "Provider Selection Internal Actions" on page 223.

Tasks

- **Navigate to** or **View** (the Provider Selection panel) - Select a service design version. Click the **Designer** tab. Select the service component on which you want to add a provider selection action. In the right pane, click the gear icon, select **Edit Component**, and select the **Resource Offerings** tab. In the **Resource Offerings** tab, click the name of the resource offering, and then click **Provider Selection** from the panel on the right.
- **Add** (a provider selection action) - Navigate to the **Provider Selection** panel and click **Add**. If no provider selection actions are configured, click the **Add** icon in the middle of the panel. Enter the information as described in the "Lifecycle Action Selection Wizard" on page 211.

  A provider selection action cannot be created if the service component is part of a published design.
- **Edit** (a provider selection action) - Navigate to the **Provider Selection** panel, click the gear icon next to the action you want to edit, and select **Edit**. Update the information as described in the "Lifecycle Action Selection Wizard" on page 211.

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

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

Provider Selection Internal Actions

For more information about provider selection actions, see "Provider Selection Panel" on page 221.

Concepts

CSA ships with internal actions to help with provider selection.

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

For information about resource accounting actions for resource offerings, see " Tokens" on page 316.

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. • 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	Resource Offering associated with a Service Component

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

Internal Action	Description	Applies To
	a Service Component, Resource Offering associated with a service component, or Resource Offering for use in troubleshooting.	Resource Offering associated with a Service Component Service Component
Select Resource Provider	Selects a resource provider from the candidate list that was built by the **Build Resource Provider List** action. The selected resource provider will be available to resource offering actions in the token `RSC_PROVIDER_ID`. The selected provider will, optionally, be written to a property on the associated service component if the `Provider Property Name` input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool	Selects a resource pool and provider from the candidate list that was built by the **Build Resource Provider and Pool List** action. The selected resource provider and pool will be available to resource offering actions in the token `RSC_PROVIDER_ID` and `RSC_POOL_ID`, respectively. The selected pool will, optionally, be written to a property on the associated service component if the `Pool Property Name` input to the action is provided.	Resource Offering associated with a Service Component
Select Resource Provider and Pool from Parent	Selects the resource pool and provider already chosen by a service component's parent service component, as identified by the `Parent Component ID` and `Pool Property Name` properties. The selected resource provider and pool will be available to resource offering actions in the token `RSC_PROVIDER_ID` and `RSC_POOL_ID` respectively. The selected pool will also be written to a `Pool Property Name` property on the associated service component.	Resource Offering associated with a Service Component
Select Resource Provider from Parent	Selects the resource provider already chosen by a service component's parent service component, as identified by the `Parent Component ID` and `Provider Property Name` properties. The selected resource provider will be available to resource offering actions in the token `RSC_PROVIDER_ID`. The selected resource provider will also be written to a `Provider Property Name` property on the associated service component.	Resource Offering associated with a Service Component

Resource Accounting Tab

For more information about associating resource offerings to service components, see "Associate Resource Offerings with Service Components" on page 219.

Concepts

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

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

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

Tasks

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

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

Best Practices

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

Measurable Properties Tab

For more information about associating resource offerings to service components, see "Associate Resource Offerings with Service Components" on page 219.

Concepts

A measurable property is an integer service component property that has a configured **Resource Type** and **Unit** (see "Service Component Properties" on page 233). When you configure measurable properties on a resource offering, you create references to the corresponding service component measurable properties. To view the value of a measurable property, see the corresponding service component property in the **Properties** tab.

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

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

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

Tasks

- **Navigate to** or **View** (the Measurable Properties panel) - In the left pane of the **All Designs** area, select the tag associated with the design you want to view. Select the service design and, in the **Designer** tab, select the service component that contains the resource offering whose measurable properties you want to view. In the right pane, click the gear icon and select **Edit Component**. In the **Resource Offerings** tab, click the name of the resource offering whose measurable properties you want to view. Finally, select the **Measurable Properties** panel on the right.
- **Add** - Navigate to the **Measurable Properties** panel and select the measurable properties you

want to add. If the service component does not contain any measurable properties, the measurable properties panel will be empty.

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

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

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

Change the Service Component Template

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

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

For more information about sequenced designs, see "Sequenced Designs" on page 182. For more information about component templates, see "Components (Sequenced Designs)" on page 136 and "Create a Service Component" on page 200.

To change the service component template

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 internal name as the current component, allowing the replacement component to be used in an upgrade path (see "Service Designs in an Upgrade Path" below).
4. Click **Save**.

Service Designs in an Upgrade Path

When replacing a service component in a service design that is part of an upgrade path, the replacement service component template must meet the following criteria in order to replace the current service component (if one or more of the following criteria are not met, the current service component will not be replaced):

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

Duplicate a Service Component

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

For information about creating components, see "Create a Service Component" on page 200.

To duplicate a service component

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

Delete a Service Component

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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

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

To delete a service component

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

Create a Property Mapping

For more information about sequenced designs, see "Sequenced Designer" on page 196.

Concepts

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

Using property mapping, you can share a single property value between multiple components in a design without the need to duplicate the value of the property across those components. For example, if your design includes three components that represent servers, and you need each server to be

provisioned with the same number of CPUs, you can define the number of CPUs on one component and then create a property mapping between the CPU properties of the other components and the component that stores that common value.

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

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

Tasks

Property mappings are managed in the Designer tab of a service design version. You can perform the following tasks in the **Designer** tab:

- **Create** - Select the service component to which you want to add a property mapping. In the component properties pane, click the gear icon next to the property you want to map and then select **Map Property**. In the Select Mapping dialog, select a different component that has compatible properties to create the mapping. Select a compatible property of the selected component.
  The flow of the property mapping is displayed at the bottom of the Select Mapping dialog.
- **Delete** - Click the gear icon next to the mapped property you want to delete and then select **Delete Mapping**.
- **View** - Select the service component with the property mapping you want to view. Mapped properties are displayed with the chain icon in the properties pane on the right.
- **Edit** - In the properties pane, click the gear icon next to the property mapping you want to update and then select **Update Mapping**. The component with the property mapping is highlighted in the Select Mapping dialog. The properties of the mapped component are displayed in the right pane. The mapped property is displayed at the bottom of the Select Mapping dialog. Click a property on the right pane to create a mapping to a different property of the mapped component. You can also select a different component and its property to create a mapping in the Select Mapping dialog, or click the trashcan icon to delete a property mapping.

Delete a Relationship between Service Components

For more information about service components, see "Components (Sequenced Designs)" on page 136.

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

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

To delete a relationship between service components

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

Service Component Properties

For more information about service components, see "Service Components" on page 199. For more information about component type properties, see "Create Component Type Properties" on page 150

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

For more advanced configuration of the properties on a component, including the ability to add or delete properties, use the **Edit Component** menu. For more information, see "Edit a Service Component" on page 201.

Concepts

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

- When a service component receives its value from a subscriber option. For example, you may wish to receive the number of CPUs for a server after its value has been specified in the Marketplace Portal. To do this, create a property (for example, `NCPU`) on the Server service component and create a subscriber option property (for example, `NCPU`). Finally, use a target binding, as described in "Sequenced Design Subscriber Options" on page 235, 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 IP Address that is stored on a Server service component.
- When you want to create a property mapping between components in a design, where the property of a component obtains its value from the property of another component in a design. For example, a Software Application Tier service component may need to know the service component ID of a

Server Group. You can create a property on the Server Group service component called `SVC_COMPONENT_ID`, which has a token value of `[TOKEN:SVC_COMPONENT_ID]`. You would also create a property on the Software Application Tier service component whose value contains a property mapping to the Server Group property (`SVC_COMPONENT_ID`). The property value is then pulled by the Software Application Tier from that `SVC_COMPONENT_ID` property on the Server Group. This use of service component properties to pull a value from another service component property is called a *property mapping*. Another type of relationship between properties is called a *target binding*. For more information about target bindings, see "Sequenced Design Subscriber Options" on the next page.

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

Tasks

- **View** - Select the service component whose properties you want to view. The **Properties** pane opens on the right and displays the properties of the selected component. A property that is set as a measurable property is displayed with its unit in parenthesis. The component type and the palette to which the component belongs are displayed at the top of the **Properties** pane. Click the **References** link under a property to view component and subscriber option property mappings.
- **Edit** - Select the service component whose properties you want to edit. The **Properties** pane opens on the right and displays the properties of the selected component. You can edit the values of any property and click **Save** to persist the changes.
- **Select Token** - Choose a token for String properties that are not mapped. Choose the **Select Token** option, and select from the list of available tokens. See " Tokens" on page 316 for a description of the tokens.
- **Map properties** - Create a mapping between the properties of components in a design. For more information, see "Create a Property Mapping" on page 231
- **Add, edit, or delete list items** - Add, edit, or delete list items for list properties. Use the **Edit Component** menu to add list properties.
- **Configure advanced settings** - Add, edit, delete, or modify properties of a service component, configure lifecycle actions, and configure resource offerings. For more information, see "Edit a Service Component" on page 201.

Sequenced Design Subscriber Options

For more information about sequenced designs, see "Sequenced Designs" on page 182.

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 service component property is called a *target binding*, described below.
- In the Marketplace Portal, subscribers can select the option that provides the desired number of servers.

Subscriber Options Workflow

As a best practice:

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

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 service component property is called a *target binding*.

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

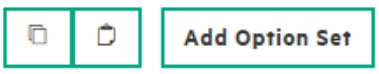
Another type of relationship between properties is called a *property mapping*. For more information about property mapping, see "Create a Property Mapping" on page 231

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

Subscriber Options Controls

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

Subscriber Options Controls

Item	Description
	Click to see a tree view of all of the option sets, options, and properties that have been configured for the design and to navigate directly to an option set or option.
	Click to copy an option, paste an option, or add an option to an option set.
	Click to copy an option set, paste an option set, or add an option set.
	Click to delete an option or option set, as described in "Delete Subscriber Option Sets and Options" on page 243.
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

Subscriber Options Controls, continued

Item	Description
	list. You can also reorder an option set or option by clicking and dragging it.
Add Property link	Click to create properties.
	Click to copy property to all options, configure bindings, or delete a property. See "Edit Subscriber Option Properties" on page 248

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 239
- "Reorder Subscriber Option Sets and Options" on page 240
- "Edit Subscriber Option Sets and Options" on page 241
- "Delete Subscriber Option Sets and Options" on page 243
- "Create Subscriber Option Properties" on page 244
- "Edit Subscriber Option Properties" on page 248

Add Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

To add a subscriber option set and options:

1. Select the service design version whose subscriber options you want to configure.
2. Select the **Subscriber Options** tab.
3. Click **Add Option Set**. You can also click the **Copy Option Set** and **Paste Option Set** buttons to copy option sets, both within and across designs.

4. Click **Add Option** to add an option to an option set. You can use this functionality to create a hierarchy of option sets that is up to three levels deep:
   - Option Set 1
     - Option
       - Option Set 2
         - Option
           - Option Set 3
             - Option

You can copy and paste option sets or options within a design, between designs, and within a tree within a design. The copy includes the entire structure, including property bindings when copied within the same design. When pasting options or option sets into a new design, bindings will not be copied and you will need to manually configure them.

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

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

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

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

- **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 235.

See the following related topics:

- "View Subscriber Option Sets and Options" below
- "Reorder Subscriber Option Sets and Options" on the next page
- "Edit Subscriber Option Sets and Options" on page 241
- "Delete Subscriber Option Sets and Options" on page 243
- "Create Subscriber Option Properties" on page 244
- "Edit Subscriber Option Properties" on page 248

View Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

To view subscriber option sets and options:

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

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

See the following related topics:

- "Sequenced Design Subscriber Options" on page 235
- "Add Subscriber Option Sets and Options" on page 237
- "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 243
- "Create Subscriber Option Properties" on page 244
- "Edit Subscriber Option Properties" on page 248

Reorder Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

To change to order of option sets or options:

1. Select the service design version whose subscriber options and option sets you want to reorder.
2. Select the **Subscriber Options** tab.
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 235.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 235
- "Add Subscriber Option Sets and Options" on page 237
- "View Subscriber Option Sets and Options" on the previous page
- "Edit Subscriber Option Sets and Options" on the next page
- "Delete Subscriber Option Sets and Options" on page 243

- "Create Subscriber Option Properties" on page 244
- "Edit Subscriber Option Properties" on page 248

Edit Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

Edit Subscriber Option Sets

To edit a subscriber option set:

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

You can edit the following subscriber option set options:

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

changing the selected values of this option set when modifying the subscription in the Marketplace Portal.

Edit Subscriber Options

To edit a subscriber option:

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

You can edit the following subscriber option properties:

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

See the following related topics:

- "Sequenced Design Subscriber Options" on page 235
- "Add Subscriber Option Sets and Options" on page 237
- "View Subscriber Option Sets and Options" on page 239
- "Reorder Subscriber Option Sets and Options" on page 240
- "Delete Subscriber Option Sets and Options" on the next page
- "Create Subscriber Option Properties" on page 244
- "Edit Subscriber Option Properties" on page 248

Delete Subscriber Option Sets and Options

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

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

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 235
- "Add Subscriber Option Sets and Options" on page 237
- "View Subscriber Option Sets and Options" on page 239
- "Reorder Subscriber Option Sets and Options" on page 240
- "Edit Subscriber Option Sets and Options" on page 241
- "Create Subscriber Option Properties" below
- "Edit Subscriber Option Properties" on page 248

Create Subscriber Option Properties

For more information, see "Sequenced Design Subscriber Options" on page 235.

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

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

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

Create a subscriber option property

To create a subscriber option property:

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

Item	Description
Property Type	Select one of the following: • **Boolean** - A property whose value is **True** or **False**. • **Integer** - A property whose value is a positive or negative whole number or zero. • **List** - A property where you can define a list of values for the subscriber to select. • **String** - A property whose value is a sequence of characters. Configure the following items for each property type: • **Name** - A unique name for the property. • **Display Name** - The display name for the property. • **Description** - A description of the property. • **Editable** - If selected, indicates the property is editable in a service offering created from the design and can be configured in the offering to be editable in the Marketplace Portal. • **Required** - If the property is **Editable**, you can select **Required** to require the service offering or subscriber to provide a value for the property. Boolean properties that are **Editable** are implicitly **Required**.
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. ◦ **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

Item	Description
	the closest maximum or minimum value. ***For List properties:*** • **Service Offering and Marketplace Portal Settings**: ◦ **Editable** - Indicates that this property can be made editable in the **Offerings** area and in the Marketplace Portal. Dynamic entry properties are always editable; this field cannot be changed for dynamic entry properties. ◦ **Required** - Select to indicate that when a subscription is ordered, a value must be provided for this field. • **List Selection Type:** ◦ **Single-Select** - Select to present options as radio boxes in the Marketplace Portal. ◦ **Multi-Select** - Select to present options as check boxes in the Marketplace Portal. • **List Items**: ◦ **Switch to Static Entry** (default) - Enter the name and value for an entry in the list. After the value entry, a new item line is displayed automatically. ◦ **Switch to Dynamic Entry** - Select a script name and specify the HTTP parameter names and token values. • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315. • **HTTP Parameters** - 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. **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*. • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316. • **Refresh Data** - Click the Refresh Data icon ( ) 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

Item	Description
	Marketplace Portal. ◦ **Required** – Select to indicate that when a subscription is ordered, a value must be provided for this field. • **Input Type**: ◦ **Single-Line** - The input area is presented as and accepts only one line of text. ◦ **Multi-Line** - The input area is presented as a text box and can accept one or more lines of content. ◦ **Number of Characters** - Configure the minimum and maximum number of characters that can be entered for this property. These fields are available only when the **Editable** and **Single-Line** options are selected. ◦ **Input Restriction** - Choose an Input Restriction from the following list. These fields are available only when the **Editable** and **Single-Line** options are selected. • **(none)** - No input restriction will be performed. A minimum and maximum length can still be configured. • **Custom Regular Expression** - Validates the value based on a regular expression, as specified in the **Regular Expression** text box. • **Email Address** - Checks that a valid email format is entered. • **IPV4 Address** - Checks that a valid IPV4 address is entered. • **IPV6 Address** - Checks that a valid IPV6 address is entered. • **Non-Numeric Characters** - Checks that no numeric characters are entered. • **URL Address** - Checks that a valid URL format is entered. The regular expression used for validating the URL values may allow creating some invalid URL values such as `http`, `http:/`, `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 235.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 235
- "Add Subscriber Option Sets and Options" on page 237
- "View Subscriber Option Sets and Options" on page 239

- "Reorder Subscriber Option Sets and Options" on page 240
- "Edit Subscriber Option Sets and Options" on page 241
- "Delete Subscriber Option Sets and Options" on page 243
- "Edit Subscriber Option Properties" below

Edit Subscriber Option Properties

For more information about subscriber options, see "Sequenced Design Subscriber Options" on page 235.

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

Perform the following steps to edit a subscriber option property:

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

8. Click **Done**.
9. Click **Save**.

For descriptions of the additional icons available on the **Subscriber Options** tab, see "Sequenced Design Subscriber Options" on page 235.

See the following related topics:

- "Sequenced Design Subscriber Options" on page 235
- "Add Subscriber Option Sets and Options" on page 237
- "View Subscriber Option Sets and Options" on page 239
- "Reorder Subscriber Option Sets and Options" on page 240
- "Edit Subscriber Option Sets and Options" on page 241
- "Delete Subscriber Option Sets and Options" on page 243
- "Create Subscriber Option Properties" on page 244

Upgradability

For more information about sequenced designs, see "Sequenced Designs" on page 182.

Concepts

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

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

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

Certain functions are restricted on a design if it is part of an upgrade path. See "Upgradability Restrictions" below for more information.

Tasks

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

- **<version number>** - Click to display the selected version of the service design.
- **Edit upgrade path description** - Click the gear icon and select **Edit** to update the description about the differences between the versions of the design in an upgrade path.
- **Delete upgrade path** - Click the gear icon and select **Delete** to remove the upgrade path from the listed service design version. If an upgrade to an offering uses this upgrade path, (that is, the selected service design upgrade path is used to update the service design for an upgrade of an offering), the selected service design upgrade path cannot be deleted.
- **Add upgrade path** - Click **Add** to define the upgrade path that establishes an upgradability relationship between two different versions of a service design. In the Add Upgrade Path dialog, select an eligible service design in the **From Version** drop-down list. Enter a brief, meaningful description of the upgradability relationship between the selected version of the service design and another version of the same service design. This action will validate whether service design versions are upgradable to the current service design version. If service design versions are not upgradable, upgradability violations will be recorded in log files.
- **Review differences between versions** - Click **View Differences** to view the differences between the versions of the design in an upgrade path. In the Differences between version dialog, design components and subscriber options that have been added, updated, or removed are listed. Changes to design components are displayed on the left and changes to the subscriber options are displayed on the right. The differences are color-coded to easily identify the types of changes, where additions are blue, updates are yellow, and removals are red.

Upgradability Restrictions

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

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

- Resource Offerings
- Service Components and Properties
- Service Component Resource Offerings and Properties
- Subscriber Option Sets
- Subscriber Options and Properties

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

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

- Deleting a resource offering
- Deleting a service component
- Editing the Processing Order and Pattern attributes of a service component
- Deleting a service component property
- Editing a service component property: Name
- Deleting the relationship between two service components
- Deleting a resource offering that was added to a component
- Adding or deleting measurable properties
- Deleting a subscriber option set
- Deleting a subscriber option
- Deleting a subscriber option property
- Editing a subscriber option property: name
- Editing a subscriber option property: target binding

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

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

Service Design Deployments

You must be in the administrator or designer role to view service design instances and deployments. The administrator can see all instances and deployments for a design; the designer can only see the instances and deployments he or she created. For more information about roles, see Cloud Service Automation Roles. For information about how to view and manage subscriptions and service instances for all consumer organizations, see "Operations" on page 294.

1. Select a version of a service design (see "View Service Design and View Service Design Version" on page 185).
2. Click the **Deployments** tab to see all service instances and deployments for this version of the design.
   Enter text in the search box to filter deployments by name or description.
3. Click on a deployment name to view additional information about the deployment. See the Operations area for additional information.

For information on the service instance information that is displayed, see "Operations" on page 294.

Create and Deploy a New Instance

You can create and deploy a new service instance from a service design. For more information about sequenced designs, see "Sequenced Designs" on page 182.

1. In the Deployments area, click **Deploy a New Instance**. The dialog appears. Enter the following general information:
   a. **Deployment Name** - Enter a deployment name. The service instance created from this action will have the same name as the deployment.
   b. **Description** (optional) - Enter a description of the deployment.
   c. **Resource Environment Filter** - From the list, select one or more resource environments to use for provisioning. For more information, see "Resource Offerings (Sequenced Designs)" on page 98.
2. Enter properties for the new instance:
   - The design associated with the instance appears on the canvas. Select a service component from the design, and modify the properties as needed. For more information, see "Service Components" on page 199.

- You can change the properties of multiple components in the design. The message icon appears next to modified components in the design. Click on the icon for details about what changes were made.

3. Click **Deploy**.

Run a User Operation from a Component in a Deployment

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

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

See "User Operations for Service Components" on page 215 for information on how to create a user operation.

Cancel a Deployment

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

A canceled deployment is moved to **Offline** state.

Delete a Deployment

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

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

Manage Tags

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 (Topology Designs)

Use the **Components** area in topology designs to import, create, and configure components. A component represents one service design element required to realize a service subscription. CSA provides a number of components you can use for creating topology designs.

Component Types

There are three types of components:

- **Concrete components** are the most common components that you will interact with. Concrete components can contain properties, relationships, and operations. Concrete components can express support for capabilities, such as Server, Application Server, Database Server, and Web Server, and can also support characteristics. Concrete components can be included in a design.
- **Abstract components** provide a base type for other components and can be the target of relationships configured on a component. Abstract components can contain properties and relationships. Abstract components cannot express support for capabilities or characteristics. Abstract components cannot be included in a design. Abstract components cannot be created by the user.
- **A capability** is a special type of component that supports properties and relationships, but does not support operations or characteristics. When a concrete component supports a capability, the concrete component inherits the capability's relationships and must provide property mappings from the concrete component properties to the capability properties. Capabilities can be the target of relationships configured on a component. Capabilities can be included in a design, but for such a design to be successfully provisioned, another design must exist that contains a concrete component supporting the capability.

Component Palettes

Palettes are user-defined groupings of components. A component can belong to multiple palettes.

When you create a topology design, you can optionally select a palette. Selecting a palette will restrict the available components that can be used in the design to the components that exist in the palette.

Tags

Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping topology components. A component can be assigned to multiple tags.

Tasks

Select how to view components - **By Palette**, **By Tag**, or **By Provider Type**. Click an item in the left pane to see its components displayed in the right pane.

Search Box - Enter text in the **Search** box.

Click the gear icon to perform the following tasks:

- **Create Component** - In the Create Topology Component dialog, enter the following information:
  - **Display Name** - A unique display name for the component.
  - **Description** - A brief description of the component.
  - **Version** - The version number of the component.
  - **Functional Type** - The functional type of the component can be **Concrete** or **Capability**.
  - **Provider Type** - Select a provider type for the component. **Provider Type** selection is supported only for **Concrete** functional types.
  - **Image** - An image that will display for the component.
  - **Tags** - Select one or more tags that will include the component.
- **Import Component** - Complete all steps in the Import Topology Component wizard. See "Import Topology Components" on page 282.
- **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.

Topology Designs

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

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

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

Configuration Tips

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

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

The subscriber selection works as described below:

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

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

```
OrchestratedTopologyDesignProvisioning.ProviderSelection.Enabled=true
```

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

Browse Topology Designs

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" below.
- **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 263.

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 259 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 259 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 259.
- **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 276.
- **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 260.
- **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 259 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 276.
- 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 282.

> **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 286. 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)

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

Use settings on the **Subscriber Options** tab to configure option sets and options to present to a user at subscription time. Option sets are configured in a topology design by adding options, creating option properties, and binding option properties to component or group properties in the design.

Option sets, options, and properties offer the subscriber the ability to customize the service that gets provisioned. An option set should contain one or more options and can be configured to allow the subscriber to select one or multiple options within the option set. Option properties can then be defined on an option, with the value for the property provided either by the designer, service offering manager, or subscriber. Bindings configured on option properties map the provided value to component or group properties in the design. In this use case, the user selected options and property values to customize the service that is provisioned.

After options have been entered, you can publish the design. Option Sets and Options cannot be deleted after they are published. After publishing, the option sets are made available in the **Offerings** area of the Cloud Service Management Console, where they can be further refined and configured. The subscriber options are then exposed to subscribers in the Marketplace Portal, allowing them to select values that customize the service offering for their personal needs.

Add Option Set

Use this functionality to create a hierarchy of option sets that is up to three levels deep:

- **Option Set 1**
  - Option
    - **Option Set 2**
      - Option
        - **Option Set 3**
          - Option

Click the **Add Option Set** link or click the button in the upper right panel. You can also click the **Copy Option Set** and **Paste Option Set** buttons to copy option sets, both within and across designs.

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

- **Image** - Clicking the image icon allows you to change the image for the option set.
- **Display Name** - Specify a display name for the option set.
- **Description** - Specify a description for the option set.
- **Modify Options** - Check **Modifiable during service modification** to allow the subscriber to modify this option set in the Marketplace Portal after a subscription has been ordered. If checked, ensure that all property bindings from options in the option set exclusively target properties that are themselves modifiable during service modification. Unchecking prevents a subscriber from changing the selected values of this option set when modifying the subscription in the Marketplace Portal.

Managing Multiple Option Sets or Options

The selected option set or option is highlighted in blue. With the option set or option selected, you can Use <Ctrl> + the arrow keys to drag the selection up and down the list to reorder. An option set or option can also be reordered by clicking and dragging it.

Delete an Option Set or Option

With the option set or option selected, press the **Delete** key on the keyboard or click the trash can on the right.

Copy and Paste an Option Set or Option

You can copy and paste option sets or options within a design, between designs, and within a tree within a design. The copy includes the entire structure, including property bindings when copied within the same design. When pasting options or option sets into a new design, bindings will not be copied and you will need to manually configure them.

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

To Add Options to an Option Set and Configure Selection Options

Click the option count button to navigate to the list of options for that option set. The name of the current option set will be displayed above the list of options. Click **Add Option** to add an option to the option set.

After selecting **Add Option**, the new Option **Display Name** is automatically generated to a unique value; you can then customize the **Display Name** and **Description** for the option.

An option set can be configured for Single-Select or Multi-Select.

- **Single-Select** - Select to present options as radio boxes in the Marketplace Portal. A subscriber is required to select a single value.

  Multi-Select - Select to present options as check boxes in the Marketplace Portal. The subscriber can select 0 or more options for a Multi-Select option set.

Adding Properties to Options

Within an option, the properties panel on the right allows you to view, add, and edit properties, as well as to create bindings.

To Configure Attributes

The following attributes can be configured when creating an option property:

Item	Description
Property Type	Select one of the following: • **Boolean** - A property whose value is **True** or **False**. • **Integer** - A property whose value is a positive or negative whole number or zero. • **List** - A property where you can define a list of values for the subscriber to select. • **String** - A property whose value is a sequence of characters. 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

Item	Description
	Boolean properties. ***For Integer properties***: • **Service Offering and Marketplace Portal Settings** ◦ **Editable** - Select to make this field editable in the **Offerings** area and in the Marketplace Portal ◦ **Required** - Integer properties are always required, which means that when a subscription is ordered, a value must be provided for this field. ◦ **Value Range** - If **Editable** is checked, configure a minimum and maximum allowed value for the property. ◦ **Default Value** - Select or type a positive or negative whole number or zero. If you enter a decimal number, the value will be truncated to the nearest integer. The maximum allowed integer value is 2147483647 and the minimum is -2147483648; if you enter a value outside these bounds the value will be automatically converted to the closest maximum or minimum value. ***For List properties:*** • **Service Offering and Marketplace Portal Settings**: ◦ **Editable** - Indicates that this property can be made editable in the **Offerings** area and in the Marketplace Portal. Dynamic entry properties are always editable; this field cannot be changed for dynamic entry properties. ◦ **Required** - Select to indicate that when a subscription is ordered, a value must be provided for this field. • **List Selection Type:** ◦ **Single-Select** - Select to present options as radio boxes in the Marketplace Portal. ◦ **Multi-Select** - Select to present options as check boxes in the Marketplace Portal. • **List Items**: ◦ **Switch to Static Entry** (default) - Enter the name and value for an entry in the list. After the value entry, a new item line is displayed automatically. ◦ **Switch to Dynamic Entry** - Select a script name and specify the HTTP parameter names and token values. • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315. • **HTTP Parameters** - 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

Item	Description
	Parameter Value, which can be a token or a constant value. **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*. • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316. • **Refresh Data** - Click the Refresh Data icon ( ) 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. • **Input Type**: ◦ **Single-Line** - The input area is presented as and accepts only one line of text. ◦ **Multi-Line** - The input area is presented as a text box and can accept one or more lines of content. ◦ **Number of Characters** - Configure the minimum and maximum number of characters that can be entered for this property. These fields are available only when the **Editable** and **Single-Line** options are selected. ◦ **Input Restriction** - Choose an Input Restriction from the following list. These fields are available only when the **Editable** and **Single-Line** options are selected. • **(none)** - No input restriction will be performed. A minimum and maximum length can still be configured. • **Custom Regular Expression** - Validates the value based on a regular expression, as specified in the **Regular Expression** text box. • **Email Address** - Checks that a valid email format is entered. • **IPV4 Address** - Checks that a valid IPV4 address is entered. • **IPV6 Address** - Checks that a valid IPV6 address is entered. • **Non-Numeric Characters** - Checks that no numeric characters are entered. • **URL Address** - Checks that a valid URL format is entered. The regular expression used for validating the URL values may allow creating some invalid URL values such as `http`, `http:/`, `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.

Item	Description
	◦ **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.
Property Bindings	Select the topology component or group to which you want to push the value of this property. Then select the appropriate property from the list of compatible properties. This is called a target binding.

Property icons

- **Edit Property** - The **Property Type** cannot be changed, but any other fields related to the property type can be edited.
- **Bind Property** - Binding is a link between option model properties and service component properties or groups in a design. A property can have more than one binding. Click the **Configure Bindings** icon to display a working area where you can view and delete existing bindings and configure new bindings.
- **Delete Property -** Click the trashcan icon to delete the property.
- **Copy properties** - Click the **Copy Property to All Options** icon to copy the current property to all options in the current option set. This icon is only present for Single-Select option sets.

Testing a Topology Design

Use the **Test** tab to test and manage topology design provisioning without having to publish the design or create a service offering. You can test the following types of topology designs:

- **Partial design** - A partial design is any design that contains capabilities. Such a design cannot be provisioned on its own and requires the selection of one or more compatible microservice designs. The partial design and the microservice designs are then composed to form a composite design, which can then be provisioned. During the test run of a partial design, you will be prompted to select from the list of candidate microservice designs. A valid microservice design:
  - Is a concrete design. See definition of **Concrete design** below.
  - Contains either of the following:
    - Concrete components that support each of the capabilities used in the partial deign, each of which supports all of the required characteristics specified on the capability in the partial

design.

- A concrete component that supports a particular capability used in the partial design and that supports all of the required characteristics specified on the capability in the partial design. For this use of microservice designs, you must select **Custom Selection** on the Design Composition screen during the **Test Run** wizard, and you can make a separate microservice design selection for each capability used in the partial design.

◦ Has property values configured for all required properties in the design.

◦ Is not a composite design that was created by the combination of a partial design with another concrete design, unless that composite design was subsequently saved as its own design (see the description of **Composite design** below for more information).

◦ Has no validation errors.

For example, consider a partial design that includes a concrete component **My App** with relationships to **Web Server**, **Application Server**, and **Database Server** components.

Assume the **Web Server**, **Application Server**, and **Database Server** have required characteristics of **Apache Web Server**, **PHP**, and **MySQL**, respectively.

The partial design could be provisioned with a single microservice design that contains **Apache 2.4 Web Server**, **PHP 8**, and **MySQL 5.5** components, respectively supporting the **Web Server**, **Application Server**, and **Database Server** capabilities, which respectively support the characteristics **Apache Web Server**, **PHP**, and **MySQL**, with each component configured to be provisioned on a **Server**. Alternatively, separate microservice designs can be selected for each of the three capabilities included in the partial design.

- **Composite design** - The combination of a partial design with one or more microservice designs creates a composite design that is itself a concrete design. A composite design is typically hidden from view in the list of topology designs. It can be made visible by navigating to the **Test** tab of the associated partial design and clicking **Save Design** for the test run that created the composite design. This enables the composite design to be published and exposed to subscribers as a service offering, and also allows selection of the composite design as a microservice design when performing test runs of partial designs.
- **Concrete design** - A design that contains no capabilities. A concrete design can include components that support a capability. However, a concrete design cannot directly contain capability components, such as Server, Web Server, Application Server, Database Server, and Platform.
- **Microservice design** - A microservice design is a concrete design that meets all or some of the needs of a partial design. When deploying a partial design, you can either select a single microservice design that meets all the needs of a partial design or you can select separate

microservice designs for each capability that exists in the partial design. Because partial designs are generally focused on applications and typically do not contain infrastructure components (such as servers), the partial design is sometimes referred to as an application design, while the concrete design (or designs) it gets deployed with is called a microservice design.

Tasks

You can view the following information in the **Test** tab:

- The name of the test run
- Date and time of the test run
- Current status of the test run
- The user who initiated the test run

You can perform the following tasks in the **Test** tab:

- **Cancel** the realized design so that the instance is terminated. You must cancel before you can delete.
- **Delete** a canceled or failed deployment instance. You must cancel before you can delete.
- **Save Design** - Saves a new composite design, which will appear in the **All Designs** list for topology designs. **Save Design** is available only for partial designs that have successfully completed the **Test Run** process.
- **Test Run** button - See Test Run Wizard.
- Click the **gear icon** and select **Refresh** to refresh data in this tab.

You can link to detailed results of test provisioning by clicking the name of the test run. You can see the following information and perform the following tasks:

- **Overview** tab shows details of the test run.
  - **Cancel** the realized design so that the instance is terminated. You must cancel before you can delete.
  - **Delete** a canceled or failed deployment instance.
- **Events** tab shows:

- **Event Time** - The time the event occurred.
- **Lifecycle Stage** - The lifecycle stage and phase of the event execution, such as Deploying or Undeploying.
- **Action** - Operations, such as deployment and server restart, that are executed during the test run.
- **Source** - The design component that is the source of the event.
- **Status** - The current state of the test run. If you click on an event, you see details about the event in the **Overview** tab and property values used in the test run in the **Properties** tab.

- **Topology** tab shows:
  - The topology diagram, properties, status of the test, and an instance summary.
  - Select a server component in this tab to see properties in the right panel and available actions below. You can invoke an action to verify that it is working.
- **Providers** tab shows which provider instances have been used for deployment.

Test Run Wizard

Use **Test Run** on a topology design's **Test** tab to test the design directly from the Cloud Service Management Console without having to publish the design or create a service offering.

The **Test Run** wizard allows you to specify the following:

- **Display Name** - Enter a display name or use the system proposed name of `Test run of <design name>`.
- **Environment** - (Optional) Select an environment that restricts provider selection to only those providers located in the selected environment.
- **Service Design** - (Available only for partial designs) Select a design from the list that, together with the partial design, will form a composite design that can be provisioned. The list displays concrete designs that support all capabilities and required characteristics in the partial design, as described in the **Concepts** section earlier in this topic. If the partial design contains multiple capabilities, you can also select **Custom Selection** and then select separate microservice designs for each capability in the partial design.
- **Group Property** - (Available only for designs containing groups) Configure the **Instance Count** for each group used in the design.
- **Component Property** - Configure property values for each component used in the design. The unit is displayed for properties that are set as measurable.

Best Practices

- After deployment cancellation, the test run is still listed in the tab. If you no longer need the entry, you can delete it.
- Select a new name for every test run so you can distinguish between them.
- Test your designs using various deployment scenarios and property configurations to ensure design stability before publishing.

Components (Topology Designs)

Use the **Components** area in topology designs to import, create, and configure components. A component represents one service design element required to realize a service subscription. CSA provides a number of components you can use for creating topology designs.

Component Types

There are three types of components:

- **Concrete components** are the most common components that you will interact with. Concrete components can contain properties, relationships, and operations. Concrete components can express support for capabilities, such as Server, Application Server, Database Server, and Web Server, and can also support characteristics. Concrete components can be included in a design.
- **Abstract components** provide a base type for other components and can be the target of relationships configured on a component. Abstract components can contain properties and relationships. Abstract components cannot express support for capabilities or characteristics. Abstract components cannot be included in a design. Abstract components cannot be created by the user.
- **A capability** is a special type of component that supports properties and relationships, but does not support operations or characteristics. When a concrete component supports a capability, the concrete component inherits the capability's relationships and must provide property mappings from the concrete component properties to the capability properties. Capabilities can be the target of relationships configured on a component. Capabilities can be included in a design, but for such a design to be successfully provisioned, another design must exist that contains a concrete component supporting the capability.

Component Palettes

Palettes are user-defined groupings of components. A component can belong to multiple palettes.

When you create a topology design, you can optionally select a palette. Selecting a palette will restrict the available components that can be used in the design to the components that exist in the palette.

Tags

Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping topology components. A component can be assigned to multiple tags.

Tasks

Select how to view components - **By Palette**, **By Tag**, or **By Provider Type**. Click an item in the left pane to see its components displayed in the right pane.

Search Box - Enter text in the **Search** box.

Click the gear icon to perform the following tasks:

- **Create Component** - In the Create Topology Component dialog, enter the following information:
  - **Display Name** - A unique display name for the component.
  - **Description** - A brief description of the component.
  - **Version** - The version number of the component.
  - **Functional Type** - The functional type of the component can be **Concrete** or **Capability**.
  - **Provider Type** - Select a provider type for the component. **Provider Type** selection is supported only for **Concrete** functional types.
  - **Image** - An image that will display for the component.
  - **Tags** - Select one or more tags that will include the component.
- **Import Component** - Complete all steps in the Import Topology Component wizard. See "Import Topology Components" on the next page.
- **Manage Component Tags** - In the **By Tag** view, click the gear icon and select **Manage Component Tags**. Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping topology components. A component can be assigned to multiple tags.
- **Manage Component Palettes** - In the **By Palette** view, click the gear icon and select **Manage Component Palettes**. In the Manage Components Palettes dialog, use the toolbar to add (create),

edit, or delete a component palette.

- **Select Palette Components** - When you are in the **By Palette** view and when you have selected a user-created palette, click the gear icon and select **Select Palette Components**. In the Select Components dialog, add or remove available components. You can select one or multiple components and then click **Add** or **Remove**.
- **Navigate to component details** - Click the name of a component in the list to see more information about it, such as Overview, Properties, Relationships, and Operations.

Best Practices

If you have a large number of components, use tags to organize them into meaningful groups.

Import Topology Components

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 288

Tasks

From the **Topology Components** area, click the gear icon and select **Import Component**. Enter the following information:

Item	Description
Content	• **Import Source** - Select the provider type to use as the import source for the component. • **Provider Instance** - Select the provider instance that contains the component you want to import. Provider instances must first be configured in the **Providers** area to enable import for Chef, Server Automation, and Puppet provider types. For Operations Orchestration, content can be imported from the instance that is configured to integrate with CSA. Depending on your selections above, select the content for the component: • **Chef** - Select one or more Chef cookbooks to be imported as new topology components. Each selected cookbook will create a separate component. • **HPE Insight Control server provisioning** - Select one or more OS Build Plans (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 280.
  - **Image** - The image configured for the component.
  - **Tags**- The tags configured for the component.
- **Save As** - Save the component with a new **Display Name** and **Description**. **Save As** can be used only for concrete components. This action cannot be used for abstract components or capabilities.
- **Edit Component** - Click the gear icon and select **Edit Component**. The following restrictions apply to editing components:
  - You cannot edit a component that is an abstract component or a capability installed with CSA.
  - For all other components, you can edit the **Display Name**, **Description**, **Image**, and **Tags**.
- **Delete Component** - Click the gear icon and select **Delete Component**. You cannot delete a component that is being used in a topology design. Some components installed with CSA cannot be deleted.

Component Properties

Properties provide a base set of attributes that can be used and edited when creating components in a service design. They represent configuration settings to be applied to the component during service

design provisioning. The value defined for a component property is the default value exposed in the service design.

Tasks

View the following information about component properties:

- **Display Name** - The display name of the property.
- **Value** - The default value for the property.
- **Visible** - This label displays if the property is visible to the designer. If this label does not display, the property is not visible to the designer.
- **Supports Modify Lifecycle** - This label displays if the property can be modified during the modify lifecycle transition phase.

Create a component property:

- You cannot create properties of a component that is an abstract component or a capability.
- Newly created properties do not affect existing service designs. You must manually update any design that uses the component by recreating the component in the design.
- For components that are being used in a topology design, you can only add additional properties, and the new properties cannot be **Required**. You cannot modify existing properties, except to change the default values for **Display Name**, **Description**, and **Default Value**.

Click **Create** and enter the following information for a property:

Item	Description
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	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.

Item	Description
Property	
Default Value	The default value exposed in the service design.
Confidential Data	Select this box to mask the values so that they cannot be read in the user interface; no encryption of the value is performed.
Consumer Visible	Use the check box to indicate if the property will be visible in the Marketplace Portal.
Designer Visible	Use the check box to indicate if the property is visible in the topology design.
Required	Use the check box to indicate if the property is required in the topology design. Required can only be selected for **Designer Visible** Properties

Edit a component property:

You cannot create properties of a component that is an abstract component or a capability.

Click the gear icon and select **Edit**.

Delete a component property:

You cannot delete properties that are being used in a design.

Click the gear icon and select **Delete**.

Component Relationships

Relationships in topology designs define dependencies between components and also impact how a design is provisioned. For example, imported Chef components require a server in order to be provisioned. Therefore, all imported Chef components are created with an outgoing relationship to the server capability, ensuring that a server is provisioned before the Chef component.

When importing new components, you might need to define new relationships. Some relationships are created for you automatically at import time, such as the Chef component dependency on a server discussed above. If there are additional dependencies, define them manually in this tab.

Tasks

View the following information about the relationships:

- **Direction** - Outgoing or Incoming.
- **Target or Source Component** - The component icon, name, and version of the target or source component to open the **Overview** tab for that component.
- **Display Name** - The display name of the relationship.

Use the corresponding icon or button to:

- **Create or Edit a relationship:**
  - You cannot create or edit incoming relationships.
  - You cannot create or edit a relationship on an abstract component.
  - You can create or edit a relationship on capabilities that you create yourself, but you cannot create or edit a relationship on capability components installed with CSA.
  - Until a component is used in a design, relationships can be added and edited. After a component is used in a design, relationships can still be added and edited, but adding new required relationships (or editing an existing relationship to make it required) is not supported. When a relationship is already used in a design, only **Display Name** and **Description** edits to that relationship are allowed.

    Provide the following information for a relationship:

Item	Description
Target Component	Select the target component for the relationship from the **Select Component** dialog box, which provides a list of available components.
Display Name	The name for the relationship.
Description	The description for the relationship.
Maximum Outgoing Relationships From Source	Enter a number to indicate the number of instances of the target component that a single instance of the source component can be connected to.
Maximum Incoming Relationships	Enter a number to indicate the number of source components that can be connected to a single instance of the target component.

Item	Description
To Target	
Required Relationship	Use the check box to indicate if the relationship is required when the component is used in a design. If selected, the source component will display a validation error when a relationship to the target component is not present in the design.

- **Delete a relationship** - Click the **gear icon** and select **Delete**. You cannot delete incoming relationships.

Component Operations

Tasks

View the following information about the operations:

- **Display Name** - The display name of the operation.
- **Parameters** - The parameters associated with the operation.
- **Visible** - This label displays if the operation is visible to the subscriber. If this label does not display, the operation is not visible to the subscriber.

Use the corresponding icon or button to:

- **Import** an operation. Click **Import**. You can import an operation, assign a lifecycle action (for example, Deploy or Undeploy), and edit operation parameter mappings. For example, you can import a new Operations Orchestration operation into an existing Chef component.

  To import, select one or more Operations Orchestration flows to import as new operations. Each item you select will create a separate operation on the topology component.
- **Edit** an operation. Click the **gear icon** for the operation and select **Edit**.

> **Note:** You cannot edit operations on an abstract component or a capability component.

Complete all steps in the Edit Operation wizard:

- **Delete** an operation. Click the **gear icon** for the operation and select **Delete**.

Item	Description
General	• **ID** - A unique identifier for the operation. You cannot edit this field. • **Display Name** - The name that displays for the operation. • **Description** - The description that displays for the operation. • **Visible** - Use the check box to indicate if the action is visible in the Marketplace Portal. • **Lifecycle Action** - Select **(none)** for user operations that will be exposed to subscribers in the Marketplace Portal. Otherwise, select a lifecycle action that will be used during provisioning or de-provisioning: ◦ **Deploy** – Actions specified in this lifecycle phase realize a component during the provisioning of a design that is using the component. ◦ **Deploy failure handler** – Actions specified in this lifecycle phase handle failures that occur during the execution of the **Deploy** lifecycle phase action on a component as part of provisioning a design. ◦ **Undeploy** – Actions specified in this lifecycle phase deprovision a component during the deprovisioning of a service instance that is using the component. ◦ **Undeploy failure handler** – Actions specified in this lifecycle phase handle failures that occur during the execution of the **Undeploy** lifecycle phase action on a component as part of deprovisioning a design. ◦ **Modify** – Actions specified in this lifecycle phase are executed on a component during the modification of a realized component in a service instance, when the service instance is modified by the **Modify Subscription** operation. ◦ **Modify failure handler** – Actions specified in this lifecycle phase are executed for the cleanup of failed **Modify** actions on a component during the modification of a service instance. ◦ **Unmodify** – Actions specified in this lifecycle phase revert the effect of modification on a successfully modified component. This action occurs during the rollback of an unsuccessful overall modification transition of the service instance due to failure occurring on another component that is also subject to 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.

Item	Description
	• **Description** - The description for the parameter. • **Required** - Use the check box to indicate if the parameter is required. • **Mapping Type** - Select the mapping type for the parameter mapping. ◦ **Component Property** - Select to map the parameter to or from a property on this component. Select the component property in the **Value** list. ◦ **Constant Value** - Select to provide a constant value for the parameter. Enter the constant value in the **Value** field. This is not available for output parameters. ◦ **Context Property Token** - Select to map the parameter to an execution context-dependent value. Tokens represent values that are not known at design time; the value depends on the context of the action execution. For example, the execution may require information about a subscriber, or it may require session information. Select the token in the **Value** list. ◦ **Multiple Properties** - Map to multiple properties. Click **Add Parameter** to create additional parameters. ◦ **Not Mapped** - Select to provide no parameter mapping. ◦ **Provider Property** - Select to map the parameter from a property on the resource provider that is used to provision the component. Enter the name of the resource provider property in the **Value** input field. ◦ **Relationship Target Property** - Select to map the parameter from a property on a different component that this component has a relationship to. Select the proper relationship in the **Relationship** list, and then select the component property in the **Value** list. ◦ **User Value** - Select to prompt the user for a value during design execution. This mapping is valid for user operations only. When a user operation is executed, the user is asked to provide values for all parameters mapped to the **User Value**. ◦ **User Value List** - Select to map the parameter to a list item. • **Switch to Static Entry** (default) - Enter the name and value for an entry in the list. After the value entry, a new item line is displayed automatically. • **Switch to Dynamic Entry** - Enter or select a JavaScript. • **Manage Scripts** - Click to manage JavaScript files that can be used to provide values for the dynamic list properties. See "Script Management" on page 315. • **HTTP Parameters** - 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.

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*. • **Select Token** - Click the Select Token icon ( ) to enter a token. See " Tokens" on page 316. • **Refresh Data** - Click the Refresh Data icon ( ) to run the script and display the results.

Component Capability

The **Capability** tab is visible for concrete components.

Concrete components can claim support for a capability component. A supported capability includes a reference to the capability component, including property mappings between the capability component and the concrete component. A single capability, such as Web Server, can be supported by multiple concrete components. However, a concrete component can only support a single capability.

A capability component can be included in a design to indicate that a concrete component supporting that capability is required in order to successfully provision the design. Designs that include capabilities are referred to as partial designs and require composition with one or more other designs in order to be provisioned. For additional information on partial designs, see "Testing a Topology Design" on page 276.

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 291.

Tasks

View the following information about the characteristics:

- **Supported Characteristics** - See a list of the characteristics supported by the component.

Perform the following tasks:

- **Select characteristics for this component** - Click this link or click **Select**.

Item	Description
Available Characteristics	Select one or more characteristics in the list and click **Add**.
Selected Characteristics	View the list of selected characteristics or select one or more, and click **Remove**.
Manage Characteristics	**Create a characteristic** - If this is your first characteristic, click **Create your first characteristic now**. • Provide a **Display Name** for the characteristic. • Provide a **Description** for the characteristic. When characteristics already exist, you can: • Click the **Create** icon to create a new characteristic. • Click the **Edit** icon to edit a selected characteristic. • Click the **Delete** icon to delete a selected characteristic. You cannot delete a characteristic that is a required characteristic in a partial design.

Operations

Use the **Operations** area of the Cloud Service Management Console to view and manage subscriptions and service instances for all consumer organizations. A subscription originates with a subscription request, which is a request for delivery of cloud services that is initiated by the subscriber (end user) using a service catalog in the Marketplace Portal. After a subscription request is approved, a service instance is created.

See the following related topics:

- "View Subscriptions for an Organization" below
- "View Subscriptions for a User" on page 296
- "View Subscriptions for a Service Offering" on page 299
- "Subscription Overview" on page 300
- "Transfer Subscriptions" on page 303
- "View Topology for a Subscription" on page 308
- "View Providers for a Subscription" on page 312
- "View Subscriptions for a User" on page 296

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** tab and by service offerings in the **Offerings** tab. **Note:** The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's

catalogs.

2. Use the drop-down list to select an option for sorting. Use the search box to filter the subscriber information. Only the User Name and associated email address are included in the search.
3. Review the following information for each user:

Item	Description
User Name	This column appears only in the **Users** tab. The user name (and associated email address) that the Subscriber uses to log into the Marketplace Portal. **Note:** Only subscriptions submitted by the subscriber are included in the list of subscriptions. Subscriptions submitted for a group the subscriber belongs to (that were not submitted by the subscriber) are not included in the list. Subscriptions submitted for a group are identified by the group icon .
Offering Name	This column appears only in the **Offerings** tab. The service offering name (and version) of an offering published in the organization's catalog.
Subscription Summary	The number of subscriptions with the status: Active Pending Paused Canceled Expired Failed For a more detailed description of each status, see "View Subscriptions for a User" on the next page.
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 page 294.

For information about viewing subscription details, see "Subscription Overview" on page 300.

For information about transferring subscriptions from one subscriber to another, see "Transfer Subscriptions" on page 303.

To view all subscriptions for a user

> **Note:** Only subscriptions submitted by the subscriber are included in the list of subscriptions. Subscriptions submitted for a group the subscriber belongs to (that were not submitted by the subscriber) are not included in the list. Subscriptions submitted for a group are identified by the group icon .

1. In the left pane of the **Operations** area, select the name of the organization whose subscriber information you want to view.
2. Click the **Users** tab. **Note:** The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once.
3. Select the user whose subscriptions you want to view.
4. In the top of the **Subscriptions** tab, review the user name and a subscription status summary for this user.
5. By default, the table is sorted by the **Submitted On** date. To change the sort option, select an option from the drop-down list. Use the search box to filter the subscriptions. Only the Display Name, Service Offering Name, Subscription Status, Service Instance Status, and Service Instance Health Status (when available) are included in the search.
6. For each subscription, review the following information:

Item	Description
User Name	This column is available only in the **Offerings** tab. The user name (and associated email address) that the Subscriber uses to log into the Marketplace Portal and who has subscribed to this offering.

Item	Description
	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. 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.

Item	Description
	◦ The subscription was upgraded but has not yet completed. The upgrade was started by the Administrator or Service Operations Manager. ◦ An action affecting the service was requested for the service instance, and the action has not completed. Paused - The subscription has experienced an error during initial provisioning. ◦ For a subscription to pause when a failure occurs, the Organization in which the subscription exists must be configured to pause on failures. ◦ Subscriptions can be paused only when a failure occurs during the following lifecycle stages: Initializing, Reserving, and Deploying. ◦ When a subscription is paused, any On Failure phase actions are not run in CSA; the provisioning stops at the first action of the failed phase. ◦ To resume the subscription provisioning, you must first fix the issues that caused the failure, and then click **Resume Provisioning**, as described in "View Topology for a Subscription" on page 308. 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
	Deploying - The service instance is being deployed. Modifying - A modification or action affecting the service instance has not yet been completed. Modification Failed - A modification or action affecting the service instance failed. Upgrading - An upgrade affecting the service instance has not yet been completed. Upgrade Failed - An upgrade affecting the service instance failed. Failed - The service instance deployment failed. Canceling - The service instance is being canceled. Cancellation Failed - The service instance cancellation has failed. Expiring - The service instance is expiring. Expiration Failed - The service instance expiration has failed.
Service Instance Health Status	See "Health Status" on page 314.
Upgradable to	This field is available in the **Overview** tab of a selected subscription only. A list of the version(s) of a service offering to which this subscription is upgradable.

View Subscriptions for a Service Offering

For more information about the **Operations** area, see "Operations" on page 294.

For information about viewing subscription details, see "Subscription Overview" below.

To view all subscriptions for an offering

1. In the left pane of the **Operations** area, select the name of the organization whose subscription information you want to view.
2. Click the **Offerings** tab. **Note:** The list of offerings shown is the offerings that are published in the selected organization's catalogs.
3. Select the offering whose subscriptions you want to view.
4. In the top of the **Subscriptions** tab, review the offering name and a subscription status summary for this offering.
5. By default, the table is sorted by the **Submitted On** date. To change the sort option, select an option from the drop-down list. Use the search box to filter the subscriptions. Only the User Name, Display Name, Subscription Status, Service Instance Status, and Service Instance Health Status (when available) are included in the search.
6. For each subscription, review the information. The overview provides the same information as described in "View Subscriptions for a User" on page 296.

Subscription Overview

For more information about the **Operations** area, see "Operations" on page 294.

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 296.

> **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 303, and "Cancel Subscriptions" on page 304.

Upgrade Subscriptions

For more information about the **Operations** area, see "Operations" on page 294.

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 a service offering in an upgrade path, its associated service instance is updated based on the changes made to the service design configured for that service offering. When an upgrade is requested, the total cost of the upgraded subscription (the cost of the subscription after it has been upgraded) and a description of the changes between the original service offering and the selected service offering to wich the original service offering is upgradable is displayed.

The following actions are performed when a subscription is upgraded:

- A token (ACTION_EXECUTION_RETRY) is set to false when an upgrade is attempted for the first time.
- Lifecycle actions configured to occur during the Upgrading stage are executed.

If the initial attempt to upgrade fails, the upgrade may be retried. See "Retry Upgrade for a Subscription" on the next page 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 294.

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 308). A node that is in a Failure phase means that a lifecycle action has failed on the node and must be fixed (see "View Events for a Subscription" on page 305 for information on how to review event information on the node to determine the event that caused the failure). A node that is in a Before, During, or After phase means that there are lifecycle actions for the node that need to be executed to complete the upgrade.

The following actions are performed when an upgrade to a subscription is retried:

- The lifecycle action that caused the upgrade to fail is re-executed.
- A token (ACTION_EXECUTION_RETRY) is set to true to indicate the lifecycle action is being executed as part of a retry of an upgrade.
- Upon successful execution of the lifecycle action that previously failed, the rest of the lifecycle execution for the upgrade (if any) is completed.

When an upgrade to a subscription fails, all subscribers to that subscription receive a notification that the upgrade failed. In the My Service Details view of the Marketplace Portal, service components will only show an Upgrading status. The subscriber may click **View Service Topology** to display the topology diagram with the lifecycle phase of each service component. The lifecycle phase indicates which service component has failed. Note that the subscriber has a limited view of the components (nodes) that make up a subscription. That is, the node that failed may not display in the subscriber's topology diagram in the Marketplace Portal.

Tasks

To retry an upgrade for a subscription:

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 294.

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 294.

You can cancel subscriptions when the service instance status is one of the following:

- Online
- Modification Failed

- User Operation Failed
- Reserved
- Failed

To cancel a subscription

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 294.

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" on the next page.

Item	Description
Event Time	The time the event occurred.
Lifecycle Stage and Phase	The lifecycle stage and phase in which the event occurred.
Action	The name of the action.
Source	The source of the event, which can be a service component, resource offering, or a resource subscription.
Status	The current status of the event, which can be one of the following: • Initialized • Active • Completed • Error • Canceled • Failure • Timeout

Subscription Events Overview

For more information about the **Operations** area, see "Operations" on page 294.

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.
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 offering, or a resource subscription.
Process Engine	The process engine that contains the process definition that created the action.
Process Engine Type	The type of process engine that contains the process definition that created the action.
Process URI	The URI of the action.
Process ID	The process identifier of the event. In the case of an Operations Orchestration process engine type, the Process ID corresponds to the OO Run ID of the flow execution. For process IDs that are based on Operations Orchestration 10.00 or greater the text in this field will appear as a link, which opens Operations Orchestration to the detailed page for the selected process.
Additional Details	Other important information about the event.

View Subscription Event Properties

For more information about the **Operations** area, see "Operations" on page 294.

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 294.

For topology designs, the **Topology** tab shows the current set of components (nodes) that make up the service instance. In the graphical view, arrows indicate the relationships between the service instance components.

For sequenced designs, the **Topology** tab shows the current service instance topology for a deployed subscription. In the graphical view, arrows indicate the relationships between the following types of nodes:

- **Service components** - A service component is defined in the associated service design and may also be created during the provisioning of the subscription
- **Resource bindings** - A resource binding is a link in a service design between a resource offering and a service component. A resource binding includes user-defined, provider-selection actions that run during the provisioning of the resource binding. The lifecycle actions defined on the resource offering run during the provisioning of the associated resource subscription.
- **Resource subscriptions** - A resource subscription is created from a resource offering at the time a subscription is ordered, and it can be thought of as a subscription to a resource offering. When a subscription (and its associated service design) is provisioned, a service instance topology is created from the service design. This topology includes copies of every service component in the associated service design. Resource offerings that are included in the service design are copied into the service topology as resource subscriptions. Changes made to the original resource offering after a resource subscription has been created from it do not affect the resource subscription or the associated user subscription. During resource subscription provisioning, the lifecycle actions that were configured on the source resource offering are executed.
- **Resource providers** - A resource provider is used to provision a subscription. Resource provider selection occurs during the resource offering provisioning process. See "View Providers for a Subscription" on page 312.

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 stage • Lifecycle phase • Node label • Health status 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 the list view. The graphical view display may not be legible for topologies that contain more than 100 nodes.

1. In the left pane of the **Operations** area, select the name of the organization whose subscription topology you want to see. **Note:** The list of subscribers shown in the **Users** tab is the list of users who have logged in to the Marketplace Portal at least once. The list of offerings shown in the **Offerings** tab is the offerings that are published in the selected organization's catalogs.
2. In the **Users** tab, select the user whose subscription topology you want to see. Or, in the **Offerings** tab, select the offering whose subscription topology you want to see.
3. In the **Subscriptions** tab, select the subscription whose topology you want to see.
4. Select the **Topology** tab. In the **Topology** tab, you see the service topology for the subscription, which shows the following information:
   - Each service component, resource offering, and subscription in the topology has icons that show the current lifecycle stage and transition phase for the node if applicable. If the service component is a server, you will see a health status icon once the component is provisioned.
   - If a subscription or service instance is in a **Failed** state, the icons represent the stage and phase (if applicable) at the time of the failure.

- Nodes with a pattern icon ( ), and whose labels are surrounded by brackets (note that brackets are displayed only in the graphical view), indicate that the nodes are specified as **Patterns**. For example, the following label indicates the node is a pattern:

  ```
  [2. Windows Server]
  ```

- Component order is displayed only in the graphical view: Nodes that have a specified **Component Order** (which defines the lifecycle execution order) are preceded by a number indicating the specified order. For example, the following label indicates that this node has a **Component Order** of two (2):

  ```
  2. Windows Server
  ```

  Due to layout algorithms, nodes are not sortable by **Component Order**.

- A health status icon is displayed for provisioned server components if Cloud Optimizer is configured. See "Health Status" on page 314.

> **Note:** In some cases, you might see an Updated stage. Updated is a stage (which immediately precedes the start of the Modifying transition stage) for a resource subscription, resource offering, or service component that is undergoing a subscription modification. The Updated stage does not display in the lifecycle diagram, and actions cannot be configured at this stage.

> **Note:** When a timeout occurs during the provisioning or de-provisioning of a subscription that is created from a topology design, the status of the components in the service instance indicates the component status just before the timeout occurred.

The icons in this view are described in the following table:

Icon	Description		Icon	Description
	Node is specified as a pattern			Before phase
	Described lifecycle stage			During phase
	Initializing lifecycle stage			After phase

Icon	Description		Icon	Description
	Initialized lifecycle stage			Before phase, paused provisioning
	Reserving lifecycle stage			During phase, paused provisioning
	Reserved lifecycle stage			After phase, paused provisioning
	Deploying lifecycle stage			On Failure phase
	Deployed lifecycle stage			Health status - Normal
	Un-deploying lifecycle stage			Health status - Warning
	Un-reserving lifecycle stage			Health status - Major
	Un-initializing lifecycle stage			Health status - Minor
	Finalized lifecycle stage			Health status - Critical
	Modifying lifecycle stage			Health status - Suspended
	Upgrading lifecycle stage			Health status - Powered off
				Health status - Unknown

To view a topology summary

Review the Instance Summary section in the right pane of the **Topology** tab.

To view properties for a topology node

Click on any node to see all configured properties and values for the node displayed in the right pane of the **Topology** tab. This pane includes properties, actions, health status, and capacity information.

Graphical view controls

The graphical view provides the following controls to help you properly display the topology:

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.

Related topics

"Operations" on page 294

"View Providers for a Subscription" below

"Health Status" on page 314

View Providers for a Subscription

For more information about the **Operations** area, see "Operations" on page 294.

The **Providers** tab shows information about the providers used by a subscription. Resource provider selection occurs during the resource offering provisioning process for sequenced designs and is determined at design time for topology designs.

To view providers for a subscription

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 296.

To resume a paused subscription

1. When a subscription is paused, a notice displays below the **Overview**, **Events**, **Topology**, and **Provider** tabs.
2. To resume the subscription provisioning, you must first fix the issues that caused the provisioning to fail and then click **Resume**.

To cancel a paused subscription

If the root cause of the provisioning failure cannot be resolved, you can cancel a paused subscription.

1. When a subscription is paused, a notice displays below the **Overview**, **Events**, **Topology**, and **Provider** tabs.

2. To cancel the paused subscription, click the gear icon and select **Cancel**.

The following actions are performed in response to a request to cancel a paused subscription:

1. Invokes On Failure phase actions on any service component, resource offering, or resource subscription that failed and had caused the subscription to be paused.
2. Sends a notification to the subscriber indicating that the paused subscription cannot be resumed because the underlying cause has not been resolved, and the subscription is being canceled.
3. Submits a cancel subscription request on behalf of the subscriber, canceling the user's subscription.

Health Status

Cloud Optimizer can provide health status information for server components in CSA. You must have a provider configured and enabled for Cloud Optimizer.

You will see health status indicators for server components throughout the Cloud Service Management Console and Marketplace Portal. You can also view capacity details and a graph of the health status history in the Topology view for a deployed server component.

Health status levels

Status	Icon	What to do
Normal		No action required.
Warning		Click **Show Performance Graph** to open Cloud Optimizer and find the details and resolution information.
Major		Click **Show Performance Graph** to open Cloud Optimizer and find the details and resolution information.
Minor		Click **Show Performance Graph** to open Cloud Optimizer and find the details and resolution information.
Critical		Click **Show Performance Graph** to open Cloud Optimizer and find the details and resolution information.
Suspended		The server is suspended. Health status will change when the server is resumed.
Powered off		The server is powered off.

Health status levels, continued

Unknown		Cloud Optimizer does not yet have data for the server.
Not monitored		The component is not supported for health monitoring.

Tasks

- **Configure Cloud Optimizer** - You must complete the following steps to enable health status in CSA and Cloud Service Management Console:
  a. Configure Cloud Optimizer for CSA. See *Cloud Service Automation Configuration Guide*.
  b. Create a provider for Cloud Optimizer. See "Providers" on page 85. If the Cloud Optimizer provider is enabled, then you will see health status indicators for server components.
- **Refresh health status** - If a status indicators includes a refresh icon, you can click this icon to update the current status information from Cloud Optimizer.
- **Open Cloud Optimizer** - From the Topology view for a deployment, select a server component and then open the Health Status tab in the panel on the right. Click the link to go to Cloud Optimizer.

Script Management

The scripts are stored in the CSA database. This means that any script you change (add, modify or delete) on one node in a clustered environment, will be changed on all nodes. For details about the dynamic list properties and developing JavaScripts, see the *Dynamic Options and Cascading Lists* white paper.

- **Upload** - Click to upload a script.
- **Download** - Click the script name to download the script to your system.
- **Delete** - Click the trashcan icon to delete a script. A confirmation dialog displays. If the script is being used by other functions, such as a service design, the dialog shows the function and number of occurrences that use the script. Click **Show details** to see where the scripts are being used.
- **Modify a script** - To edit a script, **Download** it and edit it on your system. Before you **Upload** this script, you need to **Delete** the script in the Script Management list. Scripts cannot be overwritten.

> **Caution:** Use caution when deleting or modifying a script. In a clustered environment, the script

will be removed or modified on all nodes.

Tokens

A token is a system value that is automatically resolved internally when the property is read. Token values are available only for the following:

- String property for a component type, component template, service component in a design, or resource offering
- Parameter when a topology component operation has a mapping type of Context Property Token
- String parameter input for an action
- List item value when a user operation input parameter has a mapping type of Prompt User List and the list is configured for Dynamic Entry
- List item value when a subscriber option is configured for Dynamic Entry

Select a token from the list, or enter the token display name (such as Keystone Trust ID) or token name (such as `[TOKEN:KEYSTONE_TRUST_ID]`) in the Search box and select the token.

The following tables provide all available tokens, their descriptions, and to which area they apply.

Server-side tokens

Token	Description	Applies to
Action Execution Retry [TOKEN:ACTION_EXECUTION_RETRY]	Resolves to **false** on the first attempt of an action. Resolves to **true** for subsequent action attempts after the initial action failed.	• Component Template • Provider Selection • Resource Offering • Service Component
Action Name [TOKEN:ACTION_NAME]	Resolves to the value of ORDER when initially ordering a subscription and to the value of MODIFY_ SUBSCRIPTION when modifying an existing subscription.	• Sequenced Subscriber Options • Topology Subscriber Options
Keystone Trust ID [TOKEN:KEYSTONE_TRUST_ID]	Resolves to the Keystone Trust ID.	• Component Template • Provider Selection

Token	Description	Applies to
		• Resource Offering • Service Component • Topology Component
Parent Service Component ID [TOKEN:PRN_COMPONENT_ID]	Resolves to the Service Component ID of the parent service component. For resource offerings, the Service Component ID refers to the service component that the resource offering is associated with in a service design.	• Component Template • Provider Selection • Resource Offering • Service Component
Resource Binding ID [TOKEN:RSC_BINDING_ID]	Resolves to the Resource Binding ID that was created at subscription time.	• Provider Selection • Resource Offering
Resource Subscription ID [TOKEN:RSC_SUBSCRIPTION_ID]	Resolves to the Resource Subscription ID that was created from the resource offering at subscription time.	• Provider Selection • Resource Offering
Selected Provider ID [TOKEN:RSC_PROVIDER_ID]	Resolves to the Provider ID that was selected at subscription time.	• Provider Selection • Resource Offering • Topology Component
Selected Resource Pool ID [TOKEN:RSC_POOL_ID]	Resolves to the Resource Pool ID that was selected at subscription time.	• Provider Selection • Resource Offering • Topology Component
Service Blueprint ID [TOKEN:SVC_BLUEPRINT_ID]	Resolves to the Service Blueprint ID.	• Component Template • Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options

Token	Description	Applies to
Service Catalog ID [TOKEN:SVC_CATALOG_ID]	Resolves to the Service Catalog ID used at subscription time.	• Component Template • Provider Selection • Resource Offering • Service Component • Topology Component
Service Component ID [TOKEN:SVC_COMPONENT_ID]	Resolves to the Service Component ID of the component associated with this action. For resource offerings, the Service Component ID refers to the service component that the resource offering is associated with in a service design.	• Component Template • Provider Selection • Resource Offering • Service Component
Service Component Type [TOKEN:SVC_COMPONENT_TYPE]	Resolves to the Service Component Type (for example, Server) of the component associated with this action. For resource offerings, the Service Component Type refers to the service component that the resource offering is associated with in a service design.	• Component Template • Provider Selection • Resource Offering • Service Component
Service Instance ID [TOKEN:SVC_INSTANCE_ID]	Resolves to the Service Instance ID created at subscription time.	• Component Template • Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options • Topology Component
Service Offering ID [TOKEN:SVC_OFFERING_ID]	Resolves to the Service Offering ID.	• Component Template

Token	Description	Applies to
		• Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options
Service Request Organization ID [TOKEN:REQ_ORG_ID]	Resolves to the Organization ID associated with the service request.	• Component Template • Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options • Topology Component
Service Request User ID [TOKEN:REQ_USER_ID]	Resolves the User ID associated with the service request.	• Component Template • Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options • Topology Component
Subscriber's Email Address [TOKEN:SVC_SUBSCRIPTION_EMAIL]	Resolves to email address of the subscriber.	• Component Template • Provider Selection • Resource Offering • Service Component • Topology Component
Subscriber's Organization ID [TOKEN:USR_ORG_ID]	Resolves to the Organization ID associated with the subscriber.	• Component Template • Provider Selection • Resource Offering • Service Component

Token	Description	Applies to
Subscription ID [TOKEN:SVC_SUBSCRIPTION_ID]	Resolves to the Subscription ID created at subscription time.	• Component Template • Provider Selection • Resource Offering • Service Component • Sequenced Subscriber Options • Topology Subscriber Options • Topology Component

Client-side tokens

Token	Description	Applies to
[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**.	• Sequenced Subscriber Options • Topology Subscriber Options
[PROVIDER:<provider_name>:ID]	The ID of the provider with the specified name that was selected by the subscriber when ordering the subscription.	• Topology Subscriber Options

Portal tokens

When a subscription is owned by a group, a requesting user can be different than the user who made the initial subscription request. Use portal tokens to retrieve the context of the requesting user.

Token	Description	Applies to
Catalog ID [PORTAL:CATALOG_ID]	The ID of the catalog where a consumer user submits an initial subscription request or a request to modify an existing subscription.	• Sequenced Subscriber Options • Topology Subscriber Options
Organization ID [PORTAL:ORG_ID]	The ID of the Organization to which the consumer user who submits a subscription request belongs.	• Sequenced Subscriber Options • Topology Subscriber Options
Organization Name [PORTAL:ORG_NAME]	The name of the Organization to which the consumer user who submits a subscription request belongs.	• Sequenced Subscriber Options • Topology Subscriber Options
User Email [PORTAL:USER_EMAIL]	The email address of the consumer user who submits an initial subscription request or a request to modify an existing subscription.	• Sequenced Subscriber Options • Topology Subscriber Options
User ID [PORTAL:USER_ID]	The ID of the consumer user who submits an initial subscription request or a request to modify an existing subscription.	• Sequenced Subscriber Options • Topology Subscriber Options
User Name [PORTAL:USER_NAME]	Resolves to the User Name.	• Sequenced Subscriber Options • Topology Subscriber Options

Deploy

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, description, and image. Then configure the catalog by providing information in the following areas:

- "Access Control for Catalogs" on page 326
- "Approval Policies" on page 327
- "Categories" on page 330
- "Offerings" on page 331
- "Environments" on page 332

- **Import Catalog** - Click the gear icon and select **Import Catalog**. This action will import a catalog from the selected archive file. This import action is not available to a tenant administrator. See "Import Catalogs".

Import Catalogs

Concepts

In this topic, artifacts refer to a catalog and its associated service offerings, service designs, resource offerings, and resource environments.

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

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

Process Information

- **Upgradability** - If the imported catalog contains a service offering or design that is in an upgrade path, those service offerings or designs are not imported nor updated.
- **Update operation** - The update operation is destructive to existing data. You should understand the differences between the import operation, update operation, and update options to ensure you

choose the operations and options that match your expectations. See the *Tasks* section below for more information.

- **Flows** - During an import, update, or preview operation, if required dependencies do not exist on the Operations Orchestration system, an error message identifies these missing dependencies (dependencies such as flows). The content pack that contain these flows must have been deployed to the Operations Orchestration system prior to importing these artifacts. The flows must also have identical signatures and identical paths as the flows on the system from which the artifact was exported.

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

- **Archive content** - The archive (`.zip`) file can only reference files or content contained within the `.zip` file itself, or that are already contained in the `csa.war` file.

- **Image files** - All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the *Cloud Service Automation Configuration Guide*):

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

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

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

Tasks

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

  > **Note:** The import operation identifies catalogs by functional equivalence to determine if an identical catalog exists on the target system. An archived catalog is considered to be functionally equivalent to the catalog on the target system if the archived catalog has the same internal name and organization ID as a catalog on the target system. If the import operation identifies a functionally equivalent catalog on the target system, the archived catalog is not imported.

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

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

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

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

  > **Note:** If you are updating a catalog that has a large number of service offerings and service designs, it is recommended that this operation be performed during off-peak hours. This will prevent degradation of subscriber request response time.

- **Preview** - Generate a report of prospective results for the import process, including information about the artifacts and their status.
- **View Detailed Report** - From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.

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

Overview

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.

  The catalogs are packaged in an archive file whose name is:

  `CATALOG_<catalog_display_name>_<catalog_id>.zip`
- **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 for Catalogs

Access Control is used to assign LDAP groups to a catalog. You choose whether a service catalog is visible to all authenticated users of a consumer organization or just a subset of users.

To make a catalog visible to all authenticated users of a consumer organization, identify the LDAP groups that have been added to the 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" on the previous page.
- **Export Catalog** - Click the gear icon and select **Export Catalog**. See "Overview" on the previous page.
- **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: ◦ **External Approval Action** - Select an action that will be used to communicate with Operations Orchestration. To add Operations Orchestration flows, see the "Import Operations Orchestration Flows" section in the *Cloud Service Automation Configuration Guide* for more information. Click **Select** and search for flows or actions by name (when searching for a flow, the folders searched in the Operations Orchestration library are determined by a property configured in the `csa.properties` file; see the

Template Type	Description
	"Action Selection Wizard" property description section in the *Cloud Service Automation Configuration Guide* for more information) or select the process engine from which to select a flow or action. Then, locate and select the flow or action. ◦ 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 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

Template Type	Description
	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 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.

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.
- **Create Offering** - Select a Standard Offering type. Click the gear icon and select **Create Offering**. See "Create Offerings".
- **Import Offering** - The import process imports archives of service offerings and their supported artifacts. Supported artifacts for service offerings include associated service designs and resource offerings. Click the gear icon and select **Import Offering**. This action is not available to the Consumer Organization Administrator role. See "Import Offerings".
- **Manage Offering Tags** - Tags are user-defined, color-coded labels and images used to provide a structure for organizing and grouping service offerings. Once created and associated to an offering, tags display with the offering name in **Browse Designs**. The only pre-created category is labeled **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 but an upgrade path from this offering to a new version of this offering has not been created.
- Upgradable label - Appears if updates to the service design on which this offering is based have been published and a new version of this offering with an upgrade path from this offering has been created. It also means that any subscriptions based on this offering version is upgradable to the new offering.

You can use the functional area tabs when a specific offering version is selected to configure settings:

- "Overview Tab"
- "Publishing Tab"
- "Options Tab"
- "Pricing Tab"
- "Documents Tab"
- "Screenshots Tab"
- "Versions Tab"
- "Upgradability Tab"

Import Offerings

Concepts

In this topic, artifacts refer to a service offering and its associated service designs and resource offerings.

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

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

Process Information

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

  During import, flow signature-related information is verified in or added to the CSA database (flow signatures are used during the creation of an artifact and when adding a resource synchronization action or an external approval type). This information is resolved by **name** which corresponds to the full path to the Operations Orchestration flow (for example, `/Library/CSA Content Pack/CSA3.2/Providers/Infrastructure/vCenter/vCenter Clone Server/Actions/vCenter Simple Compute - Deploy`). For information about how to deploy Operations Orchestration content packs, see the *Central User Guide*.
- **Archive content** - The archive (`.zip`) file can only reference files or content contained within the `.zip` file itself, or that are already contained in the `csa.war` file.
- **Image files** - All images in the archive files must end in one of the following suffix values (for information on adding additional suffix values, see the *Cloud Service Automation Configuration Guide*):

  `jpg|jpeg|jpe|jfif|svg|tif|tiff|ras|cmx|ico|pnm|pbm|pgm|ppm|rgb|xbm|xpm|xwd|png`
- **Back up your data** - Create a backup of your system or data. Before proceeding, be sure to create a backup of any artifacts you may be affecting by using the export operation to save an archive zip file.

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

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

Tasks

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

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

  > **Note:** Use the **Update** option rather than **Import** when importing a service offering based on a sequenced design with delegated topology components.
  >
  > A delegated topology service component is only available if you have upgraded from CSA version 4.50 or earlier AND a delegated topology service component was configured in version 4.50 or earlier.

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

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

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

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

- **Preview** - Generate a report of prospective results for the import process, including information about the artifacts and their status.
- **View Detailed Report** - From the Import Summary dialog, select this link to see a summary and details of the import process, including information about the artifacts and their status.

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

Modify Offerings

Tasks

To edit, save as, export, delete or create a new version of an offering:

1. Select an offering.
2. Perform any of the following actions:
   a. Click the gear icon and select **Edit**. In the Edit Offering dialog, you can change the **Display Name**, **Offering Version**, **Description**, and **Image** of the offering.
   b. Click the gear icon and select **Save As** to create an exact copy of the offering with a new name. This new version can be edited. See "Copy Offering Versions".
   c. Click the gear icon and select **Export** to export the offering, which sends all files and details related to the offering to a zip file. The Export Zip file appears in the lower left hand side of the screen as a downloadable zip file. In Windows, it also appears in your Downloads folder.

d. Click **Delete** to delete the selected offering.

e. To create a new version, see "Create Offering Versions".

Best Practices

- Make sure you know the path and file name of the archive file when exporting an offering.

Copy Offering Versions

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 349.

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 upgradable from the base offering (enabling subscriptions belonging to the base offering to be upgradable to the new offering).

b. Select **No** if the new offering is not upgradable from the base offering (subscriptions belonging to the base offering are not upgradable to the new offering) or if the selected offering contains a topology design (topology designs are not upgradable).

This selection also determines the service designs that can be used by this offering.

The **Upgradable from** field is not available to the Consumer Organization Administrator role. If this dialog is accessed from the Marketplace Portal, the offering cannot be configured by the Consumer Organization Administrator to be upgradable from the base offering.

5. Browse to select the topology (if the new offering is not in an upgrade path) or sequenced **Service Design**, and then click **Select**.

   a. If the offering being created is upgradable from the base offering, the service designs that are selectable are published service designs that are upgradable from the service design of the base offering.

   b. If the offering is not upgradable from the base offering, the service designs that are selectable are published versions of the service design of the base offering.

   For example, there are three published service design versions(1.0.0, 2.0.0, and 2.0.1) and one unpublished service design (3.0.0). The base offering uses service design 1.0.0, service design 2.0.0 is upgradable from service design 1.0.0, and service design 2.0.1 is upgradable from service design 2.0.0. If the new offering is upgradable from the base offering, the selectable service design would be service design 2.0.0. If the new offering is not upgradable from the base offering, the selectable service designs would be service designs 1.0.0, 2.0.0, and 2.0.1.

6. If the new offering is upgradable from the base offering and the selected service design has been configured with a description of the upgrade path, the upgrade path of the service design is displayed. You can also click **View Service Design Upgrade Description** to display the description of the upgrade path. This link displays only if the upgrade description is defined in the design.

7. Enter the offering version description.

8. To change the image used as your version icon,

   a. Click the **Change Image** button.

   b. Select a new image, then click **Select**.

   c. To upload an image of your choice, click **Upload**. Selecting an image file here copies it into the image library. Click **Select**.

9. Click **Select Tags** if you want to associate tags to the offering. Select the desired tags and click **Done**.
10. Click **Create** to finish. The new version page opens for editing.
11. Use the **Versions** tab to view a list of all versions of the offering. See "Versions Tab" on page 349.

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 are upgradable to the current offering.
Upgradable to	A link to the version(s) of an offering to which subscriptions belonging to the current offering are upgradable.
Image	Image associated with the offering.
Tags	Group(s) to which the offering belongs.

The following options are available from the **Overview** details page, in the gear icon drop-down list:

- **Edit** - You can edit all attributes of a saved service offering except the service design (sequenced or topology) that was associated during creation.
- **Save As** - Creates a copy of the selected offering. Only the name can be changed in the copy.
- **Create New Version** - Allows you to create a new version of the offering. See "Create Offering Versions".
- **Export** - Exporting a service offering creates a content archive (.zip) file. The content archive contains XML documents and associated artifacts for the service offering you are exporting, icons for customizing the artifacts, and the Manifest XML document that contains meta-information about the archive files. This action is not available to the Consumer Organization Administrator role.

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

  `SERVICE_OFFERING_<offering_display_name>_<offering_id>.zip`
- **Delete** - Avoid deleting service offerings that have been published to a catalog or are currently in use by active subscriptions.

Publishing Tab

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 user operations that exist in the design that is associated with the offering. Changing the approval policy here does not change the default catalog approval policy. You cannot configure an approval policy for offerings published in the Global Shared Catalog. The default approval policy is **No Approval**. To change this setting, select an offering and click **Change Approval**.
- **Unpublish -** Service offerings cannot be edited after they are published. If you want to change the attributes of a published service offering, click **Unpublish** to unpublish the offering from this catalog.

Options Tab

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, or option sets that you do not want to expose to subscribers in the Marketplace Portal.

You define a hierarchy of option sets and options. When creating an option set, the option you set becomes the default option. You can create properties on either an entire option set or on a specific option within the set. When you create a property on the entire option set, the property is added to each option within the set.

Tasks

Within the **Options** tab, you can perform the following tasks.

- Show or hide properties within an option set.
- Collapse the option set and options.
- Expand the option set and options.

- Show or hide an option set, option, or property; determines visibility in the Marketplace Portal.
- Lock or unlock an option set to disallow or allow the subscriber to modify the default option selections within an option set. When an option set or property is locked, all options within the option set are also locked.
- Edit the option set name or option name.
- Add or update the image associated with the option set or option.
- Move the option down within an option set.
- Move the option up within an option set.
- Drag and drop the option within an option set.
- Collapse the entire option set, including options and properties.

Best Practices

Conditions for Locking/Unlocking option sets, options, and properties

User Action	Result
Locks or unlocks any property.	An independent action that does not affect any option sets or options.
Locks at the option set level.	All options in this option set are locked *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 for Approvers, or Subscribers, or both
- Hide recurring price in Marketplace Portal for Approvers, or Subscribers, or both

Service offering pricing

Item	Description
Initial Price	The base price for the service offering, excluding the price of all selected options.
Recurring Price	The price charged for each recurring period and the period interval.
Currency	The desired currency for the service offering.
Quantity Multiplier	Change the price of this property when the quantity for another property is changed.

Hide or Show Pricing in the Marketplace Portal

Initial or recurring pricing can be hidden for an option and its properties or on an option property in the Marketplace Portal for Approvers, or Subscribers, or both. Select the appropriate boxes to choose whether to hide or show pricing, and who can view the proicing.

When checked, the checkmark will appear in the Hide Initial column for every row in the table or in the Recurring Price column. To support a common use case, detailed subscription pricing fees are hidden because they are typically used for department bill-back purposes. Click **Show Pricing Details** to display all hidden subscription pricing fees.

If you click **Show Pricing Details**, the number of units, the type of unit (such as a flat cost), and the cost for each unit that corresponds to the initial price and recurring price of the subscription display in views throughout the Marketplace Portal, such as Browse Catalog, Browse Catalog Details, Requests, Request Details, and Request Confirmation.

Note: Price-hiding choices are reflected in notifications.

Use external prices

If you enable external pricing, you will enter a key for the price of an option rather than a numeric value. The key must exist in the JSON file from your external pricing system and must be assigned to the same organization as the offering. See *Cloud Service Automation External Pricing Guide*.

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 339.

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 upgradable.

This tab is not available to the Consumer Organization Administrator role.

Tasks

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

- **Add upgrade path** - Click **Add** to define an upgrade path that establishes an upgradability relationship between two different versions of an offering. In the Add Upgrade Path dialog, select a service offering in the **From Version** drop-down list (the listed service offerings are any versions of the current service offering that have been created from a service design that are upgradable to the current service offering's service design). Enter a description of the upgradability relationship between the offerings, such as the differences between the offering versions.
- **<version number>** - Click to display the selected version of the offering.
- **Edit upgrade path description** - Click the gear icon and select **Edit** to update the description about the differences between the selected offering version and the version from or to which it is upgradable.
- **Delete upgrade path** - Click the gear icon and select **Delete** to remove the upgrade path from the listed offering version.

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.

Send documentation feedback

If you have comments about this document, you can contact the documentation team by email. If an email client is configured on this system, click the link above and an email window opens with the following information in the subject line:

Feedback on Cloud Service Management Console Help (Cloud Service Automation 4.70)

Just add your feedback to the email and click send.

If no email client is available, copy the information above to a new message in a web mail client, and send your feedback to clouddocs@hpe.com.

We appreciate your feedback!