

HP Cloud Service Automation

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Concepts Guide

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Welcome to this Guide

This guide contains general information about the HP Cloud Service Automation solution, introducing important concepts that you need to understand how the solution works. This guide provides you with several entry points into the solution:

- *Chapter 1: Understanding HP Cloud Service Automation* introduces cloud services and describes solution function through an overview of the service lifecycle.
- *Chapter 2: HP CSA Solution Components* provides a functional analysis of system components, including core components shipped with the HP Cloud Service Automation Foundation and integrated components that HP has validated as part of the solution.
- *Chapter 3: HP Cloud Service Automation User Roles* describes how IT professionals maintain and administer the cloud solution within your installation and provides a simple job description for each user role.
- *Chapter 4: Putting It All Together* contains a summary of key concepts and terminology.

The guide also contains these additional sections: *For More Information*, and *Glossary*.

1 Understanding HP Cloud Service Automation

Tech Talk

HP Cloud Service Automation (HP CSA) is a unique platform that orchestrates the deployment of infrastructure compute resources and complex multi-tier application architectures. HP CSA integrates and leverages the strengths of several HP data center management and automation products, adding resource allocation management, service offering design, and a customer portal to create a comprehensive service automation solution.

Services are designed with a visual palette. Then the service designs are referenced in offerings presented to subscribers through a customer catalog. Subscriptions are instantiated and processed through a structured lifecycle, with pre-defined integration mechanisms to invoke external processes. Service instances can be flexed to respond to changing business conditions. A provider console serves to administer the system, configuring offerings, resources, and viewing service instances for the HP CSA domain.

Hybrid Cloud Environment

HP Cloud Services Automation (HP CSA) automates the deployment of infrastructure and applications across your organization. HP CSA supports a *hybrid cloud* environment—in other words, you can integrate both on-premise and public cloud resources into your business plan. For instance, you can purchase compute services, such as Microsoft® Hyper-V server resources, from an external provider. While tapping into the public cloud, you still have the flexibility and safety of launching mission-critical applications, such as payroll or financial applications, from behind your company firewall.

The takeaway is this: in a cloud-computing environment it doesn't matter where a service is located. What does matter is that the cloud can deliver an application-based focus to complete the task at hand. So, you might purchase an inventory service through the cloud—the inventory application could run on an Oracle WebLogic application server, or it could run natively on a Windows or Linux machine. The key is the timely delivery of services, not platform choice or the location of service components.

Multi-level Service Offerings

Because application-based service delivery is priority one, HP CSA features a straightforward, catalog-based ordering system. Customers order (or *subscribe*) to services using the *HP CSA Portal*, a subscription-based ordering system providing a variety of selectable *service offerings*. For example, a customer could request a two-tier web service running on RedHat Linux infrastructure with an Apache Web server, monitoring capability, and email notification when deployment is complete.

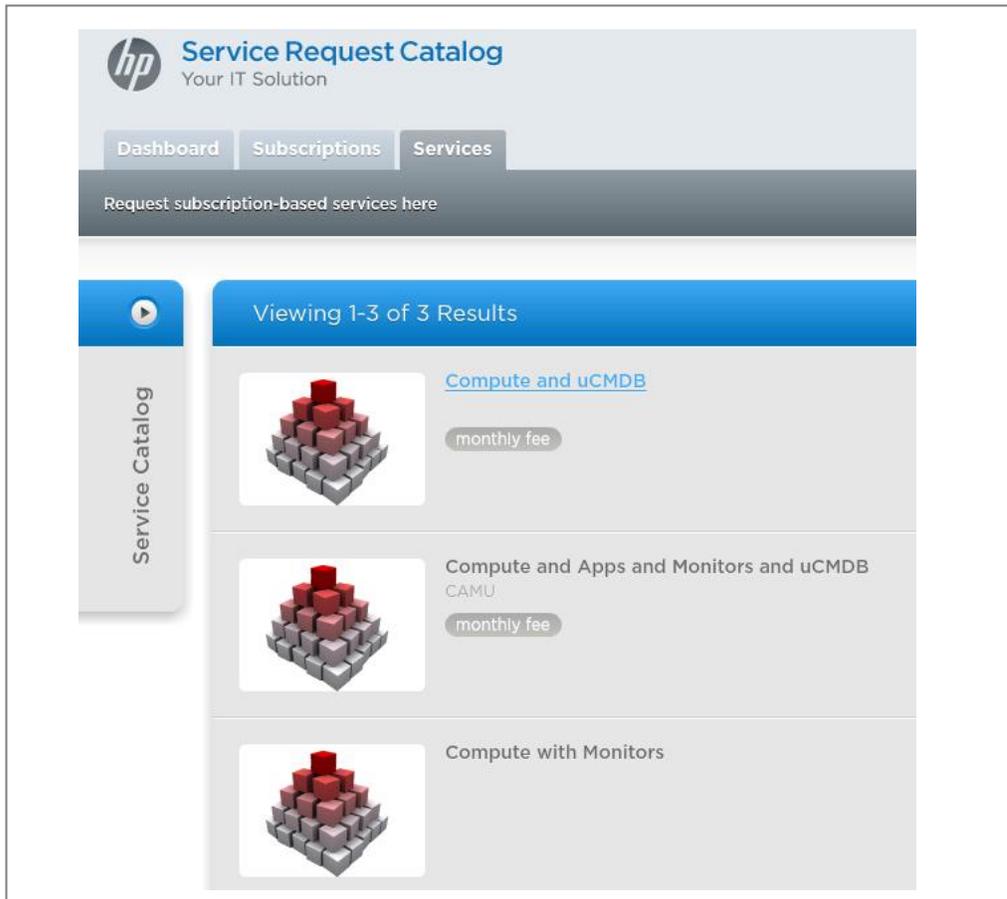
Figure 1 shows sample service offerings in the service catalog. The kinds of service offerings that HP CSA provides can vary in complexity depending on the needs of your organization. When decisions need to be made, the *Service Publisher*—an expert who administers cloud services—determines what kind of services should be available to customers and how much they should cost. Here are a few possibilities ranging from simple infrastructure provisioning to full application and platform delivery:

Compute-as-a-Service—keep it simple: This type of service offering consists of a single virtual machine (VM) image with a predetermined (or static) set of choices, such as how many CPUs to provision. This type of service offering may be most useful in a one-off, “test bed” environment.

Infrastructure-as-Service—build it out: This type of service offering provides customers with the ability to order a set of infrastructure organized into named server groups or tiers. Instead of ordering a single VM, the customer can order a much more complex configuration.

Application/Platform-as-a-Service—full provisioning: This type of service offering enables customers to order a compound application/platform layered on a dynamic infrastructure. The two-tier web-service previously mentioned is an example of this type of service.

Figure 1: Sample Service Offerings in the service catalog



The Service Lifecycle

When a customer selects one of the service offerings available in the service catalog, a larger process kicks into gear. This process—called the *service lifecycle*—is the heart of the HP CSA solution: a state-based, multi-level structure that orchestrates each phase of resource allocation and service delivery. Let's begin with how services are defined. In HP CSA, the *service definition* is done interactively by the *Service Designer*—an architect who collaborates with the *Service Publisher* to make cloud services available to customers. The Service Designer determines the building blocks (or elements) in each service design flow and the extent to which these elements are customizable through the service catalog.

For compute infrastructure—the Service Designer specifies server deployment elements: for example, the number of CPU cores, a specific amount of memory, or the size of the boot disk. Or, based on the needs of the organization, end-user choices can be simplified or predetermined: for example, infrastructure selections could be standardized as *small, medium, or large*.

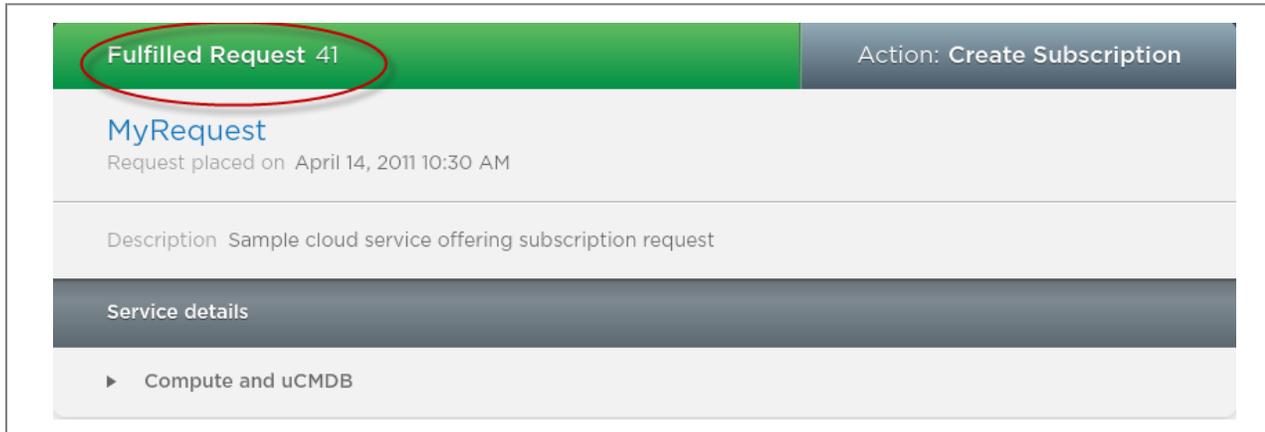
For platform deployment—the Service Designer specifies options such as clustering or high-availability on top of the basic platform construct. In addition, the Service Designer can describe database technology, whether the platform configuration will be internal or Internet-facing, and scalability options.

For applications and business processes—the Service Designer presents subscribers with a fully enabled application-based delivery system. This may include Service Level Agreements (SLAs) around availability, performance, or capacity, as well as options such as backup, encryption, or other policies relevant to deployment. This type of service delivery provides the full benefit of HP CSA's rich feature set.

To make this kind of precise service definition possible, HP CSA coordinates infrastructure provisioning and application-based delivery through *lifecycle phases*, as shown in Figure 2. Once a service is designed, associated with an offering, and published into the HP CSA Portal, a service definition document is produced each time the offering is requested. The service lifecycle begins when the CSA Controller receives the service definition document and decomposes it into individual *service elements*. In the *Initialized* phase, each of those elements is instantiated in the resource database and relationships between the elements are established. In the *Reserved* phase, external providers and resources for deployment are identified for those elements that require them, and the service model is updated to reflect those targets. As the service moves to the *Deployed* phase, external service providers are contacted, deployments are initiated, and successful deployment is confirmed.

For the termination of a service, the phases are identical, and the process is reversed. From the *Deployed* phase, HP CSA terminates or *un-deploys* the service, confirming that all of the service resources are released. Then, after updating the available resources in the HP CSA Controller, the service element records are finalized in the HP CSA Resource Allocation Database.

Figure 3: Fulfilled Subscription Request



Integrated Lifecycle Actions

Lifecycle actions describe external integrations with HP CSA. Discrete, well-bounded elements of the service model can be passed into the lifecycle action, or the entire model can be implemented, depending upon what is appropriate for the integration. The lifecycle action parses the service model for context to execute the integration. Lifecycle actions are associated with specific service elements, so they are processed by the CSA Controller at the same time as those elements. There are eighteen pre-determined integration points, which are structured around the *lifecycle transitions*, as shown in Figure 2. For each transition, a lifecycle action can be configured to execute before, during, or after the transition. Lifecycle actions are available for both the deploy sequence and the un-deploy sequence:

- 1) The HP CSA Controller initiates a service lifecycle action when the associated service element is processed through the integration phase.
- 2) The HP CSA Controller extracts the necessary part of the service model (or the entire service model) to make the service definition document available to the lifecycle action flow.
- 3) The HP CSA Controller invokes the HP Operations Orchestration flow associated with this lifecycle action, using configured values for error handling, timeouts, and concurrency; while passing in the appropriate part (or fragment) of service definition document.
- 4) The lifecycle action parses the service definition fragment for context, and executes the appropriate actions with external service provider systems.

The HP CSA lifecycle with its functional richness and openness to integration takes place as an automated process hidden from the end user. From the customer's standpoint, ordering a service is a simple "push-button" affair; application-based services simply appear out of the cloud. However, as shown in Figure 2, the instantiation processes beneath the surface are highly sophisticated. The next chapter delves into workings of HP CSA, describing the software components that make the solution hum. The chapter also provides a component-level overview, showing how management software works with key service providers to create an integrated solution.



Concepts Summary

- HP CSA is a *hybrid cloud* solution—in other words, you can integrate both on-premise and public cloud resources.
- As part of its service *lifecycle*, HP CSA delivers a range of services from simple compute services to complex application and business process services.
- The HP CSA service lifecycle defines lifecycle phases programmatically, so that a service moves from uninitialized to deployed, or conversely from deployed to uninitialized.
- Lifecycle actions integrate the service lifecycle with external processes according to the needs of your organization.

2 HP CSA Solution Components

Tech Talk

HP CSA is functionally defined by three hierarchical layers. The *Service Subscriber* layer represents an entry point into the system for end-users and administrators, including all aspects of capturing and meeting customer demand for cloud subscription services:

- Customer subscription through the HP CSA Portal
- Publication of service offerings, resource management, and administration tasks through the HP CSA Provider Console

The *Service Delivery* layer sustains the service lifecycle, representing all aspects of assembling and managing automated services. This layer contains the HP CSA Controller software, which interacts with the HP CSA Resource Allocation Database and HP Operations Orchestration to execute *lifecycle actions* by means of HP OO flows. Graphical service design also takes place in this layer within HP OO Studio.

Finally, the *Service Provider* layer furnishes the building blocks (resources) that comprise a service. These can be a combination of application, configuration management, monitoring, and compute providers, which can access Infrastructure as a Service (IaaS) provided through in-house resource management or a public-facing cloud.

The HP CSA Solution

In the previous chapter, we introduced HP CSA in terms of its cloud service offerings (page 5) and lifecycle processes (page 7). In this chapter, we take a more detailed look at the components that make up the HP CSA solution and how they work together.

HP CSA combines several sophisticated HP data-center management products into its automated solution-delivery engine. The logic to execute complex lifecycle actions is provided in a core set of software, available only with HP CSA. This software—the HP CSA Controller—works with other solution components to orchestrate the timely delivery of cloud services to customers.

When you purchase an HP CSA license, you obtain a set of software called the *HP CSA Foundation*, which includes the HP CSA Controller, the HP Resource Allocation Database, and the HP Universal CMDB. Then, you add integrated *software providers* to assemble the resources required for service delivery. The table below lists the HP CSA component products. For specific information about supported software versions and platforms, see the *HP Cloud Service Automation Solution Support Matrix*.

HP CSA Component List	
Name	Description
HP CSA Foundation Components	
HP CSA Installer software	Installs HP CSA solution files.
HP CSA Portal (service catalog)	Provides subscription services for customers, featuring a selectable set of service offerings.
HP CSA Provider Console	Delivers the design capability required to prepare service offerings for publication in the service catalog, and to manage service offerings. Additionally, contains an administrator interface to manage the HP CSA solution, and resource-management capability for the HP CSA Resource Allocation database.
HP CSA Controller <ul style="list-style-type: none"> ○ HP CSA Lifecycle Engine ○ HP Operations Orchestration flows for HP CSA ○ Sample CSA 2.00 templates 	Contains the HP CSA lifecycle engine, plus customized flows and sample templates for the service lifecycle.
HP CSA Resource Allocation Database	Stores resource, composite and lifecycle state information, including resource allocation for datacenters, hypervisors and general providers.
HP Universal CMDB	Maintains accurate, up-to-date information regarding the relationships between infrastructure, applications, and cloud services.
Integrated Solution Components	
HP Operations Orchestration (HP OO)	Coordinates communication between the integrated products and managed devices. Customized HP OO flows are essential to implementing the HP CSA solution lifecycle (see HP CSA Controller above).
HP Server Automation (HP SA) with optional ADM content	Deploys operating systems and policies to managed devices. Optionally, controls application deployment processes through Application Deployment Manager (ADM).
HP SiteScope	Monitors servers, storage, and other managed devices.
HP BladeSystem Matrix <ul style="list-style-type: none"> ○ HP Insight Software with HP Insight Orchestration (HP IO) ○ HP BladeSystem 	Provides a converged infrastructure platform for private cloud deployments, including HP IO software for interactive service design, and HP BladeSystem for blade architecture.
Datacenter Virtualization Software	
VMware vCenter Server	Provides virtualization management services.
VSphere	Provides virtualized platform and infrastructure.

HP CSA Component Description

HP CSA Foundation software works with integrated software products to instantiate the lifecycle process. For simplicity, the interaction between these *solution components* can be presented as three layers: *Service Subscriber*, *Service Delivery*, and *Service Provider* as shown in Figure 4 on page 15. See Chapter 3: HP Cloud Service Automation User Roles for more information about the administrative and user roles associated with each layer.

Service Subscriber

The top layer of the component diagram (Figure 4) shows two interfaces that provide important information for the HP CSA lifecycle engine.

- The *HP CSA Portal* is a service catalog implementation, featuring a simple graphical interface for customers to subscribe or unsubscribe to cloud services (called *service offerings*).
- The *HP CSA Provider Console* presents a graphical interface to prepare services for subscriber consumption. The Service Publisher (user role) uses the Provider Console to publish service offerings into the service catalog and to view information about subscription requests (called *service instances*). In addition, the Provider Console contains an interface for administrative function, such managing cloud resources and administering system settings.

Service Delivery

The second layer of the component diagram shows the service delivery process. The driving force behind this process is a tightly coupled interaction between the HP Operations Orchestration (HP OO), the HP CSA Controller, and the HP CSA Resource Allocation database.

- HP OO Studio provides a way to graphically design the components of a service offering. When this process is complete, the Service Designer (user role) places the service offering designs in a folder where they can be accessed by the Service Publisher.
- *HP OO Central* interacts with the *HP CSA Controller* to achieve the automated processing that forms the heart of the service delivery process.
 - From the HP CSA Portal, the subscription request goes to the *Master Service Flow* in HP OO Central, which determines whether the service instance should be *created*, *modified*, or *terminated*.
 - The Master Service Flow activates the *HP CSA Controller*, which communicates with HP OO Central to manage lifecycle processing through content use (OO flows) and design instantiation.
 - Lifecycle actions launch task-specific flows, such as cloning a VM, deploying a SiteScope monitor, or accessing stored uCMDB configurations.
- As an ongoing part of service delivery, the HP CSA Controller communicates with the HP CSA Resource Allocation Database. The database stores artifacts used in the lifecycle process such as *lifecycle objects*, *providers*, and lifecycle actions. The database also maintains records of service instances and associated lifecycle states.

Service Providers

The third layer of the component diagram shows the *service providers* essential to the lifecycle process. When the HP CSA Controller instructs HP OO Central to perform a lifecycle action, the system can tap the resources of one of several underlying service providers:

Application Providers—HP Application Deployment Manager (HP ADM) is the provider of choice for handling the deployment and configuration of applications on the target platform. HP ADM is part of HP Server Automation software.

Runtime Configuration Management Providers—HP Universal CMDB (uCMDB) stores and tracks infrastructure configurations required at runtime, such as configuration for server groups and the relationship between individual server configurations.

Monitoring Providers—HP SiteScope provides monitoring of resources and infrastructure.

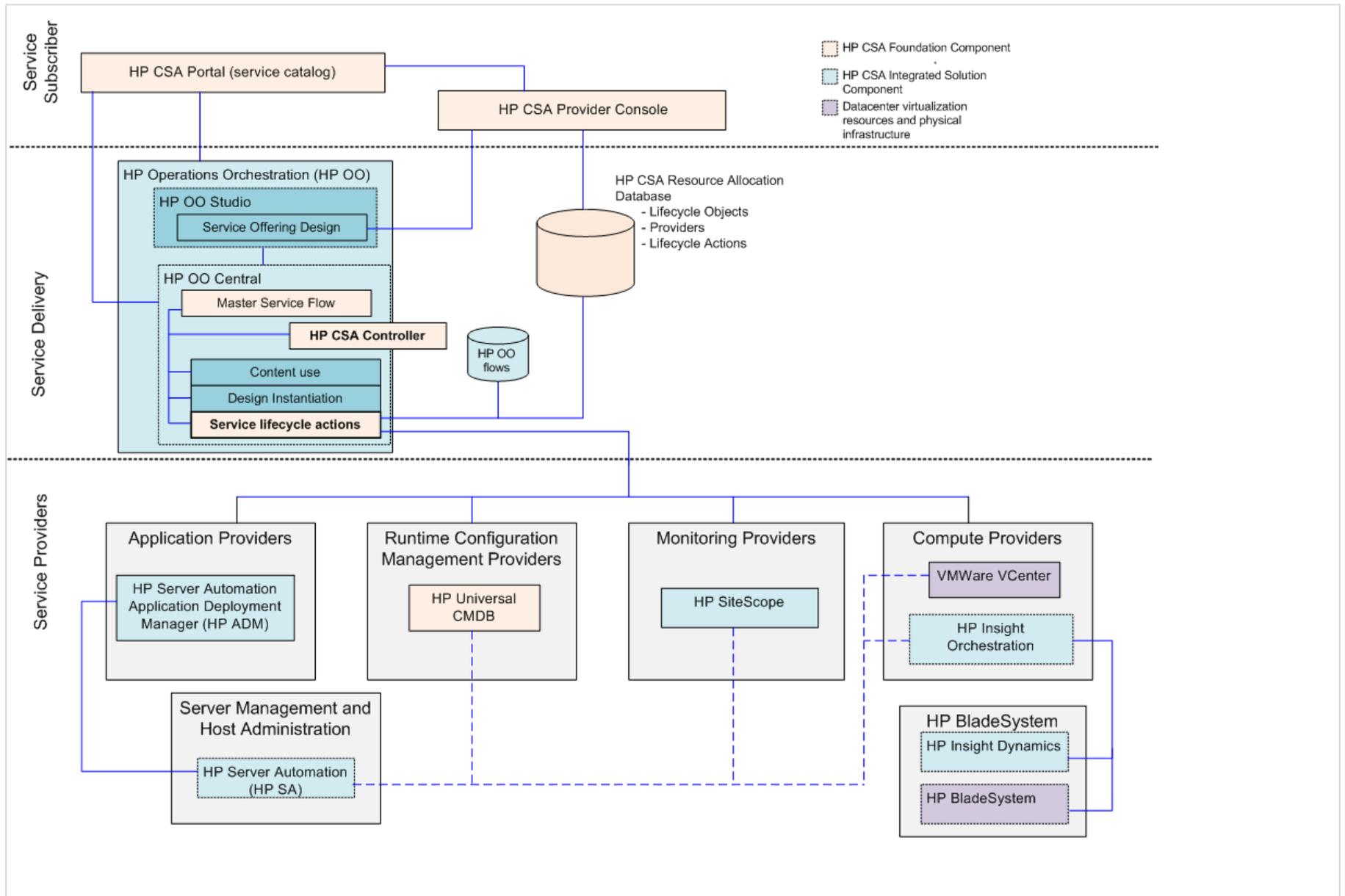
Compute Providers—VMWare and HP Insight Orchestration handle the provisioning of compute resources within the system.

- VMWare VCenter provides virtualization management services, coordinating with VSphere for virtualized platform and infrastructure support.
- HP Insight Orchestration (part the HP Insight Dynamics suite) is an integrated part of HP's BladeSystem Matrix solution, providing automated provisioning for blade servers.

In addition to these providers, HP Server Automation adds server management and host administration capability. Other providers communicate with HP Server Automation to obtain server and platform configuration data used in the infrastructure provisioning process.

Altogether many program interactions take place between components to achieve an automated delivery system. However, like all cloud computing systems, the delivery of HP CSA cloud services ultimately depends on people within your organization who accomplish mission-critical tasks. The next chapter contains information about user roles—describing the people who maintain the process.

Figure 4: CSA Component Diagram





Concepts Summary

- HP CSA Foundation components include the HP CSA Controller, which works with HP Operations Orchestration and the HP CSA Resource Allocation Database to drive the lifecycle engine.
- User input into the system is captured through these graphical interfaces, which are also part of the HP CSA Foundation license:
 - The HP CSA Portal, a catalog for the service subscriber
 - The HP CSA Provider Console, an interface to publish services to the catalog, and to administer resources and to manage the HP CSA solution.
 - HP Operation Orchestration (HP OO) Studio for service design.
- The following service providers integrate with HP CSA:
 - Application Providers: HP SA Application Deployment Management (HP ADM)
 - Runtime Configuration Management Providers: HP Universal CMDB (part of the HP CSA Foundation)
 - Monitoring Providers: HP SiteScope
 - Compute Providers: VMWare VCenter and HP Insight Orchestration (part of HP BladeSystem Matrix solution)
- HP Server Automation (HP SA) provides server management and host administration for other service providers in the solution.

3 HP Cloud Service Automation User Roles

Tech talk

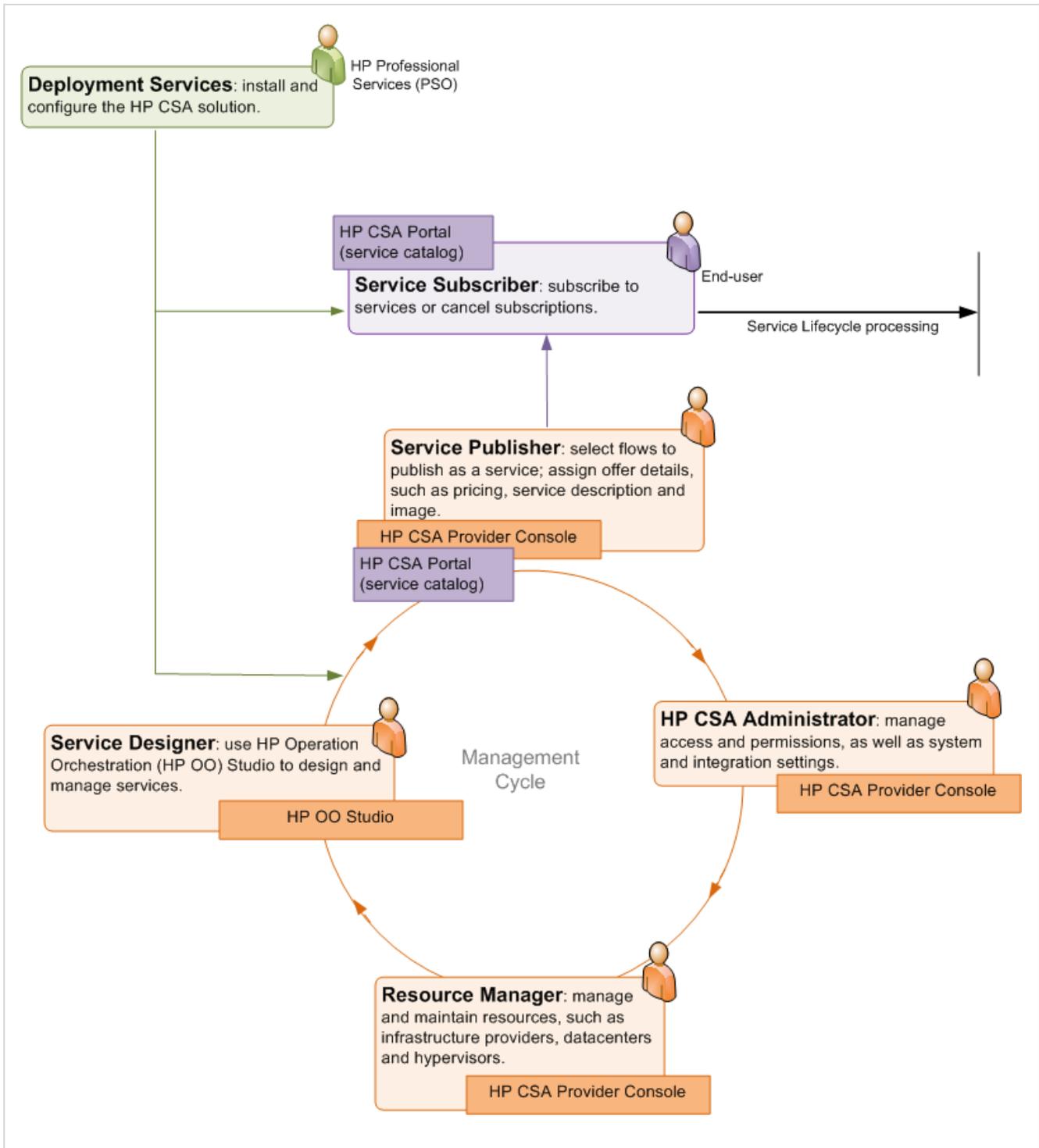
Personas or *user roles* describe task-based scenarios for the deployment and maintenance of the HP CSA solution. Installation/configuration is performed by the HP Professional Services Organization (PSO) in collaboration with on-site personnel. Other user roles are assigned within your organization as necessary, including administration of the HP CSA solution, resource management, service design, and service publication. The end-user role (called the *Subscriber*) requires subscribing to or cancelling services interactively through the CSA Portal.

Note that the user roles in this chapter do not include ALL use cases for component products. Products such as the HP Universal CMDB or HP Server Automation have their own maintenance and administration requirements that are outside the scope of this document. These requirements should be carefully considered during the planning phase for HP CSA deployment.

HP CSA has a complex, automated service lifecycle requiring installation and maintenance of important software and infrastructure components; however, in many ways, successful implementation of HP CSA depends upon people—expert designers and administrators within your organization who work in partnership with HP.

Figure 5 shows HP CSA user roles, with emphasis on the roles for end-use, resource management, administration, service design and delivery, and deployment. Note that the core process or management cycle requires skilled IT professionals to maintain the lifecycle engine. Depending on the needs of your organization, these roles may be separate or shared—for example, in some cases the HP CSA Administrator and Resource Manager may be the same individual, or the roles of the Service Designer and the Service Publisher could be combined.

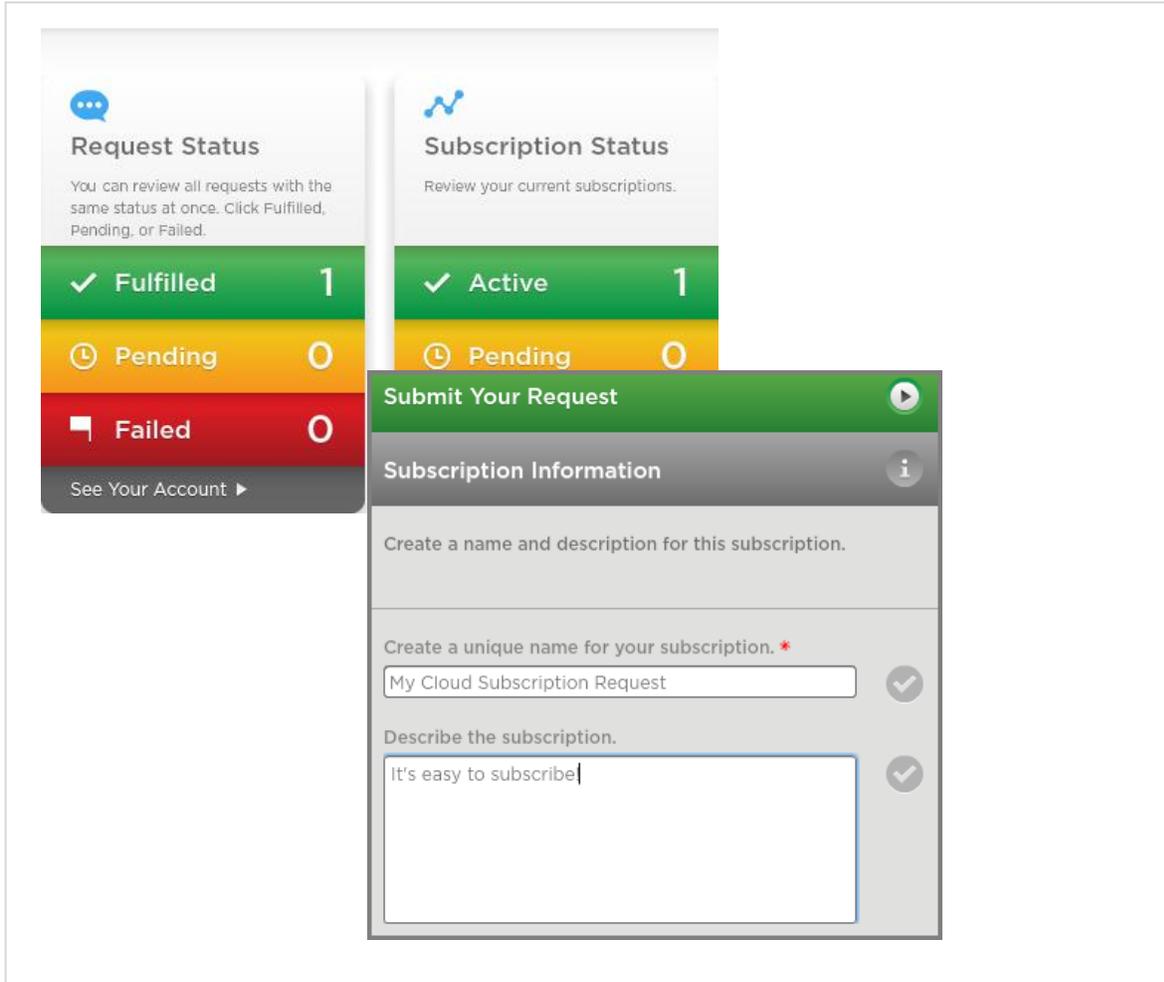
Figure 5: HP CSA User Roles



Service Subscriber

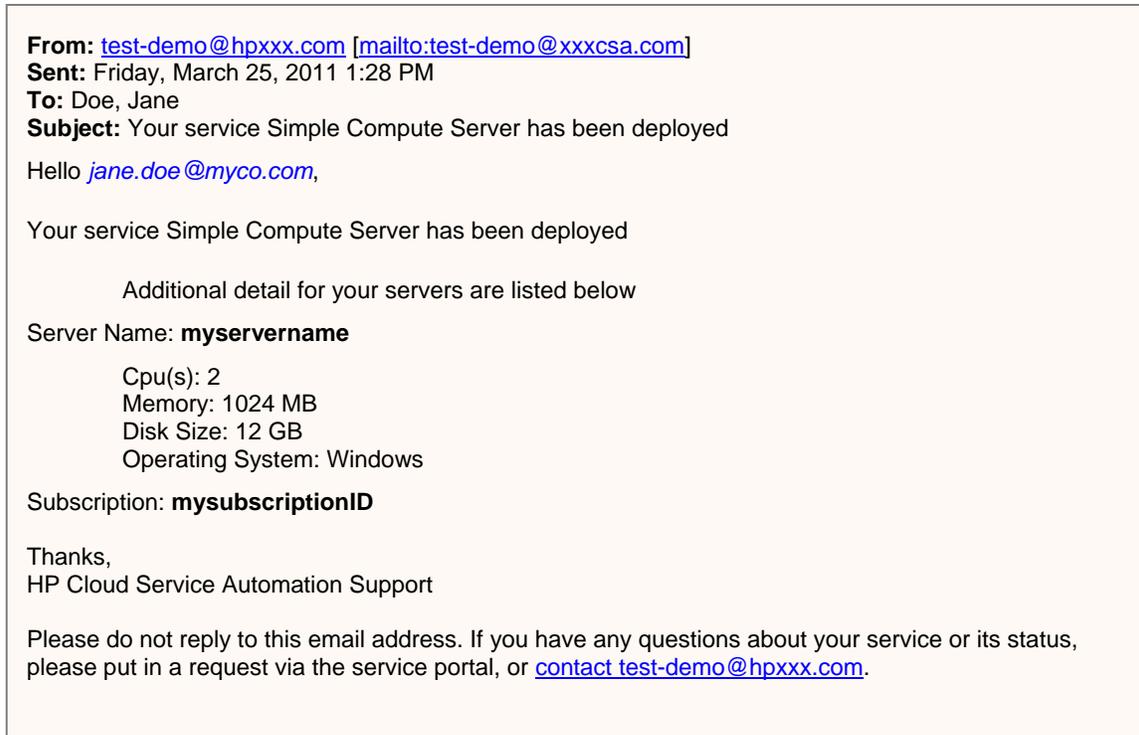
The primary and highest-level user role is the *Service Subscriber* or end-user. The Subscriber is your customer—the person who selects (or subscribes to) one of the cloud service offerings in the HP CSA Portal. As previously mentioned, each service offering can be anywhere on the spectrum from simple infrastructure provisioning for a single VM to complex application and business-services requiring an SLA. Subscription is a straightforward step-by-step process as shown in Figure 6.

Figure 6: Subscribing to a Service Offering



When a customer subscribes to a service offering, the lifecycle process activates and provisioning begins, as described on page 7. The customer is notified when each stage of the subscription process is complete, as shown in Figure 7.

Figure 7: Email notification for deployed cloud service



Service Publisher

The Service Publisher plays a key role in managing the service lifecycle by *publishing* service offerings to the HP CSA Portal. The Service Publisher uses the Service Offering tab in the Provider Console for the following tasks:

- Browse available library entries
- Select a service design flow
- Create (or publish) service offerings in the service catalog
- Modify service offerings
- Delete service offerings from the library or remove them from the service catalog

Figure 8 shows how service offerings are created in the Provider Console.

Figure 8: Create Service Offerings

Compute with Monitors

The Service Offering tab allows you to create offerings for your services by associating business information such as pricing, categories and images.

*** Required fields**

Service Template

Template: * /Library/CSA 2/Designer/Service Design/Designs/Draft/Simple Cloud (Compute and Monitors)
508cc407-28b5-44df-8286-c7b52044...

Basic Information

Name: *

Category: *

Description:

Price Information

Price: * ▾

Miscellaneous Information

Reference Address:

Image Address:

|

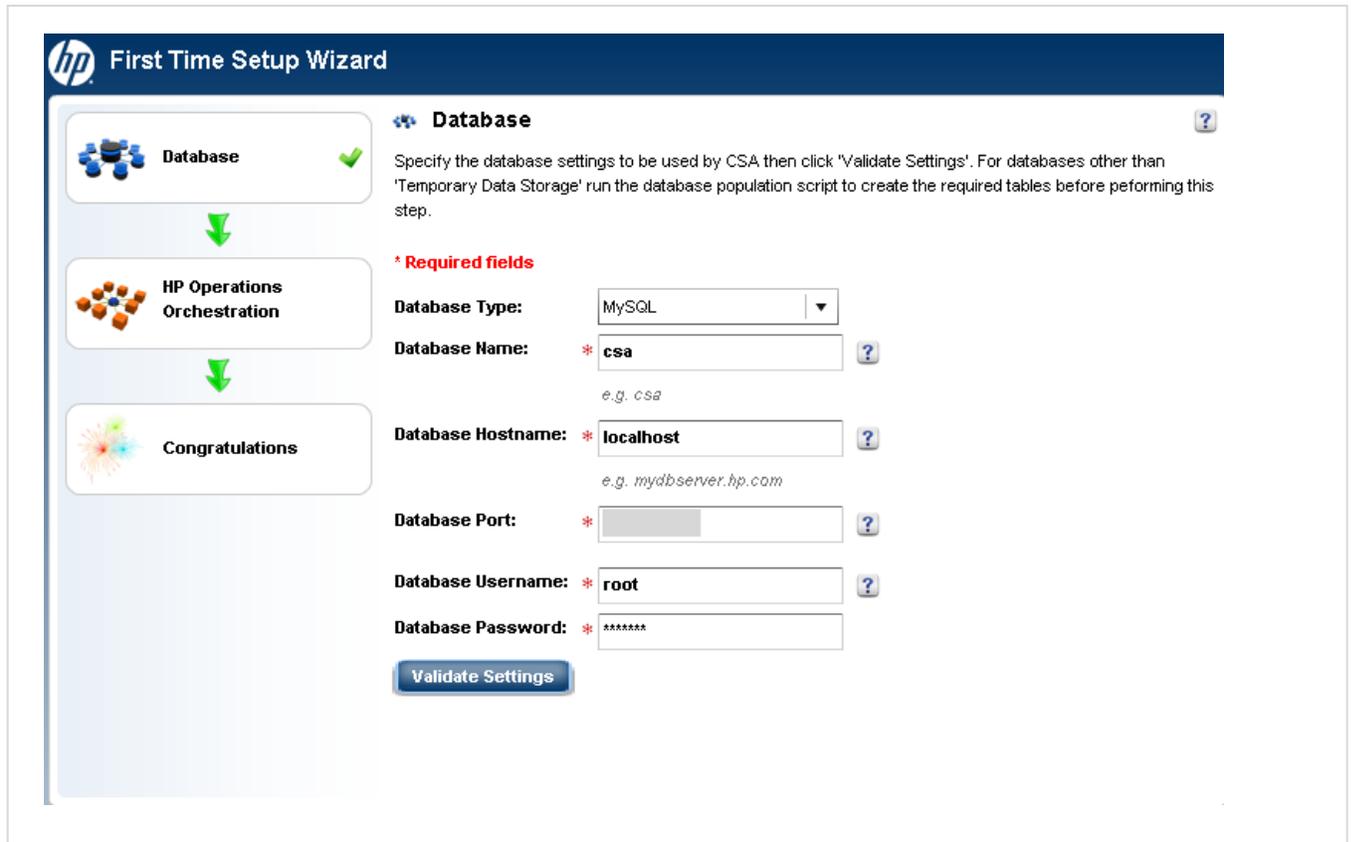
Administrator

Administrative processes for HP CSA are handled from the Control Panel in the HP CSA Provider Console. The Control Panel assists administrators in the following tasks:

- Specify system settings, such as the repository where images are stored for display in the service catalog.
- View parameters for the HP CSA Resource Allocation Database, such as the database type (MySQL, Microsoft SQL Server, or Oracle).
- Set up access to remote servers that are provisioned by HP CSA, including Virtual Network Computing (VNC) connectivity settings, Windows Remote Desktop, and SSH web terminal settings.
- View integration settings for HP Operations Orchestration, including connectivity settings for the HP OO Central server.

HP CSA facilitates important administrative tasks through the First Time Startup Wizard, which should only be run after all HP CSA installation and configuration is complete. The Startup Wizard provides a step-by-step way to configure database and HP Operations Orchestration settings. You see this wizard when you first access the HP CSA Provider Console, as shown in Figure 9.

Figure 9: HP CSA First Time Startup Wizard



Resource Manager

In HP CSA, *resources* are defined as types of virtual infrastructure used to provision cloud services. An administrator in your organization called the Resource Manager uses the Resource Management tab in the HP CSA Provider Console to populate the HP CSA Resource Allocation Database, as shown in Figure 10. This database is used to maintain resource, compute and lifecycle state information. By accessing it, the Resource Manager can create, delete, or modify the following virtual entities:

Compute Providers – Virtual infrastructure management platforms that offer centralized control over all the virtual infrastructure resources underneath. Compute Providers contain datacenters, which contain the hypervisors that host the virtual machines.

- *Datacenters* – Logical constructs under a Compute Provider. Datacenters contain the hypervisors that host the virtual machines.
- *Hypervisors* – Virtual machine management platforms running on a physical server. Hypervisors can run multiple virtual machines simultaneously, allowing the physical resources of the underlying server to be shared.

General Providers – Application management platforms that offer application deployment and configuration services.

Figure 10: General Provider (Application) Resource definition

New Provider

A Compute Provider is a virtual infrastructure management platform which offers a centralized control over all the virtual infrastructure resources underneath. Compute Providers contain datacenters, which contain hypervisors hosting the virtual machines. A General can be used for an application management platform which offers application deployment and configuration services.

*** Required fields**

Provider Class: General

Basic Information

Name: * My Provider ?

Is Active: ?

Description: Application X provider ?

Connection Information

Service Access Point: * https://... ?
e.g. https://myvcenterhostname.hp.com:443

Log in: * mylogin ?
e.g. root

Password: * ***** ?

Miscellaneous Information

Tags: tagIT ?

Save | Reset | Cancel

Service Designer

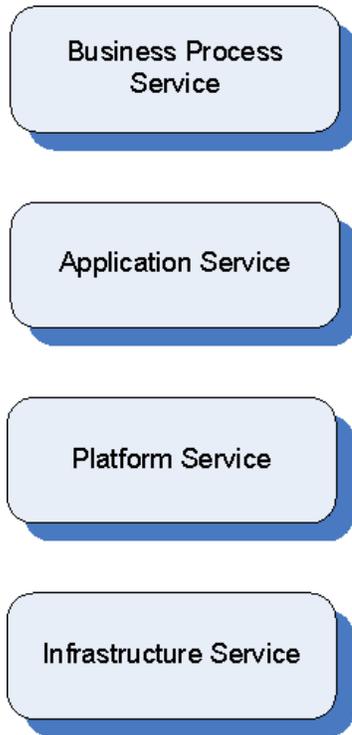
Proper service design and maintenance is essential to the delivery of cloud services. The Service Designer is a skilled architect who uses HP OO Studio to graphically design the components of a service offering, which produces a Service Definition Document (an XML artifact that describes the service).

When the design process is complete, the Service Designer places the flow that defines the service offering into a designated location in the HP OO Studio library. Now this service definition is accessible to the Service Publisher, who works closely with the Service Designer to make the service offering available to Subscribers.

As part of the design process, the Service Designer decides how much detail to expose in the service options, and at what level to expose those choices. For example, service options can be presented as low level–detailed characteristics of servers, such as the number of CPU cores, or amount of memory. Choices can also be abstracted at a high level to present standard configurations and offer options, such as *small*, *medium*, or *large*. Service offerings can be defined hierarchically as shown in Figure 11.

At the application service or business-process level, the Service Designer offers specific SLAs around the availability, performance, or capacity of cloud services, plus options such a backup, encryption, or other policies relevant to deployment. From the customer’s viewpoint, the complexity of the infrastructure behind application services and business process services is transparent. For instance, at this level a customer would not be concerned with the number of CPUs or even the number of servers. The Service Designer has made the appropriate deployment choices to facilitate sophisticated cloud-service delivery.

Figure 11: Hierarchical Service Offerings



HP Deployment Services

HP CSA deployment services are provided by the HP Professional Services Organization. Deployment activities must be closely coordinated with on-site personnel, including set up for basic network and storage function, and server installation for the HP CSA foundation and its component products.

Figure 12 shows the sequence of installation activities for solution components. For more information about HP Professional Services or to plan for HP CSA deployment, contact your HP representative. For installation and configuration procedures for HP CSA, refer to the *HP Cloud Services Automation Configuration Guide*.

Figure 12: HP CSA Deployment Sequence

ID	Activity	Sequence
1	Pre-Installation Planning	[Redacted]
2	Provider Installation Considerations	[Redacted]
3	Set up DNS, NTP, and DHCP for CSA	[Redacted]
4	HP CSA Database Requirements	[Redacted]
5	Install HP Universal CMDB	[Redacted]
6	Install HP Operations Orchestration	[Redacted]
7	Install HP Server Automation	[Redacted]
8	Install HP SiteScope	[Redacted]
9	Install HP Cloud Service Automation	[Redacted]
10	Post-Installer Configuration	[Redacted]
11	Configure HP CSA and SRC Authentication	[Redacted]
12	First Time Setup Wizard	[Redacted]
13	Prepare Templates for vCenter	[Redacted]
14	Getting Started with HP CSA Solution	[Redacted]



Concepts Summary

- The HP Deployment Services engineer, an HP Professional Services representative, works with on-site personnel to install and configure the HP CSA solution, including integrated products.
- The HP CSA management cycle requires the following user roles to be defined in your datacenter:
 - Service Designer—uses HP OO to create and administer service design flows.
 - Service Publisher—selects flows to publish as service offerings; assigns details to service offering such as pricing, description and image.
 - Administrator—manages system settings, such as permissions, and settings for integrated solutions products.
 - Resource Manager—manages resources for service providers.
- HP CSA user roles culminate with delivery to the Subscriber—the customer who selects service offerings from the service catalog or cancels subscriptions.

4 Putting It All Together

<i>User Role</i>	<i>Task</i>	<i>CSA Components</i>	<i>What happens?</i>
Subscriber (end user)	Subscribe to cloud service offerings.	<p>HP CSA Foundation components, plus integrated service providers, depending on type of the request.</p> <p>See Figure 4: CSA Component Diagram on page 15.</p>	<p>The Subscriber uses the <i>HP CSA Portal</i> to select a <i>service offering</i>, which is tracked and managed as a <i>service instance</i> during automated <i>lifecycle</i> processing. Lifecycle processing begins as the service instance is initialized and ends when the service instance is deployed. (See Figure 2: The Service Lifecycle on page 8.)</p> <p>The subscription results are indicated in HP CSA Portal with one of the following status messages: <i>Pending</i>, <i>Failed</i>, or <i>Fulfilled</i>.</p>
	Cancel a subscription.	<p>HP CSA Foundation components, plus integrated service providers, depending on type of the request.</p> <p>See Figure 4: CSA Component Diagram on page 15.</p>	<p>The Subscriber uses the HP CSA Portal to cancel a service offering, which is tracked and managed as a service instance during automated lifecycle processing. Lifecycle processing begins as the service instance moves from deployed to un-deployed state, and ends when the service instance is un-initialized. (See Figure 2: The Service Lifecycle on page 8.)</p>
Service Publisher	Publish a service offering in the service catalog.	HP CSA Provider Console	The Service Publisher uses Service Offering tab in the HP CSA Provider Console to publish a service offering to the HP CSA Portal (service catalog). The publication process requires assigning a name, category, description, image, and price to each offering.
	Modify a service offering.	HP CSA Provider Console	The Service Publisher uses Service Offering tab the HP CSA Provider Console to modify service offerings. For example, the price of the offering could be increased or decreased.
	Delete a service offering.	HP CSA Provider Console	The Service Publisher uses the Service Offering tab in HP CSA Provider Console to delete a service offering. When deleted, the service offering is no longer available in the service catalog.

Administrator	Specify system settings.	HP CSA Provider Console	The Administrator uses the Control Panel in the HP CSA Provider Console to specify system settings such as the repository where images are stored for display in the service catalog.
	Set up the database.	First-Time Setup Wizard	The Administrator uses the First-Time Setup Wizard to define parameters for the HP CSA Resource Allocation Database (MySQL, Microsoft SQL Server, or Oracle).
	Set up access to remote servers.	HP CSA Provider Console	The Administrator uses the Control Panel in the HP CSA Provider Console to set access and permissions to remote servers that are provisioned by HP CSA, including Virtual Network Computing (VNC) connectivity settings, Windows Remote Desktop, and SSH web terminal settings.
	Specify HP OO settings.	First-Time Setup Wizard	The Administrator uses the First-Time Setup Wizard to specify integration settings for HP Operations Orchestration including connectivity settings for the OO Central server.
Resource Manager	Configure database resources.	HP CSA Provider Console	The Resource Manager uses the Resource Management tab in the HP CSA Provider Console to configure resources in the HP Software Resource Management Database, such as compute providers, general providers, datacenters, and hypervisors.
	Modify database resources.	HP CSA Provider Console	The Resource Manager uses the Resource Management tab in the HP CSA Provider Console to modify resources in the HP Software Resource Management Database, such as compute providers, general providers, datacenters, and hypervisors.
	Delete database resources.	HP CSA Provider Console	The Resource Manager uses the Resource Management tab in the HP CSA Provider Console to delete resources in the HP Software Resource Management Database, such as compute providers, general providers, datacenters, and hypervisors.

Service Designer	Create service offering designs.	HP Operations Orchestration (HP OO) Studio	The Service Designer creates a service offering design using HP OO Studio. This design is an HP OO flow, which is rendered into an XML artifact called a Service Definition Document. When the design is ready, the Service Designer places the design into a designated HP OO folder, where it can be accessed by the Service Publisher.
	Modify service offering designs.	HP Operations Orchestration (HP OO) Studio	The Service Designer modifies a service offering design using HP OO Studio. The Designer can change details of the service design, such as the number of CPU cores and the amount of memory, or choose not to expose these detailed service options to the Subscriber.
	Delete service offering designs.	HP Operations Orchestration (HP OO) Studio	The Service Designer deletes a service offering design by removing it from the HP OO design folder. When deleted, the service offering design is no longer available for publication.
HP Deployment Services	Install and configure the HP CSA Solution.	HP CSA media and datacenter resources	Deployment services are provided by the HP Professional Services Organization (PSO) in cooperation with on-site personnel. Deployment includes installation and configuration as necessary to set up a working system.

A For More Information

HP CSA Publications

The following publications are available on the HP Software Product Manuals website (<http://support.openview.hp.com/selfsolve/manual>). This site requires an HP Passport sign-in.

- *HP Cloud Service Automation Documentation List* – lists all other HP CSA publications, shows where they are located, and indicates when they are updated.
- *HP Cloud Service Automation Concepts Guide* – this publication, introduces the HP CSA solution.

The following publications are available on the HP Live Network website (<https://www.www2.hp.com/>). This site requires that HP customers have an active HP Support Agreement ID (SAID) for HP Cloud Service Automation and an HP Passport sign-in.

- *HP Cloud Service Automation Concepts Guide* – this publication, introduces the HP CSA solution.
- *HP Cloud Service Automation Solution and Software Support Matrix* – provides information about platform support requirements for the HP CSA Foundation with links to requirements for component products.
- *HP Cloud Service Automation Release Notes* – contains product release notes; please read before installation.
- *HP Cloud Service Automation Configuration Guide* – provides instructions for HP CSA installation and configuration.
- *HP Cloud Service Automation Provider Help (printable PDF)* – provides step-by-step information about how to design HP CSA service offerings and make cloud services available to customers.
- *HP Cloud Service Automation Troubleshooting Guide* – contains solutions and workarounds to known problems.

Glossary

Administrator

In HP CSA, a user role that includes managing access and permissions to the HP CSA solution, as well as other solution-specific administrative tasks. See also *user roles*, *Resource Manager*, *Service Designer*, and *Service Publisher*.

BladeSystem Matrix

See HP BladeSystem Matrix.

Callouts

Exit points in an HP CSA service flow (created using HP Operations Orchestration) that trigger the invocation of external systems or processes. The timing for callouts is defined as part of the Lifecycle actions. See *Lifecycle* and *Lifecycle actions*.

Cloud Computing

A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (for example, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. *National Institute of Standards and Technology, Information Technology Laboratory* <http://www.nist.gov/itl/>

Compute Providers

In HP CSA, virtual infrastructure management platforms that offer centralized control over all the virtual infrastructure resources underneath. Compute providers contain datacenters, which contain the hypervisors that host the virtual machines. See also *general providers*, *datacenters*, and *hypervisors*.

Controller

See HP CSA Controller.

CSA

See *HP Cloud Service Automation*.

Database

See HP CSA Resource Allocation Database.

Datacenters

In HP CSA, a logical construct under a compute provider. Datacenters contain the hypervisors that host the virtual machines. See also *compute providers*, *general providers*, and *hypervisors*.

Elements

See Service Elements.

First-Time Startup Wizard

A wizard used to do preliminary database and HP Operations Orchestration configuration after solution installation and configuration is complete. See also *HP CSA Resource Management Database* and *HP Operations Orchestration (HP OO)*.

Foundation components

See HP CSA Foundation.

Fulfilled status

In the HP Service Request Catalog, notification that the product or subscription is available according to the subscription agreement.

Flow

See HP Operations Orchestration flow.

General providers

In HP CSA, service providers that can be used for an application management platforms that offer application deployment and configuration services. See also *compute providers*, *datacenters*, and *hypervisors*.

HP Application Deployment Manager (HP ADM)

An optional component of HP Server Automation used to manage the deployment of software applications. See also *HP Server Automation (HP SA)*.

HP BladeSystem Matrix

An integrated HP CSA component that provides a converged infrastructure platform for private cloud deployments, including HP Insight Orchestration (HP IO) software for interactive service design, and HP BladeSystem for blade architecture.

HP Deployment Services

The HP service professionals who install and deploy the HP CSA solution and are part of the HP Professional Services Organization (PSO).

HP Cloud Service Automation (HP CSA)

A unique platform that orchestrates the deployment of infrastructure compute resources and complex multi-tier application architectures. HP CSA integrates and leverages the strengths of several HP data center management and automation products, adding resource allocation management, service offering design, and a customer portal to create a comprehensive service automation solution.

HP CSA

See *HP Cloud Service Automation*.

HP CSA Controller

An HP CSA core component, which provides program function necessary to execute complex lifecycle tasks and to orchestrate the timely delivery of cloud services to customers. The HP CSA Controller is available only with the HP CSA solution. It contains the HP CSA lifecycle engine, plus customized flows and sample templates for the service lifecycle.

HP CSA Foundation

A set of integrated software components that are required for the HP CSA Solution, including (but not limited to) the HP CSA Controller, HP Operations Orchestration, and the HP Universal CMDB.

HP CSA Installer software

Core software delivered with the HP CSA Foundation, which installs HP CSA solution files.

HP CSA Portal (service catalog)

Core software delivered with the HP CSA Foundation, which provides subscription services for customers, featuring a selectable set of service offerings.

HP CSA Provider Console

Core software delivered with the HP CSA Foundation, which provides the design capability required to prepare service offerings for publication in the service catalog, and to manage service offerings. Additionally, contains an administrator interface to manage the HP CSA solution, and resource-management capability for the HP CSA database. See also *service provider*.

HP CSA Resource Allocation Database

Core software delivered with the HP CSA Foundation, which stores resource, composite and lifecycle state information, including resource allocation for datacenters, hypervisors and general providers.

HP Insight Orchestration (HP IO)

A component of HP BladeSystem Matrix that provides rapid provisioning and repurposing of infrastructure services from shared resource pools using a self-service portal. HP Insight Orchestration is delivered as an HP CSA integrated component within HP BladeSystem Matrix. See also *HP BladeSystem Matrix*.

HP Operation Orchestration (HP OO)

A core software product delivered with the HP CSA Foundation that coordinates communication between integrated products and managed devices. Customized HP OO flows are essential to implementing the HP CSA solution lifecycle. See also HP CSA Controller.

HP Operations Orchestration Central (HP OO Central)

The manager within HP Operations Orchestration that executes the flows and also provides an administrative interface to manage users and flows. In addition, HP OO Central also provides dashboard and reporting capabilities for ROI and execution metrics for flows.

HP Operations Orchestration Studio (HP OO Studio)

A tool within HP Operations Orchestration that provides flow authoring and flow deployment capabilities by means of a drag-and-drop graphical user interface. HP OO Studio is used by the HP CSA Service Designer to create, manage, and share customized flows, which are later published as service offerings. See also *service offerings* and *Service Publisher*.

HP Operation Orchestration flow

A set of linked actions that automate customer-specific IT tasks within an HP CSA automated service. Operations Orchestration flows are created, modified, and saved using HP Operations Orchestration Studio, the workflow designer embedded in Insight Orchestration. See also *HP Operations Orchestration*.

HP Server Automation (HP SA)

An integrated HP CSA component that deploys operating systems and policies to managed devices. Optionally, controls application deployment processes through Application Deployment Manager (ADM). See also *Application Deployment Manager (ADM)*.

HP SiteScope

An integrated HP CSA component that monitors servers, storage, and other managed devices.

HP Universal CMDB (uCMDB)

A core software product delivered with the HP CSA Foundation that maintains accurate, up-to-date information regarding the relationships between infrastructure, applications, and cloud services.

Hybrid Cloud

A cloud infrastructure that is a composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology enabling data and application portability (for example, cloud bursting for load-balancing between clouds). *National Institute of Standards and Technology, Information Technology Laboratory* <http://www.nist.gov/itl/>

Hypervisor

A virtual machine management platform running on a physical server. Hypervisors can run multiple virtual machines simultaneously, allowing the sharing of the physical resources of the underlying server. See also *compute providers*, *general providers*, and *datacenters*.

Insight Orchestration (IO)

See HP Insight Orchestration (HP IO).

Lifecycle

In HP CSA, the automated process to activate a service instance as defined by specific programmatic states: (1) Described > Initializing > Initialized > Reserving > Reserved > Deploying > Deployed; or conversely (2) Deployed > Un-deploying > Reserved > Un-Reserving > Initialized > Un-initializing > Described.

Lifecycle actions

In HP CSA, actions to invoke external systems during lifecycle processing used to customize HP CSA service delivery. Lifecycle actions are triggered by *callouts* in the service definition document. See also *callouts* and *service definition document*.

Management Cycle

Core management and administrative processes within HP CSA, which are done by datacenter personnel to maintain the service lifecycle, including administration, resource management, service design, and service publication. See also *Administrator*, *Resource Manager*, *Service Designer*, and *Service Publisher*.

Operations Orchestration (OO)

See *HP Operations Orchestration (HP OO)*.

Portal

See HP CSA Portal (service catalog).

Private Cloud

A cloud infrastructure operated solely for an organization. It may be managed by the organization or a third party, and may exist at your site or another location. *National Institute of Standards and Technology, Information Technology Laboratory* <http://www.nist.gov/itl/>

Professional Services

See HP Deployment Services.

Provider Console

See HP CSA Provider Console.

Public Cloud

The cloud infrastructure made available to the general public or a large industry group and owned by an organization selling cloud services. *National Institute of Standards and Technology, Information Technology Laboratory* <http://www.nist.gov/itl/>

Resource Allocation Database

See HP CSA Resource Allocation Database.

Resource Manager

In HP CSA, a user role that includes managing and maintaining solution resources, such as infrastructure providers, datacenters, and hypervisors. See also *user roles*, *Administrator*, *Service Designer*, and *Service Publisher*.

Server Automation (SA)

See HP Server Automation (HP SA).

Service

A configuration of IT resources and software that provides a customer with a single, automated point of delivery for a complex computing task.

Service definition document

An XML document that provides details about the infrastructure that is required to realize a service offering. The Service Definition document selectively exposes elements that can be chosen during the subscription process. See also *Subscription*, *Service Designer*, and *Service Elements*.

Service Delivery Layer

An architecturally designated layer of the HP CSA solution, which represents the service lifecycle processes, including all aspects of assembling and managing automated services and binding resources to appropriate service instances. This layer contains the HP CSA Controller software, which interacts with the HP CSA Resource Allocation Database and HP Operations Orchestration (HP OO) to execute lifecycle actions by means of HP OO flows. Graphical service design also takes place in this layer within HP OO Studio. See also *lifecycle actions*, *Service Subscription Layer* and *Service Provider Layer*, and *HP Operations Orchestration (HP OO)*.

Service design

An HP Operations Orchestration (HP OO) flow that describes the elements and attributes of a service. The service design process results in a service definition document, which contains *elements* describing the service. See also *HP Operations Orchestration*, *service definition document*, and *service elements*.

Service Designer

In HP CSA, a user role that includes using HP Operations Orchestration (HP OO) to design and manage flows to be provided to the Service Publisher, and ultimately (after publication) to subscribers as service offerings. See also *HP Operations Orchestration (HP OO)*, *user roles*, *Administrator*, *Resource Manager*, and *Service Publisher*.

Service elements

Building blocks that make up a service offering, which can additionally be presented as options or choices in the service catalog. For example, a service element could specify what infrastructure is reserved and provisioned, what applications are installed, or which integrations with external systems are necessary. See also *service offering*.

Service instance

A particular instantiation of a service offering that has been ordered from the service catalog. See also *service offering* and *Service Request Catalog*.

Service offering

An HP CSA service design (created in HP Operations Orchestration) that is made available to a service catalog with additional information such as pricing, category and description.

Service Provider

An entity that provides services to other entities. In HP CSA, Service Providers can be Application Providers (such as HP Application Deployment Manager, Runtime Configuration Management Providers (such as HP Universal CMDB), Monitoring Providers (such as HP SiteScope), or Compute Providers (such as VMWare VCenter or HP Insight Orchestration).

Service Provider Layer

An architecturally designated layer of the HP CSA solution, which provides the building blocks (resources) comprising a service. These can be a combination of compute, storage, and network resources, or existing Infrastructure as a Service (IaaS) provided by HP resources (such as BladeSystem Matrix) or a public-facing cloud. See also *Service Subscription Layer* and *Service Delivery Layer*.

Service Publisher

In HP CSA, a user role that includes selecting flows to be published as service offerings and associated publication details (such as pricing, service description, and service image). The output of the Service Publisher's work appears in the HP CSA Portal (service catalog). See also *HP CSA Portal*, *user roles*, *Administrator*, *Resource Manager*, and *Service Designer*.

Service Subscriber

In HP CSA, an end-user or IT customer who subscribes or cancels a subscription using the HP CSA Portal. See also *HP CSA Portal*.

Service Subscriber Layer

An architecturally designated layer of the HP CSA solution, which represents an entry point into the system for end-users and administrators, including all aspects of capturing and meeting customer demand for cloud subscription services. See also *Service Delivery Layer* and *Service Provider Layer*.

Service Request Catalog

See HP CSA Portal (service catalog).

SiteScope

See HP SiteScope.

Subscription

An agreement to provide a service or a product to consumers using HP CSA. The HP CSA Portal shows the services that are offered on a subscription basis. Customers can use the HP CSA Portal interface to choose an item, make a request, and confirm the details of the subscription. See also *HP CSA Portal*.

uCMDB

See HP Universal CMDB.

User roles

Designated job descriptions (or personas), which are done by datacenter personnel (as opposed to automated processing). Of these, installation/configuration is performed by the HP Professional Services Organization (PSO) in collaboration with on-site personnel.

Other user roles are assigned within the IT organization as necessary, including administration of the HP CSA solution, resource management, service design, and service publication. The end-user role (called the *subscriber*) requires subscribing or cancelling services interactively through the CSA Portal. See also *Administrator, Resource Manager, Service Designer, Service Publisher, and Service Subscriber*.