HP Cloud Service Automation for Matrix

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1 Overview

CSA for Matrix provides software to integrate specific HP products for the purpose of delivering and managing automated infrastructure services in a cloud-computing environment. CSA for Matrix delivers monitoring templates for HP SiteScope, workflows for HP Operations Orchestration (OO), and specialized integration capability for HP Server Automation (SA) with Infrastructure Orchestration (IO).

CSA for Matrix also provides an optional integration between Insight Dynamics and HP Storage Essentials. To use this integration, you must purchase HP Storage Essentials separately and install HP Storage Essentials in your environment before deploying CSA for Matrix.

CSA for Matrix integration assists with the following:

- Automated service provisioning
- End-to-end service management

This chapter provides conceptual information about the cloud-computing environment. Additionally, it describes how CSA for Matrix fits within the a cloud-computing environment by showing its interaction in various lifecycles.

Automated Service Provisioning

Design and Validate

A service is a configuration of IT resources that run a single business application; for example, a multi-tier web application. A service includes physical servers (server blades, for example) or virtual machines (VMs), each running an operating system, middleware, database, or other software. In addition, a service must include storage, such as SAN disks or local disks, and a network to provide connectivity.

Automated provisioning begins when a service architect designs a service template. The architect has access to an inventory of managed resources and to data center policies.

To create and maintain a library of service templates, the architect uses the template designer in Infrastructure Orchestration (IO). The IO Designer can be accessed from your desktop. It features a drag and drop interface, employing icons to manipulate the logical objects used to design and validate a template.

Customizing a template with work flows allows you to run specific operations before or after a provisioning operation. These workflow entries become a part of the template, as well as being available for import/export purposes.

Publish

After a service template has been successfully designed and validated, the architect publishes the template to the IO Self-Service Portal. The published template displays in the list of templates, available to all business users who have appropriate access and permissions to IO.

Templates can also be exported to .xml files, so that they can be shared across the data center, and easily transferred between server installations. Also, templates can be exported in .gif, .jpeg, or Excel file format.

Request Provisioning

Business users submit requests for service provisioning through the IO Self-Service Portal, or through the IO Operations Console (Administrators only). When IO processes a request, it executes a sequence of core and extended tasks to allocate resources. Depending on the type of user request, IO automates the following lifecycle processes:

- Instantiate (or create) a service
- Modify the service
- Remove (or de-provision) the service

End-to-End Service Management

Allocate Resources

Resource management is a key component of the CSA for Matrix automation process. When a business user requests a service, data center resources must be allocated for provisioning. The service administrator creates resource pools. The administrator then assigns business users who can use specific server pools and templates. When a business user requests a service, the administrator approves the request and the resources are automatically reserved from the defined resource pools:

- Virtual machine hosts (where VM can be hosted)
- Physical machines
- Software
    - OS images
    - Software applications (such as IIS, Exchange, Apache)
- Networks
- SAN storage resources

The administrator's tasks include managing OS and application software inventory, and creating and maintaining resource pools. Additionally, the administrator performs manual tasks associated with the lifecycle of services, such as approving provisioning requests from business users and managing access to CSA for Matrix components.

Execute Core Process

The administrator uses IO to coordinate the core provisioning process. This process has several key steps, as shown in Figure 1 on page 9.

Figure 1   Overview of Core Processes
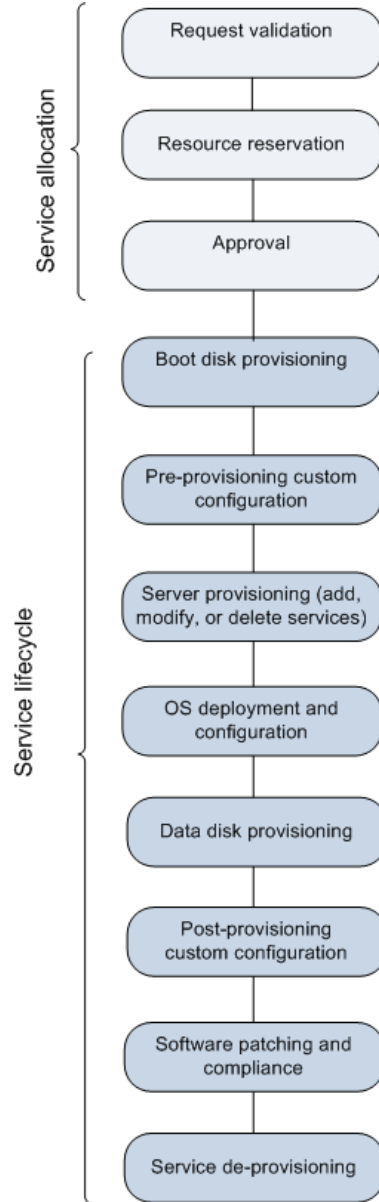
Service Allocation

Allocation includes automatically reserving and appropriating resources. Logical objects in the service template are matched against available resources from assigned server pools, storage pools, network inventory, and software inventory. Reservations become allocations.

1   Request validation: IO validates the resources are present that match the template selected for service provisioning initiated by a CSA for Matrix business user.

2   Resource reservation: IO matches logical objects against available resources. If storage resources are not available, the service request pauses and the IO administrator is notified. If other resources are not available, the reservation fails.

3   Approval: Approvals are required for all requests submitted by IO Self-Service Portal users. If an IO administrator creates the service, the processing goes forward automatically.

Service Lifecycle

Provisioning includes any task that performs configuration of physical or virtual resources, or deployment and configuration of software resources. In terms of time consumed and number of overall tasks, provisioning is the major part of the core processing.

1   Boot disk provisioning is done using SAN, local disk, or virtual disk (VM). For SAN storage, IO reserves storage for system start-up. For automated, out-of-the-box storage provisioning, CSA for Matrix supports the HP EVA storage array and direct-attached storage.

    CSA for Matrix supports the "Dynamic" SAN volume automation feature with EVA.

    The optional integration with HP Storage Essentials also enables you to use the "Dynamic" SAN volume automation feature with the HP EVA, HP XP, EMC CLARiiON, and HDS storage arrays. For this integration to work, you must purchase and install HP Storage Essentials separately and use Insight Dynamics 6.3 (or 6.3 Update 1). This integration doesn't work with Matrix OE 7.0.

    For more information, see the *Support Matrix for HP Cloud Service Automation for Matrix*.

2   Pre-provisioning custom configuration: The core provisioning process provides an egress point to initiate additional, customized task flows. These task flows include any tasks you want to perform as part of core processing before any provisioning is started.

3   Server provisioning: HP IO communicates with HP SA to register the server, so that provisioning can begin.

4   Operating system (OS) deployment and configuration: HP IO communicates with HP SA to deploy and configure the operating system of the allocated physical or virtual servers.

5   Data disk provisioning: IO reserves storage for data. CSA for Matrix supports the HP EVA storage array for automated, out-of-the-box storage provisioning and local disk provisioning.

    CSA for Matrix supports the "Dynamic" SAN volume automation feature with EVA.

    The optional integration with HP Storage Essentials also enables you to use the "Dynamic" SAN volume automation feature with the HP XP, EMC CLARiiON, and HDS storage arrays. For this integration to work, you must purchase and install HP Storage Essentials separately (This integration doesn't work with Matrix OE 7.0).

    For more information, see the *Support Matrix for HP Cloud Service Automation for Matrix*.

6   Post-provisioning custom configuration: The core provisioning process provides an egress point to initiate final processing of HP OO flows; these include any tasks you want to perform after provisioning is complete.

7   Software, patch, and audit compliance: HP SA operates in its normal capacity to provide patching and compliance functionality on the provisioned servers.

8   Service de-provisioning: IO communicates with HP Server Automation (SA) to de-provision allocated resources. Servers will be removed from HP SA.

Support for Different Types of IT Infrastructure

Servers

The CSA for Matrix solution provides out-of-the-box support for HP BladeSystem c-Class servers using HP Virtual Connect technology. CSA for Matrix also supports provisioning for hardware that is **not** enabled through HP Virtual Connect by using embedded HP Operations Orchestration (HP OO) workflows.

CSA for Matrix includes a reference implementation of the HP OO work flows required to provision non-Virtual Connect HP hardware. This reference implementation may be used with specific ProLiant rack mount servers.

▶   Support from HP for utilizing the reference implementation HP OO work flows on non-HP hardware is neither expressed nor implied.

CSA for Matrix supports virtual server provisioning using hypervisors from Microsoft and VMWare.
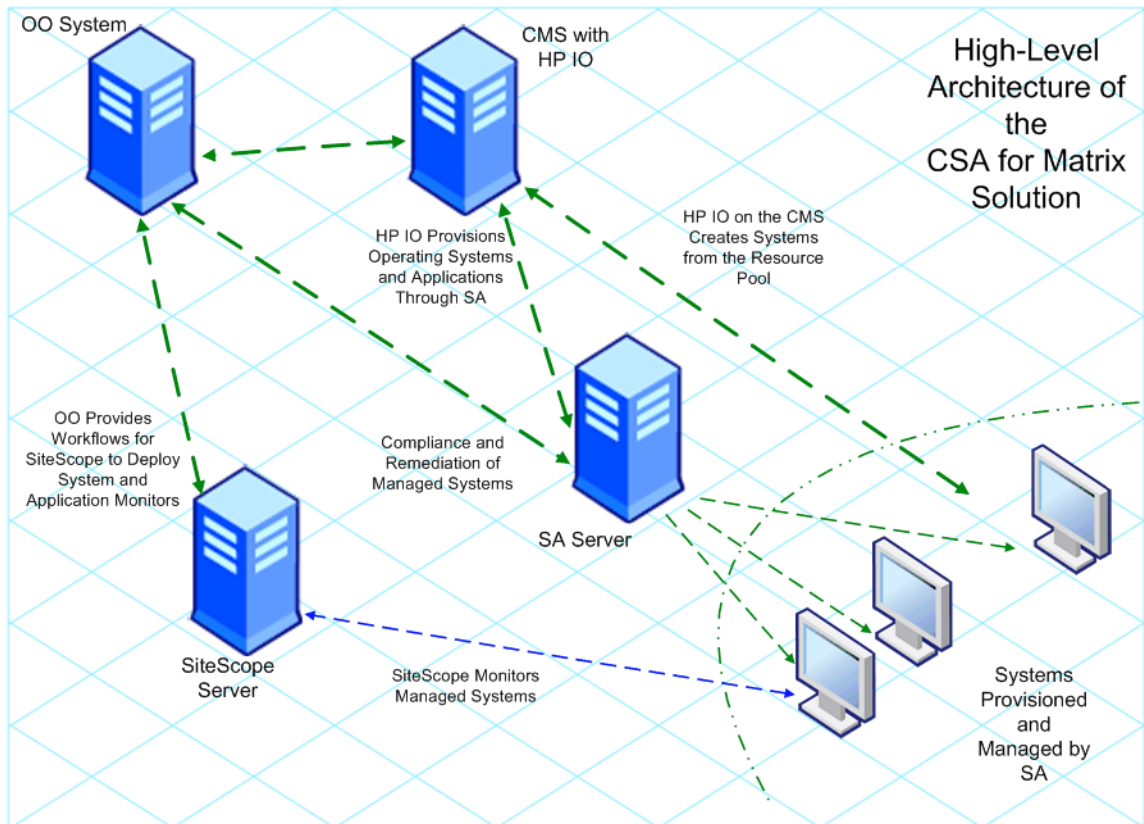
Storage Arrays

CSA for Matrix provides out-of-the-box support for the HP EVA storage solution. In addition, you can use the "Dynamic" SAN volume automation feature for the following SAN arrays: HP EVA, HP XP, EMC CLARiiON, and HDS. This feature is available only if you choose to use HP Storage Essentials with the optional integration workflows for HP Storage Essentials. You must purchase HP Storage Essentials separately (This integration doesn't work with Matrix OE 7.0).

2 Components of the CSA for Matrix Solution

The CSA for Matrix solution is primarily built with the following software products:

- **HP Insight Dynamics:** HP Insight Dynamics enables you to automate the task of system provisioning from a resource pool.

- **HP Server Automation:** The CSA for Matrix solution uses HP Server Automation in conjunction with HP Insight Dynamics to provision operating systems and applications on target systems that are created from the shared resource pool.

- **HP SiteScope:** HP SiteScope provides the agentless monitoring framework to monitor health and performance of target systems, applications running on target systems, and the CSA for Matrix infrastructure.

- **HP Operation Orchestration:** HP Operation Orchestration provides you with definitions in the form of workflows to complete the procedure of deploying additional software in the environment.

- **HP Storage Essentials (Optional):** You can use the optional integration of CSA for Matrix with HP Storage Essentials to dynamically provision storage arrays. To use this feature, you must separately purchase HP Storage Essentials. This feature is not available if you use Matrix OE 7.0.

Figure 1   High-Level Architecture

OO System

CMS with
HP IO

High-Level
Architecture of
the
CSA for Matrix
Solution

HP IO Provisions
Operating Systems
and Applications
Through SA

HP IO on the CMS
Creates Systems
from the Resource
Pool

OO Provides
Workflows for
SiteScope to Deploy
System and
Application Monitors

Compliance and
Remediation of
Managed Systems

SA Server

SiteScope
Server

SiteScope Monitors
Managed Systems

Systems
Provisioned
and
Managed by
SA

3 Using CSA for Matrix

The architect creates service templates that describe commonly requested services. Each template is based on one type of available network resource as defined by the network administrator. A business user then selects a template in the self-service portal and customizes the template to request service provisioning.

Designing Service Templates

A service template defines one type of service that a business user can request. Each template contains the information necessary to provision that service. Create a unique service template for each supported server type.

For an overview of the operations that you can include in a service template, see "Infrastructure Orchestration provisioning and allocation" in the *IO User Guide*.

The network architect uses the IO Designer for the following tasks:

- Create, test, and publish a service template.
- Maintain a service template.
- Delete a service template.

For an overview of the IO Designer, see the Designer help.

Managing Resources and Services

The network administrator uses the IO console for the following tasks:

- View the status, progress, and details of completed and in-process service provisioning requests.
- Approve or reject service provisioning requests.
- View available resources.
- Manage resource pools.
- Manage Self-Service portal users.

For an overview of the console, see the Console help.

Requesting Services

The business user uses the IO Self-Service portal for the following tasks:

- Request that a service be provisioned.

- Monitor the progress of the service provisioning.

- Delete a service that is no longer needed but has not yet expired.

- Request a change in the lease duration of a service (add more time, request less time, or request suspension).

For an overview of the Self-Service portal, see the Portal help.