HP Cloud Service Automation for Matrix

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Integration Guide

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Contents

Introduction to HP Cloud Service Automation for Matrix

This section contains the following chapters:

CSA for Matrix Installation Overview

This guide provides high-level information on the HP cloud computing environment, how and where HP Cloud Service Automation for Matrix (CSA for Matrix) fits within that environment as a product, high-level information on the processes involved in setting up an integrated environment, and specific information on installing and configuring CSA for Matrix within that environment.

Successful implementation of CSA for Matrix requires knowledge of the component products, as well as the CSA for Matrix solution. Information in this guide augments information provided in the component product documentation, but is not intended to replace that documentation.

Figure 1 identifies the high-level processes required to set up an integrated cloud environment. This figure provides the context for the primary integration processes listed in the CSA for Matrix Software column as shown in Table 1.

Figure 1 High-Level Process Groups and Processes

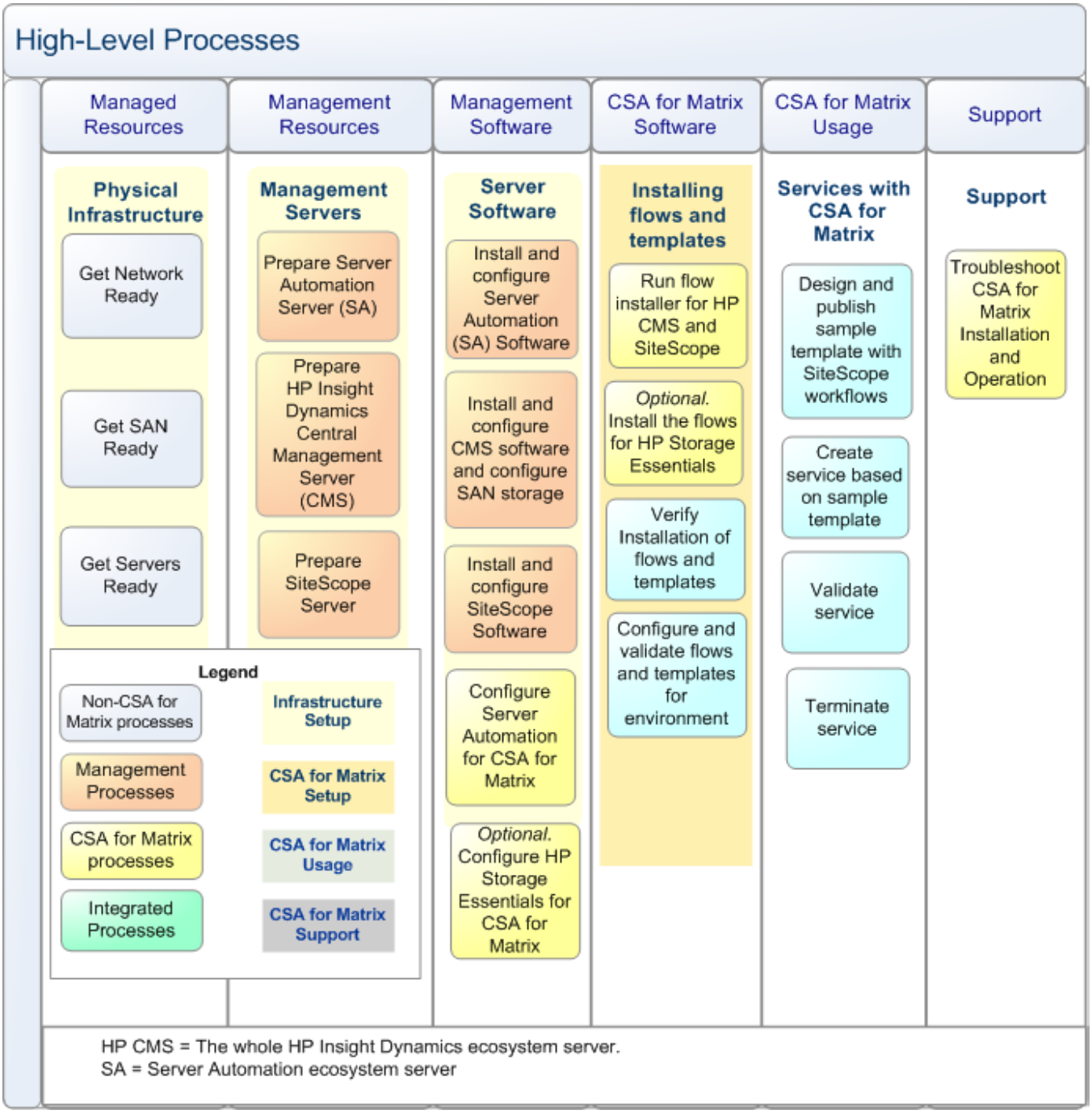


Table 1 High-Level Process Groups for Creating a Cloud Environment with CSA for Matrix

Process Group	Description
Prepare managed resources	Prepare the network, SAN, and server infrastructures for CSA for Matrix installation.
Prepare management resources	Set up the HP Insight Dynamics CMS, SiteScope server, Server Automation server, (optional) HP Storage Essentials infrastructure.
Install and configure management software	Install, configure, and integrate the HP Insight Dynamics CMS software, SiteScope software, Server Automation software. CSA for Matrix includes optional content to integrate Insight Dynamics with HP Storage Essentials to access a variety of non-Virtual Connect-enabled SAN arrays. For this integration to work, you must purchase and install HP Storage Essentials separately.
Install and configure CSA for Matrix flows and templates	Install and configure the CSA for Matrix software flows.
Use CSA for Matrix software	Use the CSA for Matrix product templates to create services.
Support CSA for Matrix	Support the CSA for Matrix product lifecycle and the CSA service lifecycle.

Required Information Before Installation

Before installing CSA for Matrix, refer to the information in Table 2.

Table 2 Required Documentation

Product	Required for Installation?	Go to...
CSA for Matrix	yes	**Release Notes**: **http://support.openview.hp.com/selfsolve/manuals**
	yes	**Support matrix**: **http://support.openview.hp.com/selfsolve/manuals**
	yes	**Manuals**: **http://support.openview.hp.com/selfsolve/manuals** NOTES: • *HP Cloud Service Automation for Matrix Integration Guide* provides documentation for installation and configuration. • *HP Cloud Service Automation for Matrix Troubleshooting Guide* provides documentation for troubleshooting installation and end use.

Table 2 Required Documentation

Product	Required for Installation?	Go to...
HP Server Automation, 9.02 or 9.03	yes	**Support matrix: http://support.openview.hp.com/selfsolve/manuals** NOTE: Search on Server Automation; select Version 9.02 or 9.03 along with the target operating system.
	yes	**Manuals**: **http://support.openview.hp.com/selfsolve/manuals** NOTES: • *User Guide: Application Automation* • *Planning and Installation Guide*
HP Insight Software, 6.1 Update 1 or 6.2 Update 1	yes	**Support Matrix**: **http://www.hp.com/go/insightsoftware/docs** • CSA for Matrix supports the detail associated with Insight Dynamics, which is further constrained by any requirements noted for Insight Orchestration 6.1 Update 1 or 6.2 Update 1. • CSA for Matrix requires the support packs listed in the support matrix.
	yes	**Manuals**: **http://h18013.www1.hp.com/products/servers/management/hpsim/techsupport.html** NOTE: Select **Installation and technical documentation**. • *HP Insight Software Installation and Configuration Guide* provides documentation for the installation of Insight Orchestration. • For end-use information, refer to the *HP Insight Orchestration User Guide*.
	yes	**White papers**: **http://www.hp.com/go/insightsoftware/docs** Select Insight Dynamics tab; then select • *Insight Dynamics—Automated Storage Provisioning: Static SAN volume automation via multi-initiator NPIV* for information on static SAN. • *Server and Storage Workflows for HP Insight Dynamics* for information on using workflows with logical servers.
HP Software SiteScope, 11.00 or 11.01	yes	**Support matrix**: **http://support.openview.hp.com/sc/support_matrices.jsp** NOTE: Check Support matrices short-cuts to find HP SiteScope. Make sure you select version 11.00 or 11.01.
	no	**Manuals**: **http://support.openview.hp.com/selfsolve/manuals**

Additional Details

If you want to use CSA for Matrix to integrate Insight Dynamics with HP Storage Essentials, you must purchase HP Storage Essentials separately, and install and configure HP Storage Essentials with the help of the following documents:

- **Support matrix**

  Available here:

  http://support.openview.hp.com/sc/support_matrices.jsp

- **Release notes**

  Available here:

  http://support.openview.hp.com/selfsolve/manuals

- **Manuals**

  Available here:

  http://support.openview.hp.com/selfsolve/manuals

What is CSA for Matrix?

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, work flows for HP Operations Orchestration (HP OO), and specialized integration capability for HP Server Automation (HP SA), HP Insight Orchestration (HP 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

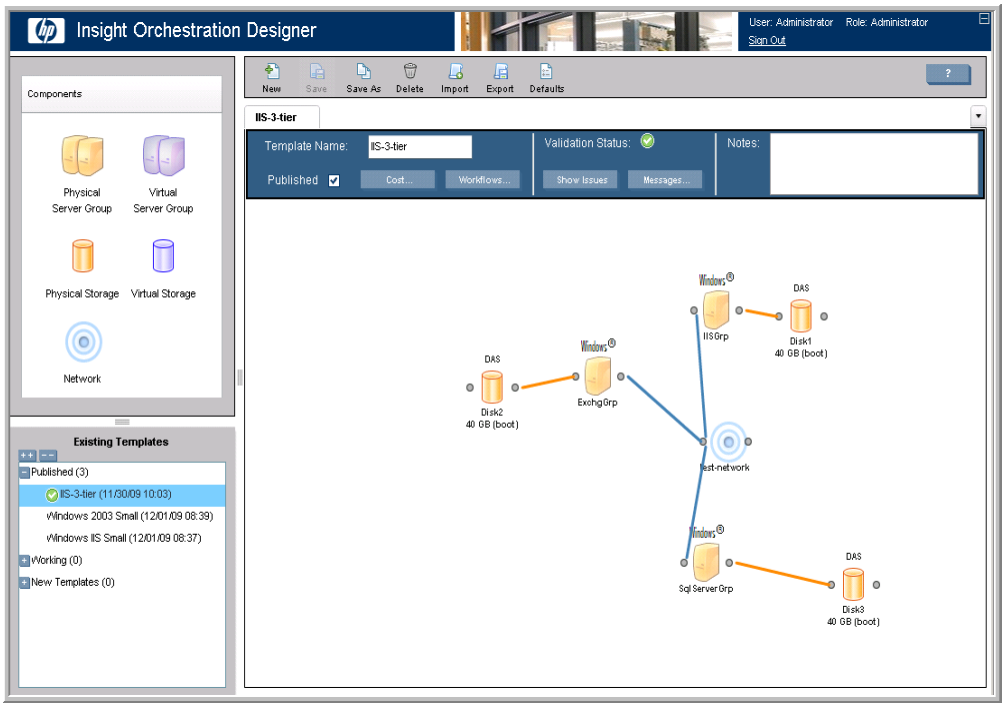
Design and Validate

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 HP Software Insight Orchestration (HP IO). The HP 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.

Figure 2 The HP IO Designer

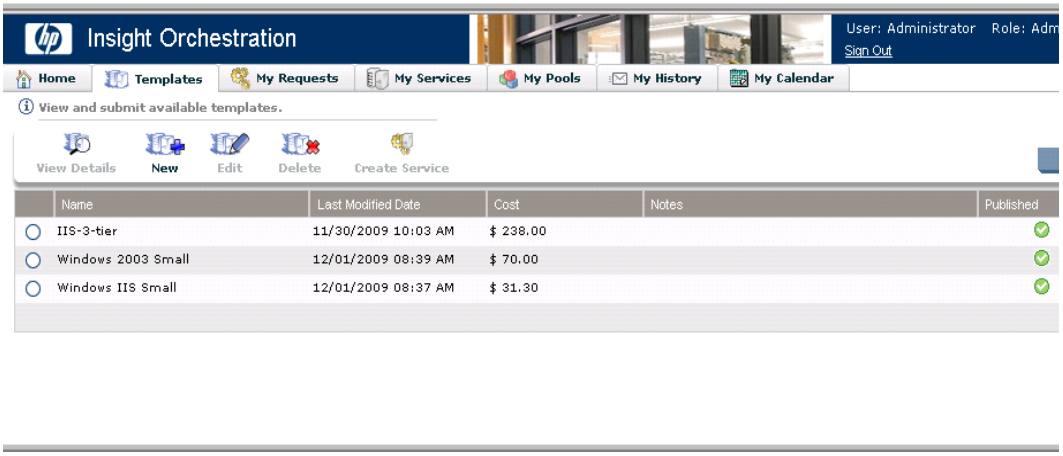


Customizing a template with work flows allows you to run specific operations before or after a provisioning operation. These workflow entries become a part of the template, as well as being available for import/export purposes.

Publish

After a service template has been successfully designed and validated, the architect publishes the template to the HP 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 HP IO.

Figure 3 The HP IO Self-Service Portal



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

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

For more information about automated provisioning, see the following:

- Using HP Cloud Service Automation for Matrix, Designing Service Templates on page 99
- Managing Resources and Services on page 99
- Requesting Services on page 99

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)

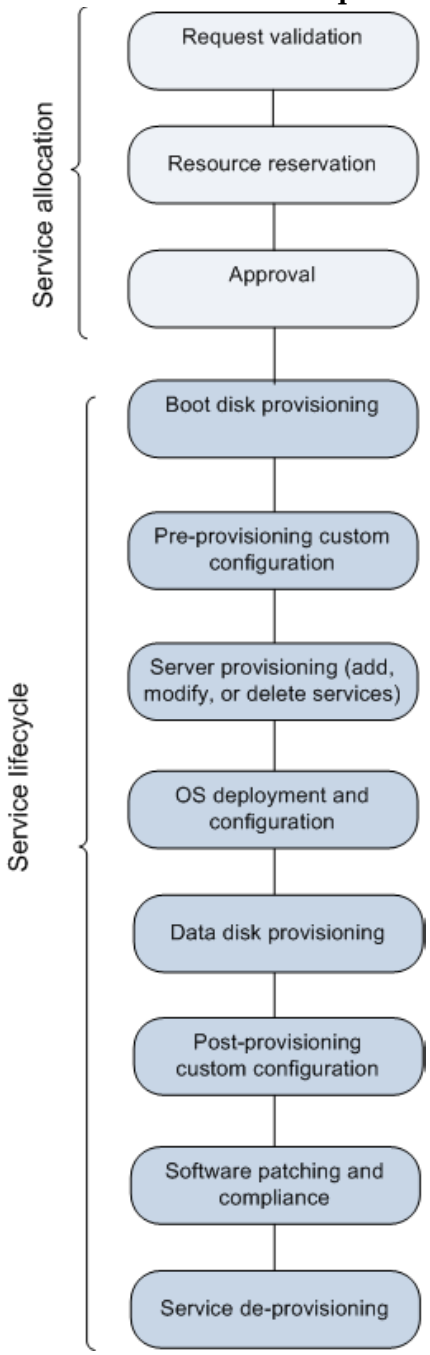
- Physical machines
- Software
  - OS images
  - Software applications (such as IIS, Exchange, Apache)
- Networks
- SAN storage resources

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 HP IO to coordinate the core provisioning process. This process has several key steps, as shown in Figure 4.

Figure 4 Create Infrastructure Service Request — Core Process



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: HP 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: HP 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 HP 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, HP 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—by utilizing Insight Dynamics 6.2 Update 1—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.

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: HP 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—by utilizing Insight Dynamics 6.2 Update 1—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.

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 patching and compliance: HP SA operates in its normal capacity to provide patching and compliance functionality on the provisioned servers.

8 Service de-provisioning: HP 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

Physical 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.

Virtual servers

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 Insight Dynamics (6.2 Update 1) and HP Storage Essentials with the optional integration workflows for HP Storage Essentials. You must purchase HP Storage Essentials separately.

CSA for Matrix Lifecycles

CSA for Matrix automates infrastructure setup, maintenance, and end-of-life processes. This guide focuses primarily on the CSA for Matrix product lifecycle that includes requirements, installation, and use. Table 3 provides more information about each step.

Table 3 Process Lifecycle Steps

Business Process	Description	For more information
Gathering and Analyzing Requirements	Collection of IT management system requirements	Business-specific projections and policies.
Installing CSA for Matrix	Installation and configuration tasks	See Figure 5
Using CSA for Matrix	Template design and core provisioning	See Figure 6.
Troubleshooting CSA for Matrix	Support and upgrade tasks	

- The Preparing Managed Resources and Preparing Management Servers chapters focus on requirements gathering, analysis and design, and deployment of the component products that are prerequisites for the deployment of CSA for Matrix.

- The Installing and Configuring Management Server Software and Installing and Configuring CSA for Matrix Flows and Templates chapters focus on the deployment of CSA for Matrix. These chapters form the core of the integration guide.
- The Using HP Cloud Service Automation for Matrix corresponds to the end use of CSA for Matrix. This chapter contains references to the HP IO and HP OO products. Once integrated, the CSA for Matrix product is presented to the end user through those products.

Figure 5 shows which process groups from Figure 1 show the CSA installation, configure, and validate processes. Table 4 provides more information about each step.

Figure 5 Installation Processes

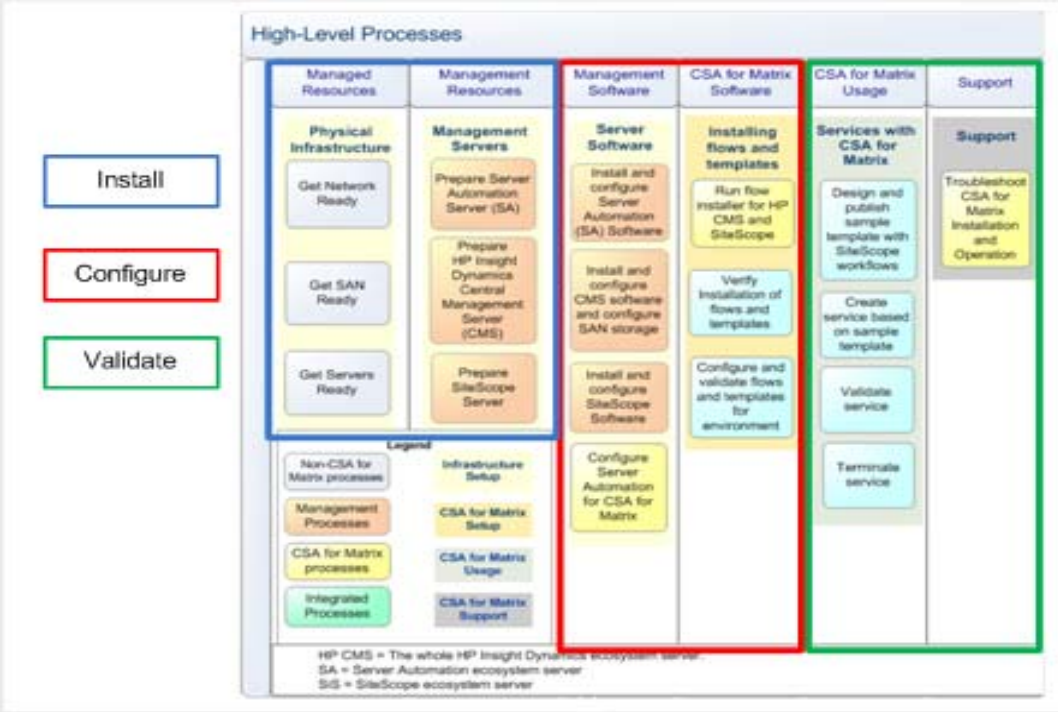


Table 4 Installation Process within CSA for Matrix Product Lifecycles

Business Process	Description	For more information
Install	Prepare and build the system according to the design	See Preparing CSA for Matrix on page 27 and Install and Configure CSA for Matrix on page 41. Documentation for sub-products is listed in the Required Information Before Installation on page 13.
Configure	Configure hardware and software. Systematically integrate the components.	See Preparing CSA for Matrix on page 27 and Install and Configure CSA for Matrix on page 41. Documentation for sub-products is listed in the Required Information Before Installation on page 13.
Validate	Evaluate and adjust the system as components are integrated.	Validate throughout the installation process.

Figure 6 shows a CSA for Matrix automation process overview. Table 5 provides more information about each step.

Figure 6 An Overview of the CSA for Matrix Automation Process

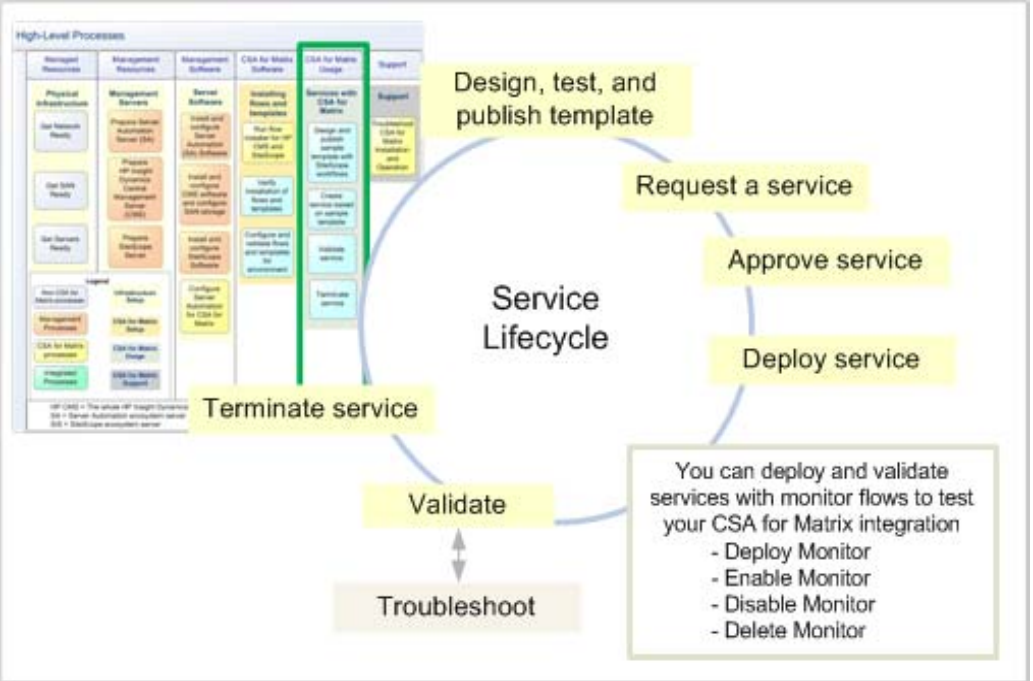


Table 5 Process Automation Steps

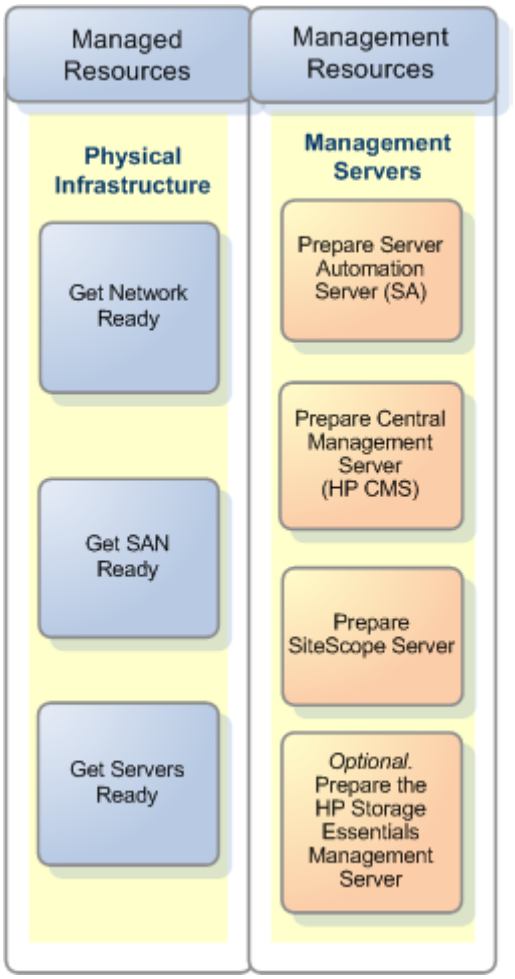
Description	Component	For more information...
The architect designs and tests service templates; then publishes them to the list of templates on IO Portal. Using the list of available templates, the business user requests that a service be created, modified, or removed. The service administrator receives and approves the request from the business user.	HP Insight Orchestration	Refer to Table 2 on page 13 for a list of related documentation.
CSA for Matrix workflows and templates integrated with HP SA, HP Insight Orchestration, embedded HP OO and HP SiteScope perform the automated service creation.	CSA for Matrix, HP Server Automation, HP Insight Orchestration, HP OO, HP SiteScope	
Troubleshooting	CSA for Matrix, HP Server Automation, HP Insight Orchestration, HP OO, HP SiteScope	
The service terminates.	CSA for Matrix, HP Server Automation, HP Insight Orchestration, HP SiteScope	

Preparing CSA for Matrix

This section contains the following chapters:

- Preparing Managed Resources
- Preparing Management Servers

Figure 7 Preparing Resources Focuses on Managed and Management Resources



The primary audience for this section is the deployment consultant responsible for setting up the network infrastructure.

Most of the documentation needed for this phase of integrating CSA for Matrix is contained in documents for products that integrate with CSA for Matrix—both HP products and vendor products. The high-level description in this section provides context.

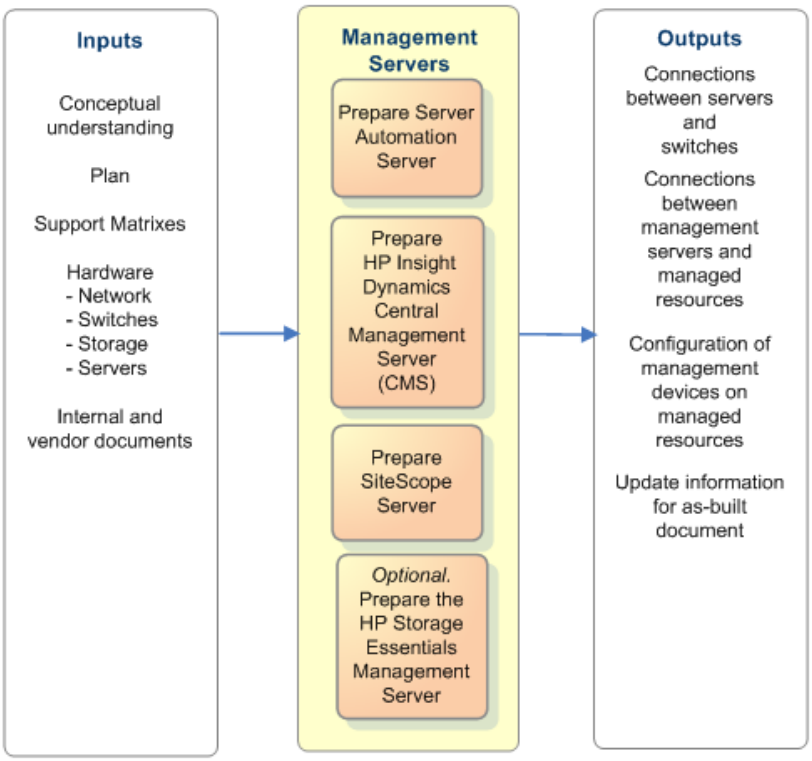
Preparing Managed Resources

In some installations, an installer might install a hardware component, install its software, and then move to the next component. Alternatively, in an enterprise system where there is a large team, hardware might be installed by one person or group and configured by another.

The sections that follow are modularized so they can be used sequentially or in parallel. Information here is presented at a high level, including processes beyond the basic CSA installation, which provide a conceptual context.

This chapter contains the following sections:

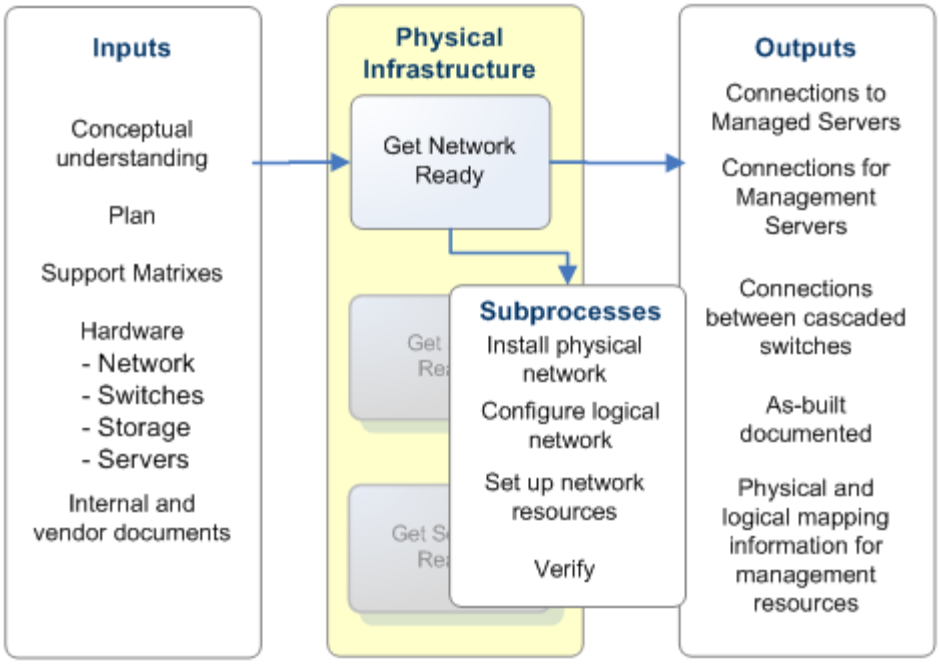
Figure 8 Preparing Managed Resources



Getting the Network Ready

Getting the network ready is a prerequisite for installing and configuring CSA for Matrix, and involves installing the necessary hardware and software, and creating the connections (physical or logical) between switches and managed devices. Detailed instructions are out of scope for this document.

Figure 9 Getting the Network Ready



Set Up the Network Environment

Physical setup of the network involves installing physical components, configuring the logical network, and documenting and verifying connections.

1. Plug in cables and switches.
2. Set up VLANs.
3. Record physical connections.
4. Verify connections and VLANs.

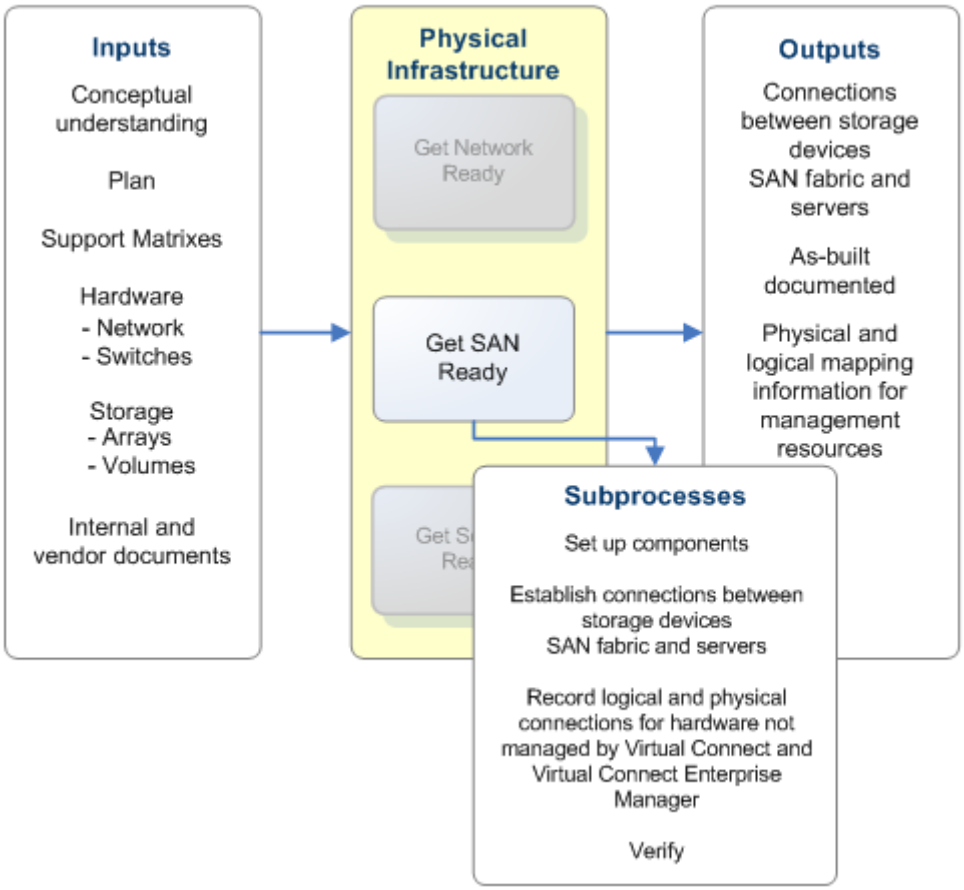
Several additional steps are completed when the HP Insight Dynamics CMS and HP SA server software are set up:

- DNS requires both forward and reverse lookup. Any static IP address used by any device in the environment should have an entry, including the management point for storage arrays.
- Provisioning requires
  - DHCP
  - PXE
  - NFX/CIFS/SMB

Getting the SAN Ready

SAN preparation, if a SAN is used, involves installing hardware and creating the physical connections between switches, storage arrays, and volumes. Detail here is at a high-level.

Figure 10 Getting the SAN Ready



CSA SAN Prerequisites

Enterprise Virtual Array (EVA) is required for physical SAN support. In addition, you can use the “Dynamic” SAN volume automation feature for the HP EVA, HP XP, EMC CLARiiON, and HDS SAN arrays if you choose to use the optional integration between HP IO and HP Storage Essentials available with CSA for Matrix.

Supported SAN Arrays

You can use the “Dynamic” SAN volume automation feature for the HP EVA arrays if you use Insight Dynamics 6.2 (Update 1).

If integrated with Storage Essentials by using the supplied optional integration, the CSA for Matrix solution supports the “Dynamic” SAN volume automation for the following SAN arrays:

- HP XP arrays

- HP EVA
- EMC-CLARiiON
- HDS

If you use EMC-CLARiiON, make sure the following requirements are met:

- An initiator port must be registered with the CLARiiON storage system before you use the initiator port while creating the Storage Pool Entry (SPE).
- If a server has multiple initiator ports, each initiator port must be registered with the CLARiiON storage system with a unique IP address. If multiple initiator ports are registered with the same IP address, the Selective Storage Presentation or creation of SPE will fail.

Set Up the SAN Environment

Logical connections can be discovered after management software has been installed, if you are using Virtual Connect (VC). Some configuration of VSANs, zones, and switch fabrics may be required at this stage. The storage management interface needs to be ready during the discovery setup of configuration and before the first OS provision. The following steps are a high-level summary; component documentation should be used for specific instructions.

1. Set up SAN components.
   a. Set up EVA for physical SAN support.

      If you want to use the "Dynamic" SAN volume automation feature, set up the SAN arrays of your choice (HP EVA, HP XP, EMC CLARiiON, or HDS).

   b. Set up SAN switches (such as Brocade, Cisco, or Mcdata).
2. Set up VC-enabled components (optional).
   a. Set up blade servers.
   b. Set up HBAs.
   c. Set up switches.
3. Configure VSANs, zones, and switch fabrics, as needed.
4. Record physical and logical connections that cannot be discovered by VC and Virtual Connect Enterprise Manager (VCEM).

Virtual Connect when used with VCEM, allows administrators to discover and manage server connections from a console. When using hardware that is non-VC-enabled, physical and logical connections must be manually recorded in the `ServerInfo.xml` file.

5. Verify.

CSA for Matrix uses the following approaches:

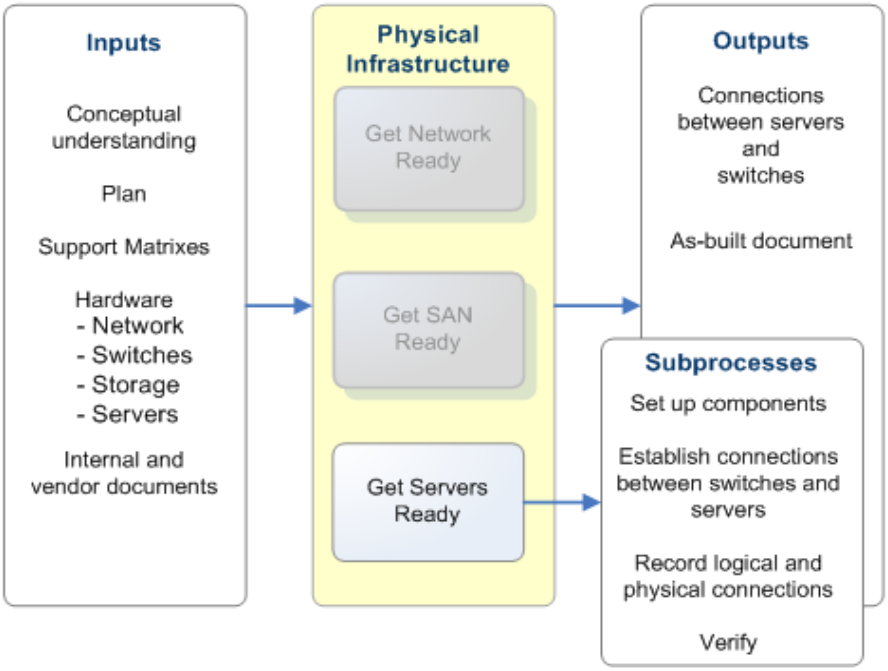
- Insight Dynamics Static SAN approach; for more information about this configuration see the white paper: *Insight Dynamics —Automated Storage Provisioning: Static SAN volume automation via multi-initiator NPIV* at **http://h18004.www1.hp.com/products/solutions/insightdynamics/info-library.html**.
- "Dynamic" SAN volume automation approach; for more information about this feature, see the *HP Insight Orchestration 6.2 User Guide*.

Getting the Servers Ready

Getting the servers ready is a prerequisite for installing and configuring CSA for Matrix. Detail here is at a high-level with links to resources for accomplishing the tasks.

Getting the servers ready involves installing the hardware and creating the physical connections between the servers and the switches.

Figure 11 Getting the Servers Ready



CSA Server Prerequisites

CSA for Matrix operates on VC-enabled blade servers, ProLiant servers, and virtual machine (VM) hosts on ProLiant servers.

Set Up Servers

The following steps are a high-level summary; component documentation should be used for specific instructions.

1. Set up server components.
2. Establish connections between servers and switches.
3. Record logical and physical connections.
4. Verify.

Preparing Management Servers

This chapter provides links to information on preparing the management-server hardware infrastructure. This chapter contains the following sections:

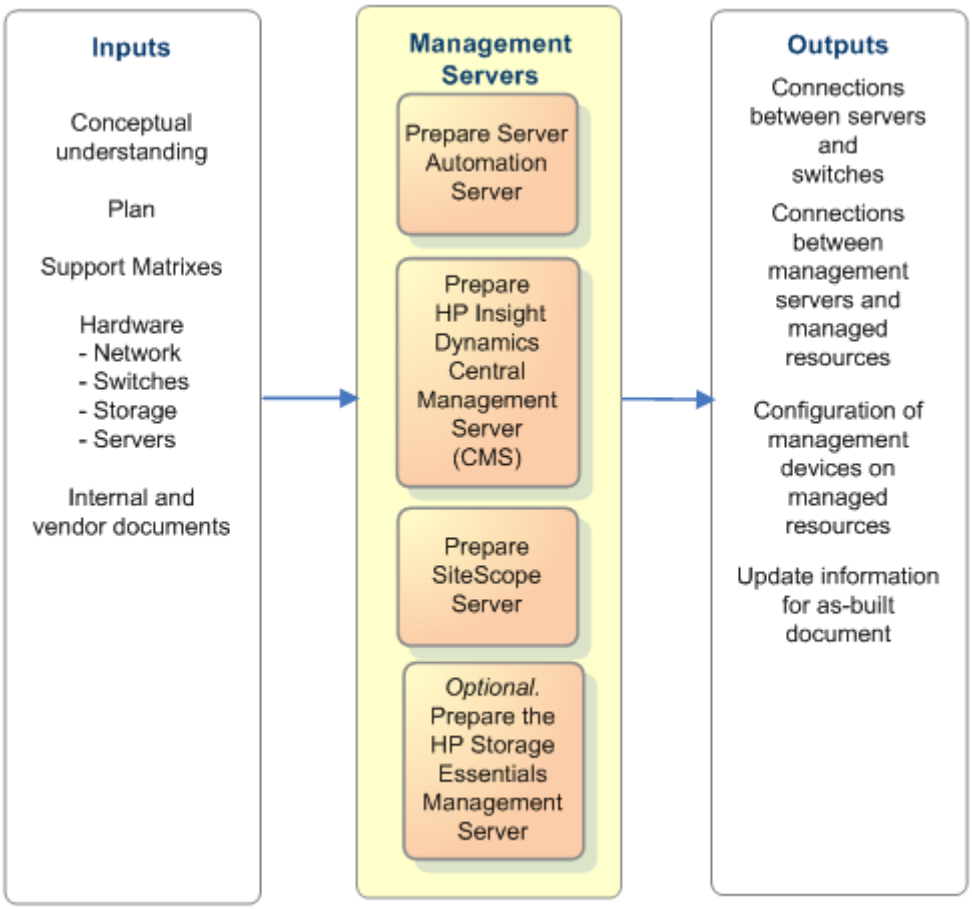
Preparation Overview

The CSA for Matrix configuration consists of the following servers:

- HP Server Automation (HP SA) running on one or more servers (in a single Core or Satellite installation).
- HP Insight Dynamics Central Management Server, which includes HP Systems Insight Manager (HP SIM) running on one server that hosts HP Insight Orchestration (HP IO) and its embedded version of HP OO.
- HP SiteScope running on one server.

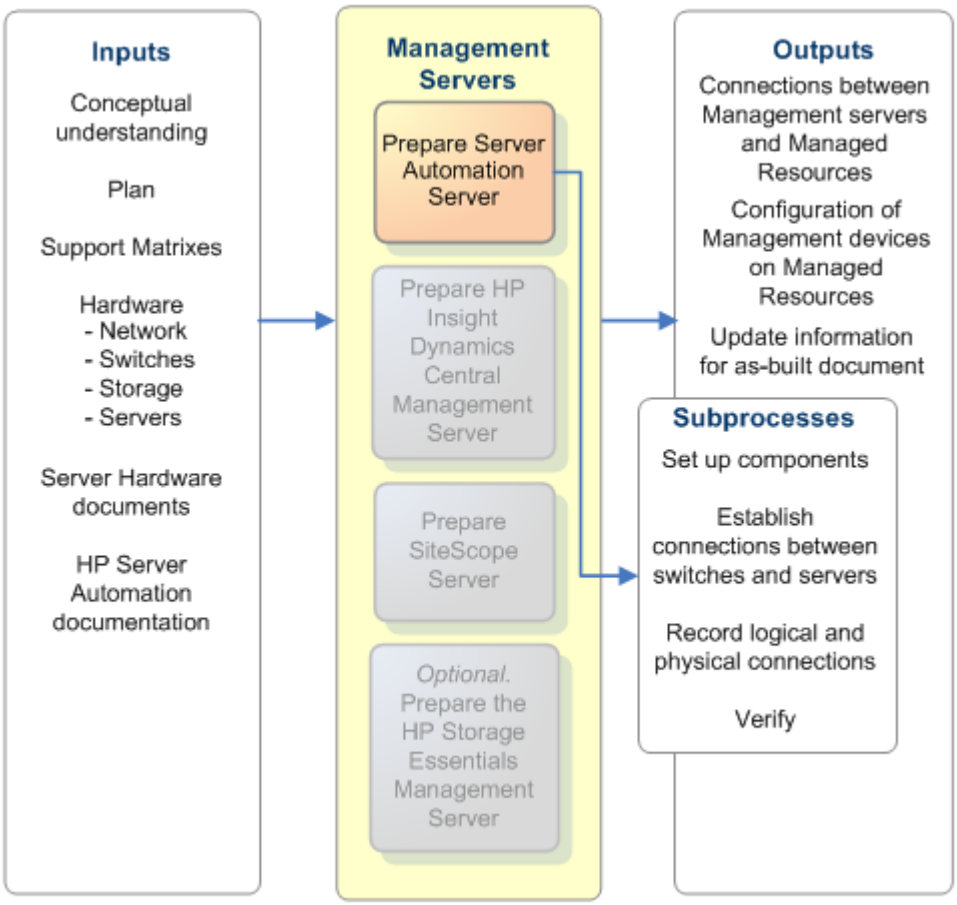
You can set up the hardware and connections for these servers in any order and concurrently. However, HP SA software should be installed before HP IO software if this is a new installation. You must install and configure all of the servers before configuring the CSA for Matrix flows and templates.

Figure 12 Preparing Management Resources



Preparing the HP Server Automation Server

Figure 13 Preparing the SA Server



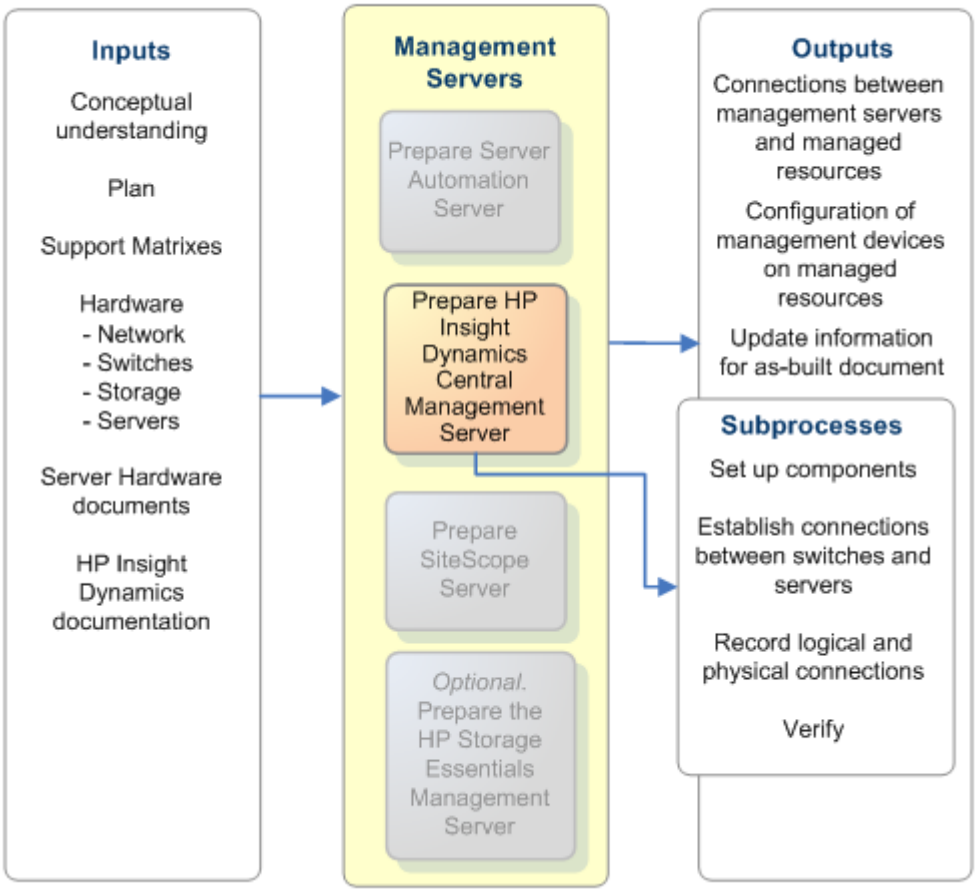
HP SA Server Prerequisites

Minimum Hardware Requirements

Information on how to determine the minimum configuration to match your target environment can be found in the *Server Automation Planning and Installation Guide*. See Required Information Before Installation on page 13.

Preparing the HP Insight Dynamics CMS Server

Figure 14 Preparing the HP Insight Dynamics CMS Server



HP Insight Dynamics CMS Server Prerequisites

Hardware Requirements

Memory: 32 bit OS 8 GB minimum, 12 GB preferred
for 64 bit OS 16 GB minimum

Storage: 30 GB minimum, 60 GB preferred

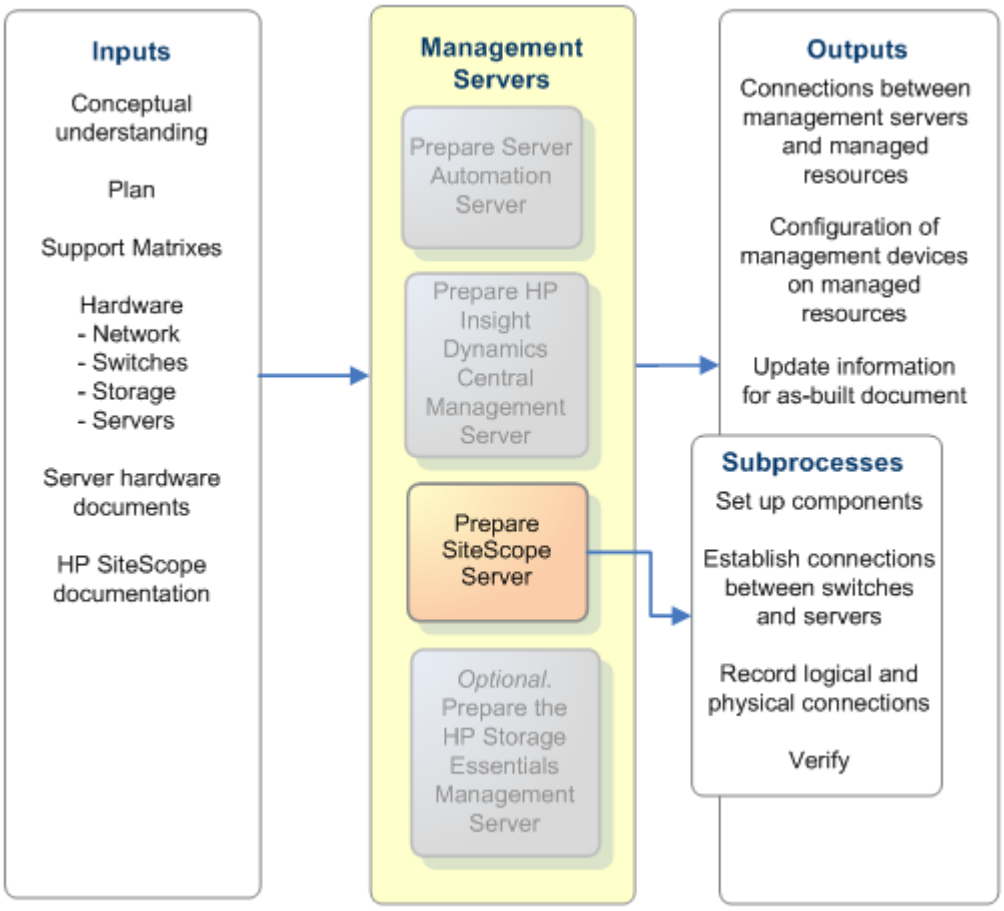
Processors: 1 minimum, 4 preferred

Confirm minimum requirements using the detailed instructions for building the HP Insight Dynamics CMS environment in the *HP Insight Orchestration User Guide*. See Required Information Before Installation on page 13.

These requirements are verified when the software is configured.

Preparing the HP SiteScope Server

Figure 15 Preparing the SiteScope Server



HP SiteScope Server Prerequisites

It is recommended that only the Windows version of SiteScope be used, if you are planning to monitor servers running Windows. The Linux version does not support the monitoring of servers running Windows, except in the limited (non-standard) case in which SSHD is running on the Windows server. The Solaris version has not been tested with CSA for Matrix. See Required Information Before Installation on page 13.

Hardware Requirements

Memory: 1 GB minimum, 2 GB preferred

Storage: 20 GB minimum, 30 GB preferred

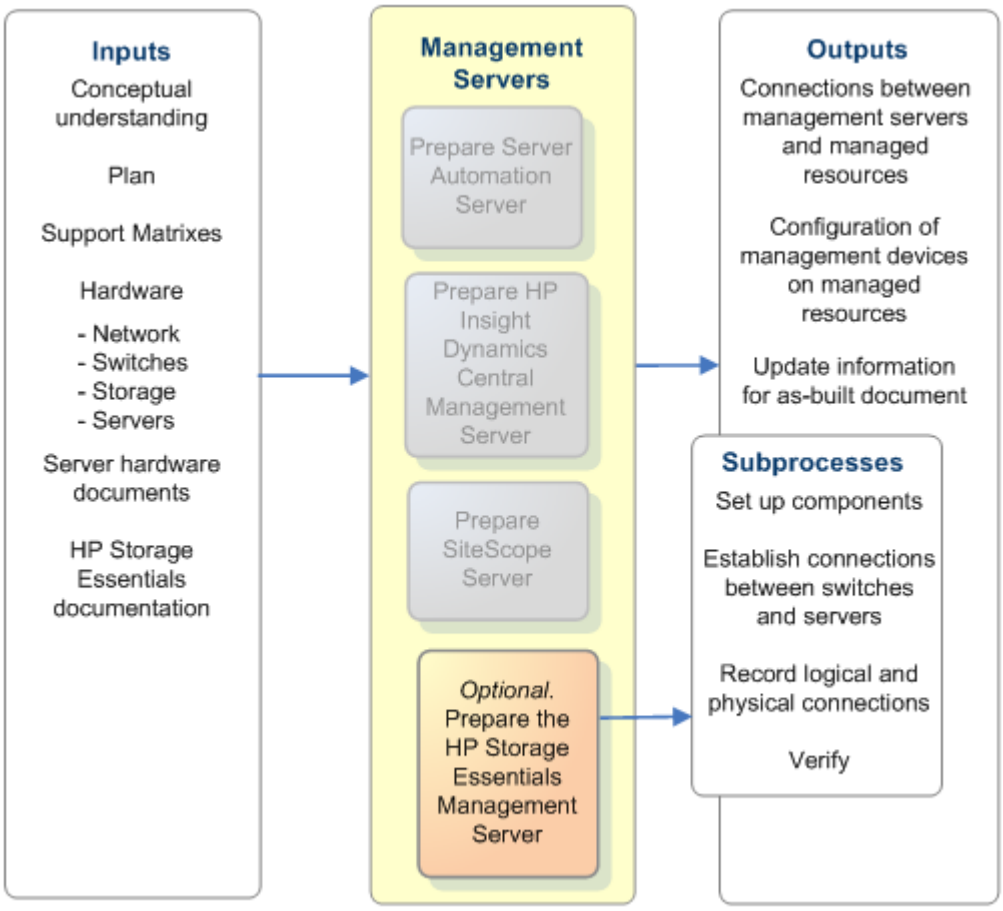
Processors: 1 minimum, 2 preferred

These requirements are verified when configuring the software.

Preparing the HP Storage Essentials Management Server

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

Figure 16 Preparing the HP Storage Essentials Management Server



HP Storage Essentials Management Server Prerequisite

Make sure you install HP Storage Essentials 6.3 in your environment. See the *HP Storage Essentials Release Notes* and *HP Storage Essentials Installation Guide* while setting up the HP Storage Essentials environment.

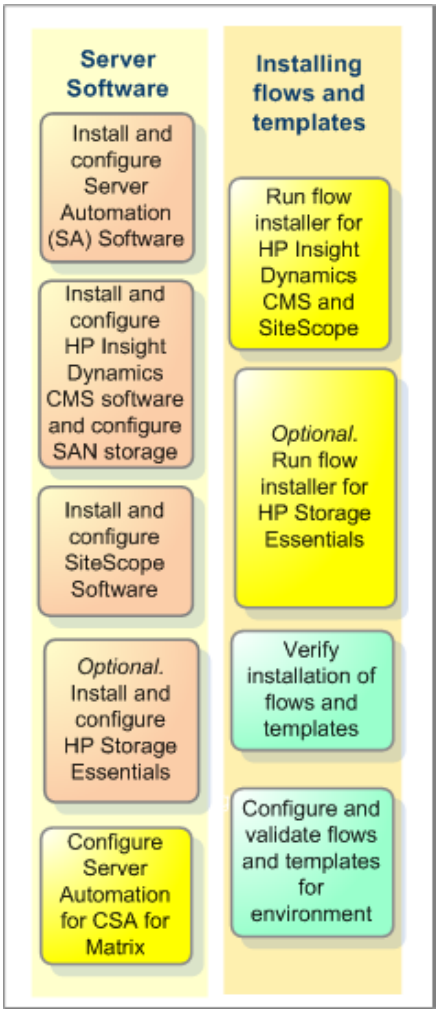
Install and Configure CSA for Matrix

This section contains the following chapters:

- Installing and Configuring Management Server Software
- Installing and Configuring CSA for Matrix Flows and Templates

Figure 17 lists the high-level processes associated with installing management server software and installing the CSA for Matrix flows and templates. These are the core processes associated with integrating the CSA for Matrix software in your cloud-computing environment.

Figure 17 Install and Configure Management Software and CSA for Matrix



Installing and Configuring Management Server Software

This chapter contains the following sections:

You can set up the physical or virtual servers, install the primary operating system, install and configure the infrastructure hardware, and address CSA for Matrix prerequisites in serial or in parallel.

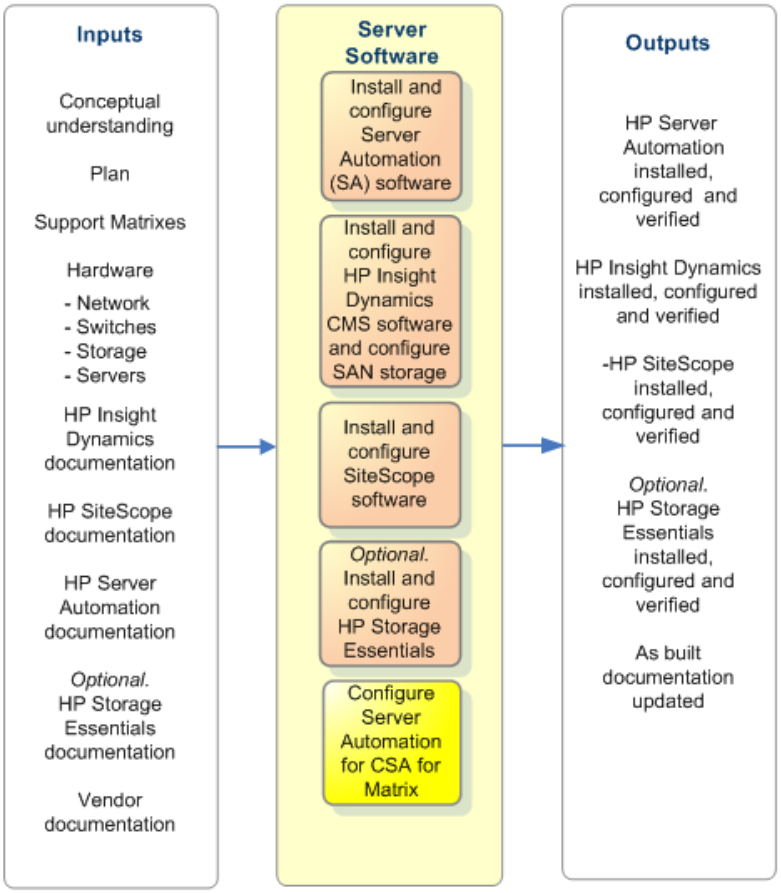
On new installations, HP Server Automation software should be installed and configured before the HP Insight Dynamics CMS software is installed.

HP SA, HP SIM, HP IO with embedded OO, and HP SiteScope must be installed and configured before CSA for Matrix flows and templates are installed.

Preparation Overview

Figure 18 depicts the preparation for installing and configuring management software.

Figure 18 Preparation Overview



For the performance and stability of the Cloud Service Automation for Matrix environment, it is very important to meet the minimum requirements for main memory, disk space, and processors for each of the component products.

This chapter assumes that HP SA is installed prior to the HP Insight Dynamics CMS. If the HP Insight Dynamics CMS has been installed first, perform the installation steps for HP SA as listed; then re-configure the CMS using the steps listed in Completing the HP SA Configuration for the HP Insight Dynamics CMS and CSA for Matrix on page 61.

The CSA for Matrix configuration consists of the following separate servers:

- HP Server Automation (HP SA) running on one or more servers in a single core installation. HP SA may be installed prior to or after the installation of Insight Dynamics.
  - If HP SA is installed first, the installation/configuration steps are as follows:

1. HP SA core installation
2. Insight Dynamics core installation
3. Insight Dynamics configuration for CSA for Matrix
4. HP SA configuration for CSA for Matrix
5. HP SiteScope core installation
6. HP SiteScope configuration for CSA for Matrix

— If Insight Dynamics is installed first, installation/configuration steps are as follows:

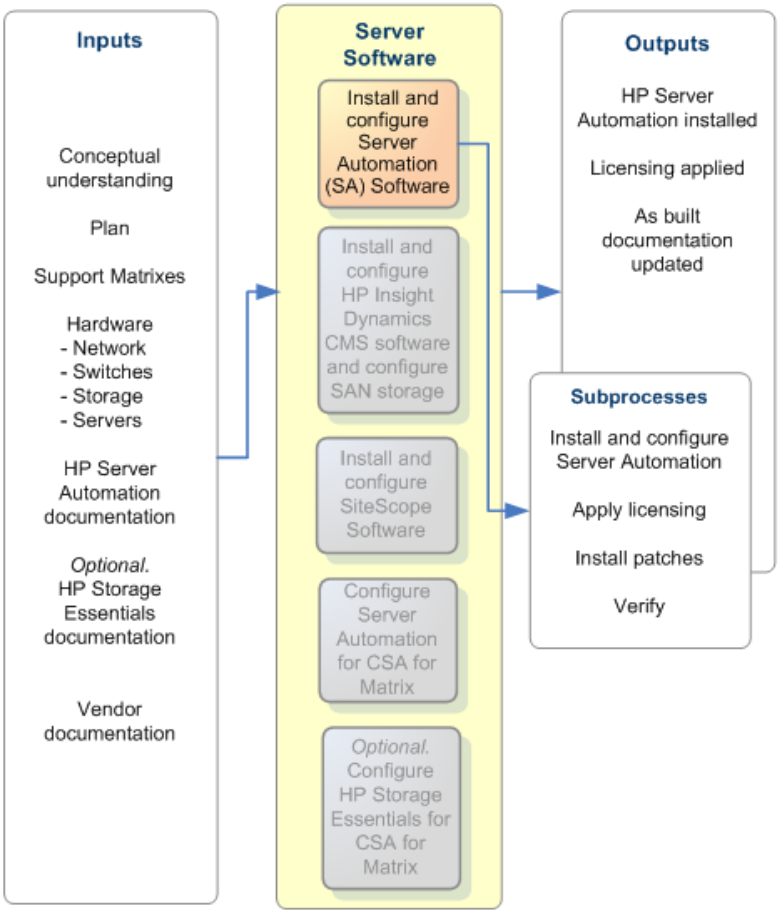
1. Insight Dynamics core installation
2. HP SA core installation
3. Insight Dynamics configuration for CSA for Matrix
4. HP SA configuration for CSA for Matrix
5. HP SiteScope core installation
6. HP SiteScope configuration for CSA for Matrix

- HP Systems Insight Manager (HP SIM) running on one server (CMS) that hosts HP Insight Orchestration (HP IO).
- HP SiteScope running on one server.

Installing and Configuring HP SA for Use with CSA for Matrix

Figure 19 lists the subprocesses involved in installing HP SA.

Figure 19 Installing HP SA for CSA for Matrix



SA Minimum Version Requirements

Determine minimum requirements using the detailed instructions for building the HP SA environment addressed in the *HP Server Automation Planning and Installation Guide*. See Required Information Before Installation on page 13.

The general requirements for HP SA for use with CSA for Matrix are listed below:

When you install SA, you need to keep a copy of the `oiresponse.omdb` file after the installation is complete. This file is typically kept in `/usr/tmp`. Be sure to save a copy because the file is deleted upon reboot.

- In the earlier version of CSA for Matrix, the HP SA build manager was required to be in the same subnet as the servers that are managed by CSA for Matrix. In the current release, HP IO can support SA satellite configurations. In addition, network configuration utilizing a DHCP relay (such as IP Helper) can be configured so that the SA build manager no longer has to reside on the same subnet as the target servers.
- SA 9.02 or 9.03 must be installed.

- CSA for Matrix requires that HP SA act as the DHCP server for the managed environment.
- Determine the account name of the HP SA user to connect between HP IO and HP SA. This HP SA user name is used in the following locations:
  - After HP SA is installed, you set up an HP SA account for this user name.
  - You supply this account name during the HP SIM installation.

For more information about HP SA requirements, see the *HP Server Automation Planning and Installation Guide*. See Required Information Before Installation on page 13 for information.

Build the HP SA Environment

In brief, the process involves:

SA 9.00

- Installing the oracle-sas packages
- Installing the primary packages
- Installing the upload packages

SA 9.02 or 9.03

- Installing opsware-patch
- Installing opsware-patch_upload

DHCP Configuration

CSA for Matrix assumes that HP SA acts as a DHCP server for the managed environment. To enable the HP SA DHCP server functionality, follow these steps:

1. Log in to the HP SA primary core using the root account.
2. In any text editor, open the following file:

   `/etc/opt/opsware/dhcpd/dhcpd.conf`
3. Uncomment the “authoritative” line by removing the number sign (#).
4. Save the file.
5. Run the following command:

   `/opt/opsware/dhcpd/sbin/dhcpdtool`

   Follow the prompts to fully enable the DHCP service.

Set up the OS provisioning images and software policies. Consult the HP SA *User Guide: Application Automation* document for version 9.0x. See Required Information Before Installation on page 13 for information. Validate the HP SA Installation without CSA for Matrix.

It is strongly recommended that you validate your installation of HP SA before integrating CSA for Matrix. Follow normal procedures for incorporating an operating system into HP_Server Automation; then deploy an operating system directly from HP SA to a target server or servers in your environment.

HP Server Automation (HP SA) Configuration

The next step involves both validation and configuration of the SA primary core or the Satellite host.

This version of CSA for Matrix supports provisioning of operating systems from SA Satellite hosts.

HP SA Topology and Scaling Limitations

This version of CSA for Matrix supports the following configurations:

Table 6 HP BladeSystem Matrix Topology

SA Component Topology	Supported
Managed servers on the same subnet of an SA primary core with no Slice Component bundles	Yes
Managed servers on the same subnet of an SA primary core with multiple Slice Component bundles	Yes
Managed servers behind SA Satellites	Yes
Managed servers on the same subnet as that of the HP SA Satellite host (the OS provisioning component must be available on the Satellite host).	Yes
Multimaster Mesh: managed servers on the same subnet as that of the SA primary core *that is registered* with the HP Insight Dynamics CMS	Yes
Multimaster Mesh: managed servers on the same subnet as that of an SA primary core *that is not registered* with the HP Insight Dynamics CMS	No
Multimaster Mesh: managed servers on the same subnet as that of the HP SA Satellite host *that is registered* with the HP Insight Dynamics CMS.	Yes
Multimaster Mesh: managed servers on the same subnet as that of the HP SA Satellite host *that is not registered* with the HP Insight Dynamics CMS.	No

Even though an SA installation may contain multiple cores, the CSA for Matrix installation must be configured to register the primary core or the Satellite host with the CMS. In an environment with multiple Slice Component bundle instances, BladeSystem Matrix cannot auto-failover to any Slice Component bundle installation that is not registered with the CMS. If you change the SA primary core or the Satellite host that is registered with the HP Insight Dynamics CMS, you must update all existing service templates to correctly identify the new software location.

In addition, if there are create service requests that have been submitted to the system for a future time (a future reservation), these requests must be cancelled explicitly and then re-submitted with an updated service template that contains the new software location. Failure to perform this step results in the request failing when the system tries process the old software location.

Updating HP SA Security and Roles

Task 1: Create a CSA for Matrix Account Group

1. Log in to the SAS Web Client as an HP SA Administrator.
2. In the navigation pane, under Administrators, click **Users & Groups**.
3. On the **Groups** tab, click **New Group**.
4. Enter a group name, for example: **HPIO Administrators**.
5. Set the following customer permissions:

Customer Name	Permission
HP Administrators	Read&Write
Not Assigned	Read&Write
Opsware	Read or Read&Write
Any other customers	None

6. Save the new group.
7. On the **Groups** tab, open the newly created group and apply the following settings:
   a. On the **Facilities** tab, set Read&Write access to the facility where the BladeSystem Matrix managed servers are assigned.
   b. On the **Devices Groups** tab, select the **Select all device groups** check box.
   c. On the **Features** tab, select at least the following features:

      Facilities

      Managed Servers and Group

      Model: **Opsware**

   d. On the **Client Features** tab, set the following permissions. (Leave all other features set to No or None)

      Policy Management: <*Policy*>

      Manage Software Policy: **`Read`**

      Allow Attach/Detach Software Policy: **`Yes`**

      OS Sequence Management: <*OS Sequence Management*>

      Manage OS Sequence: **`Read`**

      Allow Execute OS Sequence: **`Yes`**

      Allow Configuration of Networking Booting: **`Yes`**

      Servers:<*Servers*>

Allow Remediate Servers: **`Yes`**

8 Under **Manage API Permissions** on the **Other Permissions** tab, select the **Manage Virtual Columns** check box.

9 Do not set anything on the **OGFS Permissions** tab.

Task 2: Create an Account for HP BladeSystem Matrix to access HP SA

Use this account name when completing the CMS configuration steps below. CSA for Matrix uses this account name during HP SA OS and Application policy provisioning. You must use the *same* account name and password in both HP SA and CSA for Matrix.

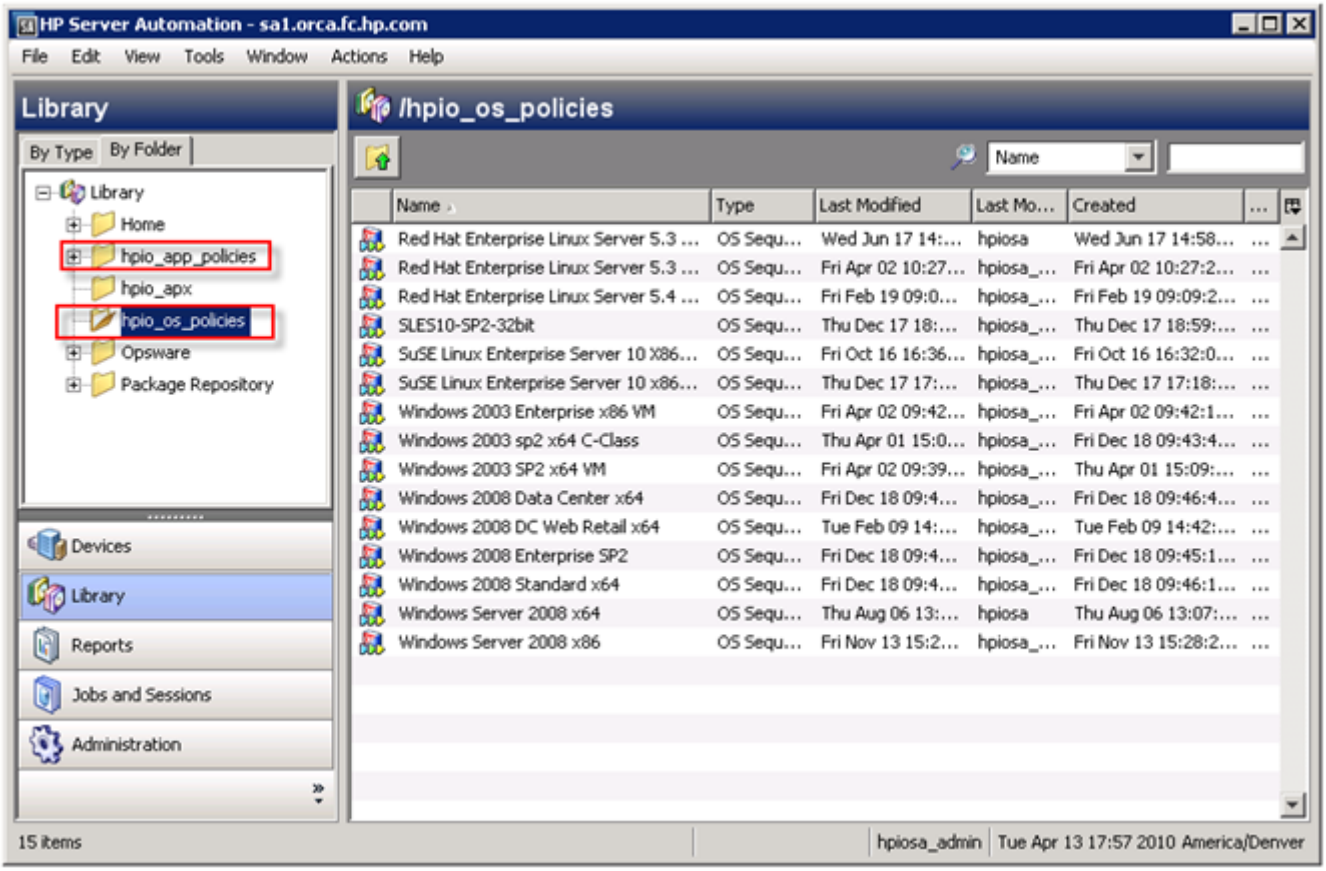
1 In the SAS Web Client, create a new user, for example: **`hpiosa`**.

2 Assign this new user to the user group that you created in Task 1: Create a CSA for Matrix Account Group.

Verification of SA OS Sequence and Application Policy Inventory

In order to make HP SA OS Sequences and Application Policies available to CSA for Matrix, you create a basic folder structure to which you assign CSA for Matrix Group Permissions. Figure 20 illustrates one example of this approach.

Figure 20 OS Sequences and Application Policies



In this example, two folders are created. One to house the OS Sequences and one to house the Application Policies that are accessible to CSA for Matrix. The folder permissions must be set to permit CSA for Matrix Group access. For the example below, the group name used for this purpose is **HPIO Administrators**.

1 Right click on the folder name: **hpio_os_policies**.

2 Add the **HPIO Administrators** group.

3 Ensure that the following permissions are selected:

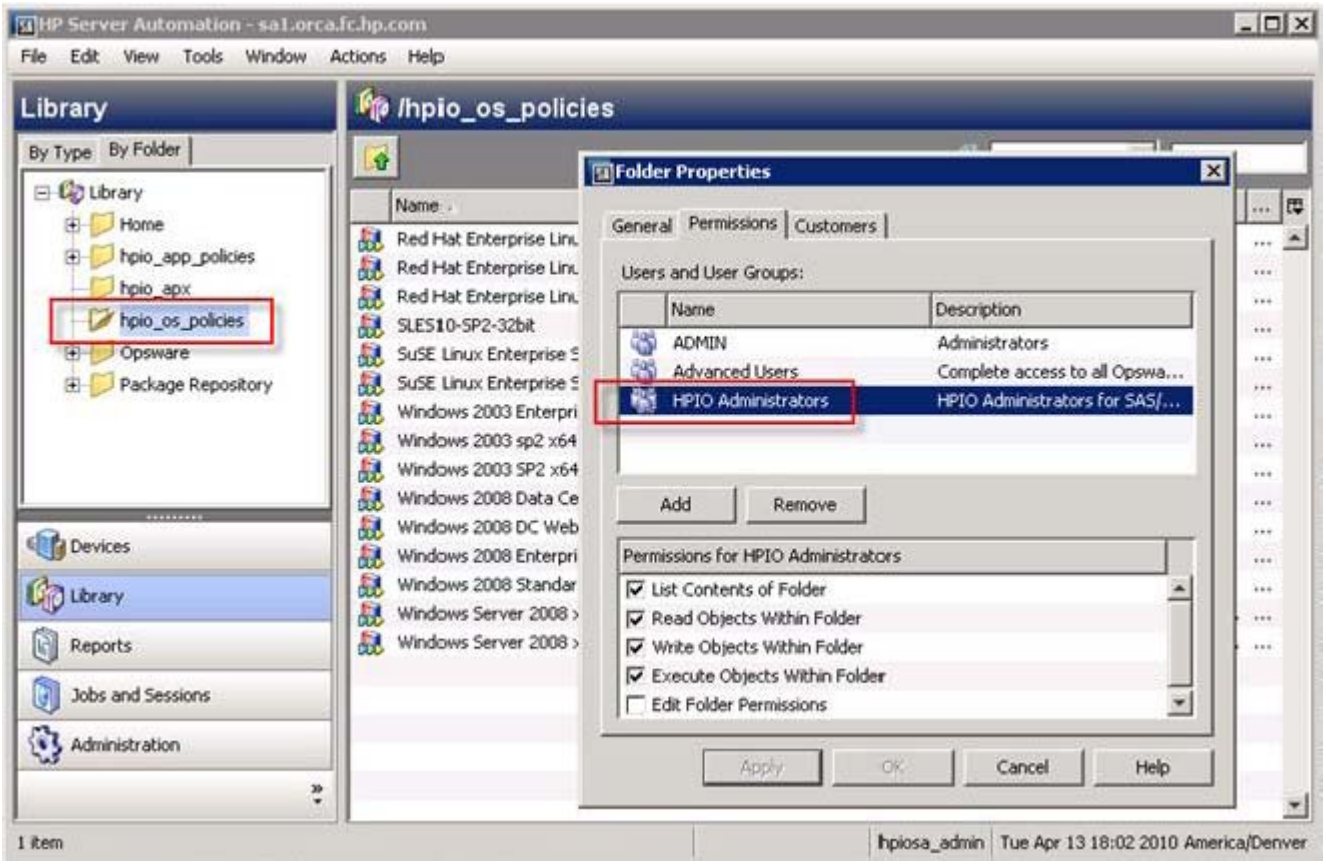
   a **List Contents of Folder**

   b **Execute Objects Within Folder**

   c **Read Objects Within Folder**

   d **Write Objects Within Folder**

Figure 21 Setting Group Permissions for a Policy Folder

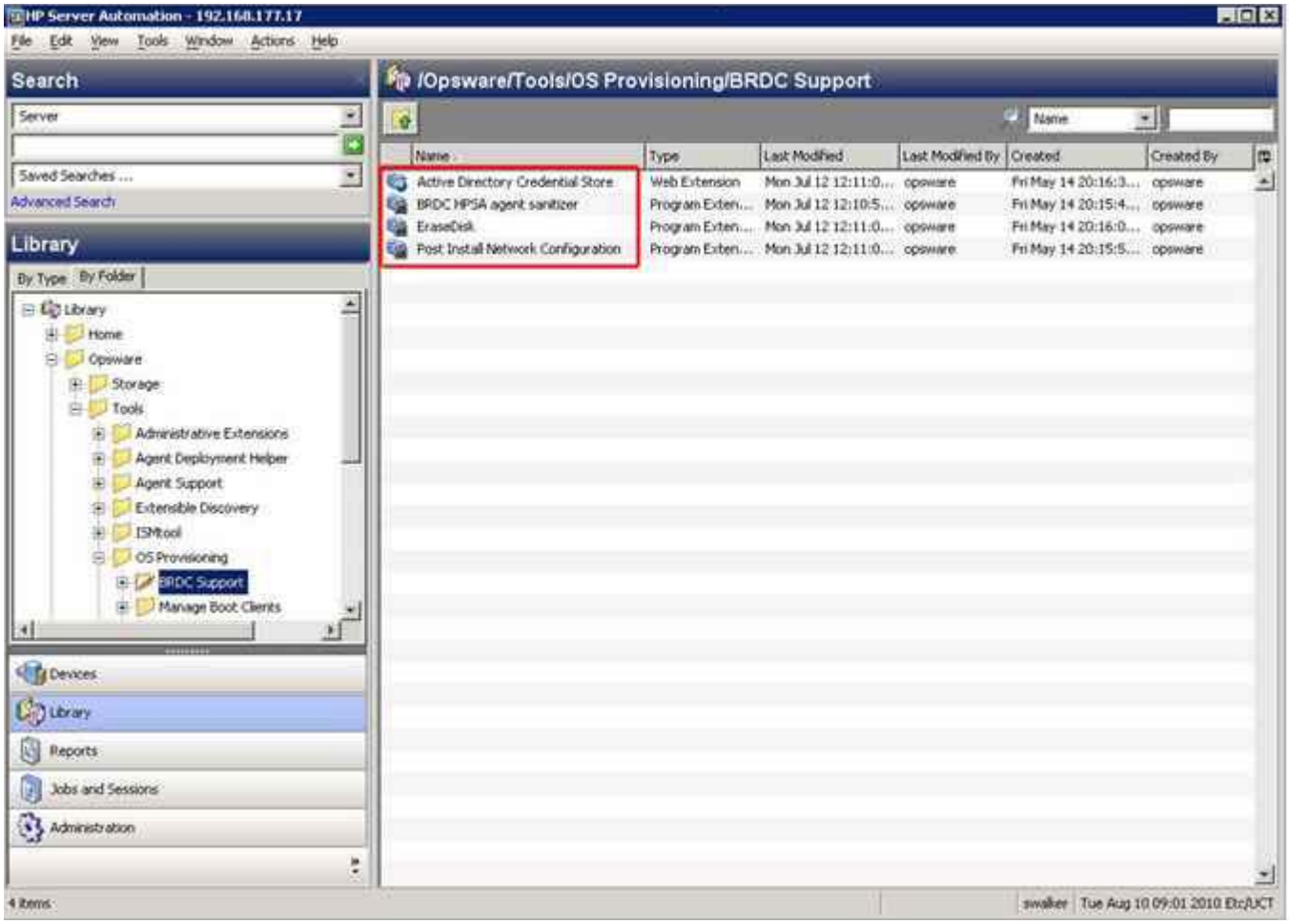


After completing the process above, any OS Sequences or Application Policies that are assigned to the folders become available to CSA for Matrix for use in service provisioning operations. Specifically, OS Sequences and Application Policies begin to show up within CSA for Matrix as available software inventory.

OS Provisioning APX Extensions

The service provisioning process makes use of several HP SA APX extensions to perform its lifecycle operations.

Figure 22 Required HP SA APX Extensions

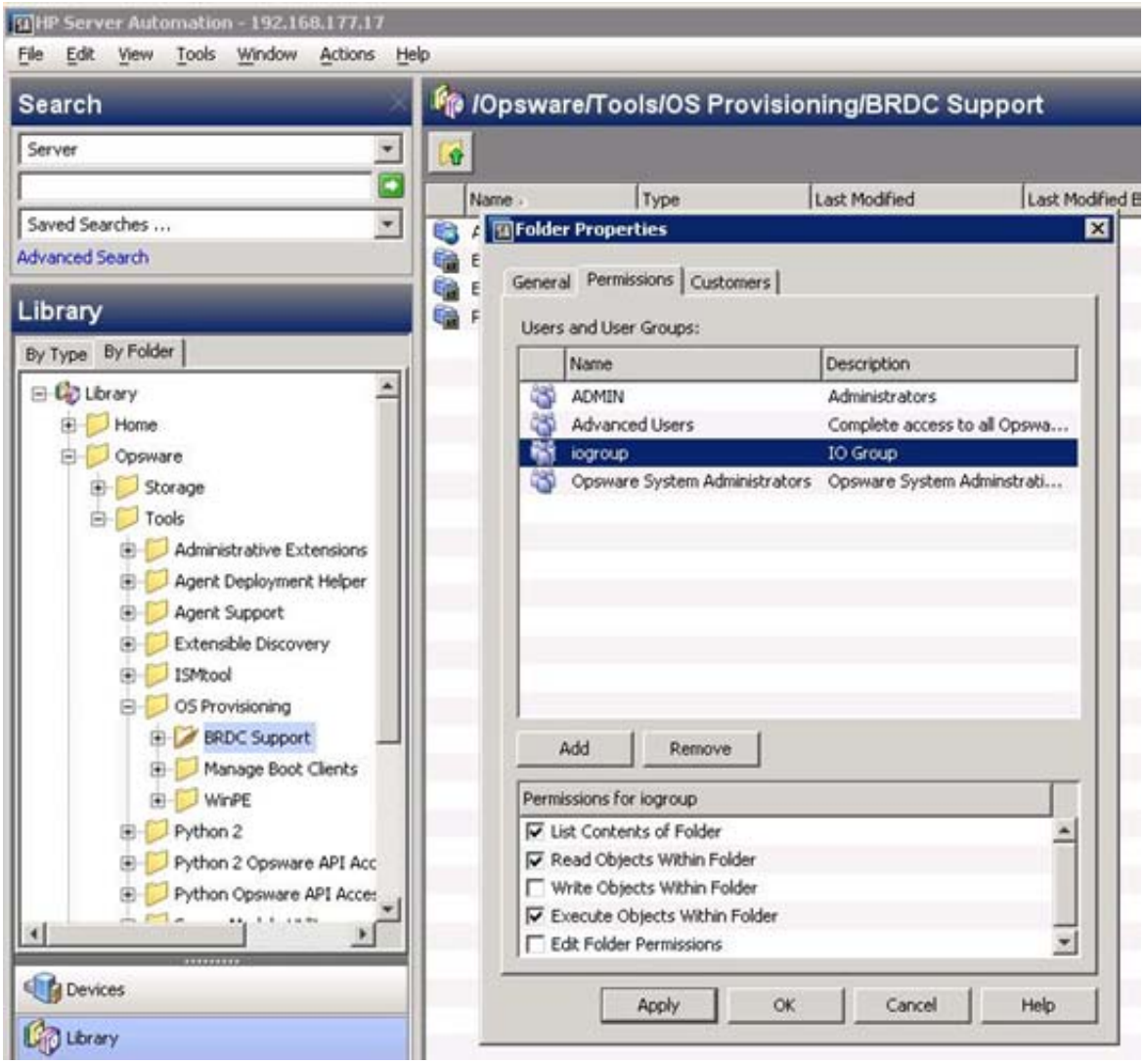


1. The EraseDisk APX is used to clean a server during the service delete process. All storage that is visible to the server is erased prior to the server (and its storage) being returned to the inventory for a future provisioning request.
2. The Post Install Network Configuration APX is used to perform OS level personalization of the server at the end of the OS provisioning process.

As is the case with OS Sequence and Application Policy folders, it is also necessary to set the folder permissions to permit Group access. For the example below, the group name for this purpose is **HPIO Administrators**.

1. Right click on the folder name: **BRDC Support.**
2. Add the **HPIO Administrators** group.
3. Ensure that the following permissions are selected:
   a. **List Contents of Folder**
   b. **Execute Objects Within Folder**
   c. **Read Objects Within Folder**

Figure 23 Setting Group Permissions for the OS Provisioning APX Extensions



Guidelines for Provisioning Operating Systems to Servers on Distinct Networks

You can use CSA for Matrix to provide operating system provisioning and network boot services to distinct networks by using one of the following setups:

- SA Satellite Host
- DHCP Relay

SA Satellite Host

You can use the SA Satellite host to provision operating systems to servers on multiple distinct networks. Make sure that the CMS and SiteScope server can communicate with the managed systems under the SA Satellite.

DHCP Relay

You can use DHCP relays to provision operating systems to servers on multiple distinct networks.

If you want to use this method, you must perform the following configuration tasks:

1. Configure a Layer 3 switch, router, or dual-homed system to transmit BOOTP and DHCP broadcast to the SA Core or Satellite.
2. Configure a single SA Core or Satellite host to run the SA OS Provisioning Boot Server component. This system must be routable by each target network.
3. Configure the DHCP service to cater to DHCP requests from the remote network.

This can be configured by using the `dhcpd` tool or by manually editing the `/etc/opt/opsware/dhcpd/dhcpd_subnets.conf` file.

For example:

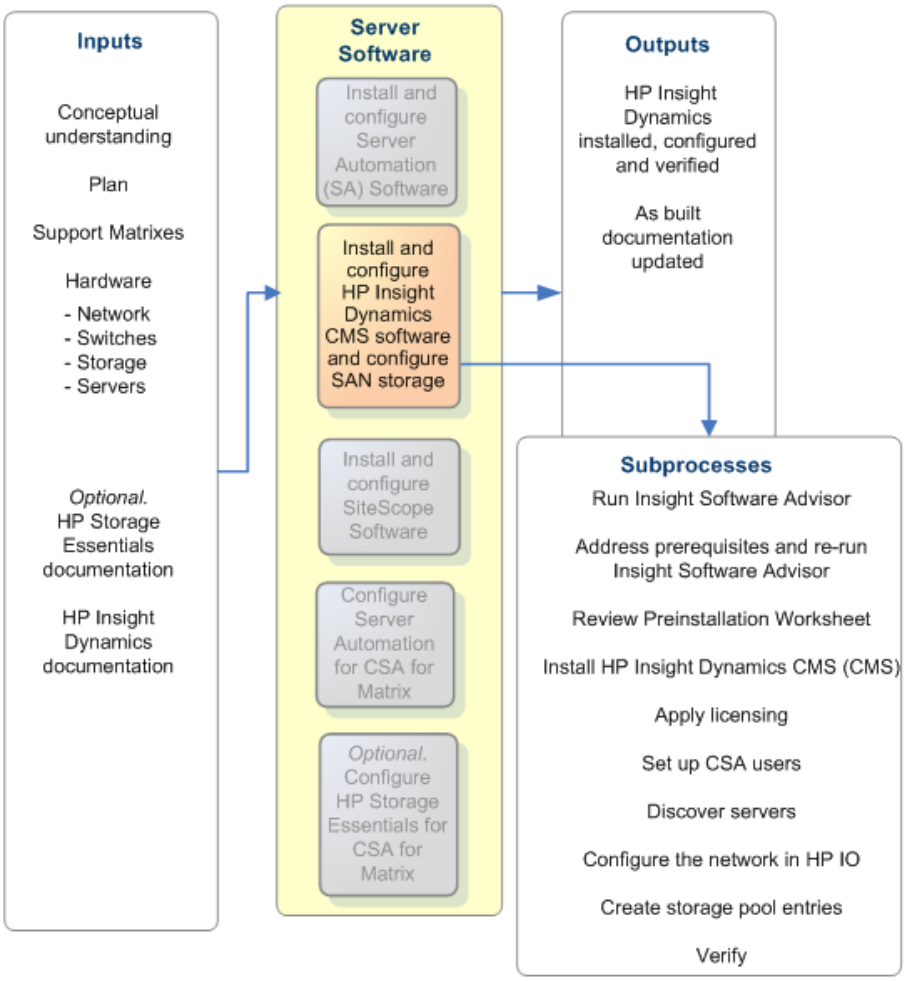
```
subnet 192.168.10.0 netmask 255.255.255.0 {
   range dynamic-bootp 192.168.10.100 192.168.10.250;
   option broadcast-address 192.168.10.255;
   option domain-name "vlan10.example.com";
   option domain-name-servers 192.168.10.2;
   option routers 192.168.10.1;
}
subnet 192.168.11.0 netmask 255.255.255.0 {
   range dynamic-bootp 192.168.11.100 192.168.11.250;
   option broadcast-address 192.168.11.255;
   option domain-name "vlan11.example.com";
   option domain-name-servers 192.168.11.2;
   option routers 192.168.11.1;
}
subnet 192.168.12.0 netmask 255.255.255.0 {
   range dynamic-bootp 192.168.12.100 192.168.12.250;
   option broadcast-address 192.168.12.255;
   option domain-name "vlan12.example.com";
   option domain-name-servers 192.168.12.2;
   option routers 192.168.12.1;
}
```

4. Make sure that the CMS, SiteScope server, and SA servers are able communicate with remote networks.

Installing and Configuring the HP Insight Dynamics CMS for Use with CSA for Matrix

Figure 24 outlines the installation of HP Systems Insight Manager (HP SIM), the HP Insight Dynamics CMS. This chapter lists considerations for installing the HP Insight Dynamics CMS software to support CSA for Matrix integration.

Figure 24 Installing HP Insight Dynamics CMS for use with CSA for Matrix



Satisfy the HP Insight Dynamics Prerequisites

Determine minimum requirements using the detailed instructions for building the HP Insight Dynamics environment in the *HP Insight Orchestration Installation and Planning Guide*. See Required Information Before Installation on page 13.

Insight Dynamics Minimum Requirements

When configuring CSA for Matrix for use with HP Server Automation, verify the software versions that are currently deployed on the CMS.

To confirm that hardware requirements are adequately addressed, run Insight Advisor. You have the option to do this when you run the integrated installer.

Microsoft Software Requirements

- Windows 2003/2008 Standard, Enterprise or data center edition, 32 or 64 bit, except Windows 2003 Standard edition 32 bit, which does not support more than 4GB of memory. All versions require the latest Service pack from Microsoft.
- After installation of Windows Server is complete, change the Data Execution Prevention (DEP). Change the DEP to Opt-In or Only for essential Windows programs and services.

From the Microsoft Installation Media

1. From **Add or Remove Programs** in the Control Panel, select **Add/Remove Windows Components**.
2. From **Application Server Details** select **ASP.NET**; then select **Details for IIS**.
3. Add the FTP server (not necessary on Windows 2008).
4. From **Management and Monitoring Tools Details**; select **Simple Network Management Protocol**.
5. After SNMP is installed, configure SNMP from the services applet and select **SNMP Service** properties.
6. Under **Security,** select **Accepted Community Names** and select **Add**.
   a. Select **READ WRITE**.
   b. Provide a community name.
   c. Select **OK** and then select **OK** again.
7. Select **Microsoft .NET Framework 2.0**.

Other Microsoft Packages

- Install .NET 3.0 and update it to .NET 3.5.
- *Optional.* For Windows Server 2003, install the Microsoft iSCSI Driver installation/Microsoft iSCSI Software Initiator 2.06 or 2.07 or 2.08, which is available at: **http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=7a133e76-5524-4362-bad7-81fe6968bba**
- *Optional.* Windows Automated Installation Kit. Requires MSXML installation from media (adds a service pack to existing MSXML).
- After installation of the above Microsoft products and features, install all of the latest service packs and hotfixes.

Non-Virtual-Center-Enabled Software

- Adobe Flash Player Installation (required)
  - **http://www.adobe.com**
- Adobe PDF reader (optional)
  - **http://www.adobe.com**

Virtual Center (VC)

If an ESX server is to be used by the HP Insight Dynamics CMS, VC must be installed. VC must be installed on a separate server, not on the CMS. You must add VC licensing before adding the VC server to the domain. See Required Information Before Installation on page 13.

Install the Insight Dynamics Software

HP Insight Dynamics is supported on Windows 2003 and Windows 2008. This section is provided as a reference. Install Insight Dynamics prior to installing CSA for Matrix. See Required Information Before Installation on page 13 for information on Insight Dynamics documentation.

Run the Integrated Installer

You need the name of the HP SA user to connect between HP IO and HP SA. This HP SA user name is used in step 17 on page 58.

1. Run **Insight Software Advisor**. This verifies that all prerequisites have been passed before you attempt the install.
   - If all prerequisites are met, continue with step 2.
   - If some prerequisites are not met, exit and address them. After addressing prerequisites, repeat step 1 until all prerequisites pass.
2. Run **Review PreInstallation Checklist**.
3. Select **System Insight Manager** and select **Customize**.
4. Add **HP Insight Control Virtual Machine Management (VMM)**.
5. Add **HP Virtual Connect Enterprise Management (VCEM)**.
6. Add **Insight Dynamics Infrastructure Orchestrator (HPIO)**.
7. Press **OK** in the popup dialog to add the other packages.
8. Press **Next**.
9. Select your preferred method to access DVD #2.
10. Either use the default installation location or enter a new one and confirm to create the new directory.
11. Enter the Service Account credentials.
12. Install SQL.

13 Enter the password to enable auto-sign-in, so that the installation can reboot and continue.

14 Enter the proxy configuration or accept the default proxy configuration.

15 Configure WMI Mapper port.

16 Configure the Insight Dynamics configuration management location to store the data.

17 Select HP SA as the deployment server and enter the credentials that HP IO uses to connect to the HP SA server:

   a Enter the HP SA IP address.

   b Enter the account. (This is the new user account created in Task 2 on page 50.)

   c Enter the password.

At this point the installer verifies that it can connect to the HP SA server at this IP address with these HP SA server credentials.

18 Select **Install**.

If the manual process was selected for the second DVD, the install will prompt for the second DVD when approximately 45% complete. Overall installation time will be 3-4 hours depending on speed of system and access speed of the DVD or DVD ISOs.

Apply the Update 1 Patch for HP Insight Dynamics

After installing HP Insight Dynamics, you must apply the Update 1 patch kit.

Update Extensible Storage and Server Adapter (ESA) Workflows to the Version 1.2.1.1 on the HP Insight Dynamics CMS 6.2 Update 1

Follow this procedure only when you are using the HP Insight Dynamics CMS 6.2 Update 1. You must complete this procedure if you want to use Storage Essentials workflows for dynamic storage provisioning.

1 On the HP Insight Dynamics CMS 6.2 Update 1, go to the directory `<vse_install_path>\esa\ref impl`.

2 Extract the contents of the file `ESA-OO-RefImpl.zip` file (which is available in the directory `<vse_install_path>\esa\ref imp`) into a local directory (for example: `C:\temp`).

   All the contents of the file are placed inside the `ESA-OO-RefImpl` directory under the chosen target directory (for example: inside `C:\temp\ESA-OO-RefImpl`).

3 Go to the `ESA-OO-RefImpl` directory, and then run the following script:

   `setupESA_IActionJars.bat`

4 Import ESA's repository to the embedded OO:

   a In OO Studio, expand **Library > Hewlett-Packard**, right-click **ESA**, and then select **Delete**.

   b Select **Repository > Import Repository**.

c In Select Repository Directory dialog box, navigate to the location *<extract_directory>*\ESA-OO-RefImpl\OOWorkflows.

In this instance, *<extract_directory>* is the directory where you extracted the contents of the ESA-OO-RefImpl.zip file.

d Click **Open**. The Importing From... window opens.

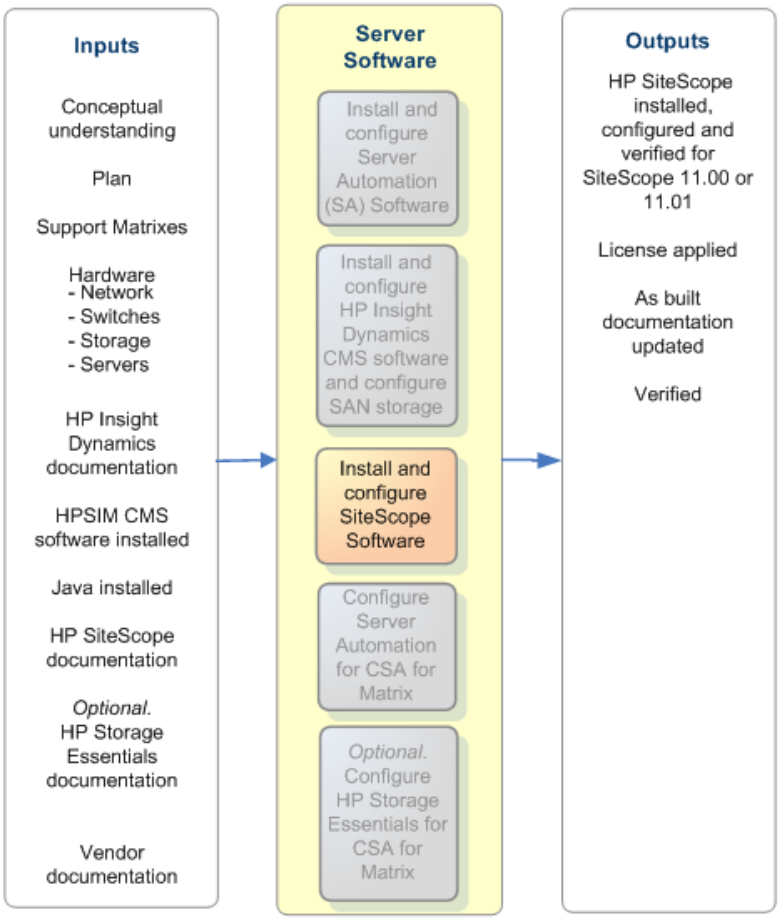
e Click **Expand All**. Make sure the ESA folder is set to Add in Repository in the Action column.

f Click **Apply**.

g Click **OK**.

Installing and Configuring HP SiteScope for Use with CSA for Matrix

Figure 25 Installing and Configuring HP Site Scope for CSA



See Required Information Before Installation on page 13 for information on HP SiteScope documentation.

HP SiteScope installation consists of the following five tasks:

- Task 1: Verify the System Resources

- Task 2: Evaluate the Existing HP SiteScope Installation
- Task 3: Install the HP SiteScope Software
- Task 4: Gather HP SiteScope Information for CSA for Matrix

Task 1: Verify the System Resources

1. Using the information in HP SiteScope documentation, calculate the resources needed for the HP SiteScope server.
2. In this calculation include the number of target servers that you expect CSA for Matrix to manage.

Task 2: Evaluate the Existing HP SiteScope Installation

The currently supported HP SiteScope installation process consists of installing SiteScope 11.00 (a full installation), followed by HP SiteScope 11.01 (a patch that requires 11.00 to be already installed). If using an earlier version of HP SiteScope, the system must be updated. If a later version of HP SiteScope is available, verify that it is supported in the *CSA Support Matrix*. If necessary, upgrade the HP SiteScope software to the required version.

Task 3: Install the HP SiteScope Software

Prerequisites

You must have Java installed for the web browser on the CMS to run HP SiteScope. You can find downloads for current Java installations by operating system here:

http://java.com/en/download/manual.jsp.

Run the HP SiteScope installer

During installation, you can change the port for the HP SiteScope service to avoid potential conflicts with other web servers that use the default port value of 8080. Select any available port on the system. Keep track of the port number that you select.

Patch Requirement

If you are using HP SiteScope 11.00, you must install the SiteScope 11.00 Cumulative fixes (`SIS_00088`) patch on the SiteScope server.

Apply HP SiteScope licenses

- Overall license
- Licenses for additional monitoring capabilities, depending on the hardware and software in the managed environment

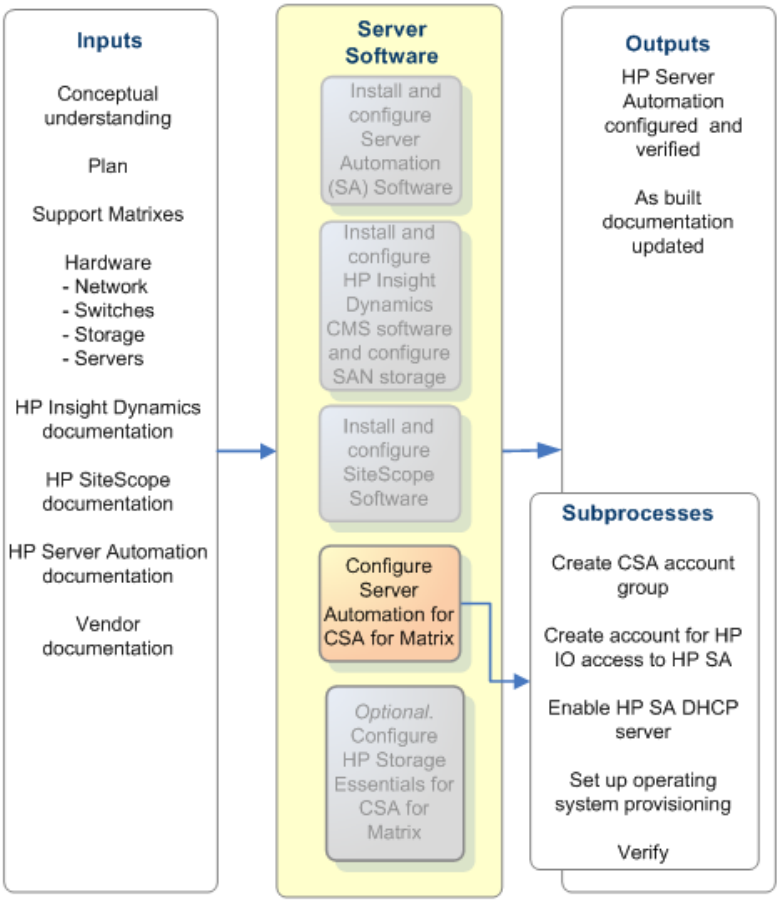
Task 4: Gather HP SiteScope Information for CSA for Matrix

Note the IP address and port of the HP SiteScope server. You must supply this information to HP IO while configuring the CSA for Matrix software.

Completing the HP SA Configuration for the HP Insight Dynamics CMS and CSA for Matrix

Since the HP Insight Dynamics CMS and HP SA interact with each other, final configuration of HP SA can be done after the HP Insight Dynamics CMS installation.

Figure 26 Completing HP SA Configuration



Configure HP Insight Dynamics to Use HP SA 9.02 or 9.03

By default, HP Insight Dynamics (6.1 Update 1 or 6.2 Update 2) works with HP SA 7.83. To configure HP Insight Dynamics to work with HP SA 9.02 or 9.03, follow these steps:

1. On the CMS, stop the `HP Systems Insight Manager` service.
2. Log on to the SA 9.02 or 9.03 Core, and then copy the following file:

   `/opt/opsware/twist/extlib/client/opswclient.jar`
3. Place the `opswclient.jar` file in the following location on the CMS:

   <SIM_INSTALL_PATH>`\lib`
4. If you are using HP Insight Dynamics 6.1 Update 1, follow these steps:

a. Go to the following web address:

   `https://h22042.www2.hp.com/servlets/ProjectDocumentList?folderID=586/`

b. Log on to the web site (HP Live Network) with HP Passport credentials.

c. Download the `SAplugin.jar` file from the web site.

d. Place the `SAplugin.jar` file in the following location on the CMS:

   <SIM_INSTALL_PATH>`\lib`

5. If you are using HP Insight Dynamics 6.2 Update 1, follow these steps:

   a. Copy the following file on the CMS:

      %HPIO_Home%`\update\6.2.1\SA9.x_support\SAplugin.jar`

   b. Place the `SAplugin.jar` file in the following location on the CMS:

      <SIM_INSTALL_PATH>`\lib`

6. Restart the `HP Systems Insight Manager` service on the CMS.

Identify Existing SIM MxNode Registrations

During the installation of the Insight Dynamics CMS, a placeholder may have been used to point to an HP SA server. To see if an HP SA server was set up, open a command shell and enter the following:

`mxnodesecurity -l`

Scan through the list and see if the `PROTOCOL` of `dsc_sas` exists. See Figure 27 on page 63 for an example of the `mxnodesecurity` output.

Registering an HP SA Primary Core via SIM MxNode Security

If the protocol exists and the IP address of the HP SA server is correct, change the credentials to those set up in Task 2 on page 50:

`mxnodesecurity -a -p dsc_sas -c <username>:<password> -n <SA primary core IP Address>`

If the protocol exists and the IP address is incorrect, remove the entry with the following command:

`mxnodesecurity -r -p dsc_sas -n <SA primary core IP Address>`

If the protocol does not exist or has just been removed, add the SA entry with the following command:

`mxnodesecurity -a -p dsc_sas -c <username>:<password> -n <SA primary core IP Address>`

It is important that the same account information that was entered in the Task 2 on page 50 be used for this step. The username and password values of this account grant CSA for Matrix access to the HP SA primary core OS Sequences and Application Polices and allow basic server operations through HP SA.

Verify the account that was just added to the CMS using the following command:
`mxnodesecurity -l`

To make sure HP Systems Insight Manager uses these new credentials immediately, restart the HP SIM server.

1 Make sure there is no activity on the HP SIM server during the restart.

2 Restart the HP SIM from the control panel or by running the following commands.

To stop HP SIM:

mxstop

To start HP SIM:

mxstart

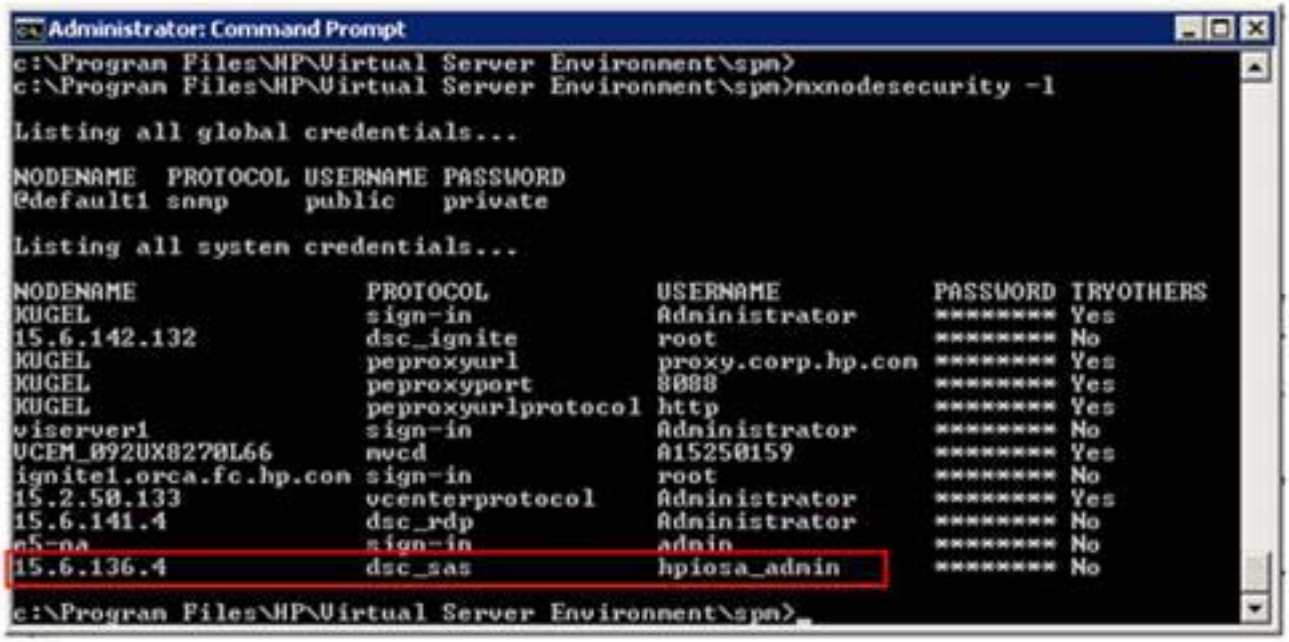
HP SIM requires some time to restart. To monitor the status of the HP SIM restart run:

mxstatus -w -v

Upon completion, **mxstatus** returns `SIM status: Ready`.

Figure 27 shows a sample listing. In this case, the account name that was used for CSA for Matrix access is **hpiosa_admin** and the IP address of the HP SA primary core is **15.6.136.4**.

Figure 27 mxnodesecurity example

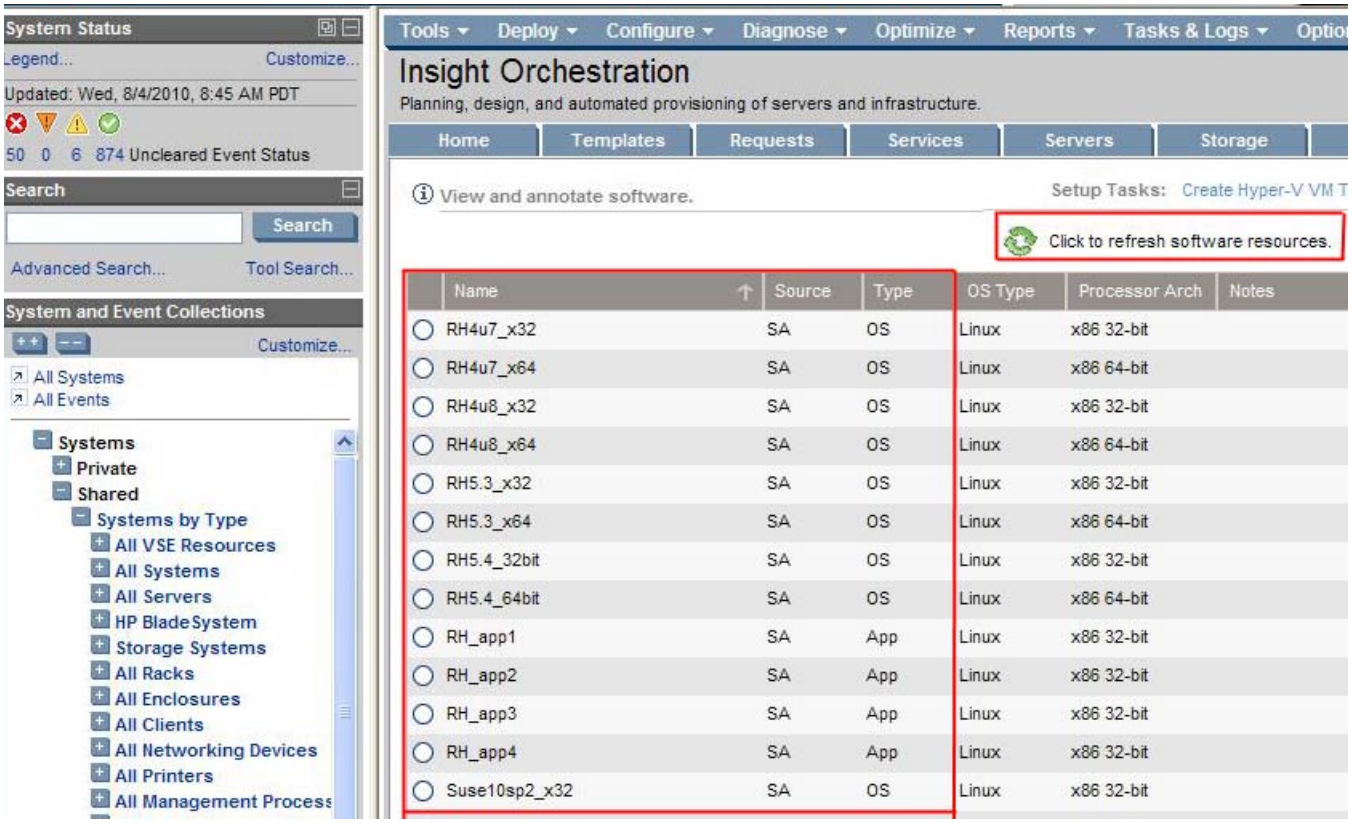


Verifying HP SA Deployment Server Access

Once the HP SA primary core has been registered the system begins receiving software inventory directly from the HP SA primary core. Go to the HP IO operations console and refresh the software inventory to verify that HP IO lists the inventory.

Figure 28 shows both operating systems (OS) sequences and application policy (App) inventory in the Type column with HP SA (shown as SA) in the Source column. The Location column (not shown) should show the HP SA primary core IP address that was registered in Registering an HP SA Primary Core via SIM MxNode Security on page 62.

Figure 28 Verifying HP SA Software Inventory



Other HP Insight Dynamics CMS Configuration Topics

This section is provided as reference. Typically, the following Insight Dynamics configuration procedures are completed as part of preparing the managed resources.

Support for HP c-Class Blades with Virtual Connect

CSA for Matrix supports c-Class blades using Virtual Connect for integration with HP SA. The c-Class blades may use a Fiber Channel (FC) SAN boot disk or a local boot disk presented through an onboard RAID controller and optionally one or more FC-SAN data disks. In this initial release, only single-path FC-SAN connectivity has been qualified.

To succeed, the operating system deployment process depends upon having only a single path to the target FC-SAN boot disk visible to the c-Class blade. The single path constraint can be enforced by constructing an FC-Fabric zone definition that contains a single initiator and a single target world-wide-name (WWN). Alternatively, the single path constraint can be enforced by mapping the FC-SAN disk to one disk array controller port on the target disk array.

PXE NIC Boot Order Requirement

HP BladeSystem Matrix has been qualified to use PXE as the basic boot and OS deployment mechanism with HP SA. In order to support the full provisioning lifecycle for a c-Class blade, the PXE NIC must be moved into the first position of the Standard Boot Order (IPL)

Move PXE NIC to First Position of Standard Boot Order (IPL) for c-Class Blade

1 Power the blade on and allow it to POST.

2 Select **F9** to force the system into the ROM-Based Setup Utility (RBSU).

3 As shown in Figure 29, select the **Standard Boot Order (IPL)**:

Figure 29 Selecting Standard Boot Order (IPL)

4 Adjust the order of the PXE NIC to the first position as shown in Figure 30 on page 66.

This modification ensures that the c-Class blade is capable of contacting the HP SA primary core over the course of its lifecycle. This means that the server always attempts to contact the HP SA primary core. If there are no HP SA specific operations to perform or if the HP SA primary core cannot be contacted, the server boots from its disk.

Enable PXE NIC

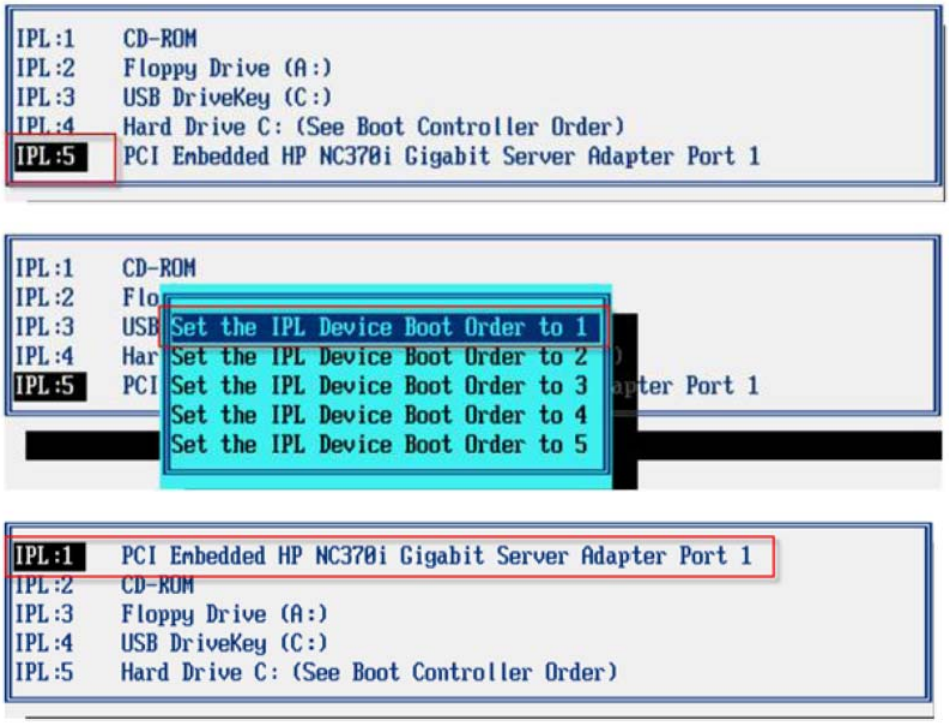
If the PXE NIC is not enabled, the NIC does not appear in the IPL list shown above. To remedy this situation, perform the following steps:

1 Select **System Options** from the from within RBSU.

2 Select **Embedded NICs**.

3 Select **NIC 1 Boot Options** to enable the PXE function.

Figure 30 Enabling the PXE function on a c-Class Blade



4 Once these changes are made, reboot the server.

5 Repeat steps 2-4 of Move PXE NIC to First Position of Standard Boot Order (IPL) for c-Class Blade on page 65 to re-enter RBSU and configure the correct boot order.

Once the PXE NIC configuration has been completed through RBSU, it remains in effect indefinitely. The c-Class blade is now “automation ready” and can be used by CSA for Matrix to create a new service.

OS SAN Boot Driver Requirements

1 QLogic HBA (BIOS version 2.07 or higher)

   a RHEL 5.3 and higher

   b Windows 2003/2008: QLogic driver 9.1.7.29 or higher

2 Emulex HBA (BIOS version 3.11a5 or higher)

   a RHEL 5.4 or higher

   b Windows 2003/2008: Emulex driver 5.00.17.06-2 or higher

Supporting VMware Virtual Servers

HP BladeSystem Matrix has qualified VMware virtual machines for integration with HP SA. Like c-Class blades, a VM must be able to PXE boot against the SA primary core in order to execute its operating system and application provisioning process. Unlike c-Class blades, there is no required manual configuration for the VM. Instead, BladeSystem Matrix automatically enables and adjusts the PXE boot order for the VM as a part of the operating system and application deployment process.

As of this software release, there are no VM specific driver-level-requirements necessary to accomplish basic operating system provisioning for all of the currently qualified OS types.

Configure ESA

The Extensible Storage and Server Adapter (ESA) is used with HP non-VC-enabled ProLiant servers. It provides a facility to import non-VC-enabled servers into the HP IO server pools. For a complete description of this configuration refer to "Configuring Insight Orchestration to list heterogeneous hardware" in the *HP Insight Orchestration User Guide*.

The reference workflows are driven by three data files. These files are located in `C:\Program Files\HP\Insight Orchestration\esa_extensions\server`

- `inventoryList.xml`
- `serverInfo.xml`
- `uuidHostMapper.xml`

The HP IO and HP SIM installation folder is the folder that you entered during installation.

When adding a new server type for use through an OO workflow, the HP IO `blade_models.properties` file must be updated to include the new model:

`Edit C:\Program Files\HP\Insight Orchestration\conf\blade_models.properties`

HP IO uses the contents of this file to determine which server model types to permit for HP IO operations.

Discover the HP SIM Managed Resources

HP SIM must identify servers that it will manage on behalf of HP IO. The discovery process finds physical servers and VM host servers.

Discovery Steps (can be applied to any resource)

1. Log into HP SIM.
2. From the Options menu select **Discovery...**
3. Create a discovery task, filling in a single IP address or range of IP addresses to discover.
   a. Select **Credentials**.
   b. For each server or device on the subnet, enter the credentials and press **OK**.
   c. Press **Save** to save the task.
   d. Select the new task and press **Run Now**.

Discovery of Linux servers might require editing the `/etc/ssh/sshd_config` setting the following variables:

`PermitRootLogin` **`yes`**
`PasswordAuthentication` **`yes`**

Configure HP IO to Use Blades

1. Discover the Onboard Administrator (OA). Use the Discovery Steps (can be applied to any resource) on page 67 to discover the OA. All the blades and related devices are automatically discovered when the OA is discovered.
2. Enter the credentials for the OA.
   a. Enter IP addresses for both OA and VC servers as part of a single discovery task.
   b. Select **Credentials**.
   c. For each server or device on the subnet, enter the credentials and press **OK**.
   d. Press **Save** to save the task.
   e. Select the new task and press **Run Now**.
3. Confirm the VC Domain is discovered.
   a. From SIM, select **Tools->Integrated Consoles->Enterprise Manager (VCEM).**
   b. Select the **VC Domains** tab and confirm a domain exists with the serial number of the enclosure.

You need to apply the HP Virtual Connect Enterprise Manager (C7000 or similar) license before adding it to the domain group. Refer to Applying Licenses on page 72.

4. Create a VC Domain Group.
   a. Select the **VC Domain Group**.
   b. Press **New.**
   c. Select the VC Domain and press **Next**.
   d. Enter the Virtual Connect credentials. Enter a VC Domain Group name. Use either the VCEM defaults or the factory settings for the Serial number, MAC and WWN drop down box.
   e. Press **OK**.

Write down the WWN, MAC, and serial range values from Virtual Connect before creating the new VC Domain. This information is necessary if you want to release CMS control of VC at any time.

5. Connect to the OA of the blade enclosure.
   a. Shut down each blade to be used in HP IO provisioning.
6. Remove blade profiles.
   a. While in VCEM, select the **Bay** tab. (This can also be done from the **Profiles** tab.)
   b. For each blade to be used as a target server for HP IO provisioning, unassign the profile.

7 Create the storage pool entries.

Information on how to create storage pool entries can be found in *Insight Dynamics—Automated Storage Provisioning: Static SAN volume automation via multi-initiator NPIV* at **http://www.hp.com/go/insightsoftware/docs**. Local storage is used differently. Refer to Local Disks on VC and non-VC-enabled Servers on page 71.

To use the "Dynamic" SAN volume automation feature, see the *HP Insight Orchestration 6.2 User Guide*.

8 Refresh the Logical Server Manager.

a From the HP SIM **Tools** menu, select **Virtualization Manager**.

b Select **Tools >Logical Servers >Refresh**.

c Select the check boxes for **Virtual Connect Enterprise Manager (VCEM), Static Servers,** and **Storage Pool Entries**.

d If you have non-VC-enabled servers, press **Refresh** to refresh the static servers.

Discover VMWare ESX

To configure an ESX server for inclusion in HP IO, ESX requires a Virtual Center Server to be present and managing the ESX server.

1 Discover the ESX server and Virtual Center as part of the single discover step a on page 68.

2 Discover the Virtual Center server.

3 License ESX. See Applying Licenses on page 72.

4 Set up Virtual Center by adding the VC credentials to **Options >VMware vCenter Settings**.

5 Register the VMHost with VMM.

a Select **Configure > Virtual Machine > Register Virtual Machine Host**.

b Select the **ESX VM Hosts** collection; then select **View Contents** and the target server.

c Press the **Apply** button; then press **Next** and **Run Now**.

d Wait for the task to complete.

Windows Hyper-V Discovery Steps

1 Discover the Hyper-V.

a Select **Credentials**.

b For each server or device on the subnet, enter the credentials and press **OK**.

c Press **Save** to save the task.

d Select the new task and press **Run Now**.

2 License Hyper-V. See Applying Licenses on page 72.

3 Register the Hyper-V server with VMM.

- Registering the Hyper-V server with VMM is similar to registering ESX (see Discover VMWare ESX); however, you must use the option **Hyper-V VM Hosts** instead of **ESX VM Hosts**.

Non-VC-enabled Server Discovery Steps

1. Make sure you have completed the steps under Configure ESA on page 67.

   Go to `C:\Program Files\HP\Insight Orchestration\esa_extensions\server` to modify the `inventoryList.xml`, `serverInfo.xml`, and `uuidHostMapper.xml` files containing required information on non-VC-enabled servers.

2. Provide the `uuid` value of the non-VC-enabled server you want to add within the file `inventoryList.xml`.

Incorrect tags in `ServerInfo.xml`, not providing model numbers for non-VC-enabled servers, or incorrect credentials for iLOs associated to non-VC-enabled servers cause the OO flows to fail. Non-VC-enabled servers are not listed in HP IO. Credentials for non-VC-enabled servers are added by using HP OO Studio.

3. Edit the `serverInfo.xml` file to include the XML tags, as described in the *Server and Storage Workflows for HP Insight Dynamics* at **http://www.hp.com/go/insightsoftware/docs.** Make sure that you include the following tags: the `<cpuFamily>` tag containing the value **`x86System`**, and the `<rackName>` tag and `<rackPosition>` tag containing appropriate values. After the non-VC-enabled server is discovered and added to the HP IO server pool, verify that the server information you provided in the `serverInfo.xml` file matches the information that HP IO sees.
   - Go to the **HPIO Server Pool** tab.
   - Select the entry associated with the server to view the detailed information about the server.
   - Review and update the `serverInfo.xml` files as necessary.

Any editing of `ServerInfo.xml` requires a restart of services before HP IO reports the changes.

If a non-VC-enabled server SAN boot disk is used, then the serverInfo.xml file should list the local disk as null. For example: `<localStorageList xsi:nil="true"/>`.

4. Note the **`serverModel`** information you provided in the `serverInfo.xml` file for the non-VC-enabled server (for example, ProLiant DL 380 G5). Using your server model information, edit `C:\Program Files\HP\Insight Orchestration\conf\blade_models.properties`
5. Add the associated entries for the server. For example:
   `x86_64_Models=Proliant DL 380 G5`
   `SUPPORTED_MODELS=Proliant DL580 G5`
6. Edit the `uuidHostMapper.xml` file. Enter the same `uuid` that matches the value provided for the server in the `serverInfo.xml` and `inventoryList.xml` files.
7. Add the *IP*/*name* for the ILO associated with the non-VC-enabled server.
8. Stop these services: `LSA`, `HP IO`, `ESA`, `RSCentral`, and `REJRAS`.
9. Restart the services in reverse order: `REJRAS`, `RSCentral`, `ESA`, `HP IO`, and `LSA`.

   This triggers the `GETSERVERINVENTORY` and `GETSERVERINFO` flows, which import the non-VC-enabled servers into the HP IO server pool as `Unassigned`.

10 To view the status of the flows, run the launch page at **https://localhost:16443/PAS/app**. Log in with the HP OO administrator credentials provided during HP Insight Dynamics integrated installation.

11 On the left side of the HP OO Central UI, you can see the flows that have run previously and view their status. Each time the flows are run (either manually by restarting the `HP LSA` service or automatically) the number of times run increments.

If you intend to run these flows manually several times in a row, allow enough time between the runs for the HP OO Central UI status to update.

12 Double-click each flow to see reporting information about the flow. Left-click any of the History IDs to see associated steps for that entry. The **Basic** and **Advanced** tab flows provide useful information for troubleshooting. The reported result of each step should be `success`.

13 To go back to the flow status page, select the **Dashboard** tab.

14 If the `GETSERVERINVENTORY` and `GETSERVERINFO` flows were completed successfully, the non-VC-enabled servers are added to HP IO.

15 Verify the non-VC-enabled server addition to HP IO by accessing **SIM > Tools > Insight Orchestration > Server Pools > Unassigned Server Pool**. If the server is not yet listed, refresh the server pool list.

16 After you have confirmed that the server has been added you can create a dedicated server pool, template, and service request; you can also provision the server with an operating system.

Local Disks on VC and non-VC-enabled Servers

To boot a virtual-connect (VC) or non-VC-enabled server from local disk, the disk needs to be visible to HP IO. To make the disk visible to HP IO follow the steps below:

1 Once the VC servers and non-VC-enabled servers are discovered, go to `C:\Program Files\HP\VSE\bin\`

2 Run **`lsmutil --exportAnnotations`** to create the `computeActuals.xml` file.

3 Modify the `computerActuals.xml` file for the local disk.

— A sample 'c' class blade in the `computeActuals.xml` file:

```
<CliLocalDisk>
    <name></name>
    <description></description>
    <deviceType>0</deviceType>
    <storageType></storageType>
    <storageDeviceType></storageDeviceType>
    <storageSizeType>GB</storageSizeType>
    <raidLevel>NONE</raidLevel>
    <volumeNumber>1</volumeNumber>
    <storageSize>60</storageSize>
    <sharable>false</sharable>
    <storageSpeed>0</storageSpeed>
    <diskStatus></diskStatus>
</CliLocalDisk>
```

— A sample non-VC-enabled server local-disk in the `computeActuals.xml` file:

```
<CliLocalDisk>
    <name></name>
    <description></description>
    <deviceType>0</deviceType>
    <storageType></storageType>
    <storageDeviceType></storageDeviceType>
    <storageSizeType>GB</storageSizeType>
    <raidLevel>NONE</raidLevel>
    <volumeNumber>1</volumeNumber>
    <storageSize>33</storageSize>
    <sharable>false</sharable>
    <storageSpeed>0</storageSpeed>
    <diskStatus></diskStatus>
```

The information provided in the `computeActuals.xml` file must match the disk information found locally on the server.

4 After the file is modified and saved, run **`lsmutil --importAnnotations`**.

If the disks are being updated, you see a message about the current LSM database schema version and success updating local disks.

Setting Up VC-enabled and non-VC-enabled Servers for SAN Boot

1 In the boot screen of the server, press **F9** to bring up the BIOS setup.

2 Select **PCI Devices** and disable the Smart array controller.

3 Select **Standard Boot Order** and set the NIC to **`IPL: 1`**

4 Select the **Boot Controller Order** and set the Smart Array controller to last (this should not matter if the controller is disabled).

5 Exit the BIOS screen using **F10** to save your changes.

6 Additional HPA setup is required. See

Applying Licenses

Import Licenses

1 Go to **SIM > Deploy > License Manager > Add Licenses**

2 Add licenses as needed.

Apply Licenses

1 Go to **SIM.**

2 From the left panel select **All Systems** and select all the target servers. Target servers include cClass blade servers, Non-VirtualConnect/HP Proliant servers, ESX, and HyperV servers, but not ILOs and Management Processors.

3 Select **Quick Launch > Managed System Setup Wizard**

4 Follow each step, selecting all the license options except HP SIM.

5 Click **Next** until the target servers are successfully licensed.

If you have not already done so in a previous section:

6 Go back to **HPSIM > Options > Discovery.**

7 Select the link to **Add Virtual Center.**

8 Add the IP address and credentials for Virtual Center.

9 Register the HP ESX Host.

HP IO Configuration

To set up HP IO for provisioning, including configuring the network space and creating the server pools:

1 Check the **Software** tab.

   a Make sure the software from the deployment engine (HP SA) is listed. If nothing is listed, press **Refresh**.

   b If the software is not listed after pressing **Refresh**, check the server credentials.

2 Check the **Networks** tab.

Networks are listed if OA and VC were discovered successfully and the VC domain group was created. However, the network status is critical until the network address, netmask, default gateway, and DNS IP address are added manually.

   a Select the option box for the network to be used for provisioning and press **Edit**.

   b Enter the data about the network, the IP address of the network (ending in 0), the netmask, and the gateway. Select deployment network.

   c Enter the data for the DNS tab, including the domain name and DNS server.

   d Select the number of DHCP addresses.

   e Enter any reserved static IP addresses.

3 Check the **Storage Pools**:

   a Storage pools are listed in HP IO only after the user creates SPE/storage pool entries.

   b Confirm that local storage devices are present. (See Local Disks on VC and non-VC-enabled Servers on page 71.)

4 Check the **Server Pool** tab:

   a The unassigned pool is automatically created. All servers when initially discovered are placed in the unassigned pool.

   b To create a new server pool, select **Create Pool** and give the pool a unique pool name.

   c From the unassigned pool, select the blades to be used as target servers for provisioning.

   d Press **>>** to move the target servers to the server pool.

   e Press **Save**.

   f Highlight the pool and select **Modify Users**.

   g Select the administrator account and any other account that must have access to this server pool.

h Press **Assign** to move the account access information to the pool, and then press **Save**.

For VMs the steps are similar:

1 Set up the networks on the **Network** tab.

Once ESX/HyperV are discovered and registered, any network set up earlier might be listed as Physical or Virtual.

2 Assign the hypervisor to its own server pool.

3 Storage pools are not required, since the storage comes from the hypervisor. HP IO should now be ready for operating system provisioning to a VM.

Configuring HP Storage Essentials for Use with CSA for Matrix

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

If you are using a previous version of HP IO such as HP IO 6.1 (Update 1) with CSA for Matrix, you cannot use the “Dynamic” SAN volume automation feature, and therefore, you need not configure HP Storage Essentials for use with CSA for Matrix

Follow the *HP Storage Essentials Installation Guide* to install and configure HP Storage Essentials for use with CSA for Matrix.

Installing and Configuring CSA for Matrix Flows and Templates

This chapter addresses the core processes related to integrating CSA for Matrix in the cloud environment. It covers installing flows and templates, confirming that the flows and templates are installed, customizing the flows for your environment, and adding SiteScope flows to templates. These processes complete the installation, but not the verification. After installation, you must configure resource pools and create a test template to verify the installation. Figure 31 shows the high-level processes covered in this chapter.

Figure 31 Installing CSA Software

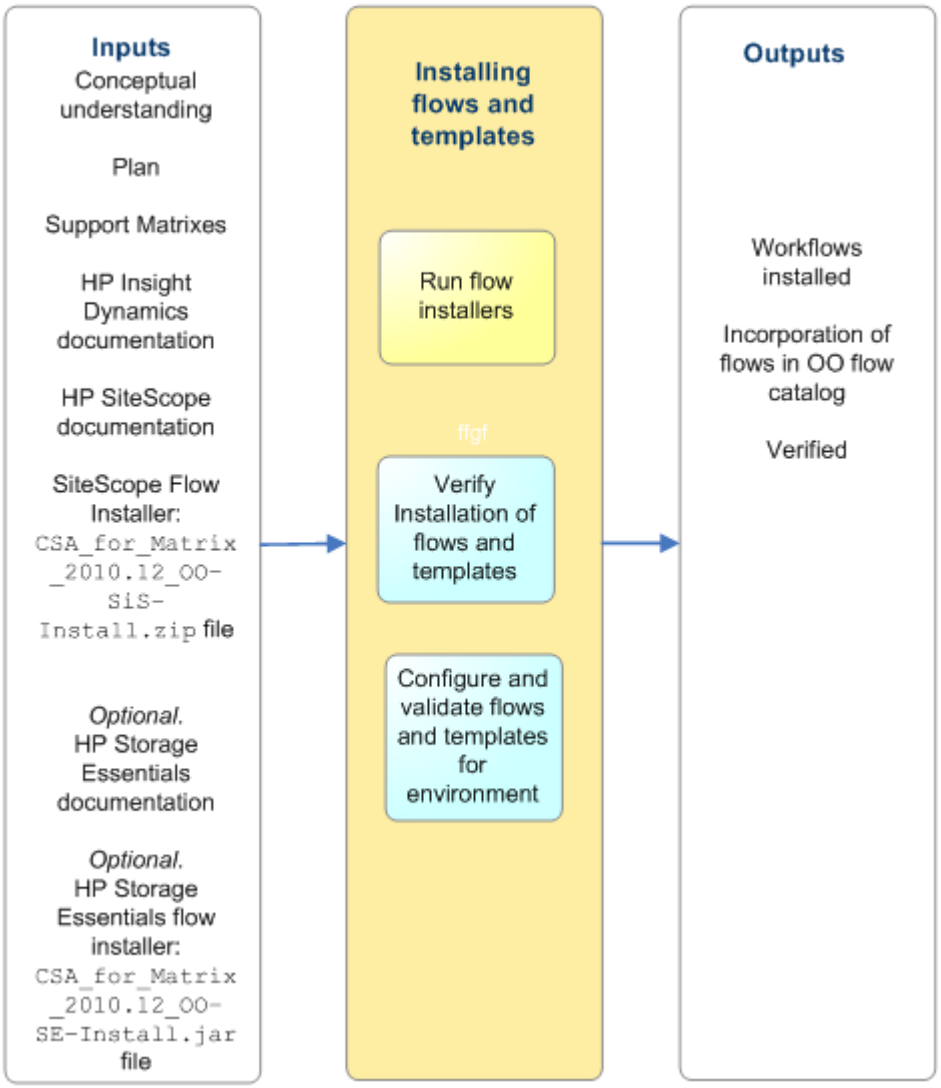
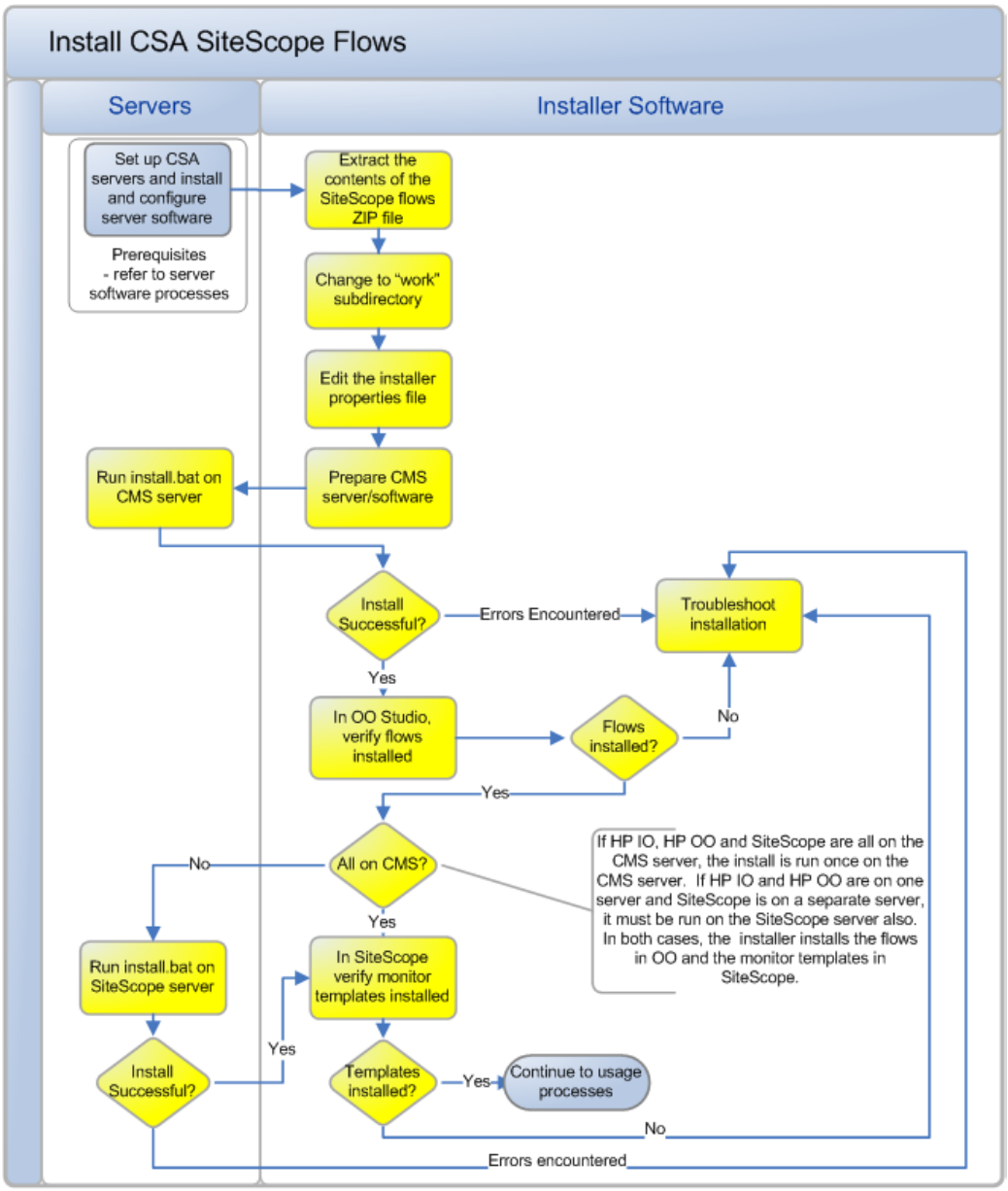


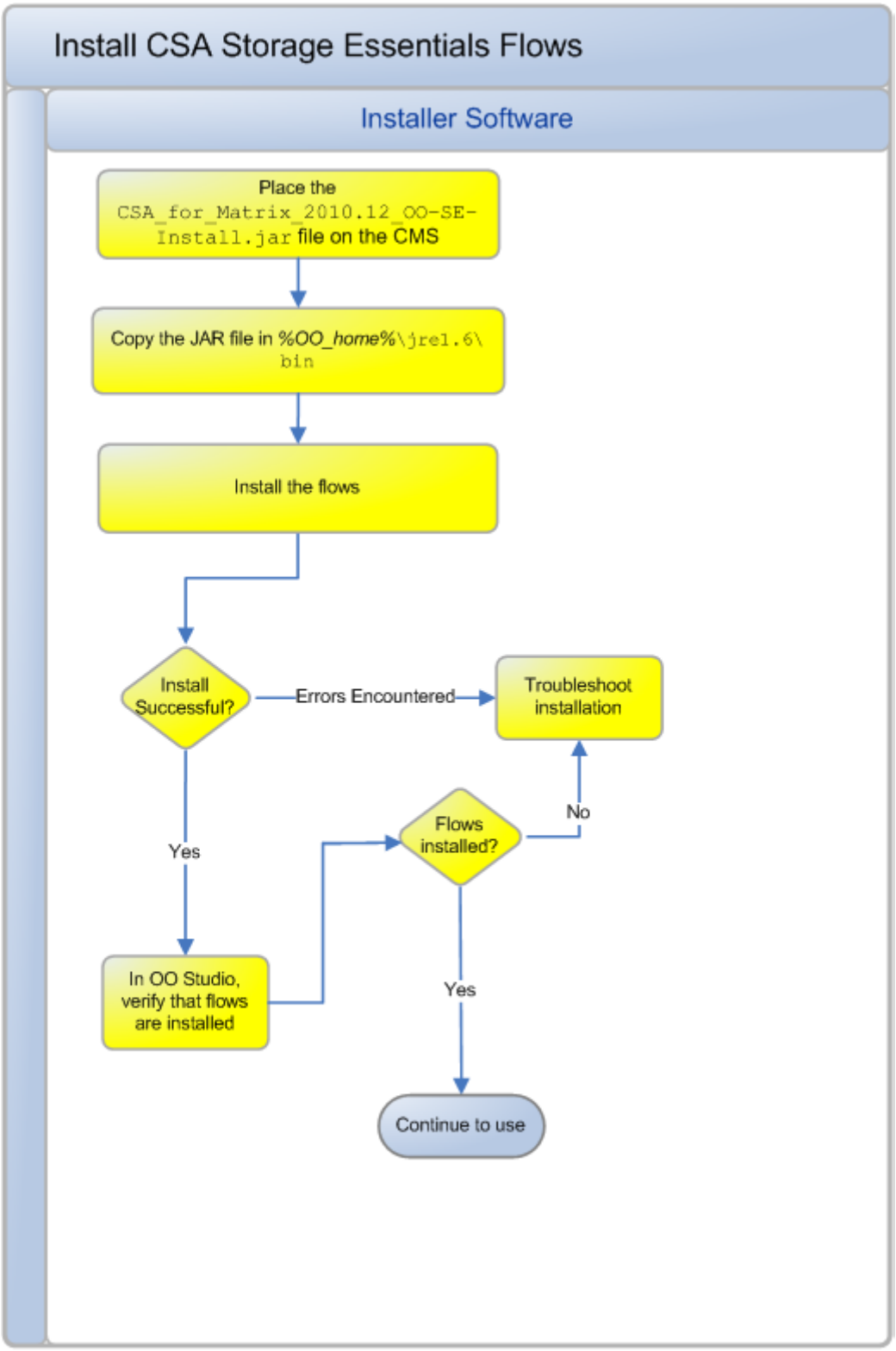
Figure 32 expands the SiteScope flow installer process into the following subcategories: preparing, installing, configuring, and validation. Evaluate each subcategory to determine the steps necessary for your installation.

Figure 32 High-level CSA for Matrix SiteScope Flow Installer Processes Expanded



Optional. Figure 33 expands the Storage Essentials flow installer process into different subcategories.

Figure 33 High-level CSA for Matrix Storage Essentials Flow Installer Processes Expanded



Preparing the Environment for CSA for Matrix Flows

The installation process described below is oriented toward new installations. If the CSA for Matrix SiteScope flows have previously been installed, specific steps must be taken prior to initiating the installation process.

The following steps describe the process of checking OO Studio for previously installed flows and system properties and clearing them.

It is unnecessary to Check for Previous Installation and Prepare for Reinstallation of CSA Flows if this is a “greenfield” installation. Proceed to Installing CSA for Matrix Workflows on page 81.

Check for Previous Installation and Prepare for Reinstallation of CSA Flows

You cannot upgrade the CSA for Matrix 2010, September, environment to CSA for Matrix 2010, December. To migrate to the CSA for Matrix, 2010, December, environment, you must perform the following tasks:

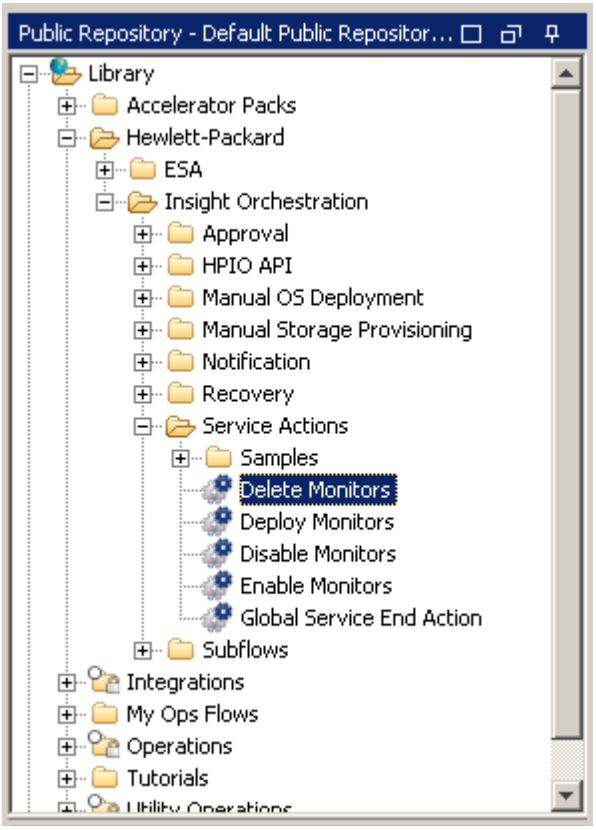
1. Upgrade the HP products to the supported versions (versions that are supported by CSA for Matrix, 2010, December).
   - Upgrade HP Server Automation to 9.02 or 9.03.
   - Upgrade HP SiteScope to 11.00 or 11.01.
   - *Optional.* Upgrade HP Insight Dynamics to 6.2 Update 1 if you want to use the “Dynamic” SAN volume automation feature.
2. Remove old flows.

To remove old flows, follow these steps:

If you do not remove the previous CSA flows and CSA SiteScope template data from the SiteScope server and CMS, the installation procedure will yield unpredictable results.

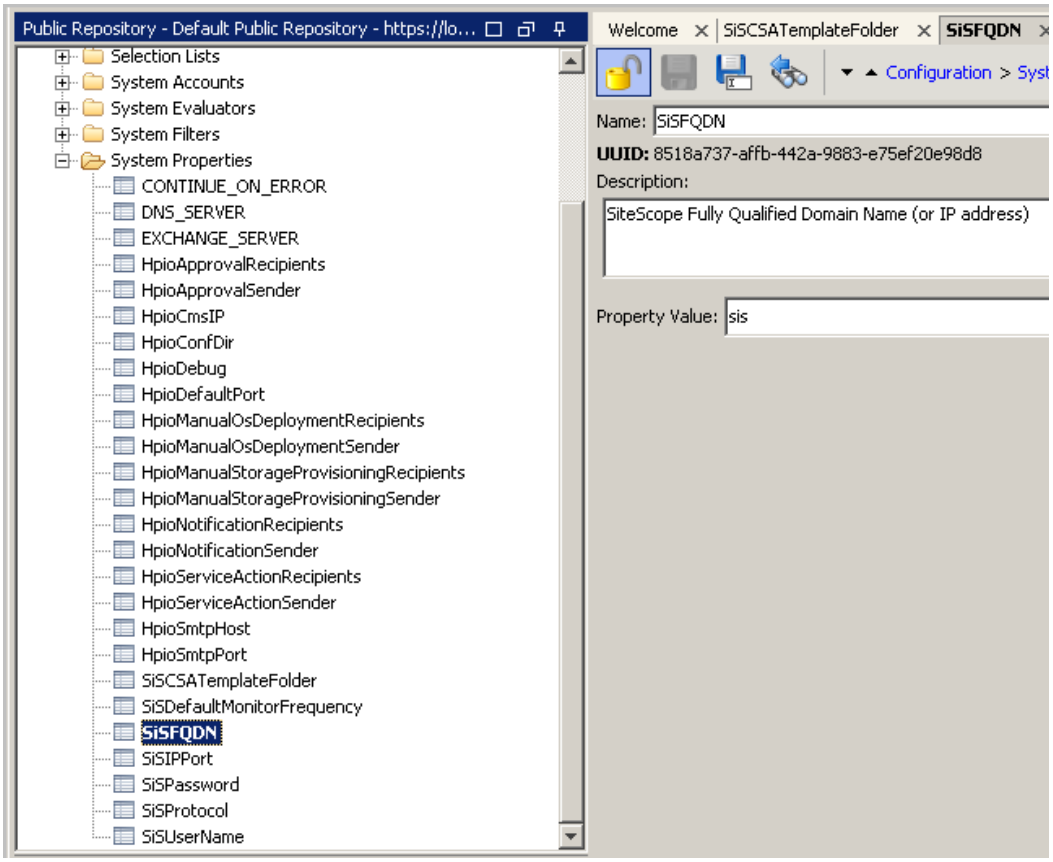
1. Open OO Studio.
2. Navigate to **/Library/Hewlett-Packard/Insight Orchestration/Service Actions**.
3. Locate the following flows:

```
Deploy Monitors
Disable Monitors
Enable Monitors
Delete Monitors
```



4 Right-click and select **Delete**; then answer **YES** to all prompts.

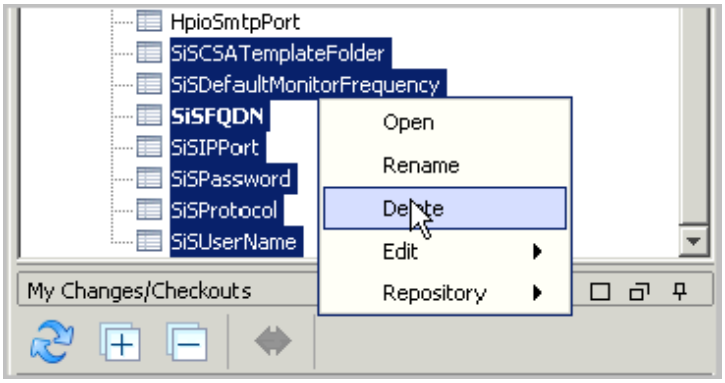
5 Navigate to **Configuration/System Properties**.



6 Delete the following CSA system properties:

If SiteScope system properties exist, the installation ignores the `csaInstall.properties` file.

```
SiSFQDN
SiSUserName
SiSPassword
SiSIPPort
SiSDefaultMonitorFrequency
SiSProtocol
SiSCSATemplateFolder
```



7 Check in changes to the repository:

a Right click **Library > Repository > Check in Tree**.

b Answer **Yes** or **OK** to all prompts.

8 Stop services:

```
net stop "RSScheduler"
net stop "RSCentral"
net stop "RSJRAS"
net stop "HP Extensible Storage & Server Adapter"
net stop "HP Logical Server Automation"
net stop "HP Insight Orchestration"
```

9 Delete the OO metadata directory, including all subfiles:

```
C:/Program Files/HP/Operations Orchestration/central/rcrepo/
data/.metadata
```

10 Restart services:

```
net start "RSScheduler"
net start "RSCentral"
net start "RSJRAS"
net start "HP Extensible Storage & Server Adapter"
net start "HP Logical Server Automation"
net start "HP Insight Orchestration"
```

11 OO is now ready for the CSA flows to be re-installed.

More Information in Log Files and the Readme File

The following log files can provide useful information regarding possible causes of errors.

The OO installation path is the path that was entered during installation.

```
C:\Program Files\HP\Operations
Orchestration\Central\logs\Central_wrapper.log
```

```
C:\Program Files\HP\Operations
Orchestration\Central\logs\audit.log
```

```
C:\Program Files\HP\Operations
Orchestration\RAS\Java\Default\webapp\logs\wrapper.log
```

The README file included with the CSA SiteScope Flows installer (`CSA_for_Matrix_2010.12_OO-SiS-Install.zip`) contains additional information.

Installing CSA for Matrix Workflows

The *Cloud Service Automation for Matrix Product Software and Documentation* CD provides you with the following flows:

- **HP SiteScope flows**

  The `CSA_for_Matrix_2010.12_OO-SiS-Install.zip` file, available on the *Cloud Service Automation for Matrix Product Software and Documentation* CD, includes necessary files to install the HP SiteScope flows.

The HP SiteScope Flow Installer installs workflows and SiteScope templates. When run on the HP Insight Dynamics CMS, the script installs SiteScope monitor OO flows and system properties. When run on the HP SiteScope server, the script installs the SiteScope templates.

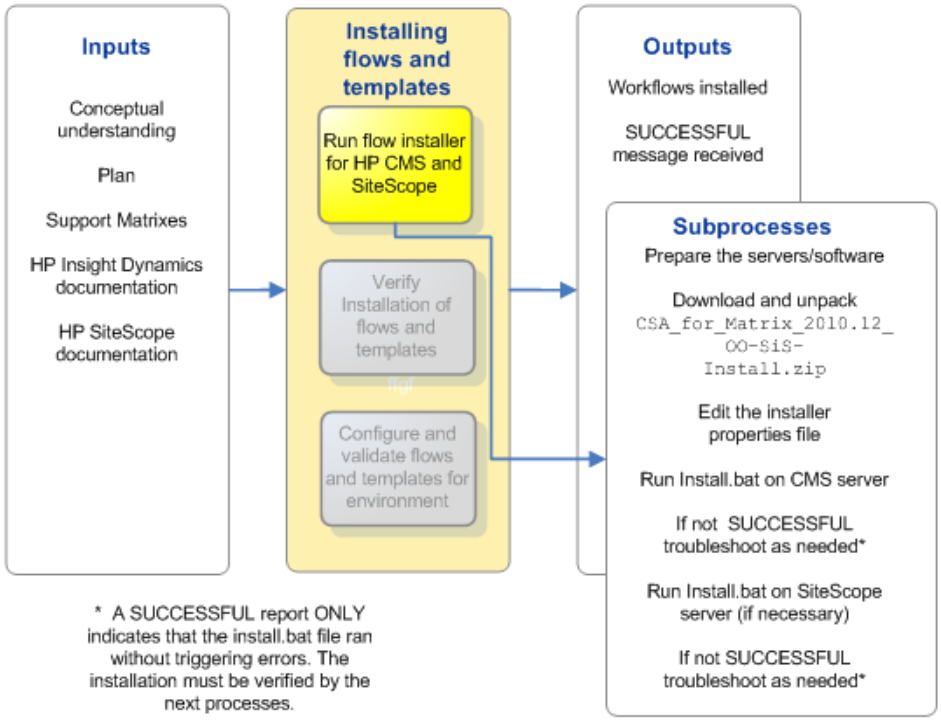
Following successful installation, SiteScope workflows can be added to HP IO service templates. Refer to Adding HP SiteScope Flows to the Templates on page 93.

CSA for Matrix provides four pre-configured HP OO workflows, which are typically paired in an HP IO service template to perform monitoring tasks on a managed server. These workflows are added to HP IO templates to simplify the process of building templates for these commonly required services.

- Deploy/Delete monitors
  - Deploy HP SiteScope monitors to a managed server
  - Delete HP SiteScope monitors from a managed service (to delete every monitor of the service)
- Disable/Enable monitors
  - Disable HP SiteScope monitors from a managed server (when the server is deactivated or powered off)
  - Enable HP SiteScope monitors from a managed server (when the server is activated or powered on)

After you import the CSA for Matrix workflows into OO, you can use SiteScope flows in any HP IO service template.

Figure 34 Installing CSA for Matrix Flows and Templates



- **HP Storage Essentials flows**

  The *Cloud Service Automation for Matrix Product Software and Documentation* CD presents the `CSA_for_Matrix_2010.12_OO-SE-Install.jar` file, which includes the necessary files to install the HP Storage Essentials flows.

Prerequisites

- Verify HP SA is installed.
- Verify HP IO and HP OO are both installed on the CMS.
- Verify HP SiteScope version 11.00 or 11.01 is installed.
- Verify the Java plug-in is installed for any client browser that runs the HP SiteScope the dashboard.
- Complete HP SiteScope licensing configuration, if necessary.
- Unless this is a clean or "greenfield" installation, the CMS with HP IO and OO must be prepared for reinstallation of CSA flows. See Preparing the Environment for CSA for Matrix Flows on page 78.
- *Optional.* Verify that HP Storage Essentials 6.3 is installed and configured in the environment.

  If you want to use HP Storage Essentials for dynamic storage provisioning, you must update the ESA to the version 1.2.1.1 on the HP Insight Dynamics CMS 6.2 Update 1. For more information, see Update Extensible Storage and Server Adapter (ESA) Workflows to the Version 1.2.1.1 on the HP Insight Dynamics CMS 6.2 Update 1 on page 58.

Importing and Installing CSA for Matrix Workflows

To import and install the CSA for Matrix workflows, perform the following tasks:

1. Task 1: Import Workflows for HP SiteScope on page 83.
2. *Optional.* Task 2: Import Workflows for HP Storage Essentials on page 84.
3. *Only if SiteScope is installed on a server other than the CMS.* Task 3: Import the CSA SiteScope Templates into HP SiteScope on a Separate Server on page 85.

Before running the installer programs for CSA for Matrix workflows on the HP OO server, you must first stop all HP OO and HP SIM clients.

Import Workflows for HP SiteScope

1. Log on to the CMS as Administrator.
2. Make sure you have placed the `CSA_for_Matrix_2010.12_OO-SiS-Install.zip` file on the CMS server from the *Cloud Service Automation for Matrix Product Software and Documentation* media. The file is available in the `CSA_for_Matrix_2010.12_OO-SiS-Install` directory on the media.
3. Extract the contents of the `CSA_for_Matrix_2010.12_OO-SiS-Install.zip` file to a temporary folder on the CMS.
4. In a Command window, change to the temporary folder.

5 Edit the `csaInstall.properties` file, which contains all configurable installation parameters.

```
Property Name Description
ooDir = OO install directory
ioDir = IO install directory
sisDir = SiteScope install directory
ooLogin = OO Studio username
ooPassword = OO Studio password
SiSFQDN = SiteScope Server Hostname or IP address
SiSIPPort = SiteScope Server Port Number*
SiSUserName = SiteScope Server Login Name
SiSPassword = SiteScope Server Password
```

6 Unless this is a clean or "greenfield" installation, the CMS with HP IO and OO must be prepared for reinstallation of CSA flows. See Preparing the Environment for CSA for Matrix Flows on page 78.

If the CMS server is not cleared of previous CSA flows and CSA SiteScope template data, the following step yields unpredictable results.

7 Run the following command:

`install.bat`

If all goes well, system reports `SUCCESSFUL INSTALL`; otherwise it reports `ERRORS ENCOUNTERED`

Import Workflows for HP Storage Essentials

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

1 Log on to the CMS as Administrator.

Install the HP Storage Essentials flow if you want to use CSA for Matrix to dynamically provision SAN arrays.

2 Make sure you have placed the `CSA_for_Matrix_2010.12_OO-SE-Install.jar` file on the HP CMS server from the *Cloud Service Automation for Matrix Product Software and Documentation* media. The file is available in the `CSA_for_Matrix_2010.12_OO-SE-Install` directory on the media.

3 Copy the `CSA_for_Matrix_2010.12_OO-SE-Install.jar` file into the following directory:

%OO_home%`\jre1.6\bin`

4 At the command prompt, go to the directory *%OO_home%*`\jre1.6\bin`, and then run the following command:

`java -jar CSA_for_Matrix_2010.12_OO-SE-Install.jar -centralPassword <`*`OO_Central_password`***`> -centralURL https://localhost:16443`**

In this instance, <*OO_Central_password*> is the password for your HP OO Central.

5 Restart the `RSJRAS` service from the Services window.

Import the CSA SiteScope Templates into HP SiteScope on a Separate Server

Skip this section if HP SiteScope is installed on the CMS.

If HP SiteScope is installed on a remote system (other than the CMS), you must import the templates on the HP SiteScope server.

To import the HP SiteScope templates, follow these steps:

1. Log on to the HP SiteScope server as Administrator.
2. Make sure you have placed the `CSA_for_Matrix_2010.12_OO-SiS-Install.zip` file on the HP SiteScope server from the *Cloud Service Automation for Matrix Product Software and Documentation* media. The file is available in the `CSA_for_Matrix_2010.12_OO-SiS-Install` directory on the media.
3. Extract the contents of the `CSA_for_Matrix_2010.12_OO-SiS-Install.zip` file to a temporary folder on the HP SiteScope server.
4. Follow step 4 through step 7 provided in the Import Workflows for HP SiteScope on page 83 section.

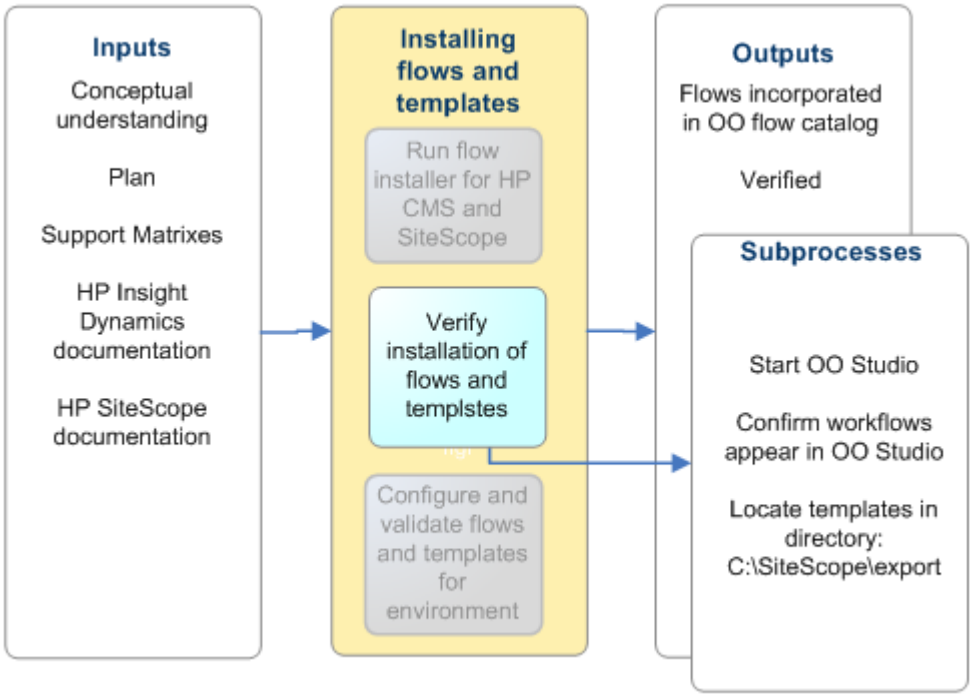
If the install is successful, you must still verify that the flows and templates were properly installed. Refer to Verifying Installation of Flows and Templates on page 86.

If you encountered errors, recheck prerequisites and procedures. Confirm installation parameters. If the cause of the error is not apparent, follow the process for Common Issues Installing CSA Flows on page 94.

Verifying Installation of Flows and Templates

Once the installation tasks report SUCCESSFUL INSTALL, you must confirm that the flows and templates have been imported properly. Figure 35 shows the verification process.

Figure 35 Verifying Installation of Flows and Templates



After installation is complete, you can test whether or not the flows and templates have been properly installed by checking the flows.

Confirm Workflows Appear in OO Studio

Workflows for HP SiteScope

1. Log on to OO Studio.
2. Navigate to **Library > Hewlett-Packard > Insight Orchestration > Service Actions**.
3. Confirm that the following monitor flows appear:
   - Delete Monitor
   - Deploy Monitor
   - Enable Monitor
   - Disable Monitor

   If these flows do not appear, you must manually import them into OO Studio.

Workflows for HP Storage Essentials

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

1 Log on to OO Studio.

2 Navigate to **Library > Hewlett-Packard > CSA > SESANStorage > Flows**, and make sure the following flows appear:

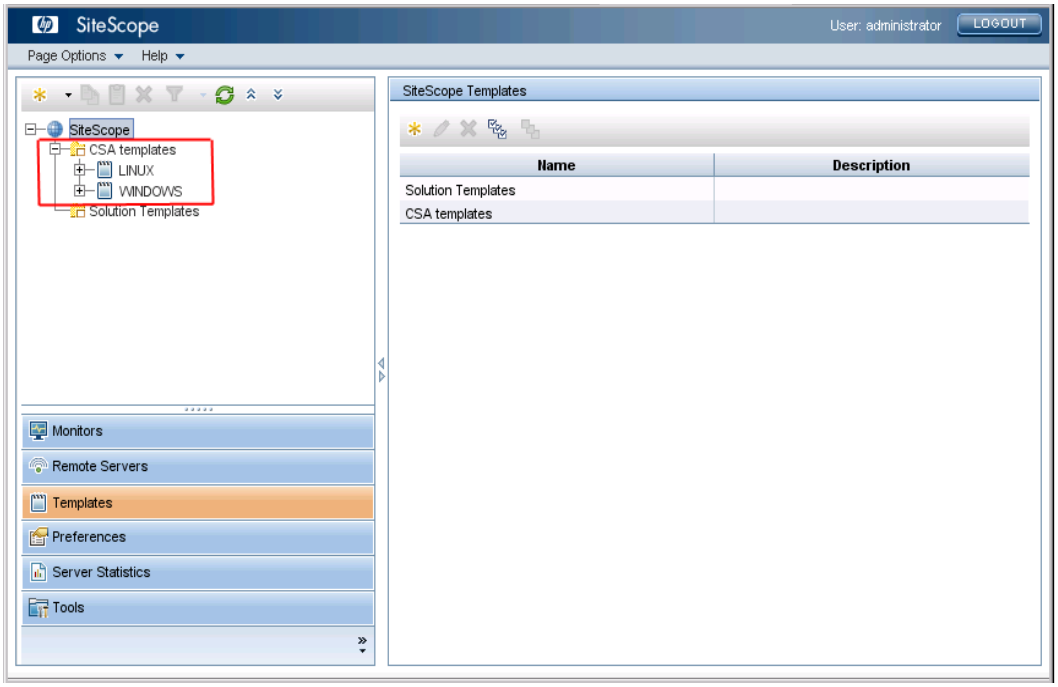
- SE Discover Arrays
- SE Enumerate Pools
- SE Enumerate Volumes
- SE Get Device Information
- SE Get Volume Info
- SE Present Volume
- SE Set Host Mode
- SE Un-present Volume

If these flows do not appear, you must manually import them into OO Studio.

Confirm Monitor Templates Appear in HP SiteScope

1 Go to the SiteScope dashboard and review contents of the Templates folder.

Figure 36 Monitor Templates in Templates Folder



2 Verify that the **CSA templates** folder is present and has two entries:

- WINDOWS

— LINUX

Either a SiteScope specific account needs to be created on each target Windows OS and each target Linux OS, or all response files to install operating systems must include the root password that matches the credentials entered into SiteScope. CSA for Matrix does not support different passwords for each Windows server or for each Linux server within SiteScope.

3 Configure a user credentials profile for the CSA for Matrix monitor templates.

a In Preferences context, click **Credential Preferences**.

On the Credential Preferences page, the following user profiles appear:

— `WINDOWS-CSA-TARGETS`

— `LINUX-CSA-TARGETS`

These users were added by CSA for Matrix.

b On the Credential Preferences page, select a user.

Select `WINDOWS-CSA-TARGETS` for Windows managed systems; select `LINUX-CSA-TARGETS` for Linux managed systems.

c Click **Edit Credential Profile** ( ).

d In the Edit Credential Profile dialog box, enter the following information:

— **`Domain`**: Leave blank unless necessary.

— **`Login`**: Specify the name of the administrative user for Windows managed systems. Specify root for Linux managed systems.

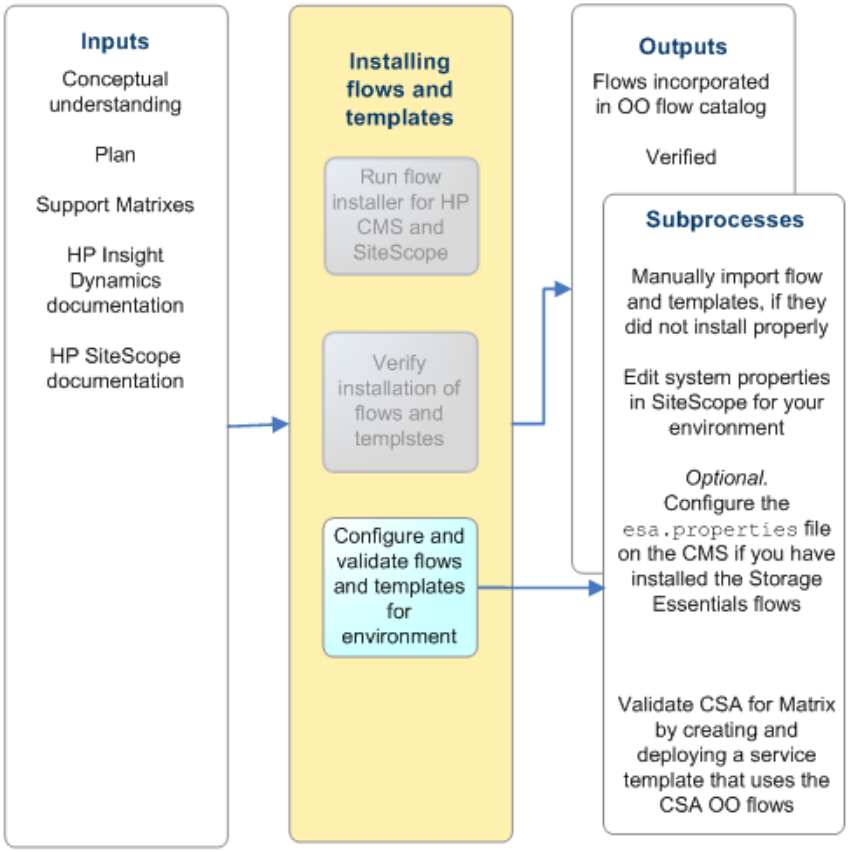
— **`Password`**: Specify the password for the above user.

4 Click **Save**.

Configuring and Validating Flows and Templates for the Environment

The final step to install the CSA flows and templates is customizing and validating the flows for the environment.

Figure 37 Customize and Validate CSA Flows and Templates



Configure the Flow Inputs for Your Environment

Configure the HP SiteScope Workflows

1. Start OO Studio.
2. In the Authoring pane, click **Check Out** ().
3. In the Repository pane, expand **Configuration > System Properties**.
4. Change the following input properties to values corresponding to your environment:
   - SiSFQDN: **<fully qualified domain name of your SiteScope server>**
   - SiSUserName: **<SiteScope server's administrator username>**
   - SiSPassword: **<SiteScope server's administrator password>**

- SiSIPPort: **<IP port of your SiteScope service from SiteScope install time>**
- SiSProtocol: **<HTTP access protocol to your SiteScope server>**
- SiSCSATemplateFolder: **<CSA templates folder on your SiteScope server>**
  SiSDefaultMonitorFrequency: **<monitor frequency in seconds for your CSA monitors>**

5 Click **File > Save**.

6 In the Authoring pane, click **Check In** ().

Configure HP Storage Essentials Workflows

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

1 Start OO Studio.

2 In the Authoring pane, click **Check Out** ().

3 In the Repository pane, under System Properties, double-click **SECMSIP**.

4 In the Authoring pane, type the IP address of the HP Storage Essentials management server in the Property Value box. If the HP Storage Essentials management server is configured to use a non-default port, type the IP address in the following format:

   <*IP_Address*>:<*Port*>

   In this instance, <*IP_Address*> is the IP address of the HP Storage Essentials management server and <*Port*> is the non-default port.

5 In the Repository pane, under System Accounts, double-click **SECredentials**.

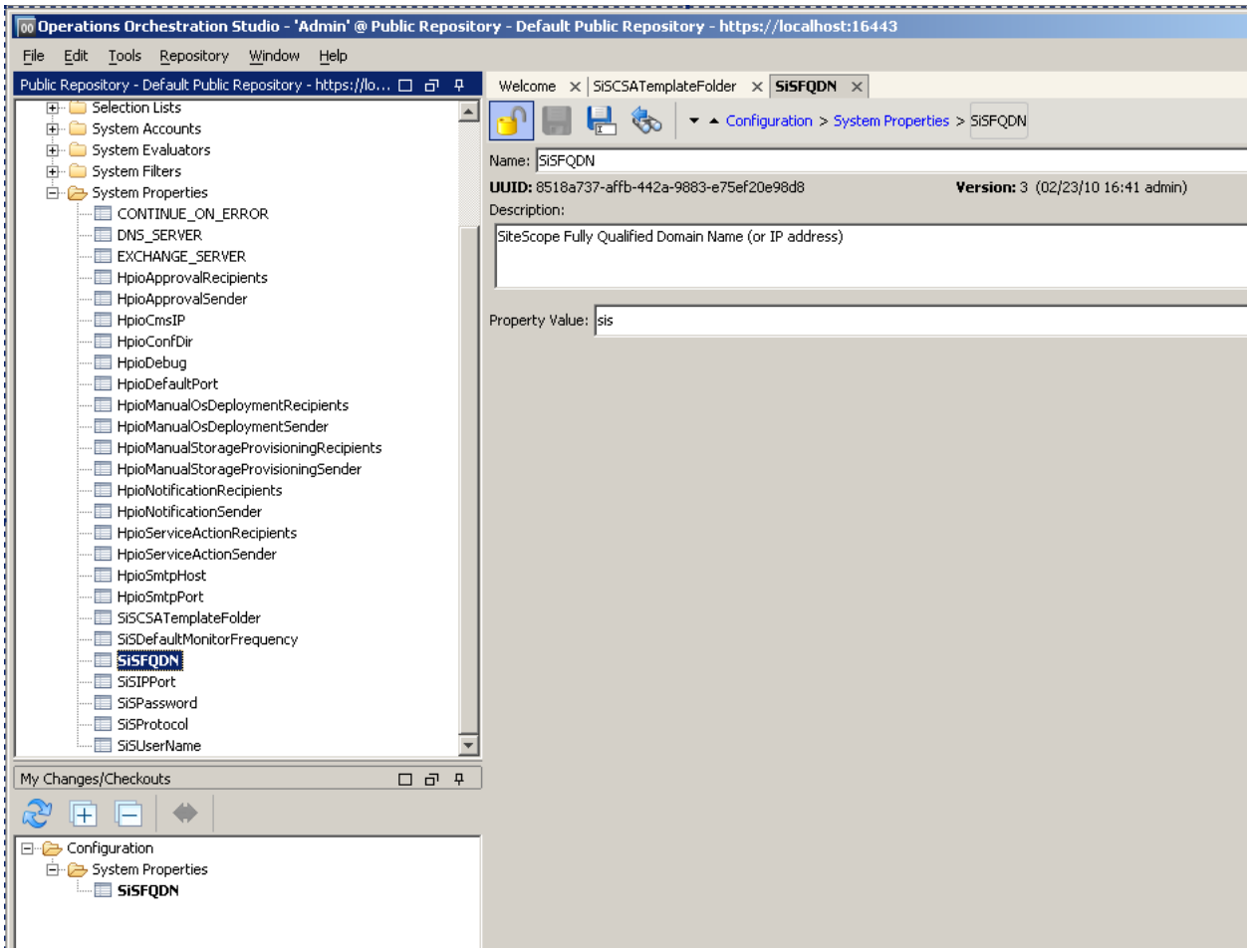
6 In the Authoring pane, type the user name and password of the HP Storage Essentials user.

7 Click **File > Save**.

8 In the Authoring pane, click **Check In** ().

Figure 38 shows editing of the system properties in OO Studio.

Figure 38 Editing the System Properties in OO Studio



Additional Configuration for HP Storage Essentials Workflows

This is an optional section. Skip this section if you do not want to use HP Storage Essentials with CSA for Matrix.

If you have installed the HP Storage Essentials flows on the CMS, you must edit the `esa.properties` file to add references to the HP Storage Essentials flows.

To edit the `esa.properties` file, follow these steps:

1. Log on to the CMS as Administrator.
2. Go to the following directory:

   `C:\Program Files\HP\Virtual Server Environment\conf`
3. Open the `esa.properties` file with a text editor program.
4. Go to the section `#STORAGE WorkFlows`.

5 Edit the following properties:

Property	Set the value to...
esa.oo.get.device.info.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Get Device Information
esa.oo.enumerate.pools.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Enumerate Pools
esa.oo.enumerate.volumes.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Enumerate Volumes
esa.oo.get.volume.info.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Get Volume Info
esa.oo.get.volume.info.flow.timeout	1200000
esa.oo.present.volume.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Present Volume
esa.oo.present.volume.flow.timeout	2400000
esa.oo.un-present.volume.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Un-present Volume
esa.oo.un-present.volume.flow.timeout	2400000
esa.oo.set.host.mode.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Set Host Mode
esa.oo.set.host.mode.flow.timeout	2400000
esa.oo.discover.arrays.flow.path	Hewlett-Packard/CSA/ SESANStorage/Flows/ SE Discover Arrays

6 Save the file.

7 *For XP and HDS only.* If the storage system has four or more ports on the fabric, you must increase the operation time-out value.

a On the CMS, open the `wrapper.conf` file with a text editor. The file is available in the directory `C:\Program Files\HP\Operations Orchestration\Central\conf`.

b Add the following line in the file:

```
wrapper.java.additional.3=-Dras.client.timeout=24000
```

c Save the file.

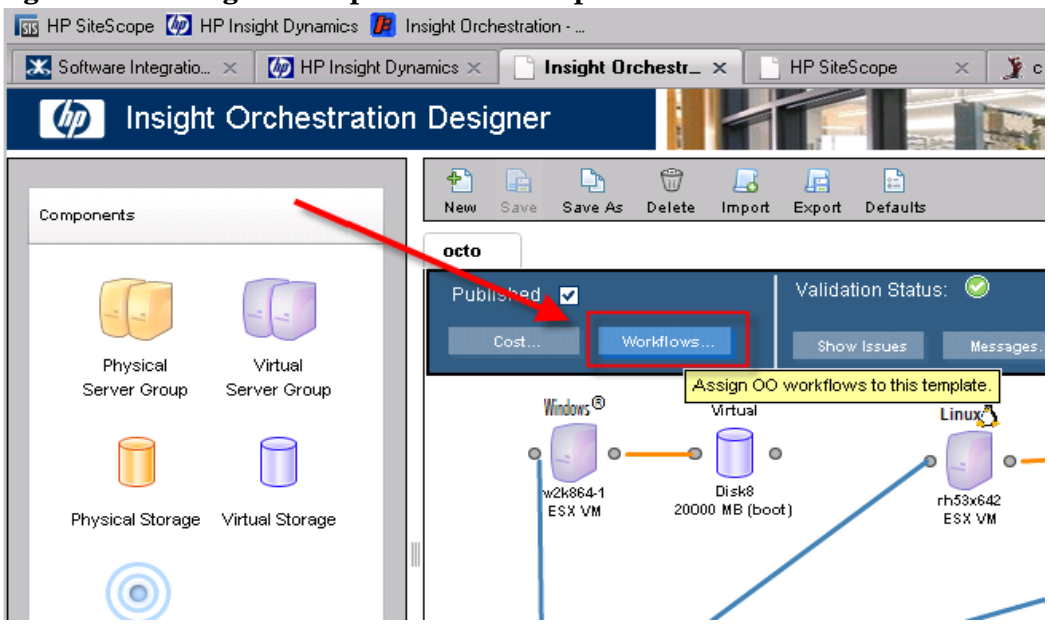
d Restart the `RSCentral` service from the Services window.

8 Restart the `HP Extensible Storage & Server Adapter` service from the Services window.

Adding HP SiteScope Flows to the Templates

1 In the IO Designer when editing the template, select **Workflows...** as shown in Figure 39.

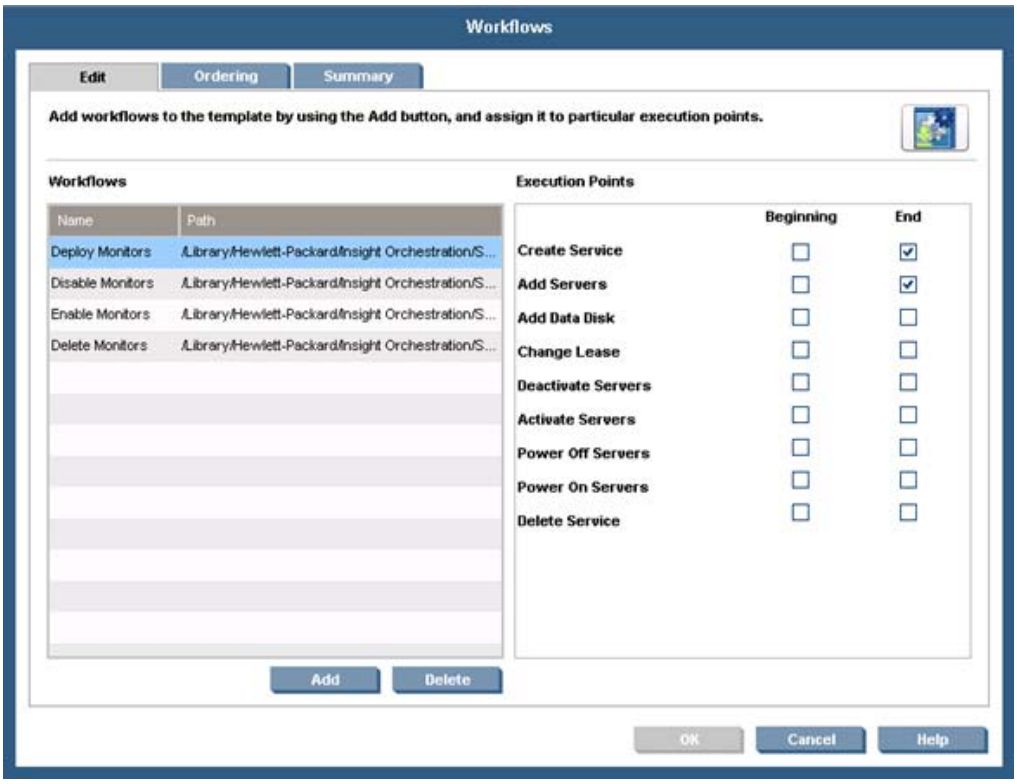
Figure 39 Adding SiteScope Flows to Templates



2 Expand all (press the **++** button).

3 Select the **Deploy Monitor Template** and select the **Create Service End** and **Add Servers** check boxes as shown in Figure 40.

Figure 40 Workflow Add Screen



4 Press **Add**.

5 Press **OK**.

6 To add the deletion flow, expand all. (Press the **++** button.)

7 Select the **Delete Monitor Group** and check the **Delete Service Beginning** check box.

8 Press **Add**.

9 Press **OK**.

10 Repeat steps 4 and 5 for the **Add Services** check box.

Common Issues Installing CSA Flows

Manually Import the SiteScope Monitor Templates

Optional: Use these procedures as backup to the installation procedure in Installing CSA for Matrix Workflows on page 81.

1 In the HP SiteScope Dashboard, create a template container for the CSA for Matrix server monitor templates:

a. In the Templates context, click **New** (*), and then click **New Template Container**.

b. In the New Template Container dialog box, enter the following information:

— **Name**: Name must match the value of `SiSCSATemplateFolder` entered in the system properties in OO Studio as described on page 90.

— **Description**: Descriptive text

2. Import the SiteScope templates to the new template container:

a. In the Templates context, right-click the template container you created in step 1, and then click **Import**.

b. In the HP SiteScope Import Template dialog box, enter the following information:

— File Name: `csa-servers.tmpl`

— Path: `C:\SiteScope\export`

The SiteScope installation path is the path that was entered during installation.

3. Follow the steps in Confirm Monitor Templates Appear in HP SiteScope on page 87.

Installing and Configuring HP Storage Essentials Flows at a Later Time

You can choose to install HP Storage Essentials workflows at a later time—after installing and configuring the HP SiteScope workflows.

To install and configure HP Storage Essentials workflows after deploying the CSA for Matrix solution with SiteScope workflows, follow these steps:

1. Make sure the version of HP Insight Dynamics is 6.2 Update 1.
2. Verify that HP Storage Essentials 6.3 is installed and configured in the environment.
3. Follow the steps in Import Workflows for HP Storage Essentials on page 84.
4. Verify that the import was successful by following the steps in Workflows for HP Storage Essentials on page 87.
5. Follow the steps in Configure HP Storage Essentials Workflows on page 90.
6. Follow the steps in Additional Configuration for HP Storage Essentials Workflows on page 91.

Migrating to a Standalone OO Installation

HP IO embeds the 7.51 version of HP OO and contains a limited edition of the OO content to facilitate server provisioning. If you like, you can migrate to a complete, standalone version of OO (*Windows only*) only after deploying the CSA for Matrix solution. You can migrate to the following complete versions of OO only after installing and configuring all flows and templates for CSA for Matrix by utilizing the embedded version of OO:

- 7.51
- 9.00

You cannot install CSA for Matrix workflows on a standalone OO server. You must complete the installation of all the CSA for Matrix workflows on the CMS, and then you must migrate the workflows to the standalone OO server.

To migrate to a standalone OO installation, follow these steps:

1. Complete the installation of OO on a standalone server (*Windows only*).
2. On the standalone OO server, create the following directory:

   `C:\tmp`
3. Migrate the embedded OO configurations to the standalone OO server. For necessary instructions, contact your HP Insight Dynamics representative.
4. *Optional.* Migrate HP Storage Essentials Workflows.
5. After completing the migration steps, log on to the standalone OO server, and then follow the steps in Configure the Flow Inputs for Your Environment on page 89.

Migrate HP Storage Essentials Workflows

If you want to use the optional integration between HP IO and HP Storage Essentials, migrate the HP Storage Essentials JAR files and workflow repository to the standalone OO server.

1. **Migrate the JAR files.**

   Transfer the JAR files for CSA for Matrix to the standalone OO server.

   a. Log on to the CMS.

   b. Go to the directory `C:\Program Files\HP\Operations Orchestration\RAS\Java\Default\repository`.

   c. Transfer the files `csaseesa.jar` and `csastorageautomation.jar` to the standalone OO server by using a file transfer mechanism.

   d. Go to the directory `C:\Program Files\HP\Operations Orchestration\RAS\Java\Default\repository\lib`.

   e. Transfer the directories `csaseesa` and `csastorageautomation` to the standalone OO server by using a file transfer mechanism. Transfer the complete directories and not just the contents of the directories.

On the standalone OO server, follow these steps:

a Place the `csaseesa.jar` and `csastorageautomation.jar` files in the following directory:

%ICONCLUDE_HOME%`\RAS\Java\Default\repository`

b Place the `csaseesa` and `csastorageautomation` directories in the following directory:

%ICONCLUDE_HOME%`\RAS\Java\Default\repository\lib`

c Restart the `RSJRAS` service from the Services window.

2 **Migrate the workflows.**

a On the CMS, open OO Studio.

b In the Repository pane, expand **Library > Hewlett-Packard**, and then right-click **CSA**.

c Select **Repository > Export as New Repository**.

d In the Select Repository Directory dialog box, go to a directory on the standalone OO server. For example:

`\\<`*OO-server*`>\C$\tmp\CSA`

In this instance, <*OO-server*> is the FQDN of the standalone OO server.

Alternatively, you can choose a local folder in the Select Repository Directory dialog box. OO saves the repository in a local folder of your choice. You must then transfer the complete folder on the standalone OO server.

e Click **Save**. The Export Options dialog box opens.

f Make sure that the following items are not selected in the export options:

– Domain Terms

– Selection Lists

– System Properties

– System Accounts

g Click **OK**.

3 **Import the HP Storage Essentials flow repository on the standalone OO server.**

a Log on to the standalone OO server.

b Open OO studio.

c Click **Repository > Import Repository**. The Select Repository Directory dialog box opens.

d Select the directory where you transferred the HP Storage Essentials flow repository from the CMS.

e Click **Open**.

f In the Importing From dialog box, click **Apply**.

g In the Import dialog box, click **OK**.

Using HP Cloud Service Automation 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 "Insight Orchestration provisioning and allocation" in the *HP IO User Guide*.

The network architect uses the HP 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 HP IO Designer, see "Using Insight Orchestration Designer" in the *HP IO User Guide*. For more detailed information, see the Designer help.

Managing Resources and Services

The network administrator uses the HP 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 "Using Insight Orchestration console" in the *HP IO User Guide*. For more detailed information, see the Console help.

Requesting Services

The business user uses the HP 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 "Using Insight Orchestration Self-Service portal" in the *HP IO User Guide*. For more detailed information, see the Portal help.

Acronyms

A - B

APX
application platform extension

C

CIFS
common internet file system

CMDB
configuration management database

CMS
central management server

CMSD
central management server domain

CSA
HP Cloud Service Automation

CSA for Matrix
HP Cloud Service Automation for Matrix

D

DA
Deployment Automation

DAS
direct access storage

DHCP
dynamic host configuration protocol

E-G

ESA
Extensible Storage and Server Adapter

EVA
Enterprise Virtual Array

FC
fibre channel

H

HP ID
HP Insight Dynamics

HP IO
HP Insight Orchestration

HP SIM
HP Systems Insight Manager

I - J

ICE
Insight Control Environment

ICMP
internet control message protocol.

ID
HP Insight Dynamics

ID-VSE
HP Insight Dynamics Virtual Server Environment

iLO
integrated lights out

IO
HP Insight Orchestration

IPL
standard boot order

ITSM
IT service management

L

LDAP
lightweight directory access protocol

LSA
logical server adapter

LSM
Logical Server Manager

LUN
logical unit number

M

N

NIC
network interface controller

NOC
network operations center

O

OA
Onboard Administrator

OO
HP Operations Orchestration

OS
operating system

P - Q

PXE
pre-boot execution environment

R

RAID
redundant array of independent disks

RBSU
Rom-Based Setup Utility

RDP
Rapid Deployment Pack

RHEL
Red Hat Enterprise Linux

RHELSA
Red Hat Enterprise Linux Server Automation/ Architecture

S

SA
HP Server Automation (SA)

SAP
servers, applications, and products

SAN
storage area network

SE
Storage Essentials

SiteScope
HP SiteScope software used to monitor servers.

SLA
Service Level Agreement, Software License Agreement

SLES
SUSE Linux Enterprise Server

SLM
service lifecycle management

SOA
service-oriented architecture

SOI
Support Operations Integration

SPE
Storage Pool Entries

SPM
Storage Provisioning Manager

SuSE
Linux operating system

U

UCMDB

HP Universal Configuration Management Database

V

VA

virtual application, virtual array

VC

Virtual Center, Virtual Connect

VCEM

Virtual Connect Enterprise Manager

VCRM

Version Control Repository Manager

VLAN

virtual local area network

VMM

virtual machine manager

VSAN

virtual storage area network

VSE

HP Insight Dynamics - VSE (formerly the
HP Virtual Server Environment)

W

WSDL

web service definition language