# Oracle® Enterprise Manager Ops Center

Configuration Reference

12*c* Release 3 (12.3.2.0.0)

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Oracle Enterprise Manager Ops Center Configuration Reference, 12c Release 3 (12.3.2.0.0)

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## 3  Configure Jobs

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# Preface

The *Oracle® Enterprise Manager Ops Center Configuration Reference* describes the features of the Oracle Enterprise Manager Ops Center software that must be prepared for your site.

## Audience

This document is intended for users who require a detailed description of the product configuration.

## Related Documents

Lists the location of Oracle Enterprise Manager Ops Center documentation.

For more information, see the Oracle Enterprise Manager Ops Center Documentation Library at `http://docs.oracle.com/cd/E59957_01/index.htm`. For current discussions, see the product blog at `https://blogs.oracle.com/opscenter`.

Oracle Enterprise Manager Ops Center provides online Help. Click Help at the top-right corner of any page in the user interface to display the online help window.

For the latest releases of Oracle documentation, check the Oracle Technology Network at: `http://www.oracle.com/technetwork/documentation/index.html#em`.

## Conventions

The following text conventions are used in this document:

| Convention | Meaning |
|------------|---------|
| *italic* | Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values. |
| monospace | Monospace type indicates commands within a paragraph, code in examples, text that appears on the screen, or text that you enter. |

**1**

# Get Started With Configuration

Overview of Oracle Enterprise Manager Ops Center's role in the data center.

Oracle Enterprise Manager Ops Center is Oracle's comprehensive solution for managing the physical and virtual assets in your data center: operating systems, firmware, BIOS configurations, bare metal server and virtual guest provisioning, hardware monitoring, automatic My Oracle Support service request generation, and performance and energy management.

**Topics**

- Overview of Oracle Enterprise Manager Ops Center in Your Datacenter

- About the Scope of This Document

- Product Documentation Library

- Viewing User Preferences and Role Preferences

- Changing the Size of a Console Window

- Related Resources for Getting Started

## Overview of Oracle Enterprise Manager Ops Center in Your Datacenter

Overview of the role and purpose of the product software and its user interface.

Various sites and various users within each site value different aspects of the Oracle Enterprise Manager Ops Center software:

- As a monitoring tool, this product discovers and identifies all assets in its environment, and displays the status of assets and details of a specific asset. When an incident occurs, you can track the progress of the investigation or service request. You can learn details of an asset by selecting each one or each type and viewing the information in the dashboard and its tabs.

- As a provisioning tool, this product deploys new assets in a manner consistent with existing assets because you define the deployment using profiles to specify the attributes and you then use plans to direct the profiles to one or many targets. In the same way, you use update profiles and to upgrade assets.

- As a virtualization manager, this product creates virtual operating systems, virtual servers such as Oracle VM Server for SPARC and Oracle Solaris Zone, and virtual data centers in the cloud and manages them throughout their lifecycle. This product can also discover existing virtual assets and manage them. To support these virtual assets, the product provides storage and network resources either directly to the asset or to a pool that specified virtual assets share. Using a server pool to support virtual assets improves the mobility of the assets and improves the

resiliency of the network and storage resources because loads can be balanced and changed without affecting the virtual assets.

Not every product feature is relevant to your site's activities or for your role. What you see in the user interface is affected by several factors:

- **The role attached to your user account**: The actions for your role are available in the Actions pane. The required roles for using a feature are listed in each chapter of this document. When you must accomplish a task and the necessary action is not available to you, your administrator can add the role to your user account. When you log in again, the action is available.

- **The current connection mode**: In Connected mode, actions that rely on OS and firmware images and packages use the latest images and packages downloaded from Oracle and vendor sites. If your site uses the product software in Disconnected mode, the images and packages in your local knowledge base do not change until your site acquires them. Also in Connected mode, you can create service request from incidents with full asset information and warranty status. In Disconnected mode, you must contact My Oracle Support and provide this information.

  Changing the connection mode can be done easily and temporarily. See *Oracle Enterprise Manager Ops Center Administration* for the procedure for changing the connection mode.

- **The scope of Oracle Enterprise Manager Ops Center**: The product software is designed to manage assets of a data center, from small to large. The product software is also installed in Oracle SuperCluster engineered system, which is a complete integration of hardware and software that reaches a specific level of capability, capacity, and scale. In an engineered system, the product software is managing the components of the system and the virtual assets that the system supports. Some actions are not relevant to an engineered system and so are not visible in the user interface.

## About the Scope of This Document

After the product software is installed, the software is directed to discover targets: the physical and virtual assets in the datacenter. After discovery, the target is an asset that can be monitored for events and managed throughout its lifecycle. You might be performing all or some of the tasks needed to discover, to monitor, and to manage one or many assets. This document describes how you can use the product to discover assets, to configure the libraries that store OS and firmware images that provision assets, to configure the networks that support virtual assets, and to monitor events and communicate incidents.

## Product Documentation Library

Lists the titles of the Oracle Enterprise Manager Ops Center documents and how to get access to them.

All documentation for the current release of Oracle Enterprise Manager Ops Center software is located in the Oracle Help Center at `http://docs.oracle.com/cd/E59957_01/index.htm`.

You can use this library from any browser or from within the product's user interface. Click the **Help** option in the title bar to display the Help menu, as shown in Figure 1-1.

*Figure 1-1   Accessing the Document Library*
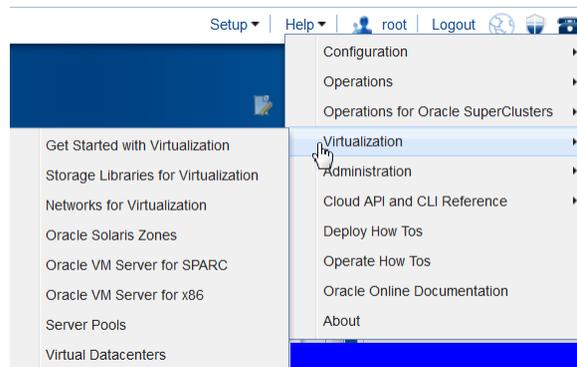


The documentation library contains the documents in Table 1-1. The How To documents are short, end-to-end examples of a specific task. In the same location of the library, you can display workflows, which are the sequence of How To documents that complete a deployment or operation scenario. For deployment tasks, go to `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm` and for operate tasks go to `http://docs.oracle.com/cd/E59957_01/nav/operate.htm`.

The documentation library also contains short videos that demonstrate some operations. The same videos are available from within the user interface. When you see the video icon in a wizard, as show in Figure 1-2, click it to watch a demonstration.

*Figure 1-2   Video Icon*



Use the Oracle Help Center's **Search** feature to locate specific information. The site can also convert the documents to PDF, EPUB, and Mobipocket file formats.

To see current discussions, you can go to the product blog at `https://blogs.oracle.com/opscenter`.

*Table 1-1   Documents for Oracle Enterprise Manager Ops Center*

| Document | Content |
|---|---|
| *Concepts* | An overview of the product software's architecture, its architecture, and its features. This document also explains the product's user interface. |
| *Readme* | Links to the installation and upgrade information and a description of known issues in the current release. |
| *Release Notes* | Information about the current version, procedures for installation, and known issues. |
| *Installation for Oracle Solaris Operating Systems* | Information about planning for a new installation of the product software and the procedure for installing the software on an Oracle Solaris server. |
| *Installation for Linux Operating System* | Information about planning for a new installation of the product software and the procedure for installing the software on a Linux server. |

**Table 1-1    (Cont.) Documents for Oracle Enterprise Manager Ops Center**

| Document | Content |
|---|---|
| *Ports and Protocols* | Lists the ports used by the product software, the protocol for each port, and its purpose. It also includes the websites that the product software uses. |
| *Upgrade* | Information about updating an existing installation of the product software to the current version. |
| *Administration* | Procedures for configuring each component of the product software, for configuring the software for high availability, for managing users and roles, and for maintaining the product database. This guide also has procedures for obtaining operating system updates, enabling Auto Service Requests (ASR), using the OCDoctor script, and upgrading the software. |
| *Configuration Reference* | Procedures for discovering and setting up storage resources, network resources, hardware assets, for monitoring these resources and assets, managing them through their lifecycle. |
| *Operations Reference* | Procedures for maintaining the managed assets such as provisioning and updating firmware and operating systems. |
| *Virtualization Reference* | Procedures for creating, configuring, and maintaining Oracle Solaris Zones, Oracle VM Servers for SPARC, and Oracle VM Servers for x86 hosts and guests. |
| *Operations for Oracle SuperCluster Reference* | A complete description of how the product works in engineered systems. |
| *Command Line Interface* | Instructions for using the product's command-line interface and man pages for each command. |
| *Security* | Descriptions and procedures for a secure Oracle Enterprise Manager Ops Center deployments. |
| *Certified System Matrix* | Supported hardware, operating systems, virtualization technologies, databases, and browsers. |
| *Cloud Infrastructure API and CLI Reference* | API and CLI commands to manage programmatically the allocated virtual resources for a virtual datacenter account and to create and manage vServers. |
| *System Monitoring Plug-in for Oracle Enterprise Manager Ops Center* | Procedure for installing and configuring the plug-in that enables Oracle Enterprise Manager Ops Center to connect to Enterprise Manager Cloud Control. |

# Viewing User Preferences and Role Preferences

Procedure for viewing the default user preferences in Oracle Enterprise Manager Ops Center.

*Oracle Enterprise Manager Ops Center Concepts* describes the features of the user interface. Some of the actions and the abilities can be changed, either by an individual user or by an administrator for all users with a specific role.

To see the current specifications or to change the specifications, click **Setup** in the title bar as shown in Figure 1-3 and then click **My Preferences** to see how your account has been specified.

*Figure 1-3    Setting User Preferences*
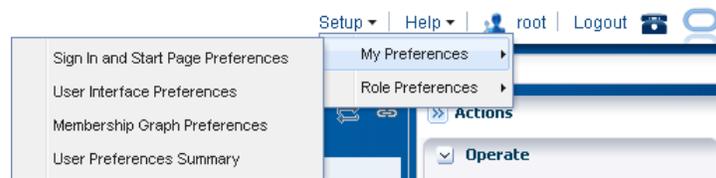


## About the Current User Interface Preferences

Describes the options for customizing the user interface for the logged-in user in Oracle Enterprise Manager Ops Center.

Figure 1-4 shows the User Preferences Summary window, which displays the current specifications for your start page, time intervals, and each asset type's default tab in the center pane.

To change the specifications in the User Preferences Summary window, click **User Interface Preferences**. Make changes, then log out and log in again.

The specification for the display of the Membership Graph and the Sign In and Start Page have separate windows.

- About Preferences By Role

- About Preferences for Sign In and Start Page

- About Preferences for the Membership Graph

- Preferences for Time Intervals

*Figure 1-4    User Interface Summary*

Oracle Enterprise Manager Ops Center - User Preferences Summary - root

## User Preferences Summary - root                                                    ORACL

### User Preferences Summary

**Assigned Roles - User has chosen to customize preferences**

Assigned User Roles: Proxy Controller Admin, Plan/Profile Admin, Apply Deployment Plans, Ops Center Admin, Cloud Admin, User Management Admin, Virtualization Admin, Fault Admin, Network Admin, Update Admin, Read, Role Management Admin, Storage Admin, SuperCluster Systems Admin, Report Admin, Asset Admin, Security Admin

**Start Page Preferences**

At every sign in, start me on the following view: Assets - All Assets

**Display Preferences**

| | | |
|---|---|---|
| ☐ Search Results | ☑ Plan Management | ☑ Networks |
| ☑ Message Center | ☑ Libraries | ☑ vDC Management |
| ☑ Assets | ☑ Reports | ☑ Administration |

| **Incident Badges in Navigation Panel** | **Enhanced tooltips in Asset Panel** | **Show OS for vServers's** |
|---|---|---|
| ☐ Visible | ☐ Visible | ☑ Visible |

**Timezone of the jobs to be displayed in the Jobs Panel and the Scheduler Panel**

**User cannot have multiple simultaneous login sessions**
☐ Disallow Multiple Sessions

**Select one of these options to display nodes in the asset tree**
Default option automatically collapses or expands the nodes based on the number of assets present in the group.
◉ Default          ○ Expanded          ○ Collapsed

**Show alarms cleared**
☑ Visible

**Time Intervals**

| | | | |
|---|---|---|---|
| Session Timeout: | 30 minutes | Table Refresh Frequency: | 30 seconds |
| Console Session Timeout: | 120 minutes | Job Status Popup Duration: | 5 seconds |
| Connectivity Check Interval: | 15 minutes | | |

**Asset Default Tab**

| Name | Start Tab |
|---|---|
| Rack | Dashboard |
| PDU | Dashboard |
| Server | Dashboard |
| Chassis | Dashboard |
| Storage | Dashboard |

Close

When you change any of the preferences, this window includes a note to indicate that the preferences are not the default specifications.

In the Assigned Roles section, the roles assigned to this user account are listed.

The Start Page Preferences specifies the default view after you log in.

The Display Preferences section provides the following preferences:

- Include each section of the Asset pane. If your responsibilities do not include some sections, clear the option to exclude them from your Asset pane.

- Show or hide the items in the Asset pane: incident badges, tooltips, and the operating system of a vServer.

- Specify the time zones for the jobs in the Jobs pane.

- Disable simultaneous sessions. The default behavior is to allow a user to log in multiple times. This convenience can be a security risk.

- Change the way assets are expanded or collapsed in the Assets pane. The Default option relies on the number of assets to determine whether the node is expanded or collapsed. You can chose the Expanded option to always show all assets or the Collapsed option to always show only the Asset Type.

The Time Interval section shows the duration of the Session Timeout, the Table Refresh Frequency, the Console Session Timeout, the Job Status Popup Duration, and the Connectivity Check Interval.

The Asset Default Tab section lists each type of asset. For each type, you can specify the tab that is displayed in the center pane when an asset of that type is selected. Although the dashboard gives an overview of an assets, you might prefer to see the Incidents tab by default.

## About Preferences By Role

Describes an administrator's options for changing the user interface according to the user's role in Oracle Enterprise Manager Ops Center.

As an administrator, you can set preferences for each role. All user accounts that are assigned the role share the same preferences.

Click **Setup** in the title bar and then click **Role Preferences**. The menu items are the same as for **My Preferences** with the addition of a drop-down list of roles. You select the role and then you select the specifications for all user accounts that have that role.

For example, the default behavior for logging in to the software is to allow the same user to log in multiple times. This is a convenience when monitoring the progress of an operation. However, it can be a security risk. To disable this behavior, check the **Disable Multiple Sessions** option in the User Interface Preferences window. As an administrator, you can disable this behavior for all users with a certain role by selecting the role and then disabling the option.

## About Preferences for Sign In and Start Page

Describes your options for selecting the page that is displayed when you log into Oracle Enterprise Manager Ops Center.

You can select a section of the Navigation pane as your default view. For example, you can specify that you see Plan Management when you log in. The Assets and Administration sections cannot be hidden. When you select Assets for display, you can choose a default tab to display. Your preferences override the default view for your role and any previous preferences that you.

## About Preferences for the Membership Graph

Describes your options for displaying the membership graph in the center pane.

You can change the default orientation of the Membership Graph to left, right, top, or bottom. You can choose the icon size as small or large and the level of depth for the assets to be displayed. Figure 1-5 shows Membership Graph Preferences window.

*Figure 1-5    Membership Graph Preferences Window*
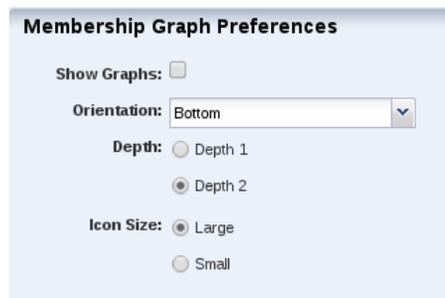
Each time you perform an operation in the Assets pane, the membership graph in the center pane is refreshed. In a datacenter with many assets, you might experience a noticeable delay during the refresh operation. If you are not making changes to the assets or to their relationships, you can hide the membership graph, which eliminates the refresh operation. Clear the **Show Graph** option, as shown in Figure 1-5. You see the effect of the change after you select an asset.

## Preferences for Time Intervals

Lists the time intervals that can be set in Oracle Enterprise Manager Ops Center.

Select the **User Interface Preferences** action to set various time intervals to control when the software takes an action or performs an operation.

- Session timeout: Sets the interval to wait for activity before ending your user interface session. The default value is 30 minutes. You can set the time to wait from 5 to 120 minutes.

- Console timeout: Sets the interval to wait for activity from the serial console of managed assets before ending the session. The default value is 120 minutes. You can set the time to wait from 5 to 120 minutes.

- Connectivity check interval: Sets the time to wait before the software checks its access to the Internet, Knowledge Base, and My Oracle Support Services. The default value is 15 minutes and the minimum value is 1 minute.

- Table refresh frequency: Sets the time to wait before refreshing the tables in the user interface. The default value is 30 seconds and the minimum value is 10 seconds.

- Job status popup duration: Sets the time to wait after a job completes to display a status message window. The default value is 5 seconds.

## Changing the Size of a Console Window

Procedure for resizing a logical domain's Terminal window or a server's Console window in Oracle Enterprise Manager Ops Center.

You can change the size of a console window to display log files or other information.

1. Select the asset in the Navigation pane.

2. For a logical domain, click the **Terminal** tab in center pane. For a server, click the **Console** tab.

3. Click the down arrow next to the **Select Terminal Window Buffer** icon or the **Select Console Terminal Window Buffer** icon.

4.  From the drop-down list, select the number of lines: **24**, **48**, or **Customize**.

    If you select 24 or 48, the window changes its length. If you select **Customize**, the Set Terminal Buffer window is displayed.

5.  Enter the number of lines for the window. The maximum number is 1000.

6.  Click **Save**.

    The window changes its size.

## Related Resources for Getting Started

List of Oracle Enterprise Manager Ops Center documents with additional information.

Oracle Enterprise Manager Ops Center provides online Help that links to the documentation library. Click Help at the top-right corner of any page in the user interface to display the online help window.

The Oracle Enterprise Manager Ops Center Documentation Library is located in the Oracle Help Center at `http://docs.oracle.com/cd/E59957_01/index.htm`.

For current discussions, see the product blog at `https://blogs.oracle.com/opscenter`.

For end-to-end examples, see the workflows and how to documentation in the library. For deployment tasks, go to `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm` and for operate tasks go to `http://docs.oracle.com/cd/E59957_01/nav/operate.htm`

# **2**

# Manage Assets

Overview of actions included in managing assets in Oracle Enterprise Manager Ops Center.

Asset management is the process through which you discover your assets and organize them using groups and tags.

**Topics**

- Introduction to Asset Management
- Roles for Asset Management
- Actions Available for Asset Management
- Location of Asset Information in the User Interface
- About Discovering Assets
- Before You Begin to Discover Assets
- Discovery Profiles
- Service Tags
- Overview of Declaring Servers
- Management Credentials
- Overview of Installing Agent Controllers Using the Command Line Interface
- Special Discovery and Management Procedures
- Managing Assets
- Asset Groups
- Related Resources for Asset Management

## Introduction to Asset Management

Definition of asset management in Oracle Enterprise Manager Ops Center.

Asset management is the process through which Oracle Enterprise Manager Ops Center discovers your datacenter's assets and begins to manage and monitor them. Assets include server hardware, chassis, racks, network equipment, operating systems, virtualization software, and clustering software. Discovering assets is a prerequisite for almost every action in the software.

## Roles for Asset Management

List of required roles for asset management tasks in Oracle Enterprise Manager Ops Center.

Table 2–1 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 2-1    Asset Management Tasks and Roles*

| Task | Role |
| --- | --- |
| View Assets | Read |
| Add Assets | Asset Admin |
| Find Assets | Asset Admin |
| Create Discovery Profile | Asset Admin |
| Update Management Credentials | Security Admin |
| Edit Asset Attributes | Asset Admin |
| Edit Access Points | Security Admin |
| Delete Assets | Asset Admin |
| Edit Tags | Asset Management |
| Create Group | Asset Admin<br>SuperCluster Systems Admin |
| Edit Group | Asset Admin<br>SuperCluster Systems Admin |
| Move Group | Asset Admin<br>SuperCluster Systems Admin |
| Add or Remove Assets From a Group | Asset Admin<br>SuperCluster Systems Admin |
| Delete Group | Asset Admin<br>SuperCluster Systems Admin |

## Actions Available for Asset Management

List of available operations in Oracle Enterprise Manager Ops Center.

You can perform a variety of asset management actions, depending on the needs of your environment:

- Add Assets by Declaring Servers for OS Provisioning

- Add Assets by Declaring Servers for Service Processor Configuration

- Add Assets Using a Discovery Profile

- Find Assets

- Create a Discovery Profile

- Edit a Discovery Profile

- Copy a Discovery Profile

- Delete a Discovery Profile

- Install Agent Controllers From the Command Line

- Update Management Credentials

- Edit Asset Attributes

- Delete Assets

- Use Access Points

## Location of Asset Information in the User Interface

Lists the location of information about assets in Oracle Enterprise Manager Ops Center.

Asset Management actions and information are located in several sections of the user interface.

*Table 2-2    Location of Asset Management Information in the BUI*

| To Display: | Select: |
| --- | --- |
| Asset Discovery and Management actions | Expand Assets in the Navigation pane. |
| Discovery Profiles | Expand Plan Management in the Navigation pane, then select Discovery in the Profiles and Policies section. |
| Number of assets' access points | Select **Administration**, then the Enterprise Controller. Click the **Asset Counter** tab in the center pane. |

## About Discovering Assets

Overview of discovery of assets in Oracle Enterprise Manager Ops Center.

To manage an asset, you must first discover it. The discovery process locates the asset, logs into it, identifies its attributes and status, and populates the All Assets section of the Navigation pane. To discover an asset, you direct Oracle Enterprise Manager Ops Center to search for assets that comply with one of the following: a discovery profile, service tags, or specific server information.

- Discovery Profiles

- Service Tags

- Overview of Declaring Servers

After assets have been discovered, they are managed assets, giving Oracle Enterprise Manager Ops Center access to monitor them and make them available as targets for jobs that update and provision them.

# Before You Begin to Discover Assets

Describes requirements for discovering various types of assets in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center requires at least one Proxy Controller that is accessible on a network before discovering and managing an asset on that network.

To discover and manage hardware assets, you must provide a set of credentials: a user account and password.

To discover and manage operating systems, you have the option of using an agent or using SSH transactions to manage the asset:

- The default discovery installs an Agent Controller, software that can only respond to queries and commands from the Proxy Controller. The OS becomes an agent-managed asset and Oracle Enterprise Manager Ops Center can manage the asset completely. It takes several minutes for the Agent Controller to register in the Enterprise Controller and Oracle SE Java Runtime Environment is required. Non-Oracle versions work initially but might exhibit performance and memory issues.

- You can choose to manage the asset through an SSH connection. For this agentless-managed asset, the Proxy Controller uses SSH credentials to probe and to perform actions on the OS. This mode is suitable for sites where installing the Agent Controller on an asset is not permitted or where full management capabilities, such as updating the OS, are not needed.

- You can change the mode after discovery, by either re-discovering the agent or using the **Switch Management Access** action. The current mode and the type of Agent Controller is displayed on the operating system's Dashboard. When you are changing the mode from agentless to agent-managed asset using the **Switch Management Access** action, you must provide the SNMPV3 credentials. See Switching Between Agent Controllers or Agent and Agentless for more details on selecting or adding the SNMPV3 credentials.

In addition to the Agent Controller, virtual assets use a Virtualization Controller to enable full monitoring and management capability.

- Oracle VM Server for SPARC Virtualization Controller Agent: Manages the logical domains that run in the Control Domain. The agent monitors the configuration and reflects any changes on the configuration in its copy of the metadata.

- Zones Virtualization Controller Agent: Manages the zones that run on the logical domains. The global zone is an asset and its non-global zones are assets.

If full management capabilities are not needed or not allowed, you have the option to manage these assets agentlessly. In the same way as the operating system's Agent Controller, an agentless-managed virtual asset is monitored through an SSH connection between the logical domains and the Proxy Controller.

See "Functionality With and Without Agent Controllers" in the *Oracle Enterprise Manager Operation Reference* for a comparison of agent-managed assets and agentless-managed assets.

When using the SSH protocol to discover and manage assets, you have the option to enable the escalation of privileges on the target asset when the asset is discovered or managed. You must prepare the asset to allow escalation and then create credentials that use escalation. The privileges for the login account are escalated when SSH

credentials are used with the sudo command or an Ops Center role is associated with the account.

You request this escalation when you create the credentials. To prepare the SSH credentials to use sudo, see "Preparing to Use sudo". For instructions in creating credentials with escalated privileges, see "Creating Management Credentials."

Some systems have unique discovery procedures. See "Special Discovery and Management Procedures."

## Actions for Proxy Controllers

Lists the actions available for managing a Proxy Controller in Oracle Enterprise Manager Ops Center.

Before you can discover an asset, create at least one Proxy Controller and associate it with at least one network. Proxy Controllers in maintenance mode and unreachable Proxy Controllers do not participate in discovery operations.

*Oracle Enterprise Manager Ops Center Administration* includes information to view and manage proxy controllers:

- To associate, enable, and disable a network in a proxy controller see `Managing Proxy Controller Networks`.

- To migrate an asset to a different proxy controller see `Migrating Assets Between Proxy Controllers`.

- To view the status of a proxy controller see `Viewing Proxy Controllers`.

- To check the status, start, stop, and set the maintenance mode of a proxy controller see `Viewing and Changing the EC, PC, and AC Status`.

## Preparing to Use `sudo`

Procedure to enable escalation of SSH credentials on discovered assets in Oracle Enterprise Manager Ops Center.

1. Log into the asset as root.

2. Enter the `visudo` command to edit the asset's `sudoers` file safely.

3. Edit the sudoers file to conform with the example. Add the command aliases for discovery and provisioning in the following way according to the operating system of the asset and whether it :

   - For agentless Oracle Solaris assets, add the SOLARIS_DISCOVERY section of the file.

   - For agent-managed Oracle Solaris assets, add the SOLARIS_DISCOVERY and SOLARIS_PROVISIONING

   - For agentless Oracle Linux assets, add the LINUX_DISCOVERY section of the file.

   - For agent-managed Oracle Linux assets, add the LINUX_DISCOVERY and LINUX_PROVISIONING

4. In the `## User privilege specification` section, add the name of the new SSH credential that you created or will create using the procedure in "Creating

Management Credentials." Because a password is mandatory, do not add the
NOPASSWD parameter.

5. Save and close the file.

6. Repeat this procedure on each asset.

***Example 2-1    Format of sudoers File for Ops Center***

```
## sudoers file.
##
## This file MUST be edited with the 'visudo' command as root.
## Failure to use 'visudo' may result in syntax or file permission errors
## that prevent sudo from running.
##
## See the sudoers man page for the details on how to write a sudoers file.
##

##
## Host alias specification
##
## Groups of machines. These may include host names (optionally with wildcards),
## IP addresses, network numbers or netgroups.
# Host_Alias    WEBSERVERS = www1, www2, www3

##
## User alias specification
##
## Groups of users.  These may consist of user names, uids, Unix groups,
## or netgroups.
 User_Alias    OPSCENTER = <username>

##
## Cmnd alias specification
##
## Groups of commands.  Often used to group related commands together.

    Cmnd_Alias SOLARIS_DISCOVERY = /sbin/ifconfig -a, \
               /usr/sbin/virtinfo -ap, \
        /usr/sbin/dladm, \
        /opt/SUNWldm/bin/ldm

    Cmnd_Alias SOLARIS_PROVISIONING = /usr/bin/sc-console, \
               /var/scn/install/uninstall, \
        /usr/sbin/zlogin, \
               /bin/cat */opt/SUNWxvm/xvm_zone_id, \
        /var/tmp/OpsCenterAgent/install, \
               /opt/SUNWxvmoc/bin/agentadm, \
               /usr/lib/cacao/bin/cacaoadm, \
               /usr/bin/unzip -q -o -d /var/tmp/ /var/tmp/OpsCenterAgent*

    Cmnd_Alias LINUX_DISCOVERY = /sbin/ifconfig -a, \
               /usr/sbin/virtinfo -ap

    Cmnd_Alias LINUX_PROVISIONING = /usr/bin/sc-console, \
               /var/scn/install/uninstall, \
        /tmp/OpsCenterAgent/install, \
               /opt/sun/xvmoc/bin/agentadm, \
               /opt/sun/cacao2/bin/cacaoadm, \
               /usr/bin/unzip -q -o -d /tmp/ /tmp/OpsCenterAgent*
```

```
##
## Defaults specification
##
## You may wish to keep some of the following environment variables
## when running commands via sudo.
##
## Locale settings
# Defaults env_keep += "LANG LANGUAGE LINGUAS LC_* _XKB_CHARSET"
##
## Run X applications through sudo; HOME is used to find the
## .Xauthority file.  Note that other programs use HOME to find
## configuration files and this may lead to privilege escalation!
# Defaults env_keep += "HOME"
##
## X11 resource path settings
# Defaults env_keep += "XAPPLRESDIR XFILESEARCHPATH XUSERFILESEARCHPATH"
##
## Desktop path settings
# Defaults env_keep += "QTDIR KDEDIR"
##
## Allow sudo-run commands to inherit the callers' ConsoleKit session
# Defaults env_keep += "XDG_SESSION_COOKIE"
##
## Uncomment to enable special input methods.  Care should be taken as
## this may allow users to subvert the command being run via sudo.
# Defaults env_keep += "XMODIFIERS GTK_IM_MODULE QT_IM_MODULE QT_IM_SWITCHER"
##
## Uncomment to enable logging of a command's output, except for
## sudoreplay and reboot.  Use sudoreplay to play back logged sessions.
# Defaults log_output
# Defaults!/usr/bin/sudoreplay !log_output
# Defaults!/usr/local/bin/sudoreplay !log_output
# Defaults!/sbin/reboot !log_output
 Defaults logfile=/var/log/sudo.log


##
## Runas alias specification
##


##
## User privilege specification
##
 root ALL=(ALL) ALL

## The password of OPSCENTER must be mandatory.
 OPSCENTER ALL=(root) SOLARIS_DISCOVERY,SOLARIS_PROVISIONING

## Uncomment to allow members of group wheel to execute any command
# %wheel ALL=(ALL) ALL

## Same thing without a password
# %wheel ALL=(ALL) NOPASSWD: ALL

## Uncomment to allow members of group sudo to execute any command
# %sudo ALL=(ALL) ALL

## Uncomment to allow any user to run sudo if they know the password
## of the user they are running the command as (root by default).
# Defaults targetpw  # Ask for the password of the target user
# ALL ALL=(ALL) ALL  # WARNING: only use this together with 'Defaults targetpw'
```

```
## Read drop-in files from /etc/sudoers.d
## (the '#' here does not indicate a comment)
#includedir /etc/sudoers.d
```

> **Note:** The ALL Configuration is not supported in etc/sudoers.

## About SNMPv3

SNMP is the Simple Network Management Protocol and is part of Transmission Control Protocol/Internet Protocol (TCP/IP) protocol.

The protocol has existed for many years and has three versions: Version 1, 2 with subversions, and 3. Starting with 12.3.2, Oracle Enterprise Manager Ops Center uses SNMPv3 to discover assets and for new or updated credentials. Existing assets continue to use SNMPv1. For releases prior to 12.3.2, only SNMPv1 is supported.

> **Note:** If your site updated from a previous release of Oracle Enterprise Manager Ops Center to Release 12.3.2, your site had the option to upgrade all assets that use SNMPv1 to SNMPv3.

The difference between Version 3 and previous versions is Version 3 uses credentials instead of a public community string in its communication exchanges. The credentials includes username, a password for an authorization protocol, and a password for a privacy protocol.

The authorization protocol uses your password to create a one-way hash to verify that the transferred information is intact, acting as a digital signature. The available algorithms are MD5 and SHA. MD5 is a legacy algorithm that is not as strong as SHA (Standard Hash Algorithm), which is a 128-bit algorithm used as the US Federal Information Processing Standard.

The privacy protocol uses your password as the private key to encrypt the transferred information. The available protocols are DES and AES. DES (Data Encryption Standard) is not as strong as AES (Advanced Encryption Standard).

If you prefer to stop using SNMPv1 for existing assets and change to SNMPv3, you can migrate to SNMPv3 by using the **Update Management Credentials** action or use the **Create Credentials** profile and plan. Other actions, such **Edit Credentials**, also offer the ability to create SNMPv3 credentials.

# Discovery Profiles

Overview of discovery profiles in Oracle Enterprise Manager Ops Center.

**Topics**

- About Discovery Profiles

- Discovering Assets Using a Discovery Profile

- Creating a Discovery Profile

- Editing a Discovery Profile

- Copying a Discovery Profile

- Deleting a Discovery Profile

## About Discovery Profiles

Describes the role of discovery profiles.

One of the ways of discovering assets is to select a discovery profile and then direct how the profile is used.

A discovery profile contains the attributes of assets. Oracle Enterprise Manager Ops Center uses the discovery profile to identify matching targets. You can make discovery profiles as specific or as generic as your site needs. Later, when you use the discovery profile, you can modify attributes in the profile.

All of the discovery profiles are available in the Plan Management section of the Assets pane, in the Profiles and Policies section. Expand **Discovery** to see the list of profiles.

## Discovering Assets Using a Discovery Profile

Procedure for using a profile to discover assets in Oracle Enterprise Manager Ops Center.

The procedure uses a previously-created profile and directs Oracle Enterprise Manager Ops Center to apply it in a specified way.

1.  In the Navigation pane, select **All Assets**.

2.  In the Actions pane, click **Add Assets**.

    > **Note:**
    >
    > Another way to launch the Add Assets wizard is using the AddAssetsUsingProfile icon. Expand the Plan Management section of the Navigation pane and, in the Profiles and Polices section, click Discovery. The center pane lists all profiles and a set of icons, including the AddAssetsUsingProfile icon.

3.  Select **Add and Manage Various Types of Assets via Discovery Probes**, then select a discovery profile.

4.  Select a discovery profile.

5.  If the profile does not include IP addresses and host names or to increase the scope of the search, enter one or more IP addresses or hostnames, as shown in Figure 2-1.

*Figure 2-1    Specifying Networks in Discovery by Profile*



> **Note:**
>
> Host names must be resolvable from the Enterprise Controller.

6. By default, the discovery operation searches for targets on all networks associated with all of the available Proxy Controllers. This is the **Use the selected network** option with the **Automatic** attribute. This type of discovery is thorough and results in a complete inventory of matching targets. To narrow the scope of the search, use one of the following options:

   • The smallest scope is to search on one network. Select the alternative option in the drop-down list, **Manual**. This action opens the Select Network window, which lists all of the networks associated with all of the available Proxy Controllers. Select the network you want the discovery operation to use and click Close.

   • Limit the search to a specific Proxy Controller's associated networks. Choose the **Use the selected proxy** option and then either accept the default **Automatic** attribute to search the Proxy Controller or select **Manual** from the drop-down list to open the Proxy Controllers wizard, which lists all Proxy Controllers that are not in maintenance mode. Select the Proxy Controller.

   > **Note:**   To prevent the selection of an unreachable Proxy Controller, place any unreachable Proxy Controllers in maintenance mode.

   When you click **Close,** you return to the Add Assets wizard.

7. Scroll down to show the Credential section. If the discovery profile includes credentials for logging into the target, click **Select** to use in this discovery operation. You can also click **Clear** and then **New** to replace them. If the discovery profile does not include credentials, click **New** to provide them.

8. Click **Add Now**.

## Creating a Discovery Profile

You can create a profile and use it to discover assets that comply with the profile.

1. In the Navigation pane, click **Plan Management**.

2. Under Profiles and Policies, click **Discovery**.

3. In the Actions pane, click **Create Profile**.

*Figure 2-2    Create Discovery Profile*



4. Enter a name for the discovery profile and a description.

5. Expand the list of asset types and select one of the asset types. Click **Next.**

6. (Optional.) Click the **Add** icon to add one or more tags to discovered assets, then click **Next**.

7. (Optional.) You can specify the IP ranges used to probe for assets that conform to this discovery within this profile or you can direct the probe at the time when you use the profile. However, to direct the discovery operation to a specific host, you must specify the host name at the time you use the profile. To specify the IP ranges in the profile, click the **Add** icon. For each IP range:

    a. Enter a name for the range.

    b. Enter a description of the IP range.

    c. In the Networks field, identify the network associated with the IP range to direct discovery to the correct Proxy Controller. Choose one of the options from the drop-down list:

    - Select **Automatic** to direct the discovery operation to the default Proxy Controller. The IP address of a target must resolve to only one network.

- Select the **Manual** to open the Select Networks window, which lists all the networks associated with all the available Proxy Controllers. Select the network you want the discovery operation to use and click **Close**.

- Select **Networks** to open the Networks and Proxy Controllers wizard:

  i.   Select the Proxy Controller.

  ii.  From the list of associated networks, adjust the list of networks to use for discovery.

8. Click **New** to add new discovery credentials for each protocol or click **Select** to select an existing set of credentials.



**Note:**

The Agent Controller requires SNMPv3 credentials for the Oracle Solaris agent to monitor any defect in the system. Click **Select** to select an existing SNMPv3 credentials, or click **New** to create new SNMPv3 credentials. SNMPv3 credentials are required for Oracle Solaris systems only. When you use SNMPv3 credentials to discover an ILOM processor, choose the correct SNMPv3 credential parameters since some ILOM service processors do not support AES encryption.

9. If this discovery profile is for discovering an ILOM, select the **Use system's default credentials** check box and set the following:

- Enter the default SNMPV3 user name as `opscenter`.

- Enter the default SNMPV3 authentication password used for authentication protocol as `authV3pw`.

- Enter the default SNMPV3 privacy password used for privacy protocol as `privV3pw`.

10. If this discovery profile is for discovering an operating system, you might have the option to manage the operating system without an Agent Controller. Select one of the following options:

- **Deploy Agent Controller** to install the Agent Controller on the operating system. This is a requirement if the operating system runs on an virtual asset or you expect to update the operating system. To discover and manage operating systems in Oracle Solaris 10 Zones or in Oracle VM Server for SPARC guests, select these options.

- **Manage Without Agent Controller** does not install an Agent Controller. Instead, the Proxy Controller that manages the operating system sends an SSH request to the asset periodically.

11. If the service tag parameters have been modified for the target assets, enter the Service Tag parameters:

- Service tag passphrase: Required when a service tag has been configured to be encrypted.

- Service tag port: Required when a service tag has been configured to use a port other than the default of Port 6481.

- Service tag timeout: Accept the default value of 20 seconds or specify a number of seconds.

12. Click **Next** to complete the discovery credentials.

13. Review the summary and click **Finish** to create the discovery profile.

## Editing a Discovery Profile

Procedure for changing a discovery profile in Oracle Enterprise Manager Ops Center.

To edit a discovery profile, perform the following steps:

1. In the Navigation pane, click **Plan Management**.

2. Under Profiles and Policies, click **Discovery**.

3. Select the profile and click the **Edit Profile** icon.

4. Edit any of the information in the discovery profile, then click **Finish** to save your changes.

## Copying a Discovery Profile

Procedure for making a copy of an existing discovery profile in Oracle Enterprise Manager Ops Center

To copy a discovery profile, perform the following steps:

1. In the Navigation pane, click **Plan Management**.

2. Under Profiles and Policies, click **Discovery**.

3. Select the profile and click the **Copy Profile** icon.

4. Edit any of the information in the discovery profile, then click **Finish** to save the new discovery profile.

## Deleting a Discovery Profile

Procedure for removing a discovery profile from Oracle Enterprise Manager Ops Center.

To delete a discovery profile, perform the following steps:

1. In the Navigation pane, click **Plan Management**.

2. Under Profiles and Policies, click **Discovery**.

3. Select the profile and click the **Delete Profile** icon. The discovery profile is deleted.

# Service Tags

Overview of service tags in Oracle Enterprise Manager Ops Center..

**Topics**

- About Service Tags
- Enabling Discovery by Service Tags
- Discovering Assets by Using Service Tags

## About Service Tags

Describes the use of service tags with the Find Assets Wizard in Oracle Enterprise Manager Ops Center.

Service tags are small XML files containing product information. Many Oracle systems come equipped with service tags. If you have hardware assets equipped with service tags, you can discover them using the Find Assets Wizard. This method lets you discover large numbers of assets quickly. The Find Assets Wizard searches known networks for service tags, then uses credentials that you specify to manage the discovered assets.

Starting with Oracle Enterprise Manager Ops Center 12c Release 2 (12.2.2.0.0), the **Find Assets** action is disabled by default.

Products without service tags cannot be discovered using this method. For example, ALOM systems do not have service tags.

## Enabling Discovery by Service Tags

Procedure for using service tags to discover assets in Oracle Enterprise Manager Ops Center.

Starting with Oracle Enterprise Manager Ops Center 12c Release 2 (12.2.2.0.0), the **Find Assets** action is disabled because, in datacenters with many assets, discovery might expire before it can complete. If you prefer to discover assets using service tags, enable this feature:

1. In the Navigation pane, click **Administration**, then click **Enterprise Controller**.

2. In the center pane, select the **Configuration** tab.



3. In the Configuration Management section, select **Discovery** from the Subsystem drop-down list.
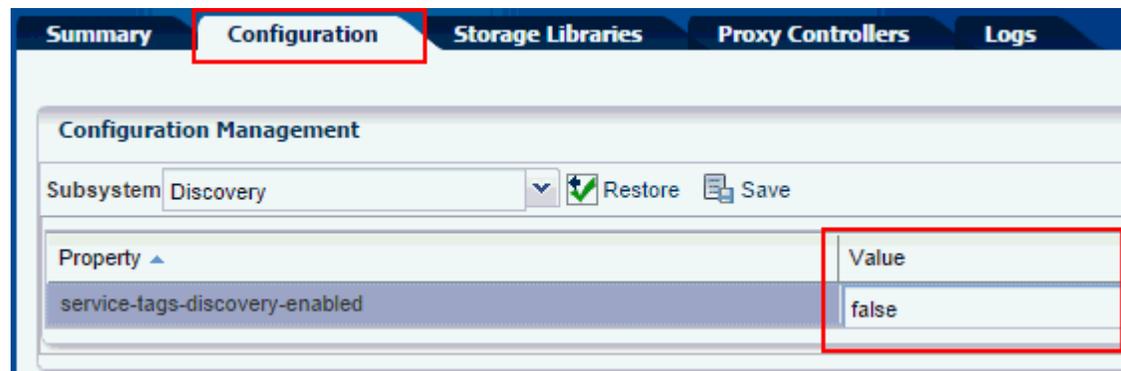


4. Set the value of the `service-tags-discovery-enabled` property to `true`.

## Discovering Assets by Using Service Tags

Procedure for using service tags to discover assets in Oracle Enterprise Manager Ops Center.

To find assets, perform the following steps:

1. In the Navigation pane, select **All Assets**.

2. In the Actions pane, click **Find Assets**.

3. Select **Run Discovery Now**.

4. When the initial discovery is complete, select the assets in each category (hardware, operating systems, and engineered systems) that you want to manage and provide credentials for them, then click **Finish**.

# Overview of Declaring Servers

Overview of discovering servers by declaring them in Oracle Enterprise Manager Ops Center.

A bare metal server is one that has no operating system or no service processor configuration or neither.

**Topics**

- About Declaring Servers for OS Provisioning

- Declaring One Server

- Information for Declaring a Server

- Declaring Multiple Servers

- About Declaring Servers for Service Processor Configuration

- Declaring Servers for Service Processor Configuration

## About Declaring Servers for OS Provisioning

Describes methods for bare metal provisioning of operating system.

Use the **Declare Server** option to prepare one or more bare metal systems for OS provisioning, even if the systems have no service processor.

To declare one server, use the Add Assets Wizards to specify information about the server. To declare multiple servers, create a discovery file as shown in Example 2-2.

## Declaring One Server

Procedure for discovering a server in Oracle Enterprise Manager Ops Center.

1. Select **All Assets** in the Navigation pane,

2. Click **Add Assets** in the Actions pane.

3. Select the **Manually Declare a Server to be a Target of OS provisioning** option in the wizard.

4. Select the **Declare a single server** option.

5. Enter the server information, as show in "Information for Declaring a Server."

## Information for Declaring a Server

Lists the attributes required for discovering a server by declaring it.

- Server Name: name of the server appearing on the UI.

- IP Address: specify an IP address to route the discovery to the correct Proxy Controller. You do not need to use a server's actual IP address. You can use an IP address that is on the same subnet as that of the server to be discovered.

- Model Categories: select the category in which the asset model appears.

- Model: the model of the asset.

- MAC Address and Port combination: used to connect to the server once it is available on the network. Click the Add or Edit icons to add or edit a MAC Address/Port combination, then select the combination.

  Enter a logical port name for each network interface. One of these logical port names must be GB_0. Available logical port names are GB_0 through GB_11. You can also use mgmt as a management port. These logical port names will be mapped to network interfaces after the asset has been provisioned, according to the MAC addresses that you specify. If the server has only one network interface, use GB_0.

  Enter the MAC addresses of the network interfaces in the server that you want to declare.

## Declaring Multiple Servers

Procedure for discovering servers using a discovery file in Oracle Enterprise Manager Ops Center.

To declare multiple servers for OS Provisioning, perform the following steps:

1. Create a discovery file using the format in Example 2-2 and the following variables:

   The following variables can be used:

   - **server name**: the name that the server has in the UI

   - **model**: must be a model supported by Oracle Enterprise Manager Ops Center

   - **guid**: a unique identifier for the server

   - **proxyHostname**: the Proxy Controller to be used to connect to the server

   - **ipAddress**: the IP address for the server

   - **netmask**: (optional) the netmask for the server

   - **gateway**: (optional) the gateway for the server

   - **unconfigured**: (optional) specifies that the server is unconfigured when set to true

   - **ethernetPort**: used to connect to the server once it is available on the network. You can specify multiple Ethernet ports. Includes:

     – **Ethernet port name**: the name of the Ethernet port

     – **Ethernet Port mac**: the MAC address for the Ethernet port

2. Select **All Assets** in the Navigation pane,

3. Click **Add Assets** in the Actions pane.

4. Select the **Manually Declare a Server to be a Target of OS provisioning** option in the wizard.

5. Select **Declare All Servers**.

6. Enter the location of the discovery file.

7. Click **Declare Asset**

### Example 2-2    Example Discovery Profile

```
<?xml version='1.0' encoding='utf-8'?>
<servers>
<server name="T5440" model="Sun SPARC Enterprise T5440 Server"
        guid="12345678"
        proxyHostname="server"
        ipAddress="10.0.0.0" >
<ethernetPort name="GB_0" mac="01:23:45:67:89:AB"/>
</server>
</servers>
```

## About Declaring Servers for Service Processor Configuration

Describes the method for configuring a server's service processor even if the server is not yet discovered.

Use the **Declare Servers for Service Processor Configuration** option to nominate one or more bare metal systems for service processor configuration.

The assets being declared do not need to be physically connected to the network at the time of the discovery, because the assets produced by an asset declaration are skeletal representations of the real assets. These assets can then be targeted with service processor configuration jobs. After the actual assets are connected to the network, provisioned and discovered, they are correlated with the declared version into complete assets.

## Declaring Servers for Service Processor Configuration

Procedure for discovering a server with no service processor from Oracle Enterprise Manager Ops Center.

To declare unconfigured assets for service processor configuration, perform the following steps:

1. Select **All Assets** in the Navigation pane,

2. Click **Add Assets** in the Actions pane.

3. Select **Declare an Unconfigured Hardware Asset**.

*Figure 2-3    Declare Unconfigured Hardware Assets*



4.  Enter data for the servers to be declared:

    •  Number of Servers: the total number of servers to be discovered

    •  Model Categories: the model category of the servers

    •  Model: the specific model of the servers

    •  Server Names: the names of the servers, including:

        –  Prefix: a prefix that appears before each server name. This field is required.

        –  Starting Number: the number of the first server. The number is increased by one for each additional server. This field is required.

        –  Suffix: a suffix that appears after each server name

    •  Network: the network on which the server or servers is added

    •  IP addresses: the IP addresses to be used for the servers

    •  MAC Addresses: the MAC Addresses of the servers

5.  Click **Declare Asset**.

# Management Credentials

Overview of management credentials.

Oracle Enterprise Manager Ops Center stores the credentials that manage each asset. You can update, edit, and delete these credentials.

**Topics**

- Upgrading Management Credentials From a Prior Version

- Updating Management Credentials

- Creating Management Credentials

- Editing Management Credentials

- Copying Management Credentials

- Deleting Management Credentials

- About Credentials for Access to the Serial Console or SSH Tunnel

- Using Custom SSH Keys for OS Discovery

- Switching Between Agent Controllers or Agent and Agentless

## Upgrading Management Credentials From a Prior Version

Procedure for assigning new credentials to assets in Oracle Enterprise Manager Ops Center.

Assets that were discovered and managed in prior versions of Oracle Enterprise Manager Ops Center might not have management credentials associated with them. You can associate new or existing sets of credentials with these assets.

If a discovered asset is blacklisted, the same can be removed by updating the management credentials.

To upgrade management credentials, perform the following steps:

1. On the Navigation pane, select **All Assets**.

2. In the Actions pane, click **Upgrade Management Credentials**.

3. Select an asset category: operating systems; servers; or chassis, m-series, and switches.

4. Select one or more assets of that category.

   - To assign an existing set of credentials, select **Assign existing set** and then select an existing set of credentials.

   - To assign a new set of credentials, select **Create and assign new set** and then enter a protocol, name, and credential information.

## Updating Management Credentials

Procedure for changing the credentials used to get access to an asset in Oracle Enterprise Manager Ops Center.

You can change the set of management credentials used by an asset or group of assets.

To update management credentials, perform the following steps:

1. On the Navigation pane, select an asset or group.

2. In the Actions pane, click **Update Management Credentials**.

   *Figure 2-4    Wizard for Update Management Credentials*

   **Management Type**

   The selected asset is currently using the following credentials:

   | Name ▲ | Protocol | Description | Access Point |
   |--------|----------|-------------|--------------|
   | ILOM - root ; chang... | IPMI | | 10.13█ ▐█.198 |
   | ILOM - root ;change... | SSH | | 10.1█░░█ ▐98 |

   Select one of the above credential(s) and choose one of the actions below. Creation or modification of credentials requires Security Admin privileges.

   ◉ Modify the current credential values
   ○ Create a new set of credentials
   ○ Use a different set of existing credentials
   ○ Clear blacklisting and continue using current credentials

3. Select the credentials that you want to change. You can select more than one type of credentials.

4. Click **Modify the current credential values**.

5. Edit the username or password or both.

   > **Note:**
   >
   > If you are modifying the SNMPv3 credential values, then you can edit the username, authentication protocol, authentication password, privacy protocol, or privacy password.

6. Click **Finish** to submit the change.

## Creating Management Credentials

Procedure for creating credentials for accessing assets in Oracle Enterprise Manager Ops Center.

Create a set of management credentials to discover and manage new assets or to manage existing assets.

To create management credentials, perform the following steps:

1. On the Navigation pane, under Administration, select **Credentials**.

2. In the Actions pane, click **Create Credentials**.

3. Click on the drop-down list to see the list of available protocols. Accept the default SSH protocol or select a different protocol. Depending on the type of protocol you select, the remaining fields change to collect the required information for the credentials. For specific examples, see Creating SSH Credentials or Creating SNMPV3 Credentials.

4. Specify a name and description, such as the purpose of the credentials.

5. Select or specify the required information for the type of credential, such as the username and password.

6. Click **Create** to create the management credentials.

The new credentials are now available to be used in discovery profiles.

## Creating SSH Credentials

Create a set of SSH credentials to discover and manage new assets or to manage existing assets.

The default protocol for managing assets is SSH. To create SSH credentials, perform the following steps:

1. On the Navigation pane, under Administration, select **Credentials**.

2. In the Actions pane, click **Create Credentials**.

3. Specify a name and description, such as their purpose for the credentials.

4. Specify the username and password.

5. Accept the default authentication type or choose one of the alternatives. Each type has different requirements for authentication.

   • Password: This is the default type of authentication and requires a login username and password.

   

   • Custom SSH Key: Creates a public SSH key by specifying the Login User name, a Private Key file name, and a passphrase. In the **Private Key File on Proxy Controller(s)** field, accept the default file or change it to refer to other keys. The Proxy Controller installs the SSH public key on the asset's privileged user's authorized SSH key.

- Ops Center Key: Oracle Enterprise Manager Ops Center generates a new SSH key pair, based on the username you provide, and installs the public key in the asset's login account during discovery. This method requires a set of credentials to begin the discovery. After discovery, the SSH key pair is used. This method does not provide a way to escalate privileges.



6. You can allow the new account to use escalated privileges. The default method is to not allow a change in privileges. The alternatives are to specify a role for the account or to add sudo to the account.

   - If you choose the Role method, the Privileged Role field is displayed. Enter the name of an Ops Center role and specify a password. The new account has this level of access.

   - If you choose the Sudo method, the Privileged Role field is displayed. Enter the name of an Ops Center account and specify a password. This account must be included in the asset's `/etc/sudoers` file. The privileges defined in the `/etc/sudoers` file will be used by the new account. See "Preparing to Use sudo" for instructions in creating this file. You can edit this file after you complete this procedure, but the Ops Center account must be in the file before the new credentials are effective.

7. Accept the default port for SSH of 22, unless your site has a different requirement.

8. Click **Create** to create the management credentials.

## Creating SNMPV3 Credentials

Procedure for creating credentials for accessing assets in Oracle Enterprise Manager Ops Center.

Create a set of management credentials to discover and manage new assets or to manage existing assets.

To create credentials that use the SNMPv3 protocol, perform the following steps:

1. On the Navigation pane, under Administration, select **Credentials**.

2. In the Actions pane, click **Create Credentials**.

3. Click on the drop-down list to see the list of available protocols. Click **SNMPV3**.

4. Specify a name and description, such as their purpose for the credentials.

5. Specify the user name with the prefix OC for the credential.

---

**Note:**

The user name for SNMPV3 protocol must be prefixed with OC.

---

---

**Note:** The password must contain 8 characters. Do not use space character for user name and password.

---

6. Accept the default authentication protocol, MD5, or choose SHA, which is a stronger authentication protocol.

7. Enter a password for authentication.

8. Accept the default privacy protocol, DES, or choose AES, which is a stronger encryption protocol.

9. Enter a password for encryption.

10. Click **Create** to create the management credentials.

## Editing Management Credentials

You can change an existing set of management credentials that you use to discover assets.

To edit management credentials, perform the following steps:

1. On the Navigation pane, under Administration, then select **Credentials**.

2. In the center pane, select a set of credentials.

3. Click the **Edit Credentials** icon.

4. You can change the description of the credentials and any characteristic of the existing credentials.

5. Click **Update** to save the changes.

## Copying Management Credentials

Procedure for making a copy of existing management credentials in Oracle Enterprise Manager Ops Center.

You can copy an existing set of management credentials to create a set.

To copy management credentials, perform the following steps:

1. On the Navigation pane, under Administration, select **Credentials**.

2. In the center pane, select a set of credentials and click the Copy Credentials icon.

3. Edit the name, description, and the information required by the protocol, then click **Copy** to save the new set of credentials.

## Deleting Management Credentials

Procedure for removing the credentials used to access an asset in Oracle Enterprise Manager Ops Center.

You can delete an existing set of management credentials if they are not in use by an asset. You can delete credentials that are used in discovery profiles but the discovery profiles must be edited to use new credentials. Agentless assets that are managed using the credentials must be given a new set.

To delete management credentials, perform the following steps:

1. On the Navigation pane, under Administration, select **Credentials**.

2. In the center pane, select one or more sets of credentials and click the **Delete Credentials** icon.

   A window reports how the credentials are used.

3. If the credentials are not in use, click **Delete All** . If the at least one set of credentials is in use by a discovery profile, you have the option to preserve those credentials by clicking **Safe Delete**. If you do want to delete the credentials used by a discovery profile, click **Force Delete**.

## About Credentials for Access to the Serial Console or SSH Tunnel

Describes how Oracle Enterprise Manager Ops Center connects to a service processor and uses SSH.

To enable a connection to a service processor or virtual machine, define the user account that Oracle Enterprise Manager Ops Center uses to open an SSH tunnel on the Enterprise Controller or to create a serial connection.

> **Note:**
>
> If you do not specify this account, Oracle Enterprise Manager Ops Center creates an account each time it accesses a serial console and deletes the account when the connection is no longer needed. This activity might not conform to your site's security policy.

The following types of assets use SSH to connect to a serial console. Create an account for each type and define the same password for each account.

- Proxy Controllers

- Global zones that use agents and require access to the consoles of non-global zones

- Control domains that use agents and require access to the consoles of logical domains

To create the account, define the `ConsoleSSHCredname` system property using the procedure in Defining the system property for console access and then define a user account for that property using either the procedure in Creating the account using Oracle Enterprise Manager Ops Center or the procedure in Creating the account using the `useradd` command.

### Defining the System Property for Console Access

Procedure for configuring the serial console in Oracle Enterprise Manager Ops Center.

1. Select the **Administration** section in the Navigation pane.

2. Select the **Configuration** tab in the center pane.

3. In the Subsystem list, select **Console Access Configuration**. The `ConsoleSSH.Credname` system property is displayed.

4. Click in the **Values** column.

5. Enter the name of the new user account. For example, SERIALCONSOLE_CRED1.

   *Figure 2-5   Configuring Console Access*
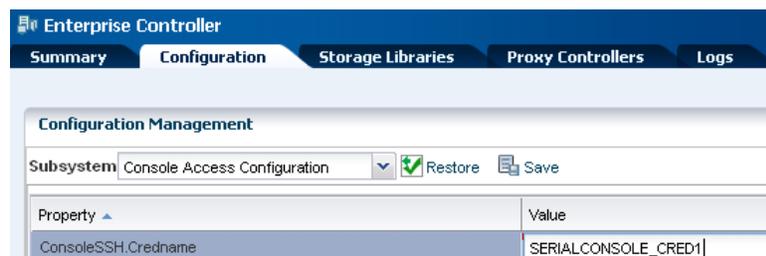
**6.** Click **Save**.

When the job is completed, define the account using the following procedure.

### Creating the Account Using Oracle Enterprise Manager Ops Center

Procedure for creating a SSH account for the serial console in Oracle Enterprise Manager Ops Center.

You must have the Security Admin role to perform this procedure.

After you define the user account, the account is created automatically in `/etc/passwd` the first time a job for console access is run. However, if your site's security policy requires that the operating system account must be created outside of Oracle Enterprise Manager Ops Center's control or if you prefer to create the account manually, use the procedure described in Creating the account using the `useradd` command.

**1.** Select the **Administration** in the Navigation pane.

**2.** Select **Credentials** in the Navigation pane.

**3.** Click **Create Credentials** in the Actions pane.

**4.** Select the **SERIAL_CONSOLE_SSH** protocol and enter the following details:

- Name of the credential: Enter the value of the `ConsoleSSH.Credname` system property. In this example, `SERIALCONSOLE_CRED1`.

- Login User: Enter a convenient or descriptive name for the user account, for example, `ConsoleAccess`.

- Password for the user account and its confirmation. Password length is minimum of 8 and maximum of 32.

*Figure 2-6    User Account for Console Access*



**5.** Click **Create** to submit the job.

### Creating the Account Using the useradd Command

Procedure for creating a SSH account for the serial console in Oracle Enterprise Manager Ops Center.

1. Create the home directory for the account. In the following example, the account is named consolex:

   ```
   mkdir /var/tmp/consolex
   ```

2. Add the user account with its shell, /opt/sun/n1gc/bin/serial_console:

   ```
   useradd -s "/opt/sun/n1gc/bin/serial_console" -d /var/tmp/consolex -u uid -P
   "profile" -A "solaris.zone.manage" consolex
   ```

   where *uid* is an available user ID on the Enterprise Controller's system and *profile* is either LDoms Review for a control domain or Zone Management for a global zone. The -A option is a feature of Oracle Solaris 11's useradd(1m) command that includes an authorization defined in auth_attr(4).

3. Change the ownership of the home directory:

   ```
   /bin/chown consolex /var/tmp/consolex
   /bin/chmod 700 /var/tmp/consolex
   ```

4. Set and confirm the password for the account:

   ```
   passwd consolex
   ```

## Using Custom SSH Keys for OS Discovery

Procedure for creating SSH credentials for discovering an operating system asset in Oracle Enterprise Manager Ops Center.

You can use SSH keys as an option when performing the OS discovery.

You must create SSH keys on each Proxy Controller that might access the target asset and also add the SSH public key to the ~/.ssh/authorized_keys location on the remote OS or use the hardware's web interface to upload the public keys.

1. On the Navigation pane, under Administration, click **Credentials**.

2. In the Actions pane, click **Create Credentials**. The SSH protocol is the default.

*Figure 2-7   Create Credentials*



3. In the **Name** field, enter a name for the credential.

4. In the **Description** field, enter a description for the credential.

5. In the SSH section, select **Custom SSH** as Authentication Type.

6. In the **Login User** field, enter the login credential.

7. In the **Private Key File on Proxy Controller(s)** field, accept the default file or change it to refer to other keys.

8. In the **Passphrase** field, enter the passphrase if one was specified when the key was created.

9. In the **Confirm Passphrase** field, enter the passphrase again.

10. In the **SSH Port** field, accept the default Port 22 or change it.

11. Click **Create**.

For a nonprivileged user, enter the Privileged User role credentials in the Privileged Role and Role Password fields respectively.

## Switching Between Agent Controllers or Agent and Agentless

Procedure for switching management mode from agentless to agent-managed asset and from agent-managed to agentless asset in Oracle Enterprise Manager Ops Center.

To discover and manage operating systems, you have the option of using SNMPV3 credentials to manage the asset. For more information on switching the management modes, see *Oracle Enterprise Manager Ops Center Operations Reference*

To switch management mode:

> **Note:**
>
> When switching from agentless to agent-managed asset, providing SSH and SNMPV3 credentials is mandatory.

1. Click **All Assets** in the Assets section of the Navigation pane.

2. Select the operating system.

   The current management status appears in the operating system's dashboard.

3. In the Actions pane, click **Switch Management Access**.

4. Add or select the SNMPV3 credentials for the system.

   - To create a new set of credentials, click **New** and complete the Create Credentials Wizard, then click **OK**. See Creating SNMPV3 Credentials for steps to create new SNMPV3 credentials.

   - To select from a list of existing credentials, click **Select**, highlight the credentials from the list of available credentials and then click **OK**.

5. Click **Finish**.

# Overview of Installing Agent Controllers Using the Command Line Interface

Overview of installing an Agent Controller using the Command Line Interface in Oracle Enterprise Manager Ops Center.

Use these procedures to install an Agent Controller and to register the target system. See `Using Agent Management for Operating Systems` for more information about Agent Controllers and Virtualization Agent Controllers.

**Topics**

- Requirements for Installing an Agent Controller on Oracle Solaris 11

- Before You Begin to Install an Agent Controller

- Installing an Configuring an Agent Controller Manuall Using User Credentials

- Installing and Configuring an Agent Controller Manually Using a Token

## Requirements for Installing an Agent Controller on Oracle Solaris 11

List of requirements for installing an agent on an asset running Oracle Solaris 11 in Oracle Enterprise Manager Ops Center.

- The Oracle Solaris 11 Package Repository must be configured and its initial synchronization completed.

- The version of Oracle Solaris 11 installed on the target system must be available in the Oracle Solaris 11 Package Repository.

- The Agent Controller packages must already be in the Oracle Solaris 11 Package Repository.

## Before You Begin to Install an Agent Controller

Requirements for installing an Agent Controller on an asset in Oracle Enterprise Manager Ops Center.

To use the `agentadm` command, you need the following information:

- To configure your Agent Controller software using an administrative user account on the Enterprise Controller you need:

  – User name: the user account provides authentication that supports Agent Controller registration. Use the user name of this account as the argument for the `-u` option of the agentadm command.

  – Password: use this password to populate the `/var/tmp/OC/mypasswd` file. Then use this file name as the argument for the `-p` option of the agentadm command.

- The auto-reg-token registration token from the `/var/opt/sun/xvm/persistence/scn-proxy/connection.properties` file on the appropriate Proxy Controller – If you decide not to use user credentials to configure your Agent Controller software, use this token to populate the `/var/tmp/OC/mytoken` file. Then use this file name as the argument for the `agentadm -t` option.

- IP address or host name of the Proxy Controller with which you will associate the Agent Controller – Use this IP address or host name as the argument for the `agentadm -x` option. Typically, you would associate the Agent Controller with the Proxy Controller that is connected to the same subnet as the target system.

- The IP address of the network interface that the Agent Controller will use for registration – Use this IP address as the argument for the `agentadm -a` option.

Some example `agentadm` commands in this procedure use the alternative administrative user name droot. In these examples, the droot user exists on the Enterprise Controller.

When you install an Agent Controller on a global zone, the installation installs, or upgrades to, Oracle Java Runtime Environment (JRE) 1.6.0_91. If a later version of JRE is installed, the installation does not downgrade.

## Installing and Configuring an Agent Controller Manually Using User Credentials

Procedure that uses credentials to install an Agent Controller in Oracle Enterprise Manager Ops Center.

This procedure creates a file that holds the password of the administrative user for your Oracle Enterprise Manager Ops Center installation.

**1.** On the Enterprise Controller, change to the `/var/opt/sun/xvm/images/agent/` directory, and list the files that it contains. This directory contains the Agent Controller installation archives. For example:

```
# cd /var/opt/sun/xvm/images/agent/
# ls
```

```
OpsCenterAgent.Linux.i686.12.2.0.2503.zip
OpsCenterAgent.Linux.i686.12.2.0.2503.zip.sig
OpsCenterAgent.Solaris.i386.12.2.0.2503.zip
OpsCenterAgent.Solaris.i386.12.2.0.2503.zip.sig
OpsCenterAgent.Solaris.sparc.12.2.0.2503.zip
OpsCenterAgent.Solaris.sparc.12.2.0.2503.zip.sig
OpsCenterAgent.SolarisIPS.all.12.2.0.2503.zip
OpsCenterAgent.SolarisIPS.all.12.2.0.2503.zip.sig
#
```

2. Identify the Agent Controller archive that is appropriate for the system where you intend to install the Agent Controller. See Table 2–4 for a description of the available packages.

*Table 2-3    Agent Controller Packages and their related Target Operating System and Architecture*

| File prefix | Operating System / Architecture |
| --- | --- |
| OpsCenterAgent.Linux.i686 | Oracle Linux/x86 |
| OpsCenterAgent.Solaris.i386 | Oracle Solaris 10/x86 |
| OpsCenterAgent.Solaris.sparc | Oracle Solaris 10 / Oracle SPARC |
| OpsCenterAgent.SolarisIPS.all | Oracle Solaris 11 / x86 and Oracle SPARC |

3. On the system where you want to install the Agent Controller (the target system), create a directory named /var/tmp/OC.

```
# mkdir /var/tmp/OC
```

4. Use scp or ftp to transfer the correct Agent Controller archive from the Enterprise Controller to the /var/tmp/OC directory on the target system. Respond to any authentication or confirmation prompts that are displayed. For example:

```
# scp OpsCenterAgent.Solaris.sparc.12.2.0.2503.zip root@10.0.0.0:/var/tmp/OC
Password:
OpsCenterAgent.S 100% |
*****************************************************************| 187078 KB
00:32
#
```

5. On the target system, change to the /var/tmp/OC directory.

```
# cd /var/tmp/OC
#
```

6. Use the unzip command to uncompress the Agent Controller archive. For example:

```
# unzip OpsCenterAgent.Solaris.sparc.12.2.0.2503.zip
(output omitted)
```

7. Run the install -a script in the OpsCenterAgent directory. For example:

```
# OpsCenterAgent/install -a
Installing Ops Center Agent Controller.
No need to install 120900-04.
No need to install 121133-02.
No need to install 119254-63.
```

```
No need to install 119042-09.
No need to install 121901-02.
No need to install 137321-01.
Installed SUNWjdmk-runtime.
Installed SUNWjdmk-runtime-jmx.
(output omitted)
6 patches skipped.
19 packages installed.
Installation complete.
Detailed installation log is at /var/scn/install/log.
Uninstall using /var/scn/install/uninstall.
#
```

If you are installing the Agent Controller on Oracle Solaris 11, run the `install` command with the `-p` option and include the IP address; the local IPS pubs are configured for Oracle Solaris 11 Package Repository access using the IP address. For example:

```
# OpsCenterAgent/install -p 10.0.0.1
#
```

If you are installing an Oracle VM Server Virtualization Controller Agent use the `-l` (or `--ldom`) option.

8. Create an empty file named `/var/tmp/OC/mypasswd`, and set its permission mode to 400. For example:

```
# touch /var/tmp/OC/mypasswd
# chmod 400 /var/tmp/OC/mypasswd
```

9. Edit the `/var/tmp/OC/mypasswd` file so that it contains the password for the administrative user that exists on the Enterprise Controller to which the Proxy Controller is connected. The following echo command appends the password to the `/var/tmp/OC/mypasswd` file. Replace password with the correct password. For example:

```
# echo 'password' > /var/tmp/OC/mypasswd
```

10. Use the `agentadm` command to associate the Agent Controller with the Proxy Controller.

   - Oracle Solaris OS: use the `/opt/SUNWxvmoc/bin/agentadm` command

   - Linux OS: use the `/opt/sun/xvmoc/bin/agentadm` command. The example commands below use the following options:

   - configure: causes an Agent Controller configuration operation to take place.

   - -u: specifies the administrative user that exists on the Enterprise Controller to which the Proxy Controller is connected. Be certain that the password that you specified in the `/var/tmp/OC/mypasswd` file is correct for the user that you specify for this option.

     **Note:**

     The example below uses *droot* as the administrative user.

   - -p: specifies the absolute path name of the file that contains the password for the user that you specified with the `-u` option.

- -x: specifies the IP address or host name of the Proxy Controller to which this Agent Controller will connect.

- -a: specifies the IP address to use during Agent Controller registration. This selects the network interface that the Agent Controller will use for registration. Accept the server's certificate when prompted. For example:

```
# /opt/SUNWxvmoc/bin/agentadm configure -u droot -p /var/tmp/OC/mypasswd -x
10.0.0.0
agentadm: Version 1.0.3 launched with args: configure -u droot -p /var/tmp/OC/
mypasswd -x 10.0.0.1
workaround configuration done.
Certificate:
Serial Number: 947973225
Version: 3
Issuer: CN=flyfishing_scn-proxy_ca
Subject: CN=flyfishing_scn-proxy_Agent Controller
Not valid before: Thu Jun 19 15:36:59 MDT 1969
Not valid after: Thu Apr 19 15:36:59 MDT 2029
Certificate:
Serial Number: 1176469424
Version: 3
Issuer: CN=flyfishing_scn-proxy_ca
Subject: CN=flyfishing_scn-proxy_ca
Not valid before: Thu Jun 19 15:36:56 MDT 1969
Not valid after: Thu Apr 19 15:36:56 MDT 2029
Accept server's certificate? (y|n)
y
Connection registered successfully.
scn-Agent Controller configuration done.
Checking if UCE Agent Controller process is still running, it may take a
couple of minutes ...
Process is no longer running
UCE Agent Controller is stopped.
UCE Agent Controller is in [online] state.
Checking if UCE Agent Controller process is up and running ...
The process is up and running.
UCE Agent Controller is started.
Added the zone configuration automation successfully.
Added the service tags recreate script successfully.
#
```

Error messages similar to *Connection cannot be registered* in the following example typically indicate problems with the user credentials that you specified in the agentadm command. In this example, the user droot was not authenticated on the Enterprise Controller. If you see this error, check that the user name that you supplied for the agentadm -u option, and the password in the file that you specified for the agentadm -p option, match an existing administrative user on the Enterprise Controller.

```
Accept server's certificate? (y|n)
y
Error with connection to CRS: com.sun.scn.connmgt.SCNRegClientException:
droot, Code: 4, Code: 4
ERROR : Connection cannot be registered.
Code--2
sc-console registration failed on [2].
sc-console : User authentication error.
Error executing step : sc_console
```

If the system where you are installing the Agent Controller has multiple active network interfaces, you can use the -a option to specify the IP address of the interface that you want to use for Agent Controller registration. For example:

```
# /opt/SUNWxvmoc/bin/agentadm configure -u droot -p /var/tmp/OC/mypasswd -x
10.0.0.0 -a 10.0.0.1
(output omitted)
```

**11.** If you encountered a *Connection cannot be registered* error message from the agentadm command, use agentadm to unconfigure the Agent Controller. For example:

```
# /opt/SUNWxvmoc/bin/agentadm unconfigure
agentadm: Version 1.0.3 launched with args: unconfigure
verified sc_console command is OK
End of validation
{output omitted}
End of configuration.
```

After the Agent Controller has been unconfigured, correct the problem that was indicated by the error message, and re-run the agentadm configure command.

**12.** Use the sc-console command to list the Agent Controller connection. For example:

```
# sc-console list-connections
scn-Agent Controller https://10.0.0.0:21165
urn:scn:clregid:abcdef12-6899-4bcc-9ac7-a6ebaf71c1f5:20090420171121805
#
```

## Installing and Configuring an Agent Controller Manually Using a Token

Procedure that uses a token to configure an Agent Controller in Oracle Enterprise Manager Ops Center.

This procedure uses a token to configure your Agent Controller software.

**1.** On the Enterprise Controller, change to the /var/opt/sun/xvm/images/ agent/ directory, and list the files that it contains. This directory contains the Agent Controller installation archives. For example:

```
# cd /var/opt/sun/xvm/images/agent/
# ls
OpsCenterAgent.Linux.i686.12.1.0.zip
OpsCenterAgent.Linux.i686.12.1.0.zip.sig
OpsCenterAgent.SunOS.i386.12.1.0.zip
OpsCenterAgent.SunOS.i386.12.1.0.zip.sig
OpsCenterAgent.SunOS.sparc.12.1.0.zip
OpsCenterAgent.SunOS.sparc.12.1.0.zip.sig
#
```

**2.** Identify the Agent Controller archive that is appropriate for the system where you intend to install the Agent Controller. See Table 2–4 for a description of the available packages.

**3.** On the system where you want to install the Agent Controller (the target system), create a directory named /var/tmp/OC.

```
# mkdir /var/tmp/OC
```

4. Use scp or ftp to transfer the correct Agent Controller archive from the Enterprise Controller to the `/var/tmp/OC` directory on the target system. Respond to any authentication or confirmation prompts that are displayed. For example:

```
# scp OpsCenterAgent.SunOS.sparc.12.1.0.zip root@10.5.241.74:/var/tmp/OC
Password:
OpsCenterAgent.S 100% |
*******************************************************************| 34695 KB
00:32
#
```

5. On the target system, change to the `/var/tmp/OC` directory.

```
# cd /var/tmp/OC
#
```

6. Use the `unzip` command to uncompress the Agent Controller archive. For example:

```
# unzip OpsCenterAgent.SunOS.sparc.12.1.0.zip
(output omitted)
```

7. Run the `install -a` script in the `OpsCenterAgent` directory. For example:

```
# OpsCenterAgent/install -a
Installing Ops Center Agent Controller.
No need to install 120900-04.
No need to install 121133-02.
No need to install 119254-63.
No need to install 119042-09.
No need to install 121901-02.
No need to install 137321-01.
Installed SUNWjdmk-runtime.
Installed SUNWjdmk-runtime-jmx.
(output omitted)
6 patches skipped.
19 packages installed.
Installation complete.
Detailed installation log is at /var/scn/install/log.
Uninstall using /var/scn/install/uninstall.
#
```

If you are installing the Agent Controller on Oracle Solaris 11, run the `install` command with the `-p` option and include the IP address; the local IPS pubs are configured for Oracle Solaris 11 Package Repository access using the IP address. For example:

```
# OpsCenterAgent/install -p 10.0.0.1
#
```

8. On the Proxy Controller that will communicate with this Agent Controller instance, examine the `/var/opt/sun/xvm/persistence/scn-proxy/connection.properties` file. The last line in this file contains the auto-reg-token that is required for Agent Controller registration. For example:

```
# cat /var/opt/sun/xvm/persistence/scn-proxy/connection.properties
#Generated by a program. Do not edit. All manual changes subject to deletion.

(output omitted)

trust-store=/var/opt/sun/xvm/security/jsse/scn-proxy/truststore
```

```
auto-reg-token=abcdef12-1700-450d-b038-ece0f9482474\:1271743200000\:T
#
```

9. On the system where you have installed the Agent Controller software, create an empty file named `/var/tmp/OC/mytoken`, and set its permission mode to 400. For example:

```
# touch /var/tmp/OC/mytoken
# chmod 400 /var/tmp/OC/mytoken
```

10. Edit the `/var/tmp/OC/mytoken` file so that it contains the auto-reg-token string from Proxy Controller with the following changes:

   - Remove the `auto-reg-token=`.

   - Remove any backslash characters from the token string. For example:

     ```
     abcdef12-1700-450d-b038-ece0f9482474:1271743200000:T
     ```

11. Use the `agentadm` command to associate the Agent Controller with a Proxy Controller.

   - Oracle Solaris OS: use the `/opt/SUNWxvmoc/bin/agentadm` command

   - Linux OS: use the `/opt/sun/xvmoc/bin/agentadm` command. The example commands below use the following options:

   - configure: causes an Agent Controller configuration operation to take place.

   - -t: specifies the absolute path name of the file that contains the registration token.

   - -x: specifies the IP address or host name of the Proxy Controller to which this Agent Controller will connect.

   - -a: specifies the IP address to use during Agent Controller registration. This selects the network interface that the Agent Controller will use for registration. Accept the server's certificate when prompted. For example:

```
# /opt/SUNWxvmoc/bin/agentadm configure -t /var/tmp/OC/mytoken -x 10.0.0.0
agentadm: Version 1.0.3 launched with args: configure -t /var/tmp/OC/mytoken -
x 10.0.0.0
workaround configuration done.

Certificate:
Serial Number: 947973225
Version: 3
Issuer: CN=flyfishing_scn-proxy_ca
Subject: CN=flyfishing_scn-proxy_Agent Controller
Not valid before: Thu Jun 19 15:36:59 MDT 1969
Not valid after: Thu Apr 19 15:36:59 MDT 2029

Certificate:
Serial Number: 1176469424
Version: 3
Issuer: CN=flyfishing_scn-proxy_ca
Subject: CN=flyfishing_scn-proxy_ca
Not valid before: Thu Jun 19 15:36:56 MDT 1969
Not valid after: Thu Apr 19 15:36:56 MDT 2029

Accept server's certificate? (y|n)
```

```
y
Connection registered successfully.
scn-Agent Controller configuration done.
Checking if UCE Agent Controller process is still running, it may take a
couple of minutes ...
Process is no longer running
UCE Agent Controller is stopped.
UCE Agent Controller is in [online] state.
Checking if UCE Agent Controller process is up and running ...
The process is up and running.
UCE Agent Controller is started.
Added the zone configuration automation successfully.
Added the service tags recreate script successfully.
#
```

If the system where you are installing the Agent Controller has multiple active network interfaces, you can use the -a option to specify the IP address of the interface that you want to use for Agent Controller registration. For example:

```
# /opt/SUNWxvmoc/bin/agentadm configure -t /var/tmp/OC/mytoken -x 10.0.0.0 -a
10.0.0.1
(output omitted)
```

**12.** If you encountered a Connection cannot be registered error message from the agentadm command, use agentadm to unconfigure the Agent Controller. For example:

```
# /opt/SUNWxvmoc/bin/agentadm unconfigure
agentadm: Version 1.0.3 launched with args: unconfigure
verified sc_console command is OK
End of validation

{output omitted}
End of configuration.
```

After the Agent Controller has been unconfigured, correct the problem that was indicated by the error message, and re-run the agentadm configure command.

**13.** Use the sc-console command to list the Agent Controller connection. For example:

```
# sc-console list-connections
scn-Agent Controller https://10.0.0.0:21165
urn:scn:clregid:abcdef12-6899-4bcc-9ac7-a6ebaf71c1f5:20090420171121805
```

# Special Discovery and Management Procedures

Describes specific requirements for discovery of certain types of assets.

Most assets can be discovered and managed using standard procedures. However, some types of assets must be discovered or managed using special procedures:

**Topics**

- Oracle Engineered Systems: Discovery requires a custom configuration file that is prepared by Oracle service. See *Oracle Enterprise Manager Ops Center Operations for Oracle SuperCluster Reference* for more information.

- Oracle Solaris 11: Discovery requires that the Enterprise Controller and Proxy Controller are installed on Oracle Solaris 11 and the Oracle Solaris 11 Update Library is configured.

- Windows Systems: You must enable Windows Management Instrumentation (WMI) on Microsoft Windows systems before discovering them.

- M-Series Servers: You must ensure that user privileges and the status of each dynamic system domain are correct before discovering a Sun SPARC Enterprise M-Series server.

- SPARC M5–32, M6–32, M7 Series Servers: These servers have ILOM server processors. You must get access the server using an account with Ops Center Admin and Ops Center Security Admin roles.

> **Note:**
>
> SPARC M5–32, M6–32, M7 series servers are supported, but some features have limitations. For more information see the `Target Servers` section of the *Certified Systems Matrix* document.

- Oracle ZFS Storage Appliance: You can discover both the storage appliance and its service processor using the appropriate discovery profile.

- Oracle Solaris Cluster: You must discover and manage Oracle Solaris Clusters in a specific order so that Oracle Enterprise Manager Ops Center can manage the entire cluster.

## Windows Systems

Describes requirements for discovery of Windows systems and WMI in Oracle Enterprise Manager Ops Center.

Microsoft Windows systems can be discovered and managed using normal discovery and management procedures. However, before the system can be discovered, the Windows Management Instrumentation (WMI) utility must be configured and have access through the Windows Firewall or Internet Connection Firewall.

### Enabling WMI

Procedure for configuring Windows Management Interface (WMI) in Oracle Enterprise Manager Ops Center.

This procedure allows the Enterprise Controller or a Proxy Controller to connect to the target Windows system.

1. Log in to the WMI on the target host.

2. Click Administrative Tools, then click Computer Management.

3. Expand Services and Applications.

4. On WMI Control, right click Properties.

5. Click the Security tab.

6. Click the Security button.

**7.** Select the Administrators group.

**8.** Select the option to allow Remote Enable.

### Allowing WMI Through the Windows Firewall

Procedure for allowing WMI through firewall for Microsoft Windows systems..

This procedure allows WMI to send data through the target system's firewall.

**1.** Go to the command prompt on the target system.

**2.** Use the `netsh` command to allow WMI to send data through the firewall.

- On Windows Server 2008 R2, use the following command:

  ```
  netsh advfirewall firewall set rule group="remote administration" new
  enable=yes
  ```

- On other Windows systems, use the following command:

  ```
  netsh firewall set service RemoteAdmin enable
  ```

## M-Series Servers

Overview of requirements for discovering an M-Series servers in Oracle Enterprise Manager Ops Center.

M-Series servers must be configured before they can be discovered and managed.

### Topics

- About Discovering a SPARC Enterprise M-Series Server

- Discovering a SPARC M-Series Server

- Discovering an Oracle SPARC M5, M6, or M7 Server

### About Discovering a SPARC Enterprise M-Series Server

Describes discovery of the M3000, M4000, M5000, M8000, M9000, or Fujitsu M10 servers and their XSCF firmware.

To discover, manage, provision, and update a Sun SPARC Enterprise® M3000, M4000, M5000, M8000, M9000, or Fujitsu M10 server (SPARC Enterprise M-series servers), you monitor its XSCF service processor and its dynamic system domains.

The SPARC Enterprise M-series servers have a dedicated processor for system control that is independent of the system processor. A SPARC Enterprise M3000, M4000, and M5000 server has one service processor. The SPARC Enterprise M8000 and M9000 servers, each have two service processors; however, only one service processor is active at a time. The eXtended System Control Facility (XSCF) firmware runs on the dedicated service processor. The firmware manages hardware configuration, monitors cooling system (fan units), domain status, and error status, and can power on and power off peripheral devices.

The XSCF firmware can also create dynamic system domains. Each domain is a logical unit that can function as a system. An Oracle Solaris OS can operate in each domain.

> **Note:**

Fujitsu M10 servers require XSCF Control Package (XCP) firmware version 2050 (XCP2050) to use the Automatic Service Requests (ASR) functions and to use service tags to enable server discovery with the **Find Assets** function.

### Discovering a SPARC Enterprise M-Series Server

Procedure for discovering an M-Series Server in Oracle Enterprise Manager Ops Center.

To discover a Sun SPARC Enterprise® M3000, M4000, M5000, M7000, M8000, M9000, or Fujitsu M10 server, run an Add Assets Using Discovery Profile job for the XSCF service processor. The discovery job discovers the XSCF service processor and its dynamic system domains.

Perform the following tasks to discover this type of asset:

1. In the XSCF service processor, create a user account with `platadm` privilege if one does not exist.

2. Ensure that user privileges and the status of each dynamic system domain are correct.

3. Check the status of each dynamic system domain, using the `showdomainstatus -a` command. Oracle Enterprise Manager Ops Center can only discover domains that do not have a "-" status.

4. Log in to the XSCF shell from an XSCF-LAN port or from the serial port.

5. Discover the system using the Add Assets Using a Discovery Profile procedure.

A Discovery job is launched. Dynamic system domains and the XSCF service processor are discovered at the same time.

When the job is complete, the XSCF service processor and the dynamic system domains appear in the Managed Assets tab. Additionally, the service processor and the domains appear under the M-Series Servers group in the Assets tree.

See Related Resources for Asset Management for more information.

### Discovering an Oracle SPARC M5, M6, or M7 Server

Procedure for discovering an M-Series Server in Oracle Enterprise Manager Ops Center.

Because these servers have ILOM service processors, use the **Add Assets** action with the ILOM service processor discovery profile to discover the ILOM service processor and its dynamic system domains. To discover an M7 server, you must use the current version of the product software.

1. Create a Discovery Profile choosing an ILOM Service Processor for the Asset Type.

2. Select existing or create new SSH and IPMI credentials.

3. Run an **Add and manage various types of assets via discovery probes** job.

4. Choose the Discovery Profile for the server and include the correct Hostnames or IP addresses.

5. After the discovery job completes successfully find the server in the Navigation pane under the M-Series Server tree.

> **Note:**
>
> An M-Series system is significantly larger than a typical server so discovery and refreshes of data can exceed the default expiration of 30 minutes. If the discovery job fails, increase the number of seconds for operations on the ILOM service processor by editing the `/var/opt/sun/xvm/hal.properties` file for the following property:
>
> ```
> ilom.sdm.maximum.command.execution.time=1800
> ```

See *Oracle Enterprise Manager Ops Center Discovering and Managing Oracle SPARC M5, M6, and M7 Servers Guide* for a complete example.

## About the Oracle ZFS Storage Appliance

Description of the Oracle ZFS Storage Appliance and methods for discovering it.

The Oracle ZFS Storage Appliance family of products provides rich and efficient data services for file and block storage formats. Each appliance has the Analytics feature for observing the condition and behavior of the appliance in real time and the ZFS Hybrid Storage Pool feature, which uses Flash-memory devices, high-capacity disks, and DRAM memory within a data hierarchy to provide solid-state response time with spinning disk capacity.

> **Note:**
>
> Starting in Release 12.3.1.0, Oracle Enterprise Manager Ops Center supports an active-active configuration. Previous releases support an active-passive configuration. In both cases, if a head fails, the other head takes control of all resources and provides the services associated with those resources.

The Oracle ZFS storage appliances are available in a cluster configuration, in which two storage controllers, or heads, use storage and network resources to provide services. In an active-active cluster, both heads are active. In an active-passive cluster, one head is active.

When working with an active-active configuration, Oracle recommends a single storage pool on each active head. Although multiple pools on one head is supported, the result is poor performance, suboptimal allocation of resources, artificial partitioning of storage, and additional administrative complexity. Configuring multiple pools on the same host is only recommended when drastically different redundancy or performance characteristics are desired, for example, a mirrored pool and a RAID-Z pool. See the documentation for the Oracle ZFS storage appliance for more information.

Before you discover the storage appliance, configure the iSCSI targets on the storage appliance. In an active-passive cluster, one iSCSI target group is sufficient, although multiple target groups are supported. In an active-active configuration, you must configure at least two iSCSI target groups: one target group for the storage served from the first head and one target group for the storage served by the second head.

To discover a storage appliance In an active-passive cluster, discover the active head and its iSCSI and/or NFS storage, and then discover the passive head, which has no storage associated with it because it will take over the existing storage. The procedure is described in *Discover an Oracle ZFS Storage Appliance and Configure Storage Libraries*.

To discover a storage appliance in an active-active cluster, discover one head with its iSCSI and/or NFS storage, and then run a second job to discover the second head with its corresponding iSCSI and/or NFS storage. This will create dynamic storage libraries backed by each storage pool.

Because the storage appliance contains a service processor, it is possible to discover the appliance but not the service processor or to discover both. It is sufficient to discover only the storage appliance by using the **Add Assets** action with a discovery profile for storage appliances as described in *Discover an Oracle ZFS Storage Appliance and Configure Storage Libraries*. You also have the following alternatives.

- Use **Add Assets** and a discovery profile to discover the storage appliance first and then use a service processor discovery profile to discover its service processor. When you discover the storage appliance, Oracle Enterprise Manager Ops Center displays the device in the Storage section of the Assets tree. When you discover the service processor, its information is mapped to the discovered appliance.

- Use **Find Assets**. Each storage appliance is discovered as two assets: a service processor and a storage appliance. Select both the appliance and its service processor and enter the user credentials. Oracle Enterprise Manager Ops Center displays the asset in the Storage section.

> **Note:**
>
> Oracle Enterprise Manager Ops Center can use either the Storage Connect driver or the RESTful/SSH Ops Center driver to communicate with the storage appliance. Starting from Release 12.3.1.0, the **RESTful/SSH Ops Center driver** is the recommended option to communicate with the storage appliance. The procedure to specify a driver provided in the product software is described in *Discover an Oracle ZFS Storage Appliance and Configure Storage Libraries*. To change drivers after discovery, use the **Switch Driver** action.

## About Oracle Solaris Cluster

Description of requirements for discovering Oracle Solaris Clusters.

Discovering and managing an Oracle Solaris Cluster has some specific requirements. The discovery and management must be performed in the correct order.

> **Note:**
>
> Do not configure a new zone cluster or add a new global node during the discovery and management process.

### Discovering an Oracle Solaris Cluster

Procedure for discovering an M-Series Server in Oracle Enterprise Manager Ops Center.

1. Verify that all global nodes in the cluster are in cluster mode.

2. Discover all of the cluster's global nodes using a discovery profile. You must provide both ssh credentials and create JMX credentials for each global node. The credentials authenticate the Oracle Solaris Cluster's agent.

*Figure 2-8    Discovery Profile for Oracle Solaris Cluster*
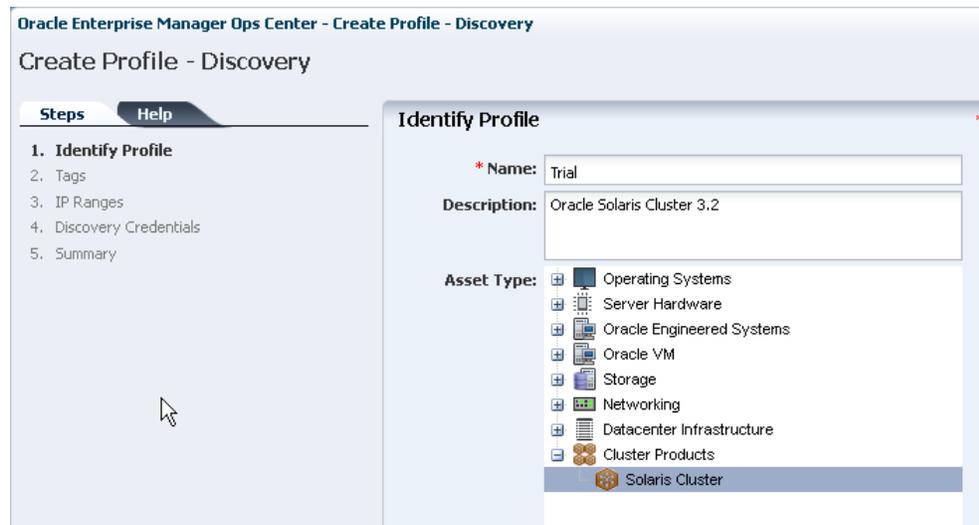


**3.** Discover the cluster using the discovery profile.

### Launching Oracle Solaris Cluster 4.2

Procedure for starting Oracle Solaris Cluster in Oracle Enterprise Manager Ops Center.

Starting in this version, you can launch the Oracle Solaris Cluster Manager:

**1.** In the Navigation pane, select **Solaris Cluster** and then select a cluster.

**2.** In the Actions pane, click **Launch Web Console**.

**3.** Log into the Oracle Solaris Cluster Manager.

## Preparing to Discover ALOM Assets

Procedure to enable discovery of ALOM service processors in Oracle Enterprise Manager Ops Center.

Starting in Release 12.3.1, the discovery of assets with the ALOM service processor is disabled by default. If your site has an asset with this type of service processor, enable discovery using this procedure:

**1.** In the Navigation pane, select **Administration**.

**2.** Select the Enterprise Controller.

**3.** Click the **Configuration** tab.

**4.** In the Subsystem drop-down list, click **Discovery**.

**5.** Change the value of ssh.alom.timeout from 0 to the number of seconds to allow for discovery.

## Managing Assets

Overview of actions for assets that have been discovered in Oracle Enterprise Manager Ops Center.

After discovery, the assets are now managed assets. Through their life cycle, you might need to make changes to their configuration or position. When an asset is moved, migrated, or deleted, the Asset tree might still display the original position of the asset for several minutes. To refresh the display of the Asset hierarchy manually, press the Ctrl key while clicking the Refresh button

**Topics**

- Editing Asset Attributes

- Viewing and Removing Access Points

- Deleting Assets

## Editing Asset Attributes

Procedure for changing the attributes of a specific asset in Oracle Enterprise Manager Ops Center.

All assets have a description that can be edited.

The description field can be used for descriptive information about a system.

To edit asset attributes, perform the following steps:

1. On the Navigation pane, under Assets, select an asset.

2. In the Actions pane, click **Edit Asset**.

3. Edit the name, description, and tags, then click **Save**.

## About the Number of Assets

Description of how assets are counted in Oracle Enterprise Manager Ops Center.

The number of assets managed by the Enterprise Controller and by each of its Proxy Controllers is reported on the Asset Counter tab. The reported numbers are not a physical inventory of assets datacenter. These numbers represent the number of access points in the assets.

The Enterprise Controller can manage 3000 assets and each Proxy Controller can manage 500 assets. More assets can be managed but performance is affected. At 90% of capacity (2700 access points), a Warning alert is issued as an incident on the operating system of the Enterprise Controller. For a Proxy Controller, the warning incident is set at 450 access points. At 100% of capacity, a Critical alert is issued.

## Viewing the Number of Assets

Procedure for displaying the number of each type of asset in Oracle Enterprise Manager Ops Center.

1. Select the Administration section in the Navigation pane.

2. Select the Enterprise Controller.

3. Click the Asset Counter tab in the center pane.

   The Asset Counter tab contains a table for the Enterprise Controller with the total number of each type of asset and a table that shows the number of assets managed by each Proxy Controller .

*Figure 2-9    Asset Counter Tab*

| Summary | Configuration | Storage Libraries | Proxy Controllers | Asset Counter | Logs | Blacklist |

**Enterprise Controller**

| EC ▲ | Assets | LDoms | Zones | OVMGuests | Servers | Storages | Switches | MSeriesCha... | MSeriesDo... | ExadataCells | Agents | Agentless |
|------|--------|-------|-------|-----------|---------|----------|----------|---------------|--------------|--------------|--------|-----------|
| EC | 3 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |

**Proxy Controllers**

Search ▾

| Proxy | Assets | LDoms | Zones | OVMGuests | Servers | Storages | Switches | MSeriesCha... | MSeriesDo... | ExadataCells | Agents | Agentless |
|-------|--------|-------|-------|-----------|---------|----------|----------|---------------|--------------|--------------|--------|-----------|
| prg10022 | 2 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| prg10095 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

4. (Optional) If you are interested in the number of asset of a specific Proxy Controller, select the Proxy Controller from the Administration section in the Navigation pane and then click the Asset Counter tab.

The number represents the number of access points reported by each Proxy Controller.

You can refresh the display by selecting **Run Asset Counter Job** in the Action pane.

## Viewing and Removing Access Points

Procedure for displaying how an asset is included in Oracle Enterprise Manager Ops Center.

An asset's access points show how Oracle Enterprise Manager Ops Center connects to the asset.

The following are possible access points:

- The discovery credentials used to discover the asset.

- The discovery credentials used to discover a related asset. For example, an access point for a service processor is the discovery credentials of its operating system.

- Agent Controller installed on the asset.

- A virtual asset's virtualization host.

To view access points, select an asset and click the Configuration tab.

To delete an access point, perform the following steps:

1. On the Navigation pane, under Assets, select an asset and click the Configuration tab.

2. Select one or more access points, then click **Delete Access Point**.

## Deleting Assets

Procedure for removing assets from Oracle Enterprise Manager Ops Center.

The Delete Asset option uninstalls Agent Controller software if it is present, removing the asset from Oracle Enterprise Manager Ops Center. All data for the asset is removed. You delete assets to stop managing them with Oracle Enterprise Manager Ops Center.

The operating systems that support the Enterprise Controller and Proxy Controllers cannot be deleted or removed.

> **Note:**
>
> Deleting a global zone also deletes its non-global zones. However, if a global zone is managed with an Agent Controller, its non-global zones continue to be managed agentlessly even if their Agent Controllers are removed.

1. Click **All Assets** in the Assets section of the Navigation pane.

2. Select the asset or assets that you want to delete from the Managed Assets or Unprocessed Assets tabs.

3. Click **Delete Asset**.

4. If the assets do not have Agent Controllers, a confirmation window is displayed. Click **Delete**. A job is launched to delete the assets.

5. If the assets have Agent Controllers, the Management Credentials page is displayed. Provide management credentials using one of the following methods:

   - Click **New** to create a set of credentials. Enter a name and the credential information, then click **OK**.

   - Click **Select** to select from a list of existing set of credentials. Click **OK**.

6. Click **Next**.

   The Summary page is displayed.

7. Review the summary, then click **Finish**.

# Asset Groups

Overview of asset groups in Oracle Enterprise Manager Ops Center.

Assets are automatically placed into system groups based on asset type. You can also create your own groups and add assets to them, either by manually adding assets or by creating rules that add assets automatically based on asset characteristics.

**Topics**

- About Types of Groups

- About Asset Tags

- About Group Data

- Creating a Group

- Editing a Group

- Adding Assets to a Group

- Removing Assets from a Group

- Moving Assets to a Group

- Moving a Group

- Deleting a Group

# About Types of Groups

Describes the default asset groups and custom asset groups in Oracle Enterprise Manager Ops Center.

Assets are members of two types of groups: System groups and User-defined groups. System groups are automatically generated for each category of asset. User-defined groups can contain any assets. You can configure rules to add any asset to the user-defined groups that meets the rule criteria.

Within system groups, a subgroup is created for each type of asset that Oracle Enterprise Manager Ops Center manages. You can use System Groups to locate and view assets of a specific type. You can also act on System Groups, such as changing monitoring thresholds and updating management credentials. You can view system groups by selecting them from the drop-down list at the top of the Assets section in the Navigation pane.

User-defined groups can contain any type of asset and can be organized by any criteria. You can configure rules for user-defined groups that automatically add assets with specific characteristics to the group.

You can take any action on a group that is applicable to the assets in the group. For example, you can update Automated Service Request (ASR) contacts for all assets in a group, or target a group containing operating systems with an OS update job.

## System Groups

List of default asset groups in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center creates these system groups:

- All Assets: contains all discovered and managed assets. This is the default view of the assets section.

- Engineered Systems: contains all Oracle Engineered Systems.

- Operating Systems: contains all operating systems with subgroups for each type of operating system such as Oracle Solaris OS, Oracle Linux, and SUSE Linux. The subgroups are further organized by version, such as Oracle Solaris 9 and Oracle Solaris 10 software.

- Servers: contains all hardware that can receive OS provisioning.

- Chassis: contains all hardware that can receive firmware updates but not OS provisioning.

- Network Switches: contains all network switches.

- Racks: contains all racks.

- Server Pools: contains all server pools.

- Storage: contains all storage systems.

- Solaris Clusters: contains all Oracle Solaris Clusters.

## User-Defined Groups

List of properties for a custom asset group in Oracle Enterprise Manager Ops Center.

You can specify the following characteristics for a user-defined group:

- **Group Name**

- **Description**

- **Group Location**

- **Group Rules**: group rules add any assets to the group that match the attributes and rules.

- **Subgroups:** groups can be organized hierarchically.

## About Asset Tags

Description of using labels to identify or sort assets.

A tag is a set of information attached to an asset. Each tag consists of a tag name, which is drawn from a list of values appropriate for each asset, and a tag value, which can be any text string. For example, an asset could have a tag with a tag name of `oracle.cloud.resource.creation.time` and a value of `12 June`.

You can use tags to categorize assets and to simplify later searches. You can use tags to associate information with assets, and to create groups of assets based on their tags or tag values. To add assets to a group using tags, either discover them using a profile that includes the tag or, after discovery, create a new group or edit an existing group to require membership based on a rule that uses the tag.

### Adding Tags

Procedure for adding tags to an asset in Oracle Enterprise Manager Ops Center.

You can create tags to assets during or after discovery. To add tags to one or more assets after discovery, perform the following steps:

1. On the Navigation pane, select an asset or group.

2. In the Actions pane, click **Edit Tags**.

   *Figure 2-10    Add Tags*

   

3. Click the **Add** icon and select a tag name from the drop-down list. Enter a tag value, then click **Save**.

### Viewing Tags

Procedure displaying an asset's tags in Oracle Enterprise Manager Ops Center.

Tags are displayed in the **Dashboard** tab for managed assets. Select an asset, then use the mouse to hover on the **Tags** icon in the center pane to display the tags.

### Deleting Tags

Procedure for deleting asset tags in Oracle Enterprise Manager Ops Center.

To delete tags, perform the following steps:

1. On the Navigation pane, select an asset or group.

2. In the Actions pane, click **Edit Tags**.

3. Select a tag, then click the **Delete** icon.

4. Click **Save**. The tag is deleted.

## About Group Data

Procedure for displaying information about a group of assets in Oracle Enterprise Manager Ops Center.

Each group can list all the assets in the group and can display data about their assets. Chassis and hardware groups display power usage information, and operating system groups display CPU, network, memory, and system load information.

You can select a group to see a dashboard page with information about the group, including:

* A group summary that shows the group's name, description, tags, location, and number of members.

* A membership graph showing the group's assets, any child groups, and any parent groups.

* A status summary showing the problems of the assets within the group.

* An asset summary showing basic data about the assets within the group.

## Creating a Group

Procedure for creating an asset group in Oracle Enterprise Manager Ops Center.

You can organize your assets into groups to aid in management and inventory. For a rule-based group, membership is determined by whether an asset conforms to the rule. For example, if you select Name as an Attribute, Contains as a condition, and Pod3 as a value, any asset with Pod3 in its name is added to the group.

1. In the Navigation pane, in the Assets section, select **User Defined Groups** from the drop-down list.

2. Click **Create Group** in the Actions pane.

**Configure Group**     * Indicates Required Field

Enter the required information to configure a group.

* **Group Name:**

**Description:**

**Location:** ● Top Level (root)

○ Inside a user-defined group or subgroup

**Advanced Options:** ☐ Configure group rules

☐ Configure subgroups

☐ Preview group before creation

**Group Tags:** ⊕ ✕

| Tag Name | Value |
|---|---|
| | |

3. In **Group Name**, specify the name to be displayed in the User-Defined Groups of the Navigation pane.

4. In **Description:**, describe the purpose of the group. This description is displayed in the group's dashboard.

5. In **Group Location**, specify whether the position of this group in the Asset tree. You can create a group at the top level (root), the default, or as a child of an existing user-defined group.

6. The **Configure group rules** option creates a rules-based group, that is, the membership of the group is determined by how an asset conforms to the rule. When you select this option, you will create one or more rules for the group. This selection also enables the **Preview group before creation** option.

7. The

   **Configure subgroups** option allows you to specify an existing user-defined group as a child of this group.

8. Keep the **Preview Group Before Creation** option if you are configuring group rules or subgroups to test your rules or selections.

9. You have the option to add tags to the new group. Click **Next**.

10. If you are creating a rules-based group, the next step defines one or more rules. The first rule, Rule 1, is required and specifies whether an asset must match all of the rules or at least one of the rules to be included in the group.



11. To specify the second rule, select the **Asset Type** from the drop-down list.

12. Depending on the type of asset, the attributes that can control membership change. Select an attribute from the drop-down list. See About Asset Attributes for a list of the asset attributes that can be used in group rules.

13. In the **Condition** dropdown list, select how the attribute is used in the rule. The options are:

   - Contains

   - Does not contain

   - Ends with

   - Equal

   - Matches

   - Not equal

   - Starts with

14. In the remaining field, enter the value that completes rule. For example, if the attribute is Name, the value is a string.

15. To add a third rule, click the Add icon and repeat the procedure. When you are finished adding rules, click **Next**.

16. If you are adding subgroups, drag and drop one or more groups from the available groups list to the selected groups list. When you are finished, click **Next**.

17. If you chose to preview the group, view the assets and subgroups that will be added to the group. If necessary, go back and change the group rules or the list of subgroups.

## Creating a Group for Assets in Maintenance Mode

Procedure for creating a user-defined group containing assets in maintenance mode in Oracle Enterprise Manager Ops Center.

You can organize assets in Maintenance Mode into one rule-based group.

1. In the Navigation pane, in the Assets selection, select **User Defined Groups** from the drop-down list.

2. In the Actions pane, click **Create Group**.

3. For Group Name, enter a name for this custom group. This name is displayed in the User-Defined Groups of the Navigation pane

4. In the Description field, describe the purpose of the group, in this case, Maintenance. This description is displayed on the group's Dashboard.

5. In the Location field, select **Top Level (root)**.

6. In Advanced Options, select **Configure group rules**, then click **Next.**

7. Create the rule that constrains membership of the group to assets that are in Maintenance mode.



a. For Rule 1, click **All** .

b. For Asset Type, select **Any**.

c. For the Attribute, **Maintenance Mode**.

d. For the condition, select **Equal**.

e. For the value, enter **MAINTENANCE** . Uppercase is required.

8. Click **Next** to skip adding subgroups.

9. In the preview, verify that the assets are listed as you intend.

**10.** Click **Finish** to create the group.

## Editing a Group

Procedure for editing the characteristics of an asset group in Oracle Enterprise Manager Ops Center.

You can change the attributes of an existing group, including its name, description, rules, subgroups, and parent group. If you change or remove the rules of an existing group, assets added by those rules are removed if they do not match the new rules. However, assets that were added manually can only be removed manually.

To edit a group, perform the following steps:

**1.** On the Navigation pane, select All User Defined Groups from the Assets drop-down list.

*Figure 2-11   All User Defined Groups*
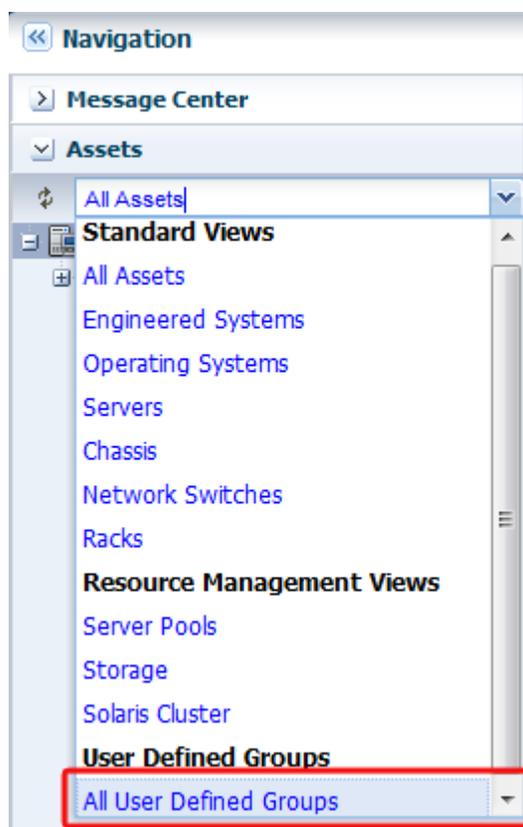


**2.** In the Actions pane, click Edit Group.

---

**Note:**

You can edit any of the group's characteristics. If you edit a group's rules, assets that were added by group rules will be removed if they do not meet the new rules, but assets that were manually added will not be affected.

---

See Expression Query Language for a list of the asset attributes that can be used in group rules.

## Adding Assets to a Group

Procedure for adding assets to a user-defined group in Oracle Enterprise Manager Ops Center.

You can place assets into user-defined groups to organize them. When an asset is added to a group, it continues to be displayed in the All Assets section. Assets can be added to any number of groups.

1. In either the **Managed Assets** tab of the center pane or the Assets section of the Navigation pane, select the assets you want to add.

2. Click **Add Asset to Group**.

3. Select the destination group.

4. Click **Add Assets to Group**.

## Removing Assets from a Group

Procedure for removing an asset from a group in Oracle Enterprise Manager Ops Center.

When you remove an asset from a user-defined group, the asset remains in any other group of which it is a member.

If an asset was added to a group by the group's rules, it cannot be removed.

1. On the Navigation pane, under Assets, select **All User Defined Groups**.

2. Select the group that contains the assets.

3. Select one or more assets.

4. Click **Remove Asset from Group**

## Moving Assets to a Group

Procedure for moving an asset from one group to another group in Oracle Enterprise Manager Ops Center.

When you move assets to a new user-defined group, the assets are removed from the current group and added to the new group.

If the current group has rules that match the asset you want to move, the asset remains in the original group and the new group.

To move assets to a new group, perform the following steps:

1. On the Navigation pane, under Assets, select **All User Defined Groups**.

2. Select the group that currently contains the assets.

3. Select one or more assets and click **Move Asset to Group**.

4. Select the destination group and click **Move Assets to Group/Subgroup**.

## Moving a Group

Procedure for moving a group of assets in Oracle Enterprise Manager Ops Center.

You can move a user-defined group within the hierarchy of groups, making it a child of a different user-defined group or placing it at the top level.

1. On the Navigation pane, under Assets, select **All User Defined Groups**.

2. Select the group you want to move.

3. Click **Move Group**.

4. Select the new parent group.

5. Click **Move Group**.

## Deleting a Group

Procedure for removing an asset group from Oracle Enterprise Manager Ops Center.

Deleting a user-defined group removes the group and all of its subgroups from the user-defined group hierarchy without removing any of the assets.

To delete a group, select a group and click **Delete Group** in the Actions pane.

# Related Resources for Asset Management

List of Oracle Enterprise Manager Ops Center documents with additional information.

- To enable the **Find Assets** action, see Enabling Discovery by Service Tags.

- See Management Credentials for information about credentials for discovering hardware assets.

- See *Oracle Enterprise Manager Operations Reference* for a comparison of agent-managed assets and agentless-managed assets.

- See Configure Monitoring Rules and Policies for information about how Oracle Enterprise Manager Ops Center generates alerts and incidents.

- See *Operations for Oracle SuperCluster Reference* for more information about discovering the Oracle SuperCluster T4-4, T5-8, and M6-32 systems.

- SPARC M5–32, M6–32, M7 series servers are supported, but some features have limitations. For more information see the `Target Servers` section of the *Certified Systems Matrix* document.

  See *Oracle Enterprise Manager Ops Center Discovering and Managing Oracle SPARC M5, M6, and M7 Servers Guide* for a complete example of discovery.

- For end-to-end examples of discovering assets, see the workflows in the Deploy How To library at `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm`. In particular, see *Discover an Oracle ZFS Storage Appliance and Configure Storage Libraries* for an example of discovery. The workflows identify the how to documents for discovering and managing assets.

- For information about SPARC servers, see SPARC Systems at `http://www.oracle.com/technetwork/documentation/oracle-sparc-ent-servers-189996.html`.

- See Systems Management and Diagnostics at `http://www.oracle.com/technetwork/documentation/sys-mgmt-networking-190072.html` for information about ILOM configurations.

# 3

# Configure Jobs

Overview of jobs in Oracle Enterprise Manager Ops Center.

This chapter describes in detail about jobs, the different roles for managing jobs, viewing jobs, and the different actions that can be performed on jobs.

**Topics**

- Introduction to Jobs

- Roles for Job Management

- Actions Available for Jobs

- Location of Job Information in the User Interface

- Details of Jobs and Tasks

- Overview of Viewing Jobs

- Overview of Job Actions

- Overview of Job Properties

- Events for Jobs

- Audit Logs

- Related Resources for Job Management

## Introduction to Jobs

Definition of jobs in Oracle Enterprise Manager Ops Center.

When you select an action, Oracle Enterprise Manager Ops Center creates a job. This job is runs on either the Enterprise Controller system or a Proxy Controller. Each consists of one or more tasks and has one or more targets. The progress of the job is recorded in a log file and displayed in the user interface.

## Roles for Job Management

List of required roles for job tasks in Oracle Enterprise Manager Ops Center.

If a job has multiple targets, you can see only the targets for which you have the correct role. If you do not have the role for any of the targets, the job is not displayed.

A cloud user can only view or act on jobs that were created by the user. The cloud user cannot view jobs that were created by another user.

The following table lists the tasks that are discussed in this section and the role required to complete the task. An administrator with the appropriate role can restrict

privileges to specific targets or groups of targets. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 3-1    Job Management Tasks and Roles*

| Task | Role |
| --- | --- |
| Viewing Job Status | The same as the role required to launch the job. |
| Viewing Job Details | The same as the role required to launch the job. |
| Monitoring Jobs for an Asset | The same as the role required to launch the job. |
| Answering Questions | The same as the role required to launch the job. |
| Stopping a Job | The same as the role required to launch the job. |
| Re-running a Job | The same as the role required to launch the job. |
| Copying a Job | The same as the role required to launch the job. |
| Deleting a Job | The same as the role required to launch the job or Job Management. |
| Changing the Maximum Time for a Job | Root access on Enterprise Controller system. |

# Actions Available for Jobs

List of available operations in Oracle Enterprise Manager Ops Center.

You can perform the following actions on jobs:

- View details about the job, including the status of all tasks.

- Respond to prompts during a job.

- Interrupt or stop a running job. You can re-run the job later.

- Remove a job from the history.

- Re-run a job that had partial success, failed, or was stopped.

- Create a new job with a new Job ID based on a previous job; for example, to repeat a successful complex multi-step job on another target.

# Location of Job Information in the User Interface

Lists the navigation instructions to locate jobs in Oracle Enterprise Manager Ops Center.

The Jobs pane is located at the bottom of the user interface and is not displayed by default. Open the Jobs pane to view a list of all jobs. You can monitor the progress of current jobs and can also review completed jobs. You can view the status of all jobs, view detailed information about specific jobs, and take actions on jobs.

*Table 3-2    Location of Job Information in the UI*

| Object | Location |
| --- | --- |
| View a list of all jobs. | Click the **Jobs** pane to display the **Job Summary** table. |
| View a list of tasks in a job. | Click the **Jobs** pane to display the **Job Summary** table, then double-click a job to display the Jobs Detail view. |
| View a job for a specific asset | Select an asset from the **Asset** view of the Navigation pane then click the **Jobs** tab Select the job. |

## Details of Jobs and Tasks

Lists the details that can be viewed for jobs in Oracle Enterprise Manager Ops Center.

The Job Details view displays the targets of the job, and also the following information:

- Job status:

  – Running – The job is in progress.

  – Waiting for User Input – The job has started, but needs information from a user before it can be completed.

  – Failed – The job was not successful.

  – Partially Successful – Some tasks were completed successfully. This could be a job with multiple tasks, in which some tasks completed but others failed, or a job with multiple targets, in which the job was successful for only some targets.

  – Stopped – The job was stopped by the user.

  – Scheduled – The job has been scheduled to run at a specific time. It might be a one-time job or a recurring job.

  – Successful – The job has completed. All of its tasks were completed successfully.

- Job ID – A unique identification number for the job.

- Type of job – For example, the discovery custom type identifies a job as a result of a custom discovery action.

- Name of job – A name for the job.

- Run ID – If a job has been run multiple times, each run of the job has a separate run ID.

- Mode of job – Simulated or Actual Run. Some jobs can be simulated. Simulated jobs verify that the necessary permissions, images, space, and other job requirements are satisfied. To perform an actual run of a simulated job, you must create a new job.

- Owner of job – The user who launched the job.

- Start / Scheduled Date – The date and time when the job was started or is scheduled to start.

- Elapsed time – The amount of time the job has been running, if the job is running. The amount of time it took for the job to complete, if the job has completed.

- Description – Description of the job.

- Failure policy – The failure policy of the job, can be one of the following:

  - Continue on Failure – if a task fails, continue to run other tasks.

  - Abort on Failure – if a task fails, all remaining tasks are aborted.

  - Rollback on Failure – if a task fails, abort all remaining tasks, and run the rollback method on the failed task and all previous successful tasks.

- Next Scheduled Time (For recurring scheduled jobs) – This option is available only in the job summary table. It displays the time when the job started. If it is scheduled to run in the future, then it displays the next run time.

- Next Scheduled Date – The next date that the job will be run, or null if the job will not run again.

- Start Date – The date/time that the run of this job started.

- Creation Date – The date/time that the job was first created.

- Task Execution Order:

  - Sequential – the tasks are run one after another.

  - Parallel – all the tasks run at the same time.

  - Sequential_on_task – this applies to tasks that target more than one target. The task must complete on all targets before the next task begins.

- List of tasks – This option is available on the job target details view. It displays the following:

  - Asset that is the target of the task

  - Last log entry for the task or the result of the task if the task is completed.

  - Elapsed time – the amount of time that this task has been running.

- Task execution order – The execution order of the task.

- Task progress/results – Progress or result of the task.

- Event logs – Event logs are generated by tasks as they progress.

# Overview of Viewing Jobs

Overview of displaying job information in Oracle Enterprise Manager Ops Center.

The Jobs pane displays all current and past jobs that have not been deleted.

**Topics**

- Viewing All Jobs and Jobs With Special Status

- Viewing Job Details

- Monitoring Jobs for an Asset

- Searching for Jobs

## Viewing All Jobs and Jobs With Specific Status

Procedure for displaying a list of jobs in Oracle Enterprise Manager Ops Center.

To view all jobs, perform the following steps:

1. Click and expand the Jobs pane at the bottom of the UI.

   The Jobs pane is displayed as shown in the following figure.

*Figure 3-1    Jobs pane*



2. In the Jobs pane, click the **All Jobs** icon, highlighted in Figure 3-1.

   All the jobs are displayed.

3. To view jobs with a specific status (such as jobs in progress, jobs waiting for user input, failed jobs, partially successful jobs, stopped jobs, scheduled jobs, and successful jobs), click the respective job status icon. The jobs with the selected status are displayed.

## Viewing Job Details

Procedure for displaying information about a specific job in Oracle Enterprise Manager Ops Center.

You can view detailed information about a job, including the status of the tasks that make up the job.

To view job details, perform the following steps:

1. Select a job in the Jobs pane.

*Figure 3-2    View Job Details*
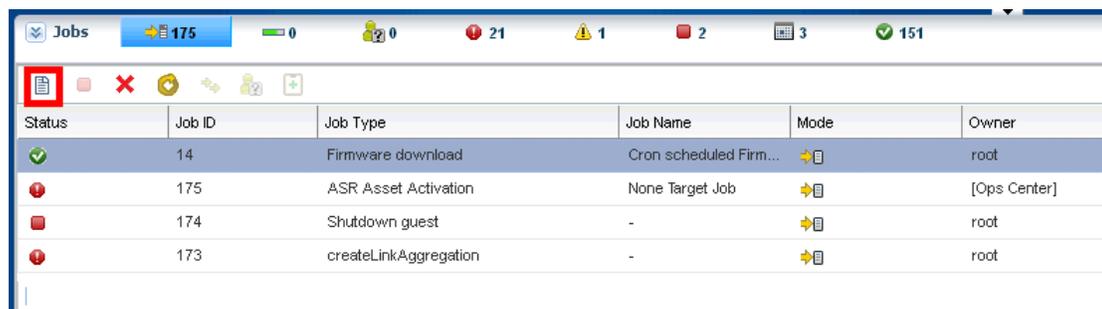


2. Click the **View Job Details** icon, highlighted in Figure 3-2 or double-click the job. The Job Details window is displayed.

*Figure 3-3    Job Details Window*
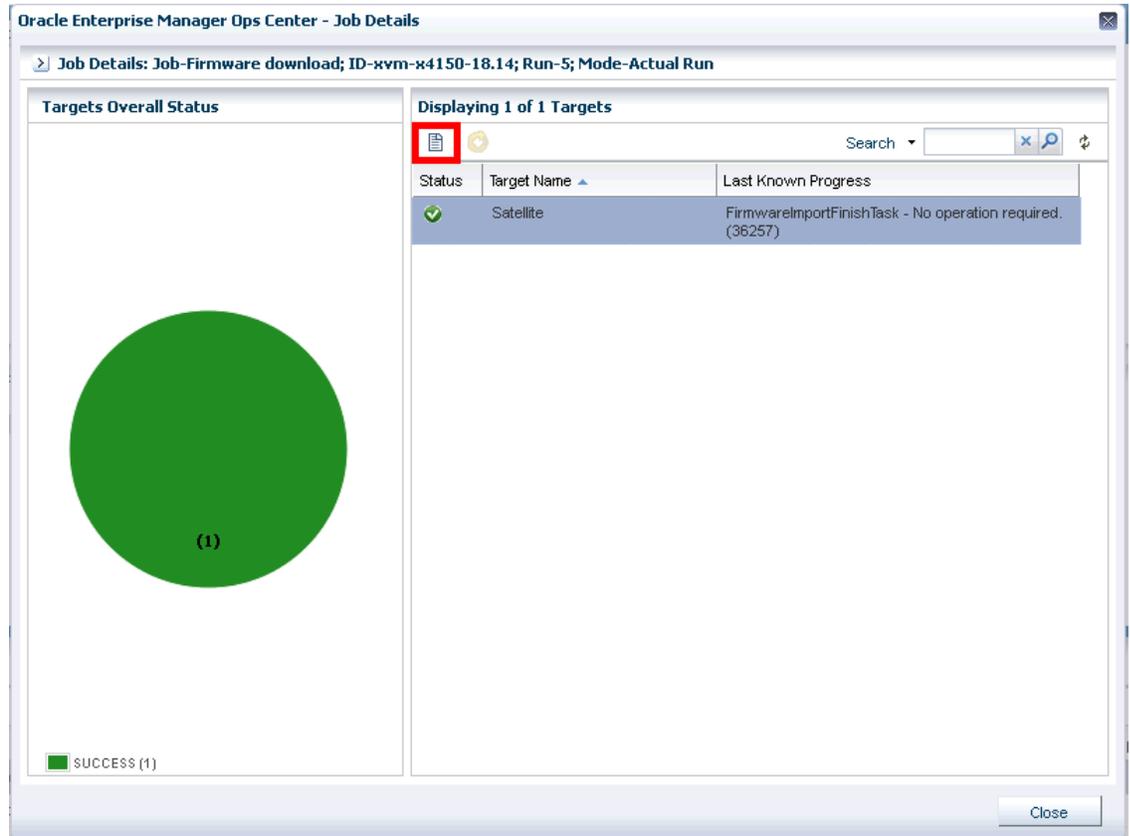


The overall status of the target is displayed on the left. On the right, a table lists all the targets.

3. Select a target and click **Display Selected Target Details** icon, highlighted in Figure 3-3. You can also double-click the target to display the target details.

The Job Target Details window is displayed.

*Figure 3-4    Job Target Details Window*



4. Select a target and click **Display Selected Task Details** icon. You can also double-click a task.

The Task Logs window is displayed with the Event Logs tab active, as show in Figure 3-5.

*Figure 3-5    Task Logs Window*



You can click the **Task Properties** tab to see additional information about the task, such as the Task ID and the permissions used to complete the task.

5. Click **Export Logs** on either tab to save the event log as a text file. The View Target Logs window is displayed with two options:

   • **Selected Task Target Log** exports the current task.

   • **Full Job Log** exports all tasks.

6. Click **Save** to export the event log to a file and location of your choice.

You can also view and export the event log for a task or job by selecting the **View Target Logs** icon on the Jobs Target Details window, as show in Figure 3-4.

## Monitoring Jobs for an Asset

Procedure for viewing jobs for a specific asset in Oracle Enterprise Manager Ops Center.

You can view jobs for a particular asset, both running jobs and jobs that have been completed.

To view only those jobs for a particular asset, perform the following steps:

1. In the Navigation pane, under Assets, select an asset.

2. In the center pane, click the **Jobs tab**.

*Figure 3-6    Jobs pane in Assets View*
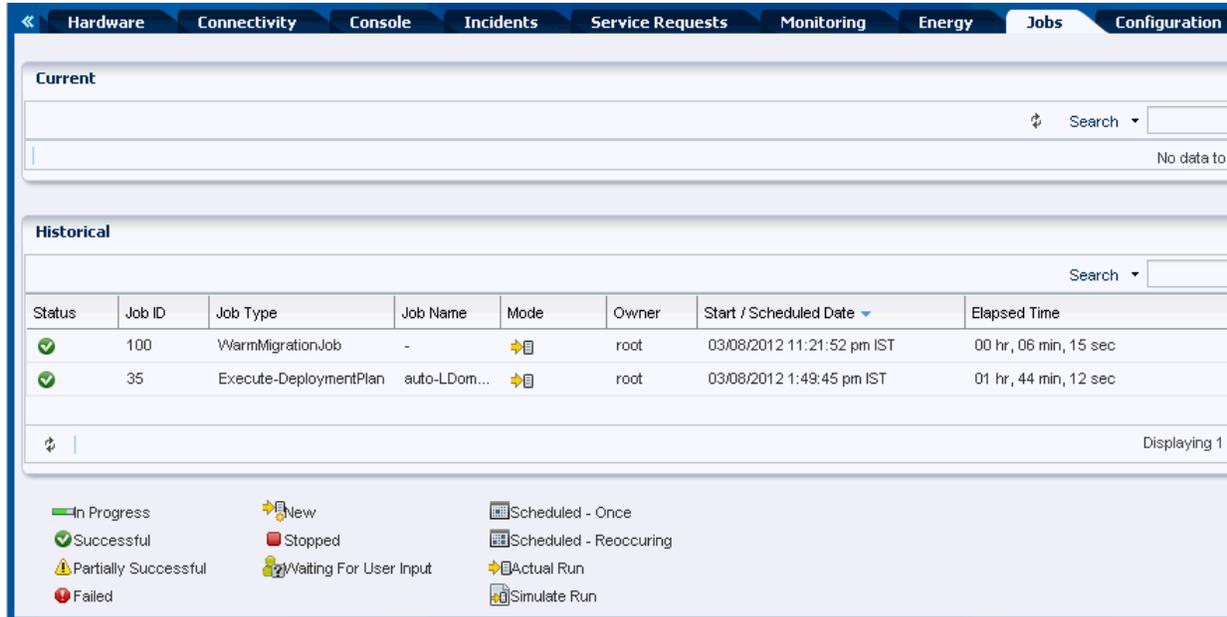


[Figure 3-6](#) shows the Jobs pane for a selected asset. The Current and Historical tables show the jobs for the asset.

3. Select a job and double-click to view the details of the job.

## Searching for Jobs

Procedure for find a specific job in Oracle Enterprise Manager Ops Center.

You can search for specific jobs in any state. To search for a particular job, perform the following steps:

1. Click **Search** in the upper right corner of the Jobs pane.

*Figure 3-7    Jobs Search*
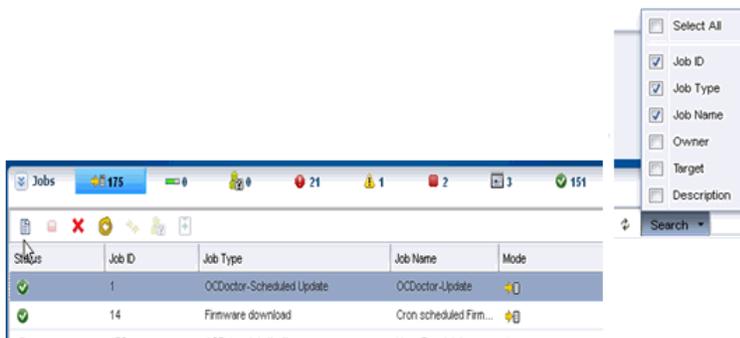


2. Select one or more job characteristics to search, then enter a search term and click the **Search** icon.

   Jobs for which the selected characteristics match or include the search term are displayed.

# Overview of Job Actions

Description of the relationship between a job's status and the actions that you can take in Oracle Enterprise Manager Ops Center.

You can take actions on jobs that have been launched. These actions vary depending on the current status of the job.

### Topics

- Answering Questions for a Job

- Stopping a Job

- Re-running a Completed Job

- Re-running a job on Failed Targets

- Copying a Job

- Deleting a Job

- Debugging a Job Using the OCDoctor

## Answering Questions for a Job

Procedure for responding to queries during a job in Oracle Enterprise Manager Ops Center.

Some jobs require user input to complete. A job that requires a response has the status of Waiting for User Input. To provide input, perform the following steps:

1. Select a job with the Waiting for User Input status.

2. Click the **Answer Question**s icon.

3. Select **Yes** or **No** for each question, or click **Yes to All** or **No to All**.

4. When you have answered each question, click **Submit** to resubmit the job using the same Job ID and Run ID.

## Stopping a Job

Procedure for interrupting a job in Oracle Enterprise Manager Ops Center.

You can stop a job that is running. All tasks in progress are interrupted and tasks that have not yet started are aborted. The completion status of the job depends on the number of tasks that have completed, have been interrupted, and have not started.

> **Note:** You cannot stop a migration job or an auto-recovery job. For these types of jobs, the taskStopForbidden job property is set to `true` by default. Although it is not recommended, it is possible to allow the stopping of these jobs by changing the value to `false`. Navigate to the Enterprise Controller's Configuration tab and select **Job Manager properties**.

To stop a job, perform the following steps:

1. Select a job that is running.

2. Click **Stop Selected Job**s.

3. Click **Stop Job** to confirm.

## Re-running a Completed Job

Procedure for repeating a job in Oracle Enterprise Manager Ops Center.

If a job is completed, you can repeat the job with a new Run ID. The re-run option is disabled for some jobs.

To re-run a job, perform the following steps:

1. Click and expand the Jobs pane.

2. Select a job.

3. Click **Re-Run Selected Jobs**.

4. Click **Run Job**.

The job is re-run with a new Run ID.

## Re-running a Job on Failed Targets

Procedure for repeating an incomplete job in Oracle Enterprise Manager Ops Center.

If a job is partially completed, failed, or stopped, you can repeat the job on failed or incomplete targets. To re-run a job on failed targets, perform the following steps:

1. Select the job and view the job details.

2. Select one or more failed targets from the list of targets and click **Re-Run Selected Failed Targets**, then click **OK**.

The job is re-run with the same Run ID on the failed targets.

## Copying a Job

Procedure for making a copy of an existing job in Oracle Enterprise Manager Ops Center.

You can copy an OS or firmware update job, using a completed job as a template for a new job. To copy a job, perform the following steps:

1. Select the job that you want to copy and click **Copy Job**.

   A new job wizard is displayed, using the information from the existing job.

2. Modify the job information, select a schedule, and click **Submit Job**.

The new job is submitted with a new Job ID.

## Deleting a Job

Procedure for removing a job from Oracle Enterprise Manager Ops Center.

Deleting a job removes it from the queue entirely. It cannot be re-run or resumed, and its job details are not available.

> **Note:**
>
> You cannot delete jobs that are running. You must first stop the job and then delete it.

To delete a job, perform the following steps:

1. Select the job that you want to delete.

2. Click **Delete Selected Jobs**.

3. Click **Delete Jobs** to confirm.

## Debugging a Job Using the OCDoctor

Procedure for diagnosing problems with a failed job using OCDoctor in Oracle Enterprise Manager Ops Center.

You can debug a job that has been run on a managed asset. This action runs a self-diagnosis using the OCDoctor's `--troubleshoot` option on the asset.

To debug a job, perform the following steps:

1. Select the job and click the **Debug Job Using OCDoctor** icon.

2. Select either **Run New Self Diagnosis** to run a new diagnosis or **Work on Previous Self Diagnosis** to view the results of a prior diagnosis. If you select Work on Previous Self Diagnosis, the results of the prior self-diagnosis are displayed, and you can re-run the self diagnosis.

3. Attempt to fix issues by selecting **Attempt to Fix Issues**, or select **Collect Logs** to collect log files from the target.

4. Review the summary information and click **Finish** to launch the self-diagnosis job.

5. Review the job details or rerun the wizard and select **Work on Previous Self Diagnosis** to view the data gathered by the self diagnosis.

# Overview of Job Properties

Overview of job management in Oracle Enterprise Manager Ops Center.

The Enterprise Controller uses several properties to manage its jobs.

### Topics

- Job Properties

- Changing a Job Property

## Job Properties

Lists the properties that can be viewed or configured for jobs in Oracle Enterprise Manager Ops Center.

You can manage the following properties of jobs and tasks:

- jobTypeWeight.FirmwareProvisioningJob – This value sets the relative weight of firmware provisioning jobs. Do not modify this value unless directed by Oracle Support.

- taskTimeOut – Sets the number of minutes before a task expires and fails.

- tierTimeOut – Sets the number of minutes before a job that has not been handled by a Proxy Controller fails.

- taskStopForbidden – The value of `true` prevents the Stop Job action. This the the default value for auto-recovery and migration jobs. Although it is not recommended, you allow these jobs to be stopped by setting the property to `false`.

- totalAllowedWeight – Do not modify this value unless directed by My Oracle Support.

- totalDispatchWeight – This value sets the total weight of jobs that can be performed in parallel. Increase this value if your Enterprise Controller system can handle additional jobs.

## Changing a Job Property

Procedure for changing the configuration of jobs in Oracle Enterprise Manager Ops Center.

You can modify the values to improve performance. The changes you make affect all activities. For example, when you increase the `taskTimeOut` value, all tasks of all jobs use the new value.

To modify a property perform the following steps:

1. In the Navigation pane, select **Administration**, then select the Enterprise Controller and click the **Configuration** tab.

2. In the drop-down menu, select **Job Manager properties**.

3. Edit the values, then click **Save**.

# Events for Jobs

Lists the location of the audit log in Oracle Enterprise Manager Ops Center.

To follow the progress of a job, view Job Details. If a job does not complete successfully, you can examine the audit log file in the following location:

On Oracle Solaris system: `/var/cacao/instances/oem-ec/audits`

On Linux System: `/var/opt/sun/cacao2/instances/oem-oc/audits`

# Audit Logs

Lists the type of event and the type of information about the event that is logged

Oracle Enterprise Manager Ops Center logs events to create a record of the following operations:

- Adding and deleting a user account

- Changing the roles for a user account

- Connecting to the Enterprise Controller

- Starting and ending jobs

The audit log contains information about:

- Date and time of event

- User ID executing a job

- Type of event

- End of the job

- Details of the login connection: type of connection, port, and IP address

> **Note:**
>
> You must have a `root` access to view the log files.
>
> Logs cannot be edited or modified by any user.

## Related Resources for Job Management

List of Oracle Enterprise Manager Ops Center documents with additional information.

For instructions on performing actions or to learn more about the role of this feature, refer to the following:

- *Oracle Enterprise Manager Ops Center Administration*

- See `Logs and Directories` in *Oracle Enterprise Manager Operation Reference* for more information on audit log files.

For end-to-end examples, see the workflows and how to documentation in the library. For deployment tasks, go to http://docs.oracle.com/cd/E59957_01/nav/deploy.htm and for operate tasks go to http://docs.oracle.com/cd/E59957_01/nav/operate.htm

# 4

# Configure Monitoring Rules and Policies

Overview of monitoring rules in Oracle Enterprise Manager Ops Center.

This chapter discusses the types of monitoring rules and how the software uses monitoring rules and policies to generate alerts and incidents in the user interface.

**Topics**

## Introduction to Monitoring Rules and Policies

Overview of asset monitoring in Oracle Enterprise Manager Ops Center.

Monitoring detects components or attributes of a managed resource that are not operating within parameters. Resource is a broad term for an asset (such as hardware or operating system), a group, a network, or a library that is managed by Oracle Enterprise Manager Ops Center. When you apply monitoring policy to all the assets, you enforce consistency in reporting status for the assets.

Monitoring rules and policies are the components of a complete monitoring configuration:

- Monitoring Rules: Define alerting conditions. You apply one or more rules to an asset to raise an alert when the asset is operating outside the defined parameter.

- Monitoring Policies: A set of monitoring rules targeted to a specific asset type. System-defined monitoring policies contain a set of rules that are applied to resources by default. You can also create your own policies, define the rules for the policy, and make those policies the default policies for new assets.

When you activate a monitoring rule on an asset, a monitor is activated on the asset's management access point (usually the Agent Controller or the Proxy Controller). The monitor gathers information about the condition of a resource. When an operating system is an agentless managed system, the software monitors the operating system remotely.

## Roles for Monitoring Rules and Policies

List of required roles for monitoring tasks in Oracle Enterprise Manager Ops Center.

Table 3 lists the roles required to complete monitoring tasks. You can restrict privileges to specific targets or groups of targets. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 4-1    Monitoring Tasks and Roles*

| Task | Role |
|------|------|
| View a monitoring rule | Read Plan/Profile Admin |
| View a monitoring policy | Read Plan/Profile Admin |
| View the association of an asset and a monitoring policy | Read Asset Admin Plan/Profile Admin |
| View the historical data of a threshold rule | Read Asset Admin |
| Create, edit, or delete a monitoring rule | Fault Admin |
| Create, copy, extract, edit, and apply a monitoring policy | Plan/Profile Admin |
| Modify the monitoring configuration of an asset | Fault Admin |
| Delete a monitoring policy | Plan/Profile Admin |
| Group assets by a monitoring policy | Asset Admin |
| Apply a monitoring policy to an asset | Fault Admin |
| Apply a monitoring policy to a group | Asset Admin and Fault Admin |

## Actions Available for Monitoring Rules and Policies

List of available operations in Oracle Enterprise Manager Ops Center.

You can perform the following actions, depending on the type of rules, the requirements, and your roles:

- Create, edit or delete a monitoring rule.

- Create, copy, extract, edit, apply, or delete a monitoring policy.

- Modify the monitoring configuration for an asset.

- Group assets by a monitoring policy.

- Apply a monitoring policy to an asset or a group.

# Location of Monitoring Information in the User Interface

Lists the navigation instructions to locate monitoring information in Oracle Enterprise Manager Ops Center.

*Table 4-2    Location of Monitoring Rules and Policies in the UI*

| Object | Location |
| --- | --- |
| Monitoring policies | Expand **Plan Management** in the Navigation pane, then click **Monitoring Policies**. |
| Monitoring rules | Expand **Plan Management** in the Navigation pane, then click **Monitoring Policies**. Double-click a policy to see the rules. |
| Asset-specific monitoring rules | Select an asset from the **Asset** view, then click the **Monitoring** tab. |

# Viewing Monitoring Policies and Rules

Procedure for displaying an asset's monitoring policy and to view a policy's rules in Oracle Enterprise Manager Ops Center.

You can view rules for a specific asset or a specific policy from different places in the UI, as follows:

To view the rules for a specific asset, use **Asset View**:

1. In the Navigation pane, expand **Assets**, then click the asset.

2. In the center pane, navigate to the **Monitoring** tab and click it.

   The name of the monitoring policy applied to the asset is displayed at the top of the monitoring rule grid, next to the number of rules.

To view the rules for a specific policy, use **Policy View**:

1. In the Navigation pane, expand **Plan Management**, then scroll to the Operational Plans section.

2. Click **Monitoring Policies**.

3. Click the policy to display details in the center pane. From this view, you can do the following:

   - Click **View Associated Assets** to view all assets that are monitored with this policy.

   - Click the **Set as Default Policy** icon to make this policy the default monitoring policy.

   - Double-click the policy in the center pane to add or remove rules or to change monitoring parameters of a rule.

# About Disabling and Enabling Monitoring

Describes the effect of disabling monitoring for an asset.

**Note:**

Disabling monitoring policies stops the evaluation of monitoring rule conditions against collected data and prevents the deployment of new monitors across your data center. It does not disable the collection of data on managed assets.

To disable monitoring, disable all monitoring policies for your data center so that incidents and alerts are not generated. When you reenable monitoring, the software applies the monitoring rules that are defined by the default monitoring policies to all of the assets.

You must use the command line interface to disable or reenable monitoring policies. See *Oracle Enterprise Manager Ops Center Command Line Interface* for more information.

To temporarily disable incidents from a single asset, or a group of assets, place the asset or group in Maintenance Mode. This mode is useful to prevent incidents generated during system maintenance.

## About Monitoring Rules

Describes the types of severity for default rules and custom rules used in monitoring policies for Oracle Enterprise Manager Ops Center.

Monitoring rules state the values and boundaries for an asset's activity. A monitoring policy is a set of rules. Each monitoring policy contains rules for threshold levels. Default policies for monitoring hardware, operating systems, and Oracle Solaris Clusters are included in the software. You can use the default policies, but you cannot edit them. To edit or add monitoring rules to a monitoring policy, you must make a copy and then set that policy to be the default.

Monitoring rules define the alerting conditions. Rules are associated with, and determined by, the type of managed resource. You can apply a generic monitoring rule to many different attributes, but other monitoring rules are attribute-specific, hard-coded into drivers and cannot be relocated or reconfigured.

When you set a threshold, the UI displays the existing historical data for an attribute. The software might propose some default threshold values based on the analysis of historical data, and display existing thresholds as a bar on that historical data. You can enter any threshold value.

Each managed resource has a Monitoring tab. You can add, edit, enable, disable, and remove resource monitoring rules. You can tune the rules for a specific managed resource.

**Note:**

Tuning rules for a specific managed resource detaches the resource from the monitoring policy, keeping only a copy of the rules. When you modify rules in the policy, the change is not made to the rules that are associated with the resource.

Rules have Info, Warning, and Critical severity levels. Default values and severity levels are provided at installation, but you can edit the rules for your organization. For user-defined rules, you can define the time between when the alerting condition occurs and when the software generates an alert or incident. You can configure the software to send an e-mail or pager message when it identifies a Warning or Critical incident.

The following categories of monitoring rules are available:

- **System-defined rules**: These are attribute-specific and are hard-coded into drivers. You can disable a system-defined rule, but you cannot edit, relocate, or reconfigure these types of rules.

- **User-defined rules**: These are associated with, and determined by, the type of managed resource. You can apply a user-defined rule to many different attributes.

## About Parameters for User-Defined Rules

Description of rule types and their severity levels in Oracle Enterprise Manager Ops Center.

The following types of editable user-defined rule parameters, also known as rule types, are available:

- **Threshold**: Sets an upper or lower monitoring threshold for the monitored attribute.

- **Boolean Control**: Sets a logical operator of true or false for the monitored attribute.

- **Enumerated Control**: A series of values that defines a subset of specific values among the possible values of the monitored attribute. An alert occurs when the attribute matches one of those specific values.

- **Expression**: Defines the variables, literals, and operators for an attribute. An expression is an instruction to execute something that returns a value.

You cannot modify all rules, but most rules include some parameters that you can tune, or edit, to meet your organization's requirements.

The following are some examples of editable parameters:

- Severity level of the alert: You can define the parameters for informational, warning, and critical alerts.

- Raising and clearing values: These are threshold settings that determine when an alert is raised and cleared. These two values are always the same. For example, you can configure the software to raise an alert when a value reaches 90% and clear the alert when the value falls below 90%.

- Monitor for alert limits at specific time: Defines when you want monitoring to occur, or to not occur. You might use this parameter when a daily maintenance procedure causes an attribute to operate outside of the normal monitoring threshold, but you do not want to raise an alert. You can define a period of time when the monitors are disabled and you can perform maintenance.

- Generate alert after: Defines how long an issue occurs before an alert is generated. The number defines the time between when a threshold is exceeded and when an alert is generated. The alert is not triggered immediately. An alert is generated when the monitored attribute value is outside the threshold after the specified delay. You might use this parameter to limit false positive alerts due to a temporary condition.

## Overview of Enabled and Active Rules

Describes the states of monitoring rules in Oracle Enterprise Manager Ops Center.

Monitoring rules have two types of states:

- **Enabled or Disabled**: Disabling a rule removes that attribute from monitoring. You can disable and enable rules on a per asset or group basis.

- **Active or Inactive**: Reflects the system's state and indicates whether the software is monitoring the asset or group. When a rule is not enabled, monitoring is not active.

By default, all monitoring rules are enabled. The status appears on the Alert Monitoring Rules page, which you can access from the Monitoring tab. When *Yes* is in the Enabled and Active fields, the rule is enabled and active. When *No* appears in the corresponding field, a rule is disabled or inactive. Figure 4-1 shows the Service Alert Monitor status as enabled, but inactive.

**Figure 4-1    Enabled and Active Monitoring Rules**



An **Enabled** field appears in the list of monitoring rules for an asset. You can disable one or more rules for a specific asset. When *No* appears in the Enabled column, the rule is disabled.

When a rule is enabled, the active state reflects the system's actual state and indicates whether the software is using the rule. The following are some reasons that an enabled rule might be inactive:

- When a specific attribute is not hard-coded into the driver, monitoring is not possible for that attribute.

- The software cannot reach the resource or the attribute cannot be refreshed.

- Some type of misconfiguration, such as a missing mandatory parameter or an illegal value for a parameter.

- An internal error specific to the monitor, particularly for driver-specific monitors.

You can view the rules for a specific asset or you can view the rules for a policy that is associated with one or more assets.

## About Editing Monitoring Rules

Describes the effect of changing a monitoring rule.

Monitoring rules have pre-defined parameters. You can change the parameters, including the threshold values and the monitoring level, to meet your data center guidelines. You can define the parameters for an individual asset or for a group of assets.

You can create separate monitoring groups to consistently and efficiently define the parameters for all systems in each group. For example, you can create a group for a set of high priority systems. You edit one set of specific threshold values for all members of that group and apply a monitoring policy to the group. All members of the group are now monitored in the same way for the same values.

You can edit a monitoring rule for a specific asset or the monitoring rule for a monitoring policy. Editing the monitoring rule parameters for an individual system might be useful when a particular system is on a critical path. For example, you might consider the systems that you have the Enterprise Controller and Proxy Controllers on critical path systems, you can monitor the system continuously and create more stringent monitoring thresholds for those systems.

> **Note:**
>
> When you update a monitoring rule in a policy, the monitoring configuration of all assets that are associated with the policy are updated to reflect the revised rule.

You can perform the following tasks:

- Change the values for the Warning and Critical thresholds

- Change file system thresholds

- Change the thresholds by system or by group

- Set specific threshold values for different operating systems

For example, you can create a threshold on the Enterprise Controller system that sends a warning when the file system use exceeds 90%. This alerts you when the Enterprise Controller file system is almost full.

For a threshold alert, you can change how often and for how long the software monitors the resource. You can change the threshold values.

- **Alert window**: Enables you to specify a period of the day when the monitoring rule is enabled. For example, when a daily maintenance operation causes a monitored attribute to exceed a threshold, you can exclude monitoring for that time to disable monitoring for that maintenance window.

- **Generate alert after**: Enables you to configure monitoring to ignore a monitored attribute that is outside the defined monitoring parameters for a short period of time. Specifying a delay means that the software generates an alert only when the value remains above the specified limit for a given duration. The software does not generate an alert when the value goes above the limit once and then immediately goes back to normal.

## Editing a Monitoring Rule

Procedure for changing a monitoring rule in Oracle Enterprise Manager Ops Center.

1. Determine whether to edit a rule for a policy or for an individual asset:

    - For a policy: From the Plan Management section of the Navigation pane, click **Monitoring Policies**, then click a policy. Make a copy of the system-defined policy to create a user-defined policy.

- For an asset: From the Assets section of the Navigation pane, select an asset, then click the Monitoring tab.

2. Click the **Edit Alert Monitoring Rule Parameters** icon to open the wizard.

3. Click the rule you want to change.

4. For the parameter you want to change, click the entry in the Value column and type the new value. For a threshold alert, you can change how often and for how long the value is monitored, and you can change the threshold values.

   For example to change a Reachability rule's parameter from Warning to Critical, click `unreachable.duration.minutes.CRITICAL`

5. You can also change the duration to wait before an alert is generated. The default time is 3 minutes.

6. Click **Apply** to submit the changes.

See About Asset Attributes for more about the attributes that you can use in monitoring rules.

## About Historical Data and Thresholds

Describes ways to use the asset data that Oracle Enterprise Manager Ops Center stores.

The software maintains a history of each monitored asset's performance against its assigned threshold rules. When you add a new threshold-type monitoring rule or modify a threshold configuration for a specific asset, it does not impact the asset's attribute history.

The asset's attribute history, which is maintained by the software, is not specifically tied to the threshold rules. Oracle Enterprise Manager Ops Center only records statistical values of the asset attributes over time. However, the threshold wizard can leverage the history to suggest meaningful threshold values. When there is historical data for the monitored attribute, a graphical representation of the historical data appears along with a proposed default threshold value based on the analysis of the data.

When modifying a threshold configuration for a specific asset, you can choose the time frame from a list of options, from one day up to six months, to display a graphical representation of the historical data. You can use this information to tune the threshold rules.

**Note:**

When you edit the threshold limit for a specific asset, the software disassociates the asset from the default monitoring policy and creates a new monitoring policy for the asset.

## About New Monitoring Rules

Describes custom monitoring rules in Oracle Enterprise Manager Ops Center.

Each monitoring policy contains a default set of rules. The rule set and default parameters depend on the managed asset subtype.

When specifying an Expression monitoring rule, you use the Oracle Enterprise Manager Ops Center query language to write a logical expression that defines the alerting condition for one or more resource attributes. The logical expression includes attribute names, operators, and literal values. You can use a dotted notation to reference attribute subfields.

When adding a Threshold, Enumerated, or Boolean monitoring rule, you must define the monitored attribute. When adding an Expression rule type, specify an expression that references one or more attributes to monitor. The following are some examples of monitored attributes:

- `CpuUsage.usagePercentage`

- `ProcessUsage.topMemoryProcesses.pid=*.physicalMemoryUsage`

- `DiskUsageSet.name=*.busyPercentage.`

Monitored attributes are available in the Javadoc that is in the Oracle Enterprise Manager Ops Center Software Developer's Kit (SDK). Go to the `dvd/`*`platform`*`/Product/components/packages` directory and install the `SUNWxvmoc-sdk.pkg` package.

Browse the available attributes and names for the monitoring framework. Attributes always start with an upper case letter, such as `SystemUpTime`, and fields always start with a lower-case letter.

For example, when you want to list the valid monitored attributes for an operating system, go to the `com.sun.hss.type.os.OperatingSystem` Javadoc page. This page displays all of the attributes of an OperatingSystem.

Each of these attributes is either a simple type, a structure or struct-like type, or a collection type. The following are examples of the different types of attributes:

- Simple: You can use the name, such as `SystemUpTime`

- Struct-like: You can drill-down into a field of the structure type. The fields always start with a lower-case letter, such as `SystemLoad.average1Minute`

- Collection: You can drill-down into a member of the collection. For Maps you do this by specifying the appropriate 'key'. When you set the key, specify the value for the 'name' field, to get the value of a single member. For example, use the following to check the 'enabled' value of the interface named *eth0*: `InterfaceInfos.name=eth0.enabled`

> **Note:**
>
> Structures are sometimes nested. For example, a struct-like attribute can contain another struct-like field, or a collection. Collections typically contain struct-like values. To drill down, continue to append the appropriate field names.

You can perform a query which scans across all members of a collection by specifying the '*' wildcard value for the key or name. When you perform a query, you must use one of the following operators: `max`, `min`, or `like`. For the query syntax, see the `DomainQuery Java class` Javadoc. See for details on the Javadocs.

See the appendix for Expression Query Language for more information on the expression query language, grammar, lexical elements, and method details.

# Monitoring Policies

Overview of monitoring policies in Oracle Enterprise Manager Ops Center.

Monitoring policies contain the configuration used to monitor an asset, including defined thresholds for alerts. You can revise many of the threshold and monitor settings, or use one of several methods to create new policies.

**Topics**

- About System and User-Defined Monitoring Policies

- Details of a Monitoring Policy

- Copying or Creating a Monitoring Policy

- About Extracting a Monitoring Policy

- About Changing the Monitoring Configuration of an Asset Bound to a Monitoring Policy

- About Applying a Monitoring Policy to a Group

- About Asset Groups with the Same Monitoring Policy

- Deleting a Monitoring Policy

## About System and User-Defined Monitoring Policies

Describes default monitoring policies and custom monitoring policies in Oracle Enterprise Manager Ops Center.

A monitoring policy is a collection of rules that are associated with each type of monitored asset. The policy defines the resources monitored and the rules for that asset type. You can add and edit policies and select the default policy for a specific asset type.

A set of default monitoring policies is included with the software. The policies are based on the type of resource being monitored, such as operating systems, servers, power distribution units, and SAN server arrays, and Oracle VM Server. Each policy contains a default set of rules. The rule set and parameters depend on the managed asset subtype. Alert monitors watch the state of managed resources and their attributes and raise an alert when the state is outside the pre-defined thresholds.

You can use the default rules and policies or you can use the following methods to create a new policy:

- Copy an existing policy and then edit it, as needed, to modify the rules.

- Extract an existing policy from an asset and modify it.

- Create a new policy, then edit the policy to add rules.

When you discover and add an asset, the software applies the default monitoring policy for the asset's type immediately. Some monitoring policies install monitors or agents on managed resources, while other policies are designed to invoke arbitrary actions or scripts against the managed resource.

Go to the Plan Management section of the UI for a list of available monitoring policies. Click Monitoring Policies to display a list of all policies, the default status of the

policy, and the intended asset or target type. The following types of monitoring policies are available:

- **System-Defined Policies**: Typically use asset specific rules. The monitored details are determined by what is implemented on the specific asset. An example of a system-defined policy is the MSeriesChassis policy that monitors the Xsb Mode of a SPARC M-series chassis. A system-defined policy is read-only, you cannot disable or modify the rules defined in the policy. You can turn the rule off and on.

- **User-Defined Policies**: Typically use generic rules and contain monitoring thresholds. An Operating System policy is an example of a user-defined policy that monitors the following generic operating system parameters: CPU usage, disk I/O queue length and utilization percentage, file system usage, memory usage, network bandwidth utilization, and swap usage, and system load.

The Navigation pane and center pane both display user-defined policies followed by system-defined policies. The icons and naming convention help to identify the type of policy in the Navigation pane. The names of all system-defined policy use the prefix OC and have a green check mark in the lower. For example, in Figure 4-2 *OC - Chassis* is a system-defined policy and *Copy of OC - Chassis* and *OS Profile - Dev* are user-defined policy.

**Figure 4-2    List of Monitoring Policies**
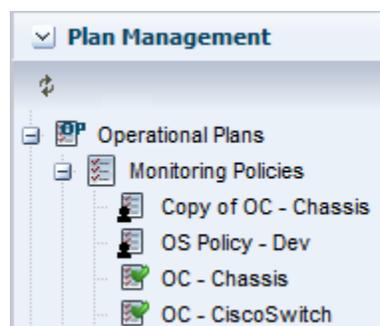


User-defined policies have a silhouette of a person in the lower left corner. A green check mark in the icon indicates that this is a default monitoring policy. In Figure 4-2, OC - Chassis is a system defined policy that is the default policy. In Figure 4-3 Copy of OC - Chassis is a user defined policy and is also the default policy.

**Figure 4-3    Default and User-Defined Policies**
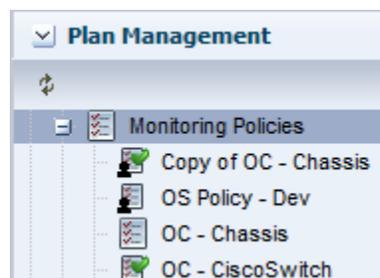


To view a detailed list of user-defined and system-defined policies, click **Monitoring Policies** in the Navigation pane, as shown in Figure 4-4.

**Figure 4-4    List of Policies, by Type**
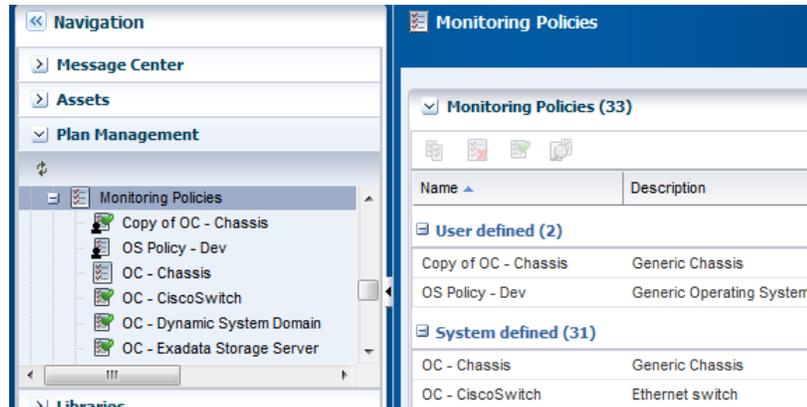


You can create your own user-defined policies by creating, copying, or extracting a monitoring policy. You perform the **Copy Policy** action from the policy view and the Extract Policy action from the asset view. By extracting a policy from the asset view, you ensure that the subtypes are valid for that asset type. You can change the target subtype to a more specific or a more generic eligible target type. To be eligible, the policy must be a member of a more general policy for the specified target.

For example, you can highlight an Oracle Solaris operating system and extract a monitoring policy for an operating system. You can specify one of the following as the OS subtype for the new policy:

- Oracle Solaris 10: Any supported Oracle Solaris 10 operating system.

- Oracle Solaris 10 Operating System: Any supported Oracle Solaris operating system, beginning with Oracle Solaris10 8/07 (update 4). You might use this subtype when you use the Oracle Solaris Zones policy.

- Oracle Solaris: Any supported Oracle Solaris operating system release.

- Operating System: Any supported Oracle Solaris, Linux, or Windows operating system.

## Details of a Monitoring Policy

Lists the default monitoring polices in Oracle Enterprise Manager Ops Center.

Monitoring policy details vary, depending on the asset and associated resources being monitored. Figure 4-5 is an example of a system-defined monitoring policy for an operating system, including the Policy Details. The Details section of the page contains information about the policy, including the name, description, and the type of policy. The policy details also describes the applicable types of assets or targets, whether the policy is a sub-type of another policy, when the policy was last modified, and whether the policy is the default policy for the target types.

*Figure 4-5    System-Defined Operating System Monitoring Policy*

| | | | |
|---|---|---|---|
| **Name:** OC - Operating System | | **Subtype:** Operating System | |
| **Description:** Generic Operating System | | **Nature:** System defined | |
| **Target Type:** Operating Systems | | **Last Modified:** 03/19/2012 11:24:01 pm MDT | |

☑ Default monitoring policy for assets matching subtype and target type

**Policy Details**

| Alert Monitoring Rules ▲ | Alert Limits | Enabled ? |
|---|---|---|
| **⊟ BooleanControl Monitoring Rules (1)** | | |
| **File System Reachability**<br>Immediate Action: N/A | ❌ Critical: false | Yes |
| **⊟ Reachability Monitoring Rules (1)** | | |
| **Operating System Reachability** | | Yes |

The following system-defined and generic monitoring policies are available:

- OC – Chassis: Monitors the chassis fan and power supply

- OC – CiscoSwitch: Monitors an Ethernet switch's power status, switch port status, and switch status.

- OC – Dynamic System Domain: Monitors the state and status of the dynamic system domains on eligible servers. Server reachability is monitored. Informational alerts are available for the power state, either on or off, and the operating system state, either running or not. The Server Port Status generates a Warning alert when the server port is disabled or down.

- OC – File Server: Monitors the file server reachability, backing devices usage percentage, storage allocation percentage, and storage usage percentage of generic file servers.

- OC – Global Zone: Monitors the DHCP status, appliance health, CPU usage, disk I/O, file system usage, memory usage, network bandwidth, Swap usage, and system load of a global zone.

- OC – ISCSI Storage Array: Monitors the iSCSI storage array reachability, storage allocation percentage, storage usage percentage, volume group allocated space percentage, and volume group used space percentage.

- OC – Local Library: Monitors the storage library usage percentage for a local storage library.

- OC – Logical Domain: Monitors Oracle VM Server for SPARC guest status, including the migration status, running or not, and whether the guest is powered on.

- OC – M-Series: Monitors the Xsb Mode of a SPARC M-series chassis

- OC – NAS Library: Monitors the storage library status and storage library usage percentage of network attached storage (NAS) libraries.

- OC – Non-global Zone: Monitors CPU usage, disk I/O queue length and utilization percentage, memory usage, network bandwidth utilization, and swap usage for non-global zones.

- OC – Operating System: Monitors the following generic operating system parameters: CPU usage, disk I/O queue length and utilization percentage, file system usage, memory usage, network bandwidth utilization, and swap usage, and system load.

- OC – Oracle VM Server for SPARC: Monitors Oracle VM Server for SPARC status, including the DHCP client, appliance health, and free virtual CPU (VCPU) usage.

- OC – Oracle VM Server for x86: Monitors Oracle VM Server for x86 status, including the DHCP client, appliance health, and free virtual CPU (VCPU) usage.

- OC - Power Distribution Unit: Monitors Ampere levels of rack Power Distribution Units.

- OC – Remote Oracle Engineered System: monitors remote Oracle engineered systems.

- OC – SAN Library: Monitors the status of the storage area network (SAN) libraries.

- OC – SAN Storage Array: Monitors the SAN storage array reachability and usage. The usage includes the storage allocation percentage, storage usage percentage, volume group allocated percentage, and volume group used space percentage.

- OC – Server: Monitors the following parameters on a generic server: Power status, server port status, CPU, NIC, fan, fan tray, memory, and power supply.

- OC – Server Pool: Monitors the total CPU allocation percentage, total cryptographic units allocation percentage, and the total memory usage percentage.

- OC – Solaris Cluster: Monitors the Oracle Solaris cluster install mode, reachability, and monitor.

- OC – Solaris Cluster Node: Monitors the online status, scalert.node reachability, and scalert.node alert monitor.

- OC – Solaris Cluster Zone Cluster Group: Monitors the scalert.zone cluster alert monitor.

- OC – Solaris Cluster Zone Cluster Node: Monitors the scalert.zone Cluster Node Alert Monitor

- OC – Storage: Monitors the following parameters for a generic storage device: operating system status, power status, server port status, and storage alert.

- OC – Switch: Monitors an Ethernet switch's power status, switch port status, and switch status.

- OC – Virtual Machine: Monitors the reachability of the virtual machine, if the operating system is running, and the migration status of a virtual machine.

## Copying or Creating a Monitoring Policy

Procedure for creating a new monitoring policy or copying an existing monitoring policy in Oracle Enterprise Manager Ops Center as well as a list of other actions for monitoring policies.

Use the policy view to add a new monitoring policy or copy an existing monitoring policy.

1. Expand **Plan Management** in the Navigation pane, then click **Monitoring Policies**.

2. Click **Copy Policy** or **Create Policy** in the Action pane.

3. Enter a name and description for the new policy, then select the subtype and target type.

4. Click **Next** to review, then click **Finish** to add the policy to the list of available policies.

To see the new policy, expand **Plan Management** and click **Monitoring Policies**. Click the policy to display details.

- To add or remove rules or change monitoring parameters, double-click the policy in the center pane.

- To view all assets that are monitored with this policy, click **View Associated Assets**.

- To make this policy the default monitoring policy, click the **Set as Default Policy** icon.

## About Extracting a Monitoring Policy

Describes the effect of extracting a monitoring policy from the asset view.

Extracting a monitoring policy is similar to copying a policy. Copying a policy is performed from the policy view, as shown in Figure 4-4; extracting a policy is performed from the asset view, as shown in Figure 4-6.

*Figure 4-6    Extract a Monitoring Policy Action*
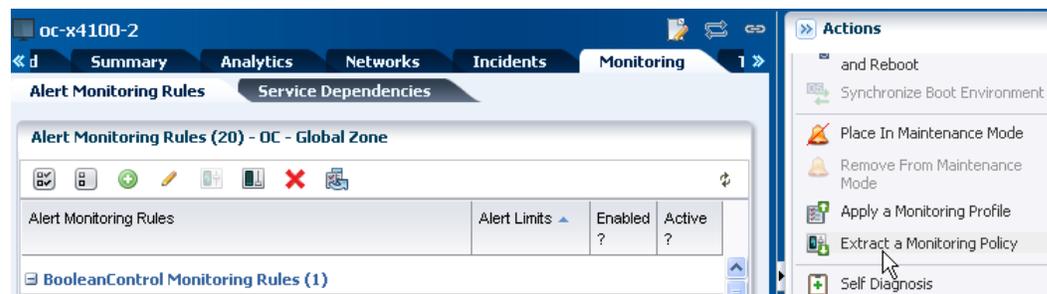


By extracting a policy from the asset view, you filter the possible subtypes to only those that are valid. You can change the target subtype to a more specific or a more generic eligible target type. To be eligible, the policy must be a member of a more general policy for the specified target.

## Extracting a Monitoring Policy

Procedure for creating a new monitoring policy from an existing policy.

1. Expand **Assets** in the Navigation pane, then click an asset type, such as operating system.

2. Click the **Monitoring** tab, then click **Extract Monitoring Policy** in the Action pane.

3. Enter a name and description for the new policy.

*Figure 4-7   Extract Monitoring Policy*



4. Select a subtype and a target. If a list of valid target types does not display, the target type cannot be changed. For an OS subtype, you can further specify the subtype:

- Oracle Solaris 10: Any Oracle Solaris 10 operating system.

- Oracle Solaris 10 Operating System: Any Oracle Solaris 10 8/07 (update 4) or higher operating system. You might use this subtype to use the policy for zones.

- Oracle Solaris: Any supported Oracle Solaris operating system release.

- Operating System: Any supported Oracle Solaris, Linux, or Windows operating system.

5. Click **Finish** to add the policy to the list of available policies.

To see the new policy, expand **Plan Management** and click **Monitoring Policies**. Click the policy to display details.

- To add or remove rules or change monitoring parameters, double-click the policy in the center pane.

- To view all assets that are monitored with this policy, click **View Associated Assets**.

- To make this policy the default monitoring policy, click the **Set as Default Policy** icon.

## About Changing the Monitoring Configuration of an Asset Bound to a Monitoring Policy

Describes the roles of an asset's monitoring configuration, monitoring policy, and any unique monitoring rules.

Monitoring configurations contain monitoring policies and are associated with an asset type, such as an operating system. You can edit specific rules and parameters, but you cannot edit general monitoring policy properties, such as name and description after you create the policy. Editing a policy changes the monitoring configuration for all associated assets.

You can modify the monitoring configuration of an individual asset. When you create a monitoring configuration, the asset is no longer associated with the monitoring configuration and policies for that asset type. Instead, it has its own independent monitoring configuration.

When you modify a monitoring configuration for an asset, you create a policy and the asset is associated with the new created policy.

## About Applying a Monitoring Policy to a Group

Describes how groups of assets are monitored in Oracle Enterprise Manager Ops Center.

When you apply a monitoring policy to a user-defined group, all applicable members of the group are associated with the policy. The policy associated with an asset is displayed next to the asset in the wizard. When you apply a policy to all assets in a group, the software disassociates the asset from the assigned policy and associates it with the policy that is assigned to the group.

When you remove the asset from the user-defined group, the asset is associated with the group's monitoring policy until you relocate it to another user-defined group that has a different policy or you manually associate the asset with a different monitoring policy.

## About Asset Groups with the Same Monitoring Policy

Describes how to identify a user-defined group by its monitoring policy in Oracle Enterprise Manager Ops Center.

When you create a user-defined group, you can specify a rule that filters the assets based on the name of the associated monitoring policy. Use this type of rule to identify all the assets associated with that monitoring policy or to identify assets that are not associated with that monitoring policy.

When viewing the monitoring configuration of an asset, you can navigate to the definition of the monitoring policy bound to the asset.

## Modifying a Monitoring Policy

This procedure will copy and make some changes to an existing Monitoring Policy.

1. From the Navigation tree, click **Plan Management**. Under **Operational Plans**, click on **Monitoring Policies**, then, click on **OC - Global Zone**.

2. In the Actions pane, click on **Copy Policy** and follow the wizard until the copied policy appears under User Defined policies.

3. Select the **File System Used Space Percentage** Monitoring Rule.

4. Click on the **Edit Monitoring Rule** button, go through the wizard, and verify that the changes were made.

5. From the Assets tree, select the asset type you want to edit.

6. From the Monitoring tab, click on **Apply a Monitoring Policy** from the Actions menu.

7. Select the new custom copy that was created previously and complete the wizard.

> **Note:**
>
> Make sure everything is working as expected by checking the Incidents tab. Make sure the current status of the incident is Cleared.

## Modifying a Monitoring Rule

Procedure for modifying the defined threshold value for a Monitoring Rule.

1. From the **Assets** pane in the Navigation pane, click an asset type, such as the Operating system.

2. Click the **Monitoring** tab.

3. Select the **File System Used Space Percentage** in the Threshold Monitoring Rules.

4. Click on the **Edit Monitoring Rule** button.

> **Note:**
>
> This procedure can apply to any similar Collection attributes. Eg. File System Used Space Percentage, ZPool Usage Percentage, etc.

### Setting a Threshold For a Specific Filesystem

1. From the **Assets** pane in the Navigation pane, click an asset type, such as the Operating system.

2. Click the **Monitoring** tab.

3. Select the **File System Used Space Percentage** in the Threshold Monitoring Rules.

4. Click on the **Edit Monitoring Rule** button.

5. In the Set Thresholds part of the wizard, click on the **Add a Component** button.

6. Type the name of the Filesystem you want to monitor and select the Warning and Critical Thresholds.

   Selecting an "Any" threshold will apply to all Filesystems that do not have a specific threshold.

> **Note:**
>
> This procedure can apply to any similar Collection attributes. Eg. File System Used Space Percentage, ZPool Usage Percentage, etc.

## Deleting a Monitoring Policy

Procedure for removing a monitoring policy in Oracle Enterprise Manager Ops Center.

You can delete user-defined monitoring policies; you cannot delete system-defined policies.

1. In the Navigation pane, expand **Plan Management**, then scroll to the Operational Plans section.

2. Click **Monitoring Policies**.

3. Click the policy you want to delete.

**4.** Click the Delete Policy icon.

*Figure 4-8   Delete Policy*
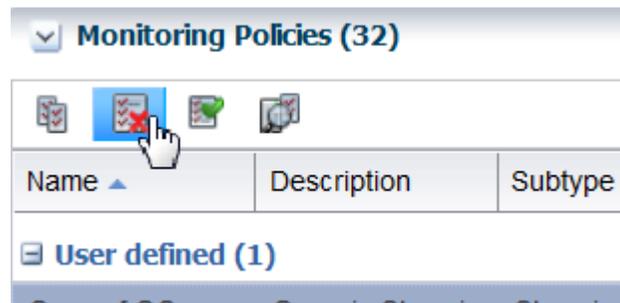


Any asset or group associated with a deleted policy is detached from the policy. However, the asset retains the monitoring configuration defined by the policy.

# Related Resources for Monitoring Rules and Policies

List of Oracle Enterprise Manager Ops Center documents with additional information.

For instructions in performing actions or to learn more about the role of this feature, go to the *Oracle Enterprise Manager Ops Center Operation Reference*:

- See the Hardware chapter for information about hardware monitoring.

- See the Operating System Management chapter for information about monitoring operating systems.

- See the Incidents chapter for information about managing incidents that result from monitoring.

- See About Maintenance Mode for information about temporarily disabling incidents.

See Expression Query Language for details about the language, grammar, lexical elements, and method details.

The following documents at `http://docs.oracle.com/cd/E59957_01/nav/operate.htm` relate to monitoring:

- *Oracle Enterprise Manager Ops Center Manage Incidents*

- *Oracle Enterprise Manager Ops Center Tune Monitoring Rules and Policies*

- *Oracle Enterprise Manager Ops Center Understand OS Performance and Capacity*

- *Oracle Enterprise Manager Ops Center Use Service Requests*

# 5

# Configure Software Libraries

Overview of software libraries in Oracle Enterprise Manager Ops Center.

**Topics**

- Introduction to Software Libraries and Repositories

- Roles for Software Libraries

- Actions Available for Software Libraries

- Location of Software Library Information in the User Interface

- Overview of the Knowledge Base and Parent Repository

- About Software Libraries

- About Libraries for Oracle Solaris 11

- Overview of the Software Library for Oracle Solaris 10, 9, 8 and Linux

- About Images

- Overview of Local Content for the Linux and Oracle Solaris 8-10 Software Update Library

- About Maintaining Images and Local Content

- Related Resources for Software Libraries

## Introduction to Software Libraries and Repositories

Overview of the role and purpose of software libraries in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center uses libraries to store and manage cached data, images, packages, and metadata. A library that stores images for provisioning operations is a Software Library. At least one software library always exists on the Enterprise Controller.

A Software Library accepts the following types of images:

- OS images that install an operating system

- Branded images that install a specialized version of an operating system

- Firmware images and the supporting metadata to update existing firmware on service processors, RAID controllers, and disks.

# Roles for Software Libraries

List of required roles for library management tasks in Oracle Enterprise Manager Ops Center.

Table 6 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 5-1    Software Libraries Tasks and Roles*

| Task | Role |
| --- | --- |
| Set Enterprise Controller Storage Library | Ops Center Admin |
| Create Library | Storage Admin |
| Delete Library | Storage Admin |
| Associate Library | Storage Admin |
| Import image | Storage Admin |
| Upload image | Storage Admin |
| View details of an image | Storage Admin |
| Moving an image | Storage Admin |
| Edit Attributes | Storage Admin |
| Associate Library to Server Pool | Cloud Admin |

# Actions Available for Software Libraries

List of available operations in Oracle Enterprise Manager Ops Center.

Perform the following actions, depending on the requirements:

- Designate a default software library

- View details of an image

- Create Library

- Delete Library

- Associate Library

- Import Image

- Upload Image

- Download an OS image

- Moving an image

- Edit Attributes

- Create a library of OS images and manage content

# Overview of the Knowledge Base and Parent Repository

Description of current OS images for all versions of Oracle Solaris and Oracle Linux in Oracle Enterprise Manager Ops Center.

By default, Oracle Enterprise Manager Ops Center operates in Connected mode. In this mode, the Enterprise Controller uses the Internet to download images and metadata from the Oracle Knowledge Base and the Oracle Solaris 11 Package Repository.

- The Oracle Knowledge Base (KB) contains metadata for Oracle Solaris 10, 9, and 8 and Oracle Linux OS components.

- The Oracle Solaris 11 Package Repository includes packages of images in IPS format for Oracle Solaris 11.

To use the Oracle Enterprise Manager Ops Center software without Internet access, your site can maintain a local version of the Knowledge Base or Repository on your site's network. In this case, the Enterprise Controller connects to the local network location to get the latest information.

## About the EC Library

Describes the default software library for images in Oracle Enterprise Manager Ops Center.

The Enterprise Controller must have at least one Software Library to store the new versions of images that are downloaded from the Oracle Knowledge Base. Oracle Enterprise Manager Ops Center updates this library each week, by default.

In addition to the routine download operations, you can create jobs to update assets. When you submit an update job for specific target assets, the Agent Controllers on the targets send a request to the KB through the Enterprise Controller to download the latest information.

The product installation procedure creates the Initial EC Library. At any time, you can specify a different software library to accept the automatic download operations from the Knowledge Base. A badge identifies the current active library. Figure 5-1 shows the badge, a white down arrow on a green background.

***Figure 5-1    Badge Identifying the Current Default Library***
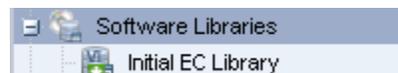


When the product software is updated, the schedule of download is interrupted. Use the **Set Enterprise Controller Storage Library** to restore the schedule.

## Changing EC Software Libraries

Procedure for changing the default software library that receives automatic downloads in Oracle Enterprise Manager Ops Center.

To specify a different software library as the default software library:

1. Create a software library.

2. Expand **Administration** in the Navigation pane. An alternative is to expand Libraries in the Navigation pane.

3. Click **Set Enterprise Controller Storage Library** in the Action pane. The window lists all libraries with the current library highlighted.

4. Click the new software library.

5. Click **Apply**.

When the job is completed, the Library section of the Navigation pane shows the software library you selected as the default library.

## Publishers and Parent of the Oracle Solaris 11 Repository

Describes the role and purpose of the Oracle Solaris 11 Repository and how Oracle Enterprise Manager Ops Center uses it.

The Oracle Solaris 11 Package repository is similar to the Knowledge Base but is only for Oracle Solaris 11 images and updates. The Oracle Solaris 11 Package Repository resides at the Oracle site: `http://pkg.oracle.com/solaris/release`.

The Support Repository Updates (SRUs) for Oracle Solaris 11 are released monthly and contain bug fixes or minor feature enhancements. This repository, `https://pkg.oracle.com/solaris/support`, is available to users with an Oracle support agreement.

These repositories have the role of Publisher and Parent for your local repository.

Other parent repositories, such as Oracle Solaris Cluster, are available. For a list of available Oracle repositories and to download the key-certificate pair, see the `https://pkg-register.oracle.com` site.

## Location of Software Library Information in the User Interface

Lists the navigation instructions to locate software libraries in Oracle Enterprise Manager Ops Center.

Table 5-2 shows where to find information.

*Table 5-2    Location of Library Information in the BUI*

| Object | Location |
| --- | --- |
| To see the software libraries | Expand Libraries in the Navigation pane, then expand Software Libraries. |
| To see firmware and OS provisioning profiles | Expand Plan Management in the Navigation pane, then click Profiles and Policies. |

## About Software Libraries

Describes the libraries that handle all image files for operating systems and firmware in Oracle Enterprise Manager Ops Center.

In addition to the EC Library, you can create more Software Libraries and organize their content, according to your site's purposes. You can use a file system on the Enterprise Controller's system or a shared file system on an NFS server that the Enterprise Controller mounts. The file system on the Enterprise Controller is called a local software library. The file system on the NFS server is called a NAS software library.

When Oracle Enterprise Manager Ops Center provisions target systems with an operating system or firmware, it copies the image files from the designated Software

Library to the Proxy Controller that manages the target. The Proxy Controllers handle the provisioning operations. When Oracle Enterprise Manager Ops Center provisions target systems with an update to an operating system, it uses the software library named Linux and Oracle Solaris 8-10 Software Update Library or the Oracle Solaris 11 Software Update Library.

# Viewing the Contents of a Software Library

Procedure for displaying information about a software library in Oracle Enterprise Manager Ops Center.

You can display the contents of the software library, its associations, and details about the disks in the software library. You can also see how Oracle Enterprise Manager Ops Center monitors the library and any problems.

1.  Expand **Libraries** in the Navigation pane.

2.  Click a software library.

    The details of the selected library are displayed in the center pane in a set of tabs.

    The Summary tab displays information about the entire software library:

    *   URL – File for a local library and NFS for a NFS share

    *   Size – Total storage capacity of the library

    *   Used Space – Percentage of used space as compared to available space

    *   State – Status of the library

    *   Access – Read-Write

    The Library Contents table lists all the images in the library, organized by type, and includes the size and the date the image was modified. The other tables on the Summary tab describe the types of images: Service Processor Firmware, Component Firmware, and BIOS Configuration Snapshots

3.  To see the results of monitoring the software library, click the **Incidents** tab.

4.  To see the attributes and values that are being monitored, click the **Monitoring** tab.

# About Libraries for Oracle Solaris 11

Description of how Oracle Solaris 11 images are stored and maintained in Oracle Enterprise Manager Ops Center.

The Oracle Solaris 11 Image Packaging System (IPS) contains the packages that you need to install, provision, and update your Oracle Solaris 11 operating system. Each IPS package has an associated manifest that describes how the package is assembled. The package manifest provides basic metadata about the package (such as name, description, version, and category), what files and directories are included, and the package dependencies. Packages might specify the services to restart to refresh some configuration on the system, specify the aliases to update for a given hardware driver, or the users and groups to create as part of the package installation process. A package repository holds all software packages. Systems must connect to the repository to install software updates.

# Oracle Solaris 11 Software Update Library

Describes the purpose of the Oracle Solaris 11 software library in Oracle Enterprise Manager Ops Center.

The Enterprise Controller can maintain a repository for the Oracle Solaris 11 Image Packaging System (IPS). The repository, called the Oracle Solaris 11 Software Update Library, provides the images for provisioning assets with the Oracle Solaris 11 operating system.

> **Note:**
>
> The host system for the Enterprise Controller must use the Oracle Solaris 11 operating system. Do not attempt to initialize an Oracle Solaris 11 Software Update Library on a different Oracle Solaris operating system.

### Options for Configuring the Oracle Solaris 11 Software Update Library

Lists the options for initializing the software library for Oracle Solaris 11 in Oracle Enterprise Manager Ops Center.

You have several options for when and how you configure the Oracle Solaris 11 Software Update Library:

- If your site already maintains an Oracle Solaris 11 IPS Repository, direct Oracle Enterprise Manager Ops Center to use it, instead of initializing a new one. Specify the location of the existing repository during the product installation or after the product is installed, as described in "About Alternate IPS Repositories."

- At any time, you can create an Oracle Solaris 11 IPS repository at your site and use it as the Oracle Solaris 11 Software Update Library. See the *Copying and Creating Oracle Solaris 11 Package Repositories* at `http://docs.oracle.com/cd/E23824_01/html/E21803/toc.html`

- During installation of the product software, initialize the library. This library downloads content from the `https://pkg.oracle.com/solaris/support` repository and continues to sync with the repository routinely. However, the initialization of the library can take many hours, depending on your site's access.

- After installation, initialize the library using the **Initialize Oracle Solaris 11 Software Update Library** action. This action performs the same operation as the installation option with the same time requirements.

To connect to `https://pkg.oracle.com/solaris/support`, either at installation or at a later time, you must provide a key file and a certificate file to authenticate the connection. If these files are missing or have expired, provide a new key and certificate, using the procedure in the *Oracle Enterprise Manager Ops Center Administration Guide*.

### Library States

Lists the states that are reported about software update libraries in Oracle Enterprise Manager Ops Center.

The Oracle Solaris 11 Software Update Library has the following states:

- Unconfigured – Oracle Solaris 11 Software Update Library was not created at installation. The **Initialize Oracle Solaris 11 Software Update Library** action is available in the Actions pane.

- Configuring – The Oracle Solaris 11 Software Update Library is in the process of being configured. The process of initializing the library takes many hours. When complete, the new library appears in the Libraries section.

- Syncing – The Oracle Solaris 11 Software Update Library is in the process of updating its contents with the parent IPS repository or is in the process of being reconfigured. The Oracle Solaris 11 Software Update Library is locked and unavailable for use when in this state.

- OK – The Oracle Solaris 11 Software Update Library is ready to use.
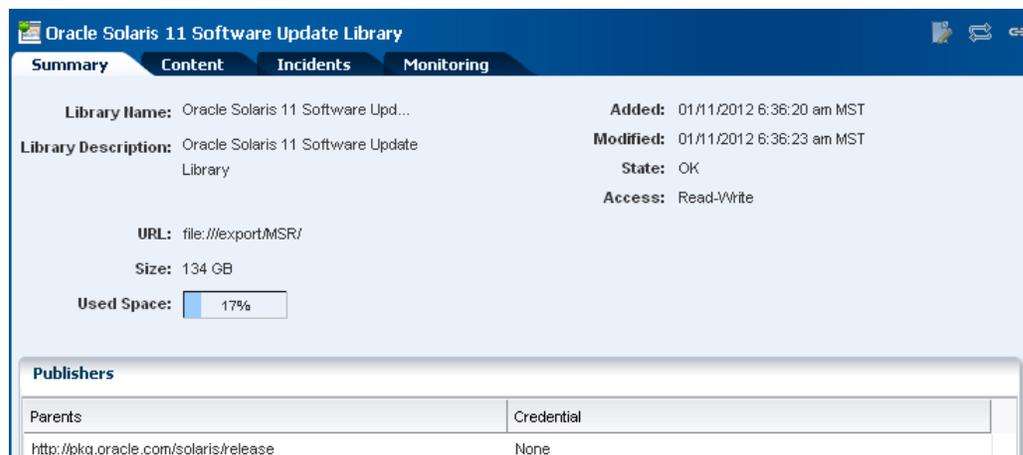
## Summary of Oracle Solaris 11 Software Update Library

Description of the attributes and status of the Oracle Solaris 11 Software Update Library in Oracle Enterprise Manager Ops Center.

When the Oracle Solaris 11 Software Update Library is configured, its Summary tab, shown in Figure 5-2, provides an overview of the health, status, and last update. The URL listed on the Summary is the location of the Oracle Solaris 11 Software Update Library. The size is the amount of space allocated to the file system, and the used space shows the amount of space used by the packages that are located in the library.

The Publishers table shows each Parent Repository and its credentials. The URL is the location of the Parent Repository for Oracle Solaris 11 packages and content located in the Image Packaging System (IPS). Oracle Enterprise Manager Ops Center uses these URLs to synchronize the information in the Oracle Solaris 11 Software Update Library with the Image Packaging System. The Parents list is created when you use the **Configure Parent Repositories** Wizard. If your site has its own local repository for Oracle Solaris 11 packages, update Oracle Enterprise Manager Ops Center's library from that location.

*Figure 5-2    Summary Tab of the Oracle Solaris 11 Software Update Library*
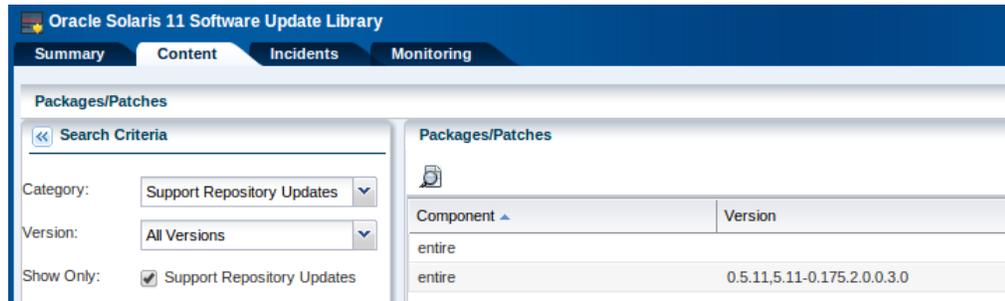


## Content of the Oracle Solaris 11 Software Update Library

Describes information listed in the Contents tab for the Oracle Solaris 11 library in Oracle Enterprise Manager Ops Center.

The Content tab, shown in Figure 5-3, displays a list of the packages in the Oracle Solaris 11 Software Update Library with a brief description of each package. You can filter the list of packages by selecting a category or version. The Support Repository Update check box is a quick way to filter the list of packages in the Oracle Solaris 11 SRU releases. You can also search for a specific package.

**Figure 5-3    Content Tab of the Oracle Solaris 11 Software Update Library**



## Configuring Parent Repositories to Synchronize

Procedure for setting up the repository for Oracle Solaris 11 to synchronize with the latest content in Oracle Enterprise Manager Ops Center.

Use the **Configure Parent Repositories** action to manage publishers for the parent repository. After the library has been configured and the content has been downloaded the first time, create a recurring schedule to synchronize the Oracle Solaris 11 Software Update Library with its parent repository.

In the Configure Parent Repositories Wizard, create a list of parent repositories with their credentials that you use to update the Oracle Solaris 11 Software Update Library. During the synchronization operation, all the content in the parent repository is compared to the existing content in the Oracle Solaris 11 Update Software Library and new or updated content is downloaded.

## About Alternate IPS Repositories

Description of an alternate repository to be used as Ops Center's Oracle Solaris 11 repository.

Oracle Enterprise Manager Ops Center synchronizes with a parent repository to maintain the Oracle Solaris 11 Software Update Library, that is, the Oracle Solaris 11 Software Update Library is a child of the parent repository. If your site already has an Oracle Solaris 11 IPS repository for other purposes, you have the option of declaring that repository as the Oracle Solaris 11 Software Update Library. Operations that use IPS content retrieve the content from your IPS repository. Because it is not a parent-child relationship, no synchronization is performed.

When you install Oracle Enterprise Manager Ops Center or when you initialize the Oracle Solaris 11 Update Software Library, identify your IPS repository as the Oracle Solaris 11 Update Software Library. All operations that use this software library will retrieve content from the IPS repository.

> **Note:**
>
> Oracle Enterprise Manager Ops Center does not maintain the content of the IPS repository. You must maintain this repository manually.

## Using an Alternate IPS Repository as the Oracle Solaris 11 Software Update Library

Procedure for directing Oracle Enterprise Manager Ops Center to use a different Oracle Solaris 11 repository.

1. Locate your site's Oracle Solaris 11 IPS repository or create one.

2. Expand **Libraries** in the Navigation pane.

3. Click **Software Libraries**.

4. Click **Initialize Solaris 11 Software Update Library** in the Action pane.

5. In the **Specify Library Location** field, enter the location of your IPS repository.

6. In the **URL** field for the parent repository, do not enter any text. Leave this field blank.

7. Click **OK**.

## Adding Content

Procedure for adding images to the Oracle Solaris 11 Software Update Library from another parent repository in Oracle Enterprise Manager Ops Center.

In addition to routine updates, you can add ISO images to the Oracle Solaris 11 Software Update Library manually. Use the **Add Content** action to specify a parent repository and add ISO image files to the Oracle Solaris 11 Software Update Library manually. The parent repository URL and credentials are not saved when you use this action. To save a list of repositories, use the **Configure Parent Repository** action.

1. Locate the ISO image.

2. Expand **Libraries** in the Navigation pane.

3. Click **Software Libraries**.

4. Click **Oracle Solaris 11 Software Update Library**.

5. Click **Add Content** in the Action pane.

*Figure 5-4   Add Content*



6. In the **Repository to add content from** field, enter the location of the ISO image using the syntax: `file:///image_name.iso`. You must only use the `file://` protocol to add ISO images.

> **Note:**
>
> To add the IPS package server contents directly, you can use the `http://` or `https://` URI to IPS server instead of file-based ISO image in the **Repository to add content from** field.

If credentials are required, specify the system's credentials, **SystemDefinedSupportCredential**, or create new key and certificate identifiers to access the repository by selecting **Define New,** shown in Figure 5-4, to launch the Create Credential Wizard.

## About Using a Custom AI Manifest to Provision an OS

Describes an alternative to using the standard AI manifest for provisioning Oracle Solaris 11 in Oracle Enterprise Manager Ops Center.

The Oracle Solaris 11 Automated Installer (AI) uses an XML file to specify how the operating system is installed. This file is the AI manifest. When you apply a provisioning plan, Oracle Enterprise Manager Ops Center creates the AI manifest from the specifications in the OS provisioning profile. Starting with Version 12.3.0.0.0, you can create a custom AI manifest to, for example, specify the disk layout or install software.

When you create the OS provisioning profile, you indicate that this profile uses a custom AI manifest and specify the location of the XML file. When you apply the provisioning plan, Oracle Enterprise Manager Ops Center uses your custom AI manifest if it meets the following requirements:

- You create the manifest according to the Oracle Solaris 11 procedure in "Customizing an XML AI Manifest File" at `http://docs.oracle.com/cd/E36784_01/html/E36800/changeai.html`.

- You validate the manifest using the Oracle Solaris 11 command, `installadm create-manifest(1M)`.

- You place the manifest in a location and path accessible to the browser on the Enterprise Controller's system.

- You create an OS provisioning profile and enable the **Use custom manifest** option in Step 2 of the Create Profile wizard for OS provisioning, as shown in Figure 5-5.

*Figure 5-5    Option for a Custom Manifest*
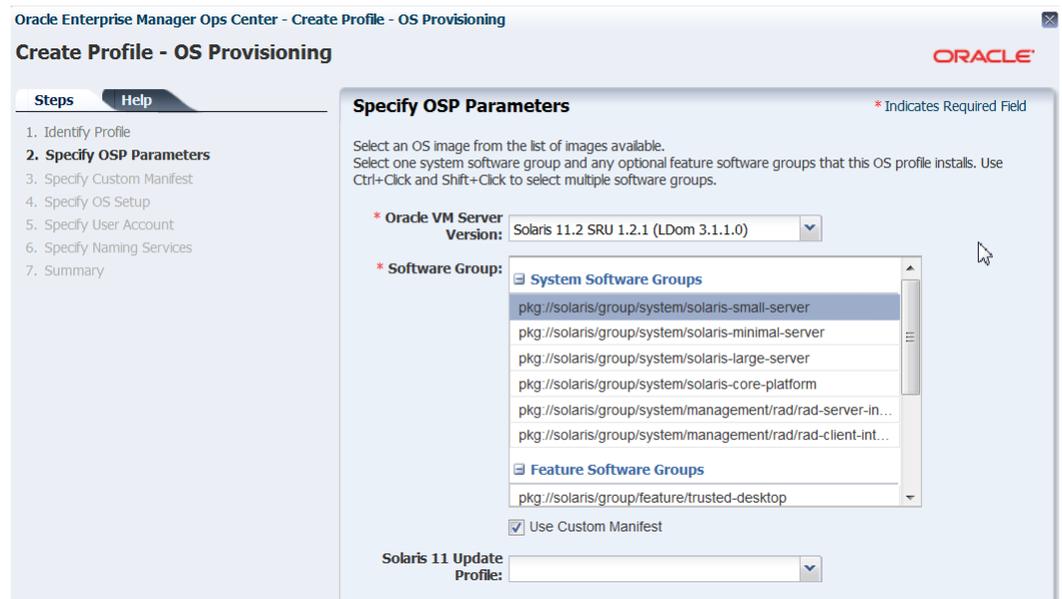


When you select this option, a step is added to the wizard so that you can specify the location of custom manifest, as shown in Figure 5-6.

*Figure 5-6    Location of a Custom Manifest*
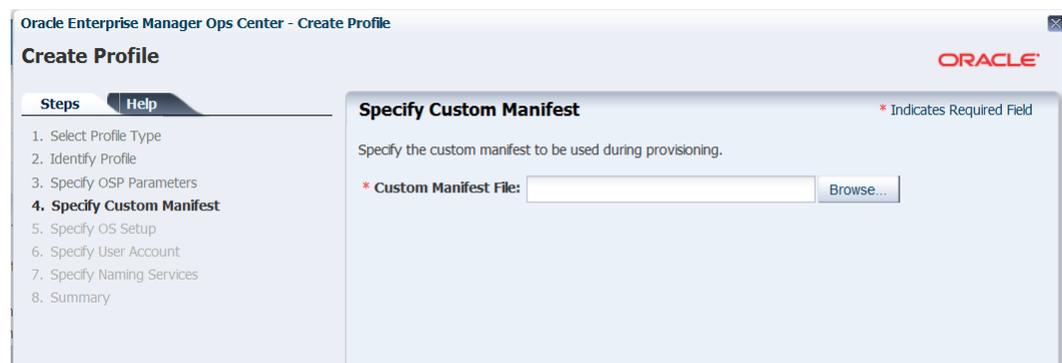


Although not required, it is a good practice to identify profiles and plans that use custom manifests by using a naming convention.

## Deleting Oracle Solaris 11 Software Update Library

Procedure for removing the Oracle Solaris 11 repository in Oracle Enterprise Manager Ops Center.
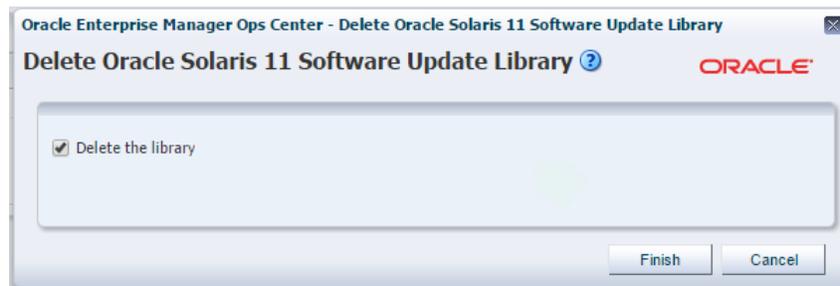
When you delete the library, its packages and content remain.

1. Expand **Libraries** in the Navigation pane.

2. Click your site's Oracle Solaris 11 Software Update Library.

3. Click **Delete Solaris 11 Software Update Library** in the Action pane.

   *Figure 5-7    Delete Oracle Solaris 11 Software Update Library*

   

4. To confirm, click the **Delete the library** option.

5. Click **Finish**.

# About Creating a Software Library

Describes a library for OS images and firmware images in Oracle Enterprise Manager Ops Center.

You can create a software library that uses space on a file system on the Enterprise Controller's system, which is a Local Software Library. You can also create a software library that uses space on a shared file system on an NFS server. This type of library is a NAS Software Library.

> **Note:**
>
> When you use both local and NAS software libraries, do not use the same name for the library.

## Creating a Local Software Library

Procedure for creating a library for OS images and firmware images on the Enterprise Controller in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **New Local Software Library** in the Action pane.

3. Enter a unique name and description.

4. In the URL field, enter the location of the file system.

    5. Click **Create**.

## Creating a NAS Software Library

Procedure for creating a library on a NAS device in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **New NAS Software Library** in the Action pane.

3. Enter a unique name and a description.

4. Select one or more server pools to use this storage library.

5. Choose the type of service:

   - To use a storage device, select the storage device and specify the exported share to use.

   - To use an NFS server, enter the host name, port, and path.

6. Click **Create**.

# Overview of the Software Library for Oracle Solaris 10, 9, 8 and Linux

Describes the repository for Oracle Solaris and Linux in Oracle Enterprise Manager Ops Center.

Update Profiles and any other profiles that provision an OS or firmware image rely on the contents of a software library. For Oracle Solaris 10, 9, and 8 and for Oracle Linux, the **Linux, Solaris 8-10 Software Update Library** is a dedicated software library that contains the packages, updates, and site-specific scripts and configuration files for these operating systems.

You create the Linux, Solaris 8-10 Software Update Library when you install Oracle Enterprise Manager Ops Center, or after installation, by using the **Create Update Library** action. If the **Create Update Library** action is not available, the library has been created.

### Topics

- See Organization of the Linux, Solaris 8-10 Software Update Library for a description of the libraries organization.

- See About Images for information about managing the content in the library.

- See Overview of Local Content for the Linux and Oracle Solaris 8-10 Software Update Library for information about managing the custom content of the site-specific categories.

# Organization of the Linux, Solaris 8-10 Software Update Library

Lists the categories of the software library that stores images of Oracle Solaris 10 and previous versions and Oracle Linux in Oracle Enterprise Manager Ops Center.

For each OS, this software library organizes its contents in the following categories. You can change the display of the contents of the library according to the OS distribution, the category, the type of view, and the version.

- Clusters (groups of Oracle Solaris packages)

- Configuration files

- Hardware

- Local

- Local Packages

- Local RPMs

- Notifications

- Packages

- Patches

- Post-actions

- Pre-actions

- Probes

- Recommended Software Configurations

- Oracle Solaris Baselines

# About Images

Describes the types of images that Oracle Enterprise Manager Ops Center stores.

In most cases, the images you need are downloaded from the Oracle Knowledge Base or the Oracle Solaris 11 Package Repository. You can also obtain images from a location external to Oracle Enterprise Manager Ops Center and then import or upload them.

> **Note:**
>
> Another type of image is a virtualization image. This type of image is stored in a Storage Library and contains the configuration information for a guest, its operating system, and the applications that the guest uses.

## About OS Images

Describes the types and formats of images that deploy operating systems in Oracle Enterprise Manager Ops Center.

OS images provision or update the operating system on both hardware servers and virtualization hosts. A subset of OS images are branded images, which install an operating system that is optimized for a specific purpose and can also include applications. An OS image contains an entire operating system in either ISO format or FLAR format.

- ISO image – The image, also called a disk image, contains uncompressed directories and files of any type: application or data or both. This type of image can reside on removable media.

- FLAR image – The image is a flash archive of an Oracle Solaris 10, 9, or 8 operating system and other software. You can use a FLAR to install or restore a system to a specific configuration. Differential FLAR images are not supported. FLAR files must have the .flar file name extension.

In addition to being grouped as packages and updates, Oracle Solaris OS images are also grouped into baselines.

### Location of OS Images

Lists the navigation instructions to locate information about OS images in Oracle Enterprise Manager Ops Center.

Table 5-3 shows the location of OS images.

*Table 5-3    Location of Images for Each Operating System*

| Operating System | Location of Images |
| --- | --- |
| Oracle Solaris 11 | Oracle Solaris 11 Software Update Library |
| Oracle Solaris 10, 9, 8 | Linux and Oracle Solaris 8-10 Software Update Library |
| Oracle Linux | Linux and Oracle Solaris 8-10 Software Update Library |

### Requirements for OS Images

Requirements for using an OS image in Oracle Enterprise Manager Ops Center.

- An OS image must be in a single image file. For example, on an Oracle Solaris system, the following command collects all OS component files on the auto-mounted file system into an ISO file.

```
# mkisofs -o <name_of_OS.iso> -J -R /cdrom/<name_of_OS>
```

- The Oracle Enterprise Manager Ops Center software uploads or imports one ISO file per operation. If you are loading an ISO file from physical media and the file spans more than one physical media, you must first combine the content onto media that can store the complete file.

- An ISO file cannot be made from Oracle Solaris installation media.

## About Unified Archives

In Oracle Solaris 11.2, the Unified Archive format (UAR) provides the ability to clone, migrate, or recover a system.

Oracle Solaris 11.2 introduces a native archive file type called Unified Archives. A Unified Archive is a compressed file that can contains one or more instances of the operating system, such as a global zone and its non-global zones. These individual systems can be archived independently or bundled together. In Oracle Enterprise Manager Ops Center, these OS instances are called deployable systems.

You create a UAR file from a deployed OS instance, including any zones or control domains. You can then deploy the Unified Archive to recover a failed system, duplicate the system on multiple machines, or migrate a system to a new server or to a virtual system. Use Oracle Solaris 11.2 SRU9 and above or Oracle Solaris 11.3.

A UAR for recovery of a system is different than a UAR for deploying a system:

- A clone archive is based upon the system's active boot environment (BE) at the time the archive is created so only one BE is included. The clone archive type is intended for rapid creation and deployment of custom images. A clone archive does not include any of the system configuration information from the OS instance or any sensitive data such as SSH keys or passwords. A system deployed from a clone archive has all the same file systems and applications as the cloned system, but, for example, will not have the same host name.

  Oracle Enterprise Manager Ops Center 12.3.1.0.0 can create clone UAR images from operating systems with multiple zpools on different disks but they can not be used to provision control domains, logical domains, or Oracle Solaris Zones. These images can be used to provision hosts and guests manually.

- A recovery archive is a full-system archive containing all boot environments from all included instances. Although a recovery archive of a global zone can contain non-global zones that are installed within it, the archive itself is treated as a single system. A recovery archive can therefore preserve zone clone relationships, unlike clone archives. The system configuration information and sensitive data is preserved in recovery archives.

  Oracle Enterprise Manager Ops Center 12.3.1.0.0 can create recovery UAR images but they can not be used to provision control domains, logical domains, or Oracle Solaris Zones. These images can be used to recover hosts and guests manually.

Like the operating systems they contain, UAR images depend on the type of architecture, either x86 or SPARC.

You can use an Oracle Solaris 11.2 or 11.3 image available from Oracle's site at the link provided in Related Resources for Software Libraries. You then import the image into the Oracle Solaris 11 Software Library and then use its deployment profile and plan to provision the operating system. Oracle provides UARs of the following types:

- Oracle Solaris 11.x Unified Archive is based on the minimal-server package cluster. Use this type to provision Oracle Solaris 11.x zones and Oracle VM Server for SPARC logical domains.

- Oracle Solaris 11.x OpenStack Unified Archive is also based on the minimal-server package cluster, but includes Openstack services. Use this type to provision Oracle VM Server for SPARC control domains.

For custom images, create a UAR using one of your existing Oracle Solaris 11.x deployable systems. As part of the creation process, the UAR is imported into your Oracle Solaris 11 Software Library, as described in Creating a UAR Image.

## Viewing Details of a UAR Image

Procedure for displaying extensive information about a United Archive image, using Oracle Enterprise Manager Ops Center.

Use this procedure to display information about an existing UAR.

1. In the Navigation pane, in the Library section, select a software library.

2. In the Summary tab in the center pane, select an image that an Image Type of UAR.

3. Click the **View Image Details** icon.

   The View Image Details window displays the name and description or the archive, lists any tags and their values, and lists an extensive list of properties and their

values. Each deployable system has its own section of properties. You can use a Search box to locate a specific tag, property, or value.



4. When you are finished, click **OK**.

## Creating a UAR Image

Procedure for creating a United Archive from an existing Oracle Solaris 11 operating system in the software library, using Oracle Enterprise Manager Ops Center.

Use this procedure to create a UAR image. The file system where the UAR is created must already exist and have sufficient space to hold the image. After the UAR is created, it is imported into the software library that you specify, if the UAR image can be supported by the version of the operating system in the library.

1. In the Navigation pane, in the Assets section, select an agent-managed deployable system such as a global zone or control domain.

2. Click **Create UAR** in the Actions pane.

   The Create UAR wizard opens.

3. Enter the name for the UAR, specifying a maximum of 99 alphanumeric characters, the hyphen character, or the underscore character. This name must be unique and must not be changed.

4. Enter a description that identifies the UAR as either clone or recovery. The default action creates a UAR that can be used for cloning the operating system: one boot environment and no credentials, host name, or system configuration information.

5. In the **Staging area** field, specify the directory in the target agent's filesystem where the UAR will be created .

6. (Optional) You can add tags specific to your site.



7. To create a recovery UAR, click the **Recovery archive** option. The UAR is an identical copy of the operating system, including all boot environments and all sensitive data.

8. By default, media is created for each global zone to improve portability. Select the **Exclude media** option to skip the creation of bootable media in the Unified Archive. For a recovery UAR, clear the **Exclude media** option so that bootable media is created.

9. Select the **root only** option to exclude all non-root pool data and to restrict the UAR to one zone. This is useful when the list of non-root pools is not known.

10. By default, the size of the UAR is not determined before it is created. Clear the **Skip Capacity Check** option to be warned if the directory you specified does not have sufficient space for the UAR. Click **Next**.

**Select Deployable Systems**      * Indicates Required Field

Select one or more deployable systems to include in UAR

**\* Deployable systems**

| Name ▲ | Description | Zone Name | Zone Type |
|--------|-------------|-----------|-----------|
| pr__b04 | | primary | control domain |

11. The new UAR can contain all or some of the zones defined in the operating system. These zones are the deployable systems. If you are creating a clone UAR, select the zones to include in the UAR. This step lists all global zones, non-global zones, and kernel zones. Use Ctrl + Click to select multiple zones. Click **Next**.

**Exclude Datasets**

Add datasets to exclude from UAR

⊕ ✖

| Dataset |
|---------|
| rpool/guests |

12. If you are creating a clone UAR, you can exclude ZFS filesystems from the UAR. If you specify a dataset that has dependent datasets, these datasets are also excluded. Click **Next**.

**Library**      * Indicates Required Field

Select a library to import UAR into

**\* Datasets**

| Name ▲ | Description |
|--------|-------------|
| library | file:///space/library |
| vDClibrary1 | nfs://10 ▓ ▓ 110/export/library1 |
| vDClibrary2 | nfs://10 ▓▓ ▓.110/export/library2 |

13. For either clone or recovery UARs, specify the software library where the new UAR is stored. If you the software library is backed by a NAS storage device, make sure that the storage device is mounted and available to the Enterprise Controller's system and that the shared filesystem allows NFS user mapping for root. Click **Next**.

14. Review the summary and click Finish.

The UAR is created and imported into the software library that you selected.

## About Images for Firmware Updates

Describes the characteristics of a firmware image.

Firmware images provision hardware assets. A firmware image is a copy of the vendor's firmware file and its metadata, such as the platform it is used on and any

software dependencies. You obtain the images by downloading them from vendor websites or uploading them from their product media. Firmware images are stored in Software Libraries. The maximum size of a firmware image is 20 MB.

### Supported Firmware Images

List of types of firmware in Oracle Enterprise Manager Ops Center.

The following firmware types are supported:

- Service Processor firmware

- Chassis firmware

- Power distribution unit firmware

- Storage Component firmware updates firmware on RAID Controllers, Expanders and Disks.

### About Firmware Metadata

Describes the information about firmware that accompanies a firmware image, using an example of firmware metadata.

When you import a firmware image, you might be required to provide the metadata to complete the image file, if it is not included. You must provide the firmware type, the systems that the firmware supports, the version of the firmware, and any other firmware images that this firmware image depends on. You can usually find the information in the image's README file.

The following example is the README file for ALOM-CMT firmware, where a single binary is deployed to the Service Processor. The example contains annotations to identify the metadata.

***Example 5-1    Example of Firmware Metadata***

- To determine the type and version of the firmware update:

```
Latest Sun System Firmware(6.1.2):
                 ---------------------------------
                 System Firmware 6.1.2 Sun Fire[TM] T2000 2006/01/20 18:19
                 ALOM-CMT v1.1.2  Jan 20 2006  18:06:10
                 VBSC 1.1.1  Jan 20 2006  17:56:19
                 Reset V1.0.0
                 Hypervisor 1.1.0 2005/12/15 11:10
                 OBP 4.20.0 2005/12/15 16:48
                 Sun Fire[TM] T2000 POST 4.20.0 2005/12/15 17:19
```

- To determine the models supported:

```
This README is intended for users who wish to
upgrade the firmware in their Sun Fire T2000.
```

- To determine if the system must be powered off before updating the firmware:

```
a)To update the Sun System Firmware, the system must be powered off (i.e. in
standby mode).
```

From this README file, identify the following metadata:

- Available platforms – Sun Fire T2000

- Type – VBSC

- Version – 1.1.1

- Require power off – Yes

For this example, the VBSC firmware subcomponent/type with version 1.1.1 was used. You can use any of the other types such as ALOM-CMT:1.1.2 or OBP:4.20.0. However, you must ensure that the version specified is always the firmware subcomponent/type.

## About Importing Images

To provision firmware or an OS, you use a deployment plan to retrieve an image from one of the Oracle Enterprise Manager Ops Center's software libraries and install the image on the targeted assets. To add images to a software library, you import the image.

Starting in Release 12.2.2.0.0, you must create a profile for each image and then include the profile in a deployment plan. If you prefer to create profiles by default whenever you import the image, you must change Enterprise Controller's configuration by editing the property file.

For Unified Archive (UAR) images, you must verify that the existing Oracle Solaris 11 Software Library can support the version of the operating system in the UAR by comparing the version in the UAR with the version of several packages in the library. For example, if the UAR is created from a system with Oracle Solaris 11.2 SRU 10, the repository must contain the boot environment for Oracle Solaris 11.2 SRU 10.

- On the Oracle Solaris 11.2 system where the UAR image is located, issue the following command to see the version included in the UAR:

  ```
  archiveadm info -p -v path/uar_name
  ```

- In Oracle Enterprise Manager Ops Center, display the Oracle Solaris 11 Software Library and check the versions of the following packages:

  - `entire`

  - `osnet-incorporation`

  - `userland-incorporation`

  - `install-image/solaris-auto-install`

If the versions do not match, any attempt to import the UAR fails in the Extract Image Properties task.

### Importing an Image

Procedure for including an image in the software library in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **Software Libraries** or **Storage Libraries** to expand.

3. Click the library.

4. Click **Import Image** in the Actions pane.

   The Import Image window is displayed.

*Figure 5-8   Import Image*



5. Identify the type of format for the image. Depending on the type of image, other options are enabled.

6. Identify the current location of the image file. For an ISO image, select the Parent ISO from the list.

   If the image file is located in an accessible location, enter the name of the directory or use the Browse button to navigate to the location.

   The Image to be Imported field is a list of available images in the location you specified. If the location contains many images, you can use the Search field to filter the list.

7. Select the image you want to import.

8. Enter a name for the image and a description. Image names must be unique, can consist of up to 100 characters, and can include numbers, letters, and some special symbols. The following special symbols are prohibited: comma, asterisk, single quote, double quote, parenthesis, question mark, equal sign, and newline.

9. Click **Import Image** to copy the image to the library with the name you provided.

## Uploading Firmware Images

Procedure for adding firmware images to the software library in Oracle Enterprise Manager Ops Center.

The **Upload Firmware** action can be directed to retrieve firmware images from either the Enterprise Controller's file system or a local file system. Use the procedures in *Keep Your Firmware Up-to-Date* to upload firmware.

## About Firmware for Power Distribution Units

Describes firmware images for a PDU in Oracle Enterprise Manager Ops Center.

The firmware for a PDU consists of two files, one for the firmware and one for the management software of the PDU. Each firmware image must be imported or uploaded and then a profile created that includes both images. The firmware images must have metadata, which is not always included in the image. In that case, you specify the metadata during the import or upload operation.

### Uploading Firmware With Metadata

Procedure for adding firmware images to the software library in Oracle Enterprise Manager Ops Center.

Use the procedures in *Keep Your Firmware Up-to-Date* to upload firmware. At the step for Select Firmware Components, select both firmware components:

- MKAPP_V*firmware_version*.DL

- HTML_V*firmware_version*.DL

### Uploading Firmware Without Metadata

Procedure for adding firmware to a software library in Oracle Enterprise Manager Ops Center.

Use the procedures in *Keep Your Firmware Up-to-Date* to upload firmware. At the step for Select Firmware Components, select the firmware component, MKAPP_V*firmware_version*.DL, and click **Upload**. To define the metadata for the firmware:

1. For the target type click **PDU**.

2. For the platform, click **Sun Rack II PDU**.

3. Enter the version of the firmware.

4. Choose **Depends On None** and accept the remaining default options.

After the job is completed, repeat the procedure with the other firmware image, HTML_V*firmware_version*.DL, with one difference: At Step 4, specify that this firmware image depends on the MKAPP_V*firmware_version*.DL image.

### Creating a Firmware Profile for PDU Firmware Updates

Procedure for creating a firmware profile for a PDU in Oracle Enterprise Manager Ops Center.

1. Expand **Plan Management** in the Navigation pane.

2. Click **Create Firmware Profile** in the Actions pane.

3. Enter a name and description for the profile.

4. For subtype, click Power Distribution Units.

5. For target type, click Power Distribution Units. Click **Next**.

6. For Firmware Configuration, accept the default options and values. Click **Next**.

7. Select both images: MKAPP_V<firmware_version>.DL and
   HTML_V<firmware_version>.DL. Click **Next**.

8. Review the summary of the new profile and click **Finish** to submit the job.

# Adding Local Content for the Oracle Solaris 11 Software Update Library

Procedure for adding local content to the Oracle Solaris 11 repository in Oracle Enterprise Manager Ops Center.

To add custom content for Oracle Solaris 11, use pkg commands to add the content to a local IPS repository and then import the repository into Oracle Enterprise Manager Ops Center.

To use custom scripts, use an operational profile with either the **Execute Operation** action or an operational plan.

# Overview of Local Content for the Linux and Oracle Solaris 8-10 Software Update Library

Overview of managing your site's custom content in Oracle Enterprise Manager Ops Center.

---

**Note:**

This section does not apply to Oracle Solaris 11.

---

The Linux and Oracle Solaris 8-10 Software Update Library can store site-specific configuration files and scripts used in deployment plans. This local content can also include data files, executable files, or binary files. For example, you might develop a script to test servers before running a provisioning job.

**Topics**

- About Local Categories

- Creating a Local Category

- About Local Actions

- Uploading a Local Software Package

- Uploading a Local Configuration File

- About Uploading Software in Bulk

- Using Local Content

- Editing Local Content

- Deleting Local Content

## About Local Categories

Describes the organization of local content in Oracle Enterprise Manager Ops Center.

The Local categories of the Updates Library have no connection to the Knowledge Base. The content in these categories is uploaded from your site to the software library. You maintain the files throughout their life cycle.

Local content is organized into the following default categories: local RPMs or PKGs, configuration files, macros, pre-actions, post-actions, and probes. You can create more categories.

## Creating a Local Category

Procedure for organizing local content by creating a category in Oracle Enterprise Manager Ops Center.

You can create subcategories to further organize your local content. The type of local content allowed in a subcategory depends on its parent category.

1. Expand **Libraries** in the Navigation pane.

2. Click **Linux and Oracle Solaris 8-10 Software Update Library**.

3. Click **Add Local Category** in the Actions pane.

4. Enter a name for the new subcategory.

5. Enter a brief description for the new subcategory such as its purpose.

6. Click **Distribution** to assign to the subcategory.

7. Click **Parent Category** to select one of the system-defined categories for the subcategory.

8. Click **Apply**. The new subcategory is created under the selected default category.

## About Local Actions

Describes how to use a script or executable file to make changes to an asset in Oracle Enterprise Manager Ops Center.

An action is a script, binary file, or executable file that makes changes to the managed host. To use the uploaded script or file, create an Update profile and include the profile in the deployment plan that installs or upgrades the OS. The following actions are available:

- Pre-Actions – Script that runs on a managed host before the provisioning step starts. When you create the deployment plan, you select the Execute Pre-Install step and then select the profile that includes the script.

- Post-Actions – Script that runs on a managed host after a job is completed. When you create the deployment plan, you select the Execute Post-Install step and then select the profile that includes the script.

- Probes – Script that runs on a managed host to verify that a job can be performed.

- Macros – Script that modifies a generic configuration file to make it specific for a managed host. Use macros to apply a single configuration file across multiple hosts by customizing the configuration file for each host's environment. The script outputs a single line that replaces a macro sign in a configuration file.

## Uploading a Local Action

Procedure for adding a script or executable file to the software library in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **Linux and Oracle Solaris 8-10 Software Update Library.**

3. Click **Upload Local Action** in the Actions pane.

   The Upload Local Action window is displayed in Figure 5-9.

   *Figure 5-9   Local Upload Action*

   

4. Enter a name for the action.

5. Enter text to describe the purpose of the script or executable file.

6. Select the type of action such as Pre-Action, Post-action, Macros, or Probes.

7. Click the name of the distribution that is appropriate for the script or executable file.

8. The Parent Category field shows the category you specified as the type of Action. If your site uses subcategories, click the **Browse** button to navigate to the specific subcategory.

9. Click **Browse** to locate and select the script or executable file.

10. Click **Upload**. The file is uploaded to the Linux, Solaris 8-10 Software Update Library in the category you specified.

You can now create a profile for the script and then use the profile in a deployment plan.

## About Local Software Packages

Describes custom packages in Oracle Enterprise Manager Ops Center.

To use the uploaded package or RPM, create an provisioning or update profile and include the profile in a deployment plan.

You can upload software in the following formats:

- `pkg`

- `rpm`

- `tar`

- `zip`

- `gzip`

- `compress`

If the file is in compressed format, the file is uncompressed after it is uploaded.

## Uploading a Local Software Package

Procedure for adding a package to the software library in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click the operating system's Software Update Library.

3. Click **Upload Local Software Packages** in the Actions pane.

4. Select **Yes** if the package is a security fix for a previous version of the software. Otherwise, select **No**.

5. Click the name of the distribution to which you want to add this package.

6. In the Parent Category section, click **Local PKGs** or click **Browse** to locate a subcategory.

7. In the Files section, click **Add** to see the list of files. Select at least one software package.

8. Click **Upload**. The file is uploaded to the Linux, Solaris 8-10 Software Update Library in the category you specified.

You can now include the package or RPM in an provisioning profile.

## About Local Configuration Files

Describes custom configuration for assets in Oracle Enterprise Manager Ops Center.

A configuration file is a text file, binary file, or non-RPM application that contains the settings and values for an asset type. To use the uploaded file, create an Update profile and include the profile in the deployment plan that installs or upgrades the OS.

## Uploading a Local Configuration File

Procedure for adding a configuration file to the software library in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **Linux and Oracle Solaris 8-10 Software Update Library.**

3. Click **Upload Local Configuration File** in the Actions pane.

   The Upload Local Configuration File window is displayed in Figure 5-10.

   *Figure 5-10    Upload Local Configuration File*

   

4. In Target path on server, type the full path to the configuration file.

5. In Version, type a character string to identify this version of the file. The string is appended to the file name when it is displayed in a Components list.

6. Enter a brief description of the file.

7. Select the Distribution to which this file is applied. You can choose multiple distributions.

8. In Parent Category, accept the Configuration Files category or click **Browse** to locate a subcategory.

9. Click **Browse** to locate and select the configuration file.

10. Click **Upload**. The file is uploaded to the Linux, Solaris 8-10 Software Update Library in the category you specified.

## About Uploading Software in Bulk

Describes requirements for uploading more than one image file in Oracle Enterprise Manager Ops Center.

You can upload multiple files or an entire directory in one operation. For example, you can upload the contents of a DVD. All components in the directory and subdirectories are uploaded.

The files must be in the following formats:

- `pkg`

- `rpm` (for Linux RPMs)

- `tar`

- `zip`

- `gzip`

- `compress`

If files are compressed, the software extracts the files after it uploads them.

### Before You Begin to Upload in Bulk

Requirements for uploading local content to libraries in Oracle Enterprise Manager Ops Center.

- Verify that the files have the supported file types.

- Verify that the file size does not exceed 2 GB. If the file is larger than 2 GB, copy the file manually to a file system on the Enterprise Controller's system.

- If you are uploading from removable media, insert the media.

### Uploading Local Software in Bulk

Procedure for adding multiple packages and images to the software library in Oracle Enterprise Manager Ops Center.

1. Expand **Libraries** in the Navigation pane.

2. Click **Linux and Oracle Solaris 8-10 Software Update Library**.

3. Click **Bulk Upload Packages and Patches** in the Actions pane.

    The Upload Packages, Patches, and RPMS window is displayed in Figure 5-11.

    *Figure 5-11    Upload Local Software*
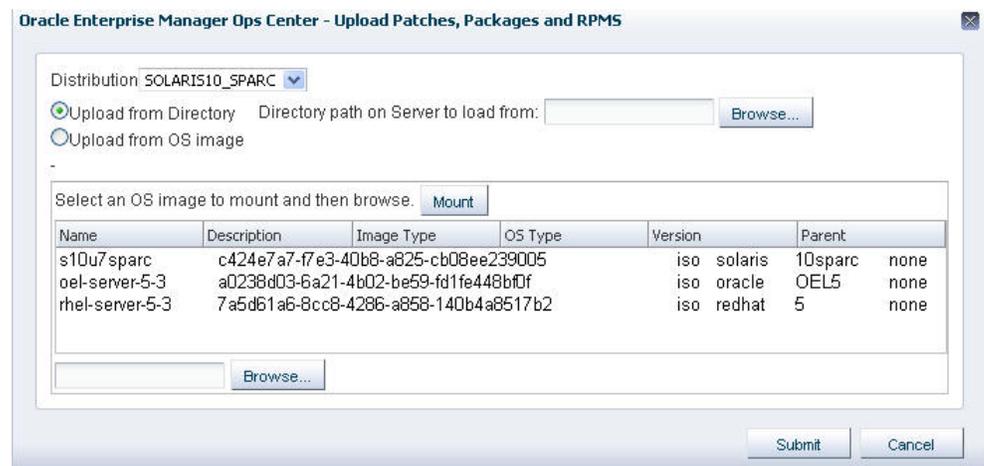
    

4. Click **Distribution** to select the distribution that applies to these files.

5. Select either **Upload from OS Image** or **Upload from Directory**.

6. If you specify a directory, prepare this directory to contain only files you want to upload. All files in the directory and its subdirectories are uploaded. Then, specify the path to the directory or click **Browse** to locate and select it.

    If you specify an OS image, you must mount the OS image and select the files.

    a. Click one of the OS images and click **Mount**.

    b. Click **Browse** to locate and select the files. Navigate to the directory **above** the packages.

7. Click **Submit**. The upload job is created.

To view the status of the upload job, select **Bulk Upload Results**.

To view the certified packages in the software update library, click the Content tab in the center pane and select Patches in the Category list. To view non-certified packages, click Local PKGs or Local RPMs in the Category list.

### Viewing Results of a Bulk Upload Operation

Procedure for displaying uploads to a software library in Oracle Enterprise Manager Ops Center.

You can view a detailed history of all the local components that were uploaded in bulk.

1. Expand **Libraries** in the Navigation pane.

2. Click **Linux and Oracle Solaris 8-10 Software Update Library**.

3. Click **Bulk Upload Results** in the Actions pane. The uploaded components list displays the name, description, status, and date for each component.

4. Select a component and click **View Results**. The details of the uploaded components are displayed.

## Using Local Content

Procedure for including local content a deployment plan in Oracle Enterprise Manager Ops Center.

The local content that you uploaded to the software library is used in profiles and deployment plans to guide and complete provisioning operations. For example, a local configuration file can be modified by the output of a macro so that each target gets the appropriate configuration file. Use the following workflow to use local content.

1. Create the macro named `mymacro` and upload it to the software library.

    ```
    # cat /var/tmp/runme.sh
    #!/bin/bash
    hostname
    ```

2. Create the local configuration file and upload it.

    ```
    ### This configuration file changes
    ### the following line to the output of "mymacro"
    ### Include this configuration file in the profile.
    <^AM^>mymacro<^AM^>
    ```

**3.** Create an Update profile and deployment plan to include the local configuration file.

**4.** Deploy the plan. The resulting configuration file on a particular server, for example `mymachine1`, has the following content:

```
### This configuration file changes
### the following line to the output of "mymacro"
### Include this configuration file in the profile.
mymachine1
```

## Editing Local Content

Procedure for editing a local component file in Oracle Enterprise Manager Ops Center.

You can edit files in the Local Categories. For example, if you uploaded a file that contained IP addresses and determined that there was an incorrect IP address in the file, you can edit the file to correct the IP address. You can also use this procedure to replace the file with a corrected file.

**1.** Expand **Libraries** in the Navigation pane.

**2.** Click **Linux and Oracle Solaris 8-10 Software Update Library**.

**3.** Click **Edit Local Component File** in the Actions pane.

**4.** To specify the file, type its name or click the **Browse** button to navigate to the file. If the file is not found, click **Distribution** to select the correct distribution. Only files in the selected distribution are displayed.

**5.** Select either **Edit existing file** or **Replace existing file**.

- If you choose to edit the file, make changes to the file and click **Save**.

- If you choose to replace the file, browse for the replacement file and click **Upload**.

## Deleting Local Content

Procedure for removing custom content in the software library in Oracle Enterprise Manager Ops Center.

You can remove your site's local content or added categories. You cannot remove the default categories.

> **Note:**
>
> Deleting content does not require confirmation and cannot be undone. Verify you are deleting the correct local component.

**1.** Expand **Libraries** in the Navigation pane.

**2.** Click **Linux and Oracle Solaris 8-10 Software Update Library.**

**3.** Click **Delete Local Component** in the Actions pane.

**4.** Expand the category to display the component you want to delete. To change the distribution, click **Distribution**.

5. Select the file or a subcategory to delete.

6. Click **Delete**.

7. If you see a message that the deletion cannot be done because the component is in use, the component has been installed on at least one agent-managed asset. If it is not practical to uninstall the component, you can force the deletion. Click the **Force Deletion** option and then click **Delete**.

To remove a subcategory and its components, do not attempt to remove each component and then remove the subcategory. When there are no components in a subcategory, the subcategory creates a placeholder component, which you cannot delete. Repeat the procedure and select the subcategory itself to delete. The placeholder component is then removed.

# About Maintaining Images and Local Content

Describes recommendations for backing up the contents of software libraries in Oracle Enterprise Manager Ops Center.

The `ecadm backup` command does not back up the software libraries. As a good practice, create the software library for OS images and local content on networked storage (NAS) and include the network storage device in your site's backup plan. If networked storage is not available, consider the following alternative for OS images:

1. Back up the Enterprise Controller's directory for OS images, `/var/opt/sun/xvm/images/os`

2. Move the archive to another server, file-share facility, or a location outside of the `/var/opt/sun` directory, according to your site's disaster recovery plan.

3. If it is necessary to rebuild the Enterprise Controller, restore the Enterprise Controller and then restore the `/var/opt/sun/xvm/images/os` hierarchy.

# Related Resources for Software Libraries

List of Oracle Enterprise Manager Ops Center documents with additional information.

For instructions in performing actions or to learn more this feature, see the following resources:

- The Oracle Solaris 11 Package Repository resides at the Oracle site: `http://pkg.oracle.com/solaris/release`.

- Other parent repositories, such as Oracle Solaris Cluster, are available. For a list of available Oracle repositories and to download the key-certificate pair, see the `https://pkg-register.oracle.com` site.

- In the Operate How To library at `http://docs.oracle.com/cd/E59957_01/nav/operate.htm`

  – *Keep Your Firmware Up-to-Date*

  – *Update Oracle Solaris 10 OS Workflow*

  – *Update Oracle Solaris 11 Workflow*

- *Deploy Software Libraries Workflow* in the Deploy How To library at `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm`

- See the *Copying and Creating Oracle Solaris 11 Package Repositories* at `http://docs.oracle.com/cd/E23824_01/html/E21803/toc.html`

- For information about key file and certificate file, see *Oracle Enterprise Manager Ops Center Administration Guide*

- Customizing an XML AI Manifest File in the Oracle Solaris documentation.

- Oracle's site for UAR images: `http://www.oracle.com/technetwork/server-storage/solaris11/downloads/unified-archives-2245488.html`

# 6

# Configure Storage

Overview of actions for storage in Oracle Enterprise Manager Ops Center.

**Topics**

- Introduction to Storage

- Roles for Storage

- Actions Available for Storage

- Location of Storage Information in the User Interface

- Storage Libraries

- Types of Storage for Libraries

- About Oracle VM Storage Connect Plug-ins

- Storage Hardware

- About Opaque Storage and Opaque Filesystems

- Storage Profiles

- About Multipath Storage for Logical Domains

- High Availability for Storage Resources

- Related Resources for Storage

## Introduction to Storage

Overview of the role and purpose of storage libraries in Oracle Enterprise Manager Ops Center and how it manages storage as both an asset and its resource.

Oracle Enterprise Manager Ops Center discover, manages, and monitors storage servers and appliances, discovers and provisions storage capacity through Storage Connect plug-in software, and makes storage resources available to virtual assets through storage libraries.

Storage libraries are the storage resources for Oracle Solaris Zones, Oracle VM Servers for SPARC, Oracle VM Servers for x86, their server pools, and virtual datacenters. These virtualization hosts and server pools store their metadata and their operational data in storage libraries. The metadata and data for Oracle Solaris zones are stored in a storage library associated with the global zone or server pool. A storage library that supports an Oracle VM Server for x86 is an Oracle VM Storage Repository.

# Roles for Storage

List of required roles for storage tasks in Oracle Enterprise Manager Ops Center.

Table 7 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 6-1    Storage Tasks and Roles*

| Task | Role |
| --- | --- |
| Create a new storage library | Storage Admin |
| Remove a storage library | Storage Admin |
| Edit attributes of a storage library | Storage Admin |
| Add storage capacity | Storage Admin |
| Update a storage appliance | Update Admin |

# Actions Available for Storage

List of available operations in Oracle Enterprise Manager Ops Center.

You can perform the following actions, depending on the requirements.

- Create new storage libraries, either as a file system or as block storage.

- Modify existing storage libraries. You can change the library's attributes or add capacity.

- Update storage appliances.

The set of available actions depends on what you have selected:

- When you select a physical asset, you can launch the asset's user interface and view information about the hardware's state and configuration.

- When you choose an asset in the File Server group, the Filesystems tab in the center pane lists all of the file systems with the **Add a Backing Device** icon, the **Edit** icon, and the **Delete** icon.

- When you choose an asset in the Storage Array group, the Logical Units tab gives you access to the **Create Logical Unit** icon, the **Resize LUN** icon, the **Delete LUN** icon, and the **Clone LUN** icon.

# Location of Storage Information in the User Interface

Lists the navigation instructions to locate storage information in Oracle Enterprise Manager Ops Center.

Table 6-2 shows where to find information.

***Table 6-2    Location of Library Information in the BUI***

| Object | Location |
| --- | --- |
| To see the storage libraries | Expand **Libraries** in the Navigation pane, then expand **Storage Libraries**. |
| To see storage hardware information | Expand **All Assets** in the Navigation pane, then scroll to the Storage section. Select a physical asset to see information about it in the center pane. |
| To see groups of storage arrays or file servers | Expand **All Assets** in the Navigation pane, then **Storage** in the Resource Management Views section. |
| To see storage profiles | Expand **Plan Management** in the Navigation pane, then click **Profiles and Policies**. The Discovery, RAID Controller, and Update Storage Appliance categories contain profiles. |
| To see the virtual host that is using a LUN | Expand **Libraries** in the Navigation pane, then expand **Storage Libraries**. Select the **storage library** to view the LUNs table in the center pane. The Allocated To field displays the virtual host's identifier. |
| To see the virtualization host that is using a storage library | Expand **Libraries** in the Navigation pane, then expand **Storage Libraries**. Select the **storage library** to view the Summary tab in the center pane. The IP address of the virtualization host is in the Allocated To field. |
| To see incidents for a storage library | Expand the **Message Center** in the Navigation pane. For more information about recovering from incidents, see the *Oracle Enterprise Manager Operations Reference*. |

## Storage Libraries

Describes the role of storage libraries in Oracle Enterprise Manager Ops Center.

- About Storage Libraries for Virtualization Hosts

- About Storage Libraries for Server Pools

- Storage Libraries for a Virtual Datacenter

- Storage Libraries for Oracle Solaris Zones

- Storage Libraries for Oracle VM Server for SPARC

- About Storage Libraries and Repositories for Oracle VM Server for x86

A storage library stores metadata for each virtualization host in the server pool that is associated with the storage library. Metadata is a virtualization host's image or identity: the configuration for its operating system, CPU, memory, and network. The virtualization host's data, which results from its use, can reside in the same storage library or in a different storage library. A storage library can be a local, that is, a file system on the virtualization host's server, or it can be accessed through an NFS server or SAN network.

When you create a virtual host, you assign it to one of the storage libraries associated with its virtualization host so that its metadata can be stored.

- For the metadata of its local virtual hosts, virtualization hosts (Oracle VM Server for SPARC, Oracle VM Server for x86, and global zones) can use a local storage library. However, storing metadata in a local storage library limits the management of the virtual host because this virtual host cannot be migrated to another server and cannot be recovered on another server if it fails.

- For the metadata of all virtual hosts, virtualization hosts must use a Network Attached Storage (NAS) storage library.

- For data, Oracle VM Server for SPARC and Oracle VM Server for x86 can use either NAS shares or SAN LUNs for itself and for its virtual hosts. A global zone can use SAN LUNs for itself and for its non-global zones. The storage library must be associated with the virtualization host.

The diagram in Figure 6-1 shows how the NAS and SAN storage libraries and virtualization hosts interact with LUNs.

- SAN storage libraries expose data as virtual disks (LUNs), identified by their LUN GUIDs. A control domain makes raw partitions available to its logical domains using Fibre Channel or iSCSI, as described in About Block Storage

- NAS storage libraries expose data as raw files and files in VMDK format. All types of virtualization hosts store metadata using NFS services, as described in About Storage Libraries for Virtualization Hosts

**Figure 6-1    SAN and NAS Storage Libraries**
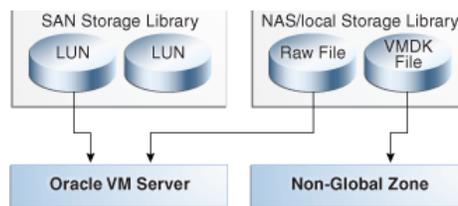


The LUNs, raw files, and raw volumes store data and metadata for the virtual hosts. Figure 6-1 expands the previous figure to show that the metadata for NAS virtual disks are stored in the NAS storage library. Metadata for SAN virtual disks is persisted in the SAN Storage Library.

**Figure 6-2    Storage Library Metadata**
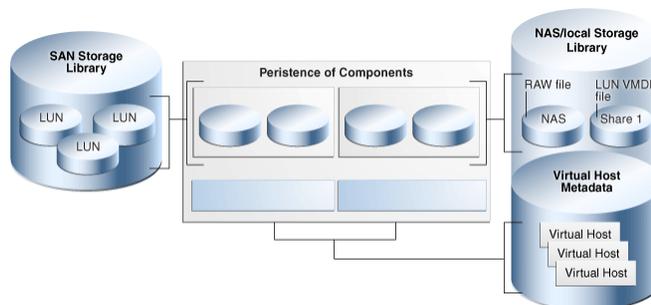


Ensure that the LUNs used by a Brownfield guest are not allocated to another guest. If the Brownfield guest discovery is done in a very close proximity to a network outage or iSCSI discovery or any other action that might cause the disks to be invisible to Ops Center, the disks coming from Brownfield guests might be detected as opaque and could be allocated to another guest.

## About Storage Libraries for Virtualization Hosts

Describes NAS storage libraries using NFS services in Oracle Enterprise Manager Ops Center.

Network-attached-storage (NAS) libraries are storage libraries for NFS storage device mount points. Virtualization hosts use NFS services to attach to the storage libraries and get access to their data and metadata.

You can store metadata for all virtual hosts in one NAS storage library or you can create separate storage libraries for each virtual host. Use separate storage libraries to increase ease of access, to increase capacity, and to increase performance.

If a NAS storage library becomes unavailable, the virtual hosts associated with the library are affected in the following ways:

- If the storage library is used for the virtual hosts' metadata, a virtual host continues to function but Oracle Enterprise Manager Ops Center can no longer manage the virtual host. Because Oracle Enterprise Manager Ops Center relies on its interaction with the metadata in the storage library, jobs that must read or modify the metadata fail. You must manage the virtual host manually.

- If the storage library is used for NFS large files that support virtual disks, the virtual host does not function.

- If the boot disk is on the NFS share, the virtual host cannot be rebooted.

- The virtual host cannot be migrated.

## About Storage Libraries for Server Pools

Describes the use of storage libraries in server pools in Oracle Enterprise Manager Ops Center.

You group virtualization hosts to create a server pool. The virtualization hosts share all the storage and networks associated with the server pool. When you add a virtualization host to a server pool, the libraries associated with that virtualization host become available to all the other hosts in the server pool.

To delete a storage library or the storage hardware asset that supports the storage library, you must remove its associations. Use the **Disassociate Library** icon in the Libraries tab to disassociate the library from the server pool.

A server pool must use a NAS storage library. Figure 6-3 shows how virtualization hosts in a server pool get access to storage resources through the storage libraries.

*Figure 6-3   External Storage*
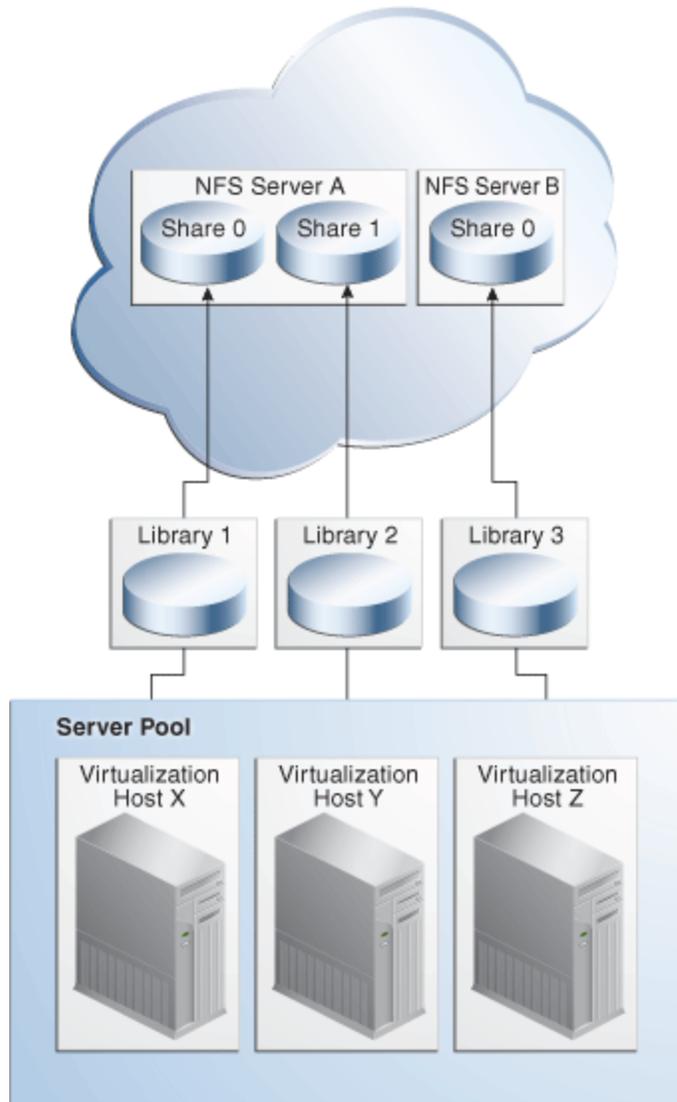


## Storage Libraries for a Virtual Datacenter

Description of the role and purpose of storage libraries and repositories in Oracle Enterprise Manager Ops Center.

The vDC inherits the storage resources allocated for the server pool, as described in Setting Up Storage Resources. For each account, the amount of storage used by the guests is shown on the Account's Dashboard tab. In the Resource Allocation section of the dashboard, the Storage graph shows the number of guests and the used space in gigabytes. The scale for the x-axis of the graph is adjusted according to amount of space allocated to guests. In Figure 6-4, one guest is allocated 14 GB of space so Oracle Enterprise Manager Ops Center uses 14 as the midpoint of the x-axis.

*Figure 6-4    Graph of Guest Storage Resource Allocation*
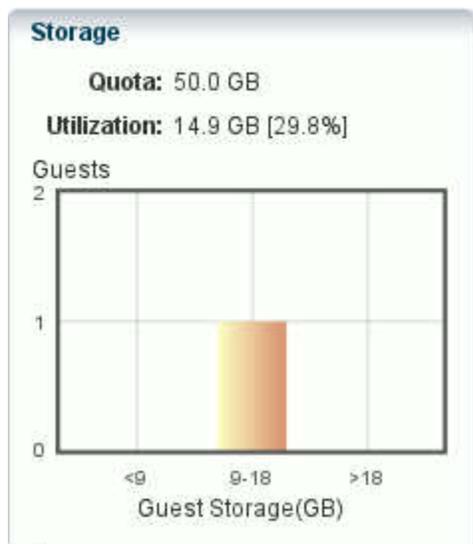


## Storage Libraries for Oracle Solaris Zones

Description of the role and purpose of storage libraries and repositories in Oracle Enterprise Manager Ops Center.

A global zone provides storage resources to its non-global zones. The Oracle Solaris Zone must be associated with a storage library. See "Associating a Storage Library with a Global Zone" in *Oracle Enterprise Manager Ops Center Virtualization Reference.*

## Storage Libraries for Oracle VM Server for SPARC

Description of the role and purpose of storage libraries and repositories in Oracle Enterprise Manager Ops Center.

The control domain provides storage resources to its logical domain. The control domain must be associated with a storage library. See "Associating Storage Library with the Domains" in *Oracle Enterprise Manager Ops Center Virtualization Reference*.

## About Storage Libraries and Repositories for Oracle VM Server for x86

Description of the role and purpose of storage libraries and repositories in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center provides option to create Oracle VM Storage Repositories. This type of storage library stores virtual machine metadata, templates, assemblies, ISO images, and virtual disks for the Oracle VM Server for x86.

When you create the storage repository on a LUN, it is a block-based repository. When you create the storage repository on a NFS file server, it is a NFS-based storage repository.

### Creating an Oracle VM Storage Repository

Procedure for creating the repository for Oracle VM templates in Oracle Enterprise Manager Ops Center.

1.  Expand **Libraries** in the Navigation pane.

**2.** Select **Storage Libraries**.

**3.** Click **New Oracle VM Storage Repository**.

**4.** Enter a name and description for the repository and choose either the NFS or OCFS protocol. Click **Next.**

**5.** From the drop-down lists, choose the Oracle VM Manager and the Oracle VM Server for x86 that use the storage repository, and the NFS File Server that supports the storage repository.

**6.** Choose the file system on the NFS file server for the storage repository and specify the share name. Click **Next**.

**7.** Choose the server pool to associate with the storage repository. Click **Next**.

**8.** Review the configuration and then click **Finish** to submit the job.

### Uploading Templates and Assemblies to an Oracle VM Storage Repository

Procedure for adding content to the Oracle VM Storage Repository in Oracle Enterprise Manager Ops Center.

**1.** Expand **Libraries** in the Navigation pane.

**2.** Select **Storage Libraries**.

**3.** Select the Oracle VM Storage Repository.

**4.** Click **Import Image** in the Actions pane.

The Import Image window is displayed.

*Figure 6-5   Import Image*



5. Identify the type of format for the image, either Assembly Template or Oracle VM Template.

6. Identify the current location of the image file. If the image file is located in an accessible location, enter the name of the directory or use the **Browse** button to navigate to the location.

7. Select the image you want to import.

8. Enter a name for the image and a description. Image names must be unique, can consist of up to 100 characters, and can include numbers, letters, and some special symbols. The following special symbols are prohibited: comma, asterisk, single quote, double quote, parenthesis, question mark, equal sign, and newline.

9. Click **Import Image** to copy the image to the library.

# Types of Storage for Libraries

List types of storage in Oracle Enterprise Manager Ops Center.

**Topics for Filesystem Storage Libraries**

- About File Systems Libraries

- Viewing Local Libraries

- Editing the Attributes of a Local Library

- Creating a Local Library

- Deleting a Local Library

**Topics for Block Storage Libraries**

- About Block Storage

- About Dynamic Block Storage

- About Static Block Storage

- Comparison of Actions in Static and Dynamic Libraries

- LUN Identification

- Selecting LUNs

- Adding Capacity to Dynamic Block Storage Libraries

- Adding LUNs to a Block Storage Library Manually

- Adding Storage to a Logical Domain

- Moving a LUN

- Creating a LUN

- Cloning a LUN

## About File Systems Libraries

Describes local libraries in Oracle Enterprise Manager Ops Center.

Each virtualization host has a default local library named `/guests` where data and metadata for each virtual host is stored. For the purposes of storage efficiency and your site's organization, you can create and maintain other local libraries.

If the storage library becomes unavailable, the local library remains available. However, any guest with metadata in a local library cannot be migrated.

### Viewing Local Libraries

Procedure displaying the local libraries used by virtualization hosts and their guests in Oracle Enterprise Manager Ops Center.

Use this procedure to see the local libraries for a virtual host and the contents of a library. You can also see details of the local disks that support the local libraries.

1. Expand **Assets** in the Navigation pane.

2. Select the virtual host.

3. Click the **Libraries** tab in the center pane. The Associated Libraries table's Type column identifies the libraries of the Local type.

4. Select a library of the Local type. The Usage table shows all the guests that use that local library.

5. In the Usage table, select a guest.

6. Click the **Contents** tab to see the Library Contents table with all of the images, sorted by type.

7. To see details of the local disks, return to the Associated Libraries table and click **Local Devices**. Then select the local device library.

When you add new disks, use the **Refresh** icon to include them in the table of disks.

### Editing the Attributes of a Local Library

Procedure for changing the characteristics of a local library in Oracle Enterprise Manager Ops Center.

You can rename a local library and you can change its description. You cannot change the file system defined for the local library.

1. Expand **Assets** in the Navigation pane.

2. Select the asset.

3. Click the **Libraries** tab in the center pane. The asset's associated libraries and the guests that are stored in the libraries are listed.

4. Click the **Edit Local Library** icon.

5. In the Edit Local Library pane, enter the new name or description for the library. The maximum number of characters for the library name is 30.

6. Click the **Update** button. When the job is completed, the edited local library is listed in the Associated Libraries table.

### Creating a Local Library

Procedure for creating a storage library on the Enterprise Controller in Oracle Enterprise Manager Ops Center.

Each virtual host has a local library, located at `file: ///guests`. In addition to the default local library, you can create other local libraries to use your storage resources efficiently or organize your images.

---

**Note:**

To use the Boot Environment feature of Oracle Solaris 11, the local library must be located in its own ZFS file system.

---

1. Create a file system with read/write permissions for only the root user.

2. Expand **Assets** in the Navigation pane.

3. Select the asset.

4. Click the **Libraries** tab in the center pane. The asset's associated libraries and the guests that are stored in the libraries are listed.

5. Click the **New Local Library** icon.

6. In the Create Local Library pane, type a name and description for the library. The maximum number of characters for the library name is 30.

7. In the URL field, enter the directory name for the location where you want to store images and metadata.

8. Click **Create Local Library**. When the job is completed, the new local library is listed in the Associated Libraries table.

### Deleting a Local Library

Procedure for removing a local library in Oracle Enterprise Manager Ops Center.

The default local library, /guests, cannot be deleted.

Use the **Remove Local Software Library** action to delete a local library. If the library was associated with a virtual host, the virtual host does not have any access to the directory defined for the local library or its contents. When you delete a library, the directory is not deleted.

1. Expand **Libraries** in the Navigation pane.

2. Select the library you want to delete.

3. Click **Remove Local Software Library** in the Action pane.

## About Block Storage

Describes a LUN, a slice of a storage volume.

Block storage libraries are used in SAN networks and define storage by Logical Units or LUNs, which are backed by either Fibre Channel disks or iSCSI disks. You can associate block storage libraries with server pools, Oracle VM Servers, or global zones to store their data.

A LUN (Logical Unit Number) is a slice of a storage volume, as defined by the following terms:

• Disk: Physical storage media. A set of disks is a disk array.

• Volume: An aggregation of storage space provided by several disks.

• Slice: A partition of a volume that is exposed to the servers connected to the disk array.

• LUN (Logical Unit Number): The representation of a slice.

• GUID: The Global Unique Identifier for a LUN.

If the storage array is a managed asset, the LUNs can provide dynamic storage. See "External Storage" compares static block storage libraries and dynamic block storage libraries.

### About Dynamic Block Storage

Describes what makes a block storage library dynamic.

When Oracle Enterprise Manager Ops Center can create, resize, delete, and clone LUNs, the block storage library is dynamic. When you add more virtual hosts to a server pool, you create LUNs in the storage library in the same action. When you discover a storage device with LUNs backed by iSCSI disks, a dynamic block storage library is created.

### About Static Block Storage

Describes what makes a storage library static in Oracle Enterprise Manager Ops Center.

When Oracle Enterprise Manager Ops Center manages a storage device with existing LUNs, it can use the LUNs but cannot change or delete them, or create new LUNs. These operations must be done through the storage device's user interface. A static block storage library supports storage devices that were discovered and configured in previous product software versions. Each LUN is for the exclusive use of its assigned virtual host. Because a LUN has a fixed size and cannot be shared, you must plan how to optimize the available storage in the storage library and assign a LUN of the appropriate size.

### Comparison of Actions in Static and Dynamic Libraries

Compares and contrasts the types of block storage library in Oracle Enterprise Manager Ops Center.

*Table 6-3    Comparison of Static and Dynamic Libraries*

|  | Dynamic Block Storage Library | Static Block Storage Library |
|---|---|---|
| Protocol | iSCSI | iSCSI<br>Fibre Channel |
| To create a storage library | The storage library is created implicitly when you discover storage hardware and its target groups. | You create LUNs and then create the storage library. You assign existing LUNs to the library. |
| To manage a storage library | When you add a virtual host, you can create a LUN for it. When a virtual host needs more storage, you can increase the size of the LUN.<br>Any changes made through the storage server's user interface are reflected in the Oracle Enterprise Manager Ops Center's user interface. | The number of LUNs in the storage library determines the number of virtual hosts that can use the storage library.<br>Changes made through the storage server's user interface are not updated in the Oracle Enterprise Manager Ops Center's user interface. Some information, such as a LUN's GUID can be obtained only from the storage server's user interface. |
| **Add LUN** icon | Create a new LUN. | Select an existing LUN or enter the GUID of an existing LUN. |
| **Edit LUN Details** icon | Increase the size of the LUN. | Renames the LUN in Oracle Enterprise Manager Ops Center |
| **Delete LUN** icon | Deletes the LUN and deletes the data. You are deleting the LUN on the storage server. | Deletes the LUN from the library but does not delete data. |

### LUN Identification

Lists the attributes that can be viewed or configured for LUNs in Oracle Enterprise Manager Ops Center.

You select LUNs from a list of available LUNs when you change the configuration of a storage library. Figure 6-6 shows an Available LUNs table, which lists all of the LUNs that the current virtualization hosts can access. For each LUN, the following information is displayed:

- **LUN GUID** – The unique 32-digit identifier for the LUN.

- Host information for the LUN:

&ndash; **Hostname** – Name or IP address of the host that can access the LUN.

&ndash; **Controller Number** – The host's identifier for the HBA port, which is the physical interface to the Fibre Channel disk array.

&ndash; **LUN Number** – The host's identifier for the LUN.

- **Size (GB)** – Size of each LUN in gigabytes.

*Figure 6-6    List of Available LUNs*



**Identify LUNs**

Add one or more LUNs to the library. Use Ctrl+Click and Shift+Click to select multiple LUNs

☑ **Available LUNs**

Search ▼

| LUN GUID | Hostname-Controller Number-LUN Number | Size (GB) |
|----------|---------------------------------------|-----------|
| 600144f0b38233e3000051c08b400036 | etc201-0-0 | 24 |
| 600144f0b38233e3000051ae18230018 | etc201-0-0 | 0.999... |
| 600144f0b38233e3000051c87cab0056 | etc201-0-0 | 12 |
| 600144f0b38233e3000051bf8d59002e | etc201-0-0 | 16 |
| 600144f0b38233e3000051a510a60002 | etc201-0-0 | 12 |
| 600144f0b38233e3000051b76423002b | etc201-0-0 | 12 |
| 600144f0b38233e3000051c87ce20057 | etc201-0-0 | 12 |
| 600144f0b38233e3000051ae0eca0015 | etc201-0-0 | 12 |

### Selecting LUNs

List of ways to select a LUN in Oracle Enterprise Manager Ops Center.

You select LUNs when you perform the following procedures:

- You are creating a new SAN storage library and have associated the new library with a virtualization host or server pool immediately.

- You are increasing the storage capacity of an existing SAN storage library and chose to select LUNs from the available LUNs.

You can select LUNs in the following ways:

- Enter the LUN GUID.

- Select a storage server and then select LUNs from a table of its available LUNs, that is, LUNs backed by that storage device.

- Select a storage library and then select LUNs from a table of available LUNs, that is, LUNs backed by storage assets that contribute to that storage library.

When you use a procedure that provides a table of Available LUNs, you can select more than one LUN.

### Adding Capacity to Dynamic Block Storage Libraries

Procedure for adding LUNs to a storage library in Oracle Enterprise Manager Ops Center.

If the block storage library is not associated with a server pool or virtualization host, you add storage capacity by specifying new LUNs by name. If the storage library is associated, you can also select new LUNs from a list of the LUNs available to the server pool or virtual host.

1. Expand **Libraries** in the Navigation pane.

2. Click **Block Storage** in Storage Libraries.

3. Click one of the available storage libraries.

4. Click **Add LUN** in the Actions pane.

5. Choose the method for adding LUNs:

   • To add LUNs to the library manually, accept the default option: **Manually enter the GUID/WWN of the LUNs to be added**. See Adding LUNs to a Block Storage Library Manually to complete the procedure.

   • To select LUNs from the available LUNs, click the **Select from available LUNs** option. The Available LUNs table, shown in Figure 6-6, lists all of the LUNs that the selected virtualization hosts can access.

6. Select one or more LUNs.

### Adding LUNs to a Block Storage Library Manually

Procedure for selecting LUNs to add to a storage library in Oracle Enterprise Manager Ops Center.

You use this procedure in the following situations:

• You are creating a new SAN storage library and have accepted the default action of adding LUNs later. You must add at least one LUN to create the storage library.

• You are adding a LUN to an existing SAN storage library. You selected the library and then the **Add LUN** action. The default option is to specify each new LUN by name.

The table shown in Figure 6-7 is displayed:

1. Click in the GUID/WWN field and type the GUID or WWN for the LUN. The GUID is the Global Unique Identifier associated with each LUN, which is a hexadecimal number of 32 digits. If your site uses SCSI initiators and targets, you can enter the WWN for the LUN.

*Figure 6-7   Specifying a LUN*

2. Click the first **Add** icon to include additional LUNs.

3. If you do not have the GUID or WWN, select a LUN from the list of available LUNs. Click the second **Add** icon to see a list of managed storage assets as shown in Figure 6-8.

*Figure 6-8    Specifying an Exported LUN*
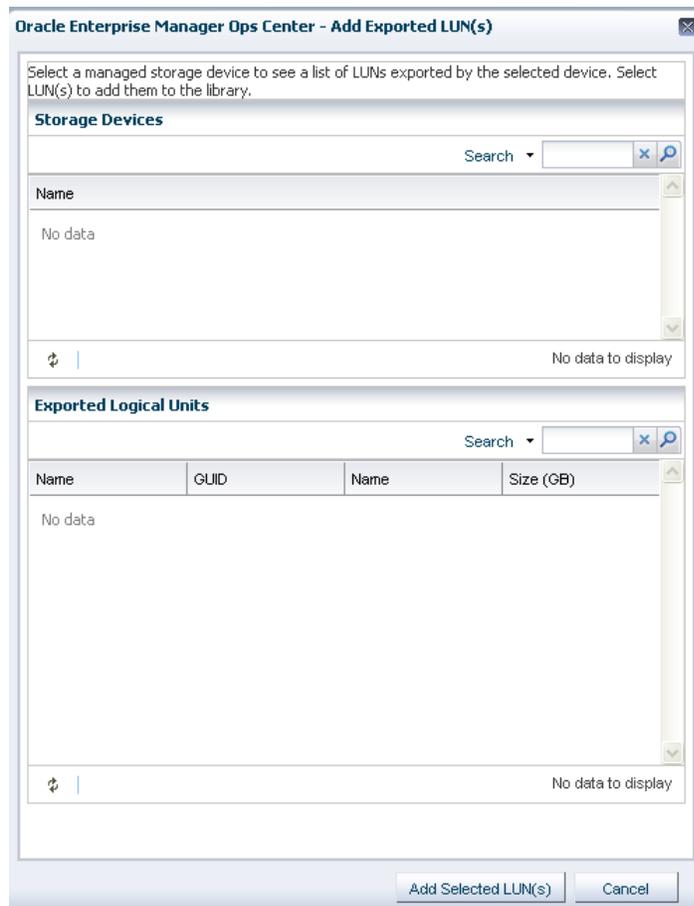


4. Select one of the storage assets to populate the list of exported LUNs on that device.

5. Select the LUNs to use in the library. Use the Search box to locate a specific LUN.

6. Click **Add Selected LUNs**.

   If you are adding a LUN to an existing storage library, a new job starts. If you are creating a SAN storage library, review the details of the LUNs you have configured in the Summary pane and click **Finish.**

### Adding Storage to a Logical Domain

Procedure for in Oracle Enterprise Manager Ops Center.

When a logical domain is created, it is assigned storage resources for its metadata and operational data. You can add storage for the use of the logical domain by selecting additional virtual disks or LUNs from the storage library.

1. In the Asset section of the Navigation pane, select the logical domain.

2. In the center pane, click the **Storage** tab.

**3.** In the table of virtual disks or LUNs, click the **Add Storage** icon.

The Add Storage wizard opens. The list of libraries includes all storage libraries that are available to the logical domain.

*Figure 6-9    Adding LUNs*
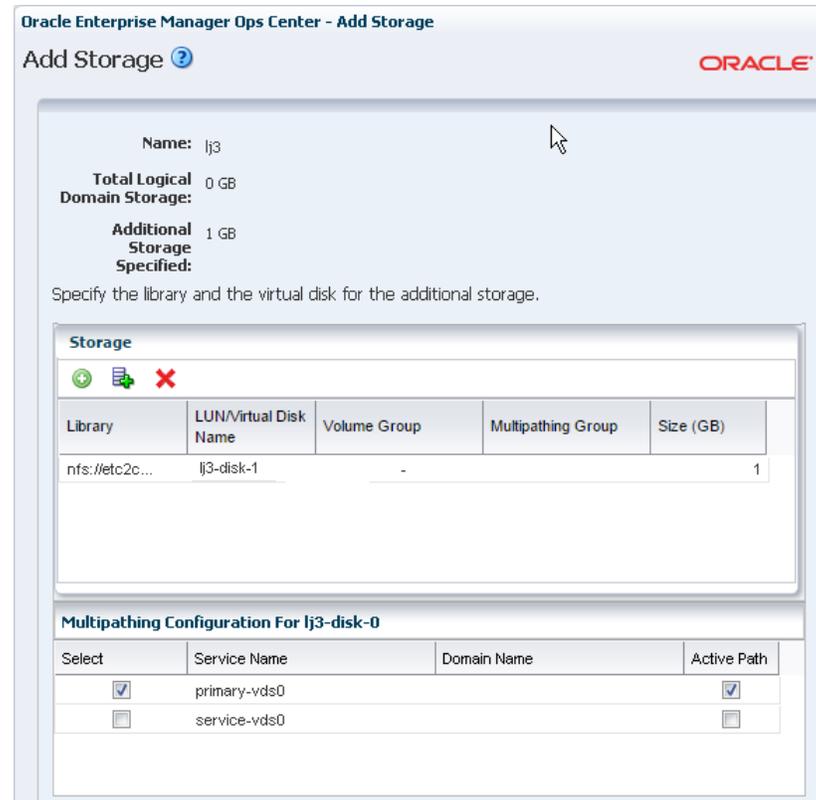


**4.** Select the library. For a filesystem storage library, you can create a new virtual disk with the size you specify. For a static block storage library, choose a LUN from the list of available LUNs. The size of the LUN is fixed. For a dynamic block storage library, select one of the existing LUNs of a fixed size or create a new LUN with the size you specify.

**5.** Select the LUN or virtual disk. As you select them, the value in the Additional Storage Specified field increases.

If you have many LUNs to manage, you can click the **Add Multiple SAN LUNs** icon, as show in Figure 6-10.

**6.** You have the recommended option of enabling multipathing by specifying an alternate path to the virtual disk or LUN. Select at least two service domains.

**7.** Click one of the paths as the Active Path. This is the default path.

**8.** Click in the Domain Name field for each path to create a name or allow Oracle Enterprise Manager Ops Center to create one.

**9.** Click **Finish**. When the job is complete, the additional LUNs are listed in the table on the Storage tab of the logical domain.

The **Add Multiple SAN LUNs** action provides a convenient way to manage many LUNs or virtual disks.

1. Select a logical domain and the **Add Storage** action, as you did in the previous procedure. Then click the **Add Multiple SAN LUNs** icon.

   *Figure 6-10    Adding Multiple SAN LUNs*
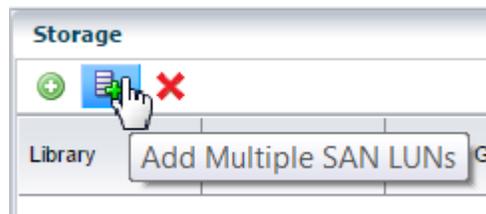
   

2. In the Select SAN LUNs window, select a SAN storage library to show its available LUNs. This example shows that the `test1` library has been selected. You can use the Search field to limit the list of LUNs.

   *Figure 6-11    Adding Multiple SAN LUNs*
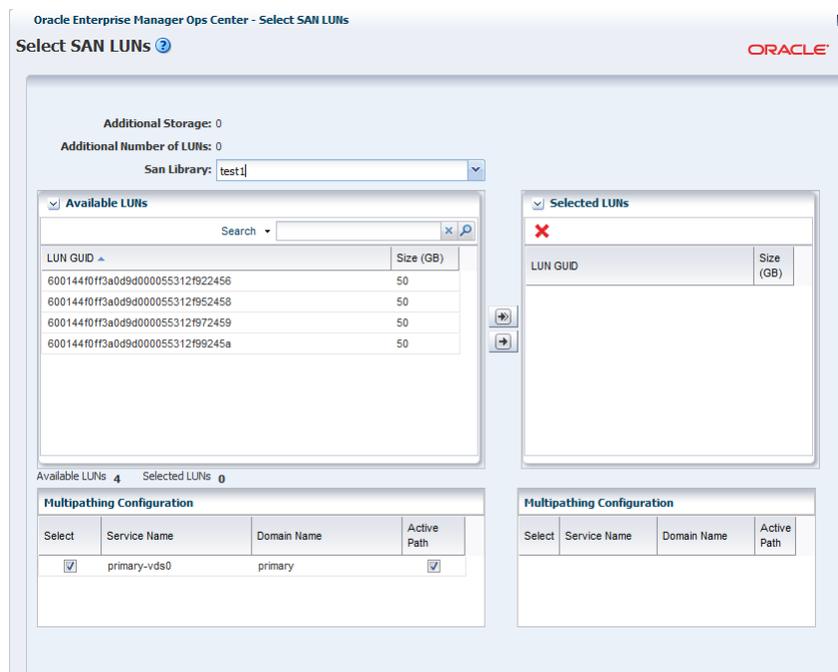
   

3. In the Available LUNs table, select a series of LUNs and then click the right-arrow button to display them in the Selected LUNs table. To select all of the LUNs, click the double-right-arrow button.

   As you select LUNs, the Selected LUNs counter increases. As you specify LUNs by clicking the arrow button, the Additional Storage counter and the Additional Number of LUNs counter increase.

4. You can configure multipathing on all the selected LUNs at the same time. Select one or more paths to these LUNs by selecting multiple service domains. Identify one path as the Active Path, the default path.

5. Click **Finish**. When the job is complete, the additional LUNs are listed in the table on the Storage tab of the logical domain.

### Moving a LUN

Procedure for moving a LUN to another library in Oracle Enterprise Manager Ops Center.

In the course of managing LUNs and creating libraries, it can become convenient to move a LUN from one storage library to another storage library. This change can be made without interrupting the assets that are associated with storage library if the assets are able to access both the source and the target library.

1. Expand **Libraries** in the Navigation pane.

2. Click **Block Storage** in Storage Libraries.

3. Click the storage library that contains the LUN.

4. In the center pane, select the LUN to move.

5. Click **Move LUN** icon.

*Figure 6-12   Move LUN Icon*
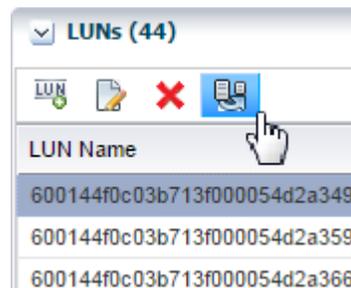


6. The Move LUN window shows the selected LUN and the guests that use it. In the **Library to move** list, select the target storage library.

*Figure 6-13 Move LUN Icon*
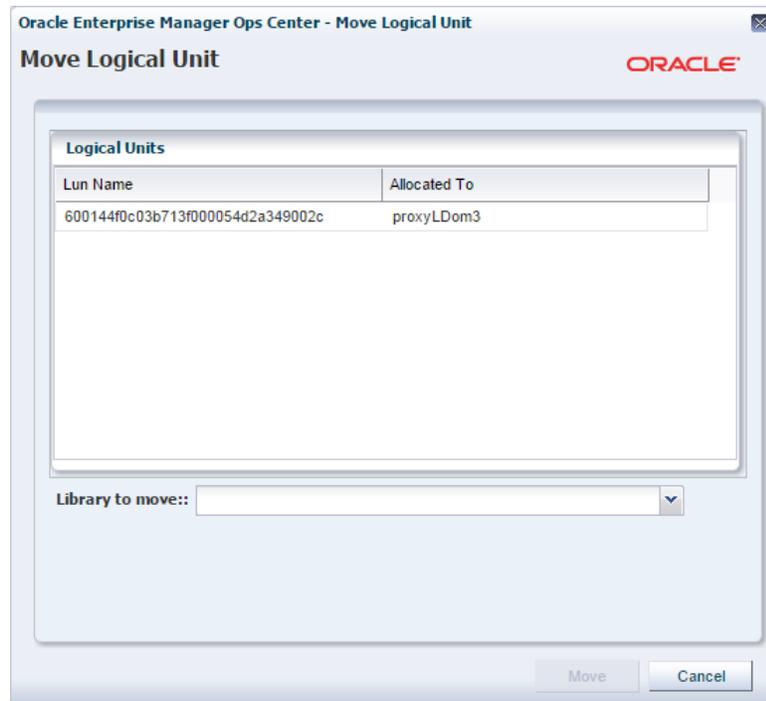


**7.** Click **Move**.

## Creating a LUN

Procedure for creating a LUN from a storage volume in Oracle Enterprise Manager Ops Center.

In a dynamic block storage library, you can create a new LUN.

**1.** In the Asset section of the Navigation pane, select an asset in the Storage Array Group.

**2.** In the center pane, click the **Logical Units** tab.

**3.** Click the **Create Logical Unit** icon.

*Figure 6-14   Creating a LUN*



4. Enter the name and size for the new LUN.

5. Click **Create.**

## Cloning a LUN

Procedure for copying a LUN from an existing LUN in Oracle Enterprise Manager Ops Center.

In a dynamic block storage library, you can make a copy of a LUN.

1. In the Asset section of the Navigation pane, select an asset in the Storage Array Group.

2. In the center pane, click the **Logical Units** tab.

3. Select the LUN to copy.

4. Click the **Clone LUN** icon.

*Figure 6-15    Cloning a LUN*
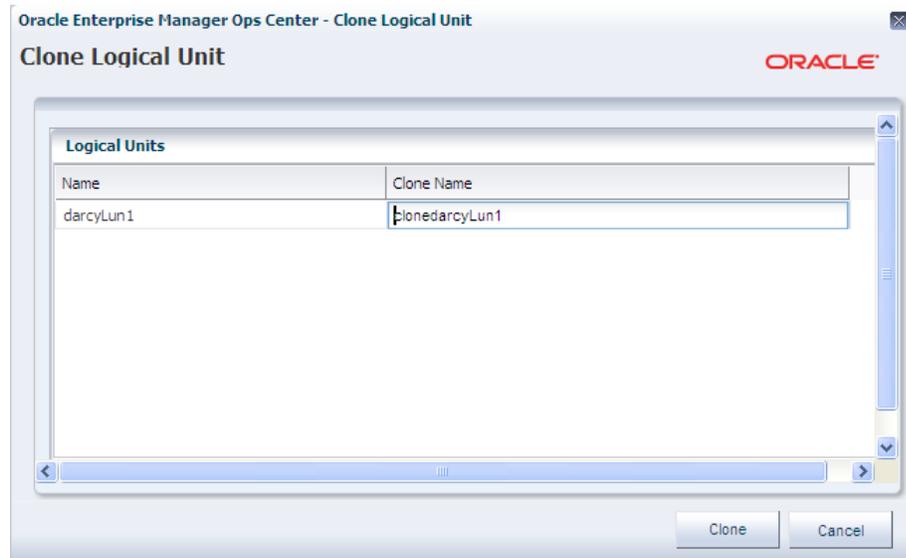


**5.** Enter the name and size for the new LUN.

**6.** Click **Clone.**

### Deleting LUNs

Procedure for removing one or more LUNs from a library in Oracle Enterprise Manager Ops Center.

**1.** Expand **Libraries** in the Navigation pane.

**2.** Click **Block Storage** in Storage Libraries.

**3.** Click the storage library that contains the LUN.

**4.** In the center pane, select the LUN to delete.

- You can click on the Allocated To title to sort the list of LUNs to see the unallocated LUNs.

- Use Ctrl+Click to select more than one LUN.

**5.** Click **Delete** button.

**6.** In the Delete Logical Unit window, review your selections and click the **Delete** button to confirm.

The selected LUNs are removed from the library.

## About Oracle VM Storage Connect Plug-ins

Description of plug-ins used to get access to storage devices in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center shares the capability of Oracle VM Manager to manage storage devices of various vendors. Oracle VM Storage Connect is an application programming interface (API) that exposes the storage device's features and attributes to Oracle Enterprise Manager Ops Center.

## Displaying Storage Connect Plugins

Procedure for viewing the Storage Connect plugin software in Oracle Enterprise Manager Ops Center.

After the plugin is installed on the Proxy Controller that supports the storage device, the storage device can be managed through the Oracle Enterprise Manager Ops Center's user interface. When you create a discovery profile for storage, the Targets step lists the plug-ins installed on the Proxy Controller.

Use the following procedure to see the plug-ins that have been installed:

1. Expand **Administration** in the Assets pane.

2. Select **Enterprise Controller**.

3. Click the **Proxy Controllers** tab in the center pane.

4. Select one of the Proxy Controllers.

5. Click the down-arrow icon, located in the title bar of the display and shown in Figure 6-16.

*Figure 6-16   Proxy Controllers*



The center pane displays the Installed Storage Connect Plugins table, as shown in

*Figure 6-17   Storage Connect Plugins*



6. For information about one of the plugins, select the plugin and the click **View Plugin Details** icon

## Adding a Storage Connect Plugin

Describes the purpose of the Storage Connect Plugin software.

Oracle Enterprise Manager Ops Center uses the same plugins as Oracle VM Manager. The plug-in software is available from the vendor and from Oracle's site, `http://www.oracle.com/us/technologies/virtualization/storage-connect-partner-program/overview/index.html`.

Install the plug-in in Oracle VM Manager software, according to the vendor documentation.

# Storage Hardware

Overview of types of storage hardware.

The storage features are supported by various types of storage devices. The tabs in the center pane contain specific information about each type.

**Topics**

- RAID Controller

- About NAS Storage Appliance

- File Server

- Storage Array

- Storage Server: Oracle ZFS Storage Appliance

- Storage Server: Exadata

## RAID Controller

Lists the information that RAID Controllers report to Oracle Enterprise Manager Ops Center.

RAID Controllers embedded in other types of storage report the following in addition to the hardware information:

- RAID Volumes

- RAID Levels

- Stripe size

- Number of disks

## About NAS Storage Appliance

Description of the supported NFS service in Oracle Enterprise Manager Ops Center.

Software and Storage Libraries can reside on the shares of an NFS server. Because the Enterprise Controller does not mount the NFS share, use an NFS server on a system that is close to the systems where the NFS share must be used, that is, the systems on which the virtualization hosts reside. The systems on which the Enterprise Controller and virtualization hosts reside must be able to write to the NAS shares as root and the files must be owned by root.

The procedure for setting up the share for a library depends on several site-specific factors such as the version of NFS protocol and name service management. The example in this section provides one method of configuring the share on an NFS server running on the Oracle Solaris 10 operating system. See *Managing Network File Systems* at `http://docs.oracle.com/cd/E26502_01/html/E28997/index.html` for the information about the Oracle Solaris 11.1 procedure.

### Setting Up a Share on an NFS Server

Procedure for configuring an NFS share for use by a library in Oracle Enterprise Manager Ops Center.

1. On the NFS server, edit the `/etc/dfs/dfstab` file.

2. Add an entry to share the directory with share options that enable the NFS clients to have read and write root-level access to the share, such as:

   ```
   share -F nfs -o rw,root=<access_list> -d "<description>" /<directory>
   ```

   where *<access_list>* specifies the clients that can access the share as the root user, *<description>* is text to identify the purpose of the share, and *</directory>* identifies the directory that you want to share on the NFS server. For example, to allow root access to the `/export/lib/libX` directory for all systems on the 192.168.1 subnet, add the following entry:

   ```
   share -F nfs -o rw,root=@192.168.1 -d "Share 0" /export/lib/libX
   ```

   See the `share_nfs(1M)` man page for information about NFS share options, and how to specify the access list.

3. Share the directory and verify that the directory is shared. For example:

   ```
   # share export/lib/libX
   # share
   -                 /export/lib/libX   rw,root=@192.168.1 "Share 0"
   ```

After setting up a share on the NFS server, prepare the NFS client to mount the share.

### Setting Up an NFS Client

Procedure for preparing an NFS share for use by a library in Oracle Enterprise Manager Ops Center.

1. On each NFS client, edit the `/etc/default/nfs` file.

2. Locate the `NFSMAPID_DOMAIN` variable and change the variable value to the domain name.

3. Verify the NFS share is visible on the client.

   ```
   # showmount -e <server-name>
   export list for <server-name>:
   /export/virtlib/lib0 (everyone)
   ```

To create a storage library, see the *Configuring NAS Libraries* How To document.

## File Server

Lists the information about file servers that is collected in Oracle Enterprise Manager Ops Center.

For file-based storage devices such as NAS appliances and other NFS devices, Oracle Enterprise Manager Ops Center reports the following in addition to hardware information:

- File systems – The location in the file system hierarchy that is presented as a physical device. For example, an NAS share.

- Backing Devices – The physical device that supports a file system. For example, a RAID disk.

## Storage Array

Describes the requirements for discovering and using a storage array's storage volumes and LUNs in Oracle Enterprise Manager Ops Center.

For block-based storage such as iSCSI SAN and Fibre Channel SAN devices, the storage array assets include the following tabs in the center pane:

- Volume Groups – Indicates a collection of physical disks or portions of physical disks.

- Logical Units (LUN) – Virtual disks created from the volume groups.

For a storage server and Oracle Enterprise Manager Ops Center to identify each other as eligible initiators and targets, each one's Fibre Channel World Wide Number (WWN) or iSCSI IQN must be registered with the other one. To create LUNs and make them available to Oracle Enterprise Manager Ops Center, see the storage server's documentation for instructions and *Oracle Solaris 11.1 Administration: SAN Configuration and Multipathing* at `http://docs.oracle.com/cd/E26502_01/html/E29008/index.html` for the procedures to perform the following:

- **Configure the initiator and the targets.** The initiator (Oracle Enterprise Manager Ops Center) must be able to recognize the targets (LUNs) and the targets must be able to recognize the initiator. Oracle Enterprise Manager Ops Center recognizes the targets because the WWNs of the storage server are recorded when the storage server is discovered. Any LUNs that have been assigned to that WWN are eligible to be used in a storage library. On the storage server, you must specify Oracle Enterprise Manager Ops Center's WWN as an initiator and assign LUNs to that initiator.

- **Enable multipathing on the Fibre Channel ports.** To use LUNs backed by Fibre Channel disks, you must enable multipathing on the Fibre Channel storage device or on its individual ports. Multipathed I/O (MPxIO) allows I/O devices to be accessed through multiple host controller interfaces. Multipathing is enabled by default on Oracle Solaris x86-based systems, but is disabled by default on Oracle Solaris SPARC-based systems. Use the `stmsboot -e` command to enable multipathing.

- **Create new LUNs.** It can take several hours for a new LUN to be displayed in Oracle Enterprise Manager Ops Center's user interface.

## Storage Server: Oracle ZFS Storage Appliance

Describes Oracle's ZFS storage appliance in Oracle Enterprise Manager Ops Center.

See the Oracle ZFS Storage Appliance documentation for specific information about the storage appliance. To view the *Sun ZFS Storage 7000 System Administration Guide*, log in to the Unified Storage System software interface and click **Help** in the top right corner of any screen.

This type of storage appliance contains a service processor, which must also be discovered. See "About the Oracle ZFS Storage Appliance" for this procedure.

### Actions for the Oracle ZFS Storage Appliance

Lists the device-specific actions that can be performed for the Oracle ZFS Storage Appliance in Oracle Enterprise Manager Ops Center.

After the storage appliance is discovered, you can manage it as you do other assets with the additional capabilities that the Oracle ZFS Storage Appliance provides. From the Oracle Enterprise Manager Ops Center UI, you can launch the storage appliance's UI. Use the following commands in the Action pane, to launch a specific page of the appliance's user interface. For each one, enter the credentials for the appliance and then perform the appliance tasks.

- **Launch Appliance UI** opens a new browser window or tab for the main page.

- **Launch Detailed Dashboard** opens a new browser window or tab for the status page.

- **Launch Analytics** opens a new browser window or tab for the dynamic analysis page.

- **Manage Shares** opens a new browser window or tab for the share configuration page.

- **Manage Services** opens a new browser window or tab for the data services configuration page.

### Volume Capacity

Lists the attributes of a storage volume in Oracle ZFS Storage Appliance that can be viewed in Oracle Enterprise Manager Ops Center.

The Oracle ZFS Storage Appliance product uses the term `project` to indicate a volume group. The Oracle ZFS Storage Appliance reports its current capacity to Oracle Enterprise Manager Ops Center, where it is displayed on the Dashboard.

- Allocated Size is the sum of all allocated space to LUNs and files systems in the select project or volume group.

- Total Size is the quota of the project or volume group. If no quota has been specified, the Total Size is the same as the Total Storage Space, which is all space reserved for other project/volume group quotas.

- Free Size is the Total Size - Allocated Size

- Used Size is the sum of the used space in all LUNs/files systems in the selected project/volume group

### Auto Service Requests for the Oracle ZFS Storage Appliance

Description of the special case of the Oracle ZFS Storage Appliance for ASR in Oracle Enterprise Manager Ops Center.

Oracle ZFS Storage Appliances have the capability to contact My Oracle Support, to provide analytic data, and to generate Oracle Auto Service Requests (ASR). The capability does not conflict with Oracle Enterprise Manager Ops Center's capability to create ASRs. If you prefer, exclude an Oracle ZFS Storage Appliance from Oracle Enterprise Manager Ops Center's communication with My Oracle Support by using the blacklisting option described in the *Oracle Enterprise Manager Ops Center Administration*.

### Provisioning and Updating an Oracle ZFS Storage Appliance

Procedures for upgrading and downgrading the firmware of an Oracle ZFS Storage Appliance using Oracle Enterprise Manager Ops Center.

> **Note:**
>
> You update the storage appliance using a provisioning profile and deployment plan. The **Update Firmware** action is not available.

1. Download the appliance update from My Oracle Support and uncompress the file to obtain the image for the appliance update.

2. Upload/import the appliance update image into a software library and accept the default action of creating a profile for this image.

3. Create a plan from the Update Storage Appliances plan template. Select the software library and then select the profile for the image.

4. To apply the deployment plan, select the plan and then select the storage appliances to update.

If it is necessary to downgrade a storage appliance, use the following procedure:

1. Expand Assets and then Storage in the Navigation pane.

2. Select the storage appliance.

3. Click the **System Details** tab in the center pane.

4. In the Appliance Updates table, select the update to remove.

5. Click the **Rollback Appliance Software** icon.

6. Confirm the action to submit the job.

## Storage Server: Exadata

Describes discovery of the Exadata Storage Server in Oracle Enterprise Manager Ops Center.

The Oracle Exadata Storage Server is a fast, high-capacity storage server. Each server has 12 disks connected to a storage controller. Exadata has three disk groups that span all of the disks so that each physical disk is in each disk group. Having all physical disks participating in data retrieval and storage maximizes performance.

In addition to discovering standalone systems, Oracle Enterprise Manager Ops Center discovers the Exadata Storage Server and its disks when it manages an Oracle SPARC SuperCluster. See *Oracle Enterprise Manager Ops Center Operations for Oracle SuperCluster Reference* for more information.

## About Opaque Storage and Opaque Filesystems

Description of storage that is in use but not managed by Oracle Enterprise Manager Ops Center.

When a virtual host, managed by Oracle Enterprise Manager Ops Center, uses storage resources that are not managed, Oracle Enterprise Manager Ops Center cannot retrieve information about the storage resources. The storage is opaque.

In versions before Release 12.2.0.0, Oracle Enterprise Manager Ops Center could not monitor opaque storage or filesystems and no operations could be performed. In this release, when Oracle Enterprise Manager Ops Center discovers a virtualization host or virtual host, the product software can also identify the virtual disks in use. For Oracle VM Server for SPARC and Oracle VM Server for x86, the storage remains opaque until you perform one of the following:

- You enable sharing on the virtual disk in a shared storage library. The opaque disk or filesystem can be shared among Oracle VM Servers.

- If the virtual host gets access to storage through a SAN, you can add the opaque LUN to the virtualization host's SAN storage library. Oracle Enterprise Manager Ops Center manages the LUN as a raw disk.

> **Note:**
>
> Oracle Enterprise Manager Ops Center makes a distinction between "shared storage" and "sharable storage."
>
> - Shared storage: You inform Oracle Enterprise Manager Ops Center that the opaque disk is accessible through the storage library. You declare the disk as shared, using the **Enable Sharing** action.
>
> - Sharable storage: You can attach the same disk to more than one virtual host. The disk is sharable storage.

## Declaring a Logical Domain's Opaque Storage as Shared

Procedure enabling shared storage for a logical domain in Oracle Enterprise Manager Ops Center.

1. Select the Oracle VM Server for SPARC in the Assets tree.

2. Select the logical domain that uses the opaque disk.

3. Click the **Storage** tab. For each opaque disk, the entry in the Disk Type column is `opaque` and the entry in the Shared column is empty.

4. Select the disk.

5. Click the **Enable Sharing** icon and then confirm that you want the storage to be shared.

*Figure 6-18   Enable Sharing on a Virtual Disk*



When the job is completed, the entry for the virtual disk's Shared column has a check symbol.

*Figure 6-19    Shared Virtual Disk*



## Storage Profiles

List of default profiles for maintaining or configuring storage devices in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center provides default profiles for the following operations:

- Configuring RAID Controllers

- Updating the Oracle ZFS Storage Appliance

## About Multipath Storage for Logical Domains

Describes redundant paths to storage for logical domains in Oracle Enterprise Manager Ops Center.

Logical domains use storage libraries to store their metadata and their operational data. The path to the storage consists of the following:

- Name of virtual disk

- Name of the backing device such as the LUN or raw file.

Creating more than one path from a logical domain to its storage ensures that the logical domain can continue to operate if one path is not accessible. Using multiple I/O Domains provides this redundant access. The path to the storage then consists of the following:

- Name of I/O Domain

- Name of virtual disk

- Name of the backing device such as the LUN or raw file.

The control domain and the I/O Domain must have access to the same LUNs. The operation requires Oracle Solaris MPxIO.

To create multipathed storage for a logical domain, select the logical domain's Storage tab and click the **Add Storage** icon. To add a path to a logical domain's existing storage, click the **Edit Storage** icon.

When you create a SAN storage library, you have the option to enable multipathed storage for guests of Oracle VM Servers. The Identify Library Associations step of the New SAN Storage Library wizard includes the **LUNs sharing to LDOMs** option.

**Figure 6-20    Sharing Option in SAN Storage Library**

**Identify Library Associations**

The new library can be used by any virtualization host or server pool. You can associate the new library now or at a later time. If you associate the new library now, the following steps will provide an option to select logical units (storage volumes) that should be contained in this library. Select at least one object from the table to associate with the new library.

○ Create the library associations later

● Associate the new library with the selected items

☑ LUNs sharing to LDOMs

When you click the **LUNs sharing to LDOMs** option, each logical domain can get access to its storage through any of the domains in the server pool. If you do not enable multipath storage, the logical domain gets access to storage through its primary domain.

# Configuring a Logical Domain for Multipath Storage

Procedure for setting up a logical domain's storage as shared and multipathed in Oracle Enterprise Manager Ops Center.

Use the following procedure to set up multipath storage:

1. Select the Oracle VM Server for SPARC in the Assets tree.

2. Select the logical domain.

3. Click the **Storage** tab. For virtual disk, the entry in the Multipathing column is empty.

4. Select the disk.

5. Click the **Enable Sharing** icon.

**Figure 6-21    Enabling Multipath Storage on a Virtual Disk**

**Storage**

| Virtual Disk Na | Enable Sharing | Disk Type | Library | Type | Multipathing Group | Shared |
|---|---|---|---|---|---|---|
| domain-3-vol0 | | Opaque | nfs-library | NFS | | |

6. Enter the path to the storage in the Multipathing Group field.

# High Availability for Storage Resources

Lists therequirements for high availability storage.

Storage devices for an HA configuration must meet these requirements:

- Storage must be transferable between the primary and secondary Enterprise Controller systems. Do not attempt to use local file systems for high-availability storage.

- Storage must offer data redundancy capability, such as mirroring or RAID 5.

- Storage must offer performance that is sufficient to support operations.

- Storage must have the capacity to hold the data that the Oracle Enterprise Manager Ops Center software stores in the `/var/opt/sun/xvm` directory structure.

A variety of storage solutions meet these criteria, including NAS appliances, hardware RAID arrays and external JBODs. Storage can be attached directly to the Enterprise Controllers or through Storage Area Networks.

You must determine what storage solution offers the required capacity, performance, connectivity, and redundancy capabilities. Configuration procedures vary greatly among the available storage solutions, and among operating systems.

You must determine the specific failover procedures to use for the HA storage solution. Contact My Oracle Support to determine the procedures to use for your particular installation.

## Related Resources for Storage

List of Oracle Enterprise Manager Ops Center documents with additional information.

For instructions in performing actions or to learn more about the role of this feature, go to one of the following resources.

- *Oracle Solaris 11.1 Administration: SAN Configuration and Multipathing* at `http://docs.oracle.com/cd/E26502_01/html/E29008/index.html`

- To create a storage library, see Configuring NAS Libraries.

- To manage network file systems, see `http://docs.oracle.com/cd/E26502_01/html/E28997/index.html`

- The plug-in software is available from the vendor and from Oracle's site, `http://www.oracle.com/us/technologies/virtualization/storage-connect-partner-program/overview/index.html`

- To exclude an Oracle ZFS Storage Appliance from Oracle Enterprise Manager Ops Center's communication with My Oracle Support, use the blacklisting option described in the *Oracle Enterprise Manager Ops Center Administration*

- See Associating Storage Library with the Domains in *Oracle Enterprise Manager Ops Center Virtualization Reference*.

- See Associating a Storage Library with a Global Zone in *Oracle Enterprise Manager Ops Center Virtualization Reference.*

- See Setting Up Storage Resources and Storage Virtualization in *Oracle Enterprise Manager Ops Center Virtualization Reference* for information on how virtual assets use storage resources.

- See Manage Assets for information discovering storage hardware.

- Deploy Storage Workflow in the library at `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm`

- To view the *Sun ZFS Storage 7000 System Administration Guide,* log in to the Unified Storage System software interface and click Help in the top right corner of any screen. You can also access this guide at the host name or IP address of the storage system:

  - `https://hostname:215/wiki`

  - `https://ipaddress:215/wiki`

See the Oracle ZFS Storage Appliance Software product information page at
http://www.oracle.com/us/products/servers-storage/storage/
unified-storage/sun-storage-7000-uss-103104.html for links to more
information.

# 7

# Configure Networks

Overview of networks in Oracle Enterprise Manager Ops Center.

**Topics**

- Introduction to Networks

- Roles for Networks

- Actions Available for Networks

- Location of Network Information in the User Interface

- About Fabrics

- About Network Domains

- About Networks

- Properties of a Network

- Network Utilization

- About Network Connectivity Information in the User Interface

- About Network Hardware

- Network Profiles

- Related Resources for Networks

## Introduction to Networks

Overview of the role and purpose of networks in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center manages network resources, from the physical to the virtual. Fabrics provide the physical infrastructure and network domains provide the logical infrastructure. Networks are created from the resources of a network domain.

Oracle Enterprise Manager Ops Center supports Ethernet and InfiniBand network protocols. While the Ethernet interconnect is the established and common interconnect, InfiniBand is popular in high-performance computing environments because it maximizes the speed of transactions using the short, multiple connections found in clusters and data centers.

- For an Ethernet network, both tagged and untagged VLANs are supported. An untagged VLAN has no VLAN IDs. Use tagged VLANs to create multiple networks on a fabric that use the same network address but different VLAN IDs.

The network instances are independent of each other. However, in a server pool, use either all tagged VLANs or all untagged VLANs; do not mix the types of network in a server pool. For more information, see "Mixed Network Tagging Mode Configuration in Server Pool" in *Oracle Enterprise Manager Ops Center Virtualize Reference*.

> **Note:**
>
> Previous versions of the product software did not create independent network instances.

- For an InfiniBand network, partitions are supported.

> **Note:**
>
> If you use an InfiniBand switch in an Ethernet network, the ports on the switch have Ethernet names.

## Roles for Networks

List of required roles for storage tasks in Oracle Enterprise Manager Ops Center.

Table 4 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 7-1    Network Tasks and Roles*

| Task | Role |
| --- | --- |
| Add Fabric | Network Admin |
| Remove Fabric | Network Admin |
| Discover and Manage the Switches | Network Admin |
| Configure Network for Server Deployment | Server Deployment Admin |

## Actions Available for Networks

List of available operations in Oracle Enterprise Manager Ops Center.

After a network is discovered or created, you can perform the following actions, depending on the requirements.

- Discover and manage the switches

- Add a fabric to network domain

## Location of Network Information in the User Interface

Lists the navigation instructions to locate networks in Oracle Enterprise Manager Ops Center.

Table 7-2 shows where to find information.

***Table 7-2    Location of Network Information in the BUI***

| Object | Location |
|---|---|
| Fabric | Expand Networks in the Assets pane. Then select Fabrics. |
| Physical Fabric | Expand Networks in the Assets pane. Then select Fabrics and select Network Switches. |
| Network | To see all networks, regardless of type, expand Networks in the Assets pane. Then select Network Domains. |
| Services of a Network | Network Services tab: time server, WINS, DNS, and NIS. To modify these services, edit the network services. You cannot change the network's IP address or name. |
| Network Domain | Expand Networks in the Assets tree. The Default Network Domain is the first item. |
| Physical switch | Expand Assets and expand Network Switches. To see each port, click the Connectivity tab. |

## About Fabrics

Describes the result of using different types of fabrics on the available network resources.

The fabric is the physical network infrastructure, such as switches, ports, host bus adapters, that provides network resources, through a network domain, to virtual assets.

When you use Oracle Enterprise Manager Ops Center to discover a physical switch or the host of switch, all the switching fabrics that the switch supports are also discovered. One physical fabric supports many fabrics, also called data links. The physical fabric is the collection of all switch ports, links, and physical interfaces or endpoints.
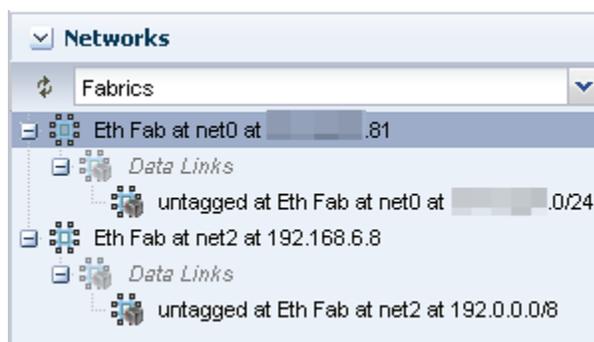


For each Ethernet fabric, the maximum VLAN ID range is 4096, which allows you to create 4096 networks.

For each InfiniBand physical fabric, the maximum number of partitions keys is 32000 so you can create 32000 partitions. Each partition is a logical fabric. For example, if a server has two partition keys, it participates in two different partitions.

Fabrics provide resources to the virtual networks they support in a manner that depends on their type: fully-managed, host-managed, or unmanaged. Table 7-3 shows the types of fabrics.

*Table 7-3    Fabrics and the Network Domain*

|  | **What Is Managed** | **Capability** | **Comments** |
| --- | --- | --- | --- |
| **Fully-managed switched fabric** | The switch is discovered and managed. | For each VLAN ID or partition key, you can create a static or dynamic private network. | This type of fabric can be achieved on only the Sun Ethernet 10GbE Fabric switch or the Sun Datacenter InfiniBand switch and gateway. |
| **Host-managed fabric** | The host connected to the Ethernet switch is discovered and managed. A range of VLAN IDs has been assigned. | For each VLAN ID, you can create a static or dynamic private network. | To create a host-managed fabric, use the **Define Ethernet Fabric** action to specify the fabric and its VLAN ID range. |
| **Unmanaged fabric** | The Ethernet fabric is discovered or declared during the discovery of another asset, but the switch is not managed. | If the fabric has existing networks with VLAN IDs, you can create static private networks. | To convert an unmanaged fabric to a host-managed fabric, use the **Assign VLAN ID Range** action. |

## About Network Domains

Describes the purpose of network domains in Oracle Enterprise Manager Ops Center.

- About the Default Network Domain

- About User-Defined Network Domains

- Editing Attributes of a User-Defined Network Domain

A network domain is a container for fabrics, managed networks, and private networks. The network domain handles the relationship between the physical fabrics and the virtual assets, such as virtualization hosts or server pools. The fabrics provide data links and IP subnets to the network domain, which then provides networks to the virtualization hosts and server pools.

Within the network domain, networks that have been discovered or specified are available for assignment. These are called public networks because their IP address space has been specified for their exclusive use. Another type of network is private, that is, the network is created using an IP address space that the network domain allocates to it.

A fabric can contribute to more than one network domain. When a network domain has more than one fabric, you designate one of the fabrics as the anchor fabric, which is the fabric from which new networks are created.

Public networks can be members of more than one network domain because their IP addresses are specific and dedicated. Private networks exist only within a specific network domain so two network domains could construct a private network with the same IP address without a conflict.

In Oracle Enterprise Manager Ops Center, networks become part of a network domain in the following ways:

- An asset that has a network is discovered.

- A user creates a network.

- A network is created when it is required. This is a dynamic network.

Oracle Enterprise Manager Ops Center operates on more than one layer of the Open Systems Interconnection model, using the network domain. Table 7-4 shows what the network domain manages in the physical to logical stack.

*Table 7-4    Elements of a Network Domain*

| Layer | Asset | What Is Managed | Capability |
|-------|-------|-----------------|------------|
| Layer 3<br>Network: IP address | For Ethernet: fabric networks<br>For InfiniBand: non-fabric networks | IP subnet and mask<br>IP address range<br>VLAN or Partition<br>Services<br>Routing | The network provides connectivity. |
| Layer 2<br>Data links | For a tagged Ethernet: VLAN<br>For an untagged Ethernet: portID<br>For InfiniBand: partition | VLAN IDs<br>Partition keys (P-key) | A virtual host uses the virtual NIC and a virtual switch in a VLAN or partition. |
| Layer 1<br>Physical: switches, ports, host bus adapters | Fabrics | Varies, by type of fabric. See Table 7-3 | Varies by type of fabric. See Table 7-3 |

## About the Default Network Domain

Describes the purpose of the system-defined network domain in Oracle Enterprise Manager Ops Center.

The Oracle Enterprise Manager Ops Center software always has a Default Network Domain and all networks are members of it. If you have upgraded your product software from the previous release, the existing managed networks are now in the Default Network Domain. A new network becomes a member of the default network domain. If you direct the new network to a user-defined network domain, the network is also a member of that network domain.

## About User-Defined Network Domains

Describes network domains in Oracle Enterprise Manager Ops Center.

Like the default network domain, a user-defined network domain provides network resources to a server pool or virtualization host. You create a network domain to support the use of virtualization hosts, server pools, or a virtual datacenter. For example, a virtual datacenter uses server, storage, and network resources in a dynamic way, allocating and releasing resources whenever necessary. The network domain provides the network resources to the virtual datacenter.

When you create a network domain, you set a limit on the number of networks that can be created in the network domain. Increase the number of networks when accounts in a virtual datacenter are not able to create vnets.

A new user-defined network domain includes the address space specified as private by the RFC 1918 specification. These addresses cannot be routed to the Internet and provide a way for organizations to create intranets. If you organization uses a portion of this private address space, reserve these IP addresses when you create a network domain so that the network domain does not use them.

## Editing Attributes of a User-Defined Network Domain

Procedure for changing the attributes of a network domain in Oracle Enterprise Manager Ops Center.

You can change the name and description of the network domain and you can change the number of dynamic networks that are in use simultaneously.

1. Expand **Networks** in the Navigation pane.

2. Click the network domain.

3. Click **Edit Attributes** in the Actions pane.

   The Details tab is displayed in the center pane. You can now change the Name Description, and Number of Networks fields.

4. Edit the name or description or increase the number of networks.

5. Click **Save**.

# About Networks

Describes how networks support virtualization hosts in Oracle Enterprise Manager Ops Center.

- Requirements for a Network

- Limitations of Networks in Previous Versions

- Overview of Public Networks and Private Networks

- Assigning Networks to a User-Defined Network Domain

- About Bandwidth Management

- About IPMP Groups

- About Link Aggregations

- Creating a Trunk Link Aggregation

- Creating a DLMP Link Aggregation

In Oracle Enterprise Manager Ops Center, networks are the discovered and managed IP subnets. Oracle Enterprise Manager Ops Center manages network resources for its virtualization hosts.

> **Note:**
>
> These networks are part of Oracle Enterprise Manager Ops Center's virtualization services. For a description of the networks that support the product, see the planning information in *Installation for Oracle Solaris Operating Systems* or *Installation for Linux Operating System*.

Networks are associated with a single virtualization host or a server pool, which contain multiple virtualization hosts. When you assign a network to a server pool, the

network is accessible to each virtualization hosts in the pool and every guest of each virtualization host.

You can use networks to do the following:

- Manage individual virtualization hosts

- Connect virtualization hosts to the Proxy Controller

- Allow guests to communicate with each other or with the Internet

- Connect remote JMX with the public API

A network depends on the physical network interface card (PNIC) that is available to the host. You can create one network for each physical network interface card. If one host has two PNICs, it is a good practice to create two networks: a management network and a data network. Then place all virtual hosts on the data network, keeping them separate from the management network. The management network is dedicated to giving access to internal resources of the data center.

Figure 7-1 shows how two virtualization hosts participate in two networks. The actual network connection is made to the PNICs in the virtualization host. Network A is connected to PNIC 1 of both hosts and Network B is connected to PNIC 2 of the hosts.

*Figure 7-1    Network with Virtual Hosts*
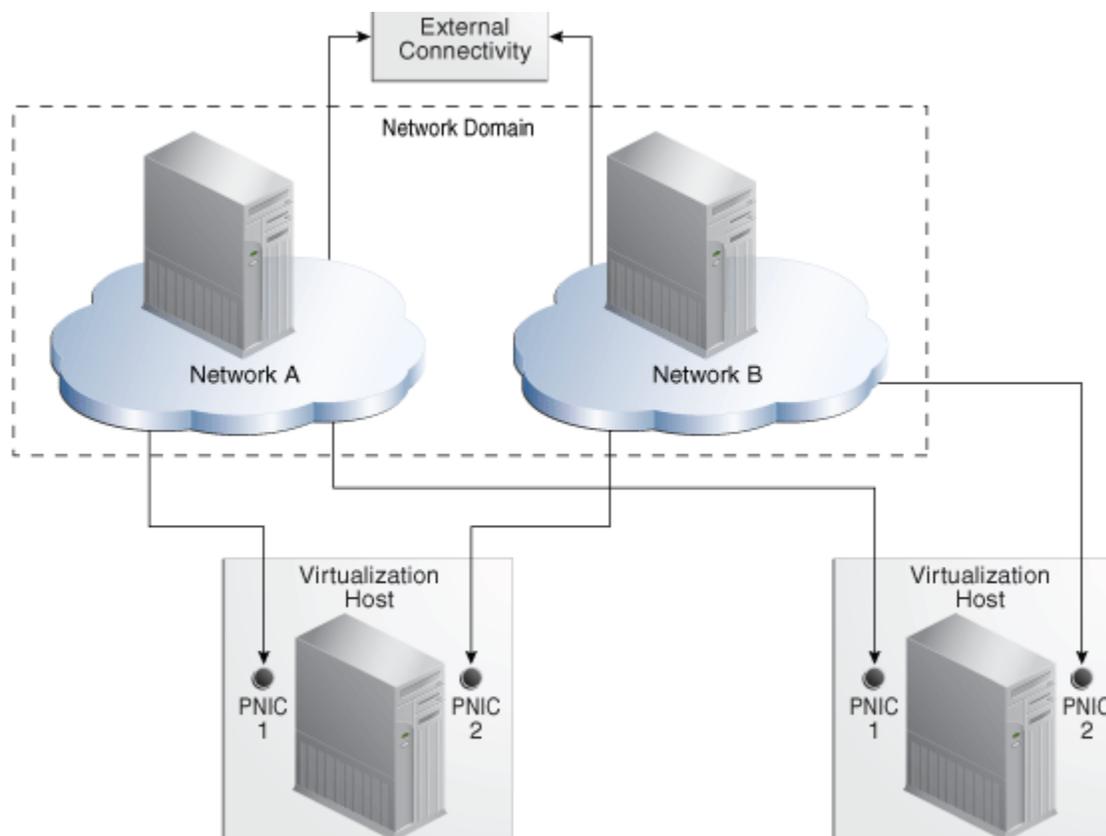


## Requirements for a Network

Requirements for assigning and using networks in Oracle Enterprise Manager Ops Center.

A network requires a physical network interface or a link aggregation and the following specifications:

- IP address and netmask or CIDR format

- If you use static IP addressing, the IP address of the management interface

  If you use dynamic IP addressing, the range of allowed IP addresses and the gateway address

Before you attach a network to a server pool, verify that each virtualization host in the server pool has a physical network interface to the network so that all members of the pool can continue to share the network resources of the server pool.

## Limitations of Networks in Previous Versions

Describes networks that share CIDR addresses.

InfiniBand networks that share a CIDR or sub-blocks of the same CIDR (Classless Inter-Domain Routing) are called overlapping networks. The support for this configuration has been enhanced through several product releases, as shown in

*Table 7-5    Comparison of Overlapping Network Configuration for InfiniBand*

| Product Version | Default Action | To Change |
|---|---|---|
| Release 12.2.1.0.0 and older | Shared CIDRs are not allowed. Reconfigure an asset before it is discovered. | No change. |
| Release 12.2.2.0.0 to Version 12.3.0.0.0 | Shared CIDRs are allowed but disabled by default. | You can allow InfiniBand networks to overlap using Enabling Overlapping Networks |
| Release 12.3.1.0.0 | Shared CIDRs are enabled for InfiniBand by default. | You can prevent overlapping networks using Disabling Overlapping Networks |

In Versions 12.2.1.0.0 or earlier, verify that the InfiniBand networks comply with the following constraints. If not, reconfigure the asset before it is discovered.

- No assets with overlapping management networks. For example, 192.0.2.1/21 and 192.0.2.1/24 are overlapping. However, you can use the same CIDR (not sub-block) for different assets. For example, you can use 192.0.2.1/22 as a CIDR for the Ethernet network for two assets.

- No overlapping private networks. For example, two private networks cannot have the same CIDR.

- No overlapping public networks. However, you can use the same CIDR (not sub-block) for different assets. For example, you can use 192.2.0.0/22 as a CIDR for the public EoIB network for multiple engineered systems.

Starting in Release 12.2.2.0.0, you can configure InfiniBand networks to share a CIDR. However, when you allow networks to have the same CIDR, you must ensure that all the NFS shares used by storage libraries have a unique pathname. Oracle Enterprise Manager Ops Center identifies an NFS share by its CIDR, its NFS server, and the share name. When the CIDR addresses are the same, either each NFS server must have a

unique name or each share must have a unique name. Use the following procedure to allow overlapping InfiniBand networks. You must have the Ops Center Admin role to change the value of a product property variable.

## Disabling Overlapping Networks

Procedure for changing the default operation of the product to disallow networks to share a CIDR.

Starting in Release 12.3.1.0.0, InfiniBand networks can share a CIDR by default. You must ensure that any NFS shares used by storage libraries have a unique pathname. If you prefer to disallow networks from sharing a CIDR and prevent networks from overlapping, change the default value, using the following procedure. You must have the Ops Center Admin role to change the value of a product property variable.

1. Log in to the Enterprise Controller.

2. Click **Administration** in the Navigation pane.

3. Click **Enterprise Controller.**

4. Click **Configuration** in the center pane.

5. In the Subsystem field, click **Network/Fabric Manager**.

   The `oem.oc.networkmgmt.ib.overlapping.enabled` property's default value is `true`.

6. Click in the **Value** field to edit it. Change the value to `false`.

7. Click the **Save Properties** icon.

8. Stop the Enterprise Controller: `/opt/SUNWxvmoc/bin/ecadm stop`

9. Start the Enterprise Controller: `/opt/SUNWxvmoc/bin/ecadm start`

## Enabling Overlapping Networks

Procedure for changing the default operation of the product to disallow networks to share a CIDR.

In Releases 12.2.2.0.0 through 12.3.0.0, InfiniBand networks can share a CIDR, but the capability is disabled by default. If you prefer to allow networks to share a CIDR, change the default value using the following procedure. You must have the Ops Center Admin role to change the value of a product property variable. You must ensure that any NFS shares used by storage libraries have a unique pathname.

1. Log in to the Enterprise Controller.

2. Click **Administration** in the Navigation pane.

3. Click **Enterprise Controller.**

4. Click **Configuration** in the center pane.

5. In the Subsystem field, click **Network/Fabric Manager**.

   In Releases 12.2.2.0.0 through 12.3.0.0, the `oem.oc.networkmgmt.ib.overlapping.enabled` property's default value is `false`.

6. Click in the **Value** field to edit it. Change the value to `true`.

7. Click the **Save Properties** icon.

8. Stop the Enterprise Controller: `/opt/SUNWxvmoc/bin/ecadm stop`

9. Start the Enterprise Controller: `/opt/SUNWxvmoc/bin/ecadm start`

## Overview of Public Networks and Private Networks

Describes the types of networks in Oracle Enterprise Manager Ops Center.

Networks are introduced into Oracle Enterprise Manager Ops Center in the followings ways:

- By discovering the fabric that supports existing networks. All the attributes are discovered but, other than the name and description, they cannot be changed. All networks of a discovered fabric are in the Default network domain.

- By specifying the network completely, using the resources provided by a fabric. Use the **Define Network** action to specify the IP addresses and the VLAN IDs for an Ethernet network, based on what the fabric can provide. To create untagged networks, specify a VLAN ID of -1. For InfiniBand networks, the P-keys are assigned automatically.

  > **Note:**
  >
  > In previous versions of the product software, this action was called **Manage Network**.

- The **Create Private Network** action creates a network from the resources of a user-defined network domain. Oracle Enterprise Manager Ops Center allocates the IP address from the addresses available within the network domain.

If you are creating networks for the use of virtual datacenters, create a private network to ensure that the virtual datacenter has exclusive use of the IP address space that it gets from the network domain, as described in `Creating Private Networks in a Virtual Datacenter`.

> **Note:**
>
> The Automated Installer for Oracle Solaris 11 uses the `installadm` service to identify all network interfaces and adds them to the `/var/ai/ai-webserver/listen-addresses.conf` file.
>
> When you add a network interface, run the following command to update the `installadm` service and ensure the Automated Installer has access to all network interfaces:
>
> `svcadm refresh system/install/server`
>
> To see the list of network interfaces handled by the `installadm` service, view the `/var/ai/ai-webserver/listen-addresses.conf` file.

## Assigning Networks to a User-Defined Network Domain

Procedure for adding a network to a network domain in Oracle Enterprise Manager Ops Center.

All networks are in the Default network domain, but a network can be a member of more than one user-defined network domains. You place a network into a user-defined network domain so that the network is available to the server pools associated with the network domain. Use the **Assign Network** action to place a network into a specific network domain.

1. Expand **Networks** in the Navigation pane.

2. Select the user-defined network domain.

3. Select **Assign Network** in the Actions pane.

*Figure 7-2    Assign Network*
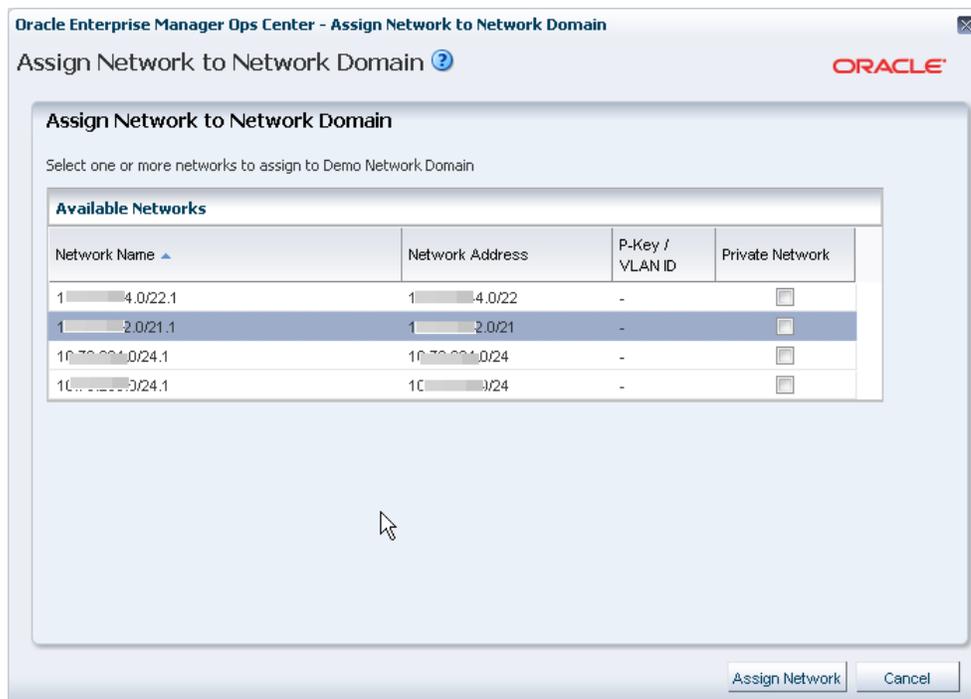


4. Select a network. If the network is does not share its IP addresses with any other network, select the Private Network option.

5. Click **Assign Network** to submit the job.

## About Bandwidth Management

Describes in data link's bandwidth flow in Oracle Enterprise Manager Ops Center.

A data link is a physical NIC, an aggregated link, or a virtual NIC. When a new data link is created, the operating system sets the default bandwidth flow. You cannot remove this flow. The flow is removed only when the physical link is removed.

In Oracle Solaris 11 operating system environments, you can manage the bandwidth flow of a data link, prioritizing the network traffic on the link and setting the maximum bandwidth limit.

### Managing the Bandwidth Flows for a Data Link

Procedure for adding or changing a bandwidth flow in Oracle Enterprise Manager Ops Center.

1. Expand **Assets** in the Navigation pane.

2. Select an Oracle Solaris 11 operating system.

3. Click the **Networks** tab in the center pane.

4. Click the **Bandwidth Management** subtab in the center pane.

5. To modify a flow, click the **Modify** icon. To create a new link, click the **Add** icon, then specify a name for the flow and the physical network interface.

   The name of flow must meet the following requirements:

   • The first character must be alphabetic.

   • All characters must be alphanumeric: a-z, A-Z, 0-9, underscore ('_'), period ('.'), or hyphen ('-').

   • Maximum number of characters is 127.

6. Set the new bandwidth properties, as described in Properties of Bandwidth Flow.

### Properties of Bandwidth Flow

Lists the attributes of bandwidth flow in Oracle Enterprise Manager Ops Center.

• Priority: Set the priority of the network traffic on the link as high, medium or low.

• Bandwidth Limit: Enable the bandwidth limit to allocate guaranteed bandwidth to the specified link. Enter the maximum value for bandwidth limit in Kbps, Mbps, or Gbps.

• Set attributes for the data flow to identify its network traffic:

   – Local and Remote IP: The source and destination IP address.

   – Transport: The Internet Protocol used such as TCP, UDP. SCTP, ICMP.

   – Ports: The source and destination ports for TCP, UDP, and SCTP.

   – DS Field: The type of service field in the IP packets' header.

## About IPMP Groups

Describes each operating system's way of defining IPMP groups.

For information about how IPMP groups work in Oracle Solaris 11.2, see `http://docs.oracle.com/cd/E36784_01/html/E37476/index.html`. For information about how IPMP groups work in Oracle Solaris 11.1, see `http://docs.oracle.com/cd/E26502_01/html/E28993/index.html`. For Oracle Solaris 10 documentation, see *IP Services* at `http://www.oracle.com/technetwork/documentation/solaris-10-192992.html`.

From the Network tab, view and manage IPMP groups as shown in Figure 7-3.

*Figure 7-3  IPMP Groups*



For all types of networks, you create an IPMP group by specifying the following:

- The link-based failure detection is enabled by default. To use, Probe-Based failure detection, select the **Probe-Based** option and provide the test address to track the interface status.

- You must assign the data addresses for the physical interfaces in the IPMP group. Data traffic flow uses the data addresses hosted on the IPMP interface and flows through the active interfaces of the group.

- The active and the standby interfaces of the group. By default, an interface added to an IPMP group is active. You can configure as many standby interfaces as you want for the group. The list of available network interfaces contains the interfaces that qualify, depending on the operating system, the type of network you select, and the network's existing attributes.

  - For an Ethernet network on Oracle Solaris 10:

    ◆ If the network has a VLAN ID, you can select the Tagged mode and you can keep or change the VLAN ID.

    ◆ If the network has a VLAN ID, you can select the Untagged mode and you can keep or change the VLAN ID.

    ◆ If the network does not have a VLAN ID, the option to make it a tagged or untagged network is not available.

  - For an Ethernet network on Oracle Solaris 11, you can specify its media type:

    ◆ For the Ethernet media type, the resulting options are the same as for an Ethernet network in the Oracle Solaris 10 environment.

    ◆ For the InfiniBand media type for a network with a VLAN ID, the P-Key field is displayed.

  - For an InfiniBand network on Oracle Solaris 10, no network interfaces are included in the list of available network interfaces.

  - For an InfiniBand network on Oracle Solaris 11:

    ◆ For the InfiniBand media type for a network with a VLAN ID, the P-Key field is displayed and you can keep or change its value.

    ◆ For the Ethernet media type, the P-Key field is not available.

## Creating an IPMP Group

Procedure for creating an IPMP Group in Oracle Enterprise Manager Ops Center.

1. Select the Oracle Solaris OS in the Assets section.

2. Click the **Network** tab in the center pane.

3. Click the **IPMP Groups** subtab in the pane. The existing IPMP groups are listed in the subtab.

4. Click the **Create IPMP Group** icon to open the Create IPMP Group wizard.

*Figure 7-4    Specify IPMP Group Details for an Ethernet Network on Oracle Solaris 11*
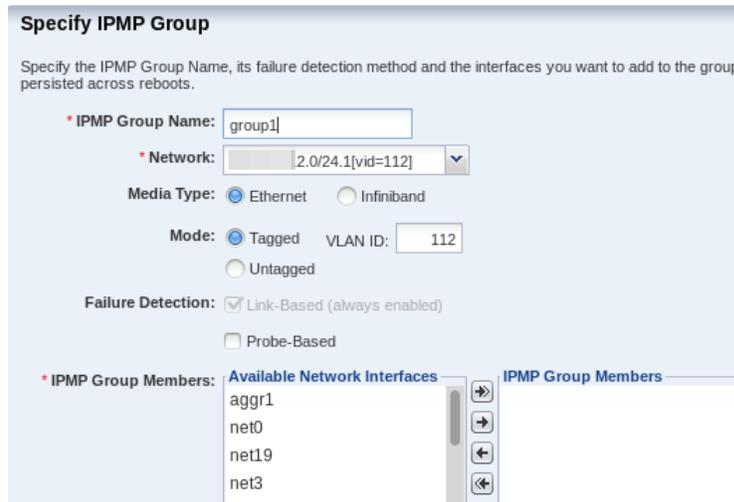


*Figure 7-5    Specify IPMP Group Details for an InfiniBand Network on Oracle Solaris 11*
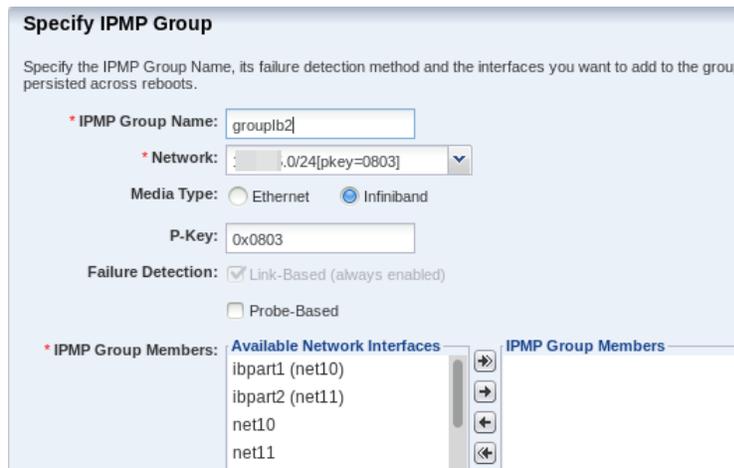


5. Enter the following details for the IPMP group, as shown in Figure 7-4:

   a. Provide a name for the IPMP group.

   b. Select a network from the list of available network interfaces.

   c. Depending on the type of network you select, specify the characteristics of the network interfaces.

    **d.** The Link-Based failure detection is always enabled by default. Select whether you want to also enable Probe-Based failure detection.

    **e.** Select each interface you want in the IPMP group from the Available Network Interfaces list and click the right arrow to include the interface in the group.

    Click **Next** to specify the NIC settings.

**6.** If you enabled probe-based failure detection, enter the test address for the NICs.

**7.** Select the interfaces that are in standby mode.

You must have at least one active interface in the group. Click **Next**.

**8.** Enter the data address for the active interfaces of the group and select whether the interface has a failover and click **Next**.

**9.** Review the information and click **Finish** to create the IPMP group.

## About Link Aggregations

Describes Link Aggregation Control Protocol in Oracle Enterprise Manager Ops Center.

The link aggregation conforms to the Link Aggregation Control Protocol (LACP) as described in the IEEE 802.3ad Link Aggregation Standard specification. The switch that communicates with the network interface must also support LACP.

To create a link aggregation, specify the following:

- Load balancing policy

- Link Aggregation Control Policy (LACP) mode and timer

- MAC address policy and if required, the MAC address

From the Network tab, you can create and manage the link aggregations as shown in Figure 7-6.

*Figure 7-6    Link Aggregations*



## Creating a Trunk Link Aggregation

Procedure for creating a link aggregation (LAG) in Oracle Enterprise Manager Ops Center.

1.  Expand **Assets** in the Navigation pane.

2.  Select an OS asset.

3.  Click the **Network** tab in the center pane.

4.  Click the **Link Aggregation** subtab.

5.  Click the **Create Link Aggregation** icon to open the wizard.

6.  Enter the name of the link aggregation. By default, the name starts with `aggr`. Append a number to make the name unique.

7.  Select the network interfaces to be in the aggregation by selecting each one from the list of available interfaces and clicking the right arrow to include them in the list of network interfaces in the link aggregation. Click **Next.**

8.  Click the `Trunk` Link Aggregation Mode.

**Configure Link Aggregation**                                          * Indicates Required Field

Specify the configuration of the Link Aggregation.

Link Aggregation Mode: ● Trunk (IEEE 802.3ad)   ○ Datalink Multipathing (DLMP)

\* Load Balancing Policy: ☐ L2 - Determines the outgoing link by hashing the MAC (L2) header of each packet

☐ L3 - Determines the outgoing link by hashing the IP (L3) header of each packet

☑ L4 - Determines the outgoing link by hashing the TCP, UDP, or other ULP (L4) header of each packet

LACP Mode: ● Passive   ○ Active   ○ Off

LACP Timer: ● Short   ○ Long

MAC Address Policy: ● Auto   ○ Fixed

MAC Address: `00:00:00:00:00:00`

9.  Accept the default options or specify alternative options:

    *   For Load Balancing Policy, set the type of packet identification in outgoing traffic. Packets with the same identification are routed to the same network interface in a link aggregation. The L4 policy is the fastest and the default.

    *   For LACP mode, set the type of LACPDU or packet required between the link aggregation and the switch. The value of `off` requires no packet, the value of `active` sends packets at intervals set by the LACP timer, and a value of `passive` sends a packet when the switch sends one.

    *   For LACP timer, set the time for the LACP active mode. The default is 1 second.

    *   For MAC Address Policy, select either Auto or Fixed. The Auto policy generates the MAC address. The Fixed policy uses the MAC address you enter in the MAC Address field.

    Click **Next** to view the summary.

10. Review the information and click **Finish** to create the link aggregation.

## About Datalink Multipathing Aggregation (DLMP)

Describes DLMP's method of aggregating network interfaces.

**Link aggregation** consists of configuring several network interfaces together to present a single, logical unit that increases throughput of network traffic. Oracle Solaris supports two types of link aggregations:

- Trunk aggregation has been supported in Ops Center for several releases.

- Datalink multipathing (DLMP) aggregation is now supported in 12.3.1.0 for assets running Oracle Solaris 11.1 and later.

DLMP aggregations support the following features:

- The aggregation can span multiple switches.

- No switch configuration is required on the switches.

- You can change between a trunk aggregation and a DLMP aggregation when the options are common to both types.

In a trunk aggregation, every port is associated with every configured datalink over the aggregation. In a DLMP aggregation, a port is associated with any of the aggregation's configured datalinks as well as with the primary interface and VNICs.

A trunk aggregation can handle network traffic of varying loads, but because this type of aggregation works with only one switch, the switch becomes a single point of failure. Although a DLMP aggregation does not require multiple switches, this is its strength:

- If the number of VNICs exceeds the number of underlying links, an individual port is associated with multiple datalinks.

- If a port fails, all the datalinks that use that port are distributed among the other ports transparently to the user and independently of any external switches connected to the aggregation.

- If a switch fails, the aggregation continues to provide connectivity to its datalinks by using other switches in the aggregation.

See https://docs.oracle.com/cd/E26502_01/html/E28993/gmdlu.html#scrolltoc for a comparison.

## Creating a DLMP Link Aggregation

Procedure for creating a link aggregation (LAG) in Oracle Enterprise Manager Ops Center.

1.  Expand **Assets** in the Navigation pane.

2.  Select an OS asset.

3.  Click the **Network** tab in the center pane.

4.  Click the **Link Aggregation** subtab.

5.  Click the **Create Link Aggregation** icon to open the wizard.

6.  Enter the name of the link aggregation. By default, the name starts with `aggr`. Append a number to make the name unique.

7.  Select the network interfaces to be in the aggregation by selecting each one from the list of available interfaces and clicking the right arrow to include them in the list of network interfaces in the link aggregation. Click **Next.**

**8.** Click the `Data Link Multipathing (DLMP)` Link Aggregation Mode.

**9.** Click **Next** to review the configuration.

**10.** Click **Finish** to create the link aggregation.

# Properties of a Network

Overview of network properties in Oracle Enterprise Manager Ops Center.

**Topics**

- About IPv4 and IPv6 Protocols

- About Routing Modes

- Managing Static Routes for the Network

- Address Allocation Method

- Maximum Transmission Unit (MTU)

## About IPv4 and IPv6 Protocols

Description of the supported Internet Protocol formats in Oracle Enterprise Manager Ops Center.

Some environments have a mix of IPv4 and IPv6. Oracle Enterprise Manager Ops Center is "IPv6-aware." If an asset has an IPv6 network interface, Oracle Enterprise Manager Ops Center can read it and displays its information, but it cannot provision an IPv6 network or use IPv6 networks to discover, monitor, or provision assets.

## About Routing Modes

Describes the various routing modes used by virtual hosts in Oracle Enterprise Manager Ops Center.

A virtual host uses the network assigned to it according to the host's routing mode. You specify a virtual host's routing mode during its initial configuration if you do not accept the default mode, Automatic Routing. Oracle Enterprise Manager Ops Center supports the following routing modes:

- Automatic Routing – This is the default routing mode. Applying the static routes depends on the following conditions:

  - If your site defined a default gateway or static route or retrieved one from the DHCP server, this route is used and dynamic routing is disabled.

  - If no default gateway or static route is available, dynamic routing is enabled.

- Dynamic Routing Off – The virtual host uses the default gateway and any static routes configured for the network. The default gateway is retrieved from the DHCP server.

- Dynamic Routing On – The virtual host uses routes provided by the dynamic routing service. The default gateway and any static routes configured for the network are ignored.

## Managing Static Routes for the Network

Procedure for adding routes for the subnet of a network in Oracle Enterprise Manager Ops Center.

Static routes specify the route for external access. Although you define a default gateway for a network, it might not reach a particular subnet. In this case, you must also provide a static route for the subnet.

When you create a network, you can specify the static route. To add static routes after the network has been created, use the following procedure.

1. Click **Managed Networks** in the Navigation pane.

2. Select a network from the list of networks.

3. Click **Edit Network Attributes** in the Actions pane.

4. Click the **Add** icon in the Static Routes table. A row is added to the table.

5. Enter the values for destination IP, netmask, and gateway.

6. Click **Finish**.

You can delete a static route and change the order of the routes using the icons in the Static Routes table.

## Address Allocation Method

Lists the options for allocating IP addresses for new networks in Oracle Enterprise Manager Ops Center.

When you define a new network, you specify how its IP address is assigned:

- Static IP: You enter a specific IP address.

- Use System Allocated IP: Oracle Enterprise Manager Ops Center assigns an available IP address.

- Do not allocate IP: No IP address is assigned.

- DHCP: Use the DHCP service to acquire an IP address.

When you create an Ethernet network without an SR-IOV connection for a control domain, you have an additional option: Do Not Plumb Interface.

## Maximum Transmission Unit (MTU)

Lists the network interface cards that can support changes in the MTU in Oracle Enterprise Manager Ops Center.

The default size for the network's Maximum Transmission Unit (MTU) is 1500 bytes. If your network interface card is one of the following types, you can change the size of the MTU to a size between 576 and 9216 bytes. However, to assign the network to a logical domain, the minimum MTU size is 1500 bytes.

- `e1000g`

- `ce`

- `nxge`

- `nge`

- `bge`

- `xge`

- `hme`

- `ixgbe`

- `hxge`

- `ipge`

- `igb`

When you specify a size greater than 1500 bytes, Oracle Enterprise Manager Ops Center modifies the network interface card's MTU size. For other types of network interface cards, the MTU is changed when the card's driver firmware is updated to support the new MTU size. However, to change the MTU value for an IPMP group, you must edit the MTU value manually.

> **Note:**
>
> When you provision an operating system, the MTU size resets to the default value. You must change the MTU again after you provision the system.

## Network Utilization

Lists the options displaying information about utilization of network resources in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center collects information every five minutes on every managed asset and displays the last hour of data on the asset. To see utilization data for a network over longer periods of time, up to six months, create a Network Utilization chart, which includes operating system, operating system for a virtual machine, virtual host, and server pool. You can also create a network utilization chart for an OS group or host group.

## About Network Connectivity Information in the User Interface

Description of how network connections are represented in Oracle Enterprise Manager Ops Center.

Connectivity is the network interface of the system. The Connectivity tab of the selected asset's dashboard displays appropriate information, depending on the asset type.

For a hardware server, the Connectivity tabs displays information about Network Interface Card (NIC), including name, connection status, MAC address, and the corresponding IP address.

For switch hardware, the Connectivity tab shows information about each port.

For an Oracle Solaris OS, the Connectivity tab includes IPMP groups and aggregated links.

- The IPMP Groups subtab shows the group's name, its assigned network, and the type of failure detection, either link-based, probe-based, or both. For each IPMP group, the details include the state of the connection for each NIC, whether it is in standby mode or failover mode, and the IP address the NIC supports.

- The Link Aggregation subtab shows the aggregation's name, its MAC address, and its attributes. For each aggregated link, the subtab shows the state of the connection for each NIC, whether it is in standby mode or failover mode, and the IP address the NIC supports.

For a virtualization host, the Connectivity tab, shown in Figure 7-7, displays the OS information and information about bandwidth and the virtual hosts that use the networks.

*Figure 7-7*



When you attach or assign networks or when you create virtual hosts, Figure 7-8 shows an example of a step in the wizard where you configure the network connection.

*Figure 7-8    Configure Interfaces*
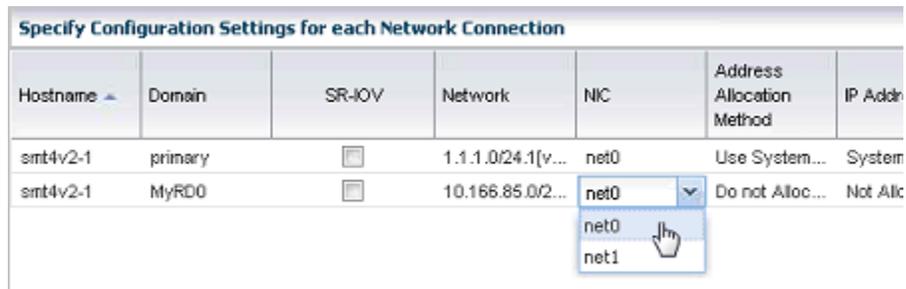


# About Network Hardware

Description of supported network hardware and how ports are represented in Oracle Enterprise Manager Ops Center.

- About PCIe Endpoints

- About Single Root I/O Virtualization

- Network Switches

- About Virtual Network Switches

Oracle Enterprise Manager Ops Center can manage Sun Ethernet 10GbE Fabric switches and Sun Datacenter InfiniBand switches. These switches reside in the system or blade system and provide the switch fabric.

The InfiniBand Gateway switch can expose the ports of a server that resides on an InfiniBand partition to an Ethernet network. To create an Ethernet on InfiniBand (EoIB) interface on the switch, you associate the switch's external port (eport) with the InfiniBand partition where the server resides, creating a virtual NIC (vNIC). The server's ports are displayed on the Switch Connectivity tab in the center pane.

## About PCIe Endpoints

Description of PCIe bus and its devices in Oracle Enterprise Manager Ops Center.

A PCIe bus consists of the PCIe bus itself and all of its PCI switches and devices. Oracle VM Server for SPARC software can assign a PCIe bus (also known as a root complex) to a domain. An I/O domain that is configured with an entire PCIe bus is also known as a root domain.

Oracle Enterprise Manager Ops Center also supports the NIU-compatible cards in T5x20, T3 or T4 systems if an XAUI card is present. You can assign the NIU device to a Logical Domain in the same way you assign a PCIe bus or End Point.

**Figure 7-9   PCIe and Buses**



## About Single Root I/O Virtualization

Describes the virtual functions of a physical network card suing SR-IOV in Oracle Enterprise Manager Ops Center.

InfiniBand switches support Single Root I/O Virtualization (SR-IOV), so that a single PCIe device (a physical network card) is presented as multiple PCIe devices. SR-IOV relies on both the hardware BIOS and the hypervisor layer to create these virtual PCIe devices. Each virtual PCIe device specializes in an operation called its virtual function (VF), but does not have the complete functionality of the physical PCIe device.

By defining a network on a virtual PCIe device, one physical PCIe device supports several networks as if each network had exclusive access to the device. Figure 7-10 shows the physical PCIe devices available to a virtualization host. When one of the physical functions is selected, its virtual functions are also displayed.

**Figure 7-10    SR-IOV Tab**



When you create a virtual host, you specify its network connection. If the networks are backed by an InfiniBand fabric, you can specify that the virtual host uses a virtual function by checking the SR-IOV option.

## About the Network Interface Card (NIC)

Description of network interface cards and how they are represented in Oracle Enterprise Manager Ops Center.

The Network Interface Card (NIC) is the physical connection between a network switch and a network. When you create a network or attach an asset to a network, you select the NIC. You can create one network for each physical network interface card. To see the NICs for a server, select the server and then click the Connectivity tab. The Server Processor Connectivity table lists all of the NICs.

## Network Switches

Describes the support for network switches in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center can manage Sun Ethernet 10GbE Fabric switches and Sun Datacenter InfiniBand switches. These switches reside in the system or blade system and provide the switch fabric. The Cisco Catalyst® 4948 Switch is also supported.

For the Ethernet switches, both tagged and untagged VLANs are supported.

If you use an InfiniBand switch in an Ethernet network, the ports on the switch have Ethernet names.

For more information about these switches, see the product documentation:

- For the Sun Ethernet 10GbE Fabric switch, see `http://docs.oracle.com/cd/E19934-01/index.html`

- For the Sun Network QDR InfiniBand Gateway Switch, see `http://docs.oracle.com/cd/E36256_01`

- For the Sun Datacenter InfiniBand Switch 36, see `http://docs.oracle.com/cd/E26698_01`

## About Virtual Network Switches

Describes a virtual switch in Oracle Enterprise Manager Ops Center.

Oracle Solaris network virtualization provides an internal virtual network solution in which a virtualization host communicates with its virtual hosts as if using a network hardware. A virtual network consists of virtual network interface cards (VNICs) and virtual switches. A VNIC depends on a physical NIC and handles incoming and outgoing data in the same ways as a physical NIC. A virtual switch is created from the hypervisor layer of Oracle Solaris to provide the data path between the virtual hosts that reside on the same server and so must communicate with each other using the same ports. Figure 7-11 shows the relationship among the elements of a virtual network built on a single system with one NIC. Three VNICs support three zones. The virtual switch handles the communication, both between the VNICS and between the VNICs and the physical NIC.

*Figure 7-11    Virtual Network*
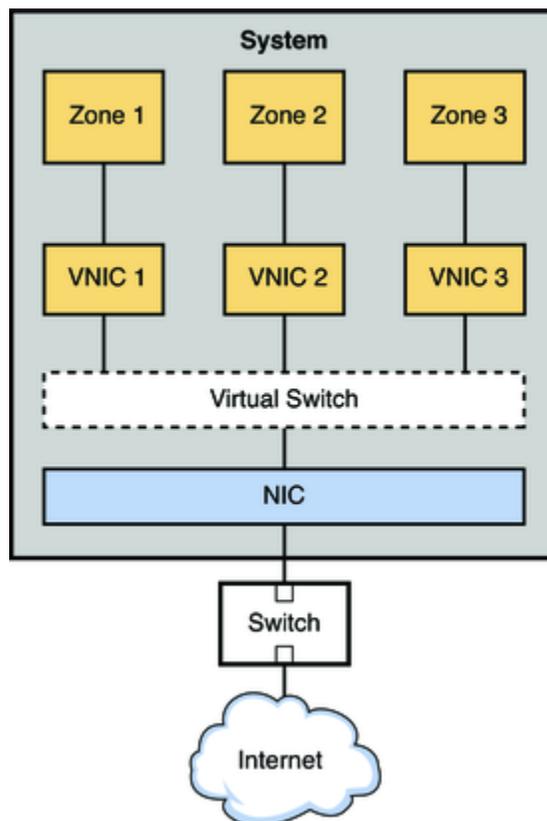


In Oracle Enterprise Manager Ops Center, the virtual network switches are listed on the Virtual Services tab, as shown in Figure 7-12. For a specific switch, you can also see VNICs that use the virtual switch.

*Figure 7-12    Virtual Switches*
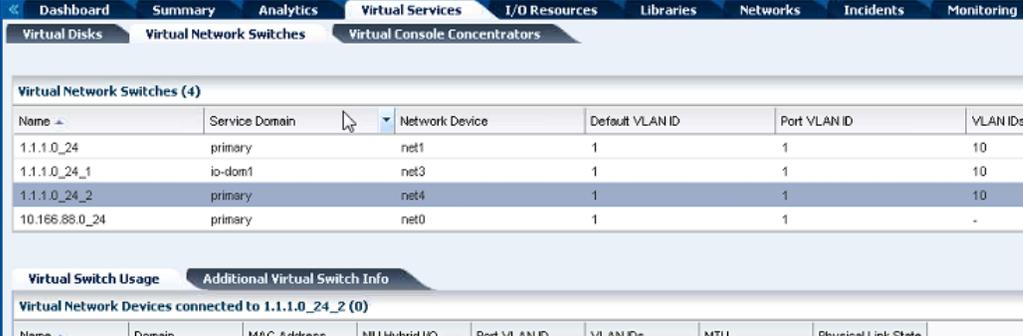


## Network Profiles

Lists the default profiles for network devices in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center provides default profiles for the following operations:

- Monitor Network hardware – Reports Cisco switch's connection to assets on the Switch Connectivity tab.

- Discover a switch – Use a discovery profile with Cisco iOS credentials.

## Related Resources for Networks

List of Oracle Enterprise Manager Ops Center documents with additional information.

For instructions in performing actions or to learn more about the role of this feature, go to one of the following resources.

- For a description of the networks that support the product, see the planning information in *Installation for Oracle Solaris Operating Systems* or *Installation for Linux Operating System*

- Mixed Network Tagging Mode Configuration in Server Pool in *Oracle Enterprise Manager Ops Center Virtualization Reference*.

- Network Virtualization in the *Oracle Enterprise Manager Ops Center Virtualization Reference* for information on how virtual assets use network resources.

- *Deploy Networks Workflow* in the library at `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm`

- For more information about these switches, see Switch Details.

- For the Sun Ethernet 10GbE Fabric switch, see `http://docs.oracle.com/cd/E19934-01/index.html`

- For the Sun Network QDR InfiniBand Gateway Switch, see `http://docs.oracle.com/cd/E36256_01`

- For the Sun Datacenter InfiniBand Switch 36, see `http://docs.oracle.com/cd/E26698_01`

- For information about how IPMP groups work in Oracle Solaris 11.2, see `http://docs.oracle.com/cd/E36784_01/html/E37476/index.html`. For information about how IPMP groups work in Oracle Solaris 11.1, see `http://docs.oracle.com/cd/E26502_01/html/E28993/index.html`. For Oracle Solaris 10 documentation, see *IP Services* at `http://www.oracle.com/technetwork/documentation/solaris-10-192992.html`.

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# 8

# Create Plans and Profiles

Overview of plans and profiles in Oracle Enterprise Manager Ops Center.

This chapter provides an overview of the concepts of operational plans, deployment plans, and profiles. Detailed information is covered in the corresponding feature chapters.

**Topics**

- Introduction to Plans and Profiles
- Roles for Plans and Profiles
- Actions Available for Plans and Profiles
- Location of Plan and Profile Information in the User Interface
- About Version Control
- Operational Plans and Profiles
- Profiles and Policies
- Overview of Deployment Plans
- Managing Deployment Plans
- About Applying a Deployment Plan
- Related Resources for Plans and Profiles

## Introduction to Plans and Profiles

Overview of the purpose and definition of plans and profiles in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center uses a combination of plans and profiles to reduce complexity and increase consistency when you perform standard management and operational activities, such as configuring hardware, installing servers, updating operating systems, and creating virtual systems.

A plan defines the actions and the targets. A profile defines a task, how the task is performed and enables you to define what is allowed, and not allowed, to be installed on a system. Together, plans and profiles enable you to create a reusable set of procedures to perform tasks, such as configuring hardware, upgrading firmware, installing and patching operating systems, and creating virtual systems and guests.

You create, manage, and access all plans and profiles in the Plan Management section of the user interface. Plan Management contains three basic components:

- Profiles and Policies: Profiles define the configuration of components for a specific type of system and task, such as the naming schema and configuration options to use when creating a zone or logical domain. Update policies define the level of interaction you want when applying patches and packages.

- Deployment Plans: Perform standard management activities. A Deployment Plan provides a framework of steps that you need to complete one or more tasks. You customize the plan to include specific profiles for the steps. Complex deployment plans enable you to add operational plans as a step. When you apply a Deployment Plan, you select one or more targets, or group of targets, on which to complete the tasks.

- Operational Profiles and Plans: Perform one or more operational activities, such as scripts and utilities to fix common problems, monitoring rule configurations and thresholds, and a knowledge base that you can create based on the incidents that occur in your environment.

## Roles for Plans and Profiles

List of required roles for plan management in Oracle Enterprise Manager Ops Center.

Table 5 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

**Table 8-1    Plan Management Roles and Permissions**

| Task | Role |
|------|------|
| View a profile or plan | Read |
| Create a profile or plan | Profile Plan Administrator |
| Edit a profile or plan | Profile Plan Administrator |
| Copy a profile or plan | Profile Plan Administrator |
| Delete a profile or plan | Profile Plan Administrator |
| Apply a plan | The plan determines the role required. |

## Actions Available for Plans and Profiles

List of available operations in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center uses plans and profiles to perform many tasks in your data center.

The following types of plans and profiles are available:

- Deployment plans and Profiles: Several types, or categories, of profiles are available. Deployment plans and profiles perform a variety of tasks, including discovering and adding assets to the UI, deploying or updating operating systems and firmware, creating zones, and creating logical domains.

- Operational Plans and Profiles: Operational profiles are a specific type of profile that you can create to store a user-defined script. The associated operational plan deploys the script to selected targets.

You can create, copy, edit, and delete profiles and create, copy, edit, deploy, and delete plans. In addition to deploying operational plans on their own, you can add an operational plan as a step in a complex deployment plan. See Operational Plans and Profiles, Profiles and Policies, and Overview of Deployment Plans for more information about the actions you can perform.

## Location of Plan and Profile Information in the User Interface

Lists the navigation instructions to locate plans and profiles in Oracle Enterprise Manager Ops Center.

Profiles, plans, and templates are available in the Plan Management section of the UI.

*Table 8-2    Location of Profile and Plan Information in the UI*

| Object | Location |
|---|---|
| Deployment Plans | Expand the **Plan Management** section of the Navigation pane. Click **Deployment Plans** for a list of existing plans. To locate a specific plan, expand the folder for the plan you want, such as Configure Server Hardware. |
| Profiles | Expand the **Plan Management** section of the Navigation pane, then scroll down to Profiles and Policies. Click **Profiles and Policies** for a list of existing profiles. Expand the folder for the type of profile you want, such as RAID Controller. |
| Update Policies | Expand the **Plan Management** section of the Navigation pane, then scroll down to Profiles and Policies. Click **Profiles and Policies**, then scroll to the bottom of the section to view the OS Update Policies. Click **Update Policies** to list the existing OS Update Policies in the center pane. |
| Update Profiles | Expand the **Plan Management** section of the Navigation pane, then scroll down to Profiles and Policies. Click **Profiles and Policies**, then scroll to the bottom of the section to view the OS Update Profiles. Click **Update Profiles** to list all default and user-defined OS Update Profiles in the center pane. |
| Operational Plans | Expand the **Plan Management** section of the Navigation pane, then scroll down to Operational Plans. Expand **Operational Plans** for a list of user-defined operational plans. |
| Operational Profiles | Expand the **Plan Management** section of the Navigation pane, then scroll down to Operational Plans. Expand **Operational Plans**, then click **Operational Profiles** for a list of user-defined operational profiles. |
| Monitoring Policies | Expand the **Plan Management** section of the Navigation pane, then scroll down to Operational Plans. Expand **Operational Plans**, then expand **Monitoring Policies** to display a list of system-defined and user defined monitoring policies. System defined policies all begin with OC. |

## About Version Control

Describes in Oracle Enterprise Manager Ops Center.

Profile and plan versions are numbered sequentially. When you create a profile or plan, the version number is one. When you edit a profile or plan, you create a version that is referenced by a new number.

When you create a version, you have the option to automatically change the related plan during the update. When you do not choose that option, the operational and deployment plans that are using the profile are not updated with the new version. For example, you have a firmware profile that is using firmware image A, the profile version is one. You want to update the profile to use the latest firmware image, B.

When you update the profile to change the image to B, version two of the profile is created. When you have five plans that are using version one of the firmware profile, all of those plans continue to use version one and image A. When you want the plans to use image B, you must manually update the plans to reference version two of the profile.

When you edit a deployment plan that is referred to by another plan in a complex plan, the referring plan is not automatically updated to refer to the edited plan's version unless you choose the option when you edit the plan.

You can view version details by highlighting the plan, then clicking the **View Version Details** icon. Use the arrows to view the different versions. When you want a plan to use the new version of the profile, edit the plan and associate it with the correct version of the profile. You can edit the following fields in an Operational Plan: Description, Failure Policy, and Associated Profile. You cannot edit the name of a profile or plan. When you want a different name, you must copy or create a profile and plan.

You can delete a version of a profile or plan. When you delete a version and more than one version exists, the previous version becomes the default. When only one version of the plan exists, both the profile and plan are deleted. When the plan is used in other plans, then the Delete Deployment Plan option is not enabled.

# Operational Plans and Profiles

Overview of actions done by operational plans in Oracle Enterprise Manager Ops Center.

An Operational Profile performs one or more routine tasks. You must have an Operational Plan to execute an Operational Profile.

**Topics**

- About Operational Profiles

- About Editing an Operational Profile or Plan

- Copying an Operational Profile

- Copying an Operational Plan

- About Deleting an Operational Profile or Plan

## About Operational Profiles

Describes profiles that perform actions on assets in Oracle Enterprise Manager Ops Center.

The profile defines one or more operations that are to be performed on a managed resource or group of resources. For example, deploying thresholds onto a managed resource, or performing state changing actions such as shutting down all logical domains and then shutting down an Oracle VM Server for SPARC.

The profile uses a shell script to define the operations. You can use an existing profile or create a profile when you create the plan. To create the profile, either download a shell script that is on the Enterprise Controller (EC Shell script), or specify the shell script (Remote Shell script). The EC Shell and Remote Shell differ in their location (on the Enterprise Controller or on the remote Agent) and credentials. The EC Shell is executed with the credentials of the user that is logged in. The Remote Shell can run

on any managed system that contains a remote agent and is executed with root permissions.

## Scripts and Variables for an Operational Profile

List of requirements for operational profiles in Oracle Enterprise Manager Ops Center.

The profile consists of a single shell script and can include asset attributes as environmental variables. For each profile, choose one of the following types of shell scripts:

- **EC Shell**: The script runs only on the Enterprise Controller and is executed with the logged-in user's credentials.

- **Remote Shell**: The script can run on any managed system that contains a remote agent and is executed with root permissions.

> **Note:**
>
> The uploaded shell script file cannot exceed 2 GB.

A list of supported asset attributes is available in About Asset Attributes.

## About Operational Plans

Describes plans that perform actions on assets in Oracle Enterprise Manager Ops Center.

An Operational Plan defines how an Operational Profile is deployed. An operational plan defines the targets and failure policy for an operational profile. By default, creating a profile also creates an Operational Plan. You use the plan to execute the profile on a managed resource or group of resources, such as performing state changing actions.

You can create a simple plan, such as disabling print capabilities, and deploy the plan across a group of resources in your data center. A more sophisticated example is to create several Operational Plans and add them as steps in a complex type Deployment Plan. For example, you can create an Operational Plan to shut down all logical domains and another Operational Plan to shut down an Oracle VM Server for SPARC. You can then add these plans as steps in a complex Deployment Plan.

## Creating an Operational Profile and Plan

Procedure for creating an Operational Plan and operational profile in Oracle Enterprise Manager Ops Center.

Perform the following steps to create an operational profile and plan:

1. Expand **Plan Management** in the Navigation pane, then click **Operational Profiles**.

2. Click **Create Profile**.

3. Name the new profile and add a description.

4. Select a subtype from the list to identify the type of target for this profile. Click **Next**.

5.  Specify the type of script, either **EC Shell** if the script is on the Enterprise Controller's host or **Remote Shell**.

6.  If the script is an EC Shell script:

    a.  Click **Choose File** , navigate to its location, and select it.

    b.  Navigate to the file's location and select it.

    c.  Click **Load File**.

    If the script is a Remote Shell script or is not in an accessible location, create the script in the **Script** field. Click the View System Variables button to see a list of product-specific variables for specifying a target name, target type, a user-friendly name, a Simple Authentication and Security Layer file, and to return a job ID.

7.  Specify the number of minutes or seconds that the script can run. The default is 60 minutes. Click **Next**.

8.  In the **Reboot Policy** field, select a policy from the drop-down list to direct the action of the script when the system reboots: Fail on Reboot, Success on Reboot, or Restart on Reboot.

9.  (Optional) To add environment variables to either type of script, click the Add icon, then specify the variable's name, value, whether input is required at execution and a hint for that input.

10. Click the View Script button to review. Click **Next**.

11. Review the entire profile, then click **Finish**.

## About Editing an Operational Profile or Plan

Describes in Oracle Enterprise Manager Ops Center.

When you edit a profile or plan, you create a version. When you create a version, you have the option to automatically change the related plans during the update. See "About Version Control to learn how versions are maintained.

You can view version details by highlighting the plan, then clicking the **View Version Details** icon. Use the arrows to view the different versions. When you want a plan to use the new version of the profile, edit the plan and associate it with the correct version of the profile.

You can edit the following fields in an Operational Plan: Description, Failure Policy, and Associated Profile. You cannot edit the name of an Operational profile or plan. You cannot rename an Operational plan; you must copy or create a Operational Profile and Plan.

## Copying an Operational Profile

Procedure for making a copy of an existing operational profile in Oracle Enterprise Manager Ops Center.

You can copy an existing operational profile, rename it, and create a new profile and plan.

1.  Expand **Plan Management** in the Navigation pane, then click **Operational Profiles**.

2. Select the profile in the center pane that you want to copy, then click the **Copy Profile** icon. Or you can double-click the profile in the center pane to display actions in the Actions pane.

3. Rename the new profile you are creating and revise the description, then click **Next**.

4. (Optional) Edit the script. Click **Next**.

5. (Optional) Edit the variables in the Specify Additional Variables page. Click **Next**.

6. Review, then click **Finish**.

## Copying an Operational Plan

Procedure for making a copy of an existing Operational Plan in Oracle Enterprise Manager Ops Center.

You can copy an existing operational plan, rename it, and create a new profile and plan.

1. Expand **Plan Management** in the Navigation pane, then click **Operational Plans**.

2. Select the plan in the center pane that you want to copy, then click the **Copy Plan** icon. Alternatively, double-click the plan in the center pane to display actions in the Actions pane.

3. Rename the new plan you are creating and revise the description. You can choose to change the Failure Policy for the new plan and change the Operational Plan steps. You can change the associated profile or plan for each step. To change the profile or plan, click the associated profile or plan to select from a list of available options. To add additional steps, click the **Replicate Step** icon, then select the profile or plan from the list to associate with that step. Click **Save**.

4. (Optional) Edit the script. Click **Next**.

5. (Optional) Edit the variables in the Specify Additional Variables page. Click **Next**.

6. Review, then click **Finish**.

## About Deleting an Operational Profile or Plan

Describes requirements for deleting versions of a profile or plan in Oracle Enterprise Manager Ops Center.

You can delete a version of a profile, or you can delete all versions of the profile and the associated plan. If a plan has more than one version and you delete a version, the previous version becomes the default plan.

> **Note:**
>
> Deleting a version of a plan or profile might affect the Incident Knowledge Base or deployment plans that rely on that version . Before deleting a version, verify that the version is not being used.

You can delete only a version of an operational plan that you created.

# Profiles and Policies

Overview of profiles and policies in Oracle Enterprise Manager Ops Center.

Profiles and policies define how a job is performed and the level of interaction.

**Topics**

- About Profiles
- Viewing Profile Details and Associated Plans
- Creating a Profile
- Copying a Profile
- Editing a Profile
- About Policies

## About Profiles

Describes how profiles are used in Oracle Enterprise Manager Ops Center.

Profiles define how standard management tasks are performed. With the help of wizards, you create a customized set of profiles. Users can use the profiles to perform tasks, such as discovery and provisioning. The software has system-defined profiles for some common OS tasks, such as reboot and check for installed security patches. You can choose to use these profiles for those actions or create your own.

With the exception of the Discovery profile, these types of management profiles require a deployment plan to execute the tasks on specific targets. When you create a profile, the default setting is to create a corresponding deployment plan.

Profiles are listed in the Plan Management section of the UI and are organized by category. For specific information about the profiles, see the following:

- For Discovery: See "About Discovery Assets".

- For Service Processor, RAID controllers, firmware provisioning and updating, Dynamic System Domain, OS provisioning, configuration, and updating, Boot Environments, and BIOS Configuration, see *Oracle Enterprise Manager Ops Center Operations Reference*.

- For Logical Domain, Oracle Solaris Zones, Virtual Machines, see *Oracle Enterprise Manager Ops Center Virtualization Reference*.

## Viewing Profile Details and Associated Plans

Procedure for displaying the contents of a profile and the plans it supports in Oracle Enterprise Manager Ops Center.

Details for each profile, including the associated plans and version number are displayed in the center pane.

1. Expand **Plan Management** in the Navigation pane.

2. Select the profile from the list of Profiles and Policies. **Finish**.

   The following tabs are displayed in the center pane:

- Details Tab

- Referrers Tab

- Version History Tab

**3.** Click each tab to review the details of the profile.

## Details Tab

Lists the information on a profile's Details tab in Oracle Enterprise Manager Ops Center.

The **Details** tab displays the profile configuration details for the current version. As shown in Figure 8-1, the details include Name, Description, Target Type, Subtype, Version, and date and time last modified. The Profile Details and File Systems sections include the wizard selections and settings for this version of the profile.

*Figure 8-1    Profile Details*



## Referrers Tab

Describes the information on the Referrers tab for profiles in Oracle Enterprise Manager Ops Center.

The **Referrers** tab displays all deployment plans that use the profile and the profile version number used. For example, in Figure 8-2 two deployment plans use the profile. The first deployment plan listed uses version 3 of the profile and the second deployment plan listed uses version 1 of the plan. This occurred because the profile was edited after the profile was part of the *S11.1 SPARC Large* deployment plan. Because the profile was part of the plan, the plan automatically updated to use the latest version of the profile. When the *S11.1 SPARC Large - Data center A* deployment plan was created, three versions of the profile existed and the user had the option of which version to associate with the plan. In this case, version 1 of the profile was selected to be part of the plan.

**Figure 8-2    Profile Referrers**



## Version History Tab

Description of Version History tab for profiles in Oracle Enterprise Manager Ops Center.

The **Version History** tab shows the number of versions, the profile description, the target type, and when the version changed. Click the **View** icon to display the profile details for that version. Figure 8-3 shows a Solaris 11 OS Provisioning profile with three versions. By clicking the view icon in the upper left corner, you can display the details for the selected profile.

**Figure 8-3    Profile Version History**



# Creating a Profile

Procedure for creating a profile in Oracle Enterprise Manager Ops Center.

When you import images into the software library, a default OS profile is created for the image. You can use the default profile, copy the default profile to create your own profile, or create a new profile. To preserve the default profile configuration, make a copy the profile and specify a name and description that describes the profile and any unique properties for the profile.

The prerequisites and steps to create a profile differ, depending on the type of profile you want to create. The following steps are an overview of how to launch the Create Profile Wizard:

1.  Expand **Plan Management** in the Navigation pane.

2.  Expand the **Profiles and Policies**, then select a profile type.

**3.** Click **Create Profile**.

**4.** Complete the wizard, then click **Finish**.

## Copying a Profile

Procedure for making a copy of an existing profile in Oracle Enterprise Manager Ops Center

Copy a profile to re-use a standard configuration with some unique modifications. For example, you might want to copy a default operating system profile to create a user-defined profile and retain the default profile as a template.

The following steps are an overview of how to launch the Copy Profile Wizard:

**1.** Expand **Plan Management** in the Navigation pane.

**2.** Expand the **Profiles and Policies** navigation tree, then select a profile.

**3.** Click **Copy Profile**.

The Create Profile - OS Provisioning Wizard is displayed.

**4.** Edit the name and description of the profile.

**5.** Edit any parameters that you want to change.

**6.** Click **Finish**.

## About Editing a Profile

Describes editing a profile in Oracle Enterprise Manager Ops Center.

Editing a profile enables you to create a new version or a new profile. Editing the name or description of the profile creates a new profile. Editing values other than the name or description creates a new version. When a profile is referenced by one or more deployment plans, the default action is to update the referring plans to the new version. Before editing a profile or plan, see "About Version Control" to learn how versions are maintained.

## Editing a Profile

Procedure for changing a profile in Oracle Enterprise Manager Ops Center.

Perform the following steps to edit a profile:

**1.** Expand **Plan Management** in the Navigation pane.

**2.** Expand the **Profiles and Policies** navigation tree, then select a profile.

**3.** Click **Edit Profile**.

**4.** Complete the changes, then click **Finish**.

## About Policies

Describes policies for upating an operating system in Oracle Enterprise Manager Ops Center.

Policies are lists of actions that are explicitly approved or denied. Policies are specific to OS update and define the amount of user interaction you want when applying OS

patches and packages. For example, you might want to automate applying fixes without user interaction, but you might want to pause a job and require user approval before performing a downgrade or uninstall. You can also deny certain actions, such as installing patches or packages that are not certified.

Policy settings are hierarchical. When you have not defined a policy for a component, the policy for that component's parent applies. For example, it is possible to create a policy that allows the system to install a given component, but prohibits installing specific versions of that component.

For more information about update policies, see "Creating Update Policies" in the *Oracle Enterprise Manager Ops Center Operate Reference*.

## Overview of Deployment Plans

Describes the role and purpose of deployment plans in Oracle Enterprise Manager Ops Center.

Deployment Plans use profiles to perform standard management activities in a consistent and repeatable manner. A deployment plan defines the sequence of operations or steps that must be carried out on an asset to deploy it together with the specification or profile that each step applies and the resources that are required to apply it such as network addresses and system names.

Deployment plans are based on a set of templates. Some templates are designed for simple tasks and other, more complex plans, are designed to perform a series of tasks. A comprehensive set of deployment templates is available for you to use to create a variety of deployment plans. Each template is an unbound deployment plan which defines the steps of execution, but not the profiles and assets.

Use the template to define a task and the associated resources such as images and network addresses to complete the task. You can use the templates and customized profiles to create plans for your data center. For each plan, you can define the course of action to take when a step cannot be completed on a target. You can choose to stop the job at the first failure, or attempt to complete as much as possible. In some cases, you can build complex plans by combining existing plans. For example, you might add an operational profile and plan to the end of a deployment plan.

Several plans contain more than one step. In some cases, you can associate steps in a plan with another plan. The associated plan is referred to as a nested plan. You can use nested plans as shared building blocks, much in the same way as profiles are used. Configuring a single nested plan once and reusing it in many other plans reduces the number of individual operations that you must complete in the UI. The templates appear in the user interface in alphabetical order, not by type. However, it is useful to categorize the plans as simple, multi-step, and complex. See the different categories for a description of each plan.

Use the templates to create your own deployment plans and configure the plans using profiles. The settings and values in the profiles bound to each step are defaults. You can modify the plan before it is actually applied. You can further constrain the profile settings and values by the target systems to which the plan is applied.

With the exception of complex plans, the templates do not allow you to add steps to a plan. You can use only those steps that are defined in the template from which the plan is derived. Complex plans enable you to add one or more deployment and operational plans inside a complex type plan.

## About Simple Deployment Plans

Describes deployment plans that perform one operation in Oracle Enterprise Manager Ops Center.

The software provides you with the ability to create, configure, manage and execute deployment plans which drive the hardware, firmware and software provisioning activities in a repeatable fashion.

You create plans from defined templates. Each plan defines the sequence of steps that must be carried out for configuration or provisioning of a system. Plans might contain a single step or a sequence of multi-steps. Each step in the plan is configured by associating a profile or another plan.

A simple plan contains a single step with a single image. You can define the image used by the plan, but you cannot add more than one image or add steps. In most cases, when you create a profile, the default action also creates a simple deployment plan.

## Templates for Simple Deployment Plans

List of templates for deployment plans in Oracle Enterprise Manager Ops Center.

The following plans are simple deployment plans:

- Configure RAID: Use this plan to configure the RAID controller on a server. See "Configuring a RAID Controller" for information and see *Configure RAID Controllers* for an example of how to use the profile and plan.

- Configure Service Processor: Use this plan to configure the service processor on a chassis. See "Configuring the Service Processor" for information and some procedures and see *Discover and Manage Hardware* for an example of how to use manage existing service processors.

- Update Firmware: Use this plan to update firmware. See "Firmware Provisioning" for information and some procedures and see *Keep Your Firmware Up-to-Date* in the library at for an example of how to use the profile and plan.

- Update BIOS Configuration: Use this plan to update the BIOS configuration of servers. See "Configuring a BIOS Configuration Profile and Plan" in for instructions in using the profile and plan.

- Create Dynamic System Domain: Use this plan to create dynamic system domains. See "Configuring a Dynamic System Domain" for information about this profile and plan.

- Update Storage Appliances: Use this plan to update storage appliance software. See "Provisioning and Updating an Oracle ZFS Storage Appliance" for instructions in using the profile and plan.

- Create Oracle Solaris Zones: Use this plan to create zones. See "Creating a Zone Profile" and "Creating and Deploying Zone Plans" for information and procedures. See *Create Oracle Solaris 11 Zones* and *Create Oracle Solaris 10 Zones* for examples of the profiles and plans.

- Create Logical Domains: Use this plan to create logical domains. See "Creating a Guest Domain Profile" for information and procedures. See *Configure and Install Guest Domains* for an example of how to use the profile and plan.

## About Multi-Step Deployment Plans

Describes deployment plans in Oracle Enterprise Manager Ops Center.

Several deployment templates with multi-step sequences are available. These plans are designed to provide you with a customized and repeatable way to perform common operations with a single click. The steps in a multi-step plan are defined in the template. You cannot skip steps or add steps.

## Templates for Multi-Step Deployment Plans

List of templates for deployment plans in Oracle Enterprise Manager Ops Center.

The following plans are multi-step deployment plans:

- Install Server: Use this plan to provision the server and update the OS.

- Software Deployment and Update: Use this plan to apply script-based update profiles. See `Updating an Operating System From a Deployment Plan` in *Oracle Enterprise Manager Operate Reference* for information on how to use the profile and plan.

- Provision OS: Use this plan to provision and configure an operating system. See "Operating System Provisioning" in Oracle Enterprise Manager Operation Reference for information about how to use the profiles and plan. See *Provision Oracle Solaris 11 Operating Systems* and *Provision Oracle Solaris 10 Operating Systems* for examples.

- Update Solaris 11 OS: Use this plan to update Oracle Solaris 11 operating systems. See `Updating an Operating System From a Deployment Plan` in *Oracle Enterprise Manager Operations Reference* for information about how to use the profile and plan. See *Update Your Oracle Solaris 11 Operating System* for an example.

- Create Boot Environment: Use this plan to create Oracle Solaris boot environments. See `Overview of Oracle Solaris 11 Boot Environments` and `Overview of Oracle Solaris 10 Boot Environment` in *Oracle Enterprise Manager Operations Reference* for information about how to use the profile and plan. See *Create and Administer a Boot Environment for Oracle Solaris 11* and *Create and Administer a Boot Environment for Oracle Solaris 10* for examples.

- Update Firmware and Install Oracle VM Server for SPARC: Use this plan to update firmware and then install Oracle VM Server for SPARC on the system. See `Overview of Oracle VM Server for SPARC Installation` in *Oracle Enterprise Manager Virtualization Reference* for information about to use the profile and plan.

## About Complex Deployment Plans

Describes complex deployment plans in Oracle Enterprise Manager Ops Center.

You can use a combination of profiles, deployment plans, and operational plans to create a complex deployment plan that enables you to automate a variety of detailed workflows into a single plan. Complex plans provide flexibility to structure plans that meet your local requirements, increasing consistency and allowing for a greater level of automation.

When you create complex deployment plans, you can choose to skip a step in the plan. Skipped steps are not processed when the plan is applied. You can replicate certain

steps to perform the same operation but using a different profile or plan. You can also add one or more deployment plans and operational plans.

See *Use Complex Plans* How To document for an example.

## Templates for Complex Deployment Plans

List of templates for deployment plans in Oracle Enterprise Manager Ops Center.

The following plans are complex deployment plans:

- Configure M-Series Hardware, Create and Install Domain: Use this plan to configure an M-Series server, create dynamic system domains, provision OS on the domains, and update the domains.

- Configure Server Hardware and Install OS: Use this plan to configure a service processor or a chassis, provision OS and update the OS.

- Configure and Install Dynamic System Domain: Use this plan to create dynamic system domains, provision and update OS on the domains.

- Configure and Install Logical Domains: Use this plan to create logical domains and provision OS on the logical domains.

# Managing Deployment Plans

Overview of actions performed by deployment plans in Oracle Enterprise Manager Ops Center.

### Topics

- Copying a Deployment Plan

- Editing a Deployment Plan

- Deleting a Deployment Plan

## Copying a Deployment Plan

Procedure for making a copy of an existing deployment plan in Oracle Enterprise Manager Ops Center

You can copy an existing deployment plan, rename it, and create a new plan.

Perform the following steps to copy a plan:

1. Select **Plan Management** from the Navigation pane.

2. Use one of the following methods to select **Copy Deployment Plan**:

   - Method 1: Select the deployment type from the tree and select a plan from the list to enable the Copy Deployment Plan icon. Click the **Copy Deployment Plan** icon.

   - Method 2: Expand the selected deployment type and select a plan from the list. Select **Copy Deployment Plan** from the Actions pane.

3. Edit the following details of the plan:

   - Description: Provide a description of the plan.

- Plan Name: By default, the plan name is Copy of <*plan name*>. For example, Copy of Firmware Update. You can modify the name.

- Failure Policy: Select whether the plan execution is to stop at failure or complete as much as possible.

4. Configure a step of the plan by setting or changing the associated profile or by creating a new profile.

5. Edit the plan by replicating the steps and associate targets, depending on the type of plan selected.

6. Click **Save the new plan**. A new plan is saved with the version v1.

## Editing a Deployment Plan

Procedure for changing a deployment plan in Oracle Enterprise Manager Ops Center.

You can edit the deployment plan details, alter the plan configuration by skipping steps in the plan, change the profile or plan bound to each step, or save the plan under a different name to create a new plan.

> **Note:**
>
> When you edit a deployment plan that is referred to by another plan, for example, in a nested plan, the referring plan is not automatically updated to refer to the edited plan's version. You must manually modify the referring plan if you want it to use the modified version.

Before editing a plan, see "About Version Control to learn how versions are maintained.

Perform the following steps to edit a plan:

1. Select **Plan Management** from the Navigation pane.

2. Use one of the following methods to select the **Edit Deployment Plan** option:

- Method 1: Select the deployment type from the tree and select a plan from the list to enable the icon. Click the **Edit Deployment Plan** icon.

- Method 2: Expand the selected deployment type and select a plan from the list. The plan details appear. Select **Edit Deployment Plan** from the Actions pane.

3. Edit the following details of the plan:

- Plan Name: Edit the name to create a new plan. You create a new plan when you modify the plan name.

- Description: Provide a description of the plan.

- Failure Policy: Select whether you want the plan execution to stop at failure or complete as much as possible.

4. Configure a step of the plan by setting or changing the associated profile, or by creating a new profile.

5. (Optional) Edit the plan by replicating the steps and associate targets depending on the type of plan selected.

6. Click **Save** to save any changes made to the plan. When you have changed the name, a new plan is saved with the version v1.

## Deleting a Deployment Plan

Procedure for removing a deployment plan from Oracle Enterprise Manager Ops Center.

You can delete a deployment plan or only a version of the plan. When the selected deployment plan is not referenced by any other plans, you can confirm deleting the plan or its version. When the plan is used in other plans, the Delete Deployment Plan option is not enabled.

Perform the following steps to delete a plan:

1. Select **Plan Management** from the Navigation pane.

2. Use one of the following methods to select the Delete Deployment Plan option:

   - Method 1: Select the deployment type from the tree. The plans of that type are listed in the center pane. Select a plan from the list. The Delete Deployment Plan and Delete Version icon is enabled. Click **Delete Deployment Plan** or **Delete Version**.

   - Method 2: Expand the selected deployment type and select a plan from the list. Select **Delete Deployment Plan** or **Delete Version** from the Actions pane.

3. Click **Delete** to confirm the delete action.

# Deleting Plans and Profiles Using the Command Line Interface

Procedure for using CLI to delete one or more profiles or plans of any type.

**Topics**

- Deleting a Single Profile or Plan

- Deleting Multiple Profiles and Plans

- Using a Command File to Delete Profiles and Plans

## Deleting a Single Profile or Plan

Procedure for using CLI to delete an individual profile or plan of any type.

Use the CLI's plan mode to view a list of plans and delete one. You can also delete the profile for the plan.

1. Invoke the Oracle Enterprise Manager's command line interface.

   The command prompt shows the Enterprise Controller's host name:

   ```
   >./oc
   hostname>
   ```

2. Enter plan mode.

```
hostname>plan
hostname/plan>
```

**3.** View the list of plans and identify the plan to delete by its ID number.

```
hostname/plan>list
Name               |     ID     |    Description
osp_planA          | 1111       | alpha
osp_planB          | 1234       | beta
fw_planA           | 1728       | alpha
complexD           | 0023       | delta
hostname/plan>
```

**4.** Issue the command to delete a plan, in this example, the plan with an ID of 1728:

```
hostname/plan>delete 1728
Plan with Id 1728 deleted successfully. (Job Id <id>)
```

To delete the profile related to the plan, issue the following command:

```
hostname/plan>delete -p 1728
Plan with Id 1728 deleted successfully. (Job Id <id>)
```

## Deleting Multiple Profiles and Plans

Procedure for using CLI to delete one or more profiles or plans of any type.

Use the CLI's plan mode to view a list of plans and delete several of them. You can also delete the profile for the plan.

**1.** Invoke the Oracle Enterprise Manager's command line interface.

The command prompt shows the Enterprise Controller's host name:

```
>./oc
hostname>
```

**2.** Enter plan mode.

```
hostname>plan
hostname/plan>
```

**3.** View the list of plans and identify the plan to delete by its ID number.

```
hostname/plan>list
Name               |     ID     |    Description
osp_planA          | 1211       | alpha
osp_planB          | 1234       | beta
fw_planA           | 1728       | alpha
complexD           | 0023       | delta
hostname/plan>
```

**4.** Issue the command to delete a plan, in this example, the plans for OS provisioning:

```
hostname/plan>delete 12*
Plan with Id 12* deleted successfully. (Job Id <id>)
```

To delete the profile related to the plan, issue the following command:

```
hostname/plan>delete -p 12*
Plan with Id 12* deleted successfully. (Job Id <id>)
```

### Using a Command File to Delete Profiles and Plans

Procedure for using a command file to delete profiles or plans of any type.

Use `plan` mode in a command file to delete plans and profiles routinely or to delete large numbers of plans and profiles.

1.  Create a file containing the commands to delete the plans and/or profiles.

2.  View the list of plans and identify the plans to delete.

3.  For each plan or for each type of plan, edit the command file to include delete subcommand. The following example shows the delete subcommand for Oracle Solaris:

    ```
    /opt/SUNWoccli/bin/oc -e "connect;plan;delete -p 1231"
    /opt/SUNWoccli/bin/oc -e "connect;plan;delete -p 1232"
    /opt/SUNWoccli/bin/oc -e "connect;plan;delete -p 1234"
    <lines omitted>
    ```

4.  Invoke the Oracle Enterprise Manager's command line interface.

    The command prompt shows the Enterprise Controller's host name:

    ```
    >./oc -c <filename>
    hostname>
    ```

(Optional) Enter the result of the procedure here.

## About Applying a Deployment Plan

Describes deployment plans in Oracle Enterprise Manager Ops Center.

When you deploy a plan, you select the target assets against which the plan is executed. After you select the targets, you have the option to temporarily override the profile configuration for specific assets before you deploy the plan.

Many actions use deployment plans. See the documentation in the Deploy How To library and the Operate How To library for workflows and end-to-end examples.

## Related Resources for Plans and Profiles

List of Oracle Enterprise Manager Ops Center documents with additional information.

For profile and plan details, and how to use individual profiles and plans, go to one of the following resources.

- Manage Assets

- See About Version Control for how versions are maintained.

- In the *Oracle Enterprise Manager Operations Reference,* see:

    - Hardware

    - Operating System Management

    - Operating System Provisioning

    - Operating System Updates

- – Creating Update Policies

- – Configuring a RAID Controller

- – Configuring the Service Processor

- – Firmware Provisioning

- – Configuring a BIOS Configuration Profile and Plan

- – Configuring a Dynamic System Domain

- – Updating an Operating System From a Deployment Plan

- – If you prefer to create profiles by default, editing the property file. See Default Profiles and Plans.

- In the *Oracle Enterprise Manager Virtualization Reference,* see:

  - – Oracle Solaris Zones

  - – Oracle VM Server for SPARC

  - – Creating a Zone Profile and Creating and Deploying Zone Plans

  - – Creating a Guest Domain Profile

  - – Overview of Oracle Solaris 11 Boot Environments and Overview of Oracle Solaris 10 Boot Environment

  - – Overview of Oracle VM Server for SPARC Installation

- For Discovery: See About Discovering Assets

- Configure RAID: See *Configure RAID Controllers* for an example of how to use the profile and plan.

- Configure Service Processor: See *Discover and Manage Hardware* for an example of how to use manage existing service processors.

- Update Firmware: See *Keep Your Firmware Up-to-Date* for an example of how to use the profile and plan.

- Update Storage Appliances: Use this plan to update storage appliance software. See Provisioning and Updating an Oracle ZFS Storage Appliance for instructions in using the profile and plan.

- Create Oracle Solaris Zones: See *Create Oracle Solaris 11 Zones* and *Create Oracle Solaris 10 Zones* for examples.

- Create Logical Domains: See *Configure and Install Guest Domains* for an example.

- Provision OS: See *Provision Oracle Solaris 11 Operating Systems* and *Provision Oracle Solaris 10 Operating Systems* for examples.

- Update Solaris 11 OS: See *Update Your Oracle Solaris 11 Operating System* for an example.

- Create Boot Environment: See *Create and Administer a Boot Environment for Oracle Solaris 11* and *Create and Administer a Boot Environment for Oracle Solaris 10* for examples

- See *Use Complex Plans* for an example.

For end-to-end examples, see the workflows and how to documentation in the library. For deployment tasks, go to `http://docs.oracle.com/cd/E59957_01/nav/deploy.htm` and for operate tasks go to `http://docs.oracle.com/cd/E59957_01/nav/operate.htm`

# A

# About Asset Attributes

Overview of properties of asset types in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center records the attributes of the assets it manages. You can use these attributes to administer groups. You can use the time zone values to adjust the reporting of assets.

## Monitoring Attributes

Describes the contents of the Javadoc package and its location in Oracle Enterprise Manager Ops Center.

The attributes that are used for asset monitoring vary across asset types. The list of attributes for each asset is available in a set of Javadocs within the SDK package. This package is located in the following directory:

- Linux OS: *Installation directory*`/xvmoc_full_bundle/Linux_i686/Product/ components/packages/sun-xvmoc-sdk-12.0.0.noarch.rpm`

- Oracle Solaris OS for SPARC: *Installation directory*`/xvmoc_full_bundle/ SunOS_sparc/Product/components/packages/SUNWxvmoc-sdk.pkg`

- Oracle Solaris OS for x86: *Installation directory*`/xvmoc_full_bundle/ SunOS_i386/Product/components/packages/SUNWxvmoc-sdk.pkg`

This package installs the Javadocs in the `/opt/sun/xvm/sdk/xvm_oc/doc/ javadoc/` directory. Open the Javadoc file for an asset type to view the attributes for that asset type.

## Grouping Attributes

Lists the attributes of assets that recorded in Oracle Enterprise Manager Ops Center.

Table A-1 lists the attributes that you can use in group rules.

*Table A-1    Group Asset Attributes*

| Attribute | Supported Values |
| --- | --- |
| Appliance IP Address | Any IP address |
| Appliance Name | Any string |
| Architecture | na |
| Asset Provisioning Supported | na |

*Table A-1    (Cont.) Group Asset Attributes*

| Attribute | Supported Values |
| --- | --- |
| Asset Type | GlobalZone |
| | NonGlobalZone |
| | LDomHost |
| | LDomGuest |
| | OperatingSystem |
| | Server Network |
| | ServerContainer |
| | MSeriesChassis |
| | VirtualPool |
| | SolarisCluster |
| | SolarisClusterNode |
| | SolarisClusterZoneClusterGroup |
| Auto Boot | on |
| | off |
| Capability Entry | na |
| Control Component Info Description | na |
| Control Component Info Version | na |
| Control Component Server Hostname | na |
| Control Web Console URI | na |
| CPU Architecture | POWER_PC |
| | SPARC |
| | SPARC-SUN4V |
| | X86 |
| CPU Core Count | Any number |
| CPU Info Thread Count | Any number |
| CPU Mode | compatible |
| | auto |
| CPU Model | Any string |
| CPU Speed | Any number |
| CPU Type | Any string |
| Debug User SSH Access | TRUE |
| | FALSE |
| Description | Any string |

***Table A-1    (Cont.) Group Asset Attributes***

| Attribute | Supported Values |
| --- | --- |
| Diag Level | max<br>none<br>min |
| DNS Configured | TRUE<br>FALSE |
| DNS Domain Name | Any string |
| Domain Degredation Policy | fru<br>system<br>xsb |
| Ethernet Port Fabric Tag | |
| Ethernet Port Info IP Address | Any IP address |
| Ethernet Port Infos Management | TRUE<br>FALSE |
| Fabric Type | |
| Firmware Info Type | Any string |
| Firmware Description | Any string |
| FirmwareInfo Compliant | TRUE<br>FALSE |
| FirmwareInfo Provider | Any string |
| Firmware Version | Any string |
| Hard Disk Size (Bytes) | Any number |
| Host ID | Any string |
| Hostname | Any string |
| HTTP Enabled | na |
| IbP Key | na |
| In Ucast Packets | na |
| Interface Info Enabled | TRUE<br>FALSE |
| Interface Info Fabric Tag | |
| Interface Info Subnet Mask | Any number |
| Interface Infos Mac Address | Any number |

***Table A-1    (Cont.) Group Asset Attributes***

| Attribute | Supported Values |
|---|---|
| Interface IP Address | Any IP address |
| IP Address | Any IP address |
| IPSLicense | Any string |
| IPS Readme | Any string |
| Keep Alive Trap Time Seconds | na |
| LDAP Profile Name | Any string |
| LDAP Proxy DN | Any string |
| LDAP Server | Any string |
| Local DNS Address | na |
| Locale | C<br>POSIX<br>en_CA<br>en_CA.ISO8859-1<br>en_CA.UTF-8<br>en_US<br>en_US.ISO8859-1<br>en_US.ISO8859-15<br>en_US.ISO8859-15@euro<br>es<br>es_MX<br>es_MX.ISO8859-1<br>es_MX.UTF-8<br>fr<br>fr_CA<br>fr_CA.ISO8859-1<br>fr_CA.UTF-8<br>iso_8859_1 |
| Location | na |
| Locator Light On | TRUE<br>FALSE |
| MAC Address | na |

*Table A-1    (Cont.) Group Asset Attributes*

| Attribute | Supported Values |
|---|---|
| Machine Hardware Class | InfiniBand<br>Ethernet<br>FibreChannel<br>EthernetGateway<br>InfiniBandGateway<br>Unknown<br>TOR<br>NEM |
| Maintenance Mode | na |
| Managed State | HIDDEN<br>MANAGED<br>MANAGED_OR_PROVISIONED<br>PROVISIONING<br>UNMANAGED<br>UNMANAGED_OR_PROVISIONED |
| Management IP | na |
| Manufactured Service Tag | na |
| Manufacturer | Any string |
| MBean Interface Name | Any string |
| Member Info Secure Mode | on<br>off |
| Member Info Set Type | DOMAIN<br>NEM<br>SERVER |
| Memor Size | Any number |
| Memor Type | Any string |
| Model | Any string |
| Monitored | TRUE<br>FALSE |
| Monitoring Policy | na |
| MTU | na |
| Multi Path Enabled | TRUE<br>FALSE |
| Name | |

**Table A-1    (Cont.) Group Asset Attributes**

| Attribute | Supported Values |
| --- | --- |
| Name Service Domain Name | Any string |
| Network CIDR | Any string |
| NFS Map ID Domain | Any string |
| NIS Name Server By IP Address | Any IP address |
| NIS Name Server By Name | Any string |
| Notifications Enabled | TRUE<br>FALSE |
| Operator Panel Switch Status | Any string |
| Ops Center Version | na |
| OSRunning | TRUE<br>FALSE |
| Out Ucast Pkts | na |
| PDU Modules | na |
| Platform | na |
| Port Info Address | Any string |
| Port Info Connected Peer | Any string |
| Port Connector Type | BOARD_INTERNAL<br>CHASSIS_BLADE<br>CHASSIS_FABRIC<br>CXP<br>QSFP<br>SFP<br>SFP_PLUS<br>UNKNOWN |
| Port Description | Any string |
| Port Fabric Tag | ETHERNET<br>FIBRE_CHANNEL<br>INFINIBAND<br>UNKNOWN |
| Port Info In Discards | Any number |
| Port Info In Errors | Any number |
| PortInfos.inNUcastPkts | Any number |
| Port Info In Octets | Any number |

***Table A-1    (Cont.) Group Asset Attributes***

| Attribute | Supported Values |
|-----------|------------------|
| Port Info Last Tick | Any number |
| Port Info Link Type | Any string |
| Port Info Local IP Address | Any string |
| Port Info Management | TRUE<br>FALSE |
| Port Info MTU | Any number |
| Port Info Node Address | na |
| Port Info Oper Status | Any string |
| Port Info Out Discards | Any number |
| Port Info Out Errors | Any number |
| Port Info Out NU CastPackets | Any number |
| Port Info Out Octets | Any number |
| Port Info Peer Address | Any number |
| Port Info Port Type | HOST<br>ROUTER<br>SWITCH<br>TARGET |
| Port Info Remote DNS Address | Any string |
| Port Info Remote IP Address | Any string |
| Port Info Speed | Any string |
| Port Info Type | ETHERNET<br>FIBRE_CHANNEL<br>INFINIBAND<br>POWER<br>SERIAL<br>VLAN<br>UNKNOWN |
| Port Infos In Unknown Proto | na |
| Port Infos NUcast Packets | na |
| PoweredOn | TRUE<br>FALSE |
| Product Defined Instance ID | na |

*Table A-1    (Cont.) Group Asset Attributes*

| Attribute | Supported Values |
| --- | --- |
| Product Name | na |
| Product URN | na |
| Product Vendor | na |
| Product Version | na |
| Public UUID | na |
| Rack ID | na |
| Rack Info Asset Domain Type | na |
| Rack Info Asset Gear Type | na |
| Rack Info Asset ON | na |
| Rack Info Asset Status | na |
| Rack Info Asset User Friendly Name | na |
| Rack Info Assets | na |
| Rack Info Assets Model | na |
| Rack Info Assets Occupancy | na |
| Rack Info Position X | na |
| Rack Info Position Y | na |
| Rack Info Position Z | na |
| Rack Info Assets User Friendly Name | na |
| Rack Info Configuration | na |
| Rack Info Number of Slots | na |
| Rack Info Type | na |
| Rcv Error Rate | Any string |
| RcvThroughput | Any string |
| Repeat Trap Number | na |
| Repeat Trap Time Seconds | na |
| Revision | na |
| RoutingMode | DYN_OFF<br>DYN_ON<br>DYN_AUTO |

**Table A-1    (Cont.) Group Asset Attributes**

| Attribute | Supported Values |
| --- | --- |
| Satellite | Any string |
| Semantic Tag Key | na |
| Semantic Tag Key & Value | na |
| Sensor Notification Enabled | TRUE<br>FALSE |
| Serial Console URL | Any string |
| Serial Number | na |
| Service Tag Agent Version | Any string |
| Service Tag AssetLabel | Any string |
| Service Tag CPU Manufacturer | Any string |
| Service Tag Customer Asset Tag | Any string |
| Service Tag Host | Any string |
| Service Tag Instance URN | Any string |
| Service Tag IP Address | Any IP address |
| Service Tag Platform Architecture | Any string |
| Service Tag Port | Any number |
| Service Tag Product Hierarchy | Any string |
| Service Tag Release | Any string |
| Service Tag Serial Number | Any string |
| Service Tag Sub-Status | Any string |
| Service Tag Type | NATIVE<br>NATIVE_NOT_FOUND<br>MANUFACTURED |
| SNMP Enabled | na |
| Solaris Non-global zone Exclusive | na |
| Solaris Non-Global Zone. | na |
| Static Route Info Set | na |

*Table A-1    (Cont.) Group Asset Attributes*

| Attribute | Supported Values |
|---|---|
| Status | FAULTED |
| | NON_RECOVERABLE |
| | MAINTENANCE |
| | DECONFIGURED |
| | DEGRADED |
| | CRITICAL |
| | WARNING |
| | INFO |
| | OK |
| | UNINITIALIZED |
| | UNKNOWN |
| | UNCONFIGURED |
| | NEEDS_POWERON |
| Subnet Manager | TRUE |
| | FALSE |
| Subnet Manager Address | Any string |
| Subnet Mask | Any string |
| System Identifier | na |
| System Name | na |
| System Version | na |
| Time Zone | See Time Zone Values list below |
| Total Rcv Errors | Any string |
| Total Rcv Octets | Any string |
| Total Xmit Errors | Any string |
| Total Xmit Octets | Any string |
| User Friendly Description | Any string |
| User Friendly Name | Any string |
| Version | na |
| Virtualization Type | ldom |
| | xen |
| | zone |
| VLan ID | Any string |
| Web Console URI | Any string |
| Web Console URL | Any string |

***Table A-1    (Cont.) Group Asset Attributes***

| Attribute | Supported Values |
|---|---|
| Xmit Error Rate | Any string |
| Xmit Throughput | Any string |
| XSB Assignment Status | Assigned<br>Available<br>Unavailable |
| XSB Connection Status | y<br>n |
| XSB Diag Status | Failed<br>Passed<br>Testing<br>Unknown<br>Unmount |
| XSB Domain ID | 00<br>01<br>02<br>03<br>04<br>05<br>06<br>07<br>08<br>09<br>10<br>11<br>12<br>13<br>14<br>SP |
| XSB Dynamic Reconf Status | Any string |
| XSB ID | Any string |
| XSB Fault Status | Degraded<br>Faulted<br>Normal |
| XSB Info Set | na |
| XSB Power Status | y<br>n |
| XSB PSB ID | Any string |

***Table A-1    (Cont.) Group Asset Attributes***

| Attribute | Supported Values |
| --- | --- |
| XSB Incorporation Status | y |
| | n |
| XVMServerVersion | Any string |

# B

# Expression Query Language

Overview of expression queries in Oracle Enterprise Manager Ops Center.

Use the expression query language to build query object constraints and create customized expression monitoring rules. . See *Oracle Enterprise Manager Ops Center Tuning Monitoring Rules and Policies* for examples of how to tune the default rules that are provided with the software and how to add new rules.

The expression query language is mainly used to define monitoring rules and to check if an asset attribute verifies a given condition. The query language is closely modeled on the `WHERE` clause of `SQL SELECT` statements.

This section contains the following information:

- Monitoring Attributes and Classes

- Lexical Elements

- Grammar

- Semantics

- Informal Examples

## Monitoring Attributes and Classes

Describes the contents of the Javadoc package.

Asset monitoring attributes vary by asset type. The asset types and corresponding attributes are available in the API Javadocs that are part of the SDK package. The package installs the Javadocs in the `/opt/sun/xvm/sdk/xvm_oc/doc/javadoc/` directory. Open the Javadoc file to view all attributes and classes.

## Classes

Lists the attributes that can be viewed or configured for assets in Oracle Enterprise Manager Ops Center.

The classes corresponding to the asset types are located in the `com.sun.hss.type` package and subpackages. The following are a few of the classes representing the asset types that you can use to create expression monitoring rules and some attributes available for monitoring:

- `com.sun.hss.type.os.OperatingSystem`

- `com.sun.hss.type.server.Server`

- `com.sun.hss.type.servercontainer.ServerContainer`

- `com.sun.hss.type.virtserver.VirtServer`

- `com.sun.hss.type.virtserver.VirtServerContainer`

For each class, you can deduce the attributes that the software can monitor by looking for the *getter* methods defined by the class. Those are the methods whose names start with *get* or *is* and which take no parameters. The name of the attribute corresponding to a method is built by removing the *get* or *is* prefix from the method name. For example, the `OperatingSystem` class defines a method named `getCpuUsage`, as follows:

```
@Description(value="CPU Usage information")

CpuUsage getCpuUsage()
```

The name of corresponding attribute name is `CpuUsage`.

## Attribute Type

Description of methods available for an attribute type for monitoring rules in Oracle Enterprise Manager Ops Center.

The return type of the method describes the attribute type. To find the subfields of the attributes that the software can monitor, navigate to the definition of the corresponding class. The name of the subfields are also deduced from the *getter* methods defined on the attribute type class. Given the name of a *getter* method, you can deduce the subfield name by removing the *get* or *is* prefix and by setting the next character to lowercase. Following the previous example, when you navigate to the Javadoc of the `CpuUsage` class, you will find the following *getter* method:

```
@ValueInfo(metricType="gauge",

thresholdRising=true,

units="%",

minValue="0",

maxValue="100")

public float getUsagePercentage()
```

This means the subfield is named `usagePercentage`. The complete attribute/subfield name that you can use in a monitoring rule is `CpuUsage.usagePercentage`.

## Lexical Elements

Lists the lexical elements for queries.

The following are some lexical elements:

- Attribute names are case sensitive.

- Keywords, such as and, `like`, and `between`, are not case sensitive.

- Use double quotes to access an attribute whose name, ignoring case, is the same as one of these keywords: `not`, `instanceof`, `like`, `true`, or `false`. For example, `"not"`. You can use double quotes to include non-identifier characters in the name of an attribute. For example, "attribute-name-with-hyphens". To include the double quote character in the attribute name, write it twice. `"foo""bar""baz"` represents the attribute called `foo"bar"baz`.

- String constants are written with single quotes, for example `'this'`. A single quote within a string constant must be doubled, for example `'can''t'`.

- Integer constants are written as a sequence of decimal digits, optionally preceded by a plus or minus sign. An integer constant must be a valid input to `Long.valueOf(String)`.

- Floating-point constants are written using the Java syntax. A floating-point constant must be a valid input to `Double.valueOf(String)`.

- A boolean constant is either true or false, ignoring case.

- Spaces cannot appear inside identifiers (unless written with double quotes), keywords, or multi-character tokens, such as `<=`. Spaces can appear anywhere else, but are not required except to separate tokens. For example, you can write the query *a < b* and *5 =c* as `a<b and 5=c`, but you cannot remove any other spaces.

# Grammar

Lists the grammar for the syntax of queries.

**query**

andquery [OR query]

**andquery**

predicate [AND andquery]

**predicate**

( query ) |

NOT predicate |

INSTANCEOF stringvalue |

LIKE objectnamepattern |

value predrhs

**predrhs**

compare value |

[NOT] BETWEEN value AND value |

[NOT] IN ( value commavalues ) |

[NOT] LIKE stringvalue

**commavalues**

[ , value commavalues ]

**compare**

= | < | > | <= | >= | <> | !=

**value**

factor [plusorminus value]

**plusorminus**

\+ | -

**factor**

term [timesordivide factor]

**timesordivide**

\* | /

**term**

attr | literal | ( value )

**attr**

name [# name]

name:

identifier [.name]

**identifier**

Java-identifier | double-quoted-identifier

**literal**

booleanlit | longlit | doublelit | stringlit

**booleanlit**

FALSE | TRUE

**stringvalue**

stringlit

**objectnamepattern**

stringlit

# Semantics

List of strings that map to Java object in Oracle Enterprise Manager Ops Center.

Table B-1 describes the grammar semantics and defines a function *q* that maps a string to a Java object, such as a `QueryExp` or a `ValueExp`.

*Table B-1    Semantics*

| String *s* | *q(s)* |
| --- | --- |
| *query1* **OR** *query2* | Query.or*(q(query1), q(query2))* |
| *query1* **AND** *query2* | Query.and*(q(query1), q(query2))* |
| ( queryOrValue ) | *q(queryOrValue)* |

***Table B-1    (Cont.) Semantics***

| String *s* | *q(s)* |
|---|---|
| **NOT** query | Query.not(*q(query)*) |
| **INSTANCEOF** stringLiteral | Query.isInstanceOf(*Query.value(q(stringLiteral))*) |
| **LIKE** stringLiteral | new ObjectName(*q(stringLiteral)*) |
| *value1 = value2* | Query.eq(*q(value1), q(value2)*) |
| *value1 < value2* | Query.lt(*q(value1), q(value2)*) |
| *value1 > value2* | Query.gt(*q(value1), q(value2)*) |
| *value1 <= value2* | Query.leq(*q(value1), q(value2)*) |
| *value1 >= value2* | Query.geq(*q(value1), q(value2)*) |
| *value1 <> value2* | Query.not(Query.eq(*q(value1), q(value2)*)) |
| *value1 != value2* | Query.not(Query.eq(*q(value1), q(value2)*)) |
| *value1* **BETWEEN** *value2* AND *value3* | Query.between(*q(value1), q(value2), q(value3)*) |
| *value1* **IN** ( *value2, value3*) | Query.in(*q(value1)*, new ValueExp[] { *q(value2), q(value3)*}) |
| *value1* **NOT IN** ( *value2, value3* ) | Query.not(Query.in(*q(value1)*, *new ValueExp*[] { *q(value2), q(value3)*})) |
| *value* **LIKE** *stringLiteral* | Query.match(*q(value)*, translateWildcards(*q(stringLiteral)*)) |
| *value* **NOT LIKE** *stringLiteral* | Query.not(Query.match(*q(value)*, translateWildcards(*q(stringLiteral)*))) |
| *value1 + value2* | Query.plus(*q(value1), q(value2)*) |
| *value1 - value2* | Query.minus(*q(value1), q(value2)*) |
| *value1 * value2* | Query.times(*q(value1), q(value2)*) |
| *value1 / value2* | Query.div(*q(value1), q(value2)*) |
| *name* | Query.attr(*q(name)*) |
| *name1#name2* | Query.attr(*q(name1), q(name2)*) |
| **FALSE** | Query.value(false) |
| **TRUE** | Query.value(true) |
| *decimalLiteral* | Query.value(Long.valueOf(*decimalLiteral*)) |
| *floatingPointLiteral* | Query.value(Double.valueOf(*floatingPointLiteral*)) |

The `translateWildcards` function translates from the SQL notation for wildcards, using % and _, to the API notation using * and ?. If the LIKE string already contains a * or ?, these characters have their literal meanings, and are quoted in the call to `Query.match`.

# Informal Examples

Lists the examples for queries.

The formal specification of the language is described in Lexical Elements. The attributes are located in the Javadocs.

This section provides some informal examples.

```
Message = 'OK'
```

`Message = 'OK'` is verified if the `Message` attribute is the string `'OK'`.

```
Message like 'OK: %'
```

`Message` attribute whose value is a string beginning with `"OK: "`. The wildcard characters are the same as in SQL. In the query language, percent character means any sequence of characters and the underscore character means any single character.

```
FreeSpacePercent < 10
```

The`FreeSpacePercent` attribute whose value is a number less than 10.

```
FreeSpacePercent < 10 and WarningSent = false
```

Uses the same attribute as the previous example, but includes a boolean attribute `WarningSent` whose value is false.

```
SpaceUsed > TotalSpace * (2.0 / 3.0)
```

`SpaceUsed` and `TotalSpace` attributes where the first is more than two-thirds the second.

```
not (FreeSpacePercent between 10 and 90)
```

`FreeSpacePercent` attribute whose value is not between 10 and 90, inclusive.

```
FreeSpacePercent not between 10 and 90
```

Another way of writing the previous query.

```
Status in ('STOPPED', 'STARTING', 'STARTED')
```

Status attribute whose value is one of those three strings.

***Example B-1    Root Disk and CPU Usage***

Example B-1 is an expression that will raise an alert when the root disk is above 80% and the CPU usage is above 10.

```
FileSystemUsages.name="/".usedSpacePercentage >= 80) AND (CpuUsage.usagePercentage
>= 10
```

***Example B-2    Root Disk and System Load***

Example B-2 is an expression that will raise an alert when the root disk is above 80% and the system load is above 15.

```
FileSystemUsages.name="/".usedSpacePercentage >= 70) AND (SystemLoad.average1Minute
>= 15
```

# C

# About the API for Oracle Enterprise Manager Ops Center

Overview of the API in Oracle Enterprise Manager Ops Center.

Oracle Enterprise Manager Ops Center APIs allow external systems management solutions to integrate with Oracle Enterprise Manager Ops Center. The APIs are available remotely using TCP/IP through the secure protocol, JMXRemoting over TLS.

The Oracle Enterprise Manager Ops Center Software Developer's Kit (SDK), which is shipped with the Oracle Enterprise Manager Ops Center software, includes some examples that show how to use the public APIs.

## Using the SDK Example

Procedure for using the examples in Oracle Enterprise Manager Ops Center's SDK.

The example demonstrates the JMX Messaging Protocol (JMXMP) connector with Java/JMX technology. This example does not require any external JARs except Java and JDMK. This example performs the following functions:

- Configures the connection.

- Performs security settings.

- Opens the connection (locally or remotely).

- Uses the connection with JMX basic requests.

- Closes the connection.

1. Locate the `SUNWxvmoc-sdk.pkg` package in the `dvd/<platform>/Product/components/packages/` directory on the DVD/Install Media.

2. Install the `SUNWxvmoc-sdk.pkg` package.

3. Locate the example, `BasicClient.java`

4. Compile the example.

5. Execute the example, using the appropriate shell script.

## List of Public APIs

Lists the packages in the API of the Oracle Enterprise Manager Ops Center.

Table C-1 provides a brief description of the public APIs. For a complete list of packages, its classes, interfaces, and methods, refer to the Javadoc that is included in the SDK.

***Table C-1    List of Public APIs***

| Package | Description |
| --- | --- |
| `com.oracle.sysman.services.bios` | Provides BIOS configuration services. |
| `com.oracle.sysman.services.bootenvironment` | Provides parameters for ABE related operations. |
| `com.oracle.sysman.services.cloudmgmt` | Provides virtual datacenter (vDC) administration and vDC management services. |
| `com.oracle.sysman.services.common` | Provides common constants and utility classes. |
| `com.oracle.sysman.services.discovery` | Provides services to perform discovery and manage discovery profiles. |
| `com.oracle.sysman.services.dmmaintenance` | Provides the service for Domain Model maintenance |
| `com.oracle.sysman.services.exadatacell` | Provides the service interface for exadata cell management. |
| `com.oracle.sysman.services.network` | Provides network domain services. |
| `com.oracle.sysman.services.ocdoctor` | Provides services for OCDoctor functionality in Ops Center. |
| `com.oracle.sysman.services.ops` | Provides Oracle pre-engineered system management services. |
| `com.oracle.sysman.services.osanalytics` | Provides services for operating systems and virtual server container analytics. |
| `com.oracle.sysman.services.ovm` | Provides services to perform operations on OVM deployments through the OVM manager. |
| `com.oracle.sysman.services.rack` | Provides rack management services. |
| `com.oracle.sysman.services.reset` | Provides the reset service interface to handle resetting and refreshing the service processor. |
| `com.sun.xvm.services.agentprov` | Provides service for managing the provisioning of agents. This package provides services for the installation, configuration, and removal of agent software to remote operating systems. |
| `com.sun.xvm.services.agentupgrade` | Provides the service interface for agent upgrades. |
| `com.sun.xvm.services.alarm` | Provides services for alarm management. |
| `com.sun.xvm.services.authorization` | Provides the operations for authorization management. |
| `com.sun.xvm.services.bootenvironment` | Provides the interface for boot environment service. |
| `com.sun.xvm.services.cachemanager` | Provides the service interface for managing the cached view of the domain model. |

*Table C-1    (Cont.) List of Public APIs*

| Package | Description |
| --- | --- |
| `com.sun.xvm.services.cluster` | Provides the service interface for cluster management. This service is responsible for viewing and managing Solaris cluster instances and their nodes. |
| `com.sun.xvm.services.common` | Provides the service interfaces that are common to different public API services. |
| `com.sun.xvm.services.componentmgmt` | Provides the service interface for hardware components management. |
| `com.sun.xvm.services.datamodel` | Provides the service for accessing low-level data models. |
| `com.sun.xvm.services.deleteasset` | Provides the service interface to delete assets such as servers, operating systems, service tags, and chassis. The virtualization assets such as hosts, guests, virtual image libraries, and networks can be removed by calling the appropriate methods on their respective services. |
| `com.sun.xvm.services.discovery` | Provides services to discover assets. The interface for discovery service provides capability to initiate a discovery operation for a set of IP addresses. |
| `com.sun.xvm.services.event` | Provides the interface for event service. The interface for event service allows the client to subscribe to notifications emitted from the domain model. |
| `com.sun.xvm.services.fabricmgmt` | Provides service interfaces for fabric management. |
| `com.sun.xvm.services.fwdeployment` | Provides services for firmware deployment management. This package manages deployments of firmware updates to servers and chassis. |
| `com.sun.xvm.services.gear` | Provides service tag and general gear management interfaces. |
| `com.sun.xvm.services.grouping` | Provides asset group management services. |
| `com.sun.xvm.services.guest` | Provides service interfaces for guest management. |
| `com.sun.xvm.services.guest.provision` | Provides service interfaces for guest provisioning. |
| `com.sun.xvm.services.jobmanager` | Provides job management services for performing job actions, controlling job status, and retrieving information on job actions and job history. |
| `com.sun.xvm.services.migration` | Provides the service interface for migration service. This package provides the service for live, warm and cold migration of guest domains. |
| `com.sun.xvm.services.mos` | Provides the My Oracle Support services. |
| `com.sun.xvm.services.network` | Provides the network management services. This package provides services for managing networks for guests. |
| `com.sun.xvm.services.notification` | Provides notifications management services. |

*Table C-1    (Cont.) List of Public APIs*

| Package | Description |
|---|---|
| `com.sun.xvm.services.oemgc` | Provides the service interface for Oracle Enterprise Manager Cloud Control repository integration. |
| `com.sun.xvm.services.operation` | Provides services for operation profile functionality. |
| `com.sun.xvm.services.opscenter` | Provides the service interface for XMV Update Job Manager. |
| `com.sun.xvm.services.osconfig` | Provides classes for OS Configuration profiles management. |
| `com.sun.xvm.services.osdeployment` | Provides services and types to manage deployment of operating systems to servers. This package provides services to access aggregated and detailed information on installed operating systems, monitor OS activity, and provision OS. This package is available only in Enterprise Controllers. |
| `com.sun.xvm.services.osmonitoring` | Provides the parameters for OS monitoring profile value object creation. |
| `com.sun.xvm.services.pam` | Provides access to services based on the pluggable authentication modules |
| `com.sun.xvm.services.pis` | Provides the product and asset information service and types interfaces, used to classify assets according to their product name and hierarchy. |
| `com.sun.xvm.services.productupdate` | Provides the service interface to download update catalog files and bundles. |
| `com.sun.xvm.services.profile` | Provides the profile services to create, delete, and update profiles. |
| `com.sun.xvm.services.provisioning` | Provides services for managing server provisioning. |
| `com.sun.xvm.services.proxyprov` | Provides services for the installation of proxy software on a set of systems. |
| `com.sun.xvm.services.proxyservice` | Provides service for managing the provisioning of Proxy Controllers. |
| `com.sun.xvm.services.report` | Provides services and types for retrieving reports on utilization trend. |
| `com.sun.xvm.services.reportsmanager` | Provides services interfaces for the report manager. |
| `com.sun.xvm.services.storagemgmt` | Provides service interfaces for storage server management. |
| `com.sun.xvm.services.svrmgmt` | Provides service interfaces for server management. |
| `com.sun.xvm.services.switchmgmt` | Provides the physical and virtual switch management service interface. |
| `com.sun.xvm.services.topology` | Provides the topology service and types interfaces to get topology information of the managed resources. This package provides a tree-based navigation view of the Ops Center assets. |
| `com.sun.xvm.services.user` | Provides the services to manage user preferences. |

*Table C-1    (Cont.) List of Public APIs*

| Package | Description |
| --- | --- |
| `com.sun.xvm.services.virtimagelib` | Provides the services for virtual images library and virtual image management. |
| `com.sun.xvm.services.virtpool` | Provides the service for managing the life cycle of virtual pools sharing the same libraries or networks, and have the same processor architecture, integrating virtual pools with storage, networks, and virtualization hosts. |
| `com.sun.xvm.services.virtserverco ntainer` | Provides the service interface for managing virtualized server containers. |
| `com.sun.xvm.services.win` | Provides filters supported for Windows services. |
| `com.sun.xvm.services.winpm` | Provides service interfaces for Windows compliance reports and Windows software updates deployment. |
| `com.sun.xvm.services.wme` | Provides the service interface for Windows management extension administration. |
| `com.sun.xvm.services.xvmserver` | Provides the XVM server management service for managing the system level aspects of the XVM server. |

# Public API Access

Overview of the API in Oracle Enterprise Manager Ops Center.

### Topics

- About JMX

- About Public API Access Through JMX Clients

## About JMX

Describes Java Management Extensions (JMX) in Oracle Enterprise Manager Ops Center.

Java Management Extensions (JMX) technology provides the tools for building distributed, modular, and dynamic solutions for managing and monitoring devices, applications, and networks. The JMX API defines the notion of MBeans, or manageable objects, which expose attributes and operations in a way that allows remote management applications to access them. An important new feature of the JMX API in the Java Platform, Standard Edition 7 (Java SE 7) is its ability to create MXBeans, a substantial improvement over Standard MBeans. For more information on JMX, see the Java Management Extensions (JMX) Technology website at `http://www.oracle.com/technetwork/java/javase/tech/javamanagement-140525.html`.

## About Public API Access Through JMX Clients

Describes the API of Oracle Enterprise Manager Ops Center.

The simplest and preferred way of interacting with the public APIs is using a Java client. This Java client communicates with the public APIs using a secure remote JMX

client. By using a remote JMX client, it is possible to directly interact with the Service MXBeans in Java using the strongly-typed Java MXBeans interface class library. The JMX MXBean interfaces are documented in the javadoc that is included in the SDK. The following remote JMX management protocols are supported: JMXMP and WS-MAN.

# Overview of the Virtualization Management Stack

Describes tiers of the virtualization management stack in Oracle Enterprise Manager Ops Center.

The virtualization management stack is a three-tier management paradigm. The stack consists of presentation tier, service tier, and an underlying domain model.

- About the Presentation Tier
- About the Service Tier
- About the Domain Model

## About the Presentation Tier

Describes the presentation tier of the API in Oracle Enterprise Manager Ops Center.

The presentation tier provides the user interface, displays the information provided by the service tier, and takes actions through the service tier.

## About the Service Tier

Describes the service tier of the API in Oracle Enterprise Manager Ops Center.

The service tier contains all the core management logic. This tier exposes the management functionality through a set of public APIs that are used by the presentation tier and external systems management solutions. These public APIs are the ideal integration points for third-party software to control or to monitor the Enterprise Manager Ops Center software.

The service tier exposes its management APIs as a series of Java Management Extensions (JMX) MXBean interfaces. These interfaces are made accessible as public APIs through several remote protocols, including JMXRemoting (JSR 160) and WS-Management (JSR 262).

The services are identified by MXBean ObjectName, and these are of the form:

```
com.sun.xvm.services:type=<service name>
```

The main entry point to the public APIs is the MXBean interface defined in com.sun.xvm.services.

## About the Domain Model

Describes the way Oracle Enterprise Manager Ops Center registers each asset and its relationships.

The domain model provides the representation of underlying managed resources and associations between them. The domain model exposes a normalized data model of these managed resources as a collection of JMX MXBeans. Each managed resource has one MXBean and each association between these resources as one MXBean.

# D

# Changing the Patch Install Directory Location for Oracle Solaris OS

You can change the temporary location of the patch install directory for Agent Controllers on Oracle Solaris OS.

> **Note:**
>
> This procedure is not applicable for versions greater than Oracle Solaris 10.

Use one of the following methods to change the temporary location of the patch install directory:

- Configure the patch installation directory by modifying the following file in the `/usr/lib/scn/update-agent/bin/.uce.rc` directory on each agent manually:

  ```
  ( all ) ( invisible.directories.__pkg.extraction_tmp_dir, "/var/tmp/" );
  ```

  After the configuration changes, restart the Agent Controller.

- Perform the following steps to create an operational profile and plan and launch the deployment job:

  1.  Expand **Plan Management** in the Navigation pane, then click **Operational Profiles**.

  2.  Click **Create Profile**.

  3.  Name the new profile and add a description.

  4.  Select a subtype from the list to identify the type of target for this profile. Click **Next**.

  5.  Specify the type of script as **Remote Shell**.

  6.  Add the below script in the **Script** field.

      ```
      #!/bin/bash

      UCE_BIN=/usr/lib/scn/update-agent/bin
      if [ -f $UCE_BIN/.uce.rc ]; then
          grep -v 'extraction_tmp_dir' $UCE_BIN/.uce.rc > $UCE_BIN/.uce.rc.tmp
          mv $UCE_BIN/.uce.rc $UCE_BIN/.uce.rc.bk
          mv $UCE_BIN/.uce.rc.tmp $UCE_BIN/.uce.rc
          echo '( all ) ( invisible.directories.__pkg.extraction_tmp_dir, "'$
      {UCE_TMP_DIR}'" );' >> $UCE_BIN/.uce.rc
      ```

```
              /usr/lib/cacao/bin/cacaoadm restart -i scn-agent
       fi
```

7.  Specify the number of minutes or seconds that the script can run. The default is
    60 minutes. Click **Next**.

8.  In the **Reboot Policy** field, select **Success on Reboot** policy from the drop-
    down list to direct the action of the script when the system reboots.

9.  (Optional) To add environment variables to either type of script, click the Add
    icon, then specify the variable's name, value, whether input is required at
    execution and a hint for that input. Add the following variables:

    –   Variable Name: `UCE_TMP_DIR`

    –   Input at Execution: `Required`

    –   Value: `/var/tmp/ (or other)`

    –   Hints: `extraction tmp dir`

10. Click the View Script button to review. Click **Next**.

11. Review the entire profile, then click **Finish**.

12. To launch the deployment job, Select **Plan Management** from the Navigation
    pane.

13. Click **Operational Plans** and select the new plan created for the new profile.

14. Click **Apply Operational Plan**.

# Glossary

## account

An account entitles designated cloud users the right to use computing, network, and storage resources of vDC. The account provides the required capabilities to manage these resources. Account defines the amount of vCPU, memory and storage resources that can be used from the available vDC resources.

## actions pane

The Actions pane is used to start jobs based on the current selection in the Navigation pane. Selections in the Navigation pane or center pane change the display of operations in the Actions pane. The Actions pane is subdivided into four sections – Operate, Organize, Deploy, and Update.

## active

Reflects the state of system and indicates whether monitoring is actually being performed. The active state is not editable. When a rule is not enabled, monitoring is not active. The status is displayed on the Alert Monitoring Rules page, which is accessed from the Monitoring tab. Text in the Active field indicates whether the parameter is active.

## activate

Changes an inactive Oracle Solaris boot environment to the new default boot environment on reboot.

## Agent Controller

The Agent Controller software communicates with the Enterprise Controller and is installed automatically when an asset is discovered to make the asset a managed asset. You can choose to manage resources remotely with proxy resources without putting an agent on the system. Some features of the product don't work without the agent, but discovery manages the assets without putting an agent on them.

## Requirements for a Network

Requirements for assigning and using networks in Oracle Enterprise Manager Ops Center.

A network requires a physical network interface or a link aggregation and the following specifications:

- IP address and netmask or CIDR format

- If you use static IP addressing, the IP address of the management interface

  If you use dynamic IP addressing, the range of allowed IP addresses and the gateway address

Before you attach a network to a server pool, verify that each virtualization host in the server pool has a physical network interface to the network so that all members of the pool can continue to share the network resources of the server pool.

## Requirements for Installing an Agent Controller on Oracle Solaris 11

List of requirements for installing an agent on an asset running Oracle Solaris 11 in Oracle Enterprise Manager Ops Center.

- The Oracle Solaris 11 Package Repository must be configured and its initial synchronization completed.

- The version of Oracle Solaris 11 installed on the target system must be available in the Oracle Solaris 11 Package Repository.

- The Agent Controller packages must already be in the Oracle Solaris 11 Package Repository.

## Requirements for OS Images

Requirements for using an OS image in Oracle Enterprise Manager Ops Center.

- An OS image must be in a single image file. For example, on an Oracle Solaris system, the following command collects all OS component files on the auto-mounted file system into an ISO file.

  ```
  # mkisofs -o <name_of_OS.iso> -J -R /cdrom/<name_of_OS>
  ```

- The Oracle Enterprise Manager Ops Center software uploads or imports one ISO file per operation. If you are loading an ISO file from physical media and the file spans more than one physical media, you must first combine the content onto media that can store the complete file.

- An ISO file cannot be made from Oracle Solaris installation media.

## Roles for Asset Management

List of required roles for asset management tasks in Oracle Enterprise Manager Ops Center.

Table 2–1 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 1    Asset Management Tasks and Roles*

| Task | Role |
| --- | --- |
| View Assets | Read |
| Add Assets | Asset Admin |

*Table 1    (Cont.) Asset Management Tasks and Roles*

| Task | Role |
|------|------|
| Find Assets | Asset Admin |
| Create Discovery Profile | Asset Admin |
| Update Management Credentials | Security Admin |
| Edit Asset Attributes | Asset Admin |
| Edit Access Points | Security Admin |
| Delete Assets | Asset Admin |
| Edit Tags | Asset Management |
| Create Group | Asset Admin<br>SuperCluster Systems Admin |
| Edit Group | Asset Admin<br>SuperCluster Systems Admin |
| Move Group | Asset Admin<br>SuperCluster Systems Admin |
| Add or Remove Assets From a Group | Asset Admin<br>SuperCluster Systems Admin |
| Delete Group | Asset Admin<br>SuperCluster Systems Admin |

## Roles for Job Management

List of required roles for job tasks in Oracle Enterprise Manager Ops Center.

If a job has multiple targets, you can see only the targets for which you have the correct role. If you do not have the role for any of the targets, the job is not displayed.

A cloud user can only view or act on jobs that were created by the user. The cloud user cannot view jobs that were created by another user.

The following table lists the tasks that are discussed in this section and the role required to complete the task. An administrator with the appropriate role can restrict privileges to specific targets or groups of targets. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

*Table 2    Job Management Tasks and Roles*

| Task | Role |
|------|------|
| Viewing Job Status | The same as the role required to launch the job. |
| Viewing Job Details | The same as the role required to launch the job. |

***Table 2    (Cont.) Job Management Tasks and Roles***

| Task | Role |
|---|---|
| Monitoring Jobs for an Asset | The same as the role required to launch the job. |
| Answering Questions | The same as the role required to launch the job. |
| Stopping a Job | The same as the role required to launch the job. |
| Re-running a Job | The same as the role required to launch the job. |
| Copying a Job | The same as the role required to launch the job. |
| Deleting a Job | The same as the role required to launch the job or Job Management. |
| Changing the Maximum Time for a Job | Root access on Enterprise Controller system. |

## Roles for Monitoring Rules and Policies

List of required roles for monitoring tasks in Oracle Enterprise Manager Ops Center.

Table 3 lists the roles required to complete monitoring tasks. You can restrict privileges to specific targets or groups of targets. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

***Table 3    Monitoring Tasks and Roles***

| Task | Role |
|---|---|
| View a monitoring rule | Read Plan/Profile Admin |
| View a monitoring policy | Read Plan/Profile Admin |
| View the association of an asset and a monitoring policy | Read Asset Admin Plan/Profile Admin |
| View the historical data of a threshold rule | Read Asset Admin |
| Create, edit, or delete a monitoring rule | Fault Admin |
| Create, copy, extract, edit, and apply a monitoring policy | Plan/Profile Admin |
| Modify the monitoring configuration of an asset | Fault Admin |
| Delete a monitoring policy | Plan/Profile Admin |
| Group assets by a monitoring policy | Asset Admin |

***Table 3    (Cont.) Monitoring Tasks and Roles***

| Task | Role |
|------|------|
| Apply a monitoring policy to an asset | Fault Admin |
| Apply a monitoring policy to a group | Asset Admin and Fault Admin |

## Roles for Networks

List of required roles for storage tasks in Oracle Enterprise Manager Ops Center.

Table 4 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

***Table 4    Network Tasks and Roles***

| Task | Role |
|------|------|
| Add Fabric | Network Admin |
| Remove Fabric | Network Admin |
| Discover and Manage the Switches | Network Admin |
| Configure Network for Server Deployment | Server Deployment Admin |

## Roles for Plans and Profiles

List of required roles for plan management in Oracle Enterprise Manager Ops Center.

Table 5 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

***Table 5    Plan Management Roles and Permissions***

| Task | Role |
|------|------|
| View a profile or plan | Read |
| Create a profile or plan | Profile Plan Administrator |
| Edit a profile or plan | Profile Plan Administrator |
| Copy a profile or plan | Profile Plan Administrator |
| Delete a profile or plan | Profile Plan Administrator |
| Apply a plan | The plan determines the role required. |

## Roles for Software Libraries

List of required roles for library management tasks in Oracle Enterprise Manager Ops Center.

Table 6 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

***Table 6    Software Libraries Tasks and Roles***

| Task | Role |
|------|------|
| Set Enterprise Controller Storage Library | Ops Center Admin |
| Create Library | Storage Admin |
| Delete Library | Storage Admin |
| Associate Library | Storage Admin |
| Import image | Storage Admin |
| Upload image | Storage Admin |
| View details of an image | Storage Admin |
| Moving an image | Storage Admin |
| Edit Attributes | Storage Admin |
| Associate Library to Server Pool | Cloud Admin |

## Roles for Storage

List of required roles for storage tasks in Oracle Enterprise Manager Ops Center.

Table 7 lists the tasks and the role required to complete the task. Contact your administrator if you do not have the necessary role or privilege to complete a task. See the *Oracle Enterprise Manager Ops Center Administration* for information about the different roles and the permissions they grant.

***Table 7    Storage Tasks and Roles***

| Task | Role |
|------|------|
| Create a new storage library | Storage Admin |
| Remove a storage library | Storage Admin |
| Edit attributes of a storage library | Storage Admin |
| Add storage capacity | Storage Admin |
| Update a storage appliance | Update Admin |

# agentless

A system that is managed with Oracle Enterprise Manager Ops Center without the Agent Controller software being installed.

## alert monitor

Monitors the state of managed resources and their attributes and raise an alert when the state is outside the pre-defined thresholds.

## annotations

Annotations are scripts or comments that you can associate with a incident. Annotations can be automated operations to solve a incident, a suggested action, or a comment. You can associate an annotation with a specific incident. Annotations can be added to the Incidents Knowledge Base.

## assets

Assets are physical or virtual piece of hardware, storage device, or operating system that you can manage with Oracle Enterprise Manager Ops Center.

## audit log

An audit log file stores details about user log ins, changes to user accounts, and job details. It shows the activity on the Enterprise Controller and the Proxy Controller.

## bandwidth flow

Bandwidth flow is the speed of a connection, or the amount of data that flows from a site's server out to the viewer at any given time.

## block storage

A block storage library consists of LUNs (Logical Unit Number). Each LUN is a slice of a storage volume, which is storage space provided by a collection of disks.

## Boolean Control Parameter

A monitoring rule that uses a true-false check.

## Boot Environment

A collection of mandatory file systems (disk slices and mount points) that are critical to the operation of the Oracle Solaris operating system. These disk slices can be on the same disk or distributed across multiple disks.

## branded zone

Zones that are capable of emulating user environments from operating systems other than Oracle Solaris 10. Zones supports different versions of Oracle Solaris operating system in the zones for running applications.

## category

For Oracle Enterprise Manager Ops Center's Local Content, a category is the type of software that is uploaded to Oracle Enterprise Manager Ops Center for use at a site. The parent category is one of the types defined in Oracle Enterprise Manager Ops

Center. The local category is a category defined for the site, for example a script for a quarterly inventory.

## channel

An operating system distribution, such as Oracle Solaris 10 5/09 on x86 platform or Oracle Linux 5.5. A channel is also called a distribution.

## Cloud

A cloud is a set of physical resources that can be divided and allocated to multiple users who can in turn create and use virtual resources as needed without impact to or awareness of the other users' resources. A cloud is implemented as a pool of servers sharing the same virtualization type, storage, networks and fabrics.

## connected mode

This is the default connection mode for Oracle Enterprise Manager Ops Center. With this mode, patch data is regularly downloaded from Knowledge Base through an Internet connection.

## Dashboard

Displays a high-level overview of an asset or a group of assets on the user interface. The information of the selected asset or group is displayed in the Center Pane.

## Deployment Plans

Defines the sequence of steps that must be carried out on an asset to deploy. Deployment plans also include the specification or profile that each step should apply, and the resources that are required to apply it such as network addresses, host names and so on. Customized deployment plan enables you to perform hardware, firmware and operating system provisioning activities in a repeatable fashion.

## disconnected mode

This is the alternate connection mode for Oracle Enterprise Manager Ops Center. Instead of relying on an Internet connection for updates, patch data is acquired using the harvester script and moved to the Enterprise Controller.

## discovery

This is the method for adding assets to Oracle Enterprise Manager Ops Center. Assets can be discovered using a variety of protocols, by their service tags, or by declaring hardware so that it can be configured and provisioned with an operating system.

## Domain Name Service (DNS)

DNS is a network protocol that issues IP addresses within a specified range to devices on the network.

## Dynamic System Domains

In M-Series servers, you can partition the available hardware resources into smaller logical systems called as dynamic system domains. Dynamic System Domains run their own copies of the operating system and offer a very high level of isolation from other domains in the system because the partitioning occurs at the hardware level.

## Dynamic Storage Library

When the block storage library uses LUNs constructed from a storage array that is a managed asset, the block storage library is dynamic. You can add storage capacity as needed by adding LUNs supplied by the storage array.

When the block storage library relies on a storage array that is not a managed asset, the block storage library is static. Because Oracle Enterprise Manager Ops Center has less information about the storage array, you cannot increase the number of LUNs in the storage library.

## enabled

A monitoring rule that is enabled is actively monitoring a parameter. By default, all rules are enabled. Users can disable and enable parameters on a per asset or group basis. The status is displayed on the Alert Monitoring Rules page, which is accessed from the Monitoring tab. Text in the Enabled field indicates whether the parameter is enabled.

## Enterprise Controller

This is the central server for Oracle Enterprise Manager Ops Center software. The Enterprise Controller hosts the user interface and communicates with the Knowledge Base. Enterprise Controller stores management information, such as firmware and operating system images, plans, profiles, and policies and also stores the asset data and site customizations. All operations, or jobs, are initiated from the Enterprise Controller.

## Enumerated Control Parameter

A monitoring rule that uses a series of values.

## Expression Parameter

A monitoring rule that uses an instruction to execute something that returns a value.

## /export File System

A file system on an operating system server that is shared with other systems on a network. For example, the /export file system can contain the root ( / ) file system and swap space for diskless clients and the home directories for users on the network. Diskless clients rely on the /export file system on an operating system server to boot and run.

## Fabrics

Fabrics are network topologies where network nodes connect with each other through one or more network switches. A true fabric provides a direct connection between any two ports, and supports single step/lookup-based processing. Regardless of its various components, a fabric appears on the outside as a single, logical device with a single, consistent state.

The term is popular in telecommunication, Fibre Channel storage area networks, and other high-speed networks, including InfiniBand.

## Filesystem Storage

A software or storage library that relies on a file system on the Enterprise Controller's system or a shared file system on an NFS server that the Enterprise Controller mounts.

## global zone

In Oracle Solaris Zones, the global zone is both the default zone for the system and the zone used for system-wide administrative control. The global zone is the only zone from which a non-global zone can be configured, installed, managed, or uninstalled. Administration of the system infrastructure, such as physical devices, routing, or dynamic reconfiguration (DR), is only possible in the global zone. Appropriately privileged processes running in the global zone can access objects associated with other zones.

## group

A group is a user-defined set of assets. Assets can be added to groups based on asset attributes such as type or location. A group can include other groups. Assets can be manually added in addition to the rules based addition using attributes. Any type of asset that can be in a group can be added manually to any user-defined asset group.

## guest

Guest refers to a virtual machine that is configured and installed in a virtualization host. For example, the logical domains in an Oracle VM Server host are referred to as guests in a server pool.

## Guest Domain

A guest domain is a non-I/O domain that consumes virtual device services that are provided by one or more service domains. A guest domain does not have any physical I/O devices, but only has virtual I/O devices, such as virtual disks and virtual network interfaces.

## GUID

Globally Unique Identifier. A pseudo-random 128-bit number that is computed by Windows to identify any component in the computer that requires a unique number. In Oracle Enterprise Manager Ops Center, GUIDs are identify LUNs.

## Hardware Virtualization (HVM)

Hardware virtualization is a technology that is used to create multiple virtual systems on a single piece of physical hardware. When you create a hardware virtualized (HVM) guest, you must supply an ISO file in a repository to create the virtual machine.

## Hardware Virtualized with Paravirtualized Drivers (PVHVM)

PVHVM is identical to HVM, but has additional paravirtualized drivers for improved performance of the virtual machine. PVHVM improves the performance level of Microsoft Windows running in guests.

## host name

The name by which a system is known to other systems on a network. This name must be unique among all the systems within a particular domain (usually, this means within any single organization). A host name can be any combination of letters, numbers, and dashes ( - ), but it cannot begin or end with a dash.

## hypervisor

A hypervisor is the software that enables multiple virtual machines to be multiplexed on a single physical machine. The hypervisor code runs at a higher privilege level than the supervisor code of its guest operating systems to manage use of the underlying hardware resources by multiple supervisor kernels.

## Image Packaging System (IPS)

Image Packaging System is an Oracle Solaris 11 package that contains operating system components and a manifest that provides basic metadata.

## incident

An event that triggers an alert when a monitored attribute does not meet the monitoring parameters. A new incident is displayed in the Unassigned Incidents queue in the Message Center. From the Message Center you can view and act on incidents.

## Incident Knowledge Base

A custom database of annotations that are associated with known incidents.

## InfiniBand

InfiniBand is a switched fabric communications link primarily used in high-performance computing. Its features include quality of service and failover, and it is designed to be scalable. The InfiniBand architecture specification defines a connection between processor nodes and high performance I/O nodes such as storage devices.

InfiniBand transmission rates begin at 2.5 GBps.

## I/O Domain

An I/O domain has direct access to a physical I/O device, such as a network card in a PCI EXPRESS (PCIe) controller. An I/O domain can own a PCIe root complex, or it can own a PCIe slot or on-board PCIe device by using the direct I/O (DIO) feature. An I/O domain can share physical I/O devices with other domains in the form of virtual devices when the I/O domain is also used as a service domain.

## IPMP

IPMP (IP network multipathing) provides physical interface failure detection and transparent network access failover. You can configure one or more physical interfaces into an IP multipathing group, or IPMP group. After configuring IPMP, the system automatically monitors the interfaces in the IPMP group for failure.

## JMX

Java Management Extensions (JMX) technology provides the tools for building distributed, modular, and dynamic solutions for managing and monitoring devices, applications, and networks. The JMX API defines the notion of MBeans, or manageable objects, which expose attributes and operations in a way that enables remote management applications to access them. The public API in Oracle Enterprise Manager Ops Center can be accessed through JMX-Remoting.

## Knowledge Base

The Knowledge Base is the repository for metadata about Oracle Solaris and Linux operating system components. Knowledge base stores information about patch dependencies, patch compatibilities, withdrawn patches, downloads, and deployment rules and also stores URL of operating system vendor download sites and downloads the components at set intervals. The Enterprise Controller must have Internet connection to connect to the Knowledge Base.

## libraries

A collection of virtual machine images and disk images that are located under the same file system. When a server pool is created, one or more libraries are assigned to the server pool. Server pools can share the same libraries.

## link aggregation

Link aggregation is a standard defined in IEEE802.3ad. An aggregated link consists of several interfaces on a system configured as a single, logical unit. Link aggregation increases the speed and high availability of a connection between a server and a switch.

## LUN

LUN stands for Logical Unit Number. In storage, a LUN is the number assigned to a SCSI protocol entity, that handles (I/O) operations. A SCSI target provides a LUN for each storage volume.

## managed asset

An asset is managed when Oracle Enterprise Manager Ops Center can monitor it and target it with jobs. Operating systems can be managed with or without an Agent Controller, but operating system update functions are only available with an Agent Controller.

## manifest

Each Oracle Solaris 11 package has an associated manifest that describes how the package is put together. The package manifest is an XML file that provides basic metadata about the package (such as name, description, version, and category), what files and directories are included, and the package dependencies.

## maintenance mode

Disables incidents from displaying in the UI, but does not disable monitoring. This mode is useful when you do not want incidents generated during system maintenance.

## membership graph

Shows a graphical relationship between assets and status of the connection. A blue line shows the working connection and a red line represents the faulted or disconnected status. The membership graph is displayed in the Center Pane.

## message center

Displays all incidents, alerts, and notifications. Message Center helps you to view and manage incidents, notifications, and service request, and display warranty information.

## MTU

MTU stands for Maximum Transmission Unit. MTU is the largest packet size, in bytes, that can be sent over a network.

## monitoring policy

A set of monitoring rules that defines alert conditions. Policies are either system-defined, user-defined, or generic. Each monitoring policy contains one or more alert monitors for a specific type of resource. An alert is raised when the state is outside the pre-defined condition.

## monitoring rule

Contains monitoring parameters that state the values and boundaries for an asset's activity. The set of rules is called a monitoring policy.

## MPxIO

MPxIO provides a multipathing solution for storage devices accessible through multiple physical paths. MPxIO is included as a part of the distribution in Solaris 10 onwards.

## NAT

NAT stands for Network Address Translation. NAT is a protocol that enables a network to use many internal-only IP addresses and a few Internet-facing IP addresses.

## navigation pane

Navigation pane is an important part of the user interface of Oracle Enterprise Manager Ops Center. navigation pane contains Message Center, Assets, Plan Management, Networks, Libraries, Reports, vDC Management, and Administration. The Assets section of the Navigation pane lists all the asset that are managed by Oracle Enterprise Manager Ops Center, grouped by its type and the required criteria.

## network

A network enables guests to communicate with each other or with the external world (that is, the Internet). When a server pool is created, one or more networks is assigned to the server pool. Server pools can share the same networks.

## network bonding

Network bonding refers to the combination of network interfaces on one host for redundancy and/or increased throughput. Redundancy is the key factor you use to protect your virtualized environment from loss of service due to failure of a single physical link. This network bonding equals as the Linux network bonding. Using network bonding in Oracle VM might require some switch configuration.

## network domain

A system of centralized network administration, in which the permissions that grant access to resources in the network are maintained in one or more servers. Network Domains use a hierarchical structure that enables you to assign permissions to collaborate with different departments in an organization.

A large network may have several domains based on the needs of each set of users.

## NIS

NIS stands for Network Information System. NIS is a network naming and administration system for smaller networks. NIS is similar to the Internet's domain name system (DNS) but designed for a smaller network.

## non-global zone

A virtualized operating system environment created within a single instance of the Oracle Solaris operating system. One or more applications can run in a non-global

zone without interacting with the rest of the system. Non-global zones are also called zones.

## non-sparse copy

A clone of the type "non-sparse copy" is a disk image file of a physical disk, taking up the space equivalent to the full specified disk size, including empty blocks.

## notifications

An email, pager, or user interface message that is automatically sent by Oracle Enterprise Manager Ops Center when specified conditions are met. You can configure separate notification profiles for different assets and different users. You can configure the software to send notification for specific incidents, or when a critical or warning incident is detected.

## Opaque Data

An opaque data is a data type that is incompletely defined in an interface, so that its values can only be manipulated by calling subroutines that have access to the missing information.

## /opt

A file system that contains the mount points for third-party and unbundled software.

## Oracle Enterprise Manager Cloud Control

Oracle Enterprise Manager Cloud Control is a single, integrated solution for managing all aspects of the Oracle Cloud and the applications running on it. Oracle Enterprise Manager Cloud Control couples a potent, top-down monitoring approach to delivering the highest quality of service for applications with a cost-effective automated configuration management, provisioning, and administration solution.

## Oracle Engineered System

Oracle Engineered Systems are hardware and software integrated systems that are designed for a specific enterprise purpose. Oracle Engineered System helps in reducing the cost and complexity of the IT infrastructures, and increases the productivity and performance.

## Oracle Services

Provides integrated methods of maintaining and displaying current contracts, warranty information, contract dates, and service requests in Oracle Enterprise Manager Ops Center.

## Oracle Solaris Clusters

Oracle Solaris Clusters is a high availability software product for Solaris operating system. Oracle Solaris Clusters are used to improve the availability of software services such as databases, file sharing on a network, electronic commerce websites, or other applications. You can now manage Oracle Solaris Clusters as any other asset using Oracle Enterprise Manager Ops Center.

## Oracle Solaris Zones

Oracle Solaris Zones is a software partitioning technology used to virtualize operating system services, and provide an isolated and secure environment for running applications. When you create a non-global zone, you produce an application execution environment in which processes are isolated from all other zones. This isolation prevents processes that run in a zone from monitoring or affecting processes that run in any other zones. See also global zone and non-global zone.

## Oracle Solaris 11 Software Update Library

Oracle Solaris 11 Software Update Library repository is located on the Enterprise Controller. This contains the Oracle Solaris 11 packages that you need to install, provision, and update your Oracle Solaris 11 operating system.

## Oracle VM Server for SPARC

Oracle VM Server is a virtualization technology that enables the creation of multiple virtual systems by a hypervisor in the firmware layer, interposed between the operating system and the hardware platform. This is designed to abstract the hardware and can expose or hide various system resources, allowing for the creation of resource partitions that can operate as discrete systems, complete with virtual CPU, memory and I/O devices.

Oracle VM Server for SPARC was previously known as Logical Domains, it is a virtualization technology designed to run on CMT based servers.

## Oracle VM Server for x86

Oracle VM Server for x86 is a managed virtualization environment or part of such an environment, that is designed to provide a lightweight, secure, server-based platform for running virtual machines. Oracle VM Server for x86 is based upon an updated version of the underlying Xen hypervisor technology, and includes Oracle VM Agent.

## Oracle Solaris ZFS

An Oracle Solaris operating system file system that uses storage pools to manage physical storage.

## Paravirtualization

Paravirtualization enables you to select a location for the mounted ISO file from which you create the virtual machine. Before you create the virtual machine using the paravirtualized method, you must mount the ISO file on an NFS share, or HTTP or FTP server.

## parent repositories

Any hosted Oracle repository that Oracle Solaris 11 Software Update Library can use to upload, or sync, content.

## photorealistic view

Photorealistic view displays the front and rear views of the rack. All slots and the respective assets are displayed. Positions within the rack are displayed in a 2-dimensional view. All assets in the rack have a specific image. The health status of assets such as OK, Warning, and Critical are displayed in the form of colored buttons.

## policy

Defines how a job is performed and sets the automation level of the job. A policy file is similar to a response file. If there is a conflict between a profile and policy, the profile overrides the policy.

## Private vNet

vNet that is unique to a given account is called private vNet.

## profile

Defines the configuration of components for a specific type of system. By using a profile, you can define what is enabled, and not enabled, to be installed on a system. If there is a conflict between a profile and policy, the profile overrides the policy.

## Proxy Controller

Proxy Controllers link the managed assets to the Enterprise Controller and act as proxies for operations that must be located close to the managed assets, such as operating system provisioning. Proxy Controllers distribute the network load and provide for fan-out capabilities to minimize network load. Proxy Controllers perform management operations on assets and report the results to the Enterprise Controller. An Oracle Enterprise Manager Ops Center installation must have at least one functioning Proxy Controller.

## repository

A repository is a central place that stores an aggregation of data in an organized way, usually in a computer storage. Depending on how the term is used, a repository may be directly accessible to users or may be a place from which specific databases, files, or documents are obtained for further relocation or distribution in a network.

## root

The top level of a hierarchy of items. `root` is the one item from which all other items are descended. See `root` directory or `root ( / )` file system.

## root directory

The top-level directory from which all other directories stem.

## Root Domain

A root domain has a PCIe root complex assigned to it. This domain owns the PCIe fabric and provides all fabric-related services, such as fabric error handling. A root

domain is also an I/O domain, as it owns and has direct access to physical I/O devices.

## root file system

The top-level file system from which all other file systems stem. The `root ( / )` file system is the base on which all other file systems are mounted, and is never unmounted. The `root ( / )` file system contains the directories and files critical for system operation, such as the kernel, device drivers, and the programs that are used to boot a system.

## RPM

A package manager used by many versions of the Linux operating system.

## rule parameters

Define the monitoring parameters. The following types of rule parameters are available: Threshold, Boolean Control, Enumerated Control, and Expression. Some parameters are editable. All active parameters can be disabled.

## SAN Storage Library

Storage Attached Network (SAN) storage which is used for providing storage spaces for managed assets in Oracle Enterprise Manager Ops Center. The SAN storage library consists of groups of LUNs.

## script

A command file that is associated with one of Oracle Enterprise Manager Ops Center's actions, either before the action occurs (pre-action script), or after the action completes (post-action script).

## security group

The organization of users and other domain objects into groups for easy administration of access permissions is known as a security group. A Security Group enables you to specify certain security settings on an instance specific basis. You have the ability to filter traffic based on IP's (a specific address or a subnet), packet types (TCP, UDP or ICMP), and ports (or a range of ports). You can also grant access to an entire security group so that your trusted computers can get access to each other without having to open ports to the public.

## server management

Server management is used to manage the physical Oracle VM Servers in a server pool, for example, to update the Oracle VM Agent on the different Oracle VM Servers.

## server pool

A server pool is a resource pool of virtualization hosts that share compatible chip architecture, which facilitates actions such as moving guests between virtualization host instances. Members of the server pool have access to the same network and

storage library resources. Guests can access the images contained in the server pool's library. Several server pools can share the same network and library storage resources.

## server templates

Server templates provide pre-built images for creating vServers. They can be uploaded individually or as part of an Assembly. Server templates can be created from an existing vServer.

## service tag

Service tags are XML files that identify assets uniquely. Assets with service tags can be discovered using the Find Assets wizard.

## Service Domain

A service domain provides virtual device services to other domains, such as a virtual switch, a virtual console concentrator, and a virtual disk server. You can have more than one service domain, and any domain can be configured as a service domain.

## Shared IP Mode

The global zone shares its network interface with one or more zone. You must define the network interface when you assign the network to the global zone.

## shared storage

A shared storage library in Oracle Enterprise Manager Ops Center is one that is accessible by the server and operating system. It is not related to Zones on Shared Storage in Oracle Solaris 11.1.

## snapshot

Snapshot, a point in time image of a volume is a non-bootable copy of a boot environment that uses much less disk space than a boot environment. You can create a boot environment from a snapshot.

## software libraries

A software library can be a local file system on the Enterprise Controller or a mount point on an NFS server. The software library is used to store the operating system images for provisioning, branded images, flars, firmwares, profiles, operating system updates, custom programs and scripts.

## sparse copy

A clone of the type "sparse copy" is a disk image file of a physical disk, taking up only the amount of space actually in use; not the full specified disk size.

## static route

Specifies the route taken by the network for external access. You define a default gateway for the network; however, this default gateway may not be reachable to a given subnet. In this case, you must add a static route for this specific subnet.

## status pane

The Status pane in the Jobs section describes about the state of the incidents like jobs in progress, jobs failed, jobs partially successful, jobs stopped, jobs schedules, jobs successful and so on.

## Support Repository Update (SRU)

Support Repository Update (SRU) is a package of Oracle Solaris 11 operating system updates that releases on a regular basis.

## SCCM

Microsoft System Center Configuration Manager (SCCM), is used to update Windows operating systems.

## syncing

Syncing is the process of reconfiguring or updating the Oracle Solaris 11 Software Update Library with the Oracle Solaris 11 Image Packaging System (IPS).

## system groups

Default asset groups that automatically organize your assets by type in the user interface.

## System-defined Rules

Attribute specific monitoring rules that are hard-coded into drivers. You can disable a system-defined rule, but cannot edit, move, or reconfigure these types of rules.

## Thin Clone

A thin clone is a clone of a physical disk that takes up only the amount of disk space actually in use; not the full specified disk size.

## threshold parameters

A monitoring rule that uses a numeric value above or below a defined level.

## time server

The network device that provides accurate time for synchronizing network activity.

## unmanaged storage

Unmanaged storage is the storage resource that is unknown to Oracle Enterprise Manager Ops Center. When you add storage to zones using the native CLI or manage existing zone environments, the zone's storage is not identified and termed as unmanaged.

## User-defined Network Domain

A network domain provides custom network resources from an Ethernet or InfiniBand fabric to virtualization hosts, server pools, or virtual datacenters so that new networks can be created as needed. A user-defined network domain supplements the Default Network Domain that is always available and cannot be deleted.

## User-defined Rules

Monitoring rules that are associated with, and determined by, the type of managed resource. You can apply a user-defined rule to many different attributes.

## /usr File System

A file system on a standalone system or server that contains many of the standard UNIX programs.

Sharing the large /usr file system with a server rather than maintaining a local copy minimizes the overall disk space that is required to install and run the Solaris software on a system.

## /var File System

A file system or directory (on standalone systems) that contains system files that are likely to change or grow over the life of the system. These files include system logs, vi files, mail files, and UUCP files.

## vDC

vDC is a collection of physical servers and storage that are placed on a common network. These physical resources are organized into a pool that are accessed by self-service users. This offers an access point through which you can allocate and control the resources inside. This is created during the set up phase.

## vNets

vNets are managed networks and their associated logical (L2) fabrics that can be associated with a vDC and its Accounts.

## vServer

vServer is an entity that provides the outward interface of a standalone operating system. This may be a Virtual Machine (VM) or a Solaris Container or a similar construct. This consumes CPU and memory resources. This can be a member of one or multiple vNets.

## vServer Type

vServer type is a profile for vServer creation that defines size of memory, size of disk and number of vCPUs to be used when creating a new vServer instance, that is used in combination with a Server Template.

## VID

VLAN Identifier. Part of the VLAN tag inserted into Ethernet frame that specifies its VLAN.

## virtual disk image

A virtual disk image is a representation of a virtual storage device that is associated with a virtual machine. Such storage can represent a virtual hard disk or a virtual CD/DVD.

## virtualization host

Oracle VM Server that are managed by Oracle Enterprise Manager Ops Center is referred to as virtualization host. The virtualization host contains a hypervisor and its local resources and network connections.

## virtual machine

A virtual machine is a software implementation of a computing environment in which an operating system or program is installed and run.

A virtual machine typically emulates a physical computing environment, requests for CPU, memory, hard disk, network, and other hardware resources that are managed by a virtualization layer which translates these requests to the underlying physical hardware.

## virtual machine template

A Virtual Machine Template provides a standardized group of hardware, and software settings that is used repeatedly to create virtual machines configured with those settings.

## virtual server image

A virtual server image is the persisted specification and state of a virtual machine. A virtual server is created when you create a guest. The virtual server image contains the general specification of the guest such as CPU, network, memory, and the type of physical storage that is backing the guest. A virtual server image is also referred to as a guest image.

## Virtual Local Area Network (VLAN)

VLAN is a group of network resources connected to different network segments that behave as if they were connected to a single network segment. All transmissions from the VLAN are identified by a unique VLAN tag.

## volume

A volume is an identifiable unit of data storage that is sometimes physically removable from the computer or storage system. In tape storage systems, a volume may be a tape cartridge. In mainframe storage systems, a volume may be a removable hard disk. Each volume has a system-unique name or number that enables it to be specified by a user.

## World Wide Name (WWN)

WWN is a unique identifier in a Fibre Channel or Serial Attached SCSI storage network. Each WWN is an 8-byte number derived from an IEEE OUI and vendor information.

## zone

Also called non-global zones, are a virtualized operating system environment created within a single instance of the Oracle Solaris operating system. One or more applications can run in a non-global zone without interacting with the rest of the system.

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