

Oracle® Enterprise Manager Cloud Control

Managing and Monitoring an Oracle Exalogic Elastic Cloud Machine



13c Release 3
E94038-02
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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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Oracle Enterprise Manager Cloud Control Managing and Monitoring an Oracle Exalogic Elastic Cloud Machine, 13c Release 3

E94038-02

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Preface

This guide describes how to manage an Oracle Exalogic Elastic Cloud machine using Oracle Enterprise Manager Cloud Control 13c. This document provides detailed steps required to install and configure an Enterprise Manager agent and its related artifacts to manage and monitor an Exalogic machine.

Audience

This document is intended for Exalogic customers, system administrators and data center administrators who are interested in managing their Exalogic machine using Oracle Enterprise Manager Cloud Control 12c.

Documentation Accessibility

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Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

What's Changed

This table provides a brief overview of the document changes for the latest publication of the *Oracle® Enterprise Manager Cloud Control Managing and Monitoring an Oracle Exalogic Elastic Cloud Machine*:

Part Number	Change Summary
E94038-0 1	In support for Enterprise Manager Cloud Control 13c Release 3.
E35776-0 7	In support for Enterprise Manager Cloud Control 13c.
E35776-0 6	Provides support for the Exalogic X5-2. Updated to support Discovering Exalogic Machine - Virtual Configuration .
E35776-0 5	Updated the Discovering Exalogic Machine - Virtual Configuration chapter. Updated the Discovering Exalogic Assets Using ExaWare section in Prepare Exalogic Machine for Discovery by Cloud Control .
E35776-0 4	Restructured content flow to better separate the physical and virtual configurations. Added an appendix to cover the pre-discovery requirements for the physical configuration. See Prepare Exalogic Machine for Discovery by Cloud Control , for more details.

1

Overview

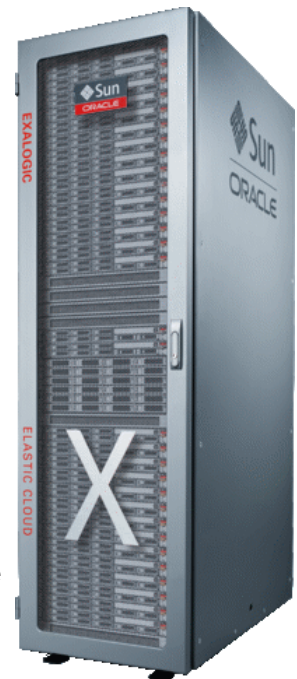
Oracle Exalogic Elastic Cloud machine is an integrated hardware and software system designed to provide a complete platform for a wide range of application types and widely varied workloads. Exalogic is intended for large-scale, performance-sensitive, mission-critical application deployments. It combines Oracle's industry-standard Fusion Middleware software and industry-standard hardware to enable a high degree of isolation between concurrently deployed applications, which have varied security, reliability, and performance requirements. Exalogic enables customers to develop a single environment that can support end-to-end consolidation of their entire applications portfolio.

Exalogic is designed to fully leverage an internal InfiniBand fabric that connects all of the processing, storage, memory and external network interfaces within an Exalogic machine to form a single, large computing device. Each Exalogic machine is connected to the customer's data center networks via 10 GbE (traffic) and GbE (management) interfaces.

Features

- Oracle Exalogic Elastic Cloud is an integrated hardware and software system engineered, tested, and tuned by Oracle to run Java and non-Java applications with extreme performance. The machine provides a complete cloud application infrastructure, consolidating the widest possible range of Java and non-Java application types and workloads and meeting the most demanding service-level requirements.
- Building on the success of the Oracle Exadata Database Machine, Oracle Exalogic Elastic Cloud combines cutting-edge 64-bit x86 processors, an InfiniBand-based I/O fabric and solid-state storage with the market-leading Oracle WebLogic Server, other enterprise Java Oracle middleware products and a choice of Oracle Solaris or Oracle Linux operating system software. The software has been tuned to exploit the I/O fabric in the Oracle Exalogic Elastic Cloud machine in order to deliver performance results 10x better than a standard application server configuration.
- Engineered for large-scale, mission-critical deployments, Oracle Exalogic Elastic Cloud provides the foundation for enterprise-class multi-tenancy or cloud applications. It can support thousands of applications with differing security, reliability, and performance requirements – making it an ideal platform for enterprise-wide data center consolidation.
- Oracle Exalogic Elastic Cloud accelerates the performance of the entire Oracle Fusion Middleware product portfolio and also increases the performance of applications running on Oracle WebLogic Server with either Oracle Linux or Oracle Solaris 11. The machine is also optimized for integration with Oracle Database 11g, Oracle Real Application Clusters and the Oracle Exadata Database Machine.
- Any Oracle Applications including: the Oracle E-Business Suite, Oracle's Siebel CRM, Oracle's PeopleSoft Enterprise, Oracle's JD Edwards and Oracle's industry specific business applications will run on Oracle Exalogic Elastic Cloud transparently, without needing any modifications.

Image



Oracle Enterprise Manager is Oracle's integrated enterprise information technology (IT) management product line, which provides the industry's only complete, integrated, and business-driven enterprise cloud management solution. Oracle Enterprise

Manager creates business value for IT by leveraging the built-in management capabilities of the Oracle stack for traditional and cloud environments, enabling customers to achieve unprecedented efficiency gains while dramatically increasing service levels.

The key capabilities of Enterprise Manager include:

- A complete cloud lifecycle management solution enabling you to quickly set up, manage, and support enterprise clouds and traditional Oracle IT environments from applications to disk.
- Maximum return on IT management investment through the best solutions for intelligent management of the Oracle stack and engineered systems with real-time integration of Oracle's knowledge base with each customer environment.
- Best service levels for traditional and cloud applications through business-driven application management.

The **Enterprise Manager Cloud Control** console is the user interface that you see after you install Enterprise Manager Cloud Control. With the help of the console, you can monitor and administer your entire computing environment from one location on the network. All the systems and services including enterprise application systems, databases, hosts, middleware application servers, listeners, and so on, are easily managed from one central location.

Oracle Exalogic Elastic Cloud is modeled as a system target rather than a group target within Enterprise Manager Cloud Control. The following targets can comprise the Oracle Exalogic Elastic Cloud:

- Infiniband Network - An Infiniband Network has IB Switches as members. This is a one-to-many association.
- Application Deployments
- SOA Infrastructure
- WebLogic Domains
- Coherence Clusters
- Oracle Traffic Director (OTD)
- Hardware targets (such as, PDU, Cisco Switch, ZFS, and ILOMs)
- Hosts

The following chapters provide instructions for installing and configuring Oracle Enterprise Manager Cloud Control to manage and monitor an Exalogic machine:

- [Discovering Exalogic Machine - Virtual Configuration](#).
- [Discovering Exalogic Machine - Physical Configuration](#).
- [Post-Discovery Configuration and Verification](#).
- [Monitoring and Managing Exalogic](#).
- [Monitoring Hosts and Applications](#).

2

Discovering Exalogic Machine - Virtual Configuration

This chapter describes the discovery steps for the Oracle Exalogic Elastic Cloud machine installed in a *virtual* configuration with Oracle Exalogic Elastic Cloud Software (EECS) version 2.0.6.0.0.

For this configuration, your Exalogic hardware is pre-installed with Oracle Enterprise Manager Ops Center to manage your hardware components. Oracle Enterprise Manager Cloud Control provides many of the monitoring features used by system administrators.

The steps below provide the prerequisites and instructions to discover an Exalogic target in Enterprise Manager Cloud Control:

1. [Verifying Prerequisites](#)
2. [Installing Management Agent for Oracle VM Manager and Ops Center](#)
 - [Installing the Management Agent](#)
 - [Importing the Oracle VM Manager Certificate into the Agent](#)
 - [Importing Oracle Enterprise Manager Ops Center Certificate to the Oracle Management Agent Keystore](#)
3. [Discovering Targets](#)
 - [Discovering Oracle VM Manager](#)
 - [Discovering the Oracle ZFS Storage Appliances](#)
 - [Discovering an Exalogic Elastic Cloud Target](#)
4. Once you have completed the discovery of your Exalogic Machine in Enterprise Manager, follow the steps outlined in [Post-Discovery Configuration and Verification](#).
5. [Monitoring Tasks for Exalogic Virtual Configurations](#)
6. [Management Tasks for Exalogic Virtual Configurations](#)

2.1 Verifying Prerequisites

Before proceeding with discovery, you must verify that your Exalogic hardware meets the following minimal software requirements:

- Oracle Exalogic Elastic Cloud Software (EECS): version 2.0.6.0.0 or later.
- For Exalogic Machine in the virtual configuration (installed with EECS version 2.0.6.0.0), Oracle Enterprise Manager Ops Center is pre-installed. If Ops Center is not installed already on your Exalogic Machine, then submit a service request to Oracle Support.
- For the Management Agents installed in the [Installing Management Agent for Oracle VM Manager and Ops Center](#) section, support is provided for Enterprise

Manager Cloud Control 13c Release 2 (13.2.1.0) or later and Enterprise Manager Cloud Control 13 c Release 3 (13.3.1.0) or later. Verify that the instance of Cloud Control you choose for monitoring is at 13.3.1.0 or later.

- [Critical Prerequisites for Oracle VM Manager Discovery](#).

 **Note:**

The Exalogic Infrastructure plug-in is not required for discovery of a Virtual Exalogic system.

2.1.1 Critical Prerequisites for Oracle VM Manager Discovery

 **Note:**

Exalogic configurations supporting virtualization must each have Oracle Virtual Machine (VM) Manager properly configured for read-only access by Enterprise Manager Cloud Control as a mandatory requirement as described in the following procedure. Failure to configure the Oracle VM Manager for read-only access by Enterprise Manager Cloud Control will result in an unsupported configuration. Operations performed in this unsupported configuration may result in software outages and necessitate the re-installation of the Exalogic Control software.

If the Oracle VM Manager Has NOT Been Discovered

If you have *not* yet performed discovery of the Oracle VM Manager in Cloud Control, then skip this section and proceed to [Installing Management Agent for Oracle VM Manager and Ops Center](#) and install the Management Agent for Oracle VM Manager and the Management Agent for Exalogic Hardware.

If the Oracle VM Manager HAS Been Discovered

This section *only* applies if you have an Enterprise Manager instance and have already discovered the Oracle VM Manager within the Exalogic Control stack VM. You must perform the following steps as a prerequisite in order to discover the Oracle VM Manager in read-only configuration.

As part of the original discovery of the Oracle VM Manager, the Management Agent for Oracle VM Manager is already installed. Once you have completed the steps outlined below, proceed to the [Discovering Targets](#) section.

 **Note:**

If Oracle VM Manager was registered with Enterprise Manager Cloud Control prior to performing the read-only configuration procedure below, then you must perform Synchronize Operation from the Oracle VM Manager Target menu in Enterprise Manager to re-register it in **read-only** mode. Confirm that the Oracle VM Manager target is in read-only configuration.

The Oracle VM Manager is part of the Exalogic Control Stack configured as part of the Exalogic installation process. If you have used an instance of Enterprise Manager to discover this target within the Exalogic Control Stack, then this process needs to take place to avoid an unsupported configuration.

1. Log in to the Exalogic Control VM that hosts the Oracle VM Manager component of the Exalogic Control stack as `oracle` user, and then perform the commands in the sequence below:

```
cd /u01/app/oracle/ovm-manager-3/ovm_shell
sh ovm_shell.sh --url=tcp://localhost:54321
                --username=admin
                --password=<ovmm admin user password>
ovm = OvmClient.getOvmManager ()
f = ovm.getFoundryContext ()
j = ovm.createJob ( 'Setting EXALOGIC_ID' );
```

The `EXALOGIC_ID` can be found in the `em-context.info` file on `dom0` located in the following file path location:

```
/var/exalogic/info/em-context.info
```

You must log in to `dom0` as a `root` user to obtain this file. For example, if the `em-context.info` file content is `ExalogicID=Oracle Exalogic X2-2 AK00018758`, then the `EXALOGIC_ID` will be **AK00018758**.

 **Note:**

Domain zero (`dom0`) is the first domain started by the Xen hypervisor on boot. For an Exalogic Machine, it is any compute node of Exalogic.

Continuing the command sequence:

```
j.begin ();
f.setAsset ( "EXALOGIC_ID", "<Exalogic ID for the Rack>");
j.commit ();
```

2. Press `Ctrl-D` to complete the sequence.

You can validate the configuration following these steps by observing that several menus for the *manager/pool/server/guest vm* target are disabled. Specifically, you can validate that Oracle VM Manager is in read-only mode by right-clicking the registered Oracle VM manager under Infrastructure Cloud.

All the active operation menu items in the second and third tier of the list, such as Create Zone, Create Virtual Server Pool, and Manage Network, are disabled (grayed

out) and are not available for selection. Conversely, if you choose an item from the pull-down menus that are displayed when you click either the VM Manager or VM Guest menu option, the same menu items may not be grayed out. However, if you select one of the active management options, Enterprise Manager displays an error message stating that the action cannot be performed, thus indicating that the Oracle VM Manager is in read-only mode.

2.2 Installing Management Agent for Oracle VM Manager and Ops Center

The Management Agent is necessary to establish a connection between Enterprise Manager and Oracle VM Manager and Ops Center. This connection will allow you to manage your Exalogic Machine through Enterprise Manager Cloud Control. Install the Management Agent before proceeding to the discovery process:

- [Installing the Management Agent](#)
- [Importing the Oracle VM Manager Certificate into the Agent](#)
- [Importing Oracle Enterprise Manager Ops Center Certificate to the Oracle Management Agent Keystore](#)

2.2.1 Installing the Management Agent

Follow the steps below to install the Management Agent:

1. Ensure that you have downloaded and applied the latest version of Oracle Enterprise Manager Agent software for Oracle Linux 64-bit platforms.
2. In Enterprise Manager Cloud Control, do one of the following:
 - From the Setup menu, select **Add Target**, then select **Auto Discovery Results**. On the Auto Discovery Results page, click the **Host and Oracle VM Manager** tab and select a host that you want to monitor from the displayed list. Click **Promote**.
 - From the Setup menu, select **Add Target**, then select **Add Targets Manually**. On the Add Targets Manually page, select **Add Host Targets** and click **Add Host**.
3. On the Host and Platform page, do the following:
 - a. Accept the default name assigned for this session or enter a unique name of your choice. The custom name you enter can be any intuitive name, and need not necessarily be in the same format as the default name. For example, `add_host_operation_1`.

A unique deployment activity name enables you to save the installation details specified in this deployment session and reuse them in the future without having to enter all the details all over again in the new session.
 - b. Click **Add** to enter the fully qualified name and select the platform of the host on which you want to install the Management Agent.

 **Note:**

- The *host* should be the VM where both Ops Center and Oracle VM Manager are installed.
- The *platform* should be Oracle Linux 5 or later. At this time, Solaris is not supported.

- c. Click **Next**.
4. At this point, the Management Agent is to be installed, which is a separate process. For details about installing the agent, see *Installing Oracle Management Agent* in the *Oracle® Enterprise Manager Cloud Control Basic Installation Guide*:

To configure the agent for an Exalogic machine, follow the steps below on the Installation Details page:
 - a. In the Deployment Type section, select **Fresh Agent Install**.
 - b. From the table, select the first row that indicates the hosts grouped by their common platform name.
 - c. In the Installation Details section, provide the installation details common to the hosts selected in Step b. For Installation Base Directory, enter the absolute path to the agent base directory where you want the software binaries, security files, and inventory files of the Management Agent to be copied.
 - d. For Instance Directory, accept the default instance directory location or enter the absolute path to a directory of your choice where all Management Agent-related configuration files can be stored.
 - e. From Named Credential list, select an appropriate profile whose credentials can be used for setting up the SSH connectivity between the OMS and the remote hosts, and for installing a Management Agent on each of the remote hosts.
 - f. For Privileged Delegation Setting, validate the Privilege Delegation setting to be used for running the root scripts. By default, it is set to the Privilege Delegation setting configured in Enterprise Manager Cloud Control.
 - g. For Port, accept the default port (**3872**) that is assigned for the Management Agent to communicate, or enter a port of your choice.
 - h. Repeat for every other row you have in the table in step b.
 - i. Click **Next**.
5. If you want to deploy Management Agents on the selected hosts in a rolling manner, such that the deployment proceeds continuously from one deployment phase to another, ignoring the failed hosts in each deployment phase, specify the following in the `$OMS_HOME/sysman/prov/agentpush/agentpush.properties` file:


```
oracle.sysman.prov.agentpush.continueIgnoringFailedHost=true
```
6. On the Review page if you are satisfied with the details, then click **Deploy Agent** to install the Management Agent. You are automatically taken to the Add Host Status page that enables you to monitor the progress of the deployment session.

2.2.2 Importing the Oracle VM Manager Certificate into the Agent

 **Note:**

The *host* described in this section is the VM where both Ops Center and Oracle VM Manager are installed.

As you are integrating an Exalogic machine in a virtual configuration with EECS 2.0.6.0.0 or later with the Enterprise Manager Cloud Control 13c or later, a certificate is needed to be imported to the agent because of a hardening in the communication channel of the Oracle VM Manager.

Now that you have installed the Management Agent onto the Control VM where the Oracle VM Manager is hosted, it is possible to use a `tcp://` connection instead of a `tcps://` connection as the access method for Oracle VM Manager discovery. Oracle recommends that you use a `tcps://` connection as it is a more secure access method.

To import the Oracle VM Manager certificate into the agent:

1. As the `root` user on the Oracle VM Manager host, export the certificate from Oracle VM Manager:

```
cd /u01/app/oracle/ovm-manager-3/  
/$AGENT_HOME/jdk/bin/keytool -keystore ./ovmmCoreTcps.ks -exportcert -alias ovmm  
-file ovmm.cr
```

```
Password: <Enter>
```

 **Note:**

When prompted for the password, press **Enter**. The password has already been set up by the Exalogic Configuration Utility (ECU).

2. As the EM Agent install user on the Enterprise Manager Agent host monitoring the Oracle VM Manager, to import the certificate into the Agent's truststore, the `EMCTL secure` command needs to be executed from the host on which the Agent is located:

```
/$AGENT_HOME/bin/emctl secure add_trust_cert_to_jks -trust_certs_loc <Location of  
the Oracle VM Manager Certificate> -alias ovmm
```

```
Password: welcome
```

 **Note:**

When prompted for the password, enter **welcome**. The password has already been set up by the ECU.

3. As the EM Agent install user on the Enterprise Manager Agent host monitoring the Oracle VM Manager restart the agent:

```
$AGENT_HOME/bin/emctl stop agent  
$AGENT_HOME/bin/emctl start agent
```

2.2.3 Importing Oracle Enterprise Manager Ops Center Certificate to the Oracle Management Agent Keystore

Note:

The *host* described in this section is the VM where both Ops Center and Oracle VM Manager are installed.

This section provides step-by-step instructions about how to export the certificate from the Enterprise Manager Ops Center keystore and how to import the certificate into the Enterprise Manager agent keystore. These steps are a prerequisite for Exalogic Elastic Cloud discovery in Enterprise Manager Cloud Control.

Use these steps to export the Oracle Enterprise Manager Ops Center Enterprise Controller trust certificate and import it to the Enterprise Manager Cloud Control Management Agent:

1. Log in to the Enterprise Controller node as `root`:
 - Log in as `root` to the Exalogic Control VM that hosts the Oracle Enterprise Manager Ops Center Enterprise Controller component.
 - When prompted, enter the password **welcome** unless changed from the default, and click **Enter**.
2. Change directory to `$OPS_CENTER_HOME/oem-ec/security/jsse` where `$OPS_CENTER_HOME` is the path to the Oracle Enterprise Manager Ops Center home. For example, `/etc/opt/sun/cacao2/instances/oem-ec/security/jsse`:

```
[root@localhost~]# cd $OPS_CENTER_HOME/oem-ec/security/jsse
```

This directory change is on the VM where the Oracle Enterprise Manager Ops Center Enterprise Controller is running.

3. Export the certificate using `keytool` that corresponds to the JDK configured to run Oracle Enterprise Manager Ops Center:

```
[root@localhost jsse]# $JAVA_HOME/jre/bin/keytool -export -alias cacao_agent -  
file oc.crt -keystore truststore -storepass trustpass
```

Note:

Both export and import tasks should use the same `JAVA_HOME` directory.

This command exports the certificate file (`oc.crt`) in the local directory, for example, `$OPS_CENTER_HOME/oem-ec/security/jsse`. In the above command, *trustpass* is the default password for the Oracle Enterprise Manager Ops Center keystore unless changed. The Oracle Enterprise Manager Ops Center certificate is stored in the `oc.crt` file. You can import the certificate to the Oracle Management Agent TrustStore using the following steps.

4. Enter the following command:

```
$JAVA_HOME/jre/bin/keytool -import -keystore $AGENT_HOME/agent_inst/sysman/  
config/montrust/AgentTrust.jks -alias <alias_name> -file  
<path_to_oc_certificate_file>/oc.crt
```

For example, you can set the `<alias_name>` value to be `wlscertgencab`.

If `<alias_name>` provided in the above command has already been used to import another certificate, you may see the following error:

```
keytool error: java.lang.Exception: Certificate not imported, alias <alias_name>  
already exists.
```

In this case, provide another `<alias_name>` in the command and try again:

```
$JAVA_HOME/jre/bin/keytool -import -keystore $AGENT_HOME/agent_inst/sysman/  
config/montrust/AgentTrust.jks -alias <alias_name> -file <path to oc  
certificate file>
```

When prompted, enter the password **welcome** unless changed from the default, and click **Enter**.

If you follow this step for exporting the certificate, the path to the certificate file will be `$OPS_CENTER_HOME/oem-ec/security/jsse/oc.crt`

5. To verify that the certificate has been imported correctly, run the following command:

```
$JAVA_HOME/jre/bin/keytool -list -keystore $AGENT_HOME/agent_inst/sysman/  
config/montrust/AgentTrust.jks
```

You should see the entry for `wlscertgencab` alias name you created in the output.

6. After verifying that the certificate has been successfully imported, restart the agent by using the stop and start procedure. To do so, see *Starting and Stopping Oracle Enterprise Manager 13c Cloud Control* in the *Enterprise Manager Cloud Control Administrator's Guide*.

2.3 Discovering Targets

Once you have installed Enterprise Manager Cloud Control 13c and the associated Manager Agent, you can now discover the targets to be monitored by Cloud Control. Follow the discovery steps below:

- [Discovering Oracle VM Manager](#)
- [Discovering the Oracle ZFS Storage Appliances](#)
- [Discovering an Exalogic Elastic Cloud Target](#)

2.3.1 Discovering Oracle VM Manager

On an Exalogic machine in a virtual configuration, Oracle VM Manager is pre-installed as part of the Exalogic Control stack.

To install the latest release of the Enterprise Manager Oracle Virtualization plug-in on the Enterprise Manager Cloud Control Server and the agent perform the following steps:

1. [Installing the Oracle Virtualization Plug-in on the Management Server](#)
2. [Deploying the Oracle Virtualization Plug-in to the Management Agent](#)
3. [Registering a New Installation of Oracle VM Manager](#)
4. [Synchronizing an Existing Installation of Oracle VM Manager](#)

2.3.1.1 Installing the Oracle Virtualization Plug-in on the Management Server

To install the latest release of the Enterprise Manager Oracle Virtualization plug-in on the Management Server:

1. Log in to Enterprise Manager Cloud Control.
2. From the **Setup** menu, select **Extensibility**, then select **Plug-ins**.
3. On the Plug-ins page, select the latest version of the **Oracle Virtualization** plug-in, in the Servers, Storage and Network section.
4. From the Deploy On menu, select **Management Servers**.
5. In the Deploy Plug-in on Management Servers dialog, enter the Management Repository SYS password, and click **Continue**. Proceed through the steps in the dialog box.
6. Click **Deploy**. Once successfully deployed, the plug-in appears. Click the **General** tab to verify the version deployed on the Management Server.

For more information about plug-ins, see *Managing Plug-Ins* in the *Oracle® Enterprise Manager Cloud Control Administrator's Guide*.

2.3.1.2 Deploying the Oracle Virtualization Plug-in to the Management Agent

To deploy the plug-in to the Management Agent:

1. From the Setup menu of Enterprise Manager Cloud Control, select **Extensibility**, then select **Plug-ins**.
2. On the Plug-ins page, select the **Oracle Virtualization** plug-in you want to deploy.
3. From the Deploy On menu, select **Management Agent**.
4. In the Deploy Plug-in on Management Agents dialog, select the host name for the Management Agent for where Oracle VM and Ops Center are installed, then click **Deploy**. Once successfully deployed, the plug-in appears. Click the **General** tab to verify the version deployed on the Management Agent.

For more information, see *Deploying Plug-Ins on Oracle Management Agent* in the *Oracle® Enterprise Manager Cloud Control Administrator's Guide*.

2.3.1.3 Registering a New Installation of Oracle VM Manager

The Oracle VM Manager provides the user interface that allows you to create and manage zones, virtual server pools, virtual servers, and guest virtual machines. Before you use the Oracle VM Manager to manage virtualization targets in Enterprise Manager, you must register an existing installation of the Oracle VM Manager.

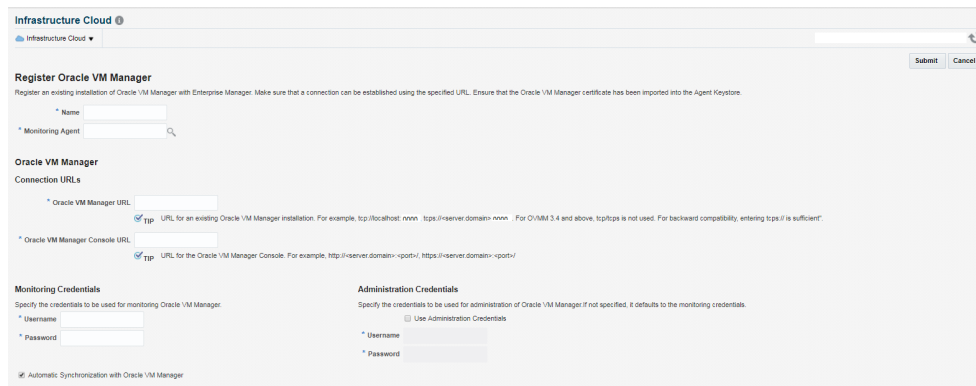
 **Note:**

- The Oracle VM Manager that you register with Enterprise Manager must be at least version 3.0.2 or later.
- The Oracle VM Manager must be associated with only one Enterprise Manager installation.
- If you are registering Oracle VM Manager 3.3, you must ensure that the Enterprise Manager for Oracle Virtualization (Oracle Virtualization) plug-in 12.1.0.7 or a later version has been deployed on the Oracle Management Service and the Management Agent.

To register the Oracle VM Manager, you must first add it as an Enterprise Manager target. To do so, follow these steps:

1. From the **Enterprise** menu of Cloud Control, select **Cloud**, then select **Oracle VM Infrastructure Home**.
2. From the Infrastructure Cloud menu, select **Register OVM Manager**. The Register Oracle VM Manager page appears as shown in [Figure 2-1](#):

Figure 2-1 Register Oracle VM Manager Page



On the Register Oracle VM Manager page, continue with the steps below to complete the registration.

3. In the **Name** field, enter the target name for the Oracle VM Manager instance to be registered.
4. In the **Management Agent** field, select the Management Agent to monitor and manage the Oracle VM Manager instance to be registered.

It is recommended that the Management Agent with Enterprise Manager for Oracle Virtualization plug-in (listed as *Oracle Virtualization* in Self Update) is present on the same machine where the Oracle VM Manager instance is running.

5. In the **Oracle VM Manager URL** field, enter the Oracle VM Manager URL. Refer to Support Note 1490283.1 (available in My Oracle Support) for details on configuring Oracle VM Manager for `tcps` access.

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1490283.1>

The URL must be in one of the following formats:

- `tcp://localhost:<port>`

For example: `tcp://localhost:54321` (If the Oracle VM Manager version is 3.1.1 or greater, you can specify only the `tcps` URL.)

- `tcps://<hostname>:<port>`

For example: `tcps://server.domain:54322`

 **Note:**

Oracle recommends that you use a `tcps://` connection as it is a more secure access method.

6. In the **Oracle VM Manager's Console URL** field, enter the Oracle VM Manager's Console URL. This is the URL to enable the VNC Console for the Guest VMs. For example:

`https://ovmmgr.example.com:7002/ovm/console`

The URL must be in the following format:

`https://<hostname>:<port>`

 **Note:**

If you are registering Oracle VM Manager 3.3, this URL is used to connect to the Oracle VM Manager.

7. By default, data from Oracle VM Manager is automatically synchronized with Enterprise Manager at fixed intervals of time. If you do not wish to enable this option, you must disable the Automatic Synchronization check box and manually synchronize the data.
8. In the Administrator Credentials section, enter the administrator user name and password to connect to the Oracle VM Manager URL provided in Step 5. If you want to use separate credentials for managing Oracle VM Manager, check the **Use Administration Credentials** check box. If these credentials are not specified, the monitoring credentials are used by default.
9. Click **Submit** to register the Oracle VM Manager. You can now use the Oracle VM Manager to monitor and manage the virtualization targets in Enterprise Manager.

2.3.1.4 Synchronizing an Existing Installation of Oracle VM Manager

When EECS 2.0.4.0.0 is upgraded to EECS 2.0.6.0.0, the following steps must be taken to re-register the upgraded Oracle VM Manager in Enterprise Manager:

1. Create a blackout for the Oracle VM Manager target in Enterprise.
2. Upgrade Exalogic from 2.0.4.0.0 to 2.0.6.0.0
3. Import the upgraded Oracle VM Manager's Certificate into Enterprise. See [Importing the Oracle VM Manager Certificate into the Agent](#).

4. End the blackout for the Oracle VM Manager target.
5. Synchronize the Oracle VM manager in Enterprise Manager. From the Oracle VM Manager Target menu, select **Synchronization**.

 **Note:**

If Exalogic with EECS 2.0.6.0.0 or later is used, then the Oracle VM Manager certificate needs to be imported to agent keystore.

 **Note:**

Register the Oracle VM Manager with Enterprise Manager Cloud Control

- Use the Enterprise Manager Cloud Control Agent deployed on the same Exalogic Control VM as the Oracle VM Manager. If an Enterprise Manager Cloud Control Agent is not present on the Exalogic Control VM please deploy one. To do so, see *Installing Oracle Management Agent in the Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*.
- In order to see Exalogic Control VMs in the Enterprise Manager Cloud Control 13c Exalogic navigation tree, you must register the Oracle VM Manager with Enterprise Manager Cloud Control.

2.3.2 Discovering the Oracle ZFS Storage Appliances

The Oracle Exalogic Elastic Cloud machine includes two Oracle ZFS Storage Appliances. Follow the steps below to view and manage the Oracle ZFS Storage Appliances in Oracle Enterprise Manager Cloud Control 13c:

1. [Deploying the Oracle ZFS Storage Appliance Plug-in](#)
2. [Configuring Oracle ZFS Storage Appliance for Oracle Enterprise Manager Monitoring](#)
3. [Adding Oracle ZFS Storage Appliance Instances for Monitoring](#)
4. Viewing metrics and accessing reports

The two primary ways to gather information about monitored instances of an Oracle ZFS Storage appliance are *viewing metrics* and *accessing reports*:

- [Viewing Metrics](#)
- [Accessing Reports](#)

2.3.2.1 Deploying the Oracle ZFS Storage Appliance Plug-in

Install the latest release of the Enterprise Manager Oracle ZFS Storage Appliance plug-in on the Enterprise Manager Cloud Control agent. To deploy the plug-in:

1. Log in to Enterprise Manager Cloud Control.
2. From the **Setup** menu, select **Extensibility**, then select **Plug-ins**.

3. On the Plug-ins page, select the latest version of the **Oracle ZFS Storage Appliance** plug-in, in the Servers, Storage and Network section.
4. From the **Deploy On** menu, select **Management Servers**, as shown in [Figure 2-2](#).
5. In the Deploy Plug-in on Management Servers dialog, enter the Management Repository SYS password, and click **Continue**. Proceed through the steps in the dialog box.
6. Click **Deploy**. Once successfully deployed, the plug-in appears. Click the **General** tab to verify the version deployed on the Management Server.
7. From the **Deploy On** menu, select **Management Agents**, as shown in [Figure 2-2](#).
8. In the Deploy Plug-in on Management Agents dialog, select the host name for the Management Agent for where Oracle VM and Ops Center are installed, then click **Deploy**. Once successfully deployed, the plug-in appears. Click the **General** tab to verify the version deployed on the Management Agent.

Figure 2-2 Deploy Plug-in

ORACLE[®] Enterprise Manager Cloud Control 13c

Plug-ins
This page lists the plug-ins available, downloaded, and deployed to the Enterprise Manager system. Use this page to deploy or undeploy plug-ins.

Actions View **Deploy On** Undeploy From Check Updates Deployment Activities

Name	Version		On Management Server	Management Agent with Plug-in	Description
	Latest Available	Latest Downloaded			
Servers, Storage and Network					
Oracle Axiom	12.1.0.1.0				0 Enterprise Manager for Pillar Axiom
Oracle Flash Storage System	12.1.0.2.0				0 Enterprise Manager for Oracle Flash Storage System
Oracle Key Manager	12.1.0.1.0				0 Enterprise Manager for Oracle Key Manager
Oracle Ops Center Infrastructure stack	12.1.0.4.0				0 Enterprise Manager for Ops Center Infrastructure stack
Oracle Secure Global Desktop	12.1.0.1.0				0 Enterprise Manager for Oracle Secure Global Desktop
Oracle Secure Global Desktop Gateway	12.1.0.1.0				0 Enterprise Manager for Oracle Secure Global Desktop Gateway
Oracle Storage Management Framework	13.3.1.0.0	13.3.1.0.0	13.3.1.0.0		N/A Enterprise Manager Storage Management Framework provides
Oracle Virtual Infrastructure	13.3.1.0.0	13.3.1.0.0	13.3.1.0.0		2 Enables Oracle Compute-based server virtualization and Infras
Oracle Virtual Networking	12.1.0.2.0	12.1.0.2.0	12.1.0.2.0		0 Enterprise Manager for Oracle Virtual Networking
Oracle Virtualization	13.3.1.0.0	13.3.1.0.0	13.3.1.0.0		3 Enables management capabilities for Oracle Linux, Ksplice, Or
Sun Ray Software	12.1.0.1.0				0 Enterprise Manager for Sun Ray Software
Oracle ZFS Storage Appliances	13.2.4.0.0				0 Enterprise Manager for Oracle ZFS Storage Appliances
Systems Infrastructure	13.3.1.0.0	13.3.1.0.0	13.3.1.0.0		18 Enterprise Manager Systems Infrastructure plug-in with support
Oracle Audit Vault	12.1.0.4.0	12.1.0.4.0	12.1.0.4.0		0 Enterprise Manager for Oracle Audit Vault provides monitoring s
Oracle Audit Vault and Database Firewall	13.3.1.0.0	13.3.1.0.0	13.3.1.0.0		0 Enterprise Manager for Oracle Audit Vault and Database Firewa

Oracle ZFS Storage Appliances

General Recent Deployment Activities

Plug-in ID oracle.sun.oss7

Vendor oracle Versions Downloaded

Version on Management Server None Description Enterprise Manager for Oracle ZFS Storage Appliances

Latest Available Version 13.2.4.0.0

For more information about plug-ins, see *Managing Plug-Ins* in the *Oracle® Enterprise Manager Cloud Control Administrator's Guide*.

2.3.2.2 Configuring Oracle ZFS Storage Appliance for Oracle Enterprise Manager Monitoring

 **Note:**

Follow the instructions listed in this section for **both** Oracle ZFS Storage Appliances in your Exalogic Rack.

To set up each appliance for monitoring from Cloud Control, enter the Oracle ZFS Storage Appliance Browser User Interface (BUI) as `root` or another user with the proper role to create worksheets, enable datasets, and create users and user roles on the appliance:

1. Log in to the BUI and go to the Maintenance/Workflows tab.
2. Run the Configure for Oracle Enterprise Manager Monitoring workflow, entering and recording the password for the `oracle_agent` user. You can rerun the workflow later to reset the worksheet, re-enable data sets, or recreate the user. The following occurs when the workflow is run:
 - A restricted role user named `oracle_user` is created for use by the monitoring agent. The restricted access role associated with the `oracle_agent` user is also named `oracle_agent`.
 - An analytics worksheet is automatically created to ensure smooth communication between the Cloud Control administrator and the storage administrator tasked with administering the target Oracle ZFS Storage Appliance.
3. Communicate the `oracle_agent` password to the Cloud Control Administrator along with the following information:
 - IP address for the network interface that you want Cloud Control to use to access management information (this interface must allow administration).
 - Full DNS name that is used to locate the system and corresponds to the IP address.
 - Port that is used by the BUI (typically 215 unless your company has a requirement to change management ports)

 **Note:**

If the Oracle ZFS Storage Appliance plug-in is version 12.1.0.4 or later, then you must carry out the following additional steps:

1. Click to edit the "Oracle Agent" User name field.
2. Uncheck "Kiosk user" if it is checked.

2.3.2.3 Adding Oracle ZFS Storage Appliance Instances for Monitoring

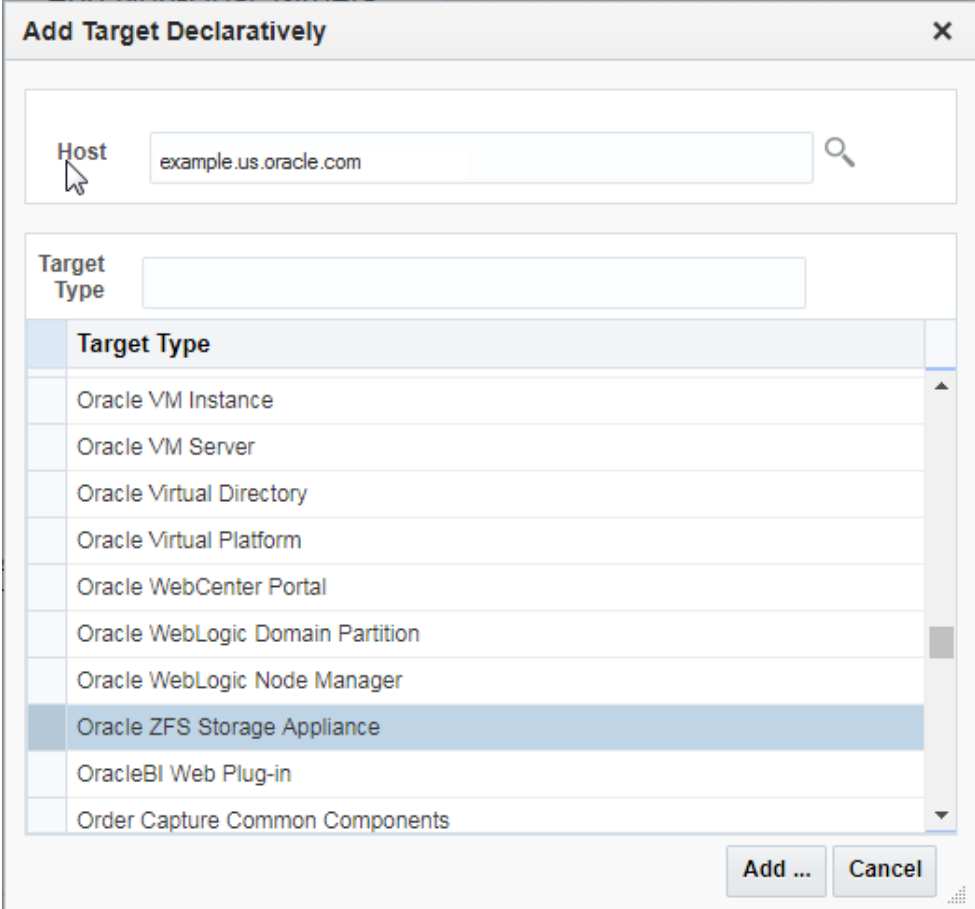
 **Note:**

Follow the instructions listed in this section for **both** Oracle ZFS Storage Appliances in your Exalogic Rack.

To add the Oracle ZFS Storage Appliance target to Oracle Enterprise Manager, complete the steps below:

1. Click the **Setup** menu, then select **Add Target**, and finally **Add Targets Manually**.
2. Select **Add Target Declaratively**.
3. Click the search button and select the **Host**.
4. In the **Target Type** list, select **Oracle ZFS Storage Appliance** as shown in [Figure 2-3](#) and click **Add**.

Figure 2-3 Add Oracle ZFS Storage Appliance Target



Add Target Declaratively [X]

Host: [Search]

Target Type:

Target Type
Oracle VM Instance
Oracle VM Server
Oracle Virtual Directory
Oracle Virtual Platform
Oracle WebCenter Portal
Oracle WebLogic Domain Partition
Oracle WebLogic Node Manager
Oracle ZFS Storage Appliance
OracleBI Web Plug-in
Order Capture Common Components

[Add ...] [Cancel]

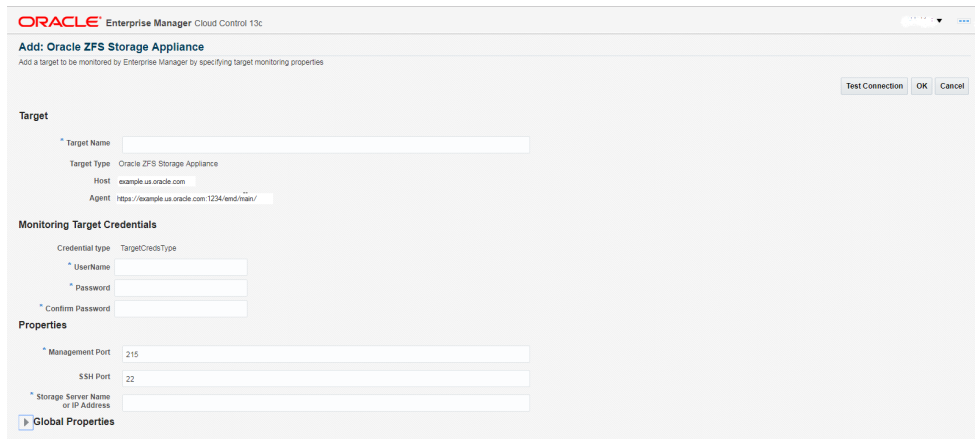
5. Add the Target details (Figure 2-4) and click **OK**.

 **Note:**

It will take about 3 minutes to complete this process the first time, as the plug-in is also being installed on the agent.

The user name should be the `oracle_agent` created in [Configuring Oracle ZFS Storage Appliance for Oracle Enterprise Manager Monitoring](#).

Figure 2-4 Oracle ZFS Storage Appliance Details



ORACLE Enterprise Manager Cloud Control 13c

Add: Oracle ZFS Storage Appliance
Add a target to be monitored by Enterprise Manager by specifying target monitoring properties

Test Connection OK Cancel

Target

* Target Name

Target Type Oracle ZFS Storage Appliance

Host example.us.oracle.com

Agent https://example.us.oracle.com:1234/endpoint/

Monitoring Target Credentials

Credential type TargetCredType

* Username

* Password

* Confirm Password

Properties

* Management Port

SSH Port

* Storage Server Name or IP Address

[Global Properties](#)

6. To find the target, click the **Targets** menu, and select **All Targets**.
7. Select the Oracle ZFS Storage Appliance added above to go to the appliance home page.

2.3.2.4 Viewing Metrics

As a rule, more "point in time" information is available in raw metric information than in reports. Reports are focused on information that administrators can use to analyze database performance and storage capacity.

To view the raw information collected from an Oracle ZFS Storage Appliance:

1. Log in to Enterprise Manager Cloud Control.
2. Click the **Targets** and select **All Targets**. On the All Targets page, select the **Oracle ZFS Storage Appliance**.
3. On the Oracle ZFS Storage Appliance target home page, click the **Target** menu, then **Monitoring**, and finally **All Metrics**.

View the categories and information collected from the last collection interval.

2.3.2.5 Accessing Reports

To view reports for an Oracle ZFS Storage Appliance:

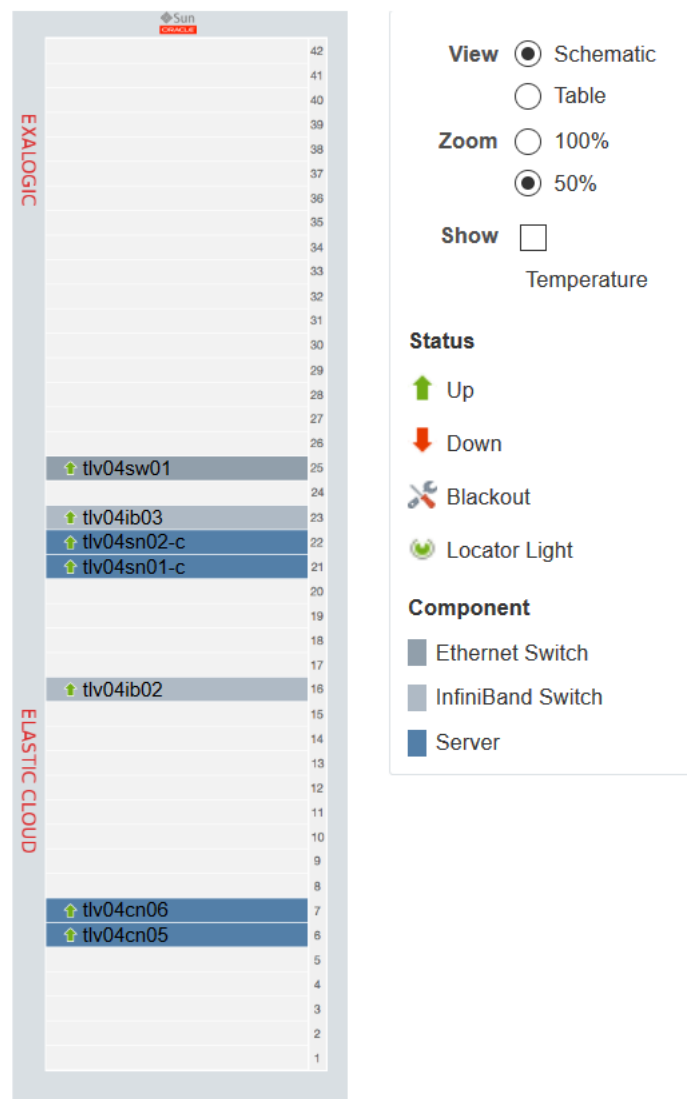
1. Log in to Enterprise Manager Cloud Control.

2. Click the **Targets** and select **All Targets**. On the All Targets page, select the **Oracle ZFS Storage Appliance**.
3. On the Oracle ZFS Storage Appliance target home page, click the **Target** menu, then **Information Publisher Reports**.

2.3.3 Discovering an Exalogic Elastic Cloud Target

The Exalogic Elastic Cloud Discovery process identifies the targets present in the Oracle Exalogic Elastic Cloud and maps them to Enterprise Manager targets, then adds Enterprise Manager targets as Exalogic Elastic Cloud system members. The system members are represented in the schematic diagram (as shown in [Figure 2-5](#)) within Cloud Control.

Figure 2-5 Oracle Exalogic Elastic Cloud Schematic



You can use the Exalogic Elastic Cloud Discovery wizard to discover and monitor an Exalogic target in Enterprise Manager. Follow these steps:

1. In Enterprise Manager, from the **Targets** menu, navigate to the Systems page.
2. From the **Add** drop-down list, choose **Oracle Exalogic**.

Enterprise Manager displays the Discover Exalogic Elastic Cloud Discovery wizard (Figure 2-5) which allows you to enter the parameters and values required to discover an Oracle Exalogic target.

Figure 2-6 Discovery Wizard for Virtual Exalogic

The screenshot shows the 'Oracle Exalogic Discovery' wizard in the 'Discovery Inputs' step. At the top, there is a progress indicator with two steps: 'Discovery Inputs' (active) and 'Discovery Review'. Below the title, a subtitle reads 'Oracle Exalogic Discovery: Discovery Inputs'. The main instruction is 'Use this process to add Oracle Exalogic as a managed target to Enterprise Manager.' The form contains three required fields: '* Name' (text input), '* Agent' (text input with a search icon), and '* Type' (a dropdown menu currently set to 'Virtual 2.x'). Below this is the 'Ops Center Properties' section, with the instruction 'Provide details about Ops Center Enterprise Controller monitoring the Oracle Exalogic you want to discover.' It includes four required fields: '* Ops Center Host Name', '* Ops Center JMX Port', '* Username', and '* Password'.

3. Choose the **Type** from the drop-down (you can select either **Physical 2.x** or **Virtual 2.x**). Select **Virtual 2.x**.
You must provide the desired Enterprise Manager target name and a corresponding Enterprise Manager agent on an Exalogic rack host target.
4. On the Discovery Inputs page, specify a unique **Name** for the Oracle Exalogic target you want to monitor in the **Name** field.
5. Enter or select an **Agent** on one of the hosts in the Exalogic System to perform the discovery. Select the agent running on the same Exalogic Control VM as the Exalogic enterprise controller. If an Enterprise Manager Cloud Control Agent is not

present on the Exalogic Control VM, deploy one. To do so, see *Installing Oracle Management Agents in the Enterprise Manager Cloud Control Basic Installation Guide*.

If you choose an agent that is not part of the Exalogic System, an error message appears stating that no Exalogic Property File can be found and indicating that you must choose an Agent which is on an Exalogic System Host. For a virtual deployment, the host may not have the ID.

6. Enter the Ops Center Properties:

- **Ops Center Host Name:** the host name of the Control VM where Ops Center and Oracle VM Manager are installed.
- **Ops Center JMX Port:** The default Ops Center JMX port is **11172**. Run the following command as the `root` user to verify the port number:

```
/opt/sun/cacao2/bin/cacaoadm get-param jmxmp-connector-port -i oem-ec
```

- **Username** and **Password** credentials.

2.4 Monitoring Tasks for Exalogic Virtual Configurations

The following monitoring tasks are only available for the Exalogic Machine in a virtual configuration:

 **Note:**

For monitoring and management tasks common to both physical and virtual Exalogic configurations, see [Monitoring and Managing Exalogic](#) and [Monitoring Hosts and Applications](#).

- [Monitoring the Exalogic Control Stack](#)
- [Viewing and Managing Exalogic Consumption Tracking](#)
- [Viewing Incidents and Status Changes Created for an Exalogic System in Ops Center as Incidents in Cloud Control](#)
- [Viewing the vCPU Consumption Report](#)
- [Viewing the Resource Consumption Trend](#)
- [Exporting the vCPU Consumption Report](#)

2.4.1 Monitoring the Exalogic Control Stack

The Exalogic Elastic Cloud Software control software stack can be monitored by selecting **Control Stack** in the left hand navigation tree of the Exalogic target. Enterprise Manager Cloud Control displays a master-detail page of Exalogic Elastic Cloud Software virtual machines, corresponding hosts and control software element. Selecting each row master element results in a change in the detail of the page and corresponding key performance indicator charts. This page provides a unified view of incidents related to the Exalogic Elastic Cloud Software control software stack.

2.4.2 Viewing and Managing Exalogic Consumption Tracking

You can use resource utilization features in Enterprise Manager to view consumption tracking and set the license edition for each target of a Exalogic system. To view consumption tracking information, follow these steps:

1. From the **Targets** menu, select **Oracle Exalogic**.
2. From the list of Exalogic targets, click the Exalogic Elastic Cloud target for which you want to view consumption information.
3. From the **Oracle Exalogic** menu, choose **Resource Utilization**, and then select **Consumption Tracking**.

Cloud Control displays the vCPU Consumption page where you can perform the following tasks:

- View the resource consumption trend for the previous 24 hours by choosing **View Trends**.
- Export the data on the vCPU Consumption page for the selected Time Period, View, and Product by clicking **Export**.
- Click **Manage License Edition** to access a dialog box where you can set the license edition for each target of the current Exalogic system.
- View the details for the selected product in the Details table. The table displays the Collection Time/Host, vCPUs, Target Name, Target Type, Version, Cost Center, and Owner.

2.4.3 Viewing Incidents and Status Changes Created for an Exalogic System in Ops Center as Incidents in Cloud Control

This section describes how to configure Enterprise Manager Cloud Control in order to consolidate alarms/incidents from Oracle Enterprise Manager Ops Center and consequently view all the issues from both systems in a single console. Furthermore, this configuration enables you to use the existing integration between Enterprise Manager Cloud Control and the ticketing system to manage the Oracle Enterprise Manager Ops Center incidents. Please note that once you start to manage Oracle Enterprise Manager Ops Center incidents within Enterprise Manager Cloud Control, if for any reason you alter incidents in Oracle Enterprise Manager Ops Center, those changes will not be reflected in Cloud Control.

The functionality of viewing Oracle Enterprise Manager Ops Center alarms in Oracle Enterprise Manager Cloud Control is disabled by default. You can enable this functionality to view Oracle Enterprise Manager Ops Center alarms in Oracle Enterprise Manager Cloud Control by performing the following steps:

1. From the **Oracle Exalogic** target menu, select **Monitoring** and then choose **Metric and Collection Settings**.
2. Enable the Collection Schedule for the Oracle Enterprise Manager Ops Center Alarms metric by clicking **Collection Schedule**.

To view incidents and status changes created for an Exalogic system in Oracle Enterprise Manager Ops Center as incidents in Oracle Enterprise Manager Cloud Control, follow these steps:

1. From the **Targets** menu, choose **Oracle Exalogic**.
Enterprise Manager displays the Systems page.
2. From the Systems page, click the **Name** of the Exalogic Elastic Cloud in the Systems table.
Enterprise Manager displays the Exalogic Elastic Cloud Dashboard.
3. Click the **Hardware tab** to view alarms and incidents in Oracle Enterprise Manager Ops Center as an incident in Oracle Enterprise Manager Cloud Control for the Exalogic System target.

2.4.4 Viewing the vCPU Consumption Report

To view the vCPU Consumption Report for the software components running on an Exalogic Machine, do the following:

1. On the vCPU Consumption page, select one of the time periods in the **Time Period** drop-down list.

 **Note:**

When you select a time period, the Product table and Details table refreshes automatically for the chosen time period.

2. From the Product list, select the product or the products for which you want to view the consumption report. By default all the products are selected.
3. From the Product table, select a **Product** for which you want to view the consumption report.

 **Note:**

When you select a product, the Details table refreshes automatically to display the Consumption Report for the product.

4. The Details table displays the consumption details for the product or products that you have selected.

You can add more details as columns to the Details table by clicking **View**, selecting **Columns**, and then selecting the items you want to be displayed. You can select which columns you want to be visible and which columns to hide by clicking **Manage Columns**.

By default, the Details table displays the collection time and the number of total vCPUs consumed. Expand the collection time and host name to view all the following details:

- Collection time of the point when vCPU was collected
- Host name of the host on which software is running
- The Exalogic machine name
- The number of total vCPUs consumed by the software/target running at that time

- The target name
- The target type
- The owner of the target

2.4.5 Viewing the Resource Consumption Trend

To view the resource consumption trend for an Exalogic machine target, do the following:

1. On the vCPU Consumption page, from the Product drop-down list, select the product for which you want to view the resource consumption trend.
Select **All** if you want to view the resource consumption trend for all the targets.

 **Note:**

When you make a selection from the Product drop-down list, the Product table and the Details table automatically refreshes to display the details for the product or products that you have selected.

2. From the Time Period drop-down list, select the time period for which you want to view the resource consumption trend.
3. Click **View Trends**.
4. The Resource Consumption Trend window opens.
If you selected All products, then the graphical representation of the resource consumption for all the products will be displayed. You can choose to view trends for individual products as well, by clicking on the Product drop-down list, and selecting the product.
5. You can also choose to view the resource consumption trend in a table format by clicking **Table View**.
On the Table view page, you can customize the details you want to view in the table by clicking **View**.
6. Click **OK** to close the Resource Consumption trend window.

2.4.6 Exporting the vCPU Consumption Report

To export the vCPU consumption report for an Exalogic machine target, do the following:

1. On the vCPU Consumption page, select the following:
 - **Time Period**
Select a time period for which you want to view the vCPU consumption report for.
 - **View**
Select **Product**.
 - **Product**

Select the products for which you want to view the vCPU consumption report.

Select **All** if you want to view the vCPU consumption report for all the products.

2. Click **Export**.
3. On the Opening License dialog box, select the program with which you want to open the file. Microsoft Office Excel is the default program. Click **OK**.

2.5 Management Tasks for Exalogic Virtual Configurations

The following management tasks are only available for the Exalogic Machine in a virtual configuration:

Note:

For monitoring and management tasks common to both physical and virtual Exalogic configurations, see [Monitoring and Managing Exalogic](#) and [Monitoring Hosts and Applications](#).

- [Configuring the Exalogic Guest Base Template](#)
- [Creating an Exalogic Control VM](#)
- [Configuring the Exalogic Network](#)

2.5.1 Configuring the Exalogic Guest Base Template

The Exalogic Guest Base Template is an OS image in a certain format that can be used to create an Exalogic Control VM. By default, a server template is bound to a specific account. You can register a server template for public use within any account inside the Exalogic Virtual Data Center (vDC). All virtual servers created in the Exalogic vDC use a Server Template.

Before you configure the Exalogic Guest Base Template, ensure that the following prerequisites are met:

- A configured virtualized Exalogic Elastic Cloud Software (EECS) installation must be present.
- Enterprise Manager Cloud Control 13c installation must be present.
- All Exalogic Control VMs are expected to have a public IP; so, the Enterprise Manager agent can be pushed.
- Root privileges required to mount and edit the Exalogic Guest Base Template.
- Oracle user account must have been defined on the Exalogic Guest Base Template.

Configuring the Exalogic Guest Base Template involves the following steps:

- [Expanding the Disk Size](#)
- [Enabling `sudo` to Deploy the Management Agent](#)
- [Customizing the Base Image for Specific Exalogic Deployments](#)

- [Uploading and Registering the Exalogic Guest Base Template to the Exalogic Server](#)
- [Known Issue: Deriving an Association between Host and Virtual Manager Guest](#)

2.5.1.1 Expanding the Disk Size

The disk size of the Exalogic Guest Base Template needs to be expanded to accommodate the Management Agent. To expand the disk size of the Exalogic Guest Base Template, follow these steps:

1. Log in to a 64-bit Linux machine as a user with **root** privileges.
2. Visit <https://edelivery.oracle.com/>. Complete your registration information (Name, Company Name, Email Address and Country) and click on the download agreement. Select the following:
 - Product Pack: Oracle Fusion Middleware
 - Select Platform: Linux x86-64
3. Click **Go**. From the list of downloads, select Oracle Exalogic Elastic Cloud Software 11g Media Pack.
4. Download the latest Oracle Exalogic Base Guest Template for Exalogic Linux x86-64 (64 bit) to a working directory, referred to as the `template_directory`. Follow the instructions as shown in the example below:

```
unzip ../V32082-01.zip
tar xzf ../el_x2-2_base_linux_guest_vm_template_2.0.6.0.0_64.tgz
cd BASE
```

Navigate to the `BASE` directory where the `System.img` file is located.

5. Next, use `Modifyjeos` to increase the disk space. To get started with Oracle Linux JeOS, visit Oracle Software Delivery Cloud and download Oracle Linux JeOS for x86 (32 bit) and x86_64 (64 bit). Follow the instructions below:
 - Visit [Oracle Software Delivery Cloud](#).
 - Complete your registration information (Name, Company Name, Email Address and Country) and click on the download agreement.
 - Select **Oracle Linux** from the Select a Product Pack pull-down menu.
 - Select **x86 32-bit** or **x86 64 bit** from the Platform pull-down menu.
 - Click **Go** and then select from the list of downloads, either:
 - Oracle Linux JeOS for Building Oracle VM templates for x86 (32 bit)
 - Oracle Linux JeOS for Building Oracle VM templates for x86_64 (64 bit)
 - Download Linux JeOS for Building Oracle VM templates, unzip the files, and install `modifyjeos` according to the instructions in the `Readme.txt`.
6. Navigate to the directory that contains the `System.img` file. This is the `BASE` directory as specified in Step 4.
7. Enter the command to increase the disk size as shown in the example below:

```
modifyjeos -f System.img -T 10240
```

where `T` specifies the disk size in MB.

- Enter the command to increase the Exalogic Guest Base Template swap size as shown in the example below:

```
modifyjeos -f System.img -S 1024
```

where *s* specifies the size of the swap partition in MB.

2.5.1.2 Enabling `sudo` to Deploy the Management Agent

To enable `sudo`, log in as user with root privileges and follow the instructions as shown in the example below:

- Log in as `root` and run the following commands:

```
/sbin/kpartx -av System.img
mount -o loop /dev/mapper/loop0p2 /mnt
```

- In the `sudoers` file (located at `/mnt/etc/sudoers`), change the following entries:

```
Defaults ! visiblepw to Defaults visiblepw
Defaults requiretty to Defaults ! requiretty
```

- After the `root ALL=(ALL) ALL` entry in the `sudoers` file, add the complete entry shown below:

```
oracle ALL=(root) /usr/bin/id,
/*ADATMP_[0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9]_[0-9][0-9]-[0-9][0-9]-[0-9]
[0-9]-[AP]M/agentdeployroot.sh,
/*/*ADATMP_[0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9]_[0-9][0-9]-[0-9][0-9]-
[0-9][0-9]-[AP]M/agentdeployroot.sh,
/*/*/*ADATMP_[0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9]_[0-9][0-9]-[0-9][0-9]-
[0-9][0-9]-[AP]M/agentdeployroot.sh,
/*/*/*/*ADATMP_[0-9][0-9][0-9][0-9]-[0-9][0-9]-[0-9][0-9]_[0-9][0-9]-[0-9][0-9]-
[0-9][0-9]-[AP]M/agentdeployroot.sh
```

2.5.1.3 Customizing the Base Image for Specific Exalogic Deployments

This procedure lists the steps required to copy the Exalogic Identifier to the Exalogic Base Image Template. It must be performed for each Exalogic on a separate fabric. The Exalogic Identifier (present in the `em-context.info` file) is specific to each Exalogic Fabric. The resulting Exalogic Server Templates must be used with the same rack from which the corresponding `em-context.info` file was copied.

To customize the guest base template:

- Copy the Exalogic identifier to the Exalogic Guest Base Template by following the steps shown in the following example:

```
mkdir -p /mnt/var/exalogic/info/
scp <user>@<dom0_ip>:/var/exalogic/info/em-context.info /mnt/var/exalogic/
info/em-context.info
umount /mnt
/sbin/kpartx -d System.img
tar -pczvf template_name.tgz template_directory
```

- Save the configured file.

2.5.1.4 Uploading and Registering the Exalogic Guest Base Template to the Exalogic Server

Upload and register the configured Exalogic Guest Base Template to the Exalogic Control by following the steps listed in:

http://docs.oracle.com/cd/E18476_01/doc.220/e25258/proc.htm#BABFFDDA

After the modified Exalogic Guest Base Template has been uploaded, follow instructions in [Configuring the Exalogic Network](#) to configure the Exalogic network. After the network has been configured, create an Exalogic Control VM using the above template within Exalogic Control. See [Creating an Exalogic Control VM](#) for details.

2.5.1.5 Known Issue: Deriving an Association between Host and Virtual Manager Guest

For Enterprise Manager to be able to map a Guest Virtual Machine on Exalogic to the corresponding host target, the host's serial number must be obtained. The `GenerateSlNo.sh` script is available to obtain the host's serial number. This script should be run on the operating system of all the Guest Virtual Machines which need to be associated with their Host targets. If your EECS does not include this script, follow the instructions below to create one and run it.

Note:

This script must be run on each and every Exalogic Control VM that would potentially be monitored via an Enterprise Manager "Exalogic Elastic Cloud" system type.

1. Check to see if the `/var/log/cellos/SerialNumbers` file exists:

If it does exist, check the content and see if it contains any serial number data. If the file is empty of serial numbers, then delete the `SerialNumbers` file before you run the script as described below; otherwise, the script will exit out.

2. As the `root` user, create a new text file in the `/etc` directory. Name the file `GenerateSlNo.sh`.
3. Add the following content to the text file:

```
serialCode=`dmidecode |grep Serial|grep -v Not|cut -d ":" -f2|cut -d " " -f2`
if [ -f /var/log/cellos/SerialNumbers ]; then
    echo "File /var/log/cellos/SerialNumbers already exists."
else
    mkdir -p /var/log/cellos
    echo "====START SERIAL NUMBERS====" > /var/log/cellos/SerialNumbers
    echo "==Motherboard, from dmidecode==" >> /var/log/cellos/SerialNumbers
    echo "--System serial--" >> /var/log/cellos/SerialNumbers
    echo "$serialCode" >> /var/log/cellos/SerialNumbers
    echo "--Chassis serial--" >> /var/log/cellos/SerialNumbers
    echo "$serialCode" >> /var/log/cellos/SerialNumbers
fi
```

4. Save the file and close it.

5. Edit the permissions of the file to make it executable:

```
# chmod 700 GenerateSlNo.sh
```

This permissions setting allows only the `root` user to run the script.

 **Note:**

It is recommended that the EM Agent install user also have read permissions for the `/var/log/cellos/SerialNumbers` file.

6. Run the `GenerateSlNo.sh` script:

```
# /etc/GenerateSlNo.sh
```

7. After this script is run manually, you can either wait for the agent to re-read it (every 24 hours) or read it now and therefore populate the fields. To read it now, from the host target menu, select **Configuration**, then **Last Collected**, and finally select **Refresh**.

2.5.2 Creating an Exalogic Control VM

Create the Exalogic Control VM with an interface on the configured Enterprise Manager external network by following steps listed in http://docs.oracle.com/cd/E18476_01/doc.220/e25258/proc.htm#CHDIHDEI.

 **Note:**

The IP address for the network is assigned when the Exalogic Control VM is created. Once the Exalogic Control VM is created, a new interface cannot be assigned.

After the IP address has been created, do the following:

- Configure the DNS by editing the `/etc/resolv.conf` file.
- Log into the running Exalogic Control VM as user with `root` privileges, set the password for the Oracle user account and follow the instructions to deploy the Management Agent.

2.5.3 Configuring the Exalogic Network

After you have uploaded and registered the configured Exalogic Guest Base Template, you need to configure the Exalogic Network and create a new Virtual Local Area Network (VLAN).

Prerequisites

- All Exalogic Control VMs must be a part of the VLAN that is to be used for communication between Oracle Management Service (OMS) and the Management Agent.

- The OMS must have access to the VLAN being used for communication between OMS and the Management Agent.
- All Exalogic Control VMs must have publicly available host names (and corresponding IPs) that are accessible from the OMS.

To configure the Exalogic network, follow these steps:

1. The following steps are typically performed by a network administrator:
 - Identify all the available IPs on the external network with which the Guest virtual machines will be configured.
 - Identify the VLAN to be used for communication between the OMS and the Management Agent. If it is a tagged network then get the VLAN ID as well. The VLAN ID is added in Step 3 below.
2. Create external Ethernet over InfiniBand (EoIB) networks to isolate public traffic for different Accounts in the Exalogic Control. Follow the instructions in:
http://docs.oracle.com/cd/E18476_01/doc.220/e25258/proc.htm#BABHHEGG
3. Assign external EoIB networks to the Account. This step makes the external networks available to users belonging to the selected Account. To perform this step, you must identify the Account(s) for which the external EoIB networks are to be assigned. Follow the instructions listed in:

http://docs.oracle.com/cd/E18476_01/doc.220/e25258/proc.htm#BEJBAIGF

3

Discovering Exalogic Machine - Physical Configuration

This chapter describes the discovery steps for the Oracle Exalogic Elastic Cloud machine in a *physical* configuration. For this configuration, you must install the appropriate Enterprise Manager software to effectively manage and monitor your Exalogic hardware. Oracle Enterprise Manager Cloud Control provides many of the monitoring features used by system administrators.

Oracle Enterprise Manager Cloud Control 13c provides a holistic, end-to-end management solution to manage the software on the Exalogic nodes, and provides an interface to manage the Exalogic hardware. To use Oracle Enterprise Manager Cloud Control it must be installed and then the Exalogic assets must be *discovered*.

Follow the steps below to discover an Exalogic target in Enterprise Manager Cloud Control:

1. [Verifying Prerequisites.](#)
2. Prepare your Exalogic Machine as described in [Prepare Exalogic Machine for Discovery by Cloud Control.](#)
3. [Installing Management Agents on Exalogic Rack Servers.](#)
4. [Discovering Targets in Enterprise Manager Cloud Control 13c.](#)
 - [Discovering an Exalogic Elastic Cloud Target \(Physical\)](#)
5. Once you have completed discovery of your Exalogic Machine in Enterprise Manager Cloud Control, perform the steps mentioned in [Post-Discovery Configuration and Verification](#) .

3.1 Verifying Prerequisites

Before proceeding with discovery, you must verify that your Exalogic system meets the following minimal software requirements:

- Oracle Exalogic Elastic Cloud Software (EECS):
 - For Exalogic X2-2 and X3-2: EECS version 2.0.3.0.6 or later.
 - For Exalogic X4-2: EECS version 2.0.6.1.1 or later.
- Operating System: check the `/etc/issue` file to verify that a supported version of Oracle Linux is running. As `root`, run the following command:

```
# cat /etc/issue
```

Output should look like this:

```
Oracle Linux Server release 5.9
Kernel \r on an \m
```

If the `/etc/issue` file does not exist or does not return an Oracle Linux Server entry, then contact Oracle Support.

 **Note:**

While the Exalogic System supports Oracle Solaris, the process for discovering an Exalogic System with Enterprise Manager on Oracle Solaris is not yet supported.

- Verify that the Exalogic Oracle Linux image is installed. Run the following command as `root`:

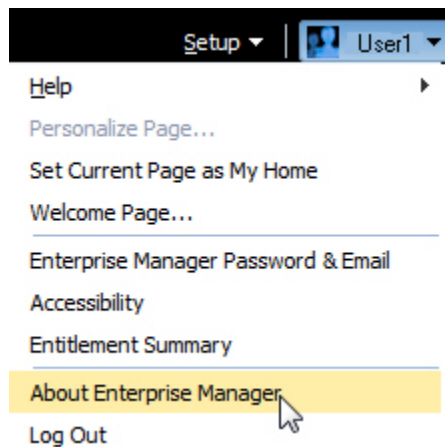
```
# imageinfo
```

Output of this command will display the Exalogic build information.

If the `imageinfo` command does not return any information or if the `Image status` value is not `SUCCESS`, then the image is either not installed or not configured properly. Submit a service request (SR) to Oracle Support to ensure you have the image installed and configured.

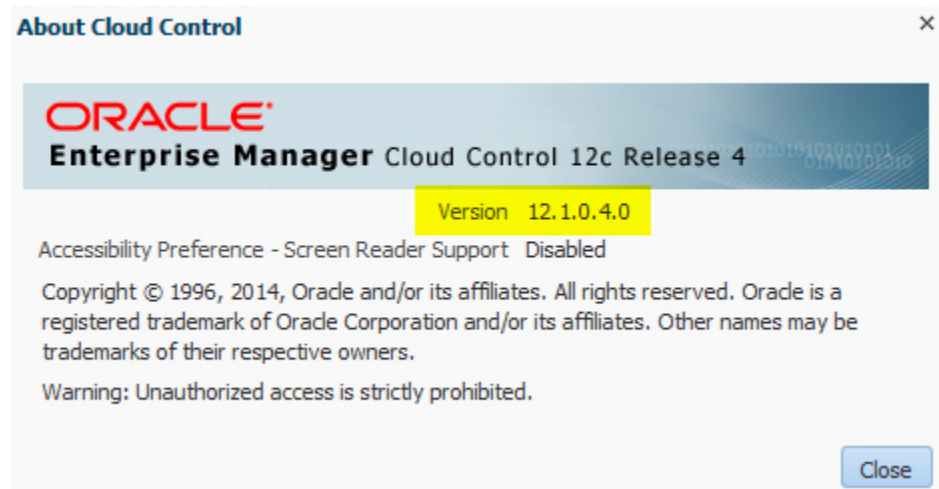
- Enterprise Manager Cloud Control 12c: release 4 (12.1.0.4.0) or later. To check the version of Cloud Control:
 1. Click your login name in the upper-right corner of the Cloud Control window, then select **About Enterprise Manager** as shown in [Figure 3-1](#):

Figure 3-1 About Enterprise Manager



2. In the pop-up window, verify that the version is 12.1.0.4.0 or later, as shown in [Figure 3-2](#):

Figure 3-2 Verify Cloud Control Version



3. Click **Close**.

3.2 Installing Management Agents on Exalogic Rack Servers

If you want to see Oracle applications running on a compute node in the Software tab, then an Enterprise Manager Agent must be installed.

Note:

The two Enterprise Manager Control Nodes should have already been configured within the steps in [Prepare Exalogic Machine for Discovery by Cloud Control](#). This section should apply to all Primary and Backup Enterprise Manager Monitoring Compute Nodes.

For details on how to download and install Management Agents, see Installing Oracle Management Agents in the *Oracle® Enterprise Manager Cloud Control Basic Installation Guide*.

3.3 Discovering Targets in Enterprise Manager Cloud Control 13c

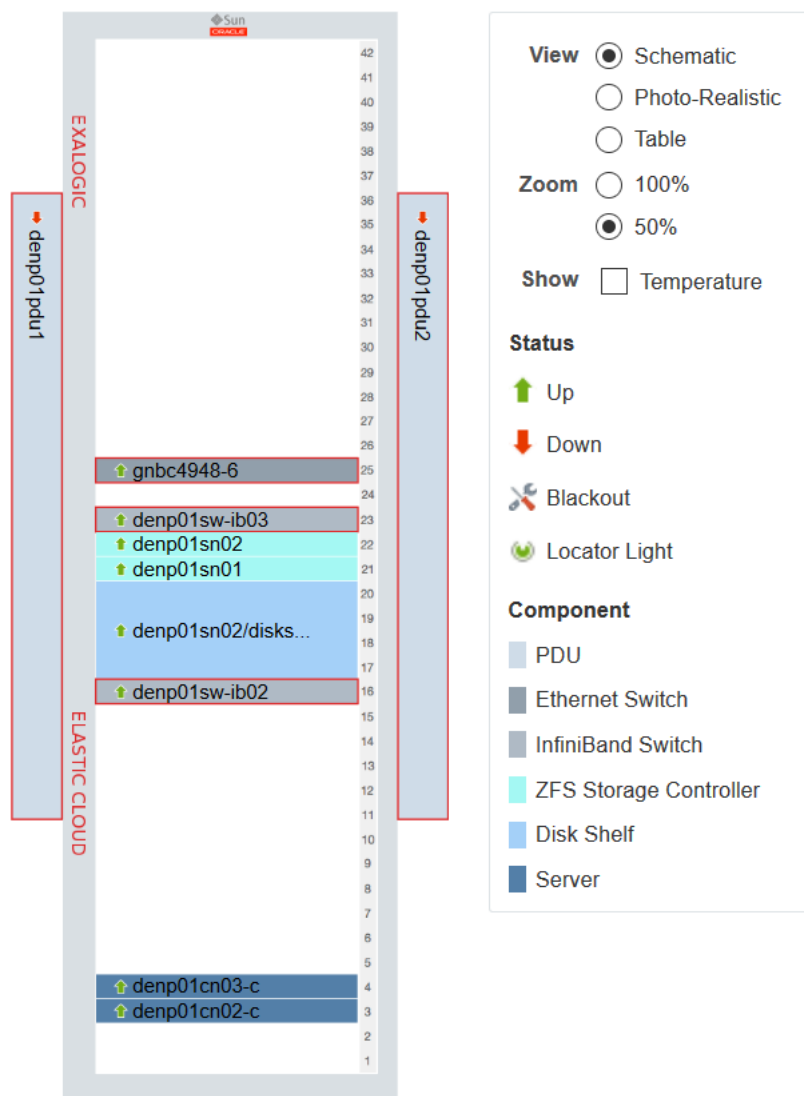
Once you have installed Enterprise Manager Cloud Control 13c and the associated Manager Agent (that is, the Enterprise Manager Control Compute Node Manager Agent configured in [Prepare Exalogic Machine for Discovery by Cloud Control](#)), you can now discover the targets to be monitored by Cloud Control by following the discovery step below:

- [Discovering an Exalogic Elastic Cloud Target \(Physical\)](#)

3.3.1 Discovering an Exalogic Elastic Cloud Target (Physical)

To view the Exalogic schematic diagram (as shown in [Figure 3-3](#)) within Oracle Enterprise Manager Cloud Control 13c, the Exalogic Elastic Cloud target must be discovered by Enterprise Manager.

Figure 3-3 Oracle Exalogic Elastic Cloud Schematic



You can use the Exalogic Elastic Cloud Discovery wizard to discover and monitor an Exalogic target in Enterprise Manager. The Exalogic Elastic Cloud Discovery process identifies the hardware components present in the EEC and maps them to Enterprise Manager targets.

To discover an Exalogic Elastic Cloud target, follow these steps:

1. In Enterprise Manager, from the **Targets** menu, navigate to the Systems page.

- From the **Add** drop-down list, choose **Oracle Exalogic**.

Enterprise Manager displays the **Oracle Exalogic Discovery: Discovery Inputs** wizard which allows you to enter the parameters and values required to discover an Oracle Exalogic target.

Figure 3-4 Discovery Wizard for Physical Exalogic

- Choose the **Type** from the drop-down (you can select either **Physical 2.x** or **Virtual 2.x**). Select **Physical 2.x**.

You must provide the desired Enterprise Manager target name and a corresponding Enterprise Manager agent on an Exalogic rack host target.

- On the Discovery Inputs page, specify a unique name for the Oracle Exalogic target you want to monitor in the **Name** field.
- Enter or select an **Agent** where the Exalogic Lifecycle (ELLC) release 14.2 toolkit is run (as described in [Prepare Exalogic Machine for Discovery by Cloud Control](#)). For a full-rack scenario, there would have 30 agents but the discovery wizard expects only one of those two agents which have the ELLC toolkit installed.

If an Enterprise Manager Cloud Control Agent is not present on the compute node, deploy one using the following documentation:

http://docs.oracle.com/cd/E24628_01/install.121/e22624/install_agent.htm#CACJEFJI

Select an Agent on one of the hosts in the Exalogic System to perform the discovery.

6. In the **SSH Authentication** field, provide the **Agent User SSH Key Passphrase**. This will be used to discover Exalogic Elastic Cloud and to collect monitoring data.

 **Note:**

In case no Key Passphrase was set up while pushing keys, then enter any value to proceed for discovery.

7. In the **SNMP Authentication** field, provide the **SNMP Community Name**. This will be used to collect the monitoring data from switches and PDUs.
8. In the **PDU Monitoring** field, select the checkbox to discover and monitor the PDUs.
9. In the **Ethernet Switch Monitoring** field, select the checkbox to discover and monitor the ethernet switch.
10. Provide the Cisco IOS username, password, and privileged EXEC password . This will be used to collect monitoring data from the ethernet switch.
11. After clicking **Next**, Enterprise Manager displays a Processing dialog box stating the following: "Finding Targets - In Progress. This operation cannot be canceled. Closing the browser window may cause the process to fail." Enterprise Manager then displays the Discover Oracle Exalogic Targets: Discovery Review page. The Review page displays the number of Targets Found after running the Discovery Inputs process. The page displays all member targets (such as PDU, Switches, ILOM) that are discovered as part of the system and displays other discovered hardware targets in physical discovery.
12. Use the Review page to specify the following information:
 - a. Enter or select the **Primary Monitoring Agent** to monitor Exalogic Elastic Cloud.
 - b. Enter or select the **Backup Monitoring Agent** to monitor Exalogic Elastic Cloud.

 **Note:**

Backup Monitoring Agent and Monitoring Agent can be only those agents where the Exalogic Lifecycle (ELLC) release 14.2 toolkit is installed and run as described in [Prepare Exalogic Machine for Discovery by Cloud Control](#).

13. Click **Submit** to save the targets as a Manageable Entity. You can also choose **Back** to return to the Discover Exalogic Elastic Cloud page or **Cancel** to terminate the discovery process.

Enterprise Manager displays a confirmation that the Exalogic Elastic Cloud instance has been added and begins to monitor the Exalogic Elastic Cloud target. The new target is displayed on the Systems page.

4

Post-Discovery Configuration and Verification

This chapter describes the post-discovery configuration steps you must complete once the Oracle Exalogic Machine has been discovered through Enterprise Manager Cloud Control 13c:

- [Refreshing the Exalogic Elastic Cloud Target](#)
- [Deploying the Management Agent for Servers](#)

4.1 Refreshing the Exalogic Elastic Cloud Target

You should consider refreshing the system whenever you upgrade the Exalogic Rack, for example, from a quarter to half. You should also consider refreshing when you discover Oracle VM Manager or ZFS targets after the Exalogic system is discovered. To refresh the Exalogic Elastic Cloud, follow these steps:

1. From the **Targets** menu, select **Oracle Exalogic**.
2. From the list of Exalogic targets, click the Exalogic Elastic Cloud target you want to view.
3. From the **Oracle Exalogic** menu, choose **Refresh System**.
4. Press **Next** to continue.

4.2 Deploying the Management Agent for Servers

If you want to monitor Oracle applications either on a physical or virtual node, then a Enterprise Manager Management Agent needs to be installed to enable the Software tab. This Management Agent allows you to manage the servers, operating system, and software (for example, WebLogic, Oracle Database) through Enterprise Manager Cloud Control.

Modify the `agentpush.properties` file present in the `<OMS_HOME>/sysman/prov/agentpush/agentpush.properties` directory. Change:

```
oracle.sysman.prov.agentpush.pdpShellOutEnabled=true
```

to:

```
oracle.sysman.prov.agentpush.pdpShellOutEnabled=false
```

Note:

This step needs to be performed for all OMS instances.

After the Exalogic network has been configured, deploy the Management Agent by following instructions listed below:

1. Ensure that you have downloaded and applied the Management Agent software for the platforms of the hosts on which you want to install Management Agents.
2. In Enterprise Manager Cloud Control, do one of the following:
 - From the Setup menu, select **Add Target**, then select **Auto Discovery Results**. On the Auto Discovery Results page, click the **Host and Oracle VM Manager** tab and select a host that you want to monitor from the displayed list. Click **Promote**.
 - From the Setup menu, select **Add Target**, then select **Add Targets Manually**. On the Add Targets Manually page, select **Add Host Targets** and click **Add Host**.
3. On the Host and Platform page, do the following:
 - a. Accept the default name assigned for this session or enter a unique name of your choice. The custom name you enter can be any intuitive name, and need not necessarily be in the same format as the default name. For example, `add_host_operation_1`.

A unique deployment activity name enables you to save the installation details specified in this deployment session and reuse them in the future without having to enter all the details all over again in the new session.
 - b. Click **Add** to enter the fully qualified name and select the platform of the host on which you want to install the Management Agent.
 - c. Click **Next**.
4. On the Installation Details page, do the following:
 - a. In the Deployment Type section, select **Fresh Agent Install**.
 - b. From the table, select the first row that indicates the hosts grouped by their common platform name.
 - c. In the Installation Details section, provide the installation details common to the hosts selected in Step b. For Installation Base Directory, enter the absolute path to the agent base directory where you want the software binaries, security files, and inventory files of the Management Agent to be copied.
 - d. For Instance Directory, accept the default instance directory location or enter the absolute path to a directory of your choice where all Management Agent-related configuration files can be stored.
 - e. From Named Credential list, select an appropriate profile whose credentials can be used for setting up the SSH connectivity between the OMS and the remote hosts, and for installing a Management Agent on each of the remote hosts.
 - f. For Privileged Delegation Setting, validate the Privilege Delegation setting to be used for running the root scripts. By default, it is set to the Privilege Delegation setting configured in Enterprise Manager Cloud Control.
 - g. For Port, accept the default port (**3872**) that is assigned for the Management Agent to communicate, or enter a port of your choice.
 - h. Repeat for every other row you have in the table in step b.
 - i. Click **Next**.

5. If you want to deploy Management Agents on the selected hosts in a rolling manner, such that the deployment proceeds continuously from one deployment phase to another, ignoring the failed hosts in each deployment phase, specify the following in the `$OMS_HOME/sysman/prov/agentpush/agentpush.properties` file:

```
oracle.sysman.prov.agentpush.continueIgnoringFailedHost=true
```

6. On the Review page if you are satisfied with the details, then click **Deploy Agent** to install the Management Agent. You are automatically taken to the Add Host Status page that enables you to monitor the progress of the deployment session.

For more information about installing the agent, see the Installing Oracle Management Agents in the *Oracle® Enterprise Manager Cloud Control Basic Installation Guide*.

5

Monitoring and Managing Exalogic

This chapter describes how to monitor and manage your Exalogic assets in the following sections:

- [Displaying and Using the Exalogic Elastic Cloud Dashboard](#)
- [Monitoring the Hardware Components of Exalogic Elastic Cloud](#)
- [Visualizing Relationships Between Exalogic Software and Hardware Components](#)
- [Analyzing the Impact of Component Failures](#)

5.1 Displaying and Using the Exalogic Elastic Cloud Dashboard

Use the Exalogic Elastic Cloud Dashboard to view status information about software and hardware targets in the Exalogic Elastic Cloud:

- [Using the Software Tab](#)
- [Using the Hardware Tab](#)

To display and use the Exalogic Elastic Cloud Dashboard, follow these steps:

1. In Enterprise Manager, navigate to the Systems page. Filter the entries in the Search field by choosing **Oracle Exalogic** from the drop-down list and click **Go**. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.

Enterprise Manager displays the Exalogic Elastic Cloud home page where you can monitor the components on the Exalogic Dashboard.

You can view the dashboard anytime from the Exalogic Elastic Cloud home page. From the **Oracle Exalogic** menu, select **Members**, then **Dashboard**.

2. You can view detailed information about each software component by choosing the component name from the **Oracle Exalogic** drop-down list. Only the software components are visible in the Exalogic drop-down list. Hardware components can be seen in the Members tab.

Enterprise Manager displays the component page you selected. For example, select WebLogic Domains Summary page to see the charts showing the status of WebLogic servers, Request Processing Time metric information, CPU Usage, Requests per minute, and Heap Usage data.

3. You can return to this page at any time by choosing **Home** from the **Oracle Exalogic** drop-down list.
4. You can display General Information about the Exalogic target by choosing **Target Information** from the **Oracle Exalogic** drop-down list.

5.1.1 Using the Software Tab

Use the Software tab on the Exalogic Elastic Cloud Dashboard to display status information including alerts and key performance metrics of the following targets in the Exalogic Elastic Cloud:

- Application Deployments - see [Viewing Application Deployments in the Exalogic Elastic Cloud Target](#)
- WebLogic Domains - see [Viewing WebLogic Domains Hosted on the Exalogic Elastic Cloud Target](#)
- Coherence Clusters - see [Viewing Coherence Cluster Targets](#)
- Hosts - see [Viewing Host Targets on the Exalogic Elastic Cloud Target](#)
- SOA
- OTD

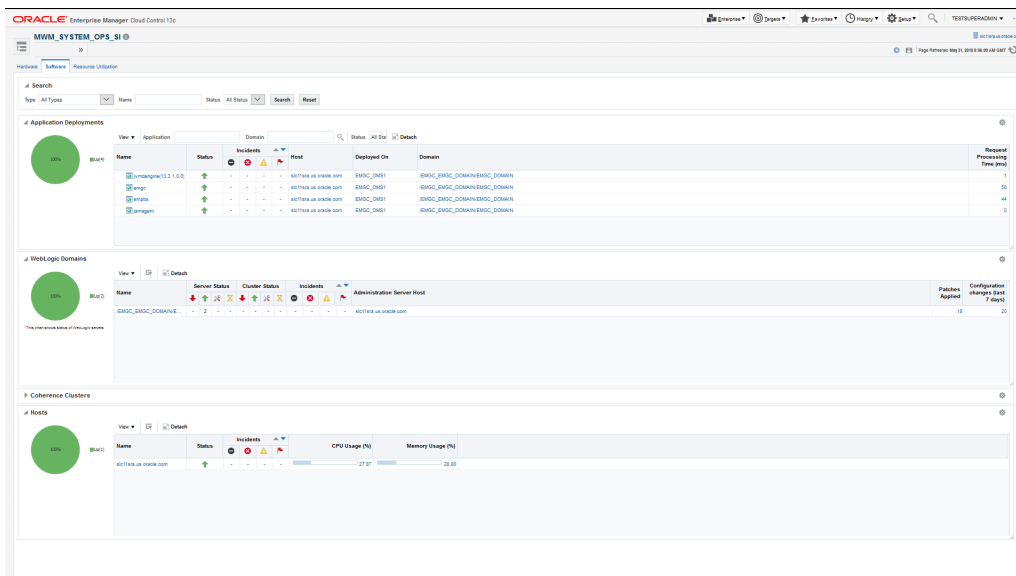


Note:

See [Deploying the Management Agent for Servers](#) for details to deploy the Management Agent to enable the Software tab.

The Software tab (as show in [Figure 5-1](#)) displays an Incident section in the table for each element, such as Application Deployments or WebLogic Domains, that shows alerts on which you can drill down for more information.

Figure 5-1 Exalogic Dashboard - Software Tab



You can also use the Software tab to view the alarms that are generated in Oracle Enterprise Manager Ops Center for an Exalogic Elastic Cloud system as incidents for

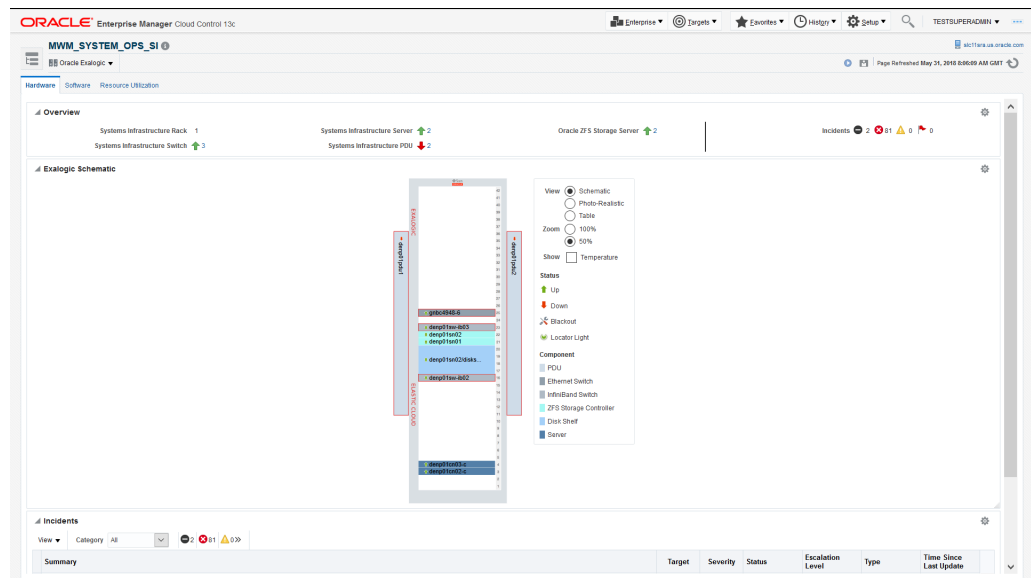
an Exalogic system target. The Software tab displays alarms and incidents generated for Oracle Enterprise Manager Ops Center as incidents in Cloud Control for an Exalogic System target so that you can view all the issues from both the systems at one place. This allows you to use the existing integration between Oracle Enterprise Manager Cloud Control and the ticketing system to manage the Oracle Enterprise Manager Ops Center incidents.

The Software tab displays large numbers of software targets that are members of the Exalogic system. You can use the inter-region filtering option to conduct a page level search. For example, if the search is performed for an Oracle WebLogic Domain, the Applications region is also filtered to show all the applications deployed on the WebLogic servers that are members of the searched WebLogic domain. Similarly the Host region is filtered to show hosts that are hosting the WebLogic servers that are part of the searched WebLogic domain.

5.1.2 Using the Hardware Tab

You can also use the Exalogic Elastic Cloud Dashboard page to access the Hardware tab (as shown in Figure 5-2) where you can view information about the hardware and infrastructure of the Exalogic Elastic Cloud. You can view information such as Temperature (by turning on the Temperature option at the top of the Exalogic Schematic) and Status, as well as a Hardware Schematic depicting the current state of the hardware.

Figure 5-2 Exalogic Dashboard - Hardware Tab



The Hardware tab displays the number of hardware units in each category along with their status in the Overview section. It also shows the Incidents associated with the hardware. The Exalogic Hardware schematic shows the position of each hardware component on the rack. You can use the Incidents section to monitor hardware issues that arise and then drill down to the Incident Manager page by clicking the **Incident Summary** for more details about the incident.

5.2 Monitoring the Hardware Components of Exalogic Elastic Cloud

You can monitor the hardware components of an Exalogic Elastic Cloud by following these steps:

1. From the Enterprise Manager Systems page, click the Exalogic Elastic Cloud target from the table. Alternatively, you can choose **Oracle Exalogic** from the Targets menu.

Enterprise Manager displays the Exalogic Elastic Cloud Dashboard page.

2. Click the **Hardware** tab to view a schematic showing the hardware configuration of the Exalogic Elastic Cloud.

You can use the Hardware tab to view information such as Temperature (by turning on the **Temperature** option at the top of the Exalogic Schematic) and Status, as well as a Hardware Schematic depicting the current state of the hardware.

The Hardware tab displays the number of hardware units in each category along with their status in the Overview section. It also shows the Incidents associated with the hardware. The Exalogic Schematic depicts the hardware, such as InfiniBand Switches, Storage Heads, Storage Disks, and Compute Nodes and employs a Legend that indicates the current state (Up, Down, Unallocated, and so on) of each.

You can use the Incidents section to monitor hardware issues that arise and then drill down to the Incident Manager page by clicking the **Incident Summary** for more details about the incident.

5.3 Visualizing Relationships Between Exalogic Software and Hardware Components

Use Enterprise Manager Cloud Control to visualize relationships among Exalogic software and hardware components. To see the routing topology among these components, follow these steps:

1. From the **Targets** menu, select **Oracle Exalogic**.
2. From the list of Exalogic targets, click the Exalogic Elastic Cloud target you want to view.
3. From the **Oracle Exalogic** menu, select **Routing Topology**.
4. View the relationships between Exalogic software and hardware components.

5.4 Analyzing the Impact of Component Failures

You can analyze the impact of component failures in an Exalogic environment by following these steps:

1. From the **Targets** menu, select **Oracle Exalogic**.

2. From the list of Exalogic targets, click the Exalogic Elastic Cloud target you want to view.
3. From the navigation panel, click the Oracle Infiniband Network you want to view.
4. From the Infiniband Network menu, select **Topology**.
5. Identify any problems with a component by observing status and incident badges, or by showing metric values by way of the Annotations toolbar menu. Identify components linked to the problem component in the diagram.

6

Monitoring Hosts and Applications

This chapter describes how you can view your Exalogic assets and create Exalogic Reports:

- [Viewing Host Targets on the Exalogic Elastic Cloud Target](#)
- [Viewing Application Deployments in the Exalogic Elastic Cloud Target](#)
- [Viewing WebLogic Domains Hosted on the Exalogic Elastic Cloud Target](#)
- [Viewing Coherence Cluster Targets](#)
- [Creating Exalogic Reports in Enterprise Manager](#)

6.1 Viewing Host Targets on the Exalogic Elastic Cloud Target

You can view details about the host targets hosted on the physical and virtual machines running on the Exalogic Elastic Cloud target. To display the hosts information, follow these steps:

1. In Enterprise Manager, navigate to the All Targets page. Filter the entries in the Search field by choosing **Oracle Exalogic** from the drop-down list and click **Go**. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.

Enterprise Manager displays the Exalogic Elastic Cloud Home page where you can monitor the status of the Exalogic target and its components.
2. Choose **Hosts** from the **Oracle Exalogic** menu.

Enterprise Manager displays the Hosts page.
3. You can view a chart that shows the status of the hosts and displays the percentage of hosts that are up and down.
4. You can view information about the Middleware Targets that lists the Type, Status, CPU Utilization percentage, Memory Utilization percentage, and Incident statistics along with Configuration Changes.
5. You can view charts showing the CPU Utilization percentage based on time and similarly, Memory Utilization based on time.

6.2 Viewing Application Deployments in the Exalogic Elastic Cloud Target

Use the Application Deployments page in the Exalogic Elastic Cloud target area to view details about the applications hosted on the hosts running on the Exalogic Elastic Cloud target.

To view application deployments in Exalogic Elastic Cloud targets, follow these steps:

1. In Enterprise Manager, navigate to the Systems page. Filter the entries in the Search field by choosing **Oracle Exalogic** from the drop-down list and clicking **Go**. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.

Enterprise Manager displays the Exalogic Elastic Cloud Home page where you can monitor the status of the Exalogic target and its components.
2. Choose **Application Deployments** from the **Oracle Exalogic** menu.

Enterprise Manager displays the Application Deployments page.
3. You can choose to show All Domains or filter by specific domains by choosing the domain from the Show menu.
4. You can drill down to specific applications, targets, domains, or dependencies by clicking on its related value in each row.
5. You can filter the list of applications by choosing a value from the Status drop-down. You can select from Up, Down, Unknown, Blackout, and All.
6. You can change the column appearance of the table by clicking **View** and choosing which Columns to display, expanding or collapsing rows, or scrolling to the first or last row. You can also reorder columns.
7. You can use the Topology tab to display a pictorial view of the Application Deployments in various relational configurations.

6.3 Viewing WebLogic Domains Hosted on the Exalogic Elastic Cloud Target

You can use Enterprise Manager to view details about the domains hosted on the virtual machines running on Exalogic Elastic Cloud target. To view WebLogic domains in Exalogic Elastic Cloud targets, follow these steps:

1. In Enterprise Manager, navigate to the Systems page. Filter the entries in the Search field by choosing **Oracle Exalogic** from the drop-down list and click **Go**. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.

Enterprise Manager displays the Exalogic Elastic Cloud home page where you can monitor the status of the Exalogic target and its components.
2. Choose **WebLogics Domain** from the **Oracle Exalogic** menu. You can choose to view either a Summary of the WebLogic Domains or specific information about Members.

Enterprise Manager displays the related WebLogic Domain page.
3. On the Summary page you can view a chart that shows the status of the WebLogic Domains and displays the percentage of domains that are up and down. You can also view server information that shows the Server Status and alert and policy violation information for each. You can monitor charts that display metric information such as Request Processing Time and CPU Usage and you can drill down through these charts for more detailed information. Change the chart view to a table view by clicking **Table View** or **Chart View** beneath each table or chart. The Server table displays information about servers and domains showing host information and related metrics.
4. On the Members page, you can view the Status information along with alerts and policy violation and metric data for each WebLogic Server or Domain. Use the

Performance Summary section to view metrics for each, such as Host and Cluster information and metrics such as Heap Usage and Request Processing Time.

6.4 Viewing Coherence Cluster Targets

You can use Enterprise Manager Cloud Control to view details about the Coherence targets that comprise the Exalogic Elastic Cloud target. To display Coherence Clusters in Cloud Control, follow these steps:

1. In Enterprise Manager, navigate to the Systems page. Filter the entries in the Search field by choosing **Oracle Exalogic** from the drop-down list and click **Go**. In the Search Results table, choose the Exalogic Elastic Cloud you want to view.
Enterprise Manager displays the Exalogic Elastic Cloud home page where you can monitor the status of the Exalogic target and its components.
2. Choose **Coherence Clusters** from the **Oracle Exalogic** menu.
Enterprise Manager displays the Coherence Clusters page.
3. You can view a chart that shows the status of the Coherence Clusters and displays the percentage of clusters that are up and down.
4. You can drill down to specific values for each cluster such as Alerts and Policy Violations along with Node information.
5. You can filter the list of clusters by choosing a value from the Status drop-down. You can select from Up, Down, Unknown, Blackout, and All.
6. You can change the column appearance of the table by clicking **View** and choosing which Columns to display. You can also reorder columns.
7. The Coherence Clusters page displays two charts showing the Top Nodes With Lowest Available Memory and Caches With Lowest Hit To Get Ratio. You can drill down to specific node information by clicking on the Node name below the Top Nodes With Lowest Available Memory chart.
8. The Nodes table displays information about each Node, including Host and several metric values such as Memory Available, Gets, and Puts.
9. The Applications table displays information about applications such as Local Attribute Cache, Clustered Session Cache, and other metrics. You can drill down to specific information about each application by clicking the Application name.

6.5 Creating Exalogic Reports in Enterprise Manager

You can create the following Exalogic reports in Enterprise Manager:

- **Oracle BI Instance Performance** -- This report covers all BI instances running on the selected Exalogic rack. First a list of all WebLogic domains associated with the selected Exalogic rack is read, then all `oracle_ias_farm` targets associated with those WebLogic domains are determined and then the list of all BI instances associated with those `oracle_ias_farm` targets are identified.
- **Oracle Internet Directory Performance** -- This report covers all OID servers running on the selected Exalogic rack. First a list of all WebLogic domains associated with the selected Exalogic rack is read, then all `oracle_ias_farm` targets associated with those WebLogic domains are determined and then the list of all OID servers associated with those `oracle_ias_farm` targets are identified.

- Oracle Service Bus Performance -- This report covers all OSB servers running on the selected Exalogic rack. First a list of all WebLogic domains associated with the selected Exalogic rack is read and then all OSB server targets associated with those WebLogic domains through 'farm' association are identified. This report has two sections under each OSB server – Top Business Services and Top Proxy Services. These sections show the top five business services and the top five proxy services respectively. The top five services are determined based on the decreasing order of max value of throughput (for example, messages per minute) metric for each service during the selected period.
- SOA Infrastructure Performance -- This report covers all SOA Infrastructure targets running on the selected Exalogic rack. First a list of all WebLogic domains associated with the selected Exalogic rack is read and then all SOA Infrastructure targets associated with those WebLogic domains through 'farm' association are identified. The SOA Infra Engine related charts cover only the following four engine types - bpel, bpmn, mediator and workflow.
- Oracle WebLogic Server Performance -- This report covers all WebLogic servers running on the selected Exalogic rack. The list of all WebLogic domains associated with the selected Exalogic rack is read. The report is divided into sections based on different WebLogic domains. For each domain, the top five servers are shown in the charts for each metric. The top five servers for each metric are determined by decreasing order of max value for the metric for each server in the selected period.
- Compliance Summary -- This report give a brief summary about the compliance standards evaluated for the middleware targets like WebLogic server, domains, clusters, host, and so on, running on the Exalogic system. The report shows the list of top ten least compliant WebLogic domains and host and Compliance Standard Summary.
- Compliance Details -- This report give details on about the compliance standards evaluated for middleware targets like WebLogic domains, servers, clusters, hosts, and so on, running on the Exalogic system. The reports show the top ten least compliant WebLogic domains and host and a detailed list on compliance rules violated for the middleware targets.

The Reports menu item is visible in the Exalogic system menu if BIP is configured with Enterprise Manager. If BIP is not configured, the menu item does not appear.

To create Exalogic reports, follow these steps:

1. From the Targets menu, select **Oracle Exalogic**.
2. From the list of Exalogic targets, click the Exalogic Elastic Cloud target for which you want to create reports.
3. From the **Oracle Exalogic** menu, choose **Reports** and then select the report you want to create from the menu.

A

Prepare Exalogic Machine for Discovery by Cloud Control

This appendix describes the pre-discovery steps completed by Oracle for an Exalogic Machine in a physical configuration. You can use the information provided below to verify that your Exalogic Machine is ready to continue the discovery process as described in [Discovering Exalogic Machine - Physical Configuration](#).

Note:

These preparation instructions are **only** for Exalogic Machine in a physical configuration running the following Oracle Exalogic Elastic Cloud Software (EECS):

- For X2-2 and X3-2: EECS Release 2.0.3.0.6 and later.
- For X4-4: EECS Release 2.0.6.1.1 and later.

Before your Exalogic Machine can be discovered by Cloud Control, it must be properly prepared. To assist with this crucial step, Oracle has provided an Exalogic Lifecycle (ELLC) release 14.2 toolkit which supports automation of:

- Enterprise Manager Cloud Control Exalogic hardware monitoring.
- Enterprise Manager Agent prerequisite automation.
- ExaWare discovery to support discovery of hardware by Cloud Control.

The ELLC 14.2 toolkit is installed on Primary and Backup Enterprise Manager Monitoring Compute Nodes of the Exalogic machine that you intend to discover. For details about installing this software, see the *Exalogic Lifecycle Toolkit* (Doc ID 1912063.1) available in My Oracle Support (<https://support.oracle.com>):

<https://support.oracle.com/epmos/faces/DocumentDisplay?id=1912063.1>

To prepare your Exalogic Machine for discovery by Cloud Control, complete the following steps:

1. [Installing Enterprise Manager Cloud Control 13c Software](#)
2. [Discovering Assets on the Exalogic Rack by Using ExaWare](#)
3. [Inspecting and Updating the `discovery.xml` File](#)
4. [Preparing the Exalogic Rack for Enterprise Manager Agent Deployment](#)
5. [Discovering Exalogic Assets Using ExaWare](#)
6. [Installing Enterprise Manager Agents on the Primary and Backup Monitoring Compute Nodes](#)

A.1 Installing Enterprise Manager Cloud Control 13c Software

Your Oracle Exalogic Elastic Cloud machine, which is installed with Oracle EECS version 2.0.3.0.6 (or 2.0.6.1.1) or later, must be installed with the appropriate Oracle Enterprise Manager software before discovering the Exalogic target. See *Oracle® Enterprise Manager Cloud Control Basic Installation Guide* to get started:

For more detailed installation and administration information, visit the Oracle Enterprise Manager Cloud Control documentation library at:

<https://docs.oracle.com/cd/cloud-control-13.3/index.htm>

A.2 Discovering Assets on the Exalogic Rack by Using ExaWare

The following information is discovered by using ExaWare:

- Addresses and names of the physical components on the rack:
 - Storage nodes and storage node ILOMs.
 - Compute nodes and compute node ILOMs.
 - InfiniBand switches.
- Name and size of the rack.

By default, the source of this discovery is the `exalogic_current.conf` file located in the `/var/exalogic/one-command/config` directory. This file is generated from the Exalogic Configuration Utility (ECU). If it is missing, then check your ECU runs.

Note:

Any manual editing of the `exalogic_current.conf` file may create parsing issues in ExaWare.

For more information about the Exalogic Configuration Utility (ECU), see *Configuring Exalogic Machine Using ECU* in the *Oracle® Exalogic Elastic Cloud Machine Owner's Guide*.

To discover assets on the Exalogic rack by using ExaWare:

1. As root, run the following commands from Primary Compute Node 1 (CN1) of the Exalogic machine on which you installed the ELLC 14.2 toolkit:

```
# /exalogic-lctools/bin/emagent_discovery
```

The command should run without error and result in the generation of a `discovery.xml` file:

```
/exalogic-lcdata/inventory/discovery.xml
```

2. Verify that there are no errors by checking the following section in the discovery.xml file:

```
<ns1:execution_report errors="0" success="1">
```

3. Verify there are no schema validation errors at the end of the file. For example:

```
...
</ns1:oracleExalogicSystem>

<!--=====
PLEASE NOTE A SCHEMA VALIDATION IS CAUGHT - ('Binding value inconsistent with
content model',)
=====-->
```

A.3 Inspecting and Updating the `discovery.xml` File

In this step, the `root` user on the Primary Compute Node inspects the `discovery.xml` file and updates it with any data that the ExaWare-driven discovery did not capture. All such data should be marked with a placeholder **CHANGEME** tag that *must* be updated by the `root` user.

Typical data to be updated include: description, PDU, Cisco, and Spine switch data.

[Example A-1](#) shows the spine switch data/template that must be populated by the `root` user.

Note:

The spine switch entry is going to be generated only for a full or a half rack.

Example A-1 Spine Switch Data/Template

```
<ns1:ib_spine_switch gateway="false" xsi:type="ns1:IBSwitch">
  <ns1:ip_address>
    CHANGEME
  </ns1:ip_address>
  <ns1:host_name>
    CHANGEME
  </ns1:host_name>
  <ns1:networks>
  <ns1:network_name>
    admin
  </ns1:network_name>
  <ns1:network_type>
    Eth
  </ns1:network_type>
  <ns1:ip_address>
    CHANGEME
  </ns1:ip_address>
  <ns1:host_name>
    CHANGEME
  </ns1:host_name>
  </ns1:networks>
  <ns1:rack_begin_position>
    1
  </ns1:rack_begin_position>
```

```
<ns1:rack_height>
  1
</ns1:rack_height>
<ns1:rack_front_facing>
  false
</ns1:rack_front_facing>
</ns1:ib_spine_switch>
```

The **CHANGEME** values have to be modified accordingly. The values set will be kept when using the updated `discovery.xml` file as a new discovery source.

In case the spine switch device is not active in your system, it is advisable to manually remove the XML entry altogether (from `<ns1:ib_spine_switch...>` to `</ns1:ib_spine_switch>`); otherwise, the assets discovery as described in step 5 will generate a warning entry in the execution report section:

```
<ns1:warning>
  Invalid device address Eth-admin-ip_address='CHANGEME', for device
  'IBSWITCHSPINE001'
</ns1:warning>
```

After manually completing the `discovery.xml` file, it is advisable to validate it with an XML editor against the corresponding `discovery.xml.xsd` schema (generated alongside the `discovery.xml` file). The XML editor should support the XSD schema validation.

A.4 Preparing the Exalogic Rack for Enterprise Manager Agent Deployment

In this step on **both** the Primary and Backup Monitoring Compute nodes, the `root` user runs a command-line utility (`emagent_presetup`) to perform the following tasks:

- Install the `oracle-emagent.rpm` software on the Exalogic rack.
- Push SSH keys to the switches, compute nodes, and Oracle ZFS Storage Appliance.
- Set the SNMP trap configurations on ILOMs, PDUs, Cisco Switch, and InfiniBand Switches.

The utility will use the `discovery.xml` file that was generated in the [Discovering Assets on the Exalogic Rack by Using ExaWare](#) section and updated in the [Inspecting and Updating the discovery.xml File](#) section. You will be prompted for the passwords for the various components.

This tool is installed as part of the lifecycle tools.

As `root`, run the utility with the following command:

```
# /exalogic-lctools/bin/emagent_presetup /exalogic-lcdata/inventory/discovery.xml
```

As the script runs, you will be prompted for the following information. To accept the default, press **Enter** to continue to the next prompt:

```
Enter EMCC agent port (default: 3872):
Enter "Compute Node" user (default: root)
Enter "Compute Node" user "root" password:
Enter "Compute Node ILOM" user (default: root):
Enter "Compute Node ILOM" user "root" password:
Enter "ZFS Storage" user (default: root):
```

```
Enter "ZFS Storage" user "root" password:
Enter "ZFS Storage ILOM" user (default: root):
Enter "ZFS Storage ILOM" user "root" password:
Enter "IB Switch" user (default: root):
Enter "IB Switch" user "root" password:
Enter "IB Switch ILOM" user (default: ilom-admin):
Enter "IB Switch ILOM" user "ilom-admin" password:
Enter "EMCC Monitoring" user "oemuser" password:
Do you have a valid public key for "oracle" user ? (y/n): n
```

 **Note:**

If you have a valid public key, enter **y** and then provide the path to key location.

```
Do you want to create a new key pair for "oracle" user ? (y/n): y
Enter passphrase for the new key pair (default: press enter key):
```

 **Note:**

If you have an SSH key for the passphrase, you can enter it here (the last item). All of the inputs shown above are the defaults for a first-time run.

A.5 Discovering Exalogic Assets Using ExaWare

As the `oracle` user from Enterprise Manager Primary Monitoring Compute Node, follow the steps below to discover Exalogic assets using ExaWare:

1. Run the following commands:

```
ssh-agent $SHELL
ssh-add ~/.ssh/id_rsa
```

You will be prompted for a passphrase. Enter the passphrase that was created from the script in [Preparing the Exalogic Rack for Enterprise Manager Agent Deployment](#) to create new keys or enter the passphrase tied to the chosen pre-created keys.

2. Once these two commands have been executed, run the following command as the `oracle` user in the same shell prompt:

```
/exalogic-lctools/lib/emcc/exaware_midi-emcc-py2.4.egg --access
oemuser:CN1:<host>::: ,nm2user:IBSWITCHGW::: ,nm2user:IBSWITCHSPINE::: ,oemuser:ZF
SSTORAGEHEAD::: --discover-from ecu --profile-query --batch
```

Where: `<host>` is the fully qualified domain name of the Primary Monitoring Compute Node with the Exalogic Lifecycle tools mounted (that is, the same node as described in [Verifying Prerequisites](#)).

Although the command is auto-executed from the Enterprise Manager UI, the `oracle` user should **manually** execute the above command and confirm that the generated XML contains no serious errors or warnings **before** proceeding with the Enterprise Manager import step.

Example A-2 shows the possible warnings that could be seen if the devices with default values (that is, **CHANGEME**) are not replaced with valid values:

 **Note:**

1. Any device having any **CHANGEME** address value *will be dropped* from the final xml.
2. Any device with ILOM having any **CHANGEME** address value (either in the device or in the ILOM) *will be dropped* from the final xml.
3. Any gateway switch-pair having any **CHANGEME** address value (in any switch device) *will be dropped* from the final xml.

Example A-2 Warning Examples

```
<ns1:warning>
  Invalid device address Eth-admin-ip_address='CHANGEME', for device
  'IBSWITCHSPINE001'
</ns1:warning>
<ns1:warning>
  Invalid device address Eth-admin-ip_address='CHANGEME', for device 'PDU001'
</ns1:warning>
<ns1:warning>
  Invalid device address Eth-admin-host_name='CHANGEME', for device 'PDU001'
</ns1:warning>
<ns1:warning>
  Invalid device address Eth-admin-ip_address='CHANGEME', for device 'PDU002'
</ns1:warning>
<ns1:warning>
  Invalid device address Eth-admin-host_name='CHANGEME', for device 'PDU002'
</ns1:warning>
```

A.6 Installing Enterprise Manager Agents on the Primary and Backup Monitoring Compute Nodes

 **Note:**

This step is mandatory for the successful discovery of the Physical Exalogic Rack.

The Enterprise Manager agent must be installed using the `oracle` user as this user was created for this purpose by the scripts described in [Preparing the Exalogic Rack for Enterprise Manager Agent Deployment](#).

For details on how to download and install Management Agents, see Installing Oracle Management Agents in the *Oracle® Enterprise Manager Cloud Control Basic Installation Guide*.

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