Oracle® Enterprise Manager
Plug-in for Oracle Database Appliance User's Guide
Release 12.1.0.1
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# Contents

## Preface

<table>
<thead>
<tr>
<th>Audience</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation Accessibility</td>
<td>vii</td>
</tr>
<tr>
<td>Related Documents</td>
<td>vii</td>
</tr>
<tr>
<td>Conventions</td>
<td>viii</td>
</tr>
</tbody>
</table>

## 1 Introduction to the Oracle Database Appliance Plug-in

| Oracle Database Appliance Plug-in Features | 1-1 |
| Monitoring Features | 1-1 |
| Target Discovery Features | 1-1 |
| Oracle Database Appliance Plug-in Supported Hardware and Software | 1-2 |

## 2 Oracle Database Appliance Plug-in Installation and Deployment

| Oracle Database Appliance Plug-in Deployment Prerequisites | 2-1 |
| Create a Database Server ILOM Service Processor User | 2-1 |
| Create Monitoring OS User on Oracle Database Appliance Server | 2-2 |
| Verify Software Versions | 2-3 |
| Verify Names Resolution | 2-3 |
| Verify Firewall Configuration | 2-3 |
| Installing Enterprise Manager Agent | 2-4 |
| Installing Enterprise Manager Agent Using the Push Method | 2-5 |
| Installing Oracle Management Agent in Silent Mode Option | 2-6 |
| Deploying the Oracle Database Appliance Plug-in | 2-6 |
| Import the Oracle Database Appliance Plug-in Archive File Locally | 2-6 |
| Import the Oracle Database Appliance Plug-in Archive File Remotely | 2-7 |
| Deploy Oracle Database Appliance Plug-in on Enterprise Manager Cloud Control (OMS Servers) | 2-7 |
| Deploy Oracle Database Appliance Plug-in to the Management Agents on Both Oracle Database Appliance Server Nodes (Hosts) | 2-8 |

## 3 Oracle Database Appliance Discovery

<p>| Oracle Database Appliance Discovery Requirements | 3-1 |
| Oracle Database Appliance Discovery Process | 3-1 |
| Discover the Virtual Platform | 3-2 |
| Discover Grid Infrastructure and Oracle RAC | 3-4 |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discover Grid Infrastructure (Cluster) Targets</td>
<td>3-4</td>
</tr>
<tr>
<td>Discover Oracle Real Application Clusters Targets</td>
<td>3-5</td>
</tr>
<tr>
<td>Removing an Oracle Database Appliance Target</td>
<td>3-5</td>
</tr>
<tr>
<td>Post-Discovery Configuration</td>
<td>4-1</td>
</tr>
<tr>
<td>Modifying Metrics Thresholds</td>
<td>4-1</td>
</tr>
<tr>
<td>Configuring Notifications</td>
<td>4-2</td>
</tr>
<tr>
<td>Creating Blackouts</td>
<td>4-3</td>
</tr>
<tr>
<td>Monitoring Oracle Database Appliance</td>
<td>5-1</td>
</tr>
<tr>
<td>Monitoring All Oracle Database Appliance Targets</td>
<td>5-1</td>
</tr>
<tr>
<td>Available Data for All (or Groups of) Oracle Database Appliance Targets</td>
<td>5-1</td>
</tr>
<tr>
<td>Oracle Database Appliance Availability Tab</td>
<td>5-2</td>
</tr>
<tr>
<td>Oracle Database Appliance Capacity Tab</td>
<td>5-3</td>
</tr>
<tr>
<td>Oracle Database Appliance Configuration Tab</td>
<td>5-4</td>
</tr>
<tr>
<td>Oracle Database Appliance Incidents Tab</td>
<td>5-4</td>
</tr>
<tr>
<td>Oracle Database Appliance Topology Tab</td>
<td>5-4</td>
</tr>
<tr>
<td>Monitoring Groups of Oracle Database Appliance Targets</td>
<td>5-5</td>
</tr>
<tr>
<td>Creating an Oracle Database Appliance Group</td>
<td>5-5</td>
</tr>
<tr>
<td>Modifying an Oracle Database Appliance Group</td>
<td>5-7</td>
</tr>
<tr>
<td>Deleting an Oracle Database Appliance Group</td>
<td>5-8</td>
</tr>
<tr>
<td>Monitoring Individual Oracle Database Appliance Targets</td>
<td>5-9</td>
</tr>
<tr>
<td>Available Data for an Individual Oracle Database Appliance Target</td>
<td>5-9</td>
</tr>
<tr>
<td>Oracle Database Appliance System General Tab</td>
<td>5-10</td>
</tr>
<tr>
<td>Oracle Database Appliance Target Virtual Machine Tab</td>
<td>5-10</td>
</tr>
<tr>
<td>Oracle Database Appliance Target Storage Tab</td>
<td>5-11</td>
</tr>
<tr>
<td>Oracle Database Appliance Target Version Tab</td>
<td>5-11</td>
</tr>
<tr>
<td>Oracle Database Appliance Target Topology Tab</td>
<td>5-12</td>
</tr>
<tr>
<td>Viewing Oracle Database Appliance Topology</td>
<td>5-12</td>
</tr>
<tr>
<td>Troubleshooting Oracle Database Appliance Plug-in</td>
<td>6-1</td>
</tr>
<tr>
<td>Host Discovery Troubleshooting</td>
<td>6-1</td>
</tr>
<tr>
<td>Prerequisite Check Failure</td>
<td>6-1</td>
</tr>
<tr>
<td>Host Discovery is Done Without Enabling the Root Privileges</td>
<td>6-2</td>
</tr>
<tr>
<td>Oracle Database Appliance Discovery Troubleshooting</td>
<td>6-3</td>
</tr>
<tr>
<td>Discovery Requires Root User</td>
<td>6-4</td>
</tr>
<tr>
<td>File /opt/oracle/oak/onecmd/onecommand.params Required</td>
<td>6-4</td>
</tr>
<tr>
<td>Metric Collection Error After Discovery</td>
<td>6-4</td>
</tr>
<tr>
<td>Plug-in Versions Do Not Match</td>
<td>6-4</td>
</tr>
<tr>
<td>Plug-in Version is Not the Same on the Two Host Nodes</td>
<td>6-4</td>
</tr>
<tr>
<td>Monitoring Credentials Set Incorrectly</td>
<td>6-5</td>
</tr>
<tr>
<td>Oracle Database Appliance ECM Configuration Data Troubleshooting</td>
<td>6-5</td>
</tr>
<tr>
<td>OAK-Based Metric Collection Troubleshooting</td>
<td>6-6</td>
</tr>
<tr>
<td>How to Determine Which Node Agent is Monitoring the Oracle Database Appliance Machine</td>
<td>6-6</td>
</tr>
</tbody>
</table>
Viewing OAK Metrics .............................................................................................................. 6-6

Index
Oracle Enterprise Manager provides the tools to effectively and efficiently manage your Oracle Database Appliance. With a consolidated view of the Oracle Database Appliance, Oracle Enterprise Manager provides a dashboard containing all of the hardware components and their physical location with indications of status.

This document provides the installation and administration instructions to set up Oracle Enterprise Manager to monitor and manage your Oracle Database Appliance.

This preface contains these topics:

- Audience
- Documentation Accessibility
- Related Documents
- Conventions

**Audience**

This system monitoring installation guide is for users who perform administrative and problem-resolution tasks on Oracle Database Appliance.

**Documentation Accessibility**

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

**Access to Oracle Support**

Oracle customers that have purchased support have access to electronic support through My Oracle Support. For information, visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=info or visit http://www.oracle.com/pls/topic/lookup?ctx=acc&id=trs if you are hearing impaired.

**Related Documents**

These books may be of particular interest:

- *Oracle Database Appliance Getting Started Guide*
- *Oracle Database Appliance Administration and Reference Guide*
- Oracle Enterprise Manager Cloud Control Documentation 12c Release 4
Conventions

The following text conventions are used in this document:

<table>
<thead>
<tr>
<th>Convention</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>boldface</strong></td>
<td>Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.</td>
</tr>
<tr>
<td><em>italic</em></td>
<td>Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.</td>
</tr>
<tr>
<td><strong>monospace</strong></td>
<td>Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.</td>
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</tbody>
</table>
Introduction to the Oracle Database Appliance Plug-in

The Oracle Database Appliance plug-in features monitoring dashboards and streamlined target discovery. The plug-in supports all Oracle Database Appliance hardware platforms and Oracle Appliance Manager software versions 12.1.2.2.0 and later. See the following topics for more details:

- Oracle Database Appliance Plug-in Features
- Oracle Database Appliance Plug-in Supported Hardware and Software

Oracle Database Appliance Plug-in Features

The Oracle Database Appliance plug-in release 12.1.0.1.0 includes the following features:

- Monitoring Features
- Target Discovery Features

Monitoring Features

With the Oracle Database Appliance plug-in, you can monitor Oracle Database Appliance targets using Oracle Enterprise Manager Cloud Control 12c. The plug-in provides seamless integration with supported Oracle Database Appliance software so that you can receive information about any Oracle Database Appliance target. Features include:

- Monitoring of the Oracle Database Appliance as an Enterprise Manager target
- Monitoring a dynamic group of Oracle Database Appliance systems using tags
- Oracle Database Appliance components (DB, ILOM, HOST, Virtual Machines, Hypervisor, ASM, and Oracle Appliance Manager) are grouped and can be monitored under a target

Target Discovery Features

The target discovery process is streamlined and simplified with the Oracle Database Appliance plug-in. Features include:

- Custom discovery process which collects credentials, discovers and validates configurations, and gives you the ability to group Oracle Database Appliance systems during discovery
- Discovery prerequisite checks updates, including:
- Check for critical configuration requirements
- Prevent discovered targets from being rediscovered
- Credential validation and named credential support
- Ability to apply a custom name to the Oracle Database Appliance target

Oracle Database Appliance Plug-in Supported Hardware and Software

Oracle Enterprise Manager Cloud Control 12c and the Oracle Database Appliance plug-in are supported on the following Oracle Database Appliance configurations:

- All Oracle Database Appliance hardware configurations from Version 1 through X5-2
- All Oracle Appliance Manager software versions from 12.1.2.2.0
- Oracle Enterprise Manager Cloud Control 12c (12.1.0.4) and later
Oracle Database Appliance Plug-in Installation and Deployment

This chapter provides the instructions for deployment of the Oracle Database Appliance plug-in. The following topics are discussed:

- Oracle Database Appliance Plug-in Deployment Prerequisites
- Installing Enterprise Manager Agent
- Deploying the Oracle Database Appliance Plug-in

Oracle Database Appliance Plug-in Deployment Prerequisites

Before deploying the Oracle Database Appliance plug-in, make sure the following prerequisites are met:

- Create a Database Server ILOM Service Processor User
- Create Monitoring OS User on Oracle Database Appliance Server
- Verify Software Versions
- Verify Names Resolution
- Verify Firewall Configuration

Create a Database Server ILOM Service Processor User

For the Enterprise Manager agent to communicate with an ILOM service processor, there must be a specific user ID established on the ILOM service processor.

**Note:** Adding the specific user ID requires administrator level privilege on the ILOM service processor.

The specific ILOM user ID can be added in the ILOM service processor web interface, ILOM CLI, or with the `ipmitool` command. This example uses ILOM CLI.

For security reasons, the password to the ILOM service processor root user ID does not appear in the ILOM CLI commands in this example.

1. Log in to the Service Processor as root:

   ```
   # ssh root@[Service Processor IP]
   Password:
   ```

2. Change to the `users` directory:
3. Create the oemuser user and password:

```
# cd /SP/users
# create oemuser
Creating user...
Enter new password: ********
Enter new password again: ********
```

Created /SP/users/oemuser

4. Change to the new user’s directory and set the role:

```
# cd oemuser /SP/users/oemuser
set role='cro'
Set 'role' to 'cro'
```

5. Test the ILOM user ID created in step 3 by listing the last 10 system events:

```
# ipmitool -I lan -H <ilom_hostname> -U oemuser -P oempasswd -L USER sel list
```

6. Repeat steps 1 through 5 for the rest of the server node ILOM service processors in your Oracle Database Appliance.

### Create Monitoring OS User on Oracle Database Appliance Server

The root user can perform monitoring on Oracle Database Appliance agents. However, if the root user is not accessible for security reasons, an alternative method is to create a monitoring OS user as the monitoring user, and set the privilege delegation appropriately.

The following is an example that creates an oak/welcome2 user for the purpose of monitoring Oracle Database Appliance.

1. Run the following commands

```
#useradd user oak
#passwd oak welcome2
```

2. Add Sudo privilege for user oak.

   a. Modify the /etc/sudoers file on the host using the visudo command.

   b. Add the following commands to the /etc/sudoers file.

```
Cmd_Alias  PLUGIN_AGENT_SCRIPT=$PERL_HOME/bin/perl
$AGENT_HOME/plugins/$PLUGIN_OPAR_VERSION /scripts/*.pl* , \n$AGENT_HOME/sbin/nmosudo DEFAULT_PLUGIN DEFAULT_FUNCTIONALITY
DEFAULT_SUBACTION DEFAULT_ACTION perl -e exit 0
MONITOR_USER ALL=(ALL) PLUGIN_AGENT_SCRIPT
```

Note that:

$AGENT_HOME is the absolute path to the installed agent home. The agent home directory is created during agent deployments to the hosts. For example, /u01/app/agent_home/

$PLUGIN_OPAR_VERSION is the complete Oracle Database Appliance Plug-in OPAR file that is deployed to the OMS and the agents. It is in the format
oracle.dba.odba.agent.plugin_12.1.0.1.0, where 12.1.0.1.0 is the plug-in version, that might increase in the future.

$PERL_HOME is the absolute path to the installed executable Perl. For example, /u01/app/agent_home/core/12.1.0.4.0/perl/

3. Set privilege delegation to the host targets.
   a. Log in to Enterprise Manager.
   b. In the **Setup** menu select **Security**, then **Privilege Delegation**.
   c. Select the **Sudo** type.
   d. Apply `/usr/bin/sudo -u %RUNAS% %COMMAND%` to **Sudo Command Settings**.

### Verify Software Versions

**Oracle Database Appliance Software**
The supported version is Oracle Appliance Manager 12.1.2.2.0. To verify the software version on Oracle Database Appliance run the command:

```
# oakcli show version
```

**See Also:** *Oracle Database Appliance Administration and Reference Guide* for information about the `oakcli show version` command.

**Grid Infrastructure/DB Cluster**
Grid Infrastructure/DB Cluster is required to be up and running before discovery. The Oracle Database Appliance deployment should be completed and the Grid Infrastructure cluster should be up and running prior to deploying the plug-in.

### Verify Names Resolution
Each server node should be verified to be able to resolve the hostnames of the ILOM servers. If the names of those components are not registered in DNS, then entries can be added to the `/etc/hosts` file of each server node.

### Verify Firewall Configuration
To verify the firewall configuration:

1. **Allow ping**

   In many secure network environments, it is normal for the `ping` service to be disabled. Enterprise Manager uses `ping` to establish the basic availability and status of the Oracle Database Appliance.

   - The server nodes need to have the `ping` service and port enabled from the OMS Server(s).
   - All other Oracle Database Appliance components (such as ILOM servers) need to have the `ping` service and port enabled from the server nodes (where the agents are running).

**Note:** The `ping` traffic overhead is minimal. The agent pings the targets every five minutes.
2. Open Database Ports

The database listener ports must be opened for the Enterprise Manager OMS server(s). Note that Oracle Database Appliance databases will use SCAN listeners; so, ports will need to be opened for the base server node, the node virtual IP, and scan listeners addresses.

3. Open Enterprise Manager Upload Port

The Enterprise Manager Cloud Control 12c agents require access to the Enterprise Manager Servers upload service, normally configured on port 4889 for HTTP uploads and 4900 for HTTPS. To verify the ports assigned, run the following command on the OMS server command line.

```
$ emctl status oms -details
```

These ports will need to be opened for each of the server nodes.

4. Open Agent Ports

The OMS server(s) will need to be able to connect to the Enterprise Manager Cloud Control 12c Agent HTTP/HTTPS port on each server node. The Agent port defaults to 3872. If port 3872 is not available, the next available port starting from port 1830 is used.

To identify the port used:

- Run the following command on the server node command line:

  ```
  $ emctl status agent
  ```

- Alternatively, you can look for the value of the EMD_URL property in the emd.properties file the following directory:
  ```
  <$AGENT_HOME>/agent_INST/sysman/config
  ```

5. Open SSH Ports

The Enterprise Manager Cloud Control 12c Agents require ssh access to the Database Appliance components they monitor. As the Agents will run on the server nodes the ssh ports, 22, on each of the ILOMs will need to be opened for each of the server nodes.

**Note:** The emkit configures ssh access but still requires the ports to be opened first.

6. Allow UDP Traffic (SNMP Ports)

All Oracle Database Appliance components need to be able to send SNMP traps to the Agents running on the server nodes. SNMP uses the UDP protocol so the Agent port and port 162 need to be opened for UDP traffic between the ILOMs and the Agent.

### Installing Enterprise Manager Agent

Deploy the Enterprise Manager agent on ODA_BASE for Oracle Database Appliance VM deployment, and in Linux Hosts for Oracle Database Appliance Bare Metal deployment.
Note: Enterprise Manager target discovery supports the use of either management network hostname or client network hostname for the server nodes. When installing the Enterprise Manager agent on the server nodes, you should use the same hostname as used in Oracle Clusterware.

You can identify the hostname of the nodes in the cluster by running the `olsnodes` command on one of the server nodes. It is recommended that a fully qualified hostname, including the domain name, be used when specifying an Enterprise Manager agent hostname.

Notes:

- The Enterprise Manager agent must be deployed to all server nodes of the Oracle Database Appliance. The host target name of the server node must be the fully qualified host name, for example, `dbm1db01.mydomain.com`.

- Non-fully qualified hostname (for example, `dbm1db01`) or IP address must not be used for the host target name of the server node.

- The same version of the Enterprise Manager agent and the same version of the plug-ins should be deployed on all server nodes within the same Oracle Database Appliance.

See Also: Oracle Enterprise Manager Cloud Control Basic Installation Guide for information about installing management agents

Installing Enterprise Manager Agent Using the Push Method

To install Enterprise Manager Agent using the push method:

1. Add the Oracle Database Appliance server nodes as host targets to Oracle Enterprise Manager Cloud Control 12c. From the Enterprise Manager home page, click the Setup menu (upper right corner), Add Target, then Add Targets Manually.

2. On the Add Host Targets: Host and Platform screen, specify a session name. Then identify the fully qualified hostnames and select the platform.

   Note: If the Agent software is not available for your platform, go to the Extensibility page and download it first.

3. Click Next to add the details for the host.

4. On the Installation Details screen, provide the following information:
   - Installation Base Directory
   - Instance Directory
   - Named Credential
   - For Port, leave this field blank. As part of the installation process, an available port will be selected automatically.
5. Click Next to review the details about the host.
6. Click Deploy Agent to start the agent deployment process.
7. As the deployment process continues, remote prerequisite checks are automatically checked. If there are no issues, you will be presented with an Agent Deployment Summary with an indication that the agent deployment has passed.

**Important:** If the root.sh was not executed during deployment, then make sure to execute it on all server nodes.

### Installing Oracle Management Agent in Silent Mode Option
You can install Oracle Management Agent in silent mode as an alternative to installing it using the Add Host Target Wizard. Silent mode requires you to use a response file for providing the installation details and a deployment script for silently installing the Management Agent using the information supplied in the response file.

See the Installing Oracle Management Agent in Silent Mode chapter in the Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide for more information:

http://docs.oracle.com/cd/E24628_01/install.121/e24089/install_agent_usng_rsp.htm#CEGGACJE

### Deploying the Oracle Database Appliance Plug-in
Oracle Enterprise Manager Plug-in for Oracle Database Appliance is delivered as a plug-in archive file (*.opar) named 12.1.0.VERSION.0_oracle.dba.odba_2000_0.opar.

Assuming you have an existing Oracle Enterprise Manager installation that you plan to use, and you have installed Oracle Enterprise Manager Agent, Oracle Database Appliance Plug-in deployment comprises the following steps:

1. **Import the Oracle Database Appliance Plug-in Archive File Locally (steps on page 2-6) or Import the Oracle Database Appliance Plug-in Archive File Remotely (steps on page 2-7)
2. **Deploy Oracle Database Appliance Plug-in on Enterprise Manager Cloud Control (OMS Servers) (steps on page 2-7)
3. **Deploy Oracle Database Appliance Plug-in to the Management Agents on Both Oracle Database Appliance Server Nodes (Hosts) (steps on page 2-8)

**Import the Oracle Database Appliance Plug-in Archive File Locally**
To import the Oracle Database Appliance plug-in archive file locally, follow these steps.

1. Copy the Oracle Database Appliance Plug-in OPAR file to the OMS host system.
2. Open a terminal (such as PuTTY) on the OMS host machine and connect as oracle user.
3. Copy the OPAR file to the host.
4. Log on to OMS using emcli.

```
$ /u01/app/middleware/oms/bin/emcli login -username=user_name -password=password
```
5. Import the OPAR file to OMS using `emcli`.
   
   Importing ensures the content that you have created and packaged in the plug-in is available with Enterprise Manager Cloud Control.
   
   ```
   $ /u01/app/middleware/oms/bin/emcli import_update -file=OPAR_FILE_LOCATION -omslocal
   
   For example,
   
   /u01/app/middleware/oms/bin/emcli import_update -file=/tmp/12.1.0.VERSION.0_oracle.dba.odba_2000_0.opar -omslocal
   ```

   **Note:** Append the `-omslocal` flag because the plug-in archive is on the same system where you are running this command (copied in step 3 above). Specify the absolute path name that exists on the system.

---

**Import the Oracle Database Appliance Plug-in Archive File Remotely**

If you are running `EMCLI` on a different system than the system where you created the plug-in archive (*.opar file), then run the following command:

```
emcli import_update
   -file="path to the .opar file"
   -host="host name of plug-in host"
   -credential_name="credential for plug-in host"
   -credential_owner="credential owner on the plug-in host"
```

where:

- `file` is the absolute path to the *.opar file on the system where you created the archive.
- `host` is the host name for the host target where the file is available.
- `credential_name` is the name of the credentials on the remote system you are connecting to.
- `credential_owner` is the owner of the credentials on the host system you are connecting to.

For example:

```
emcli import_update
   -file=/tmp/sample_plugin.opar
   -host='host1.acme.com'
   -credential_name='myOracleCred'
   -credential_owner='myPassword'
```

---

**Deploy Oracle Database Appliance Plug-in on Enterprise Manager Cloud Control (OMS Servers)**

To deploy the Oracle Database Appliance plug-in do the following steps.

1. Open a web browser and log in to Enterprise Manager Cloud Control.
2. Open the **Setup** menu, and select **Extensibility** then **Plug-ins**.
3. Under **Engineered System** select **ORACLE DATABASE APPLIANCE**.
4. Click **Deploy on** and follow the instructions.
Deploying the Oracle Database Appliance Plug-in

This step takes approximately 3 to 5 minutes, including stopping and restarting OMS. During the deployment use $ ./emctl status oms -details to check OMS status.

5. Wait until OMS is back up.

Deploy Oracle Database Appliance Plug-in to the Management Agents on Both Oracle Database Appliance Server Nodes (Hosts)

To deploy the Oracle Database Appliance plug-in to the management agents on both Oracle Database Appliance nodes, do the following steps.

1. Open a web browser and log in to Enterprise Manager Cloud Control.
2. Open the Setup menu and select Extensibility then Plug-ins.
3. Under Engineered System select ORACLE DATABASE APPLIANCE.
4. Click Deploy on and choose Management Agents.

This step takes approximately 2 minutes depending on how many agents are deployed at the same time. This step does not restart OMS. Wait until the deployment process is finished.
Oracle Database Appliance Discovery

This chapter provides instructions for discovery of the Oracle Database Appliance through Enterprise Manager Cloud Control 12c.

The following sections describe how to discover the Oracle Database Appliance and other supported targets:

- Oracle Database Appliance Discovery Requirements
- Oracle Database Appliance Discovery Process
- Discover the Virtual Platform
- Discover Grid Infrastructure and Oracle RAC
- Removing an Oracle Database Appliance Target

See Also: Oracle Enterprise Manager Cloud Control Administrator’s Guide for more information about discovering and promoting targets

Oracle Database Appliance Discovery Requirements

Before you begin the discovery process, verify the following items to ensure a smooth discovery.

- Install agents on Oracle Database Appliance.
  - On bare metal deployments, the agent must be deployed on each node.
  - On virtualized platform deployments, the agent must be deployed on each node in ODA_BASE.
- Deploy Oracle Database Appliance Plug-in on the agents.
- If you are using the virtualized platform, the Oracle Virtualized Infrastructure Plug-In can be deployed to monitor running Virtual Machines and view the Hypervisor statistics.
- The host names of the server nodes in each individual Oracle Database Appliance should have a unique name within the enterprise.

See Also: Oracle Enterprise Manager Cloud Administration Guide for more information about monitoring the hypervisor and dom0

Oracle Database Appliance Discovery Process

To discover an Oracle Database Appliance target, follow these steps:
1. From the Enterprise Manager home page, select the Setup menu (upper right corner), Add Target, and then Add Targets Manually.

2. Select the Add Targets Using Guided Process option. From the Target Types drop-down, select Oracle Database Appliance. Click Add Using Guided Process.

   Enterprise Manager displays the Oracle Database Appliance Discovery page.

3. Click Discover Now.

4. On the Agent URL page, enter the following information and click Next:
   - Agent URL: Click the Browse icon to open a list of Oracle Database Appliance agents to choose from. Select one and click Select.
   - Credential: Select New and configure the root credential for Oracle Database Appliance Discovery. Check the Save As box to give this credential a name for future use.

   The Discovered Targets page opens and shows detail about the system.

5. On the Discovered Targets page, you can optionally edit the fields, then click Next.

6. On the Credentials page, use the credentials you configured or used in Step 4. Uncheck the Same as the first one checkbox if the password is different on each node, then click Next.

7. Optionally, on the Tag Cloud page, you can select existing tags or create new ones to associate with the discovered system. You can also configure tags in the Oracle Database Appliance home page.

   The Add Tag button is located at the bottom of the page under the list of available tags. See "Creating an Oracle Database Appliance Group" on page 5-5 for instructions about creating tags.

8. On the Review page, verify each section is correct. Click Back to return to previous pages.

9. If the information on the Review page is correct, click Submit.

10. On the Target Creation Summary page, click OK.

**Discover the Virtual Platform**

If you have deployed the Oracle Database Appliance Virtualized Platform, follow these steps to discover the Hypervison and Virtual Servers.

1. In the Enterprise Manager Setup menu, select Add Target, then Add Targets Manually.

2. In the Add Targets Manually page, select Add Targets Using Guided Process and choose the Oracle Virtual Platform target type.
3. Click **Add Using Guided Process**.

4. On the Discover Oracle Virtual Platforms page, next to the **Monitoring Agent** field, click the search icon (magnifying glass).

5. In the **Search and Select: Agent Targets** dialog, the agent that is deployed in the ODA_BASE domain on Node 0, and click **Select**.

   The failover monitoring agent can be chosen as the Node 1 ODA_BASE agent.

6. Enter the host credentials of the DOM0 of the Oracle Database Appliance server, then click the **Add** button in the Hostname and IP Address section of the page as shown below.

7. Enter the Dom0 node names in the Discover Virtual Servers dialog, and click Add.

8. Click **Submit** in the upper right corner of the page.
Once the job completes, it may take a few minutes for the targets to be visible under the Oracle Database Appliance target.

See Also: Oracle Enterprise Manager Cloud Administration Guide for more information about the Oracle Virtual Infrastructure plug-in

Discover Grid Infrastructure and Oracle RAC

The following sections provide instructions for discovering Grid Infrastructure and Oracle Real Application Clusters targets:

- Discover Grid Infrastructure (Cluster) Targets
- Discover Oracle Real Application Clusters Targets

See Also: Oracle Enterprise Manager Cloud Control Administrator's Guide for more information about discovering and promoting targets

Discover Grid Infrastructure (Cluster) Targets

To discover the Grid Infrastructure targets:

1. From the Setup menu, select Add Target, then Add Targets Manually.
2. In the Add Targets Manually page, select Add Targets Using Guided Process and Target Type as Oracle Cluster and High Availability Service.
3. Click Add Using Guided Process and follow the instructions in the wizard.
4. On the Add Cluster Target: Specify Host page, select the first database node and click Discover Target.
5. The cluster home details are displayed. Ensure that all database nodes are shown in Cluster Host and High Availability Services Targets section.
6. Click Save.
Discover Oracle Real Application Clusters Targets

To discover Oracle RAC targets:

1. From the Setup menu, select Add Targets, then Add Targets Manually.
2. In the Add Targets Manually page, select Add Targets Using Guided Process and Target Type as Oracle Database, Listener and Automatic Storage Management.
3. Click Add Using Guided Process and follow the instructions in the wizard.
4. In the wizard pages, configure Cluster Databases (dbsnmp password required) and Cluster ASM (asmsnmp password required).

See Also: Oracle Enterprise Manager Cloud Control Administrator’s Guide for more information about discovering and promoting targets

Removing an Oracle Database Appliance Target

If you need to remove an Oracle Database Appliance target, you can perform this task within Enterprise Manager Cloud Control 12c:

1. Open the Enterprise Manager Target menu, and select All Targets.
2. In the All Targets page, in the navigation tree, find and expand the Engineered Systems category.
3. Select Oracle Database Appliance System.
4. Right click the target name to open a context menu.
5. Select Target Setup, then Remove Target.
6. A warning page will display to confirm the target deletion. Click Yes to continue.

See Also: Oracle Enterprise Manager Cloud Control Administrator’s Guide for more information about discovering database targets.
Once Oracle Enterprise Manager Plug-in for Oracle Database Appliance has been deployed and Oracle Database Appliance targets are discovered, you can start monitoring and managing the Oracle Database Appliance system targets. Optionally, you can setup notifications for alerts and incidents and create blackout periods for the duration of system maintenance activities.

- Modifying Metrics Thresholds
- Configuring Notifications
- Creating Blackouts

Modifying Metrics Thresholds

You can modify the default thresholds for different metrics for an Oracle Database Appliance system based on your requirements to meet SLAs. You can also create a set of standard threshold values that you apply across multiple Oracle Database Appliance systems. Further, you may have different threshold limits for different types of systems such as production, test, development, and so forth.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Warning Threshold</th>
<th>Critical Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Device Busy (%)</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Filesystem Space Available (%)</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>CPU Utilization (%)</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Memory Utilization (%)</td>
<td>80</td>
<td>95</td>
</tr>
<tr>
<td>Swap Utilization (%)</td>
<td>80</td>
<td>95</td>
</tr>
</tbody>
</table>

You can view and modify the thresholds by selecting Monitoring and Metric and Collection Settings from the drop down menu for Oracle Database Appliance host as shown in Figure 4–1.
Configuring Notifications

Just as with other targets, you can setup to receive email notifications from Oracle Enterprise Manager Cloud Control when incidents occur on Oracle Database Appliance. For example, you can configure notification to be sent to an Administrator’s email when certain events or incidents occur on Oracle Database Appliance hosts.

You can setup notification by going to the Enterprise Manager Setup menu and selecting Notifications and Notification Methods as shown in Figure 4–2.

Notification Methods allow you to globally define different mechanisms for sending notifications. These include email, SNMP traps, PL/SQL procedures and running
Creating Blackouts

Blackouts are a means to suspend monitoring on one or a group of targets in order to perform maintenance operations. For example, during an Oracle Database Appliance patching event, you might decide to set up a blackout for the target Oracle Database Appliance system to suspend monitoring and notifications. You can also create a blackout at fine-grained level, such as at a database level, when only one of the several databases running on Oracle Database Appliance might be down for maintenance.

**Note:** To blackout a target, you must have Blackout Target privileges on the target.

You can create blackouts for an Oracle Database Appliance system by selecting the Oracle Database Appliance system and clicking on Oracle Database Appliance System drop down menu as shown in Figure 4–3. Click on **Control** and then select **Create Blackout**. The Create Blackout page appears.

**Note:** When an Oracle Database Appliance target is in Blackout state, all of its members and host targets go to Blackout state.

![Figure 4–3 Creating a Blackout for Oracle Database Appliance](image)

To create a blackout for multiple Oracle Database Appliance systems, from the Enterprise menu select **Monitoring** and then select **Blackouts**.

Custom scripts. Once defined, Notification Methods are used by Incident Rules to send notifications to administrators for events, incidents, or problems.

**See Also:** Oracle Enterprise Manager Cloud Control Administrator’s Guide 12c for more information about setting up notifications.
See Also: Oracle Enterprise Manager Cloud Control Administrator’s Guide 12c for more information about Blackouts
Monitoring All Oracle Database Appliance Targets

By default, when you open the Oracle Database Appliance home page, you will see data aggregated from all of the Oracle Database Appliance systems that are managed by Oracle Enterprise Manager.

To display data for all systems:

1. From the Targets menu, select Oracle Database Appliance.
   Enterprise Manager displays the Oracle Database Appliances page showing all the available targets.
2. Use the tabs in the Oracle Database Appliance home page to monitor the aggregated topology.

Available Data for All (or Groups of) Oracle Database Appliance Targets

Whether you are monitoring all or a subset (group) of the Oracle Database Appliance systems in the topology, the data are organized and grouped in tabs on the Oracle Database Appliance home page, as show in Figure 5–1.
Oracle Database Appliance Availability Tab
The Availability tab contains several charts displaying the states of the Oracle Database Appliances.

System Status
The System Status pie chart indicates whether the Oracle Database Appliance systems in the selected group are currently online or offline.

You can click on the sections of the pie chart to view detailed information about the system availability represented by the chart. The details are displayed in the table at the bottom of the page.

Virtual Machine Status
The Virtual Machine Status chart displays the status (online, offline, or missing) of all of the virtual machines in the selected group. If Oracle Database Appliance is not deployed with the Virtualized Platform, this chart is not displayed.

You can click on the elements in the chart to view detailed status information about the virtual machine components. The details are displayed in the table at the bottom of the page.

System Component
The System Component graph displays the status (online, offline, or missing) of components such as Appliance Manager, Oracle ASM, Oracle Database, hosts, and ILOMs for the selected group.
You can click on the bars in the chart to view detailed information about the components represented by the bar. The details are displayed in the table at the bottom of the page.

**Physical Disk Status**
The Physical Disk Status chart displays the status of all of the disks in the selected group.
You can click on the sections of the pie chart to view detailed information about the physical disk availability represented by the chart. The details are displayed in the table at the bottom of the page.

**Availability Table**
The table at the bottom of the page changes based on elements you click on in the other sections of the page.

To display the system status of each system in the group, click the pie chart in the System Status section. The table lists all Oracle Database Appliance systems in the selected group, along with their statuses. Each Oracle Database Appliance system name is a URL link, which, if clicked, opens the Oracle Database Appliance system home page of the selected system.

The Oracle Database Appliance system home page contains detailed information for one Oracle Database Appliance system. See "Monitoring Individual Oracle Database Appliance Targets" on page 5-9 for more information.

**Oracle Database Appliance Capacity Tab**
The Capacity tab displays the space, memory, and CPU capacities that are utilized by the managed Oracle Database Appliance systems.

**Local Filesystem Space Utilization**
Each Oracle Database Appliance server node contains 600GB local storage. The local file system space utilization chart displays the mount points and their space utilization. Place your mouse over the bar to display the mount point details. Clicking on a bar in the chart lists all systems in that utilization range in the table at the bottom of the Capacity tab.

**CPU Load**
Systems are grouped in ranges of percentage of CPU utilization. Clicking on a bar in the chart lists all systems in that CPU load range in the table at the bottom of the Capacity tab.

**Memory Utilization**
The Memory Utilization chart displays the memory utilization across the Oracle Database Appliances in the group. The bars represent the percentage of memory utilization. Place your mouse over the bar to display the total number of nodes in this utilization range. Clicking on a bar in the chart lists all systems in that utilization range in the table at the bottom of the Capacity tab.

**Shared Filesystem Space Utilization**
Oracle Database Appliance uses ACFS file systems to store database and non-database files, guestVM templates, and virtual disk. The chart displays the shared file space utilization groupings, and the number of mount points that fall into this utilization grouping. Place your mouse over the bar to display the utilization group and number.
Monitoring All Oracle Database Appliance Targets

of mount points. Clicking on a bar in the chart lists all systems in that utilization range in the table at the bottom of the Capacity tab.

**Disk Group Space Utilization**
Disk groups (such as RECO, REDO, DATA, and FLASH) are grouped in ranges of percentage of space utilization. Clicking on a bar in the chart lists all systems in that utilization range in the table at the bottom of the Capacity tab.

**Oracle Database Appliance Configuration Tab**
The Configuration tab displays the hardware and software configurations on the managed Oracle Database Appliance systems.

**Configured Cores**
The pie chart displays a segment representing the number of systems with a similar number of cores configured. Clicking a segment causes the table at the bottom of the tab to display the names of each system with that number of configured cores.

**Hardware Type**
The pie chart displays a segment representing the number of systems with a similar hardware platform (such as X5-2, X4-2, X3-2, and V1). Clicking a segment causes the table at the bottom of the tab to display the names of the systems with that hardware platform.

**Configuration Type**
The pie chart displays a segment representing the number of systems with a similar configuration type (such VM-ODA_BASE). Clicking a segment causes the table at the bottom of the tab to display the names of the systems with that configuration type.

**Version**
The pie chart displays a segment representing the number of systems with the same software version (such as 12.1.2.2.0). Clicking a segment causes the table at the bottom of the tab to display the names of the systems with that software version.

**Capacity Table**
The table at the bottom of the page changes based on elements you select in the other sections of the page.

**Oracle Database Appliance Incidents Tab**
The Incidents tab displays all incidents related to all or a subset (group) of the Oracle Database Appliance systems managed by Oracle Enterprise Manager. The Summary links are clickable, opening a page with details about the selected incident.

You can adjust the columns and order of the table using the options in the View menu.

You can filter the incidents by category using the Category drop-down list.

**Oracle Database Appliance Topology Tab**
Use the Topology tab of the Oracle Database Appliance home page to view the topology of all systems or a group of systems. See “Viewing Oracle Database Appliance Topology” on page 5-12 for more information.
Monitoring Groups of Oracle Database Appliance Targets

Oracle Database Appliance systems are grouped using tags. When you monitor groups of targets, the Oracle Database Appliance home page only displays an aggregate of the data available for the group of targets defined by the tag. Oracle Database Appliance targets can belong to more than one group.

To monitor a group of Oracle Database Appliance systems, click on its tag in the tree on the left side of the page.

Creating an Oracle Database Appliance Group

To create a group of Oracle Database Appliance targets, you create a tag, and then add targets to the tag.

1. From the Targets menu, select Oracle Database Appliance.
   Enterprise Manager displays the Oracle Database Appliances page showing all the available system groups in the navigation tree.

2. Click the green plus sign icon (Add Tag) above the navigation tree as shown here.
   Clicking the icon opens the Add Tag dialog.

3. Enter a display name for the tag, enter an optional description, and click OK.

4. Select the tag in the navigation tree, and click the wrench icon (Modify Systems).
Note that when you select the tag in the navigation tree, the topology tab shows a representation of MyTag, the tag created for this example, but there are no systems branched from it.

The Modify Systems dialog opens.

5. Select systems to add to the group by moving them from the left column to the right column in the Modify Systems dialog, then click OK.

If you expand the tag in the navigation tree the selected systems appear beneath it and you can refresh the topology diagram to show the added system.
Modifying an Oracle Database Appliance Group

You can add or remove targets from a group at any time.

1. From the Targets menu, select Oracle Database Appliance.
   Enterprise Manager displays the Oracle Database Appliances home page showing all of the available system groups in the navigation tree.

2. Select the tag in the navigation tree, and click the wrench icon (Modify Systems).

   The Modify Systems dialog opens.

3. Select systems to add or remove from the group by moving them to the left or to the right in the Modify Systems dialog, then click OK.
Deleting an Oracle Database Appliance Group

You can delete a group of targets by removing the tag.

1. From the Targets menu, select Oracle Database Appliance.
   
   Enterprise Manager displays the Oracle Database Appliances page showing all the available system groups in the navigation tree.

2. Select the group you want to delete, then click the red X icon (Remove Tag) above the navigation tree.
   
   The All ODA tag cannot be deleted because it is the default tag for all of the discovered Oracle Database Appliances.

3. In the Remove Tag dialog, select the checkbox next to the group you want to delete and click OK.

Removing the tag from the navigation tree does not remove any Oracle Database Appliance targets from Enterprise Manager. For information about removing a
Monitoring Individual Oracle Database Appliance Targets

URL links are used to display the names of the Oracle Database Appliance systems, and clicking a link opens the page for monitoring that individual system.

1. From the Targets menu, select Oracle Database Appliance.
   Enterprise Manager displays the Oracle Database Appliances page showing all the available targets.

2. Select All ODA in the navigation tree on the left side of the page.
   The systems are listed under the expanded All ODA group.

3. Select the link corresponding to the system you want to monitor.
   The target page opens as shown here.

Available Data for an Individual Oracle Database Appliance Target

You can monitor all components of the Oracle Database Appliance. Oracle Database Appliance monitors all subcomponent targets, whether hardware or software. This includes the hosts, databases, virtualization, ASM, and more.

On the left hand side of the individual Oracle Database Appliance, you can navigate to the specific component details which includes Appliance Manager, ASM, Host, Hypervisor, ILOM, Oracle Databases, and the virtualization components.
Oracle Database Appliance System General Tab
The General tab has several sections.

Availability
The Availability section lists the name, type, status, and availability for the last 24 hours of all of the components in the Oracle Database Appliance. The links in the Name column redirects the page to the home page of the component selected.

Configuration
The Configuration section displays the platform, hardware type, software version, and tags configured for the Oracle Database Appliance.

Each tag is clickable, once clicked will redirect the page to the Oracle Database Appliance home page displaying the data pertinent to the group of systems configured with the selected tag.

CPU
The CPU chart shows the CPU utilization percentage of hosts for the last 24 hours.

Hardware
The Hardware table shows the status of power supply, enclosure, cooling, and memory of each oak target. Statuses include online, offline, pending, and unknown.

You can move your mouse to the status icon to see a popup of the detailed status for each category. The Oak Name links redirect the page to the OakHome page.

System Status
The System Status is an illustration of the back panel of the Oracle Database Appliance. A green light indicates that a node is online; a red light means either the system is offline or the status is unknown. You can hover your mouse over each of the disks to see a popup displaying the status for each disk.

Memory
The Memory chart shows the memory utilization percentage of hosts for the last 24 hours.

Incidents
The Incidents table lists the incidents for the selected Oracle Database Appliance. The Summary links are clickable, opening a page with details about the selected incident.

You can adjust the columns and order of the table using the options in the View menu. You can filter the incidents by category using the Category drop-down list.

Oracle Database Appliance Target Virtual Machine Tab
The Virtual Machine tab lists information in the following six categories: Virtual Machine, Repository, Network, Vdisk, VM Template, and CPU Pool. This tab only appears in Oracle Database Appliance targets configured with Virtualized Platform environments and not in Oracle Database Appliance targets configured with Bare Metal environments.

The Virtual Machine tab has several groupings of sections. Use the list of links on the left side of the Virtual Machine tab to view each section.
Virtual Machine
When the Virtual Machine category is selected, the tab displays a summary, a list of virtual machines, and further details about virtual machine metrics.

The Virtual Machine list shows summary information for all the virtual machines created by users in the Oracle Database Appliance, including virtual machine name, memory, CPU, repository, node number, and state. You can select a virtual machine name and the detailed information is shown in the Details section to the right.

Repository
When Repository is selected, the tab displays a summary, a list of repositories, and further details about repository metrics.

The Repository list shows summary information for all of the repositories created by users in the Oracle Database Appliance, including repository name, free space, node number, and state. You can expand the repository name using the grey arrow to display the node number and state. You can select a repository name and the detailed information is shown in the Details section to the right.

Network
When Network is selected, the tab displays a list of VLANs and related summary information, including name, interface, node number, and ID.

You can select a VLAN name to display the list of virtual machines attached to the VLAN in the Details section to the right.

Vdisk
When Vdisk is selected, the tab displays summary information about vdisks created by users, including the repository, name, size, and type. You can select a vdisk name to display detailed information in the Details section to the right.

VM Template
When VM Template is selected, the tab displays summary information for all the virtual machine templates created by users in the Oracle Database Appliance, including template name, memory, CPU, and repository. You can select a template name to display detailed information in the Details section to the right.

CPU Pool
When CPU Pool is selected, the tab displays all of the CPU pools for node 1 and node 2 in the Oracle Database Appliance. You can click a pool name to display details about the Node1 and Node2 CPUs in the Details section to the right.

Oracle Database Appliance Target Storage Tab
The Storage tab displays all of the physical disk and ASM disk information. On the left, the pie charts and lists show the number of disks and their statuses. You can select a disk name to display detailed information for an individual disk in the Details section to the right.

Oracle Database Appliance Target Version Tab
The Version tab displays a list of the component versions on the Oracle Database Appliance target.
**Oracle Database Appliance Target Topology Tab**

The Topology tab displays the topology of the individual target. The individual targets define one physical Oracle Database Appliance that consists of several components including hosts, databases, virtual machines, etc.

**See Also:** Viewing Oracle Database Appliance Topology

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**Viewing Oracle Database Appliance Topology**

The Oracle Database Appliance plug-in provides a Topology Viewer that allows you to view the relationships between the components within the Oracle Database Appliance. You can zoom, pan, see selection details and summary information, and evaluate aggregate components. Unique icons are used for each object type, and standardized visual indicators are used across all applications.

Select the Topology tab of the Oracle Database Appliance home page or system page to view the topology of the system by group or individual target. Groups are a collection of Oracle Database Appliance systems. The individual targets define one physical Oracle Database Appliance that consists of several components including hosts, databases, virtual machines, and more.

To view the topology of an existing Oracle Database Appliance target:

1. From the **Targets** menu, select **Oracle Database Appliance**.

   Enterprise Manager displays the Oracle Database Appliances page showing all the available targets.

2. From the Oracle Database Appliance page, select the Oracle Database Appliance target (group or individual system) whose topology you want to view.

3. Select the **Topology** tab.

   You can click an element in the Topology and view data associated with the element.

   Each Oracle Database Appliance system tree node has three children: Hosts, Databases, and Virtualization. You can click the system tree node to open a popup which contains information about the system, including system name, availability, and a list of components and their statuses.
Troubleshooting tips and techniques for the Oracle Database Appliance plug-in include the following items:

- Host Discovery Troubleshooting
- Oracle Database Appliance Discovery Troubleshooting
- Metric Collection Error After Discovery
- Oracle Database Appliance ECM Configuration Data Troubleshooting
- OAK-Based Metric Collection Troubleshooting

**Host Discovery Troubleshooting**

For problems with host discovery check the following solutions:

- Prerequisite Check Failure
- Host Discovery is Done Without Enabling the Root Privileges

**Prerequisite Check Failure**

Possible causes for the prerequisite check failure are displayed in the Agent Deployment Details page as shown in the following figure. Recommended solutions are given in the page.
Host Discovery is Done Without Enabling the Root Privileges

Failure to run root.sh manually results in metric collection failure. The Agent Deployment Details page displays the following:
If the warning is ignored during the host discovery, the root.sh script that exists on the remote host must be run manually after agent deployment is done.

**Oracle Database Appliance Discovery Troubleshooting**

Very often, the error message itself will include the cause for the error. Look for error messages in the OMS and agent logs (case insensitive search for `odadiscovery`) or in the guided discovery flow itself.

Check the following solutions:

- **Discovery Requires Root User**
- **File `/opt/oracle/oak/onecmd/onecommand.params` Required**
**Discovery Requires Root User**

Oracle Database Appliance discovery must be done by the root user. As part of any discovery troubleshooting, possible causes can include:

- Some other user is given to perform the discovery
- An incorrect root password was entered

**File /opt/oracle/oak/onecmd/onecommand.params Required**

The file `/opt/oracle/oak/onecmd/onecommand.params` is required as prerequisite for guided discovery. As part of any discovery troubleshooting, possible causes can include:

- The `onecommand.params` file is missing or not accessible
- Some of the fields in `onecommand.params` file are missing. This can be fixed on the Discovered Targets page where the user can manually enter all the required information.

**Metric Collection Error After Discovery**

For problems with metric collection found after discovery, check the following solutions:

- Plug-in Versions Do Not Match
- Plug-in Version is Not the Same on the Two Host Nodes
- Monitoring Credentials Set Incorrectly

**Plug-in Versions Do Not Match**

Verify that the agent side plug-in version matches the OMS side plug-in version.

**Plug-in Version is Not the Same on the Two Host Nodes**

Verify that the plug-in version is the same on both of the host nodes.

To check the Enterprise Manager Oracle Database Appliance Plug-in versions on the OMS and agents:

1. Open the Enterprise Manager **Setup** menu and select **Extensibility**, then choose **Plug-ins**.
2. On the Plug-ins page expand the **Engineered Systems** folder and find the **Oracle Database Appliance** row as shown below.
The **Latest Downloaded** column shows the version uploaded to Enterprise Manager repository.

The **On Management Server** column shows the plug-in version deployed on the Management Server.

3. If the value in the **Management Agent with Plug-in** column is non-zero, click on the number.

   A page opens which lists the agents that have the plug-in, and the **Plug-in Version on Management Agent** column shows the plug-in version deployed on the agent.

**Monitoring Credentials Set Incorrectly**

Verify that the monitoring credentials were set correctly.

1. Log in to Enterprise Manager.

2. Click **Setup**, then **Security**, and then **Monitoring Credentials**.

3. On the Monitoring Credentials page, click the **Oracle Database Appliance Manager** target type, then set the monitoring credentials.

**Oracle Database Appliance ECM Configuration Data Troubleshooting**

This data is scheduled to run the collection every 24 hours by default. To check for data availability and last collected time:

1. From the Enterprise Manager Cloud Control console:
   a. Click **Targets**, then **All Targets**.
   b. Click the Oracle Database Appliance Manager target from the list.
   c. Click **Configuration**, and choose the **Last Collected** option.
   d. On the Latest Configuration page, click **Actions**, then **Refresh**.

2. From the command line run:

   ```
   # emctl control agent runCollection
   # target_name:target_type <collectionName>
   ```
3. You can also verify that ECM data are collected and presented in Enterprise Manager Repository using SQL plus.

**OAK-Based Metric Collection Troubleshooting**

Oracle Database Appliance is a multi-agent target like Oracle RAC. At a given point in time, Oracle Database Appliance is monitored by only one node’s agent, which is the master agent. OMS determines which node’s agent will do the actual monitoring, and this is referred to as the OMS mediated target. The data displayed in the Oracle Database Appliance Target Navigation page is based on the OAK metric collection from the node running the master agent.

**How to Determine Which Node Agent is Monitoring the Oracle Database Appliance Machine**

To determine which node agent is monitoring Oracle Database Appliance, click on the information icon next to Oracle Database Appliance machine name in the Oracle Database Appliance Target Navigation page as shown below.

There are many ways to access the page. In this example we start from the Enterprise Manager Targets menu.

1. Open the Enterprise Manager **Target** menu, and select **All Targets**.
2. In the All Targets page, in the navigation tree, find and expand the **Engineered Systems** category.
3. Select **Oracle Database Appliance System**.
4. Click the information icon next to the Oracle Database Appliance machine name in the target page to display the Agent name.

**Viewing OAK Metrics**

To view OAK metrics:

1. Right click on an OAK target under **Appliance Manager**, then select **Monitoring**, then **All Metrics**.
2. Choose a metric to see details.
Index

A
agent installation, 2-4, 2-5, 2-6
agent, master, 6-6
ALL ODA, 5-1
archive, plug-in, 2-6
availability, 5-2
availability monitoring, 5-10

B
blackouts, 4-3

C
capacity, monitoring, 5-3
cluster discovery, 3-4
cluster prerequisites, 2-3
genconfiguration, 5-4, 5-10
genconfiguration type chart, 5-4
configured cores chart, 5-4
CPU chart
target, 5-10
CPU load chart, 5-3
CPU pool, 5-11
create group, 5-5
create tag, 5-5
creating
ILOM service processor user, 2-1
monitoring user, 2-2
credentials, 6-5

D
database server ILOM service processor user, 2-1
DB Cluster, 2-3
delete group, 5-8
delete Oracle Database Appliance target remove
target, 3-5
delete tag, 5-8
deploy plug-in, 2-6
deploy plug-in on Enterprise Manager, 2-7
deploy plug-in to management agents, 2-8
deployment prerequisites, 2-1
discover
Grid Infrastructure, 3-4
Oracle Database Appliance, 3-1
Oracle RAC, 3-4
virtual platform, 3-2
discover troubleshooting, 6-4
discovery
Grid Infrastructure, 3-4
Oracle RAC, 3-5
post-discovery configuration and verification, 4-1
review page, 3-2
disk group space utilization chart, 5-4
disk status chart, 5-3
DNS, 2-3
drilling down, 5-9

E
EMCLI, 2-7
Enterprise Manager agent installation, 2-4, 2-5, 2-6
Enterprise Manager support, 1-2
Enterprise Manager, deploy plug-in on, 2-7
features, 1-1
monitoring, 1-1
target discovery, 1-1
firewall configuration, 2-3

F

G
Grid Infrastructure, 2-3
discovery, 3-4
group deletion, 5-8
group modification, 5-7
group targets, 5-5
guided discovery, 3-1

H
hardware monitoring, 5-10
hardware supported, 1-2
hardware type chart, 5-4
host discovery, 6-1

I
ILOM creating, 2-1
ILOM servers, 2-3
importing plug-in archive, 2-6
importing plug-in archive remotely, 2-7
incident monitoring, 5-10
incidents, monitoring, 5-4
install
   Enterprise Manager agent, 2-4, 2-5, 2-6

L
local file system utilization, 5-3
local file system utilization chart, 5-3

M
management agents
   deploy plug-in to, 2-8
manually deploy plug-in, 2-6
master agent, 6-6
memory monitoring, 5-10
memory utilization chart, 5-3
metric collection error, 6-4
metric threshold modification, 4-1
modify group, 5-7
modify tag, 5-7
monitor, 5-3
   ALL ODA, 5-1
   availability, 5-2, 5-10
   capacity, 5-3
   configuration type, 5-4
   configurations, 5-4
   configured cores, 5-4
   CPU, 5-10
   CPU load, 5-3
   CPU pool, target, 5-11
   disk group space utilization, 5-4
gen
   general system information, 5-10
groups of targets, 5-5
   hardware type, 5-4
   incidents, 5-4
   incidents, target, 5-10
   machine, 5-9
   memory utilization, 5-3
   memory, target, 5-10
   network, target, 5-11
   physical disk status, 5-3
   shared file system utilization, 5-3
   storage, target, 5-11
   system components, 5-2
   system configuration, 5-10
   system status, 5-2
   system status, target, 5-10
tags, 5-5
target, 5-9
target hardware, 5-10
topology, 5-4
topology, target, 5-12
vdisk, target, 5-11
version, target, 5-11
virtual machine repository, target, 5-11
   virtual machine status, 5-2
   virtual machine, target, 5-10, 5-11
   VM template, target, 5-11
   monitor version, 5-4
   monitoring
      creating user for, 2-2
      monitoring features, 1-1
   monitor version, 5-4

N
names resolution, 2-3
network monitoring, 5-11
notifications, 4-2

O
oak metrics, viewing, 6-6
oak user, 2-2
oak-based metric collection, 6-6
OPAR file, 2-6, 2-7
Oracle Database Appliance
   view topology, 5-4, 5-12
Oracle RAC discovery, 3-4, 3-5
Oracle Virtual Platform discovery, 3-2

P
physical disk status chart, 5-3
plug-in
   deploy on Enterprise Manager, 2-7
   deploy to management agents, 2-8
plug-in archive import, 2-6
plug-in archive, importing remotely, 2-7
plug-in deployment, 2-6
plug-in versions, 6-4
prerequisite
   verify software versions, 2-3
   prerequisite checks failure, 6-1
prerequisites
   database server ILOM service processor user, 2-1
   firewall configuration, 2-3
   Grid Infrastructure, 2-3
guided discovery, 3-1
   monitoring user creation, 2-2
   names resolution, 2-3
   plug-in deployment, 2-1
   push method, 2-5

R
remotely importing plug-in archive, 2-7
root privileges, 6-2
root user, 2-2, 6-4

S
shared file system space utilization chart, 5-3
silent mode, 2-6
software supported, 1-2
software version verification, 2-3
storage monitoring, 5-11
sudo user configuration, 2-2
supported hardware and software, 1-2
system components chart, monitoring, 5-2
system configuration, 5-10
system monitoring, 5-10
system status chart, 5-2
system status monitoring, 5-10

T
tag deletion, 5-8
tag modification, 5-7
target
  availability, 5-10
  configuration, 5-10
  CPU chart, 5-10
  CPU pool, 5-11
  hardware, 5-10
  incidents, 5-10
  memory, 5-10
  network, 5-11
  storage, 5-11
  system status, 5-10
  topology, 5-12
  vdisk, 5-11
  version, 5-11
  virtual machine, 5-10, 5-11
  virtual machine repository, 5-11
  VM template, 5-11
target discovery, 3-1, 3-2, 3-4, 3-5
target discovery features, 1-1
target group
  modify, 5-7
target group create, 5-5
target group deletion, 5-8
target removal, 3-5
targets
  drilling down, 5-9
threshold modification for metrics, 4-1
topology, 5-12
topology view, 5-4
topology, target, 5-12
troubleshooting, 6-1
discovery, 6-1, 6-4
ECM configuration, 6-5
host discovery, 6-1
incorrect user, 6-4
metric collection, 6-2, 6-4, 6-5
oak-based metric collection, 6-6
Oracle Database Appliance discovery, 6-3
prerequisite checks, 6-1

V
vdisk, 5-11
verify
  firewall configuration, 2-3
  names resolution, 2-3
  software versions, 2-3
  version, 5-11

version chart, 5-4
versions match, 6-4
versions supported, 1-2
view topology, 5-4, 5-12
virtual machine monitoring, 5-10, 5-11
virtual machine repository monitoring, 5-11
virtual machine status chart, 5-2
virtual platform discovery, 3-2
VLANs, 5-11
VM template, 5-11