Oracle® Enterprise Manager

Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud

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Oracle Enterprise Manager Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud, 13c Release 4

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Contents

Preface

Oracle Database Exadata Cloud Service provides full Oracle Databases hosted on Oracle Exadata Database Machine. Exadata Cloud Service is offered on Oracle Cloud, using state-of-the-art Oracle-managed data centers. You can also choose Exadata Cloud at Customer, which provides Exadata Cloud Service hosted in your data center.

This book describes how you can use Oracle Enterprise Manager Cloud Control for Exadata Cloud Service to:

- Have a unified view of all the cloud components and their status
- Efficiently manage cloud target resources
- Perform typical administrative tasks on the cloud target and its component targets

Unless specified, the contents of this book are applicable to both *Oracle Database Exadata Cloud Service* and *Oracle Database Exadata Cloud at Customer*.

Audience

This guide is intended for administrators of *Oracle Enterprise Manager Cloud Control for Exadata Cloud Service* who manage and monitor the resources associated with these services.

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 who 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 Resources

For more information, see these Oracle resources:

- Exadata Cloud Service
- Administering Oracle Database Exadata Cloud Service
- Administering Oracle Database Exadata Cloud at Customer
- Oracle Exadata Database Machine Getting Started Guide

- Exadata DB Systems

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.
italic	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.

1

Introduction to Monitoring Exadata Cloud Service

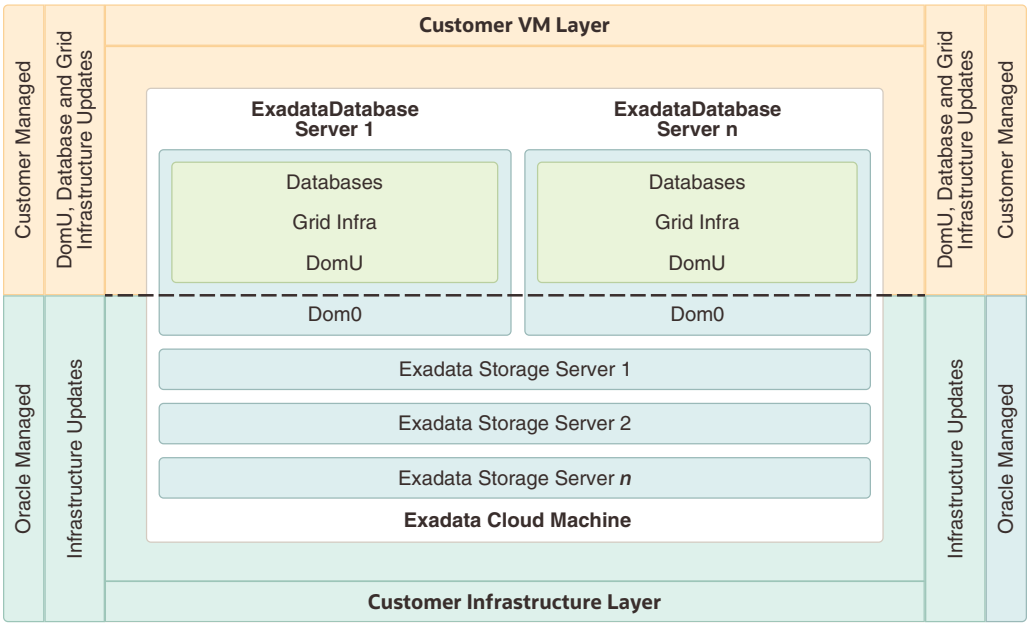
Oracle Enterprise Manager Cloud Control provides a complete cloud lifecycle management solution for Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer, collectively Exadata Cloud Service.

> **Note:**
>
> To monitor Oracle Exatadata Database Machine using Oracle Enterprise Manager Cloud Control, see *Oracle Exadata Database Machine Getting Started Guide*.

Overview and Architecture

Oracle Enterprise Manager Cloud Control provides an integrated monitoring solution for the various layers of Exadata Cloud Service. The end users have access to select components of the service such as the databases, hosts, and ASM. The hardware components like physical servers and network interfaces are monitored and managed by Oracle.

The following diagram shows the various components of Exadata Cloud Service, and their access control and management:



Oracle Enterprise Manager Cloud Control discovers Exadata Cloud Service as a single target and automatically identifies and organizes all its dependent components. Using Oracle Enterprise Manager Cloud Control you can then:

- Monitor and manage all Exadata, Exadata Cloud systems along with any other targets, from a single interface
- Visualize storage and compute data
- View performance metrics of your Exadata components

Features

Oracle Enterprise Manager Cloud Control for Oracle Exadata Cloud includes the following features:

Enterprise Manager target for Exadata Cloud

- Automatically identifies and organizes related targets
- Provides a high level integration point for Enterprise Manager framework features such as incident rules, groups, notifications, and monitoring templates

Improved Performance Monitoring

- Adds Exadata Storage Server and Exadata Storage Grid targets.
- Offers visualization of storage and compute performance for Oracle Exadata Cloud
- Enables use of the same Maximum Availability Architecture (MAA) Key performance Indicators (KPI) developed for Oracle Exadata Database Machine

Scripted CLI-based discovery

- Scripts the discovery of Oracle Exadata Cloud, by combing the existing hosts, cluster, ASM, Database and related targets as well as adding the storage server targets

Provides a single pane of glass for Oracle Exadata Database Machine and Oracle Exadata Cloud

- Monitors and manages Oracle Exadata Database Machine and Oracle Exadata Cloud systems through a common Exadata target menu
- Exadata Cloud Target provides consistent Enterprise Manager experience across both Exadata Cloud Service and Exadata Cloud at Customer by means of a single target type

Visualization

- Visualize the database and related targets assosiated with each Oracle Database Exadata Cloud Service and Oracle Database Exadata Cloud at Customer

Supported Operating Systems

The following operating systems (where OMS and agent is installed on) are supported by the Oracle Exadata plug-in 13.4.1:

- Management Server plug-in (all OMS-certified platforms):
  - IBM AIX on POWER Systems (64-bit)

  - HP-UX Itanium
  - Linux x86 and x86-64
  - Microsoft Windows x64 (64-bit)
  - Oracle Solaris on SPARC (64-bit)
  - Oracle Solaris on x86-64 (64-bit)
- Agent Plug-ins for Exadata and Supercluster
  - Exadata Plug-in + SI plug-in + VI Plug-in for Exadata
  - Exadata Plug-in + SI Plug-in for SSC
  - Linux x86-64
  - Oracle Solaris on x86-64 (64-bit)
  - Oracle Solaris on SPARC (64-bit)

2
Discovery Prerequisites

Before discovering the Exadata Cloud Service target, make sure the following prerequisites are met:

Topics:

System Configuration Prerequisites

Before starting the discovery procedure, make sure the following prerequisites are met:

Verify Names Resolution

The Enterprise Manager OMS servers require direct network access to each of the compute nodes. If the names of the compute nodes are not registered in the OMS nodes' DNS, then they must be manually entered in the `/etc/hosts` file for each OMS.

To manage the Exadata Cloud Service components from Enterprise Manager Cloud Control 13*c*, your local machine must be able to resolve the host name of Cloud Control 13*c*.

Verify Firewall Configuration

To verify the firewall configuration:

1. Open Database Ports

   The database listener ports must be opened for the Enterprise Manager OMS servers. Note that Exadata Cloud Service databases will use SCAN listeners; so, ports will need to be opened for the base compute node, the compute node virtual IP, and scan listeners addresses.

   For example, if an Exadata Cloud Service quarter rack has been configured with two compute nodes - `exadbnode1.example.com` and `exadbnode2.example.com` - and the listeners are using port 1521, then port 1521 will have to be opened to the Enterprise Manager Server for the following addresses:

- The compute node hostnames - `exadbnode1.example.com` and `exadbnode2.example.com`
- The virtual IPs for each compute node - `exadbnode1-vip.example.com` and `exadbnode1-vip.example.com`
- The scan listener hostname - `scan-exadatadb`

2. Open Enterprise Manager Upload Port

   The Enterprise Manager Cloud Control 13*c* 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 must be opened for each of the compute nodes.

3. Open Agent Ports

   The OMS servers must be able to connect to the Enterprise Manager Cloud Control 13*c* agent HTTP/HTTPS port on each compute 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 compute 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
     ```

Table 2-1 Firewall Ports

Component	Notes
OMS	Upload http/https port - usually 3872
Agent	The OMS servers will need to be able to connect to the Enterprise Manager Cloud Control Agent HTTP/ HTTPS port on each compute node. The agent port defaults to 3872. If port 3872 is not available, the next available port starting from port 1830 is used.

Creating Roles to Manage the Plug-in

To manage the plug-in, you need to create roles and administrators, and then assign roles to administrators. This restricts the privileges that each user has, for example in deleting the plug-in or accessing reports.

> **Note:**
>
> For security reasons, Oracle recommends that the SYSMAN account be used only as a template to create other accounts, and not used directly.

To create roles to provide management rights to users:

1. Log in to the Enterprise Manager Cloud Control as the super administrator user.
2. Click **Setup**, then **Security**.
3. Select **Roles**.

   On the Security page, a list of predefined roles is provided. These roles can serve as basis to define custom roles to suite specific site level requirements.

   > **Note:**
   >
   > The predefined roles provided cannot be edited or deleted.

4. Select a role that closely matches the role you wish to create. Click **Create Like**.
5. On the Properties page, enter a name for the role you wish to create. You can optionally add a description.

   Click **Next**.
6. On the Roles page, select the roles from the list of Available Roles. Click **Move** to add the role to Selected Roles.

   Click **Next**.
7. On the Target Privileges page, select the privilege you want to grant to the new role.

   Click **Next**.
8. On the Resource Privileges page, you can edit specific privileges to be explicitly granted. Click the **Manage Privilege Grant** edit icon to make the changes.

   Click **Next**.
9. On the Administrators page, select the administrators from the list of Available Administrators that you want to grant the new role to. Click **Move** to add the administrator to Selected Administrators.

   Click **Next**.
10. On the Review page, a complete summary of the new role you have created is displayed. Click **Back** to go to previous screens to make changes. Click **Finish** to complete the role creation.

When the newly created administrator logs in, unlike SYSMAN, the administrator is restricted by the privileges set.

Install Enterprise Manager Agent

Enterprise Manager Exadata discovery supports the use of either management network hostname or client network hostname for the compute nodes. When installing the Enterprise Manager agent on the compute 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 compute nodes. It is recommended that a fully qualified hostname, including the domain name, be used when specifying an Enterprise Manager agent hostname.

For steps to install agents, see Installing Oracle Management Agents in ***Cloud Control Basic Installation Guide***.

Manually Deploy Exadata Plug-in

The Exadata plug-in is automatically deployed to the agent as part of discovery.

You may need to manually deploy the Exadata plug-in to the agents on each of the compute nodes when upgrading an existing agent plug-in installation. Deploy the Exadata plug-in manually if an older version of the plug-in has been deployed to the agent already and you would like to upgrade to the latest version of the plug-in deployed on the OMS.

To determine if the Exadata plug-in is deployed on each compute node and what version it is, you have two options:

- From a terminal window, run the following command:

  ```
  emctl listplugins agent
  ```

  > **Note:**
  >
  > The `emctl listplugins agent` command must be run on the compute node using `emctl` in the agent installation directory.

- From Enterprise Manager Cloud Control, click the **Setup** menu (upper right corner), **Extensibility**, and then **Plug-ins**.

To manually deploy the Exadata plug-in:

1. From the Enterprise Manager home page, click the **Setup** menu (upper right corner), **Extensibility**, and then **Plug-ins**.
2. On the **Plug-ins** page, select **Oracle Exadata** Plug-in from the **Name** list.

> **Note:**
>
> Please check *Exadata Storage Software Versions Supported by the Oracle Enterprise Manager Exadata Plug-in* (Doc ID 1626579.1) on My Oracle Support for the latest supported plug-ins. Oracle recommends that you deploy the latest version of the Exadata plug-in to the agent.

3. Click **Deploy On**, then **Management Agent**.
4. On the **Deploy Plug-in on Management Agent** screen, verify the version of the plug-in to deploy and click **Continue**.
5. On the **Deploy Plug-in on Management Agent** screen, select the agents for which the plug-in should be deployed. You can select more than one agent.
6. After you have added the agents, click **Next** on the **Deploy Plug-in on Management Agent** screen to review and verify the agent information.
7. Click **Deploy** to deploy the plug-in to the agents.
8. After the plug-in is deployed to all the agents, a confirmation screen will be displayed. Click **OK** to dismiss the dialog box or **Show Status** to display the status of the agent in the Enterprise Manager **Deployment Activities** screen.

Discover the Member Targets

You can discover the following targets before discovering the unified cloud target which is composed of these targets:

- **Individual Database Targets**: See Discovering and Adding Database Targets in *Cloud Control Administrator's Guide*.
- **Grid Infrastructure (Cluster) Targets**: See Discovering Grid Infrastructure and RAC in *Oracle Exadata Database Machine Getting Started Guide*.
- **Oracle Real Application Clusters Targets**: See Discovering Grid Infrastructure and RAC in *Oracle Exadata Database Machine Getting Started Guide*.

Create Credential Set

To associate the storage servers of the grid infrastructure with the cloud target, create a named credential for storing the ExaCLI username and password used for connecting to the Exadata Storage Server.

For the relevant documentation about the username and password, see:

- Exadata Cloud at Customer (Gen 1/OCI-C): Monitoring and Managing Exadata Storage Servers on Exadata Cloud at Customer in *Administering Oracle Database Exadata Cloud at Customer (Gen 1/OCI-C)*
- Exadata Cloud at Customer (Gen 2/OCI): Monitoring and Managing Exadata Storage Servers on Exadata Cloud at Customer in *Oracle Cloud Infrastructure Documentation*

During the discovery of the cloud target, you will point to this named credential set for discovering the storage servers. This must be a named credential of the type *ExaCLI* or *RESTful API*.

1. Click the setup icon  > click **Security** > select **Named Credentials**. The **Named Credentials** page is displayed.
2. Click **Create**. The **Create Credential** page opens.
3. Provide the following information:
   - **Credential Name**: Provide a suitable name to the credential. For example, `EXADATA_CRED`.
   - **Credential Description**: Describe the purpose of the credential and the intended use.
   - **Authenticating Target Type**: Specify the target type for which this credential set will be used for authentication. Select `Oracle Exadata Storage Server` from the menu.
   - **Credential Type**: Specify the type of the credential that you're creating. Select `Credential for ExaCLI or RESTful API` from the menu.
   - **Scope**: Select the visibility of the credential in Enterprise Manager. Select `Global`.
   - **Username** and **Password**: Provide the user name and password to access the storage cells. This is the exacli user that was generated as part of the Exadata Cloud Service setup.
   - **Run Privilege**: You can select the level of privilege provided to the user for access.
   - **Access Control** section: You can add grants, and select the grantee in this section.

   Click **Save**.

You can now view the new credential created in the **Named Credentials** page.

3
Discover the Exadata Cloud Service Target

Use emcli to discover the cloud target. After the discovery is complete, you can explore the cloud target home page and navigate to its dependent targets.

Topics:

Discover the Cloud Target Using emcli

Perform the following steps to discover the cloud target using emcli. Specify the hosts of the dependent targets in the properties file to automatically detect them and associate them with the cloud target.

This discovery procedure will also discover the storage server cells associated with the Exadata Cloud Service target using the given credentials set. After the discovery is complete, you can monitor all the cloud targets through a single control pane.

Before you begin, verify that you added the Enterprise Manager Agent to all the compute nodes and discovered the cluster database, database instances and cluster ASM.

1. First, create a property file, for example `exacc_fin.txt` as shown in the example:

```
configMap.targetName=ExaCC_Finance
configMap.region=TestRegion
configMap.tenancy=TestTenancy
configMap.serviceType=ExaCC
configMap.monitorAgentUrl.0=https://
hostxyz.example.com:portnumber/emd/main/

credMap.cellCredSet=SYSMAN:EXADATA_CRED

host.name.0=host0.example.com
host.name.1=host1.example.com
host.name.2=host2.example.com
host.name.3=host3.example.com
```

   In the above example,

   - **configMap.targetName**: Name of the target that you want to create
   - **configMap.region**: The cloud region where the target is created
   - **configMap.tenancy**: The tenancy where the cloud target is created

- **configMap.serviceType**: Specify **ExaCC** if the service type is *Oracle Database Exadata Cloud at Customer*, or **ExaCS** if the service type is *Oracle Database Exadata Cloud Service*
- **configMap.monitorAgentUrl.0**: The URL of the agent which will be used to monitor the new target. You can obtain this from the agent home page or run the following command to get the agent URL:
  `emcli status agent`
- **credMap.cellCredSet**: The credential set that you created earlier, which is used to discover the storage servers in the new cloud target. This must be a named credential of the type *ExaCLI* or *RESTful API*. In the above example, *SYSMAN* is the owner of the credential and *EXADATA_CRED* is the name of the credential.

  To obtain the credential set information, click the setup icon > click **Security** > select **Named Credentials**. The **Named Credentials** page is displayed. Collect the required information about the credential set in this page. See Create Credential Set.
- **host.name.*x***: The host names on which the databases that must be associated with the new cloud target, are run. Specify all the host names for the discovery to complete successfully. Here, *x* is the host name number which should start with 0, and must be incremented by 1 for every additonal host name added to the file.

2. Run the following `emcli` command by specifying the property file in the form of data <*property_file*>:

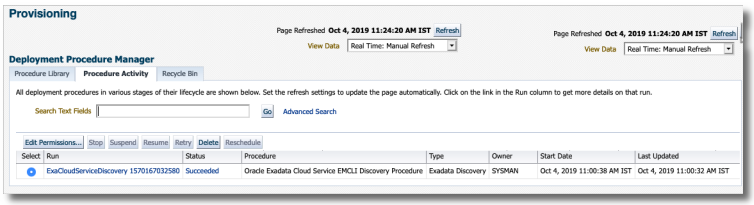
```
emcli submit_procedure -name=ExaCloudServiceDiscovery -
input_file=data:<property_file> -notification="scheduled, action
required, running" ;
```

Here's an example output after the command is executed by using the example property file `exacc_fin.txt`:

```
$ emcli submit_procedure -name=ExaCloudServiceDiscovery -
input_file=data:exacc_fin.txt -notification="scheduled, action
required, running" ;
Schedule not specified, defaults to immediate.
94100035BF9341DCE053010011AC4000
Deployment procedure submitted successfully
```

3. You can view the status of the discovery in the **Procedure Activity** page.

   Go to Enterprise Manager Home page > click the **Enterprise** icon > click **Provisioning and Patching**. The following **Procedure Activity** page is displayed:



After the discovery is complete, explore the cloud target homepage, the topology view, and the navigation tree. See Explore the Cloud Target Home Page.

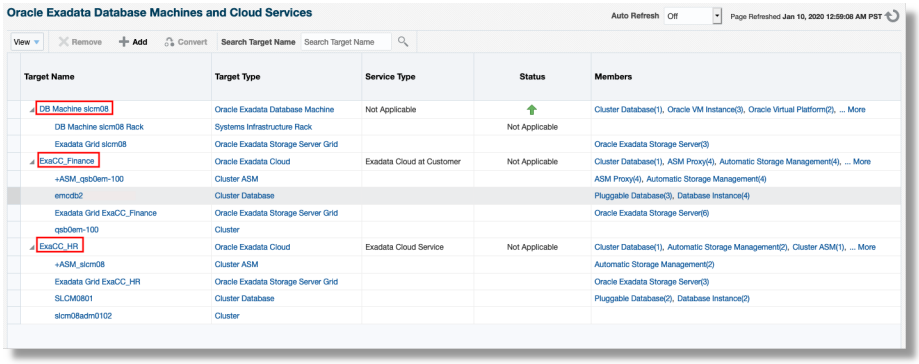
Explore the Cloud Target Home Page

After the discovery is complete, visit the cloud target home page and explore the various views.

All Exadata Targets

Go to Enterprise Manager Home > click the **Targets** icon > click **Exadata**.

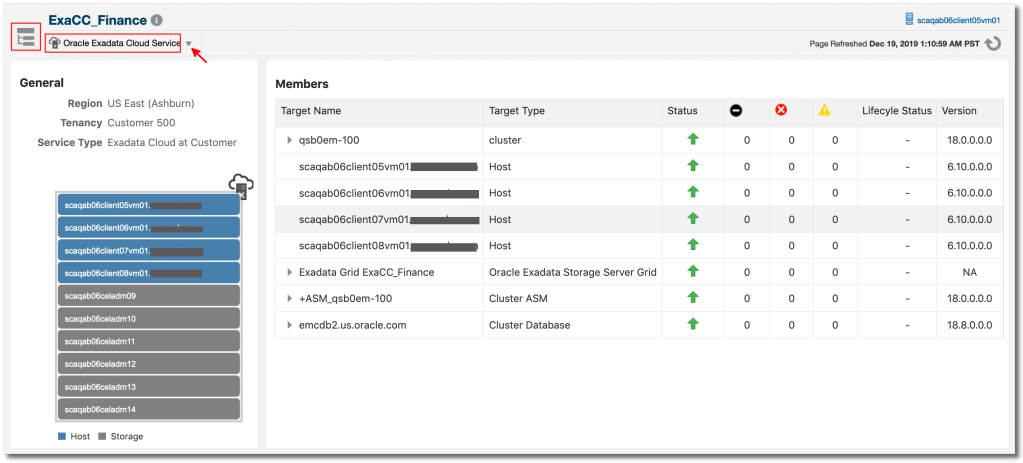
The **Oracle Exadata Database Machines and Cloud Services** page is displayed. This page lists all the Exadata targets discovered on Enterprise Manager. The targets can include Oracle Exadata Database Machine, Oracle Database Exadata Cloud Service, and Oracle Database Exadata Cloud at Customer. The page also displays the member targets of each Exadata target, the **Target Type**, **Service Type**, status of the Exadata target, status of the member targets, and alerts.



Cloud Target Home Page

Go to Enterprise Manager Home > click the **Targets** icon > click **Exadata**. All the Exadata targets are listed in this page. Click the link on your cloud target name to open the home page.

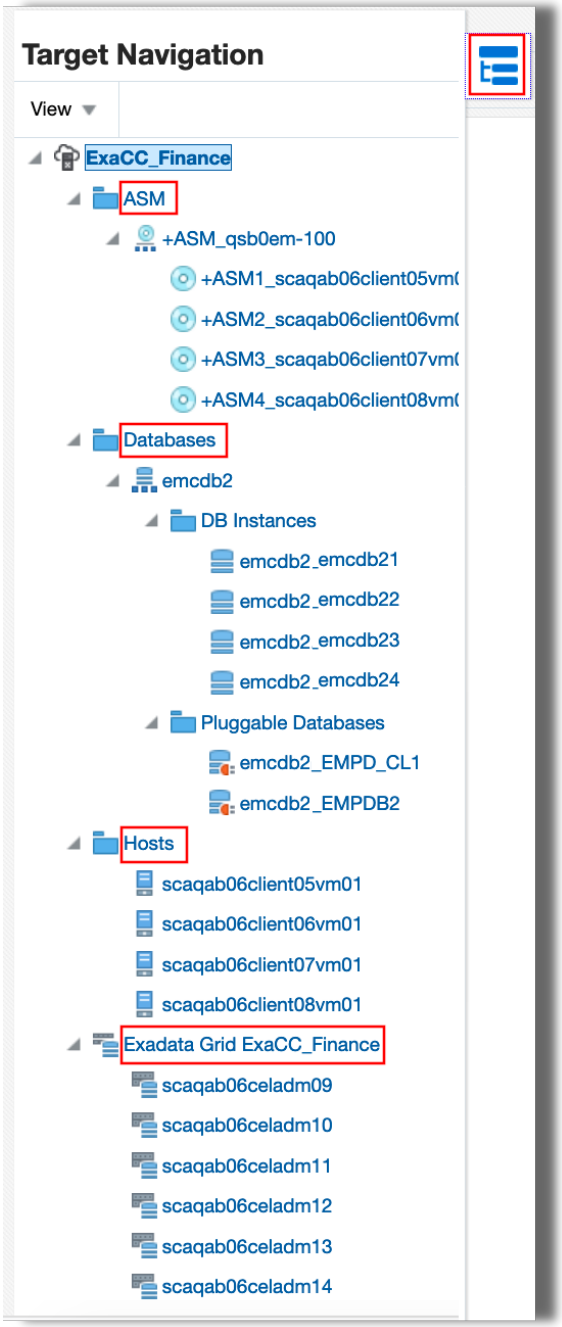
The **Oracle Exadata Cloud Service** target home page is displayed. The General section on this page provides details for this Oracle Exadata Cloud Target such as the Oracle Cloud Infrastructure **Region** and **Tenancy** where the cloud target is created. The Service Type field specifies if the cloud target is of the type **Exadata Cloud at Customer** or **Exadata Cloud Service**. The **Members** section on the page displays a list of the member targets, their target type, status, and versions. The **Incidents** section at the bottom of the page displays the alerts and their details. Click the down-arrow next to **Oracle Exadata Cloud Service** icon to view options for configuration, administration, and other settings for the cloud target. You can explore the details of each member target by clicking the navigation icon and selecting the target.



Target Navigation Tree

Click the **Target Navigation** icon on the top left corner of the screen of the cloud target home page to view the navigation tree.

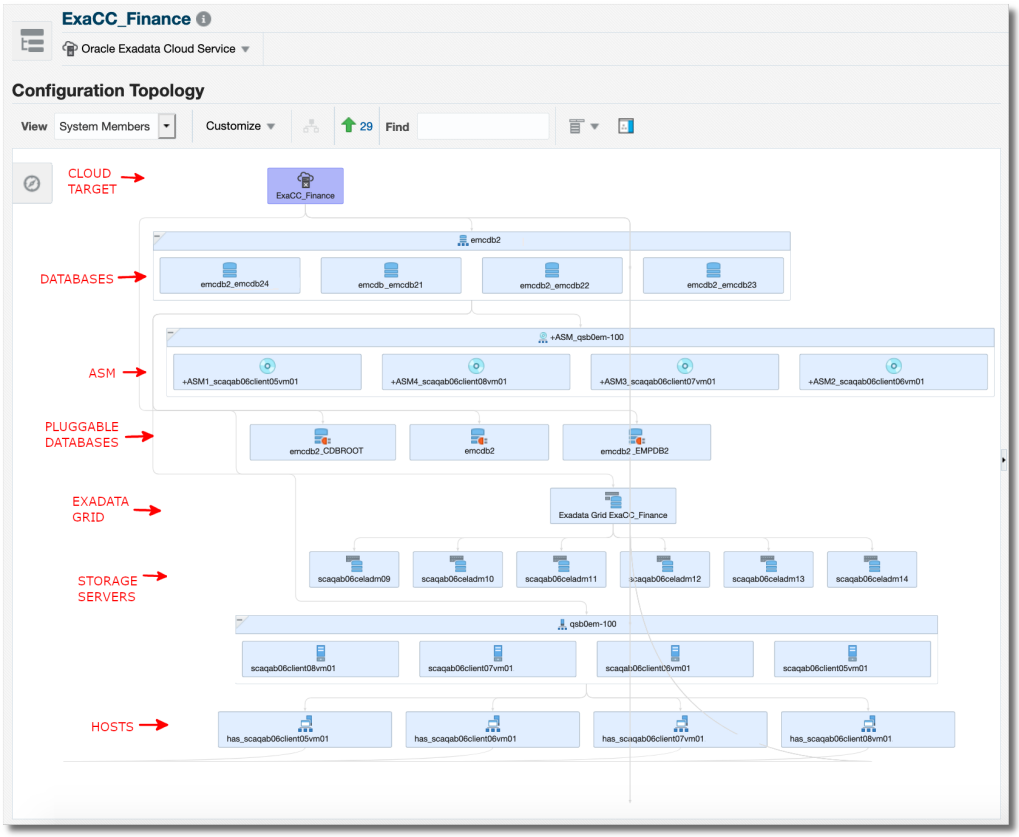
The navigation tree lists all the member targets of the cloud target. Expand each member target to explore further. You can click the member target link to visit the member target home page to view its details.



Target Topology

Go to the cloud target home page > click the down arrow next to the target type **Oracle Exadata Cloud ...** > click **Members** > click **Topology**.

The topology view displays the member targets and the components of the cloud target like databases, ASM, Exadata Grid and its storage servers, and the hosts. The configuration view presents the inter-dependency of the component targets and the overall heirarchy.



Refresh the Cloud Target After Discovery

You can refresh the cloud target after discovery in any of the following scenarios:

- To associate those additional database targets that were discovered after cloud target discovery
- To associate any new storage server cells added to Exadata Cloud Service after discovery
- To add a compute node or host
- To remove a compute node or host

1. Create the property file, for example *refresh_exacc_fin.txt* with the list of hosts to add or remove.

```
configMap.targetName=ExaCC_Finance

credMap.cellCredSet=SYSMAN:EXADATA_CRED

host.add.name.0=addhost0.example.com
host.add.name.1=addhost1.example.com

host.remove.name.0=removehost0.example.com
host.remove.name.1=removehost1.example.com
```

In the above example,

- **configMap.targetName**: Name of the cloud target that you want to refresh
- **credMap.cellCredSet**: The credential set which was used to discover the cloud target. This must be a named credential that provides explicit grant to you, and of the type *ExaCLI* or *RESTful API*.
- **host.add.name.*x***: The host names on which the databases that must be associated with the cloud target, are run. Here, *x* is the host name number which should start with 0, and must be incremented by 1 for every additonal host name added to the *add* list.
- **host.remove.name.*x***: The host names that must be removed from the cloud target association. Here, *x* is the host name number which should start with 0, and must be incremented by 1 for every additonal host name added to the *remove* list. Note that all the databases that are running on the specified host are removed.

2. Run the following `emcli` command by specifying the property file in the form of data <*property_file*>:

```
emcli submit_procedure -name=ExaCloudServiceRefresh -
input_file=data:<property_file> -notification="scheduled, action
required, running" ;
```

Here's an example output after the command is executed by using the example property file `refresh_exacc_fin.txt`:

```
$ emcli submit_procedure -name=ExaCloudServiceRefresh -
input_file=data:refresh_exacc_fin.txt -notification="scheduled,
action required, running" ;
Schedule not specified, defaults to immediate.
94100035C07141DCE053010011AC4000
Deployment procedure submitted successfully
```

3. You can view the status of the refresh activity in the **Procedure Activity** page.

   Go to Enterprise Manager Home page > click the **Enterprise** icon > click **Provisioning and Patching**. The **Procedure Activity** page is displayed.

After the refresh activity is complete, you can visit the cloud target home page to view the new database targets / hosts added to the cloud target or notice that the hosts that you removed are absent. See Explore the Cloud Target Home Page.

Delete the Cloud Target and Its Member Targets

The following steps help you to remove the target from the Enterprise Manager repository. These steps do not have any effect on the underlying Exadata Cloud Service and do not physically delete the target itself.

1. Run the following command using *emcli* by specifying the cloud target name to remove it from the management repository:

```
emcli delete_target -name="<target_name>" -
type="oracle_exadata_cloud_service"
```

Optionally, to delete the member targets of the cloud target from the management repository, include the option `-delete_members` in the command as following:

```
emcli delete_target -name="<target_name>" -
type="oracle_exadata_cloud_service" -delete_members
```

When you include the option `-delete_members`, the following member targets are removed, if they are part of Exadata Cloud Service target:

- Cluster
- Cluster Database
- Database Instance
- Oracle High Availability Service
- Pluggable database
- Cluster ASM
- Automatic Storage Management
- Oracle Exadata Storage Server Grid
- Oracle Exadata Storage Server

2. You can verify the deletion of the cloud target by visiting the Exadata targets page.

   Go to Enterprise Manager Home > click **Targets** icon  > click **Exadata**. The Exadata targets page is displayed which lists all the Exadata Cloud targets and Exadata Database Machines available in the management repository.

4

Administer Exadata Cloud Service Target

After the discovery of Exadata Cloud Service target, you can perform the following administration tasks:

Topics:

Navigate to Individual Targets

You can drill down to a component target of the Exadata Cloud Service (such as clusters, a database instance, or an Exadata Storage Server).

1. From the **Targets** menu, select **Exadata**.

   Enterprise Manager displays the **Oracle Exadata Database Machines and Cloud Services** page showing all the available Exadata targets.

2. From the **Oracle Exadata Database Machines and Cloud Services** page, select the Exadata Cloud Service target whose components you want to view.

   Enterprise Manager displays the **Oracle Exadata Cloud Service** page showing an General, Members, and Incidents section for the selected cloud target.

3. From **Oracle Exadata Cloud Service** page, use the left navigation icon  to view the navigation panel. Expand the list of available targets that comprise the Exadata Cloud Service.

4. Click the target to which you want to navigate.

View Cloud Target Alerts

You can view alerts on Exadata Cloud Service and drill down to details about each alert. These alerts may be performance/configuration metrics or hardware faults.

1. From the **Targets** menu, select **Exadata**.

   Enterprise Manager displays the **Oracle Exadata Database Machines and Cloud Services** page showing all the available Exadata targets.

2. From the **Oracle Exadata Database Machines and Cloud Services** page, select the Exadata Cloud Service target whose configuration information you want to view.

Enterprise Manager displays the **Oracle Exadata Cloud Service** home page on which you can see all alerts associated with the current cloud target under the **Incidents** section.

View Metrics of the Individual targets

You can view the performance metrics of the dependent targets of Exadata Cloud Service by following these steps:

1. Navigate to the Exadata Cloud Service target home page by selecting the cloud target from the **Targets** page of Enterprise Manager.

   Enterprise Manager displays the **Oracle Exadata Cloud Service** home page for the cloud target that you selected.

2. Navigate to the component target whose metrics you want to view. See Navigate to Individual Targets.

3. From the target drop-down menu, choose **Monitoring** and then **All Metrics**.

Delete a Target Using the UI

You can delete the cloud target or any of its member targets by using UI.

If you want to delete the cloud target **and** its member targets using the UI, then first delete the member targets individually using the following steps. After deleting the member targets, delete the cloud target.

1. From the **Targets** menu, select **Exadata**.

   Enterprise Manager displays the **Oracle Exadata Database Machines and Cloud Services** page showing all the available Exadata targets.

2. From the **Oracle Exadata Database Machines and Cloud Services** page, select the Exadata Cloud Service target that you want to navigate to.

   Enterprise Manager displays the **Oracle Exadata Cloud Service** page with **General**, **Members**, and **Incidents** sections for the selected cloud target.

   If you want to delete a member target of the cloud target, then navigate to that target using the navigation panel.

3. From the target drop-down menu, celect **Target Setup**, then **Remove Target**.

4. A warning page will display to confirm the target deletion. Click **Yes** to continue.

You can alternatively use *emcli* to delete the cloud target. Optionally, you can also delete the member targets using the `-delete_members` option with the `delete_target` command. See Delete the Cloud Target and Its Member Targets.

Manage Exadata Storage Server Metrics and Alert Settings

To access the settings for Exadata Storage Server metrics/alert:

1. Navigate to the Exadata Cloud Service target home page by selecting the cloud target from the **Targets** page of Enterprise Manager.

   Enterprise Manager displays the **Oracle Exadata Cloud Service** home page for the cloud target that you selected.

2. Navigate to the Exadata Storage Server target whose metrics you want to view. See Navigate to Individual Targets.
3. From the Exadata Storage Server menu, click **Monitoring**, then **All Metrics** to display all editable metric alert setting.
4. To change a setting, click **Monitoring**, then **Metric and Collection Settings** from the Exadata Storage Server menu. The default View option "Metrics with thresholds" is displayed. You can modify the following parameters:
   - Warning Threshold
   - Collection Schedule - click the link to set a collection schedule.
   - Click the Edit icon  for advanced settings.
5. Click **OK** to save the changes.

Accessing BI Publisher Enterprise Reports

Access the Oracle Business Intelligence (BI) Publisher reports in Oracle Enterprise Manager Cloud Control to run the Exadata report *Exadata Cloud Service Capacity Planning Report* to understand the health and utilization of your Exadata portfolio.

To access the Exadata reports in the BI Publisher application from Enterprise Manager:

1. From **Enterprise** menu, click **Reports** > click **BI Publisher Enterprise Reports**.

   The BI Publisher Enterprise Reports page is displayed.
2. Expand the **Exadata Reports** tree.

   The link to **Exadata Cloud Service Capacity Planning Report** is displayed. This is the capacity planning report for Oracle Exadata Cloud.
3. Click the link on the report to view it in BI Publisher application. In the resulting report page, you can optionally obtain the report in *PDF*, *HTML*, *RTF*, *Excel* or *PowerPoint* formats.

Exadata Cloud Service Capacity Planning Report

The Capacity Planning Report enables you to analyze and visualize the utilization and health of Exadata resources like storage, CPU, memory, and IO. It also helps to plan for upcoming resource requirements.

Some of the benefits of monitoring your resources:

- *Optimum Resource Usage*: Helps you to fine tune the size and number of resources to ensure that you are getting optimum output
- *Cost Efficiency*: You pay for the exact amount of resources that you will use
- *Predictive Capacity Planning*: Based on the past performance of your configuration, you can plan your resources for future requirements
- *Improved IT Management*: Helps you to keep a close watch on the performance and health parameters of your resources

Configuration

This section reports the name of the Exadata Cloud Service target for which the capacity planning report is generated. It also lists the various hosts and their corresponding host types associated with the configuration. The host type can be **Database Node** or **Storage Cell**.

Global Summary

This section summarizes the key metrics of your configuration for the time ranges like *Last 24 hours*, *Last 7 Days*, *Last 31 Days*, and *Last 365 Days*. The same key metrics are analyzed in greater details in the following sections of the report.

The metrics for *Last 24 Hours* time range are calculated based on the metric collection frequency.

The metrics for the *Last 7 Days* time range are calculated based on the hourly aggregated data.

The metrics for the *Last 31 Days* and *Last 365 Days* time ranges are calculated based on the daily aggregated data.

This is an example global summary of an Exadata Cloud Service:

Time Period	Maximum CPU %	Average CPU %	Maximum Memory %	Average Memory %
Last 24 Hours	33.26	12.34	69.88	67.78
Last 7 Days	56.41	30.03	71.14	69.29
Last 31 Days	56.41	25.88	71.14	69.17
Last 365 Days	56.41	25.88	71.14	69.17

Storage Capacity Planning Details

As an administrator, you can use *Storage Capacity Planning Details* section to diagnose and resolve issues in your storage systems, thus resulting in better performance of not only the storage systems but also the applications relying on them. This section displays the current and historical storage space usage information for all the disk groups.

The current space usage is reported based on the data that was last collected. The following parameters are tabulated for each disk group:

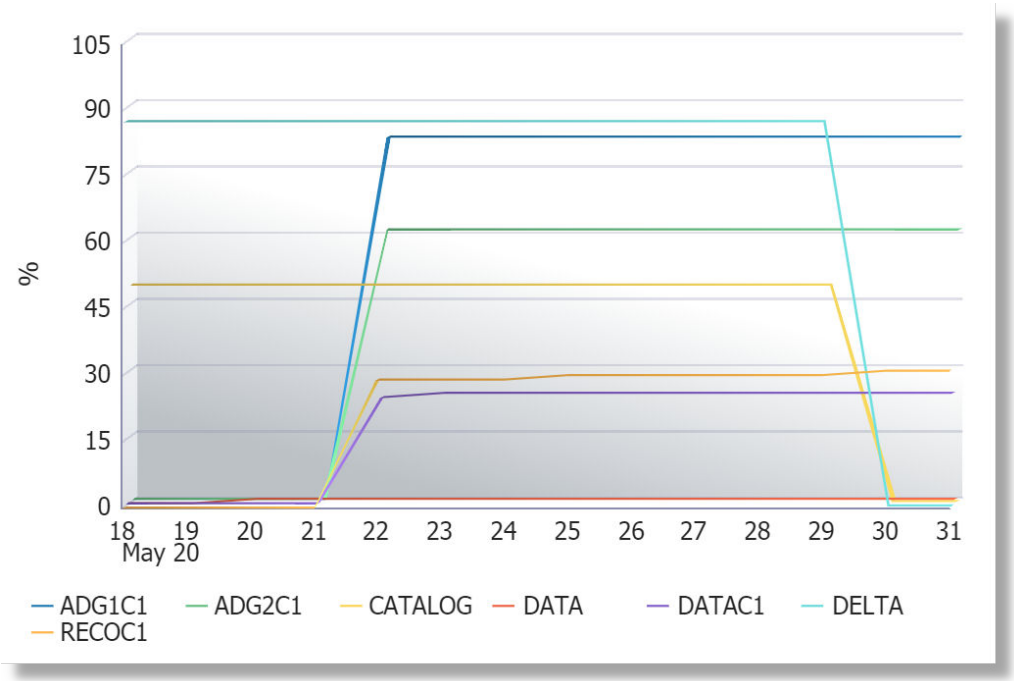
- Redundancy
- Used (%)
- Total Size (GB) - Raw
- Free Space (GB) - Raw
- Used Space (GB) - Raw
- Total Size (GB) - Usable
- Free Space (GB) - Usable
- Used Space (GB) - Usable

Disk Group	Redundancy	Used (%)	Total Size (GB) - Raw	Free Space (GB) - Raw	Used Space (GB) - Raw	Total Size (GB) - Usable	Free Space (GB) - Usable	Used Space (GB) - Usable
DELTA	NORMAL	87	436824	67379	369445	212345	27623	184722
DATAC1	HIGH	25	7344	5573	1771	2380	1790	590
CATALOG	HIGH	49	5760	3112	2648	1813	931	882
RECOC1	HIGH	31	1800	1249	551	583	400	183
ADG1C1	NORMAL	82	1440	285	1155	708	130	578
ADG2C1	NORMAL	61	480	193	287	236	92	144
DATA	EXTERN	1	59	58	1	59	58	1

The historical report is generated based on the data available for the selected time range. The following parameters are tracked and plotted in a line chart along the X-axis against time which is on Y-axis:

- Historical Space Usage By Disk Group (GB) - Usable
- Historical Space Usage By Disk Group (%) - Usable
- Historical Total Space Usage (GB) - Raw
- Historical Total Space Usage (GB) - Usable
- Historical Space Usage by the Top 5 Serviced Databases - As seen daily

Following is an example of the graph for Historical Space Usage by Disk Group (%) - Usable:

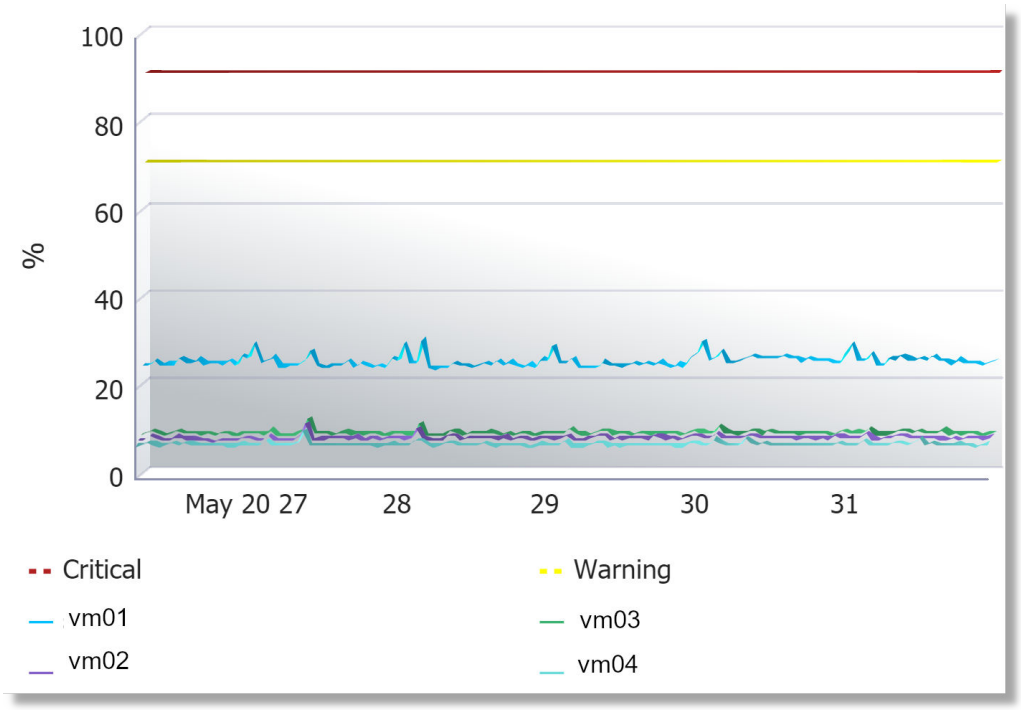


CPU and Memory Capacity Planning Details

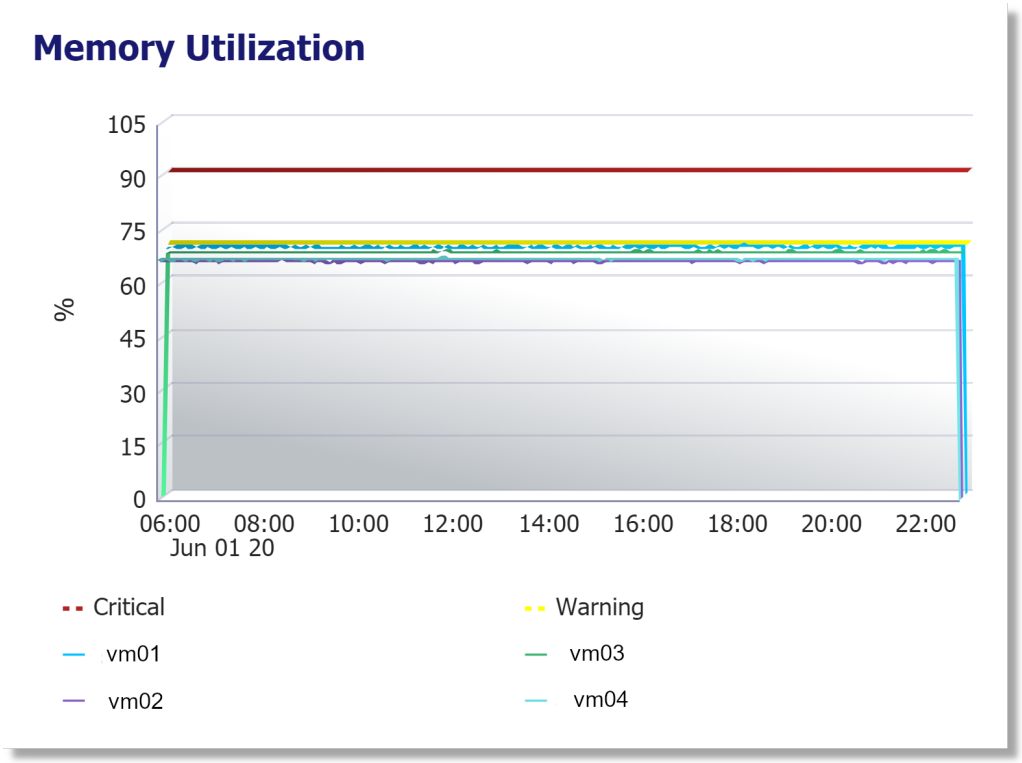
Your CPU and Memory utilizations should not be at critical limits during normal load hours. You should determine CPU and Memory utilizations based on your application needs, including CPU and Memory cycles for peak usage. If your CPU and Memory utilizations are optimized at 100% during normal load hours, you have no **capacity** to handle a peak load. A mismatch between the capacity and the demands can result in unsatisfactory utilization of resources.

In the *CPU and Memory Capacity Planning Details* section, **CPU Utilization** and **Memory Utilization** parameters of each database node are measured and plotted in line charts for the time ranges *Last 24 Hours*, *Last 7 Days*, *Last 31 Days*, and *Last 365 Days*.

Following is an example of the CPU Utilization metric for the 7 days time range:



Following is an example of the Memory Utilization metric for the 24 hours time range:



IO Capacity Planning Details

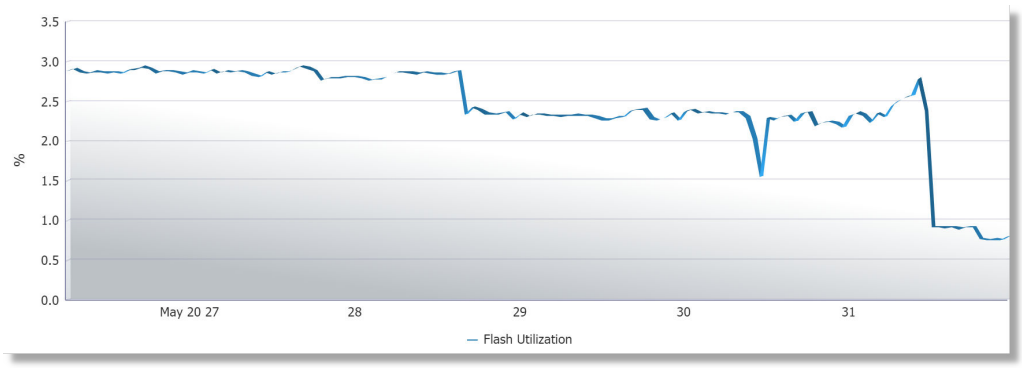
The *IO Capacity Planning Details* section displays the current and historical IO, throughput and disk utilization aggregated across all the storage servers for the selected Exadata Cloud Service target. It summarizes the amount of data being stored in the disks, the read/write throughput rate, and load handling in response to normal and peak demands. Use this report to optimize your disk resources and to plan for future demands.

The following parameters of **Cell Disk** and **Flash** are measured and plotted in line charts for the time ranges *Last 24 Hours*, *Last 7 Days*, *Last 31 Days*, and *Last 365 Days*:

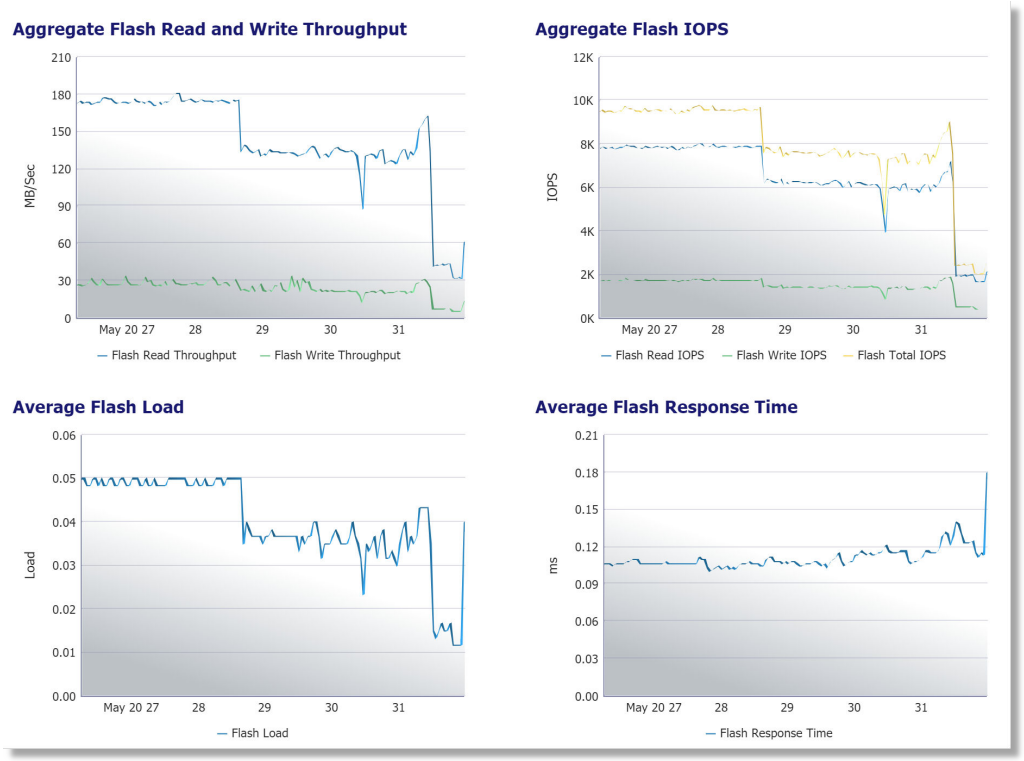
- Average Cell Disk Utilization
- Aggregate Cell Disk Read and Write throughput
  - Disk Read Throughput
  - Disk Read Throughput
- Aggregate Cell Disk IOPS
  - Read IOPS
  - Write IOPS
  - Total IOPS
- Average Cell Disk Load
- Average Cell Disk Response Time
- Average Flash Utilization

- Aggregate Flash Read and Write throughput
  - Flash Read Throughput
  - Flash Read Throughput
- Aggregate Flash IOPS
  - Read IOPS
  - Write IOPS
  - Total IOPS
- Average Flash Load
- Average Flash Response Time

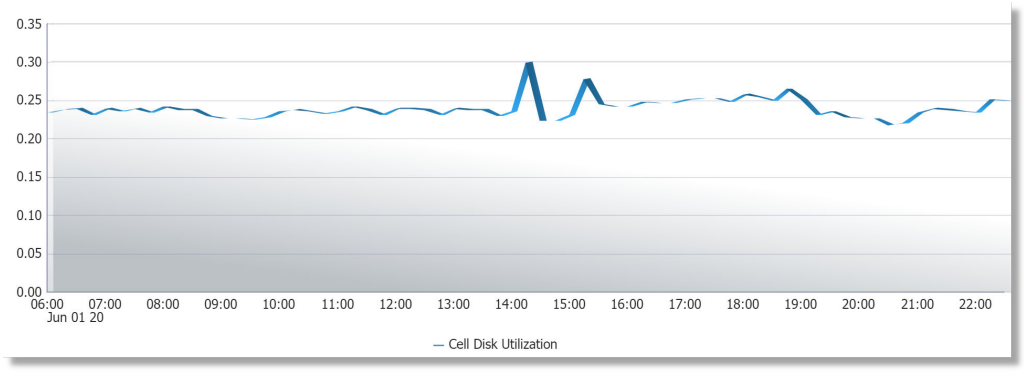
Following is an example of the average utilization of Flash over a 7-day time range:



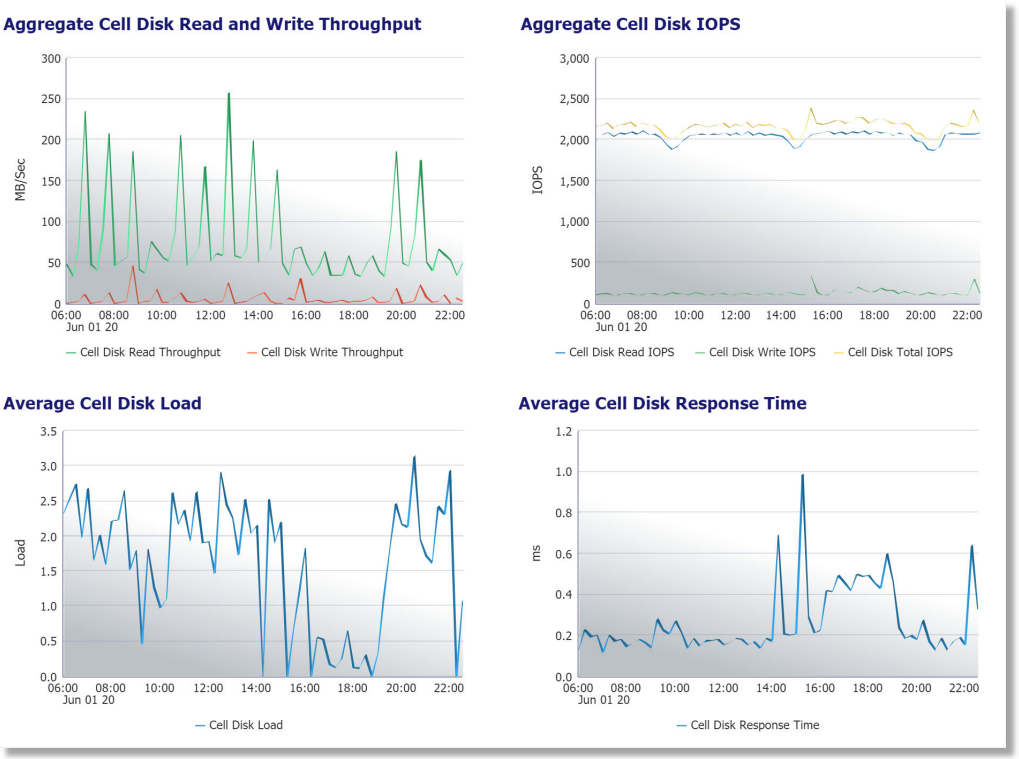
Following is an example of the various IO capacity metrics of Flash over a 7-day time range:



Following is an example of the average utilization of Cell Disk over a 24-hour time range:



Following is an example of the various IO capacity metrics of Cell Disk over a 24-hour time range:


Aggregate Cell Disk Read and Write Throughput
MB/Sec
300
250
200
150
100
50
0
06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00
Jun 01 20
Cell Disk Read Throughput
Cell Disk Write Throughput
Aggregate Cell Disk IOPS
IOPS
3,000
2,500
2,000
1,500
1,000
500
0
06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00
Jun 01 20
Cell Disk Read IOPS
Cell Disk Write IOPS
Cell Disk Total IOPS
Average Cell Disk Load
Load
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00
Jun 01 20
Cell Disk Load
Average Cell Disk Response Time
ms
1.2
1.0
0.8
0.6
0.4
0.2
0.0
06:00 08:00 10:00 12:00 14:00 16:00 18:00 20:00 22:00
Jun 01 20
Cell Disk Response Time

5

Monitor Exadata Cloud Service

After the Exadata Cloud Service target and its member targets are discovered, you can use the Oracle Enterprise Manager Cloud Control environment to monitor the targets and obtain insights into their performance.

Topics:

Access Exadata Metrics

For a complete list of metrics available for Oracle Exadata, see *Oracle Exadata* in *Oracle® Enterprise Manager Oracle Database Plug-in Metric Reference Manual*.

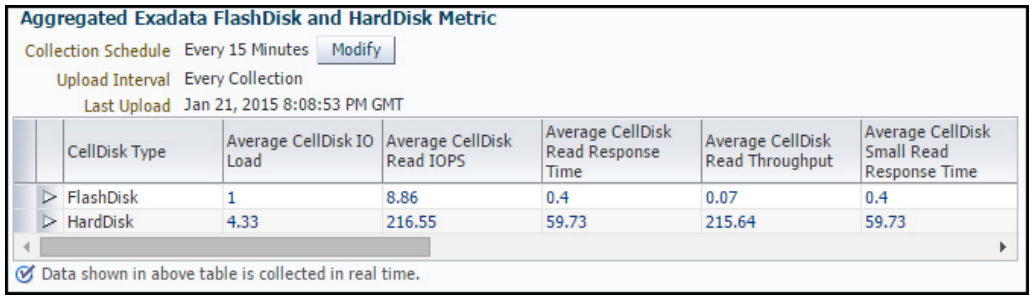
To access the available Exadata Metrics:

1. Go to Enterprise Manager Home > click the **Targets** icon  > click **Exadata**. All the Exadata targets are listed in this page. Click the link on your cloud target name to open the home page.

   The **Oracle Exadata Cloud Service** target home page is displayed.
2. From the Target Navigation tree, expand the **Exadata Grid** and select an Exadata Storage Server. See View Metrics of the Individual targets.
3. On the Exadata Storage Server page, click the **Exadata Storage Server** menu > select **Monitoring** > select **All Metrics**.
4. On the All Metrics page, a variety of metrics are available. Select a metric or click to expand available metric details.

Aggregated Exadata FlashDisk and HardDisk Metric Example

This metric category contains metrics that are aggregated over either the hard disks or flash disks in a cell. Selecting this metric from the All Metrics page generates a high-level summary, as shown below:



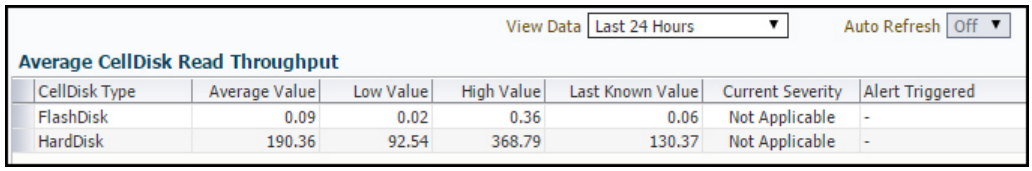
Aggregated Exadata FlashDisk and HardDisk Metric

Collection Schedule: Every 15 Minutes [Modify]
Upload Interval: Every Collection
Last Upload: Jan 21, 2015 8:08:53 PM GMT

CellDisk Type	Average CellDisk IO Load	Average CellDisk Read IOPS	Average CellDisk Read Response Time	Average CellDisk Read Throughput	Average CellDisk Small Read Response Time
FlashDisk	1	8.86	0.4	0.07	0.4
HardDisk	4.33	216.55	59.73	215.64	59.73

Data shown in above table is collected in real time.

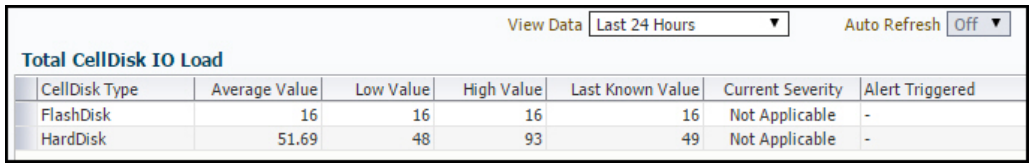
Expand the **Aggregated Exadata FlashDisk and HardDisk Metric** in the All Metrics page to show a variety of metric details, such as **Average CellDisk Read Throughput**, which gives an indication of the average number of bytes read from the cell disk, or **Total CellDisk IO Load**, which gives an indication of the total input/output load to the celldisk.



View Data: Last 24 Hours Auto Refresh: Off

Average CellDisk Read Throughput

CellDisk Type	Average Value	Low Value	High Value	Last Known Value	Current Severity	Alert Triggered
FlashDisk	0.09	0.02	0.36	0.06	Not Applicable	-
HardDisk	190.36	92.54	368.79	130.37	Not Applicable	-



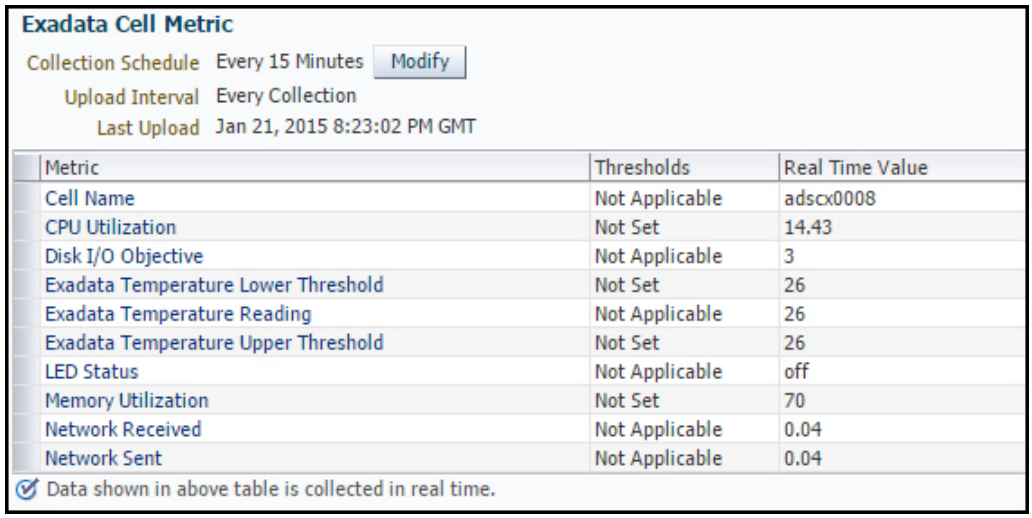
View Data: Last 24 Hours Auto Refresh: Off

Total CellDisk IO Load

CellDisk Type	Average Value	Low Value	High Value	Last Known Value	Current Severity	Alert Triggered
FlashDisk	16	16	16	16	Not Applicable	-
HardDisk	51.69	48	93	49	Not Applicable	-

Exadata Cell Metric Example

This metric category contains the performance metrics collected at the cell level for each cell, such as CPU utilization and memory utilization. Selecting this metric from the All Metrics page generates a high-level summary, as shown below:



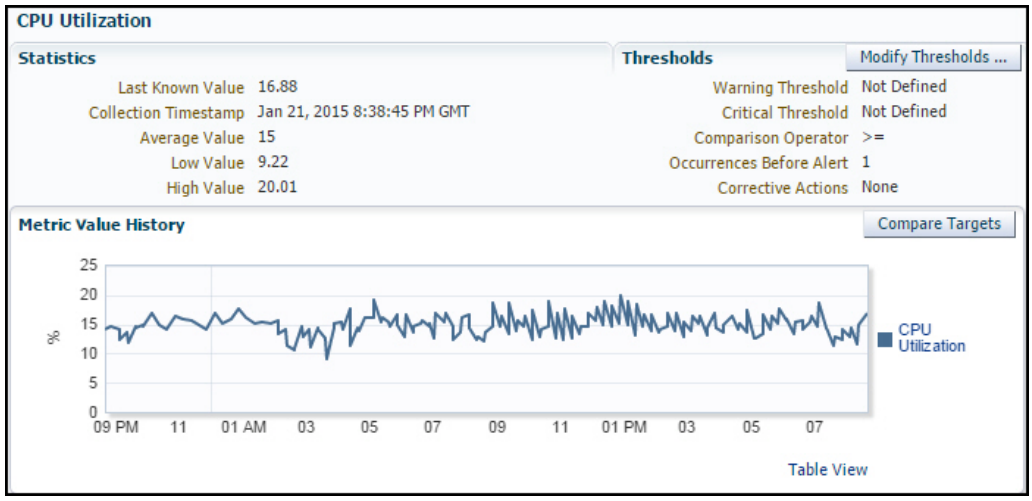
Exadata Cell Metric

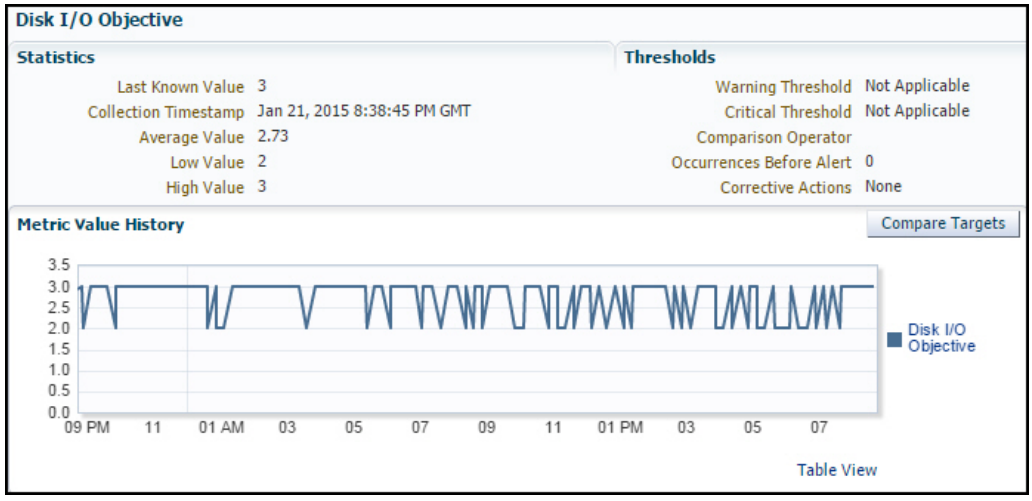
Collection Schedule: Every 15 Minutes [Modify]
Upload Interval: Every Collection
Last Upload: Jan 21, 2015 8:23:02 PM GMT

Metric	Thresholds	Real Time Value
Cell Name	Not Applicable	adscx0008
CPU Utilization	Not Set	14.43
Disk I/O Objective	Not Applicable	3
Exadata Temperature Lower Threshold	Not Set	26
Exadata Temperature Reading	Not Applicable	26
Exadata Temperature Upper Threshold	Not Set	26
LED Status	Not Applicable	off
Memory Utilization	Not Set	70
Network Received	Not Applicable	0.04
Network Sent	Not Applicable	0.04

Data shown in above table is collected in real time.

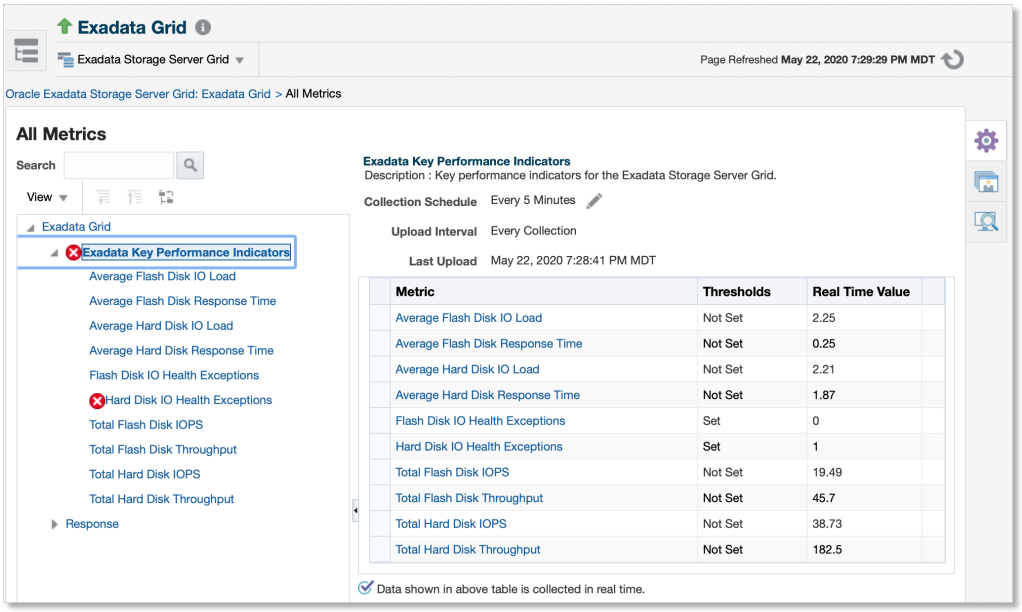
Expand the **Exadata Cell Metric** in the All Metrics page to show a variety of metric details, such as **CPU Utilization**, which provides information about the CPU utilization, or **Disk I/O Objective**, which provides the optimization objective which IORM is configured to achieve, for example, *Low Latency* or *Balanced* for OLTP-oriented databases, or *High Throughput* for data warehouses.





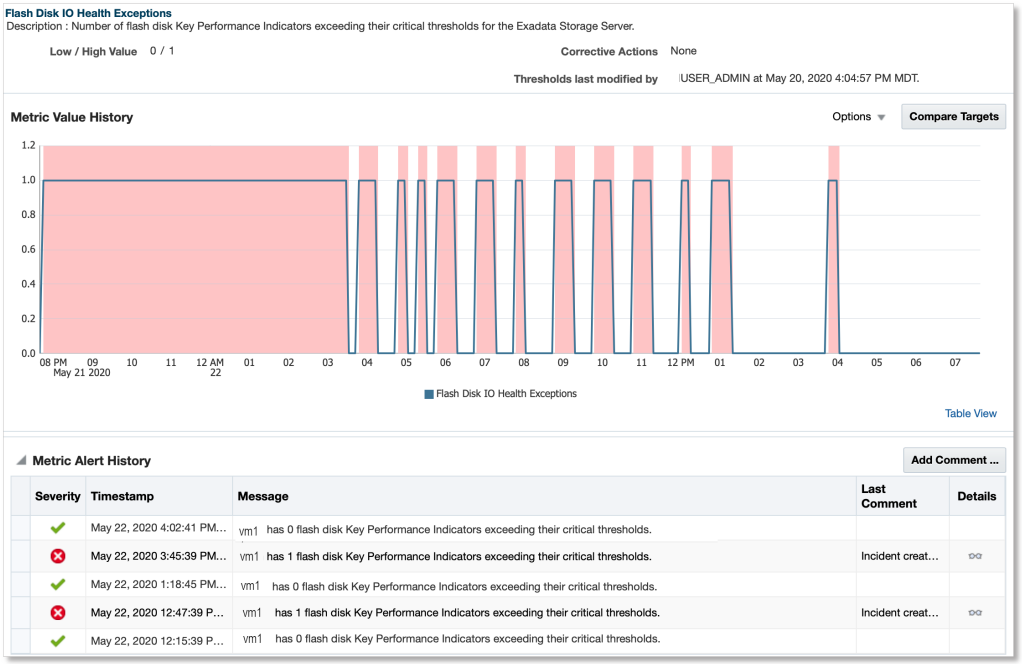
Exadata Key Performance Indicators Metrics Examples

Access the Key Performance Indicators Metrics for Exadata Storage Servers and Exadata Storage Server Grid to view the metrics of the parameters as listed in the image below for an Exadata Storage Server Grid:



The following is an example of the Average Hard Disk IO Load metric of an Exadata Storage Server:

The following is an example of the Flash Disk IO Health Exceptions metric of an Exadata Storage Server:


Flash Disk IO Health Exceptions
Description : Number of flash disk Key Performance Indicators exceeding their critical thresholds for the Exadata Storage Server.
Low / High Value 0 / 1
Corrective Actions None
Thresholds last modified by USER_ADMIN at May 20, 2020 4:04:57 PM MDT.
Metric Value History
Options
Compare Targets
1.2
1.0
0.8
0.6
0.4
0.2
0.0
08 PM May 21 2020
09
10
11
12 AM 22
01
02
03
04
05
06
07
08
09
10
11
12 PM
01
02
03
04
05
06
07
Flash Disk IO Health Exceptions
Table View
Metric Alert History
Add Comment ...
Severity
Timestamp
Message
Last Comment
Details
May 22, 2020 4:02:41 PM... vm1 has 0 flash disk Key Performance Indicators exceeding their critical thresholds.
May 22, 2020 3:45:39 PM... vm1 has 1 flash disk Key Performance Indicators exceeding their critical thresholds. Incident creat...
May 22, 2020 1:18:45 PM... vm1 has 0 flash disk Key Performance Indicators exceeding their critical thresholds.
May 22, 2020 12:47:39 P... vm1 has 1 flash disk Key Performance Indicators exceeding their critical thresholds. Incident creat...
May 22, 2020 12:15:39 P... vm1 has 0 flash disk Key Performance Indicators exceeding their critical thresholds.

6 Troubleshooting

For troubleshooting issues related to Oracle Exadata Database Machine, see Troubleshooting the Exadata Plug-in in *Oracle Exadata Database Machine Getting Started Guide*.

List of members of the cloud target does not show Database Instance

From cloud target home page, use the left navigation icon  to view the navigation panel. Expand the list of available targets in the navigation panel, locate your database instance, and check if it belongs to a cluster database.

If the database belongs to a cluster database, then this is an expected behavior. It is not associated to the cloud target explicitly as a system member.

List of members of the cloud target does not show Cluster DB

All the hosts that are part of the cluster must be mentioned in the discovery properties file. To resolve the issue, add the missing host in the refresh procedure properties file and refresh the cloud target. See Refresh the Cloud Target After Discovery.

List of members of the cloud target does not show Storage Servers

Discovery is usually skipped in one of the following scenarios:

- Credentials are not supplied in the discovery properties file. See Discover the Cloud Target Using emcli.
- IP's of the storage servers are typically listed in the file `/etc/oracle/cell/network-config/cellip.ora` which is located in one of the hosts mentioned in the discovery properties file. Discovery will be skipped if the file is not present on any of the hosts.
- Credentials are incorrect. See Create Credential Set.
- *exacli* is not installed on any of the hosts.

To resolve the issue, try one of the following:

- Ensure that proper named credentials are created and provided in the property file.
- Ensure that *exacli* is installed on each of the hosts listed in the property file that was used for discovering the cloud target.

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