

# Operational Considerations and Troubleshooting for Oracle Enterprise Manager 12.1.0.4

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## Introduction

There are many areas that need to be discussed when talking about managing Enterprise Manager in a data center. Some of these are as follows:

- » Recommendations for staffing roles and responsibilities for EM administration
- » Understanding the components that make up an EM environment
- » Backing up and monitoring EM itself
- » Maintaining a healthy EM system
- » Patching the EM components
- » Troubleshooting and diagnosing guidelines

This whitepaper will help define administrator requirements and responsibilities, and guide you in setting up the proper monitoring and maintenance activities to keep Oracle Enterprise Manager 12c healthy.

## Infrastructure Components

### Oracle Management Service (OMS)

The Oracle Management Service performs several important tasks in an EM environment. It is the web-based application that communicates with the Oracle Management Agents and Oracle Management Plug-ins to discover, monitor and manage targets as well as store the information in the Oracle Management Repository. It is also responsible for running the user interface for the Enterprise Manager Cloud Control Console.

### Systems and Services

In EM, an application can be modeled as a service that runs on a group of targets called a system. A system is created to define the infrastructure required to host a specific application. Then, the application can be defined as a service allowing monitoring and management of the application. Out of the box, the EM components are combined into a system called "Management Services and Repository". Services have been created on this system for specific functions within EM itself as described below.

#### *EM Jobs Service*

The EM Jobs Service is a service using the Management Services and Repository system and consists of all components required for the EM jobs to function properly. The availability of the EM Jobs System as a whole depends on the availability of each of the underlying components defined in this service.

#### *EM Console Service*

The EM Console Service is a service using the Management Services and Repository system and consists of all components required for the EM Console to function properly. The availability of the EM Console System as a whole depends on the availability of each of the underlying components defined in this service as well as a defined "EM Console Service Test" and the "EM Management Beacon".

### Oracle Management Agent

The Oracle Management Agent is deployed on each host to be managed by an EM environment. It is responsible for managing and monitoring all of the targets on that host (including the host itself) and communicating all information to the Oracle Management Service.

### Oracle Management Repository

The Oracle Management Repository is used for storing all of the data received from the Oracle Management Agents. It organizes the data so that the Oracle Management Service can retrieve it and display it in the Enterprise Manager Cloud Control Console.

### Oracle Management Plug-ins

The core Enterprise Manager Cloud Control features for managing and monitoring the different Oracle components are now provided via separate components called plug-ins. This allows the flexibility of updating EM with the latest product releases for one or more component releases without having to upgrade to a later Cloud Control release. These provide a more “pluggable” framework.

### Enterprise Manager Cloud Control Console

The Enterprise Manager Cloud Control Console is the user interface that provides one central location for monitoring and administrating an entire environment.

Below is a picture of a typical environment showing how each of the above components interact.

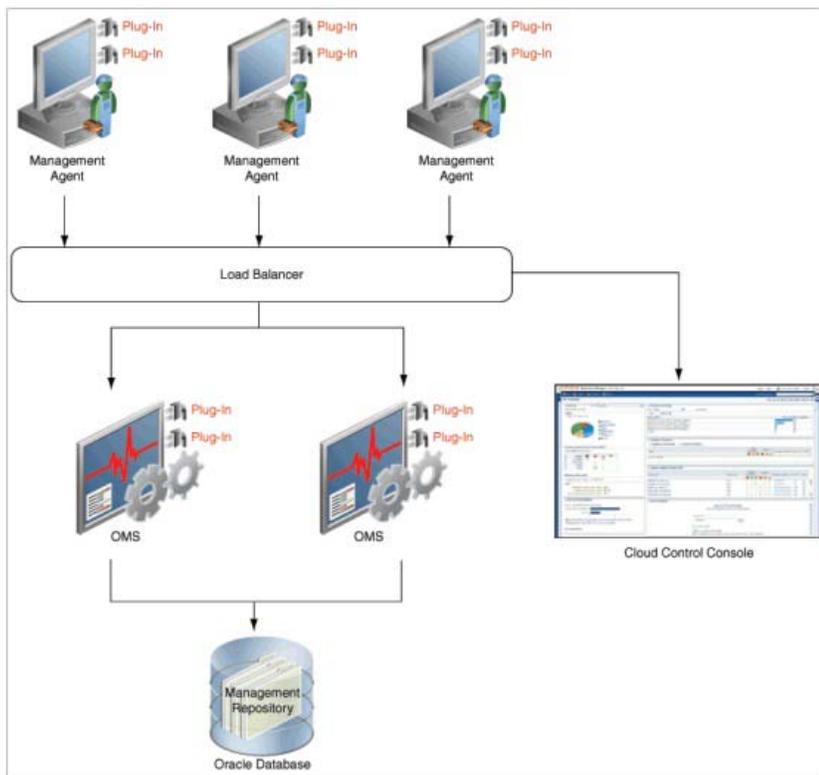


Figure 1: EM Components

## EM CLI

EM CLI is the Enterprise Manager Command Line Interface. Not only can this interface be executed from an operating system console, it also allows administrators to run many EM commands via scripts and thereby allows the customers to create workflow based on their business needs. Using this interface, you can do many things such as manage credentials, define service targets, templates and setup incidents. For more information about using EM CLI refer to the [Oracle Enterprise Manager Cloud Control Documentation](#).

## Diagnostic Tools

### EMDIAG

The EMDIAG Toolkit is a set of utilities that collect data from Cloud Control OMS, Repository and Agents to assist in troubleshooting and maintenance. EMDIAG consists of REPVFY, OMSVfy and AGTVFY Tools. Many of the recommendations in this whitepaper will utilize the EMDIAG tools. See [EMDIAG Troubleshooting Kits Master Index \[421053.1\]](#) for more information.

### REPVFY

The EMDIAG REPVFY 12c kit is designed to collect data from a Cloud Control Management Repository 12c to assist in the diagnosis and correction of Cloud Control issues. For detailed installation instructions see [EMDIAG REPVFY Kit for Cloud Control 12c - Download, Install/De-Install and Upgrade \[ID 1426973.1\]](#). For details on utilizing REPVFY see [EMDIAG Repvfy 12c Kit - How to Use the Repvfy 12c kit \[ID 1427365.1\]](#).

### OMSVFY

OMSVFY is installed on each OMS server and collects data on the OMS configuration and patches. There are also several utilities available to help in searching log files, zipping the files for transfer to support, and identifying trouble areas on the OMS. See note [EMDIAG Omsvfy 12c Kit - Download and Install \[ID 1374450.1\]](#) for detailed installation instructions.

### AGTVFY

AGTVFY gets installed on the each Agent server. This is a good component to become familiar with and use when troubleshooting agent issues. For detailed install instructions see [EMDIAG Aqtvfy 12c Kit - Download and Install \[ID 1374441.1\]](#).

## Best Practices Configuration

Enterprise Manager 12c Cloud Control is an enterprise application that manages and monitors the infrastructure in your environment as well as the applications running on top of that infrastructure. The system itself requires some care and feeding to ensure that it is performing properly and that the data available is timely and accurate. One of the most common questions is who should manage EM and how much effort will it require. This all depends on what functions you plan to leverage, how critical the targets are, and the size of the environment.

## Staffing Recommendations

As EM is very broad application on its own therefore, the recommendation is to have at least 2 people trained and responsible for managing EM who know the system very well and maintain its health. Depending on the size and scope of your environment, this may be 2-4 people who spend 25-50% of their time on EM. This ensures backup coverage during vacation or extended illnesses. Someone with knowledge of Oracle Database and WebLogic Server is extremely helpful as these are the main backbones of EM; however they also need to understand your entire enterprise. Integration into authentication and ticketing systems, placement in network/firewall rules, configuration of the Software Load Balancer, segregation between support groups and organizations are all areas where the EM Administrator will be required to interface during initial setup and continued operations. For further details on EM best practices, refer to the note [Oracle Enterprise Manager 12.1.0.4 Configuration Best Practices \[1929586.1\]](#).

### Administrator Responsibilities

Implementing EM and managing an enterprise will require involvement from various teams. Companies divide the roles and responsibilities differently based on the size of the implementations and the different data center responsibilities. There needs to be a well defined, agreed upon list of tasks that identifies the individual or team responsible for particular tasks. This is often referred to as a RACI diagram (Responsible, Accountable, Consulted and Informed). The EM Administrator should own architecture and installation, overall agent deployment procedures, agent patching procedures, OMS patching and user administration. It is also important for the EM Administrator to know the baseline functionality and performance of their EM environment to more easily identify existing or pending problems. Knowing the baseline environment consists of two items. The first item is to understand and document the architecture of the environment (i.e. topology, key components). This will help in understanding the impact of any architecture change. The second item is for the EM Administrator to understand the normal baseline operations of the environment. This consists of understanding the environment and the expected load (i.e. how much data to expect in a day). Things like deploying agents, discovering targets, solving agent issues and solving target availability can all be delegated to target owners. The RACI diagram below is an example of defining this responsibility and is a starting point for your organization to define the roles and responsibilities in your environment even if multiple roles are performed by the same person.

TABLE 1: ENTERPRISE MANAGER 12C RACI

Task	Responsible	Accountable	Consulted	Informed
Define Monitoring Requirements	Target Owners, Infrastructure Teams, EM Admin	EM Admin		
Installation planning and architecture	EM Admin	EM Admin	Target Owners, Infrastructure Teams	
Installation and Configuration of EM	EM Admin	EM Admin		

Defining Agent deployment and patching procedures and processes	EM Admin	EM Admin		Target Owners
Security and User Administration	EM Admin/Security Admin	EM Admin		
Admin Group Creation	EM Admin	EM Admin	Target Owners	
Agent Deployment (can be performed by target owners)	Target Owners	Target Owners	EM Admin	
Agent Patching (can be performed by target owners)	Target Owners	Target Owners	EM Admin	
Target Configuration and Availability	Target Owners	Target Owners		
Agent Troubleshooting	Target Owners, EM Admin	EM Admin		
Target Troubleshooting	Target Owners	Target Owners	EM Admin	
Weekly/Monthly/Quarterly Maintenance	EM Admin	EM Admin		Target Owners
OMS Patching	EM Admin	EM Admin		Target Owners

## Maximum Availability

Since EM plays an important role in managing and monitoring the enterprise environment, it is important to ensure that the environment is configured for maximum availability. This includes regular backups as well as architecting the environment for disaster recovery. The [Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide](#) provides details on backing up the Enterprise Manager environment. As part of an overall backup strategy, it is important to take regular backups as well as backups before any patching or plugin update is applied for the following:

### Oracle Management Service Backups

Backups for the OMS should consist of the following:

- » Software Homes: filesystem level backup of the software homes and the Oracle inventory files whenever patches or patchsets are applied
- » Instance Homes/Administration Server/OMS Configuration: all of this information can be backed up by issuing the `emctl exportconfig oms` command on each of the oms servers.

Refer to the [Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide](#) for further details on backing up the OMS server(s).

### Management Repository Backups

The backup strategies for the repository are the same as for the Oracle Database. This includes having the database in archivelog mode and performing regular hot backups with RMAN which consists of a full backup and then incremental backups. EM provides a simple way to setup database backups via the option for Oracle suggested backups. This backup strategy will create a full database backup followed by an incremental backup on each subsequent run. The database backup will be

recovered using these incremental backups thus creating a new full backup baseline. For further detail on the setup of Oracle Recommended Backups, refer to the [Oracle Database 2 Day DBA 11g Release 2 \(11.2\)](#) document. The steps for configuring the backup in EM are documented below.

1. Click on Targets / Databases. Select the EM Repository database.



Figure 1: Databases

2. From the database home page, click on Availability / Backup & Recovery / Schedule Backups...
3. On the Schedule Backup page, select the proper login credentials for the database owner under the Host Credentials section and then click on the push button Schedule Oracle-Suggested Backup

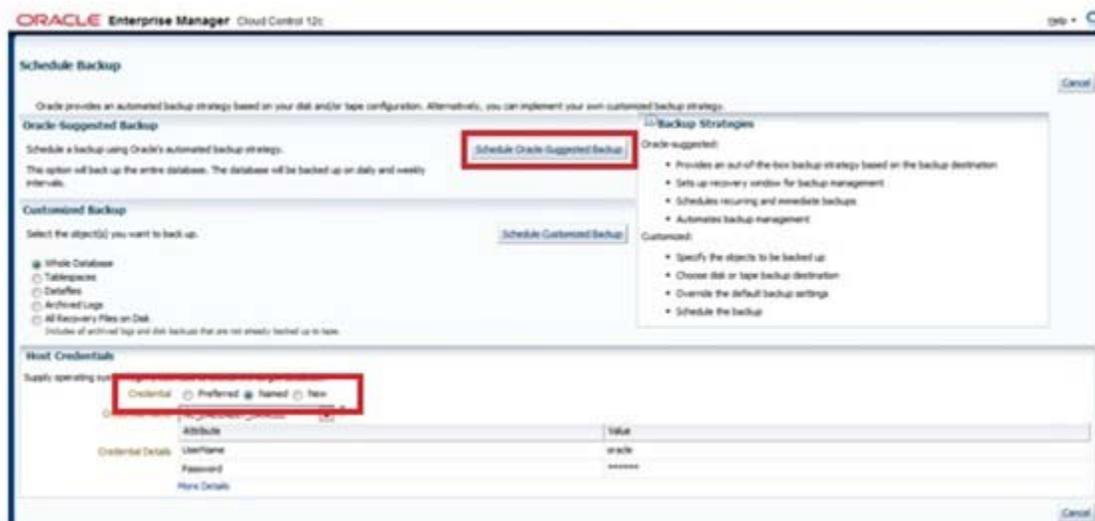


Figure 2: Schedule Backup

4. Select the destination media for the backup and click **Next**



Figure 3: Backup Location

5. Set the backup settings for the backup based on the destination chosen above (a disk backup was selected for this example). Click **Next**



Figure 4: Oracle Suggested Backup

6. Select the day and time to start the backups. Click **Next**.



Figure 5: Backup Schedule

7. Review the backup details and if the information is correct, click **Submit Job**

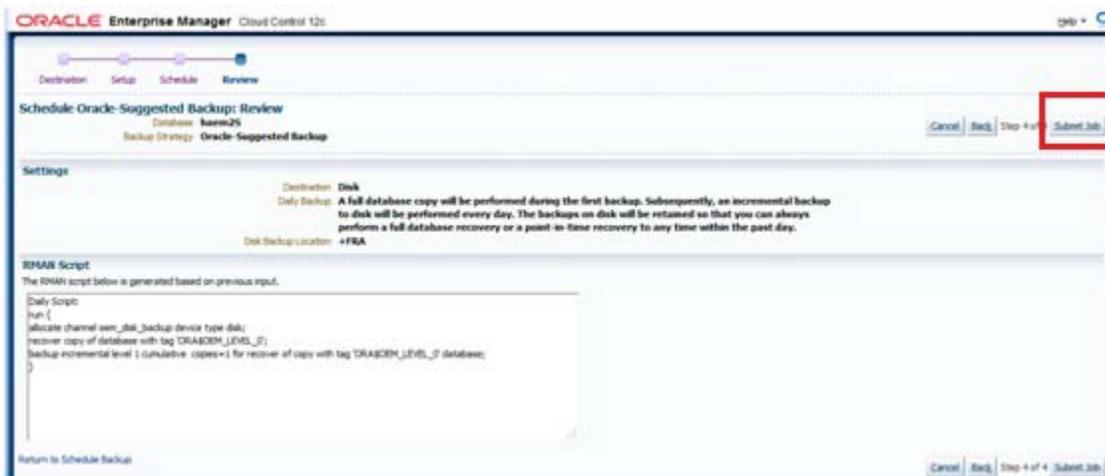


Figure 6: Backup Review

## Management Agent Backups

For the management agent, a reference agent should be maintained and kept current with patches so that if a management agent is lost, it can be reinstalled via cloning of this reference agent. Starting with the EM 12cR3 release, there is a new option available which will allow for the creation of a custom

'package' for an Agent-side plugin that includes any required patches and updates. With this feature, each deployment of that plugin to an Agent will deploy the updated version of that plugin. To create an updated/revised Agent-side plugin, follow these steps (for more details on this process, refer to the [Oracle Enterprise Manager Cloud Control Administrator's Guide](#)):

1. Update and patch one agent with all of the required changes
2. Run this EMCLI command to create the custom plugin version based on this modified agent:

```
$ emcli create_custom_plugin_update \
    -agent_name="<patched agent name>" \
    -plugin_id="<internal ID of the plugin>"
```

3. To get the list of plugins and their ID's for an Agent, use this EMCLI command:

```
$ emcli list_plugins_on_agent - agent_names="<patched agent name>"
```

Once this custom plugin is created, any push of that plugin( with that version) to the Agent will mean the custom updated plugin will be pushed.

#### Increased High Availability and Disaster Recovery Options

As the importance of Enterprise Manager grows, so do the availability requirements. For some customers, it is just not enough to have a single OMS monitoring their entire database or WebLogic infrastructure. There are additional HA configurations available to meet specific business requirements. The table below details the different degrees of high availability that can be implemented for Oracle Enterprise Manager. Additional information on High Availability configurations can be found in the [Enterprise Manager Cloud Control 12c Advanced Installation and Configuration Guide](#).

TABLE 2: HIGH AVAILABILITY CONFIGURATIONS

Level	Description	Minimum Nodes	Recommended Nodes	Load Balancer Requirements
Level 1	OMS and Repository database each reside on their own host, no failover	1	2	None
Level 2	OMS installed on shared storage with VIP based failover. Database replicated with Data Guard	2	4	None
Level 3	OMS in Active/Active configuration. Database is using RAC + Data Guard	3	5	Local load balancer

Level 4	<p>OMS on the primary site in Active/Active Configuration. Repository deployed using Oracle RAC.</p> <p>Duplicate hardware deployed at the standby site.</p> <p>DR for OMS and Software Library using Storage Replication between primary and standby sites.</p> <p>Database DR using Oracle Data Guard.</p> <p>Note: Level 4 is a MAA Best Practice, achieving highest availability in the most cost effective, simple architecture.</p>	4	8	<p><b>Required:</b> Local load balancer for each site</p> <p><b>Optional:</b> Global load balancer</p>
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### Notifications

To properly monitor your EM environment, you need to receive notifications on events, incidents and problems that occur on the infrastructure components. In addition to your standard notifications for Database, FMW and Host targets Oracle recommends you set up notifications for the EM infrastructure. To receive notifications on the OMS and Repository components that consist of your EM infrastructure create an Incident Rule Set specifically for these targets. The steps to do this are detailed in the section [Setting Up Your Incident Management Environment](#) of the Administrator's Guide. The best practice is to create a rule set for incoming Events on the OMS and Repository target that creates an incident and sends a notification (via e-mail, ticket or SNMP traps) to the EM Administrators for the categories listed below. The OMS and Repository target is an internal target type that will contain all of the EM components such as the infrastructure hosts, repository database, listeners, management services, etc. For the steps on how to create this rule set, refer to the My Oracle Support (MOS) note [Oracle Enterprise Manager 12.1.0.4 Configuration Best Practices \[1929586.1\]](#).

TABLE 3: INCIDENT RULE RECOMMENDATIONS

Category	Filters	Actions
Metric Alert	Severity in Critical, Warning	E-mail/Ticket EM Administrators
Metric Alert	All	If event open > 7 days, clear the event
Target Unreachable	Target Availability (Agent, Host)	E-mail/Ticket EM Administrators
Target Down	Target Availability.	E-mail/Ticket EM Administrators
High Availability	Severity in Critical	E-mail/Ticket EM Administrators
Target Error	Target Availability	E-mail/Ticket EM Administrators

### Out-of-Band Notifications

Out-of-Band Notifications for Enterprise Manager 12c can be configured to send an email or trigger a script when certain fatal conditions occur. This then allows the EM administrator to receive



notifications when there is a failure in an EM component. The notification is triggered in the following scenarios:

- » single OMS environment, if the OMS is down, but the Agent is up
- » multi-OMS environment, if all OMSes are down, but the Agent is up
- » if Repository database is unavailable (down, archive hung, listener down, etc)

Configure Out-of-Band Notifications by following the steps in note [How To Setup Out Of Bound Email Notification In 12c \[1472854.1\]](#).

## Patching

As with any application regular patch maintenance is key. The recommended patches for Enterprise Manager Base OMS, Agent and various Plugins can be found and downloaded from My Oracle Support. Note that when searching for patches using the Recommended Patch Advisor, make sure you enter “Enterprise Manager 12.1.0.4.0” for the product to see the patches for the 12.1.0.4 version. Oracle recommends setting up a planned maintenance window for the EM environment. This window would provide time for regular patching and activities that may require downtime (i.e. plugin updates). A good recommendation is to schedule this planned maintenance on a quarterly basis and to check for the latest recommended patches at this same time (may vary according to the requirements of the individual companies). Note that the patching for the different components (i.e. agent) may be performed by different people or groups within your organization based on the roles and responsibilities as mentioned in [Table 1: Enterprise Manager 12c RACI](#) above. For additional information on guidelines for patching an Enterprise Manager environment, refer to these white papers: [Reducing Downtime While Patching Multi-OMS Environments](#) and [Oracle Enterprise Manager Software Planned Maintenance](#).

### Agent Patching

Keeping the Enterprise Manager Agent patched is a critical component to efficient and accurate monitoring as the collection scripts reside in the agent. Using the automated patching feature in Enterprise Manager it is possible to create a patch plan from tested and approved agent patches, and deploy to many agents at one time or in batches. Recommended patches can be found by clicking **Enterprise / Provisioning & Patching / Patches & Updates** by selecting the **Recommended Patch Advisor**. Select **Enterprise Manager Base Platform – Agent** for the product, and the correct Release and Platform. Version 12.1.0.4 while testing this. For version 12.1.0.3, Normal Oracle Home preferred credentials must be set (or overridden during patching) for all Agent targets that will be patched via EM. In 12.1.0.4, the Agent uses its internal credentials to Patch itself making the setting of preferred credentials or specifying at run-time no longer required. The privileged credentials will need to be provided for any patch/upgrade requiring execution of the root.sh script if wanting EM to execute if as part of the patch apply. The user patching requires the Manage Target Patch and Patch Plan privileges Full step by step instructions can be found in the [Oracle Enterprise Manager Cloud Control Administrator's Guide](#).

## Repository Patching

The recommended Database patches can be found on **My Oracle Support /Patches & Updates** by selecting the **Recommended Patch Advisor** and select Oracle Database for the product and the appropriate Release and Platform.

## OMS Patching

For the OMS, patches must be manually applied with OPatch or OPatchauto. Some patches require all OMS servers to be down during the application of any post-patch scripts. In multi-OMS environments, it is possible to shorten the patching cycle by following the procedure below:

1. shut down the 1st OMS
2. apply the patch
3. shutdown the remaining OMSes
4. run the post patch scripts
5. restart the 1st OMS to reduce downtime
6. patch the remaining OMS servers and then restart them

For further details on OMS patching see the [Oracle Enterprise Manager Cloud Control Administrator's Guide](#). Oracle is now creating rolling OMS patches which provide even higher availability since all OMSes do not have to be shutdown to apply the patch but it can be applied in a rolling fashion. Not all patches are able to be rolling patches so it is important to check the individual patch README.txt file.

## Plug-ins

To make the Enterprise Manager 12c framework extensible, the plug-ins contain all the binaries needed for specific components; therefore each plug-in has its own ORACLE\_HOME on the OMS and sometimes the Agent. For example, a database plug-in is deployed on the OMS and Agent. The scripts that collect metrics from the database reside in the plug-in home. There will be plug-in specific patches for these components. They can be found in My Oracle Support by looking for Enterprise Manager for Oracle Database or Enterprise Manager for Fusion Apps, etc.. These patches also require that the OMS be shutdown during patching so it is a good idea to combine them in the same patching window as any OMS patch requiring downtime.

Starting with 12.1.0.4, the individual OMS-side plug-in bundles are being grouped into a System Patch each month. So for example, in June 2014 the System patch includes MOS, Cloud, DB, FA, FMW, SMF, and Siebel plug-ins. Non-required patches will be skipped during the application of the patch. For more details on plug-ins and how to maintain them, see the [Oracle Enterprise Manager Cloud Control Administrator's Guide](#). For more information on the EM Patch Bundles and Patching EM: [Enterprise Manager 12.1.0.4.0 \(PS3\) Master Bundle Patch List \(Doc ID 1900943.1\)](#)

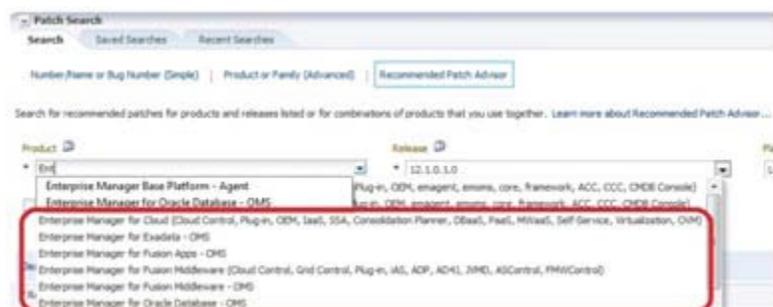


Figure 7: Patch Advisor

## Audit Log Data

Oracle always audits certain operations regardless of the database audit settings. This is referred to as Mandatory Auditing and the audit records are written to the operating system in the destination specified by the initialization parameter `AUDIT_FILE_DEST`.

Mandatory auditing includes these operations:

- » Database startup
- » SYSDBA and SYSOPER logins
- » Database shutdown

The OMS servers have an agent that resides on each of them. This agent logs into the repository every few minutes for self monitoring thereby causing an audit record for each login. Therefore, it is very important that the audit records are regularly archived and purged. The steps for doing this may vary according to a company's security requirements but a sample setup is provided below.

*Archive the audit data.* Archiving of the mandatory audit records from the operating system can be done via Oracle Audit Vault or tape/disk backups. For further details on using Oracle Audit Vault, refer to [Oracle Audit Vault Administrator's Guide](#).

*Purge the records.* This can be done manually or via a purge job that performs the purge at a specified time interval. The recommendation is to setup a job that will purge the records at a specified time interval and is the example shown below. Note that purging a large audit trail can take time to complete so it is wise to schedule the job so that it runs during a time when the database is not too busy. For further details on the process and an explanation for each parameter used in the example, refer to the [Oracle Database Security Guide](#).

1. Initialize the audit trail cleanup operation.

```
SQL> begin

    dbms_audit_mgmt.init_cleanup(

        AUDIT_TRAIL_TYPE => DBMS_AUDIT_MGMT.AUDIT_TRAIL_ALL,

        DEFAULT_CLEANUP_INTERVAL => 12);

end;

/
```

2. Setup an archive timestamp for the audit records. The RAC\_INSTANCE\_NUMBER refers to the instance number when using a RAC database. This must be set for each instance in a RAC database since the mandatory audit records are stored on the operating system and therefore for each instance.

```
SQL> begin

    DBMS_AUDIT_MGMT.SET_LAST_ARCHIVE_TIMESTAMP(

    AUDIT_TRAIL_TYPE => DBMS_AUDIT_MGMT.AUDIT_TRAIL_OS,

    LAST_ARCHIVE_TIME => TO_DATE('2013-07-29 09:00:00','YYYY-MM-DD HH:MI:SS'),

    RAC_INSTANCE_NUMBER => 1);

    END;

/
```

3. Create and schedule the purge job

```
SQL> BEGIN

    DBMS_AUDIT_MGMT.CREATE_PURGE_JOB(

    AUDIT_TRAIL_TYPE => DBMS_AUDIT_MGMT.AUDIT_TRAIL_ALL,

    AUDIT_TRAIL_PURGE_INTERVAL => 12,

    AUDIT_TRAIL_PURGE_NAME => 'Standard_Audit_Trail_Cleanup',

    USE_LAST_ARCH_TIMESTAMP => TRUE);

    END;

/
```

## Maintaining Enterprise Manager

To ensure Enterprise Manager is configured and optimized properly, implementation planning should take into account the [sizing recommendations](#) provided in the *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide*. Sizing is based on a combination of number of agents, targets and concurrent users. After implementation, review the system sizing and usage on a regular basis to account for system growth. Frequently review updates in [Information Center: Enterprise Manager Base Platform Release Cloud Control 12c \[ID 1379818.2\]](#) to look for updates, patches or known bugs that should be addressed.

The OMS servers process incoming and outgoing tasks. The incoming tasks are telemetry data and alert information coming in from the agents. A problem occurs if there is more data coming in than the network can handle. This is seen via the following:

- » Network statistics (bandwidth/IO throughput/collisions)
- » Loader backlog
- » Job backlog (only if there is a backlog and a low number of available threads)

The outgoing tasks are created when the OMS sends requests out to the agents (config updates and job/tasks to perform on the managed targets) and when the OMS processes and sends out the

notifications. To detect if an OMS server is having a bottleneck with outgoing tasks, look for the following:

- » A job backlog even though a significant number of jobs are processed (sufficient throughput)
- » Notification backlog even though there is a significant 'churn' on getting stuff out.

An additional OMS may need to be added into an environment based on the following situations. Note that the more incoming/outgoing stress on the system, the more likely the need for an additional OMS.

- » load (number of agents and number of Admins) and whether or not that load is increasing
- » backlog for incoming or outgoing tasks (as discussed above)

In addition to proper sizing and configuration, there are a few areas that should be checked on a regular basis using the EM Cloud Control Console itself as well as EMDIAG. Both of these tools provide a good way to make sure any issues that occur in the EM components can be identified and resolved. Below are the recommended tasks and frequency to maintain a healthy Enterprise Manager environment. The need to review the daily tasks should lessen as proper notifications and incidents are setup and the EM Admin has established a good baseline and understanding of the data components.

TABLE 4: RECOMMENDED MAINTENANCE TASKS

Task	Daily	Biweekly	Monthly	Quarterly
Review <a href="#">critical EM component availability</a>	X			
Review <a href="#">events, incidents and problems</a> for EM related infrastructure	X			
Review <a href="#">overall health of the system</a> including the job system, backlog, load, notifications and task performance	X			
Review <a href="#">Agent issues</a> for obvious problems (i.e. large percentage of agents with an unreachable status)	X			
Review <a href="#">Agent issues</a> . (deeper /more detailed review of agents with consistent or continual problems)		X		
Review <a href="#">metric trending for anything out of bounds</a>		X		
Evaluate <a href="#">database (performance, sizing, fragmentation)</a>			X	
Check for updates in <a href="#">Self Update</a> (plug-ins, connectors, agents, etc.) Note that there is an out-of-box ruleset that will provide notification for the availability of new updates.				X
Check for recommended <a href="#">patches</a>				X

### Availability

When confirming the health of the EM 12c environment the first place to start is to verify the status of the key components that make up this environment. Enterprise Manager is dependent upon many components for a complete working system. The Repository database, OMS, Console and PBS

services, WebLogic servers all have to be available for EM to function properly. A key component that is down could impact performance as well as availability. The goal is to keep the infrastructure components in an available status and to resolve any critical errors occurring in each one

### Oracle Management Service

The **Management Services** page provides a more detailed status of the OMS services. In Cloud Control, click on **Setup / Manage Cloud Control / Management Services**.

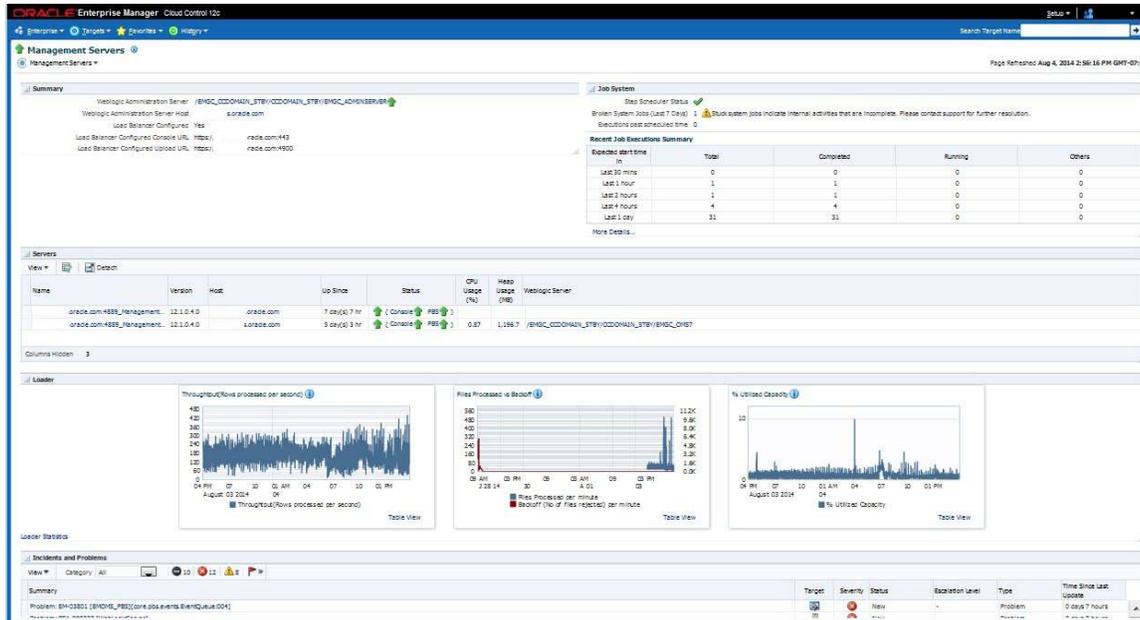


Figure 8: Manage Cloud Control Management Services

The figures above show the information about the Management Services running in Normal mode and in Stand-by mode (if applicable). In version 12.1.0.4, this page will show additional details such as a summary of the job executions, graphs showing loader performance and any open incidents. Verify that the Management Services in Normal mode show an Up status, including the status of the Console and Platform Background Service (PBS) for each Management Service.

### Repository Database

Verify the status of the Repository database and underlying instances in the case of a RAC database. Click on **Setup / Manage Cloud Control / Repository**. Under the **Repository Details** section, click on the name of the Database or Cluster Database.



Figure 9: Manage Cloud Control Repository

In the case of a standalone database, the Status section will show the Up Time for the database. On the target menu bar, click on **Availability / High Availability Console**. On this page, the status of the database should show Up.

In the case of a RAC cluster database, the Status section will show the number of Instances for this database and the status summary. Further down on this page under the Instances section, verify that each instance is in a “good” status. also It is also possible to view the status of the cluster database by clicking on **Availability / High Availability Console**. If implemented with Level 3 or Level 4 High Availability, also validate the standby status in the High Availability Console.

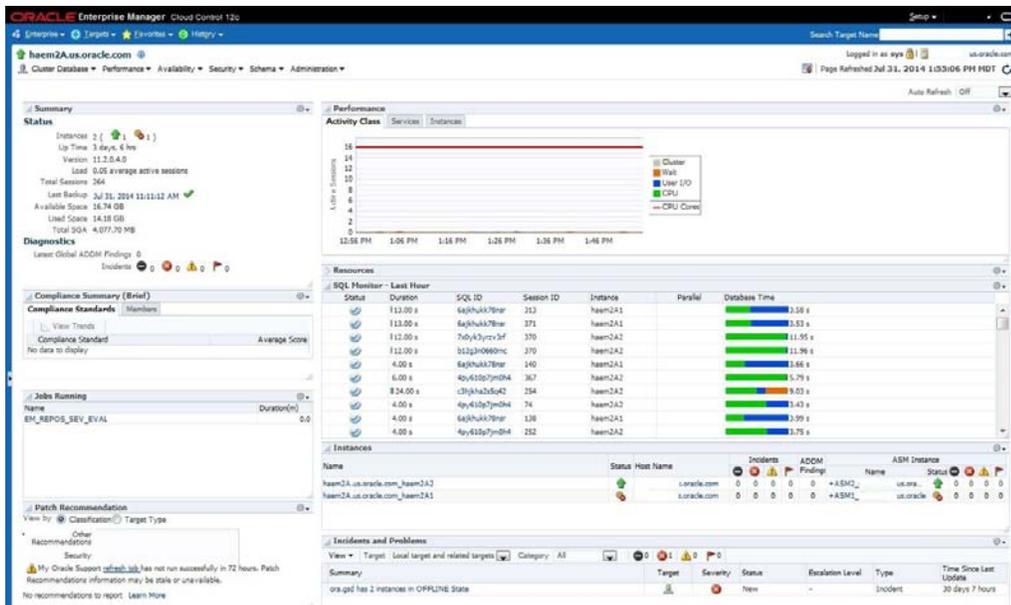


Figure 10: High Availability Console

EM version 12.1.0.4 now provides more details on the OMS and Repository target page. It includes three tabs of information called Repository, Metrics, and Schema. Each tab includes the following data:

*Repository*

This page provides details about the repository database including the following:

- » Configuration Details
- » Initialization Parameters
- » Incidents
- » Repository Job Status
- » Collection Performance
- » Metric Rollup Performance



Figure 112: OMS and Repository - Repository

*Metrics*

This tab provides graphs showing the rollup of key repository performance measurements. The information includes the following:

- » Top 25 Metric Data Loading Target Types In Last 30 Days
- » Top 10 Data Loading Metrics In Last 30 Days
- » Metric Alerts Per Day In Last 30 Days
- » Top 10 Metric Collection Errors By Target Type In Last 30 Days



## Agent Availability

Prior to EM version 12.1.0.3.0, the status of the host target was derived from the status of the agent target monitoring that particular host. EM had no way of knowing if a host had gone down. When the agent missed a certain number of heartbeats, the OMS would run a reverse ping job to check the agent's upload and host communication status. Based on this outcome, the OMS would mark the agent as "Unreachable". Once the agent is able to communicate to the OMS again, it would "tell" the OMS that it had been down. Therefore, the OMS only knew about the status of the agent. In the case of agent down, it only knew about past statuses – never the present/current severity. To further add to the problem, the OMS was not able to understand the actual status of a host target.

Starting with the 12.1.0.3.0 release, EM is now able to more quickly determine the status of an agent as well as the status for the host the agent is running on. This is done with a new feature referred to as a partner agent. When an agent is pushed to a host, the OMS determines the closest agent to that host (in the same sub-net) and pushes the monitoring details to that agent (the EMD URL of the monitored agent). This partner agent will check the status of the agent it is monitoring on a regular basis. If it fails to receive a response from the agent, it will then check the status for that agent's host and update the OMS with the proper status for both the agent and the host.

To help explain this, consider the following scenarios:

### Scenario 1

In this scenario, the agent goes down and the host reboots before the agent comes up.

TABLE 5:SCENARIO 1

Time	Agent	Host	Partner Sends	Agent Status in EM	Host Status in EM
10:00	Goes DOWN	Is UP	Agent DOWN, Host UP	Agent Unreachable, Down	Agent Unreachable, with sub status host UP (unmonitored)
10:02		Crashes	Agent DOWN, Host DOWN	Agent Unreachable, Down	Agent Unreachable, Down
10:10		Comes UP	Agent DOWN, Host UP	Agent Unreachable, Down	Agent Down, with sub status host UP (unmonitored)
10:15	Comes UP, uploads severities and send clean heartbeat			UP	UP

### Scenario 2

In this scenario, there is a network issue between the agent and its partner agent with no communication to the OMS.

TABLE 6:SCENARIO 2

Time	Agent	Host	Partner Sends	Agent Status in EM	Host Status in EM
10:00	Network comm. Break		Agent Unreachable, Host DOWN	Unreachable, Normal	Agent Unreachable, Down
10:05	Network comm. Is UP between all players and pings OMS			UP	UP

### Scenario 3

In this scenario, There is a network issue between the agent and its partner agent but the agent is able to communicate to the OMS. In this example, the unreachable status will be quickly cleared and the history would show that the agent and host never went down.

TABLE 7:SCENARIO 3

Time	Agent	Host	Partner Sends	Agent Status in EM	Host Status in EM
10:00	Network comm. Break between agent and partner agent		Agent Unreachable, Host DOWN	Agent Unreachable, Normal	Agent Unreachable, Normal
10:01	Agent sends a clean heartbeat to OMS			UP (unreachable is cleared)	UP (unreachable is cleared)
10:01	Network comm. Issue is resolved between agent and partner agent				

### General Availability

To confirm the overall health of the complete list EM components from Enterprise Manager Console navigate to **Setup / Manage Cloud Control / Health Overview** where the overall status is displayed. To drill further into each component, click on the menu bar for OMS and Repository / Members / Show All.

Check the status of the key components such as the EM services, application deployment, WebLogic Deployments as described above. The status should show Up. Clicking on the status icon will drill down to show availability details. Each component represents a target in EM. If any components are

down, use the information provided on the target's home page (i.e. errors/alerts) to assist in diagnosing and resolving the availability issue. It is important to note, if the system is configured with Level 4 High Availability using the standby domain setup, the standby OMS servers will show down. For additional information on High Availability configurations, see the [Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide](#).

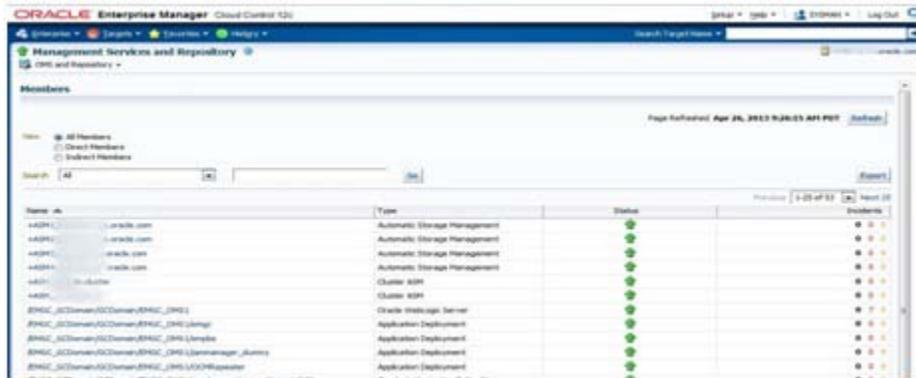


Figure 145: OMS and Repository All Members

## EM Internal Subsystems

There are several internal subsystems that work in the background to process incoming data, evaluate alerts and severities, send notifications and do internal housekeeping for EM. This section will review four of the critical subsystems.

### DBMS Scheduler

The DBMS Scheduler is a database feature and is used to execute SQL and PL/SQL at specific times. If any of the system jobs are running behind schedule or down completely, they can cause significant performance problems, stale and incorrect availability data, as well as missing critical alerts and notifications. For the repository jobs to run, the DBMS\_SCHEDULER must be enabled and db initialization parameter JOB\_QUEUE\_PROCESSES must be set to a non-zero value. It is common to set JOB\_QUEUE\_PROCESSES to 0 during upgrades or patches, so be sure to reevaluate often.

To view the Job status click on **Setup / Manage Cloud Control / Repository**.

Repository Scheduler Jobs Status				Restart Job
DBMS Job Name	Status	Duration	Next Scheduled Run	Edit
Adaptive Threshold Jobs	↑	0.01 s	Jul 31, 2014 1:30:00 PM PDT ✓	
Agent Ping	↑	0.06 s	Jul 31, 2014 1:01:03 PM PDT ✓	
EM Audit Externalization Service	↑	0.01 s	Aug 1, 2014 4:36:03 AM PDT ✓	✎
Beacon Service Availability	↑	0.01 s	Jul 31, 2014 1:01:03 PM PDT ✓	
Change Activity Planner Task Job Monitor	↑	0.09 s	Aug 1, 2014 12:00:00 AM PDT ✓	
Cost Based Optimizer Statistic Analysis	↑	9.10 s	Jul 31, 2014 1:36:03 PM PDT ✓	
Compute Metric Baseline Statistics	↑	0.14 s	Jul 31, 2014 11:30:00 PM PDT ✓	
EM Daily Maintenance	↑	15.66 s	Aug 1, 2014 1:00:00 AM PDT ✓	✎
EM General Purge Policies	↑	6.18 s	Aug 1, 2014 4:00:00 AM PDT ✓	
Feature Use Data Collection	↑	3.72 s	Aug 1, 2014 12:00:00 AM PDT ✓	

Figure 156: Repository Jobs

In the Repository Scheduler Jobs Status section, check the following items:

1. **Status** - Make sure all jobs are Up. If there are errors, click on the error to get more details.
2. **Processing Time (%) (Last Hour)** – Seconds per hour for a job. If a job is consistently running at 50% or more, there may be a resource problem in the database. The overall health and performance of the database should be checked and any issues resolved if found to make sure the database does not start to fall behind and thereby create a permanent backlog problem. If the processing time increases and runs consistently as high as 75%, this is a problem and it may mean a need to increase resources for the repository server.
3. **Next Scheduled Run** - If the next scheduled time is not correct or empty, the database has stopped scheduling the job. The job that is not running can be resubmitted by selecting the job and clicking on the “Restart Job” button at the top right of that window. It also provides an edit option for high cost performance jobs to provide the ability to reschedule the next runtime. Only change the frequency of runtime under guidance of Oracle.

A few of the more critical system jobs are listed below with a description of the tasks that they control:

TABLE 8:KEY SCHEDULER JOBS

Job Name	Scheduler Job Name	Task
Agent Ping	EM_PING_MARK_NODE_STATUS	Keeps track of the health of the host targets in EM. A nonzero number means there are machines that are suspected to be down. As long as this number is low relative to the total number of machines in EM (considering that some may be in blackout or offline), there is not a major health issue for EM. There is a potential problem if the processing time is showing 30-40% or higher and should be diagnosed further.
Daily Maintenance	EM_DAILY_MAINTENANCE	This job does the daily repository maintenance tasks such as partition maintenance, stats updates, etc. If this job is not running, you will eventually stop receiving information into the repository.
Job Step	EM_JOBS_STEP_SCHED	This is the job that puts the work into the queues that are ready to be dispatched to the agents.
Repository Metrics	MGMT_COLLECTION.Collection Subsystem	This job shows the amount of work done for the repository metrics. This metric will have a number associated with it (i.e. Repository Metrics 71) and represent the short and long task workers. The short task workers handle tasks that should run in a minute or less and the long task workers handle the longer tasks. The best thing to look for here is that all Repository Metric jobs are within 10% of each other.
Rollup	EM_ROLLUP_SCHED_JOB	This job indicates the amount of data involved in the rollup job. This number may increase over time as more targets are added to the system but on a daily basis should remain about the same. Large spikes could indicate that agents are not communicating properly to the OMS.

#### Database Advanced Queuing (AQ)

Both the OMS and the repository rely heavily on Advanced Queues. This then implies that the Advanced Queues have to be ‘up’ and healthy. To confirm the status of the Advanced Queues in EM, do the following:

1. Click on Setup / Manage Cloud Control / Health Overview
2. In the drop down list next to “OMS and Repository” select Monitoring/All Metrics
3. Look at the Metric for Management Services AQ Status as seen in the figure below.

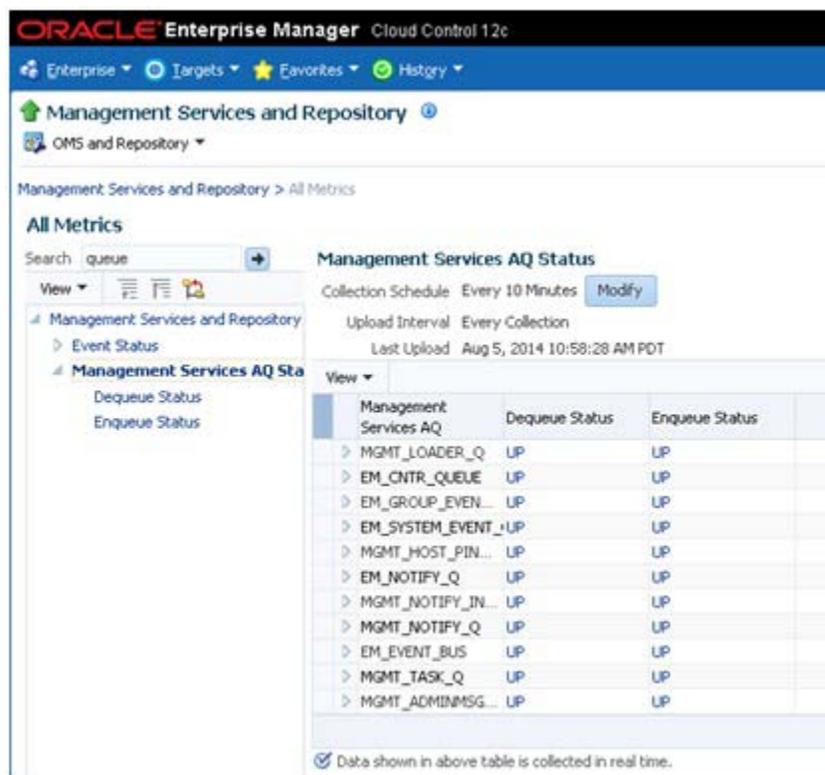


Figure 167: Advanced Queuing

The current severity status of the underlying components can be checked by clicking on the Dequeue Status or Enqueue Status for a particular Management Services AQ as seen in the figure below.



Figure 178: Advanced Queuing

If system performance deviates from previously experienced levels, it is possible that the AQ have become fragmented. Refer to the MOS note on AQ performance tuning for further details:

[Performance Tuning Advanced Queuing Databases and Applications \[102926.1\]](http://www.oracle.com/technetwork/middleware/enterprise-manager/performance-tuning-advanced-queuing-databases-and-applications-102926-1.html)

Details on the Advanced Queuing can also be seen via the following option in EMDIAG:

```
$ repvfy show aq
Name                               Enq  Deq  Rtn
-----
EM_CNTR_QUEUE                      YES YES   0
EM_EVENT_BUS                       YES YES   0
EM_GROUP_EVENT_Q                   YES YES   0
EM_NOTIFY_Q                        YES YES   0
EM_SYSTEM_EVENT_Q                  YES YES   0
MGMT_ADMINMSG_BUS                  YES YES   0
MGMT_HOST_PING_Q                   YES YES   0
MGMT_LOADER_Q                      YES YES   0
MGMT_NOTIFY_INPUT_Q                YES YES   0
MGMT_NOTIFY_Q                      YES YES   0
MGMT_TASK_Q                        YES YES   0
-----
```

### Loader Subsystem

All the data collected by agents has to be loaded to the repository. The efficiency of this process can greatly impact the performance and health of your system overall. A graph showing the Backoff Requests can be found by doing the following:

1. Click on Setup / Manage Cloud Control / Health Overview
2. In the drop down list next to "OMS and Repository" select Monitoring/All Metrics
3. Look at the Metric for Overall Status as seen in the figure below.

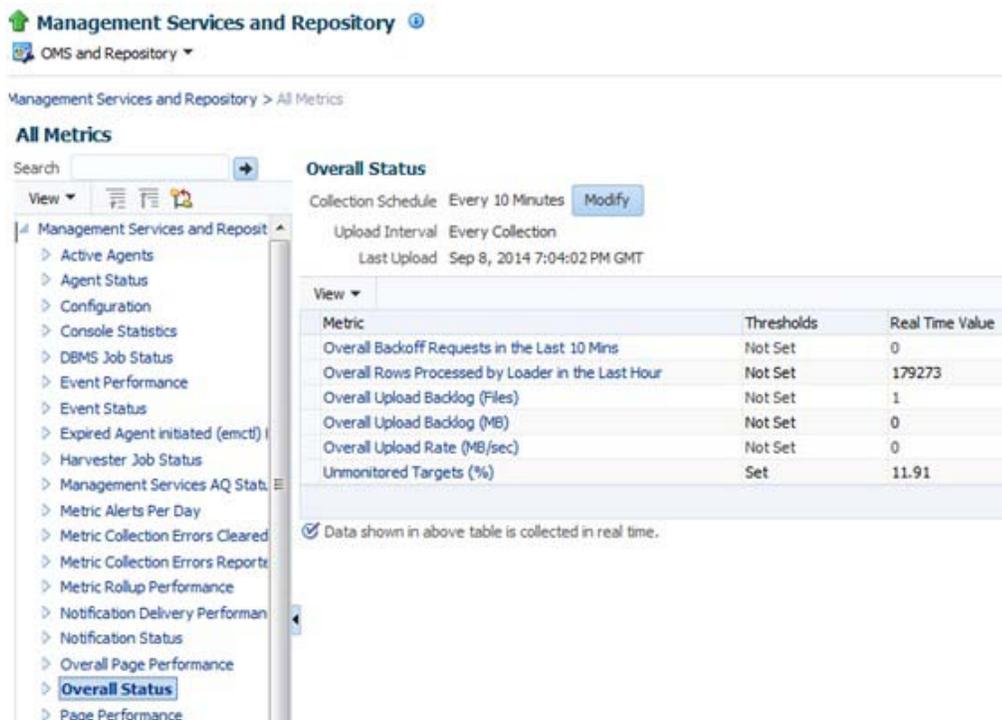


Figure 189: Backoff Requests Metric

To monitor the loader process, look for a consistent increase in the Overall Backup Requests in the Last 10 Mins and the Overall Upload Backlog (Files)/(MB). This is a good indicator as to whether or not the loader threads are keeping up with incoming data. Higher values for these metrics indicate the system is backlogged and not keeping up, lower values indicate the loader throughput is efficient. For additional details on loader metrics and throughput see the [Sizing](#) guide.

A loader backlog can cause delays in receiving critical information and notifications. It can also cause the Agent to stop collecting data once it reaches its maximum threshold, to avoid filling up the file system it's installed on. Backlogs can also cause poor console performance and OMS restarts if not resolved quickly.

Some of the key metrics to watch are:

- » Overall Backoff Requests in the Last 10 Mins
- » Overall Rows Processed by Loader in the Last Hour
- » Overall Upload Backlog (files)
- » Overall Upload Backlog (MB)
- » Overall Upload Rate (MB/sec)

EM provides a graph showing the Upload Rate and the Upload Backlog as seen below. This graph is found by clicking on **Setup / Manage Cloud Control / Health Overview**.

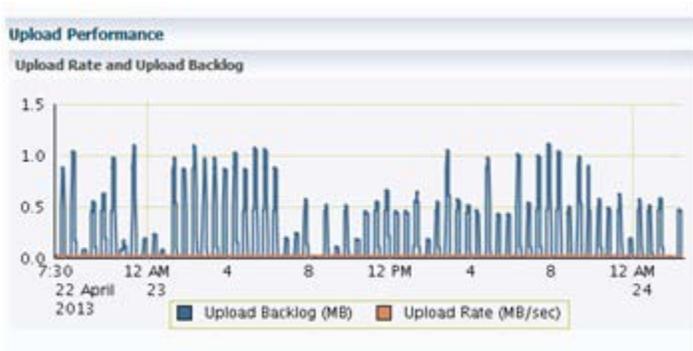
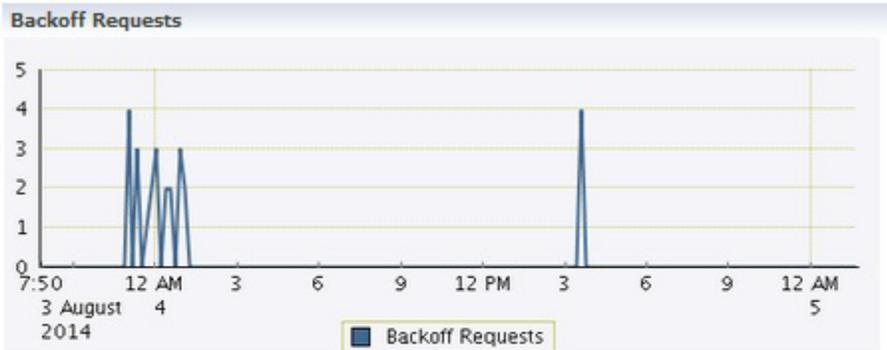


Figure 20: Upload Graph

#### *Loader report*

If an OMS is busy processing the uploaded XML files, it may send a backoff request to an agent, asking the agent to backoff sending the XML files for a specified period of time. EM provides a graph showing the overall backoff requests for a 24 hour period. A sample of this graph is shown below and can be found by clicking on **Setup / Manage Cloud Control / Health Overview**.



✓ **TIP** If Upload Backlog is increasing but Upload Rate is not increasing and there has been a significant number of Backoff Requests, this indicates a probable loader problem. If Upload Backlog is increasing but Upload Rate is not increasing and there has been no Backoff Requests, this indicates a probable network problem.

Figure 21: Backoff Requests Graph

EM also provides an out-of-the-box report showing loader statistics including the configured loader resource allocation, loader performance and the agent count broken down by agent priority level. The available values are None/Mission Critical/Production/Staging/Test/Development. This report is found under **Enterprise / Reports / Information Publisher / Loader Statistics**. If the Loader Performance (3 hours) chart shows a high number of backoff requests and there has not been a recent downtime, it is an indication that the OMS cannot keep up with the load from the agent. This report will also provide the priority level of the agents that can be used by the EMDIAG loader\_health report as mentioned below.

EMDIAG also provides a report for the health of the loader subsystem. By using **repvfy dump loader\_health** you can generate a report of loader health and statistics. The loader\_health report will break down the backoff requests based on priority level (the lifecycle stages of the agent target) of the agents. It is important to watch for backoff requests for mission critical and production agents. If there are issues with these agents, contact Oracle Support for help in diagnosing the issue.

#### Notification Subsystem

The notification system controls all e-mail, ticket connectors and custom notification methods. For each event, the notification job checks to see if there's a required action and submits the task for processing. A backlog in notifications can cause a delay in alerts being sent, or a missing alert all together.

In the Console go to **Setup / Manage Cloud Control / Health Overview**. Check the Notification Performance section for a notification backlog. A steady increase needs to be evaluated further using the guidelines below.



Figure 22: Notification Performance Graph

Select **OMS and Repository / Monitoring / All Metrics**. From here, validate Notification Status metric is Up.

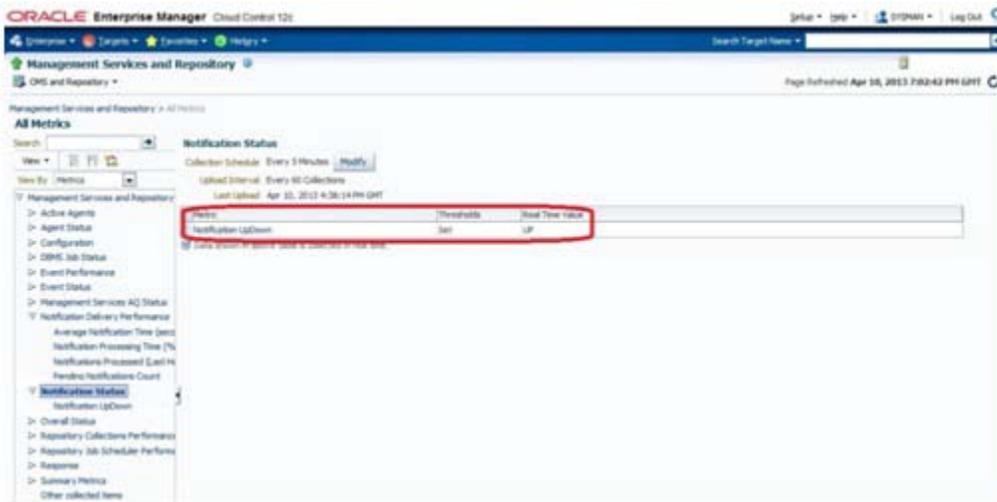


Figure 23: Notification Status

To determine if a specific notification queue is having a problem, select *Pending Notifications Count* metric as seen below.

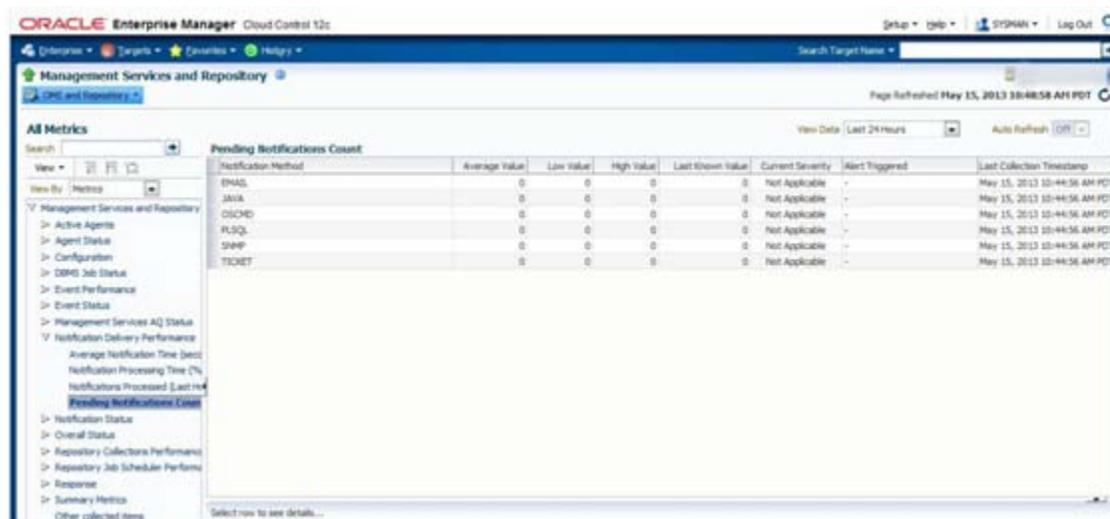


Figure 24: Pending Notification Count

There are 4 performance metrics for Notification delivery. By default, there are no Warning/Critical thresholds. Once you have your system running, evaluate the trend in these metrics and set a Warning/Critical threshold based on this baseline. The metrics below can be found by selecting **Setup / Health Overview**. Under the drop down list next to the OMS and Repository target, select **Monitoring / All Metrics / Notification Delivery Performance**

**Average Notification Time (seconds) / Notification Processing Time (% of last hour)** – Average time for notification delivery and the total amount of processing time for notification delivery. If the average delivery time and notification processing time are both steadily increasing, you have a performance or capacity problem which will create a risk of not receiving notifications a timely manner. If the system is not experiencing a general performance problem, examine the notification queue detail to look for an issue with a specific queue. If a specific issue is not found, contact Oracle Support.

**Notifications Processed (Last Hour)** - The total number of notifications delivered by the Management Service over the previous 10 minutes. The metric is collected every 10 mins and no alerts will be generated. If the number of notifications processed is continually increasing over several days, consider adding another Management Service.

**Pending Notifications Count** - Notifications waiting to be delivered. If this number is continually increasing there is a notification backlog. Look at the view to determine which queue has an issue and use this to further diagnose the issue.

In addition, you can use the `repvfy dump notif_health` command to generate a detailed report to identify Notification statistics and backlogs.

#### Task Subsystem

EM provides a chart to display the backlog performance of the repository collections as seen in the example below. This chart can be found by clicking on **Setup / Manage Cloud Control / Repository**. A steady increase in backlog indicates a problem that needs to be evaluated.



Figure 25: Repository Collections Graph

Many of the repository collection jobs are divided between short running tasks and long running tasks. Each EM environment should be configured with a minimum of 3 short running task workers and 2 long running task workers. The performance of these task workers can be monitored via the details in the Jobs Status chart above. Click on the drop down list to select the Long Running workers. The graph for 12.1.0.4 now shows more information about the Workers such as the number of collections in backlog, throughput per second, and average collection duration (seconds) for both short running and long running workers. The job names are Repository Metrics xx (where xx is a number). The lower numbers are the short running task workers and the higher numbers are the long running task workers. Look for any large spikes in processing time or throughput as this could indicate some occurrence that is generating more work for the repository (i.e. many server outages). If the throughput for these Repository Metric jobs is consistently high and the backlog is continuous or grows, then consider adding another task worker.

EM 2.1.0.4 has a new feature here called the Collection Manager. It is found by clicking on the "Configure" push button as seen in the figure above. The figure below shows the options available when configuring the Collection Manager. It is recommended to turn this option on if high spikes are seen in the backlog of tasks at specific times. The Collection Manager will check at specific frequencies (30 mins) and if the backlog is climbing, a task worker will be added up to the specified maximum number of workers. When the backlog decreases, the Collection Manager will remove task workers. It is recommended that the maximum workers not be set higher than 5. If the backlog is not going down when using up to 5 workers, then contact Oracle Support for further assistance.

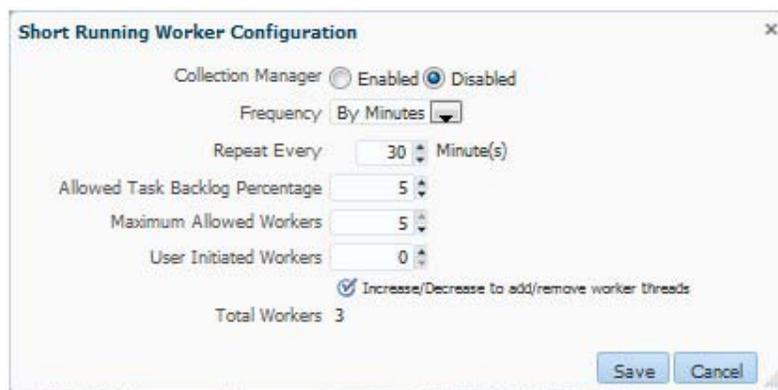


Figure 196: Repository Collections Graph

To get a health report of the Task sub-system, run this EMDIAG report:

```
$ repvfy dump task_health
```

If you suspect a performance problem with the tasks the workers are executing, execute the following EMDIAG tests to look for 'expensive' tasks:

```
$ repvfy verify repository -test 6013 (short running tasks)
```

```
$ repvfy verify repository -test 6014 (long running tasks)
```

If a 'rogue/expensive' task is found, it can be further debugged using the following EMDIAG commands:

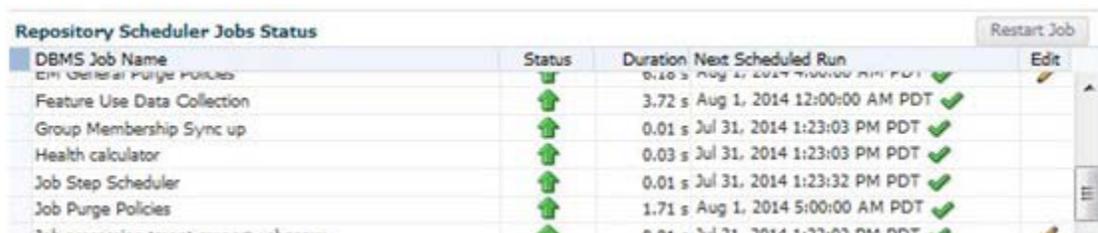
```
$ repvfy send run_task -id <task id>
```

```
$ repvfy dump trace
```

#### EMJob System

The EM job system is crucial to Enterprise Manager's health. The majority of background processes and tasks are run via a series of jobs. Included in these jobs are loading metric data, calculating availability of composite targets, rollup and purge of metric data and notifications. This Job System is an OMS subsystem and includes a Job Scheduler and Job Workers. The Job Scheduler in turn consists of two components, the Job Step Scheduler and the Job Dispatcher. Each of these components are described in further detail below.

**Job Step Scheduler** – The Job Step Scheduler is a global component so there is only one per EM environment. It is scheduled to run by the DBMS Scheduler. The primary purpose of this component is to look for jobs that need to be executed. Make sure that this job is up. This can be seen by clicking on **Setup / Manage Cloud Control / Repository** and looking for the status of the Job Step Scheduler in the Repository Scheduler Jobs Status section as seen below:



DBMS Job Name	Status	Duration	Next Scheduled Run	Edit
EM Central Purge Policies	Up	0.10 s	Aug 1, 2014 12:00:00 AM PDT	✓
Feature Use Data Collection	Up	3.72 s	Aug 1, 2014 12:00:00 AM PDT	✓
Group Membership Sync up	Up	0.01 s	Jul 31, 2014 1:23:03 PM PDT	✓
Health calculator	Up	0.03 s	Jul 31, 2014 1:23:03 PM PDT	✓
Job Step Scheduler	Up	0.01 s	Jul 31, 2014 1:23:32 PM PDT	✓
Job Purge Policies	Up	1.71 s	Aug 1, 2014 5:00:00 AM PDT	✓
...	...	...	...	...

Figure 207: Job Step Scheduler

**Job Dispatcher** - The EM Job system also has a notion of a 'short' and 'long' job (execution time wise) and has separate worker pools in the OMS (not in the database as with the job workers) to handle those requests. The Job Dispatcher runs locally on each OMS and its purpose is to dispatch the jobs found by the Job Step Scheduler to the job workers. If the dispatcher cannot keep up with the work in the queue, a backlog is created. This is not a problem as long as the backlog is temporary. If it is not, then either the dispatcher is not able to keep up with the amount of work which could mean adding another OMS server or there is a problem with the job workers and they are not able to accept the work from the dispatcher (see the next section below for details on how to diagnose a job worker problem).

**Job Workers** – The Job Workers take work from the Job Dispatcher and send it to the appropriate agent and they also receive information from the agents. If Job Workers are always busy and never free, then capacity needs to be added either via another OMS server or by increasing the number of job workers and potentially increasing the number of db connections (each job worker takes a connection to the database). EM provides a way to tell if the Job Workers are keeping up with the dispatched work. If the amount of work the dispatcher is able to give to the job workers approaches zero, then the workers are not keeping up.

To see the Job Worker details for each OMS server, select **Setup / Manage Cloud Control / Management Services**. The top right quarter of the window is titled “Job System”. Under the “Recent Job Executions Summary” table, click on the link called “More Details...”. This will open a new window showing the Job Dispatcher details for each OMS server. In that table, the Configured Threads column is the number of threads configured for each thread pool. The Avg. Threads Available is the number of threads that are waiting to take work from the dispatcher. See screenshot below (note the configured threads shown below are the defaults).

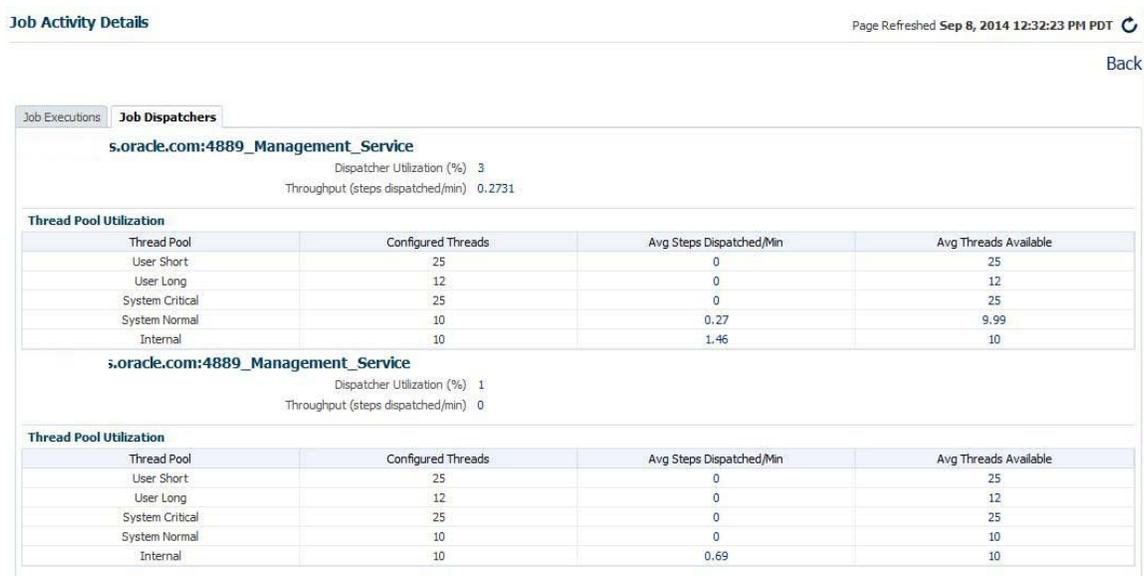


Figure 218: Free Threads

- » The number of Configured Threads should be the same for each OMS server. The values in the Avg. Steps Dispatched/Min and Avg. Threads Available columns should be approximately the same for each OMS while EM is running. If the values are consistently different then one OMS is working harder than the others. At this point, it is best to contact Oracle Support for further diagnosing.
- » If the number for Avg. Threads Available is getting close to zero then it means the dispatcher CANNOT dispatch to ALL the workers in a timely fashion.
- » If the Avg. Steps Dispatched/Min is HIGH, there is a resource problem, and the environment could probably benefit from more worker threads however do not go beyond 'doubling' the size of the threads. If doubling the number of threads does not seem high enough, contact Oracle as it might be better to add an additional OMS.
- » If the Avg. Steps Dispatched/Min is LOW, but the number of available threads per cycle is also low, this typically means that either a thread is stuck, or is 'busy for too long'. If this persists, refer to the section “Omsvfy Commands” in the [Use of the emctl dump Options to Collect OMS Log Files \[ID 1369918.1\]](#) for

steps on how to take a thread dump of the OMS processes. It is also possible to use EMDIAG for this information with this command:

```
$ omsvfy snapshot oms
```

## Agent Health

The overall health of the environment can also be seen by the status of the Agents. The central view for all agents can be seen from **Setup / Manage Cloud Control / Agents**. From here you can evaluate agents that are blacked out, unreachable, pending or blocked.

Name	Secure Upload	Status	Incidents				Last Successful Load	Monitored Targets	Broken Targets
			Down	Unreachable	Blocked	Misconfigured			
oracle.com:3872	Yes	Up	0	6	0	0	Sep 15, 2014 1:39:05 PM PDT	97	3
oracle.com:3872	Yes	Up	0	0	0	0	Sep 15, 2014 1:40:38 PM PDT	27	1
oracle.com:3872	Yes	Up	0	0	0	0	Sep 15, 2014 1:43:28 PM PDT	12	0
oracle.com:3872	Yes	Up	0	0	0	0	Sep 15, 2014 1:44:44 PM PDT	41	1
oracle.com:3872	Yes	Up	0	1	0	0	Sep 15, 2014 1:43:54 PM PDT	47	1
us.oracle.com:3872	Yes	Blocked	0	7	0	0	Aug 23, 2014 1:45:05 AM PDT	24	1
oracle.com:3872	Yes	Up	0	7	0	0	Sep 15, 2014 1:43:44 PM PDT	23	0
oracle.com:3872	Yes	Up	0	3	0	0	Sep 15, 2014 1:37:27 PM PDT	22	0
oracle.com:3872	Yes	Blocked	0	3	0	0	Aug 1, 2014 8:08:14 AM PDT	21	0
oracle.com:3872	Yes	Blocked	0	2	0	0	Aug 1, 2014 8:08:32 AM PDT	20	0
us.oracle.com:3872	Yes	Blocked	0	2	0	0	Jan 30, 2014 7:16:33 PM PST	16	0
us.oracle.com:3872	Yes	Up	0	0	0	0	Sep 15, 2014 1:42:41 PM PDT	18	0

Figure 229: Manage Cloud Control Agents Page

This is a very powerful page for EM Administrators as you can issue various agent control commands from this page, including: startup, shutdown, block, unblock, restart, secure, unsecure. It is possible to edit agent properties (emd.properties file) or submit a job to edit properties for multiple agents at one time. For additional details on managing and configuring Agents, see [Controlling and Configuring Management Agents](#) in the *Oracle Enterprise Manager Cloud Control Administrator's Guide*.

A significant percentage of agents down or not responding indicates an unhealthy environment and a lack of proper monitoring. The goal is to have 100% agent availability. Spot check the agent health daily watching for a significant increase in the percentage of problem agents and checking the alerts for the problem agents, correcting those that are creating issues (pinging, etc). On a bi-weekly basis, take the time to fix those agents that have shown problems for several days.

Starting with version 12.1.0.3.0, EM now has more details for the status of the targets. For example, the status for a target that has recently been discovered may be "Diagnose for Status Pending (Target Addition in Progress)" or for a host that is up but whose agent is down or unreachable would be "Diagnose for Up (Unmonitored)". These more detailed statuses can be seen in several new locations. They are reflected in the All Targets tab via the new icons. Note: clicking on the icon on this page will open the Symptom Analysis page which will provide details on the possible root cause and resolution. The new target status details can also be seen on the Status Graph found on the Enterprise Summary page. To see the breakdown of the different sub-status, click on the Unknown Status for this graph and a pop-up window will open detailing the sub-status breakdown as seen in the figure below.

## Enterprise Summary

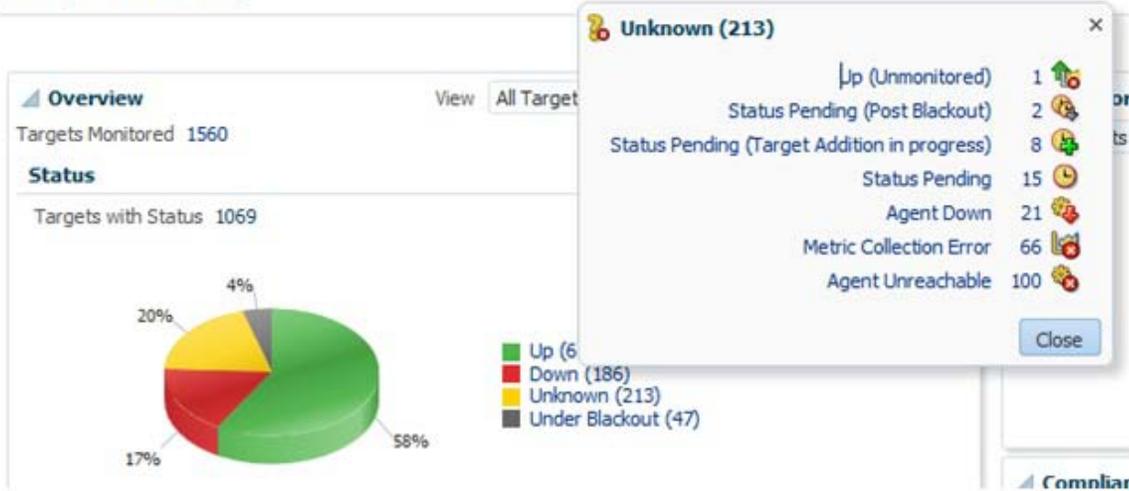


Figure 30: Enterprise Summary Target Status - Unknown

The new statuses are also represented on the individual target's home page and at the top of the agent's home page. The Incidents and Problems section will have an incident for this status. Clicking on the incident will open the incident details page containing recommendations/documentation in the Guided Resolution section for addressing the particular target status.

A large number of agents in the "Agent Unreachable", "Status Pending" and/or "Blocked/Misconfigured" status indicate that these targets are not being properly monitored/managed. Click on the status type in the summary line with the most problematic agents to get a list of these agents and begin diagnosing to resolve the issues. Basic agent troubleshooting steps to be followed:

TABLE 9: AGENT TROUBLESHOOTING

Check	Notes
Host Up	Check to verify if the host is up. If not, is the host still valid? Many times hosts are decommissioned but not removed from monitoring.
Agent Up	Check to verify if the agent is up: emctl status agent Start agent if necessary
Agent Uploading	In the emctl status agent, check for messages about heartbeat/upload. Attempt upload with emctl upload
OMS Reachable	Ping the oms from the agent, and agent from the OMS, ensure ports are not blocked by firewalls

Check Logs	<p>\$EMSTATE/agent_inst/sysman/log/ (Ex: /u01/app/oracle/em/agent_inst/sysman/log)</p> <ul style="list-style-type: none"> <li>» <i>gcagent.log</i> – contains trace, debug, information, error or warning messages from the agent.</li> <li>» <i>gcagent_skd.trc</i> – logging about fetchlets and receivelets</li> <li>» <i>gcagent_mdu.log</i> – tracks the metadata updates to the agent</li> <li><i>emctl.log</i> – information from the execution of the emctl commands.</li> </ul>
Agent Dump	<p>If the agent is still not uploading or reachable, run a target and availability dump on the agent target from repvfy.</p> <p>Repvfy dump target –name &lt;agent:port&gt;</p> <p>Repvfy dump availability –name &lt;agent:port&gt;</p>

REPVFY can also be used to get an overview of agent health by running a **repvfy dump agent\_health** report. The command will provide details about the agent such as agent ping statistics, agent down statistics and system errors.

### Events and Incidents

It is also necessary to review Critical or Warning errors which could indicate an underlying issue and lead to an outage. Also, large amounts of alerts cause a performance impact on the EM system. Metric errors indicate that data is not being collected or monitored properly, and these should be resolved to have an accurate picture of the current system status. For detailed look at using Incident Manager see the [Oracle Enterprise Manager 12c Cloud Control Administrator's Guide](#). Below is a list of some of the places to check for events and/or incidents.

1. **OMS and Repository Events and Incidents** – Click on **Setup / Manage Cloud Control / Health Overview**. Then from the target menu select **OMS and Repository / Monitoring / Incident Manager**. This will filter the events and incidents to those related to the OMS and Repository targets. The default view is All open incidents.

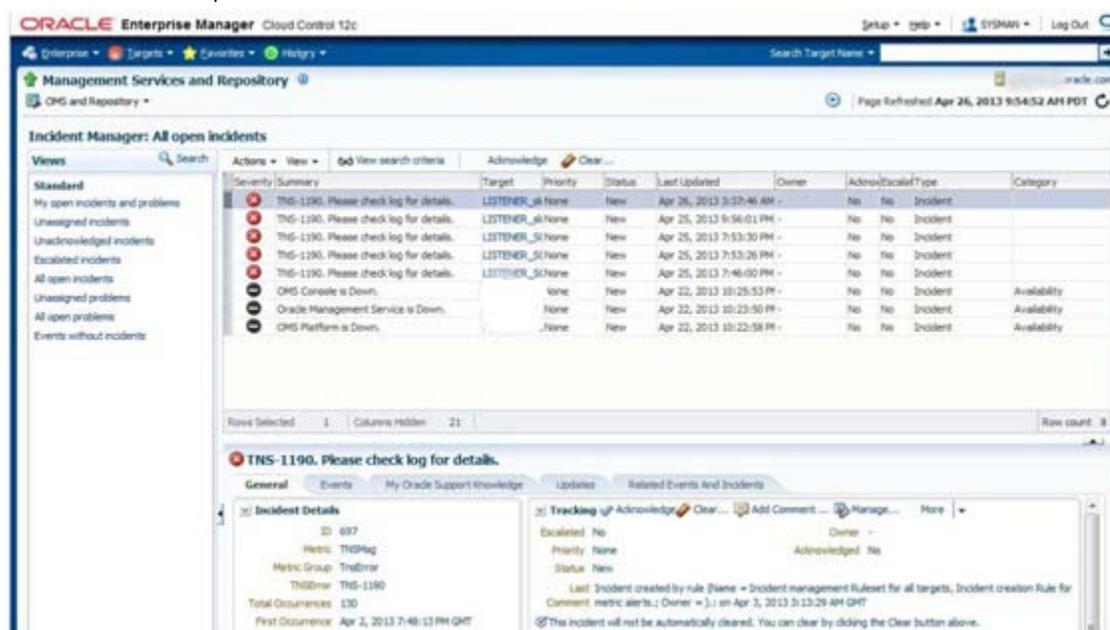


Figure 31: Open Incidents Page

Click on Events without incidents to see additional events. Depending on your incident rules, you may not be receiving an incident for each event. For details on how to create the recommended rule set to ensure notifications are sent to the EM administrator, refer to [Oracle Enterprise Manager 12.1.0.4 Configuration Best Practices \[1929586.1\]](#).

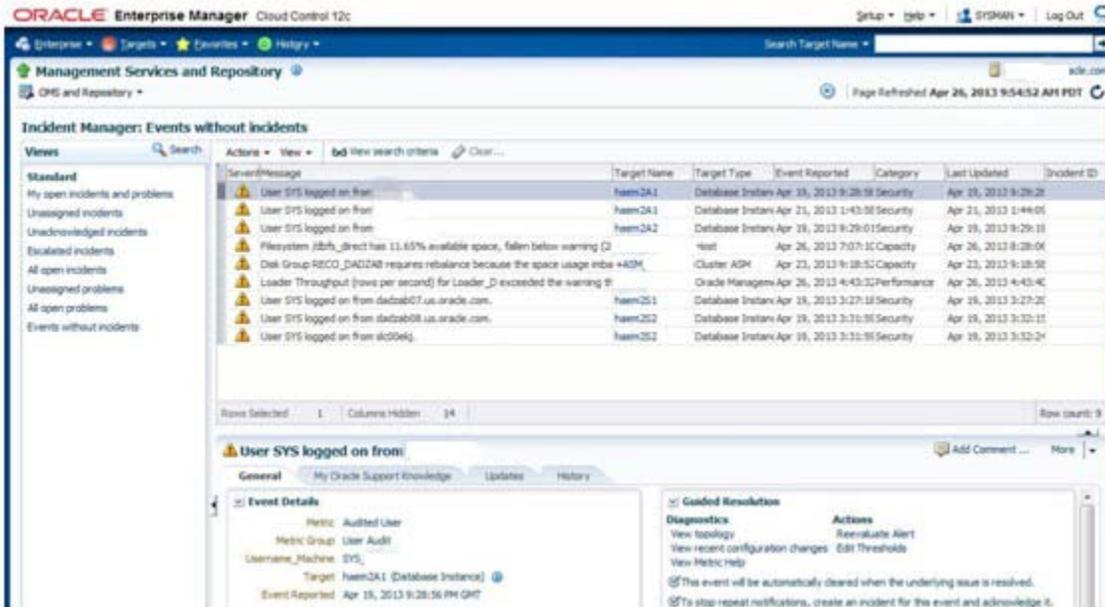


Figure 32: Open Events Page

Clicking on an individual message will provide more details for that particular alert. Look for repeating messages and address these first. Some alerts must be manually closed, such as TNS errors or alert log errors. These will have an additional action of Close as seen below. Clearing these errors regularly helps maintain a clean environment. This can also be done with the EM CLI utility using the `clear_stateless_alerts` flag.



Figure 33: Event Detail

- Note: You may see BEA-337 [WebLogicServer] errors coming from WebLogic Server. By default WLS will ping applications and wait for a response for up to 600 seconds. EM will keep threads running as long as there is work in the queue so they will not respond to a heartbeat, causing WLS to timeout and error. To work around this, increase the stuck thread timeout in the Admin server. This is done by logging onto the WLS Admin server. Click on Environment in the top right side menu and expand Servers. For each server, click on the server name and then on the Tuning tab on in the



TABLE 10: LOG/TRACE FILES

EM Component	Log Files	Trace Files
Oracle Management Agent	\$EMSTATE/sysman/log ("emctl getemhome" will return the location for \$EMSTATE) Ex: /u01/app/oracle/em/agent_inst/sysman/log	\$EMSTATE/diag/ofm/emagent/emagent/trace
Oracle Management Service	\$MWARE/gc_inst/em/<OMSNAME>/sysman/log (where \$MWARE is the middleware home and OMSNAME is the name of the oms instance ex: EMGC_OMS1)	\$MWARE/gc_inst/em/<OMSNAME>/sysman/log (where \$MWARE is the middleware home and OMSNAME is the name of the oms instance ex: EMGC_OMS1)
Oracle HTTP Server (OHS)	<EM_INSTANCE_BASE>/<webtier_instance_name>/diagnostics/logs/OHS/<ohs_name> Ex: /u01/app/oracle/MWare/gc_inst/WebTierIH1/diagnostics/logs/OHS/ohs1	
OPMN	<EM_INSTANCE_BASE>/<webtier_instance_name>/diagnostics/logs/OPMN/<opmn_name> Ex: /u01/app/oracle/MWare/gc_inst/WebTierIH1/diagnostics/logs/OPMN/opmn	
Oracle WebLogic	<EM_INSTANCE_BASE>/user_projects/domains/<domain_name>/servers/<SERVER_NAME>/logs/<SERVER_NAME>.log Ex: /u01/app/oracle/MWare/gc_inst/user_projects/domains/GCDomain/servers/EMGC_OMS1/logs	

## Incident Files

### OMS Incident Files

Any errors in these log files indicate product defects (bugs). Open an SR with Oracle Support for these issues. There are two different locations for the Automatic Diagnostic Repository (ADR) incidents created on the OMS servers. These are as follows:

#### WebLogic Server incidents:

<EM\_INSTANCE\_BASE>/user\_projects/domains/<domain\_name>/servers/<SERVER\_NAME>/adr/diag/ofm/EMGC\_DOMAIN/EMOMS/incident

Ex:

/u01/app/oracle/MWare/gc\_inst/user\_projects/domains/GCDomain/servers/EMGC\_OMS1/adr/diag/ofm/EMGC\_DOMAIN/EMOMS/incident

#### EMS incidents:

<EM\_INSTANCE\_BASE>/user\_projects/domains/<domain\_name>/servers/<SERVER\_NAME>/adr/diag/ofm/<domain\_name>/<SERVER\_NAME>/incident

Ex:

/u01/app/oracle/MWare/gc\_inst/user\_projects/domains/GCDomain/servers/EMGC\_OMS1/adr/diag/ofm/GCDomain/EMGC\_OMS1/incident

## Agent Incident Files

The ADR incidents created for the Agent are found here:

\$EMSTATE/diag/ofm/emagent/emagent/incident

Ex:

/u01/app/oracle/em/agent\_inst/diag/ofm/emagent/emagent/incident

NOTE: For more details on gathering incident information, refer to [12c Cloud Control: How to Invoke ADR Command Interpreter \(adrci\) in OMS or Agent Home? \[1512905.1\]](#)

## Troubleshooting

The following table lists high-level process flows for troubleshooting various issues with Enterprise Manager.

TABLE 11:TROUBLESHOOTING

Issue	Component
Performance	<ul style="list-style-type: none"> <li>» <b>RUN REPVFY EXECUTE OPTIMIZE (FOR FURTHER DETAILS ON THIS REPVFY COMMAND, REFER TO <a href="#">Oracle Enterprise Manager 12.1.0.4 Configuration Best Practices [1929586.1]</a>)</b></li> <li>» <b>EVALUATE DB PERFORMANCE, LOCKS, WAITS, ETC.</b></li> <li>» <b>LOOK FOR ADDM RECOMMENDATIONS</b></li> <li>» <b>VALIDATE SYSMAN STATISTICS</b></li> <li>» <b>RUN REPVFY DUMP PERFORMANCE</b></li> <li>» <b>RUN REPVFY DUMP ERRORS</b></li> </ul>
Jobs	<ul style="list-style-type: none"> <li>» <b>CHECK <a href="#">DBMS_SCHEDULER</a> STATUS</b></li> <li>» <b>CHECK VALUE OF JOB_QUEUE_PROCESSES</b></li> <li>» <b>RUN REPVFY DUMP JOB_HEALTH</b></li> <li>» <b>CHECK FOR ERRORS RELATING TO A SPECIFIC JOB FAILURE (SEE MOS NOTE <a href="#">744645.1</a> TO IDENTIFY THE JOB)</b></li> <li>» <b>REFER TO MOS NOTES <a href="#">783357.1</a> AND <a href="#">1520580.1</a> FOR FURTHER HELP IN DIAGNOSING AN ISSUE WITH JOBS</b></li> </ul>
Notifications- if a notification is missing or late	<ul style="list-style-type: none"> <li>» Check event/incident details to see if Notification was triggered</li> <li>» Check EM Jobs Service – Notification Job</li> <li>» Run repvfy dump notif_health</li> </ul>
Events – missing event or incident	<ul style="list-style-type: none"> <li>» Check for loader backlog (repvfy dump loader_health)</li> <li>» Check agent status (not blocked, uploading?)</li> <li>» Check target thresholds</li> <li>» Check incident rules</li> </ul>
OMS Availability – see MOS note <a href="#">1432335.1</a> for details on OMS Process Control	<ul style="list-style-type: none"> <li>» Verify that the repository database and listener are up</li> <li>» Verify that the sysman, sysman_opss, sysman_mds user accounts in the repository database are open</li> <li>» Check log files (see MOS note <a href="#">1448308.1</a>) <ul style="list-style-type: none"> <li>» emctl - &lt;EM_INSTANCE_BASE&gt;/em/EMGC_OMSn/sysman/log</li> <li>» OPMN - &lt;EM_INSTANCE_BASE&gt;/WebTierH1/diagnostics/logs/OPMN/opmn</li> <li>» HTTP_SERVER - &lt;EM_INSTANCE_BASE&gt;/WebTierH1/diagnostics/logs/OHS/ohs1</li> <li>» EM Node Manager - &lt;EM_INSTANCE_BASE&gt;/NodeManager/emnodemanager</li> <li>» Admin Server - &lt;EM_INSTANCE_BASE&gt;/user_projects/domains/GCDomain/servers/EMGC_ADMINSERVER/logs</li> <li>» EM Managed Server - &lt;EM_INSTANCE_BASE&gt;/user_projects/domains/GCDomain/servers/EMGC_OMS1/logs</li> </ul> </li> <li>» For diagnosing issues with connectivity between OMS and the Repository, refer to MOS note: <a href="#">1448007.1</a></li> </ul>

Target Availability	<ul style="list-style-type: none"> <li>» Check gcagent.log for ERROR messages</li> <li>» Run repvfy dump target</li> <li>» Run repvfy dump availability</li> </ul>
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The table below shows the different target availability states and the guided resolution recommendations.

TABLE 12: TARGET AVAILABILITY STATES

Availability State	Icon	Guided Resolution Recommendations
NA	N/A	
Down		If the target was brought down as part of a planned maintenance, consider creating a blackout on the target. If the target was brought down in error, restart it by going to the target homepage, target menu -> Control -> Start up. If the target status is not correct, refer to My Oracle Support article Enterprise Manager 12c: How to run the \"Targets Status Diagnostics Report\" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )
Up		
Error		To troubleshoot, refer to My Oracle Support article Enterprise Manager 12c: How to run the \"Targets Status Diagnostics Report\" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )
Agent Down		
Agent Down Target Up Unmonitored		Target is up but Agent is down. Start the Agent
Unreachable		
Unreachable Target Down		If agent was brought down in error, restart it by go to the agent homepage, menu \"Agent -> Control -> Start up...\". If agent was brought down as part of planned maintenance, consider creating a blackout on the agent.
Unreachable Agent Down		If agent was brought down in error, restart it by go to the agent homepage, menu \"Agent -> Control -> Start up...\". If agent was brought down as part of planned maintenance, consider creating a blackout on the agent
Agent Unreachable Target Up Unmonitored		To troubleshoot, go to the agent homepage and run the Symptom Analysis tool located next to the Status field. Also, refer to My Oracle Support article Enterprise Manager 12c: How to run the \"Targets Status Diagnostics Report\" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )
Under Migration		Agent is unreachable as it is under migration

Unreachable Readonly Filesystem		Agent cannot write to file system. Check Agent file system. To troubleshoot, go to the agent homepage and run the Symptom Analysis tool located next to the Status field. Also, refer to My Oracle Support article Enterprise Manager 12c: How to run the "Targets Status Diagnostics Report" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )
Unreachable Collection Disabled		Agent Collections have been disabled. Check that Agent can upload to OMS. To troubleshoot, go to the agent homepage and run the Symptom Analysis tool located next to the Status field. Also, refer to My Oracle Support article Enterprise Manager 12c: How to run the "Targets Status Diagnostics Report" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )
Unreachable Disk Full		Agent file system is full. Check available space. To troubleshoot, go to the agent homepage and run the Symptom Analysis tool located next to the Status field. Also, refer to My Oracle Support article Enterprise Manager 12c: How to run the "Targets Status Diagnostics Report" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> ).
Unreachable Blackout		Agent is unreachable as its first severity has not yet come after blackout end.
Unreachable Agent Block Manual		Agent has been blocked manually. Unblock the Agent.
Unreachable Agent Block Plugin Mismatch		Agent has been blocked due to Plug-in mismatch. If Agent has been restored from a backup perform an Agent Resync
Unreachable Agent Block Counter		Agent has been blocked due to Bounce Counter mismatch. If Agent has been restored from a backup perform an Agent Resync
Unreachable Agent Misconfigured		Agent is configured for communication with another OMS. Check Agent configuration.
Unreachable Agent Communication Broken		Agent is unreachable due to communication break between agent and the OMS
Blackout		
Unknown		To troubleshoot, refer to My Oracle Support article Enterprise Manager 12c: How to run the "Targets Status Diagnostics Report" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> ).
Status Pending Add Target		Target addition is in progress. To troubleshoot, refer to My Oracle Support article Enterprise Manager 12c: How to run the "Targets Status Diagnostics Report" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a> )

<p>Status Pending Blackout Ended</p>		<p>Blackout has recently ended on this Target and Availability Status is pending. To troubleshoot, refer to My Oracle Support article Enterprise Manager 12c: How to run the \"Targets Status Diagnostics Report\" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a>)</p>
<p>Status Pending Error</p>		<p>Metric error has recently ended on this Target and Availability Status is pending. To troubleshoot, refer to My Oracle Support article Enterprise Manager 12c: How to run the \"Targets Status Diagnostics Report\" to Troubleshoot Target Status Availability Issues (up, down, metric collection error, pending, unreachable) for all Targets (Doc ID <a href="#">1546575.1</a>).</p>

## Conclusion

As an environment grows for any enterprise, the dependency on Oracle Enterprise Manager 12c to help monitoring and administer the environment becomes very important. This also means that the EM environment itself must be supported, maintained and treated as highly available as the most highly available target it manages. Therefore, this means that EM must be properly configured, monitored, maintained and high performing to provide the daily monitoring and administration capabilities that an enterprise requires to maintain their environment.



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**Hardware and Software, Engineered to Work Together**

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