

Installation/Upgrade Tactics and Architecture for Large Sites

This is a continuation of *Chapter 2, Enter Oracle Cloud Control* of the book, *Oracle Enterprise Manager Cloud Control 12c: Managing Data Center Chaos*

Use of Oracle Virtual Box

In the next few bonus sections, we will look at a sample installation of Enterprise Manager Cloud Control 12c, to demonstrate the ease of the entire process. For this, we will be using Oracle Virtual Box, which is an excellent way to virtualize a guest operating system on your workstation for demonstration or test purposes.

For example, if you have a Microsoft Windows 7 64-bit laptop with 8 GB of RAM, you can install Oracle Virtual Box on the laptop and create a Linux guest on which you can install Cloud Control.

Oracle Virtual Box can be downloaded for free from the following location:

<https://www.virtualbox.org/wiki/Downloads>

After installing Oracle Virtual Box, you can create a new virtual machine with about 30-40 GB of disk space and install Oracle Enterprise Linux 5 - Update 5 (64 bit).

As this is a 64-bit based OS VM, you should have hardware virtualization enabled in your BIOS settings for your host computer. Also, remember to change the base memory of the VM to a figure around 4 GB.

On top of this, you decide to install Oracle Database Enterprise Edition 11gR2 (11.2.0.1.0). As per the kernel parameter requirements in the Cloud Control basic installation guide, you should set the `kernel.shmmax` parameter to a value that is not greater than 4294967295 (1 byte less than 4 GB). This is to avoid memory issues and to make sure the core file is successfully generated. You can do this as the root user as follows:

```
sysctl -w kernel.shmmax=4294967295
```

After this, you install Enterprise Manager Cloud Control 12c, as we will see in the coming sections.

After the installation of Enterprise Manager is complete, you may want to access it from your host operating system, that is, you prefer to log in to the Cloud Control console from a browser on your Windows computer, rather than opening a browser window inside the machine. For enabling this access, you can follow these simple steps:

By default, the network setup of the VM will be configured to NAT for the first adapter, which means the guest OS shares the host's IP address.

Now, in the VM settings, add a second adapter as a bridged adapter using the same wireless card. The first adapter is still kept as NAT.

On rebooting the VM, the command `ifconfig -a` inside the guest Linux OS shows multiple IP addresses. Note the new address, for example, 192.168.1.103. When initially installing the OS in the VM, we had kept the host name of the Linux system as `havipori.sainath.com`. So in the host OS, you need to add the following line to the `hosts` file, which is located at `C:\Windows\System32\drivers\etc\hosts`:

```
192.168.1.103 havipori.sainath.com
```

After doing this, you can access the guest OS Enterprise Manager console from your browser in the host as follows:

```
https://havipori.sainath.com:7799/em
```

What's new in the 12c install

You can download the latest Enterprise Manager Cloud Control 12c binaries from the **Oracle Technical Network (OTN)**. Go to `technet.oracle.com` and navigate to **Downloads | Enterprise Manager**. Select the OS platform you want.

At the time of writing, the Enterprise Manager Cloud Control 12c software (OMS plus Agent) can be installed on Linux x86 32-bit or 64-bit, Solaris SPARC or Solaris x86-64, IBM AIX on POWER Systems 64-bit, or Microsoft Windows (64-bit).

Other platforms such as HP-UX PA-RISC (64-bit) or Microsoft Windows (32-bit) are not planned, so at this point of time you can install the central Cloud Control software only on the platforms just mentioned.

For the latest information on when particular platforms will be available for each version of Enterprise Manager, please see the Release Schedule of Current Enterprise Manager Releases and Patch Sets (Article ID 793512.1) document on **My Oracle Support (MOS)**.

One major change is that there is no documentation folder in this download, nor are the Agent binaries included as they used to be in the previous versions. You have to download the Cloud Control documentation from the OTN at `technet.oracle.com`; and for the Agent deployment on your Target machines, the self-update feature will be used to get the necessary Agent binaries. Note that the Cloud Control documentation may change from time to time with new manuals or sections being added, for example, the Bundle Patch 1 sections were recently added to a few documents. So, it is advisable to always refer to the latest Cloud Control documentation on the OTN, rather than download it to your computer.

The Agent-only software is currently available for multiple platforms such as Solaris, IBM AIX, HP-UX platforms, and also the OMS platforms listed previously, at the time of writing. Other Agent-only platforms such as Microsoft Windows (32-bit) and z/Linux are also supported. For the latest information, please see the preceding document or look at the certification matrix in MOS, described later in this section.

In Enterprise Manager Cloud Control 12c, go to **Setup | Extensibility | Self Update**. This is the self-update console where you can download the Agent software for different platforms, as can be seen in the following screenshot:

Self Update Page Refreshed Aug 22, 2012 9:18:23 AM PDT

Oracle periodically provides new functionality and updates for existing features in Enterprise Manager. The Self Update home allows administrators to receive notifications and view, download, and apply such updates. While these updates are retrieved automatically, a manual check can be made at any time.

Status Informational Updates (4 New)

Connection Mode **Online** Last Download Time Jun 5, 2012 7:55:54 AM PDT
 Most Recent Refresh Time **Aug 21, 2012 11:26:10 PM PDT** Last Download Type Plug-in

Actions Agent Software

| Type | Available Updates | Downloaded Updates | Applied Updates | Description |
|--------------------------------------|-------------------|--------------------|-----------------|--|
| Agent Software | 1 | 0 | 9 | Agent software has to be installed on hosts for managing the host. |
| Compliance Content | 0 | 0 | 0 | Compliance Content contains Framework, Standard, Rules with support of add an |
| Diagnostic Checks | 0 | 0 | 0 | Target side policy checks that identify conditions that may require the attention of |
| EM Deployment Prerequisite Resources | 0 | 0 | 0 | EM Deployment Pre-requisite Checks are the metadata used for checking prerequ |
| Exadata Configuration Template | 0 | 0 | 0 | Configuration Templates for Oracle Exadata Database Machines |
| Management Connector | 8 | 0 | 1 | Management Connectors are components that integrate different enterprise fram |

Past Activities: Agent Software

| Actions | Status | OS Platform | Version | Administrator | Start Time | Elapsed Time(Sec) |
|---------|-----------|-----------------------|------------|---------------|--------------------|-------------------|
| Apply | Succeeded | Linux x86-64 | 12.1.0.1.0 | SYSMAN | | 0.23 |
| Apply | Succeeded | Oracle Solaris on x86 | 12.1.0.1.0 | A | Jun 5, 2012 9:20:0 | 2.37 |

The installer in this version of Cloud Control is more user friendly and intuitive. The total number of installer screens has been reduced even further from the previous versions, as is the sum total of inputs.

This is a full release, so there is no need to install a Base release and to patch it to the latest version, as used to happen in the earlier versions. Just install the full release. On September 13, 2012, Oracle announced general availability of Oracle Enterprise Manager 12c Release 2, which is simultaneously available on all major platforms.

There is a single installer for WebLogic Server (WLS 10.3.5) and Cloud Control, that is, both WLS and Cloud Control are installed out of the box. There is no need to preinstall WLS as was done in Enterprise Manager 11g. However, the repository database needs to be preinstalled, and this has been intentionally done so as not to have a lag between the latest database release and the release that was previously bundled inside the Grid Control installers.

There is now an ability to browse install log files from inside the installer, and this helps in finding out the exact status of the installation steps being executed.

Also, if any prerequisite checks fail, it is possible for the installer to autofix the issues that are causing the failure, instead of you having to make the fixes manually and then restart the installer.

The error messages are now more user friendly and also show recommendations. You can also do a software-only install via the graphical installer, which means you are installing the Enterprise Manager software only and not going ahead with configuration. You can then configure it at a later point.

One important thing to note is that only the Oracle Management Agent 12c is supported by the Enterprise Manager 12c **Oracle Management Service (OMS)**, earlier Agent versions are not supported. This means you cannot continue to use any Agents from previous versions with the 12c OMS, you also need to upgrade the Agent on all your Targets to 12c, bearing in mind that the 12c Agent may not be released on all platforms existing in your company. Refer to article ID 793512.1 on MOS.

The new EM 12c Agent is now much more robust, and can perform self-diagnosis. The single Agent process is able to watchdog itself, and can change its memory settings and perform self-restarts (that is, it auto-tunes itself). The Agent uses an improved upload protocol of metrics, so the uploads are smaller. As a result, the Agent can support the uploading of 10 times more metrics than before.

Also, the disk space used by the 12c Agent is only half as much as previous versions. This is because each and every plugin is not pushed to every Target, but only those plugins that are required by a Target will be deployed and utilized by the Agent on that Target, for example, the Fusion applications plugin will not be sent to a Target having only a database and no Fusion applications, and so on. Along with the disk footprint, the resource consumption is also lower. This reduces the overall impact on the Target server where the Agent is installed. The Agent, rewritten in Java, has been redesigned to be a single unified Agent with multiple capabilities, including those from previously acquired products such as the **Application Change Console (ACC)**, **Configuration Change Console (CCC)**, **Application Dependency and Performance (ADP)**, and **Java Virtual Machine Diagnostics (JVMD)**; all of these, in the past, required separate Agents to be installed and deployed on the same Target. Thus, Agent management and deployment has been simplified in such cases – only one unified Agent needs to be installed.

The Enterprise Manager console now allows you to bulk-manage all your Agents. This consumes less time and results in fewer errors than was previously possible with the manual methods to control the Agent in earlier versions of Enterprise Manager.

The Enterprise Manager Cloud Control 12c installation procedure installs one OMS, per Agent, and a repository (in a preexisting certified Oracle database). It also installs Oracle WebLogic Server 10.3.5 and JDK 1.6, plus it creates an Oracle Common folder, a WebLogic domain called `GCDomain`, and a node manager user account called `nodemanager`.

Silent mode install is possible instead of the graphical installation. A new response file is provided:

```
<Directory>/Disk1/response/new_install.rsp.
```

Software-only installation is also possible in silent mode.

The hardware requirements for the Enterprise Manager Cloud Control 12c version have also changed from the previous versions. Please refer to the *Meeting Hardware Requirements* chapter of the *Oracle Enterprise Manager Cloud Control Basic Installation Guide* document at

```
http://docs.oracle.com/cd/E24628\_01/install.121/e22624/preinstall\_req\_hw.htm.
```

The next chapter in this guide lists the software requirements, such as what packages are required, what kernel parameters are required (one example is the setting of the `shmmax` parameter mentioned earlier), as well as the library requirements.

You need to make sure that the host where you will be installing Cloud Control has a certified Operating System, and the database you use to house the Enterprise Manager repository should also be certified to be used for the 12c version. This can best be checked in My Oracle Support under the **Certifications** tab, select **Enterprise Manager Base Platform - OMS** as the product and the release as **12.1.0.1.0** (if looking at Release 1), platform as any, and search. This gives the certification matrix of the 12c OMS along with everything else, as can be seen in the screenshot:

The screenshot shows the Oracle My Oracle Support interface. The search results for 'Enterprise Manager Base Platform - OMS 12.1.0.1.0' are displayed under the 'Certification Results' section. The results are organized into a table with two columns: 'Certified With' and 'Number of Releases / Versions'. The table lists various software categories and their certified versions.

| Certified With | Number of Releases / Versions |
|---|---|
| Agents (1 Item) | |
| Enterprise Manager Base Platform - Agent | 1 Release (12.1.0.1.0) |
| Enterprise Applications (5 Items) | |
| Databases (8 Items) | |
| Audit Vault 10.3.0.0.0 (Managed Target) | 1 Release (10.3.0.0.0) |
| IBM DB2 (Managed Target) | 1 Release (9.1) |
| Microsoft SQL Server (Managed Target) | 2 Releases (2008 R2, 2005) |
| Oracle Audit Vault (Managed Target) | 1 Release (10.2.3.2) |
| Oracle Database (Managed Target) | 8 Releases (11.2.0.3.0, 11.2.0.2.0, 11.2.0.1.0, |
| Oracle Database (Repository) | 5 Releases (11.2.0.3.0, 11.2.0.2.0, 11.2.0.1.0, |
| Oracle Exadata Storage Server (Managed Target) | 2 Releases (11.2.2.4.0, 11.2.2.3.0) |
| Sybase Adaptive Server Enterprise (Managed Target) | 1 Release (12.5.4) |
| Virtualization Software (2 Items) | |
| Desktop Applications, Browsers and Clients (3 Items) | |
| Other (2 Items) | |
| Middleware / Application Servers (37 Items) | |
| Management and Development Tools (40 Items) | |
| Operating Systems (6 Items) | |

As per the matrix, the 12c OMS is only compatible with the 12c Agent, it cannot be used with any other Agent (such as EM 11g). The matrix also shows the database versions supported for the repository, and those supported as a managed Target. The certified operating systems are listed in the lower half of the matrix.

In the same way, you can see the certification matrix for the Agent if you select **Enterprise Manager Base Platform - Agent** as the product, in My Oracle Support under the **Certifications** tab.

As usual, make sure that the Unix user (normally Oracle) that is installing Cloud Control 12c belongs to the Oracle inventory group `oinstall`. This is the group that normally owns the Oracle inventory.

Before you start the installer, you need to ensure that no environmental variables are set. These include `ORACLE_HOME` and `ORACLE_SID`, which should not be set. Also note that `umask` should be set to `022` before invoking `runInstaller`.

If the host has more than one IP address, you can pass a hostname to the `runInstaller` using the `ORACLE_HOSTNAME` argument.

When the installer goes through the system prerequisites, it now also checks the `LD_ASSUME_KERNEL` environment variable and the `TZ` region. These were not checked in the previous Enterprise Manager versions. Other system checks include checking for sufficient free space in the `TEMP` location, whether there is enough physical memory, whether the `ulimit` values are set as required, and so on.

There are some **WebLogic Server (WLS)** related prerequisites as well. First of all, only WLS version 10.3.5 and typical WLS installs are supported. The JDK that gets installed with the installer is 1.6 version 24.

WLS 10.3.5 is installed by the Cloud Control installer, however, an existing WLS 10.3.5 installation can be specified for the GC domain. The caveat is that the installation user of this existing install and the Cloud Control installation user should be the same. Note that there are no patches required on top of WLS 10.3.5, unlike the previous 11g version of Enterprise Manager, where it was required to patch the WLS version after installing it.

However, if you use an existing WLS installation, another caveat exists. You cannot install Cloud Control on an Oracle WebLogic Server instance with Oracle SOA Suite 11.1.1.2.0 already installed. This is because the `ORACLE_COMMON` property is used by both the Enterprise Manager Administration Server and the SOA Suite Administration Server, and as a result Cloud Control and the Oracle SOA Suite cannot coexist.

Installing the repository database

You need to install an Oracle database as the repository before you start the Enterprise Manager Cloud Control 12c installation.

As per the certification matrix available on MOS, which we have seen earlier, one of the database versions certified for the repository is 11.2.0.1 and you have opted to use this version.

However, after installing the database software, note that there are certain repository prerequisites for Cloud Control. These should be followed while creating the database. For example, there is a redo log size requirement of being greater or equal to 300000000 (bytes), and there are certain initialization parameters that need to be set before the database can be used as the repository for Cloud Control.

For these repository prerequisites, refer to the appendix *A Overview of EM Prerequisite Kit Utility of the Oracle Enterprise Manager Cloud Control Basic Installation Guide* document . The URL is as follows:

http://download.oracle.com/docs/cd/E24628_01/install.121/e22624/appdx_about_emprereqkit.htm#CIHCCJII.

This appendix also prominently mentions that you must ensure that the database is patched with all the **Patch Set Updates (PSU)** or **Critical Patch Updates (CPU)** released for whatever version you use.

You must also ensure that you apply the patches for bugs 10014178 and 8799099 in the case of Oracle Database 11g Release 2 (11.2.0.1). Of course, first download and apply the `opatch` update, which is `p6880880_112000_Linux-x86-64.zip`.

In the case of Cloud Control 12c Release 2, there are 11.2.0.3 database templates available for various platforms. These database templates have the Enterprise Manager 12.1.0.2 repository preconfigured and can be downloaded from the OTN. Instructions to use these templates are in the *Oracle Enterprise Manager Cloud Control Basic Installation Guide*, at the following URL:

http://docs.oracle.com/cd/E24628_01/install.121/e22624/appdx_seed_db_template.htm#CACIJIDC

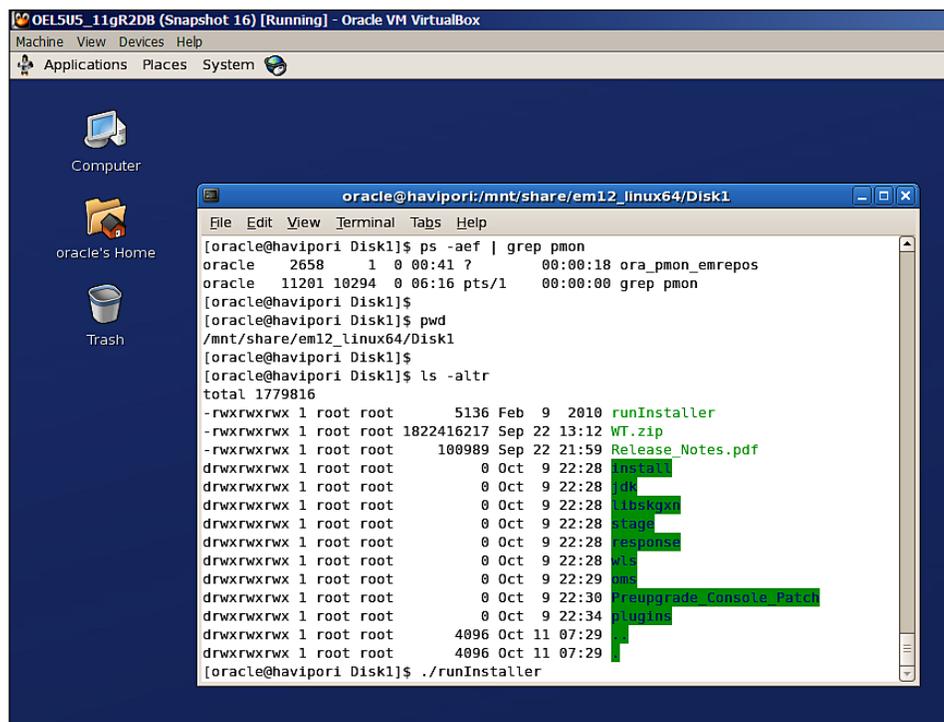
Installing the management service

Now that you have a database installed and ready for the Cloud Control repository, you can proceed with the actual installation of the Cloud Control management service.

Make sure the intended repository database is up and running, you can check this with the command `ps -aef | grep pmon` to see if the pmon process is active.

Also make sure the Oracle Listener is up, and verify that `sys` or `system` can connect to the repository database using the Oracle Listener.

Then, you can move to the `Disk1` folder where you have downloaded and unzipped the installation files, and start the `runInstaller`.



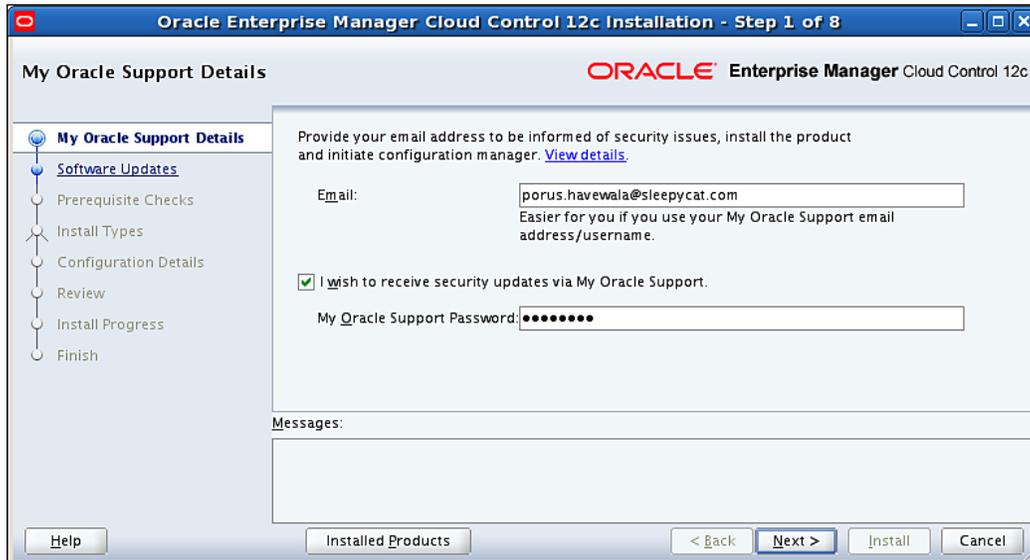
```

[oracle@haviport:/mnt/share/em12_linux64/Disk1]
[oracle@haviport Disk1]$ ps -aef | grep pmon
oracle      2658      1  0 00:41 ?        00:00:18 ora_pmon_emrepos
oracle     11201 10294  0 06:16 pts/1    00:00:00 grep pmon
[oracle@haviport Disk1]$
[oracle@haviport Disk1]$ pwd
/mnt/share/em12_linux64/Disk1
[oracle@haviport Disk1]$
[oracle@haviport Disk1]$ ls -ltr
total 1779816
-rwxrwxrwx 1 root root      5136 Feb  9  2010 runInstaller
-rwxrwxrwx 1 root root 1822416217 Sep 22 13:12 WT.zip
-rwxrwxrwx 1 root root   100989 Sep 22 21:59 Release_Notes.pdf
drwxrwxrwx 1 root root      0 Oct  9 22:28 lib
drwxrwxrwx 1 root root      0 Oct  9 22:28 lib
drwxrwxrwx 1 root root      0 Oct  9 22:28 libsql
drwxrwxrwx 1 root root      0 Oct  9 22:28 stage
drwxrwxrwx 1 root root      0 Oct  9 22:28 response
drwxrwxrwx 1 root root      0 Oct  9 22:28 etc
drwxrwxrwx 1 root root      0 Oct  9 22:29 bin
drwxrwxrwx 1 root root      0 Oct  9 22:30 Preupgrade_Checks_Patch
drwxrwxrwx 1 root root      0 Oct  9 22:34 o
drwxrwxrwx 1 root root    4096 Oct 11 07:29
drwxrwxrwx 1 root root    4096 Oct 11 07:29
[oracle@haviport Disk1]$ ./runInstaller

```

Optionally, you can supply the `ORACLE_HOSTNAME` parameter to the `runInstaller` command. This starts the installation process.

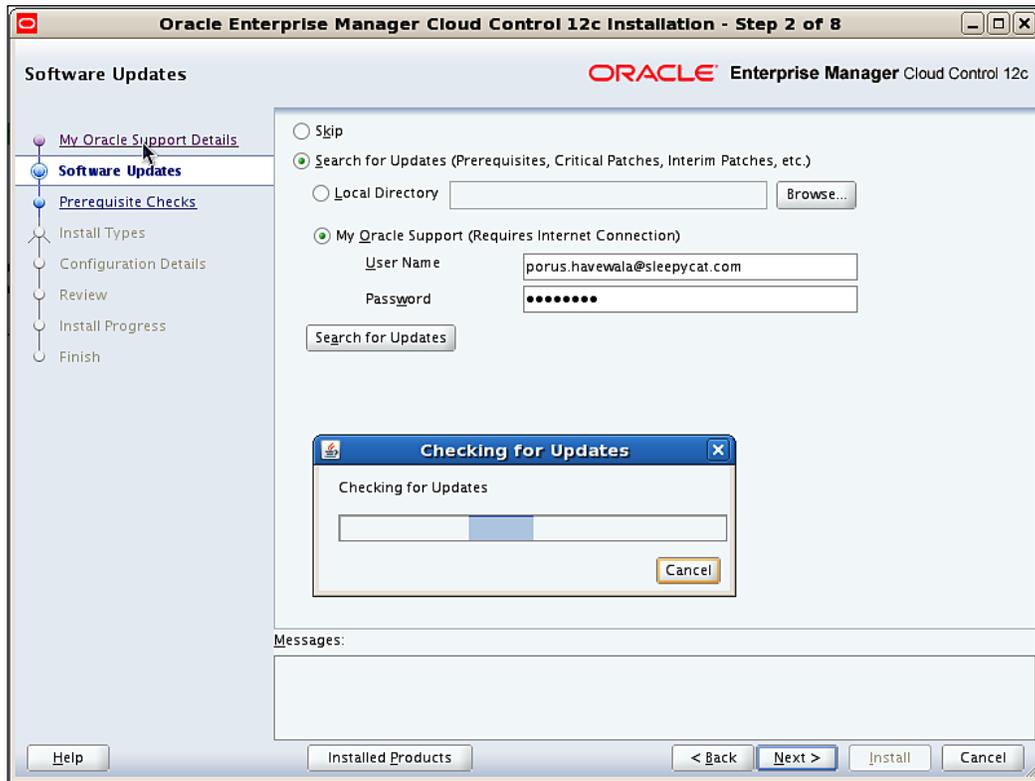
The first screen requests your Oracle Support details. It is recommended to supply this information and allow your e-mail address to receive security updates, such as when the next CPU is released. Please note that the sleepycat e-mail address of the author, seen in the following screenshot, is not a contactable email address:



However, please feel free to contact the author on his blog at:

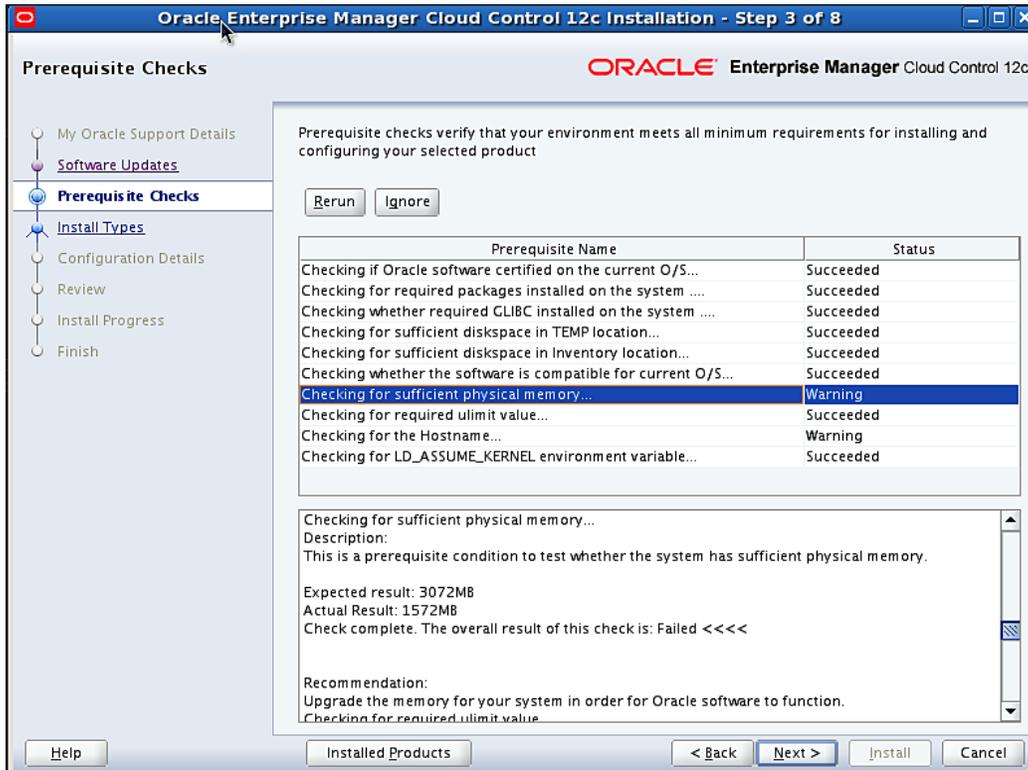
<http://enterprise-manager.blogspot.com>

The next screen allows you to connect directly to MOS from within the Oracle installer, and search for updates. These include any interim or critical patches if they have been released recently, and also for new or changed prerequisites, if any have been published at the Oracle site. The idea is to get the latest and the best from Oracle before even starting the installation, and this is a welcome idea. You should apply the updates, if any, available at the time you do the installation. In this case there were no updates, so we continue to the next screen.

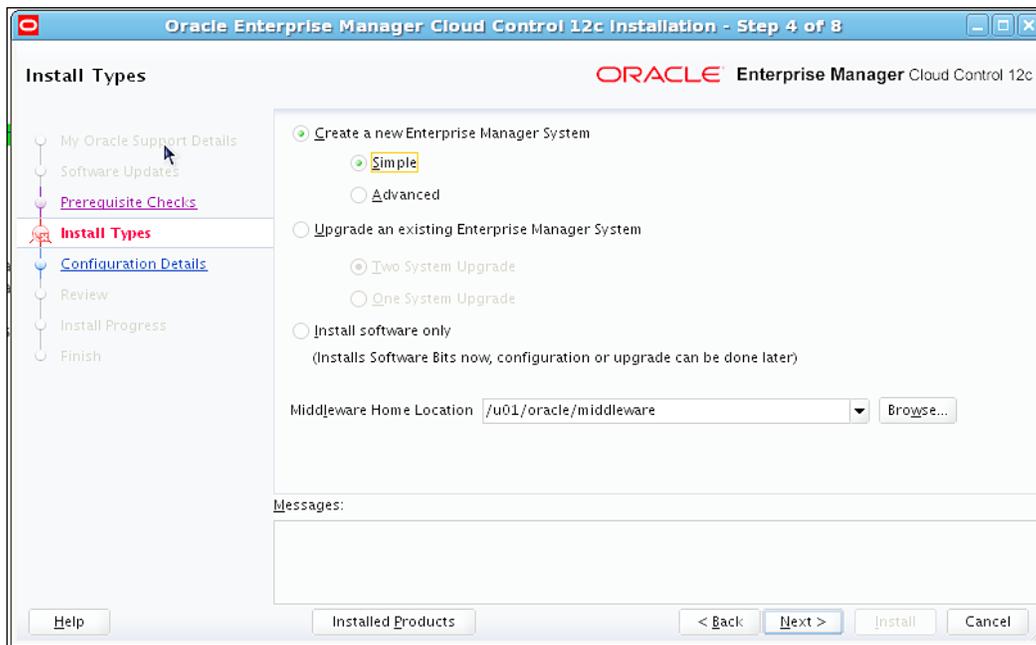


The installer now runs the prerequisite checks, and depending on the results, you can choose whether to ignore the results of any failed check and proceed, or to fix the issue first and then rerun the prerequisite checks.

However, it is recommended not to ignore any of the warnings or failures if they do come up. In this case there is a warning that there is not enough physical memory, because at least 3072 MB is expected to be available. This issue was resolved by allocating more memory to the virtual machine.



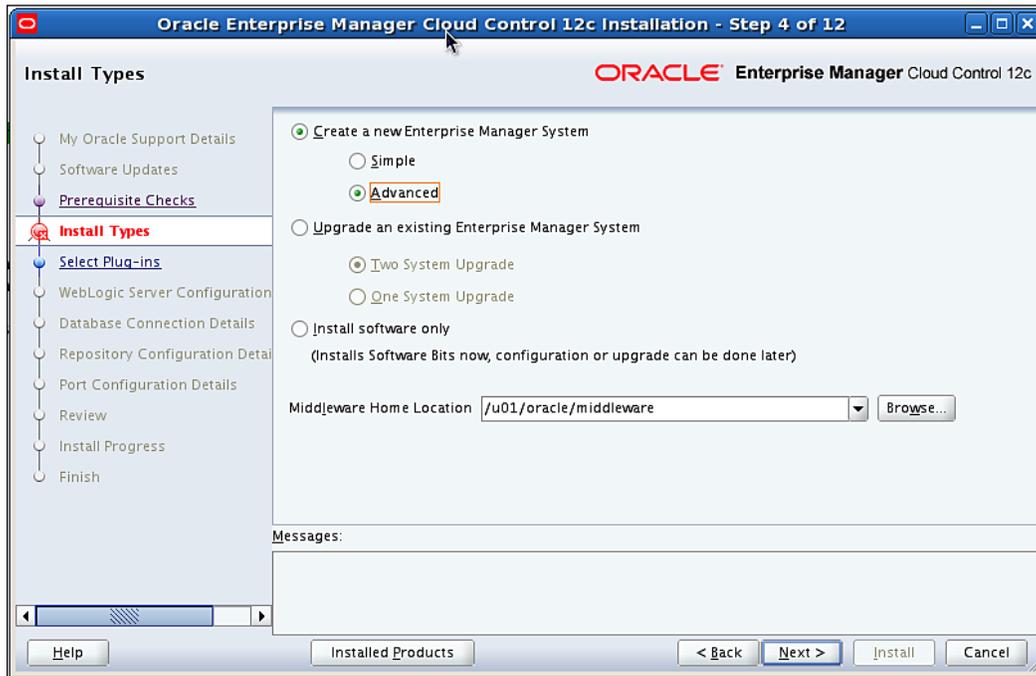
On the **Install Types** page the installation type can be chosen as either **Simple** or **Advanced**. In the **Simple** type, as seen in the following screenshot, there are fewer installation screens and some information is presumed to be the default. For example, WebLogic Server configuration details are not asked for:



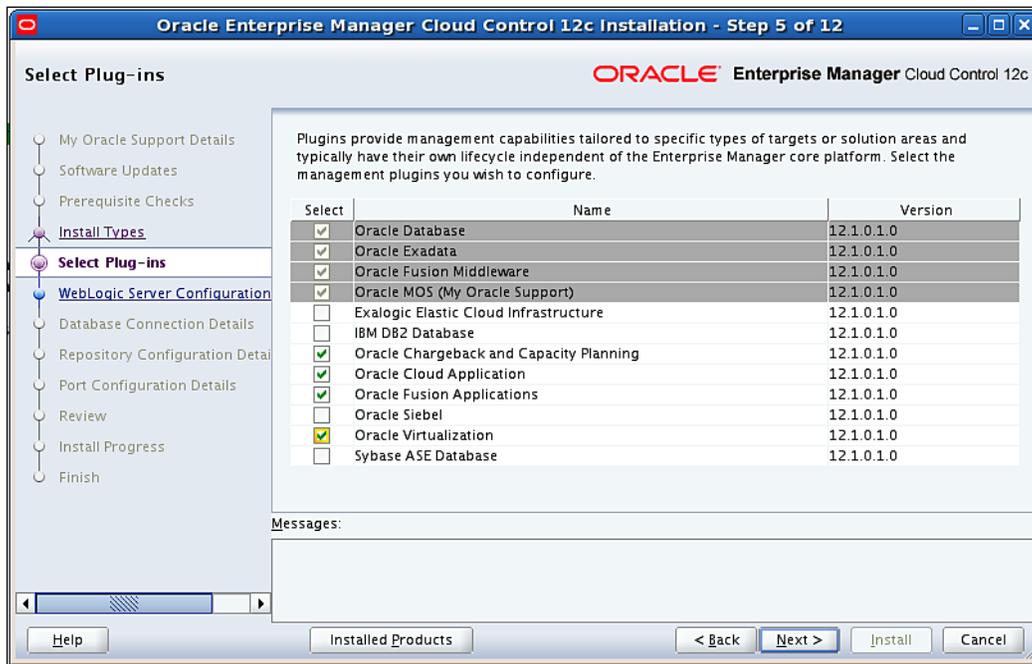
Instead, choose the **Advanced** type, where you can enter all necessary configuration details. This option will have a number of extra screens, as we will see in the following pages.

On this screen, it is also possible to choose to upgrade by selecting the **Upgrade an existing Enterprise Manager System** option, either in a two-system upgrade by using the **Two System Upgrade** option or a one-system upgrade by using the **One System Upgrade** option, or to install the software only by using the **Install software only** option. In the case of the latter, only the OMS software will be installed and the configuration or the upgrade can be done later on. We will look into the upgrade process in a little more detail in the coming sections.

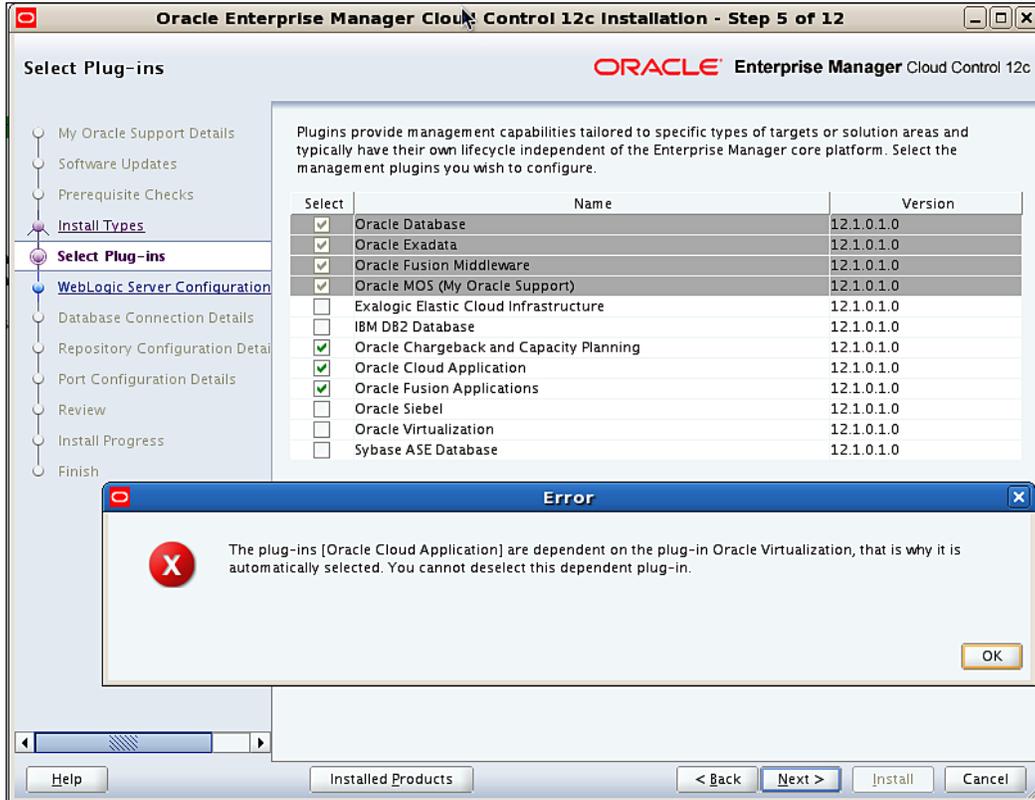
The middleware home location can also be entered at this point. We used `/u01/oracle/middleware` as the value. WebLogic Server 10.3.5 will be installed in this location by the installer. All this is seen in the following screenshot:



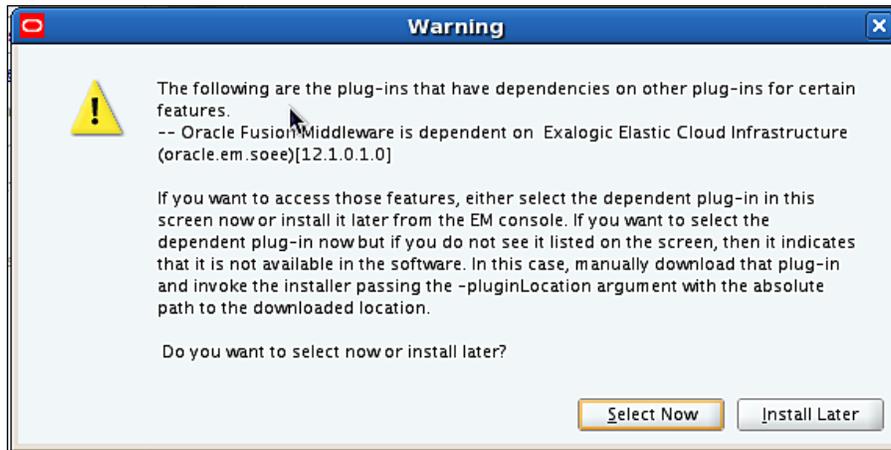
You can now select the plugins you want installed on the Enterprise Manager system. By default, the first four plugins are preselected. These are the **Oracle Database**, **Oracle Exadata**, **Oracle Fusion Middleware**, and **Oracle MOS (My Oracle Support)**. You can select more plugins from this list, as required. The plugins for **Oracle Siebel**, **IBM DB2 Database**, and **Sybase ASE Database** can be seen in the following screenshot, as are the plugins for the **Oracle Cloud Application**. We decide to select a few of these as shown in the following screenshot:



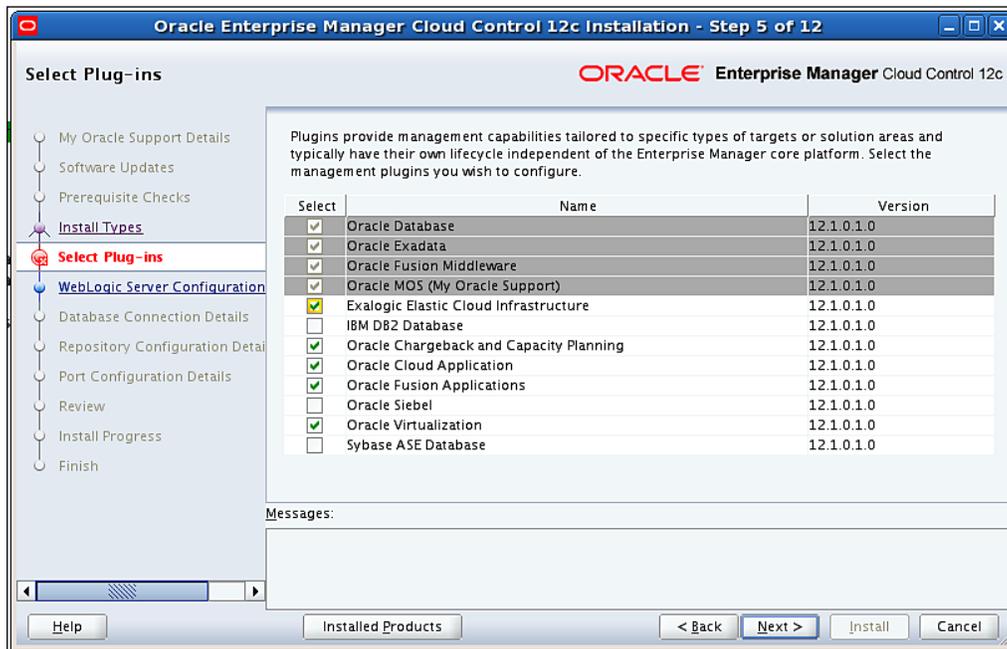
In case the **Oracle Virtualization** plugin is deselected at this stage, an error message appears showing the dependency of the **Oracle Cloud Application** plugin (that has already been selected) on the Oracle Virtualization plugin. As a result, it is not possible to deselect the plugin in this case. This is shown in the following screenshot:



Another dependency is seen in the following screenshot, where it is shown that the **Oracle Fusion Middleware** plugin is dependent on the **Exalogic Elastic Cloud Infrastructure** plugin. You need to select the latter first:



The final list of plugins with all the necessary dependents is shown in the following screenshot:



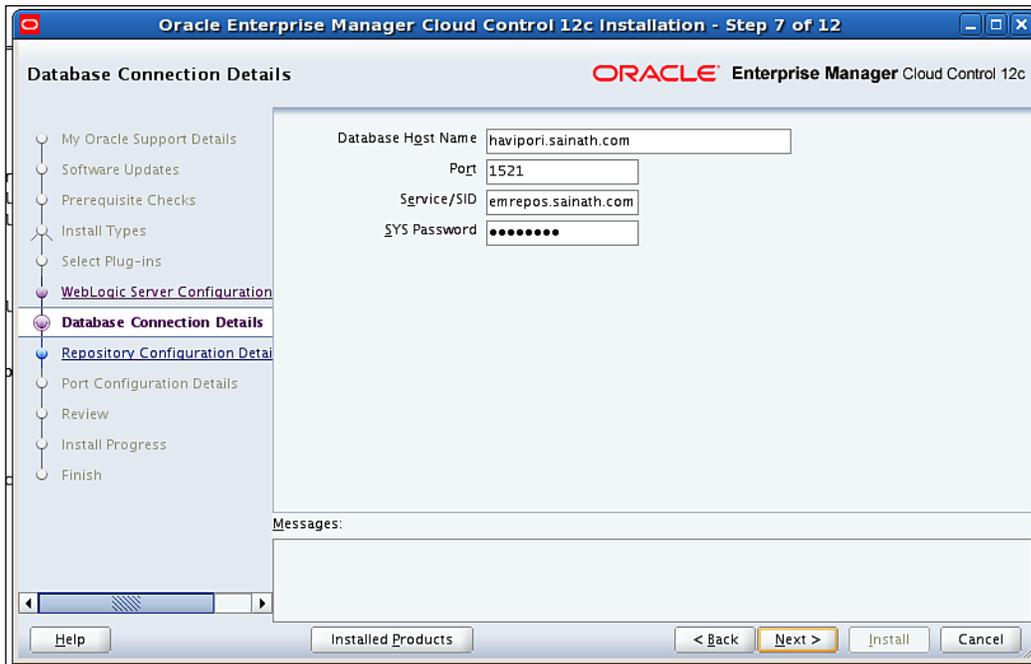
On the **WebLogic Server Configuration Details** page, the server details can now be input. The **Domain Name** field is fixed as **GCDomain**. You can select the WebLogic username and password that will be used.

The **Node Manager User Name** field is fixed as **nodemanager**, and you can select the node manager password. Also select the **OMS Instance Base Location** field, this should be under the middleware home location. In our case, we have used `/u01/oracle/middleware/gc_inst` as the value for the **OMS Instance Base Location** field:

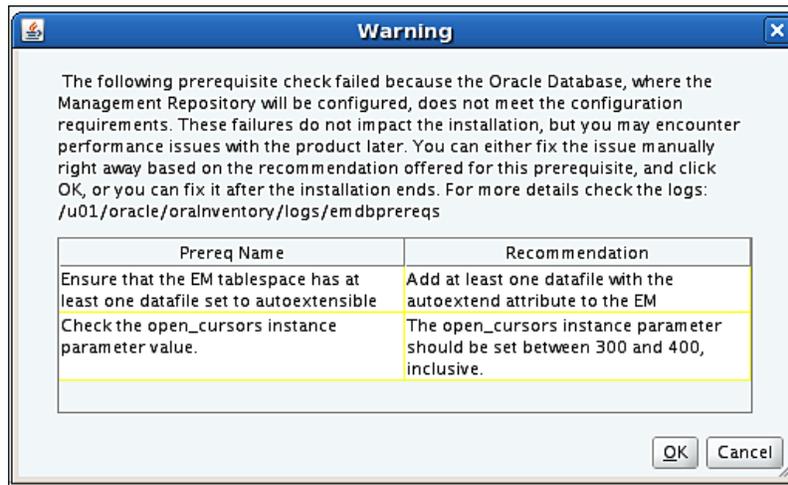


On the **Database Connection Details** screen, you can now enter the connection details of the database that you want to use as the repository for Enterprise Manager.

As mentioned earlier, this must be a preinstalled and certified database (as per the certification matrix) with specific requirements that need to be satisfied if it wants to serve as the Enterprise Manager repository. This is shown in the following screenshot:



When you hit the **Next** button, the installer connects to the database and goes through a number of prerequisite checks. If any of these checks fail, the installer will inform you appropriately, as can be seen in the following screenshot:

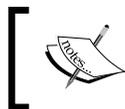
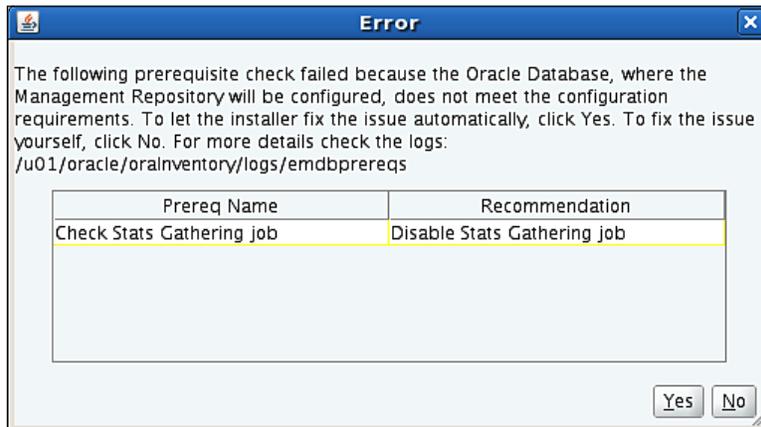


In this case, the recommendation is that at least one auto-extending file should be present in the database, and the `open_cursors` parameter should be between 300 and 400, both inclusive.

Likewise, if the installer finds that a database control schema exists in the database, it will ask you to deconfigure database control using the `emca` command. The command to use is as follows:

```
<Oracle Home of database>/bin/emca -deconfig dbcontrol db -repos drop  
-SYS_PWD <sys password> -SYSMAN_PWD <sysman password>
```

Another example: if the **Stats Gathering Job** task is active in the database, the recommendation will be to disable this job. You can let the installer fix this issue automatically by clicking on **Yes**, or select **No** to fix the issue yourself. This is shown in the following screenshot:



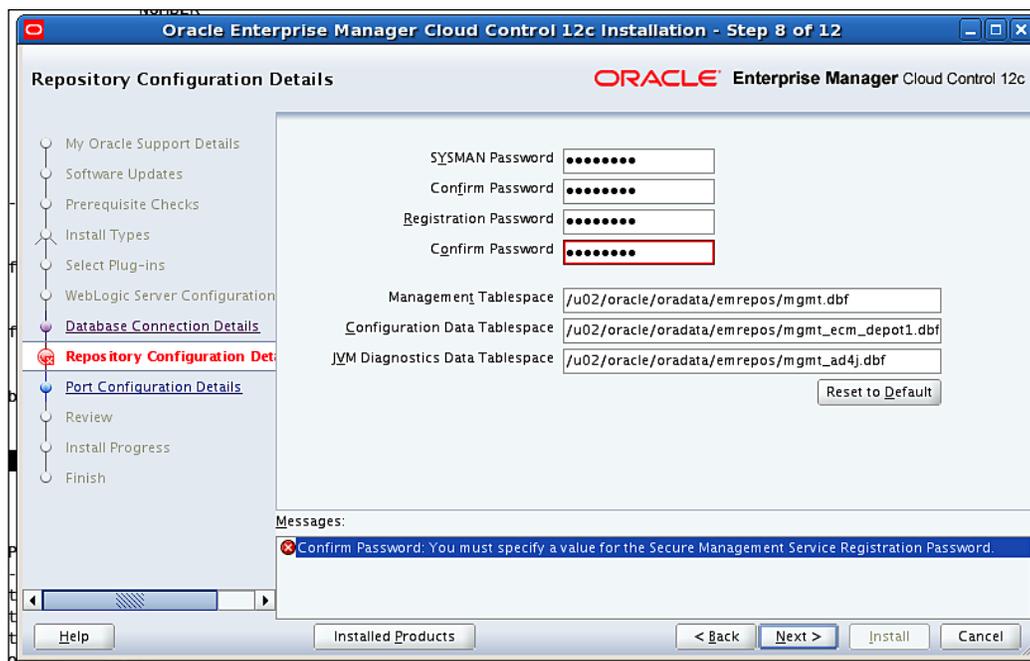
Note that it is possible for the installer in Enterprise Manager Cloud Control 12c to fix a few issues automatically, but all issues cannot be fixed in this way.

After the prerequisite checks run, it is possible to view the resulting log at the following location:

```
cd /u01/oracle/orainventory/logs/emdbprereqs/LATEST  
more emprereqkit.log
```

You can now enter the repository configuration details. These include the value for the **SYSMAN Password** field, the value for the Agent's **Registration Password** field, and the locations for certain specialized Tablespaces for Enterprise Manager, such as **Management Tablespace**, **Configuration Data Tablespace**, and **JVM Diagnostics Data Tablespace**.

We have opted to put these in the same directory location as the rest of the database files for the emrepos database, but you can place them in any suitable storage location with reasonably good I/O performance. This is shown in the following screenshot:



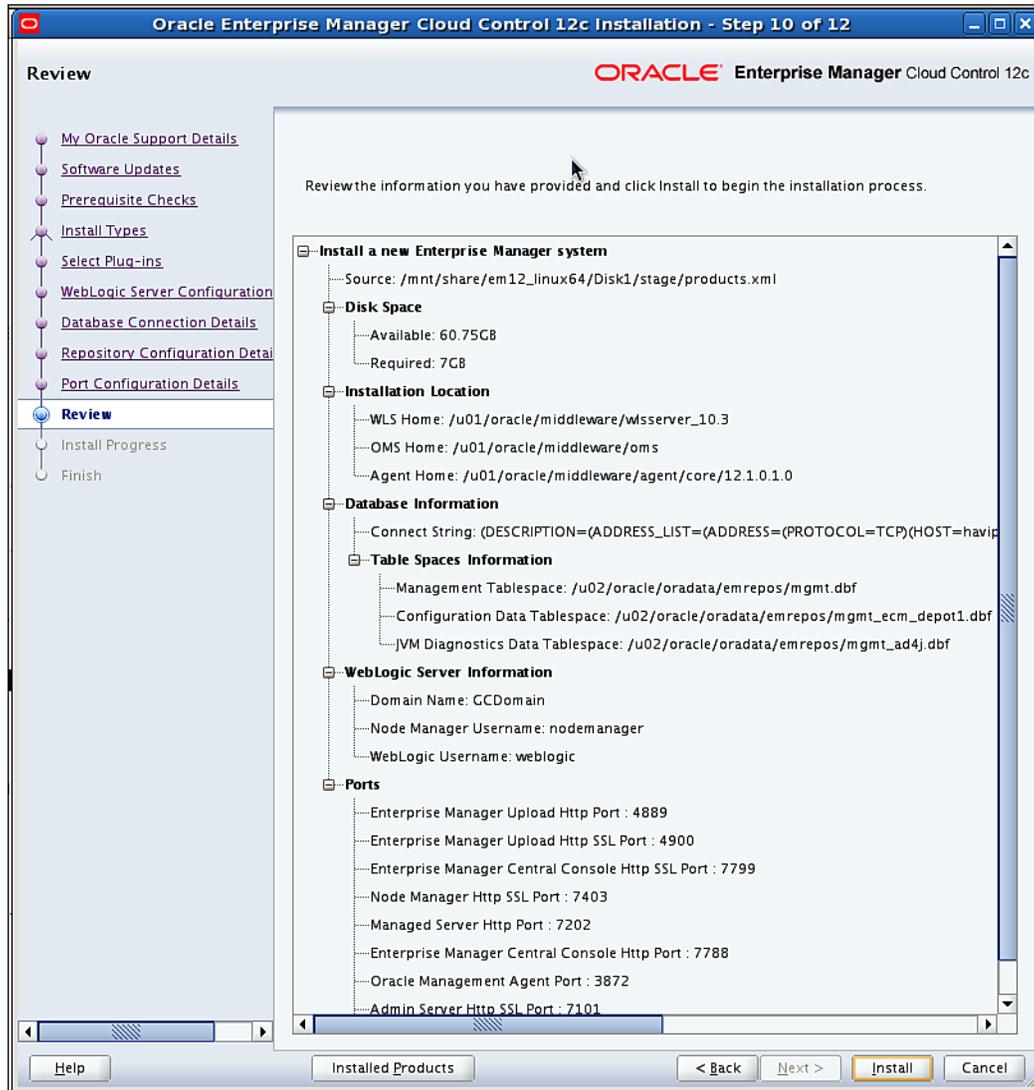
The ports required for Enterprise Manager's communication are now shown on the screen. For example, the **Enterprise Manager Upload Port** port, the **Enterprise Manager Central Console Port** port, and so on, both for HTTP and HTTPS (SSL).

These are the default ports; the recommended port ranges for each component are also shown in case you wish to change the ports. By default, the first port number in each range has been chosen, unless that port number is already in use. It is also possible to import a `staticports.ini` file with all the port information typed in that file, in case you want to change many of these ports. This is shown in the following screenshot:



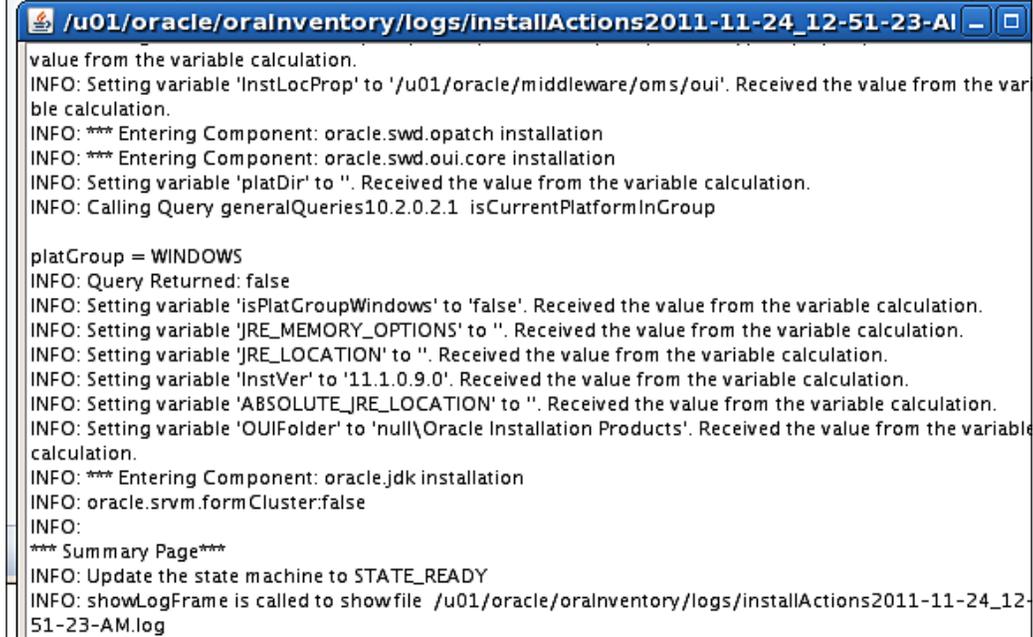
The ports can also be modified after installation. To do this, please refer to My Oracle Support (MOS) Document ID 1381030.1, *Steps for Modifying the HTTP and HTTPS Upload & Console Ports After Installation*. You could also refer to the *Customizing HTTP/HTTPS Console and Upload Ports After Installing Enterprise Manager Cloud Control* section in the *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide* document at http://docs.oracle.com/cd/E24628_01/install.121/e24089/getstrtd_things_to_know.htm#EMADV11827.

The **Review** screen now appears, showing the installation details. We can see that **7GB** of **Disk Space** will be used. The **Installation location** details, **Table Space Information** details, and **Ports** are displayed on this screen. You can review, and if correct, go ahead and press the **Install** button. This is shown in the following screenshot:



The installation now proceeds. One of the interesting new features is that you can click on the **View Log** link shown against each step, if you want to examine the details in the particular log for that step. This is shown in the following screenshot, where one of the logs has been displayed:

| Detailed Status | Status | Step | Log Details |
|-----------------|---|------------------|--------------------------|
| |  | Copy files | View Log |
| | | Configure | |
| | | Run root scripts | |



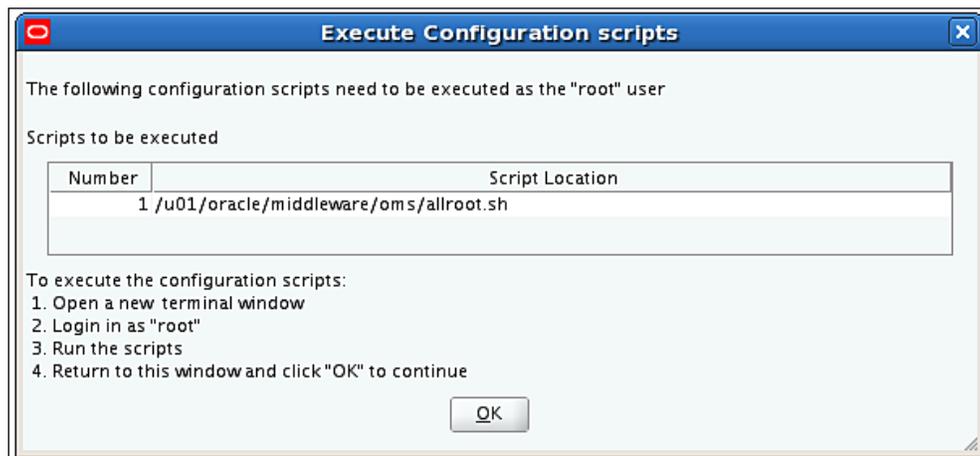
```
value from the variable calculation.
INFO: Setting variable 'InstLocProp' to '/u01/oracle/middleware/oms/oui'. Received the value from the variable calculation.
INFO: *** Entering Component: oracle.swd.opatch installation
INFO: *** Entering Component: oracle.swd.oui.core installation
INFO: Setting variable 'platDir' to ''. Received the value from the variable calculation.
INFO: Calling Query generalQueries10.2.0.2.1 isCurrentPlatformInGroup

platGroup = WINDOWS
INFO: Query Returned: false
INFO: Setting variable 'isPlatGroupWindows' to 'false'. Received the value from the variable calculation.
INFO: Setting variable 'JRE_MEMORY_OPTIONS' to ''. Received the value from the variable calculation.
INFO: Setting variable 'JRE_LOCATION' to ''. Received the value from the variable calculation.
INFO: Setting variable 'InstVer' to '11.1.0.9.0'. Received the value from the variable calculation.
INFO: Setting variable 'ABSOLUTE_JRE_LOCATION' to ''. Received the value from the variable calculation.
INFO: Setting variable 'OUIFolder' to 'null\Oracle Installation Products'. Received the value from the variable calculation.
INFO: *** Entering Component: oracle.jdk installation
INFO: oracle.srvm.formCluster:false
INFO:
*** Summary Page***
INFO: Update the state machine to STATE_READY
INFO: showLogFrame is called to showfile /u01/oracle/orainventory/logs/installActions2011-11-24_12-51-23-AM.log
```

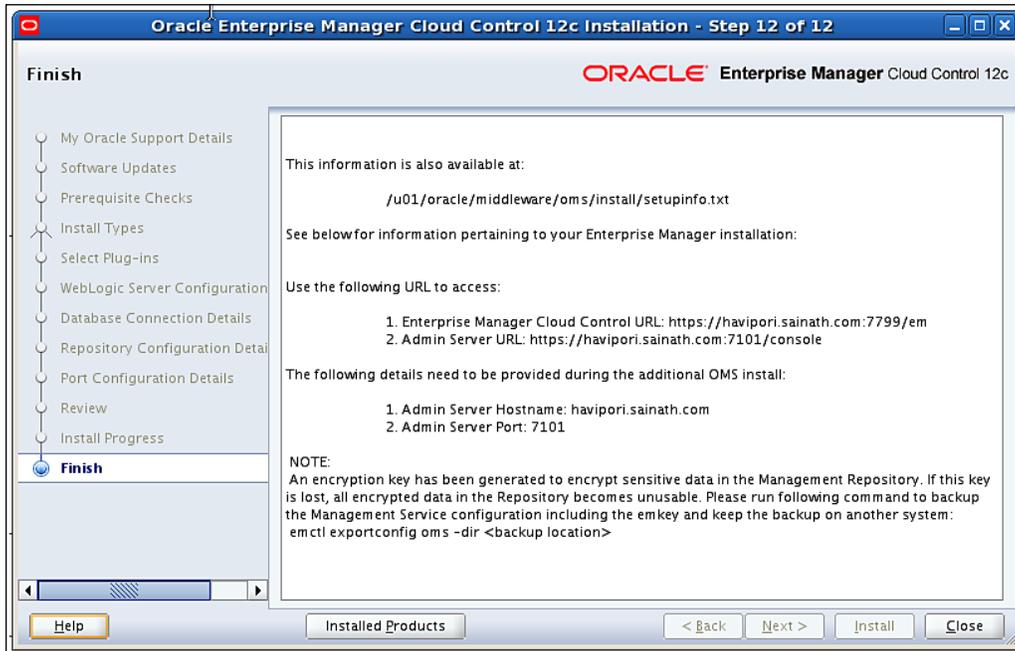
Installation and the multiple configurations proceed to completion, including that of the repository, OMS, and Agent. This is shown in the following screenshot:



You are then asked to run the `allroot.sh` script from the OMS Home, as follows:



After the root scripts are run, the installation finishes with the final information shown on the screen. The Enterprise Manager Cloud Control 12c URL is displayed, which is <https://havipori.sainath.com:7799/em>, and also the administration server URL, which is <https://havipori.sainath.com:7101/console>. There is normally one administration server in every WebLogic Server domain. This is shown in the following screenshot:



If another OMS is to be installed as part of this Enterprise Manager system, as is normally done for large sites with thousands of Targets (refer to the *Recommended architecture for large sites* section in this chapter for more details), the Admin Server details need to be noted down.

At this point, advice is also given to back up the encryption key that has been generated. This is responsible for encrypting sensitive data in the Management Repository.

This key, along with the management service configuration, is backed up via the following commands. For reasons of safety, it is recommended to place this backup on a separate system. This is shown in the following screenshot:

```

[oracle@havi pori ~]$ cd /u01/oracle/middleware/oms/bin
[oracle@havi pori bin]$
[oracle@havi pori bin]$ ./emctl exportconfig oms -dir ~/emencryptkeybackup
Oracle Enterprise Manager Cloud Control 12c Release 12.1.0.0.0
Copyright (c) 1996, 2011 Oracle Corporation. All rights reserved.
Enter Enterprise Manager Root (SYSMAN) Password :
ExportConfig started...
Machine is Admin Server host. Performing Admin Server backup...
Exporting emoms properties...
Exporting secure properties...

Export has determined that the OMS is not fronted
by an SLB. The local hostname was NOT exported.
The exported data can be imported on any host but
resecuring of all agents will be required. Please
see the EM Advanced Configuration Guide for more
details.

Exporting configuration for pluggable modules...
Preparing archive file...
Backup has been written to file: /home/oracle/emencryptkeybackup/opf_ADMIN_20110911_061753.bka

The export file contains sensitive data.
Please ensure that it is kept secure.

ExportConfig completed successfully!
[oracle@havi pori bin]$ ls -altr /home/oracle/emencryptkeybackup/
total 16480
drwx----- 22 oracle oracle 4096 Sep 11 06:09 ..
-rw-r----- 1 oracle oracle 8417294 Sep 11 06:12 opf_ADMIN_20110911_061218.bka
-rw-r----- 1 oracle oracle 8416894 Sep 11 06:17 opf_ADMIN_20110911_061753.bka
drwxrwxr-x 2 oracle oracle 4096 Sep 11 06:17 .

```

Post-installation tasks - GUI

After the successful installation of Enterprise Manager Cloud Control 12c, you may want to access the Cloud Control console from your host browser if you have used a virtual machine for installation. In that case, please follow the steps outlined in the earlier section – *Use of Oracle Virtual Box*.

In your browser, test the following URLs to make sure they work. If there is any issue with the URLs, there could have been a problem in the deployment of the Enterprise Manager application.

This is the main login to the Cloud Control console:

<https://havi pori.sainath.com:7799/em/login.jsp>

This is the HTTP XML File receiver servlet page:

<https://havi pori.sainath.com:4900/empbs/upload>

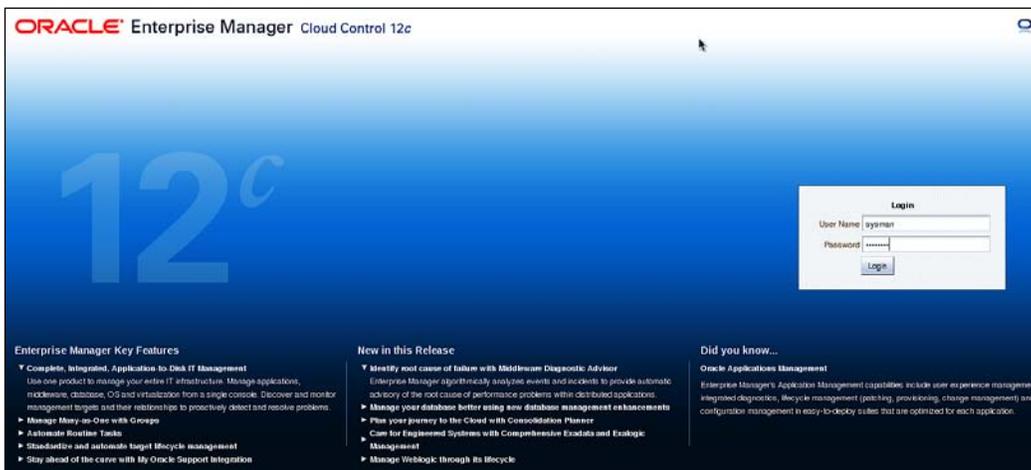
This is the EM platform background services check servlet page:

`https://havipori.sainath.com:4900/empbs/check`

If there is any problem while connecting to these URLs, you can look at the following access log for any hints as to why the problem is happening:

```
cd /u01/oracle/middleware/gc_inst/  
cd user_projects/domains/GCDomain/servers/EMGC_OMS1/logs  
more access.log
```

If all of these URLs work, we can now proceed to the main Enterprise Manager Cloud Control 12c console. After accepting the certificates, this displays the **Login** screen as shown in the following screenshot:



Log in as `sysman` with the password you have specified in one of the installation screens. `sysman` is the super user owner of the Enterprise Manager system. The first thing you see is the license agreement, which appears only the first time the user logs in.

This makes you aware that full use of Enterprise Manager requires the license for the Management Packs, and informs you that any use of the functionality, even via the SQL Plus interface or the **EMCLI** command line interface, is licensable even if the GUI Enterprise Manager is not being used.

As an example, the use of `awrrpt` from SQL Plus, or accessing the Active Session History views via any method, requires a license for the Database Diagnostics Pack.

ORACLE Enterprise Manager Cloud Control 12c

License Agreement

Clicking the 'I Accept' button below confirms your agreement that you comply with each of the following statements:

Oracle Enterprise Manager provides central management of your entire Oracle environment. Note that usage of certain product features requires separate licenses for Oracle Enterprise Manager Management Packs. You can enable or disable access to Management Pack features to stay compliant with your license terms. This can be done for individual targets, or you can use batch update to enable or disable management packs for all targets of a specific type.

Management Pack features can be accessed through Oracle Enterprise Manager Cloud Control browser interface, EMCLI (Enterprise Manager Command-line Interface) as well as through APIs provided with Oracle Database software. Access with any of these methods requires appropriate Management Pack license. For detailed information on the functionality contained within these packs, please refer to the Oracle Database Licensing Information document, the Oracle Application Server Licensing Information document or the Oracle Enterprise Manager Licensing Information document.

I Accept
I Do Not Accept

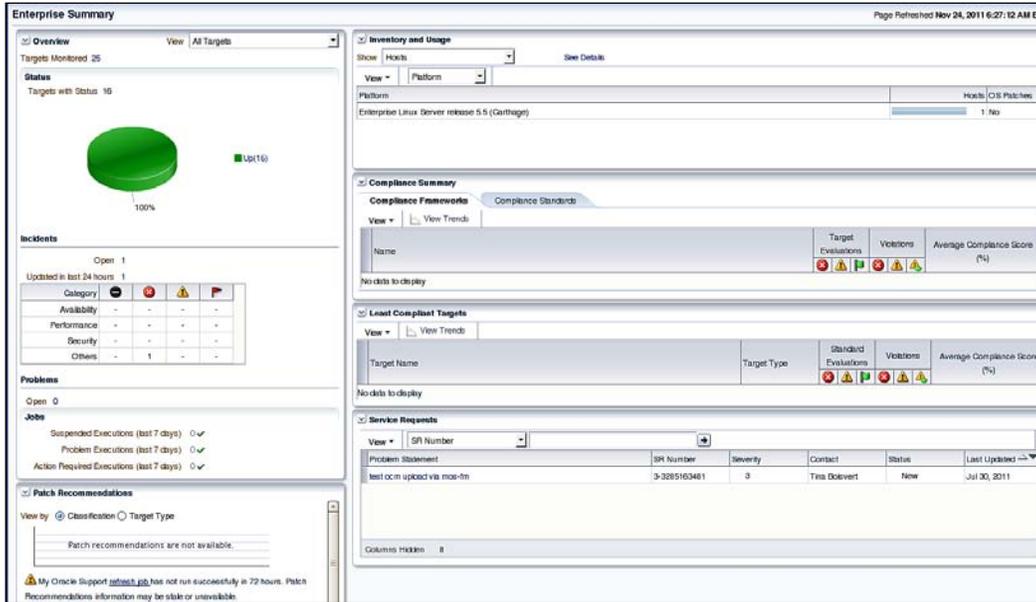
After the license agreement is accepted, a selection of home screens is presented for you to make a choice from. This is the new personalization feature of Enterprise Manager Cloud Control 12c, whereby each Administrator can choose the screen that is the best suited, depending on the job function. This is shown in the following screenshot:

Select Enterprise Manager Home

You can choose your preferred home page (viewed immediately after login and always accessible by clicking on the "Enterprise Manager" link in the top left corner) from one of the following options. If these options do not match your job profile or role, then using Setup > My Preferences you can make any other page in Enterprise Manager as your home page.

| | |
|--|---|
| <p>Summary</p>  <p>The summary page provides a complete and consolidated view of all targets monitored by Enterprise Manager and any critical events across those targets.</p> <p><i>Best for: EM Administrators</i></p> <p>Preview Select As My Home</p> | <p>Databases</p>  <p>Monitor any or every database instance or RAC database right on your homepage. Spot-check the text, memory consumption and any issues related to the target and initiate tuning processes with one click.</p> <p><i>Best for: Database Administrator</i></p> <p>Preview Select As My Home</p> |
| <p>Incidents</p>  <p>The Incident Manager helps users track, diagnose and resolve issues identified across targets by Enterprise Manager.</p> <p><i>Best for: on-call IT Operations personnel</i></p> <p>Preview Select As My Home</p> | <p>SOA</p>  <p>An enterprise level view for all the SOA targets featuring Alerts, Policy Violations, and critical metrics. Instantly review details of SOA Composites, EPEL, Processes, OBB Services and Web Services.</p> <p><i>Best for: SOA Architect</i></p> <p>Preview Select As My Home</p> |
| <p>Middleware</p>  <p>Monitor and manage all Fusion Middleware targets and non-Oracle middleware in your environment from this page.</p> <p><i>Best for: Weblogic and Middleware Administrators</i></p> <p>Preview Select As My Home</p> | <p>Fusion Applications</p>  <p>A single view of all Fusion instances, Product Families and Product targets for monitoring and management activities.</p> <p><i>Best for: Fusion Applications Administrator</i></p> <p>Preview Select As My Home</p> |
| <p>Infrastructure Cloud</p>  <p>Infrastructure Cloud Management Home allows the cloud administrator to monitor and manage the health of the cloud by tracking self service requests, chargeback information, and monitoring performance and availability of cloud infrastructure resources.</p> <p><i>Best for: Private Cloud Administrator</i></p> <p>Preview Select As My Home</p> | <p>Composite Application</p>  <p>An enterprise-wide view of the health, performance and availability of Composite Applications. It provides list of all Composite Applications created with their member details along with status information.</p> <p><i>Best for: Application Architect</i></p> <p>Preview Select As My Home</p> |

We have selected the **Summary** screen, and this now appears as shown in the following screenshot:

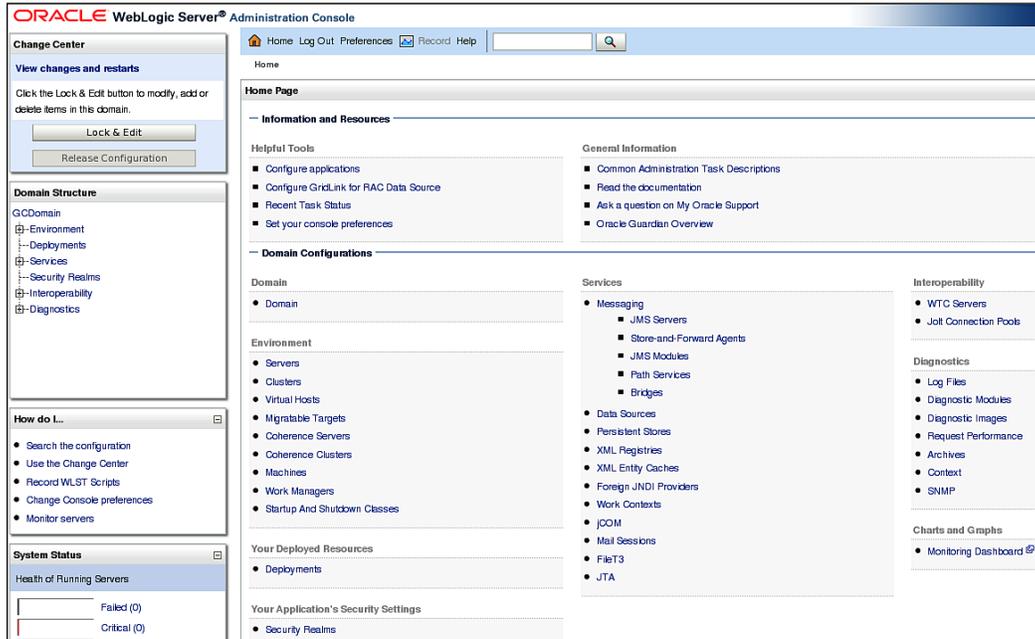


This is an enterprise-wide view of all the Targets managed by Enterprise Manager. As the installation is fairly new, the number of Targets being monitored is low – as these Targets are from the one server where Enterprise Manager was installed.

Let us check the WebLogic server administration console as well. Using the login details supplied, attempt to log in to the console as follows:



This displays the Administration Console, which lets you manage the WLS domain configuration and also aids in WebLogic diagnostics, as can be seen in the following screenshot:



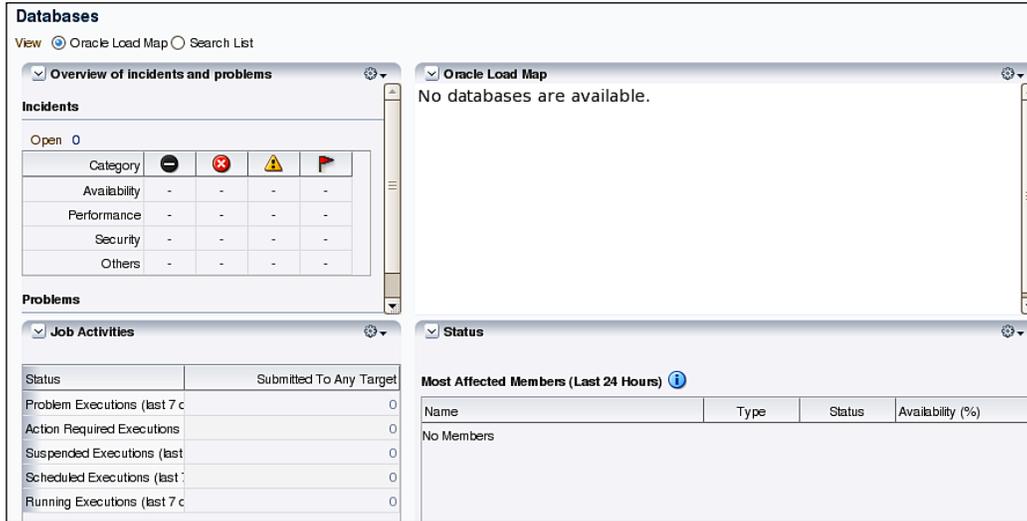
Moving back to the main Cloud Control console, go to **Targets | Hosts** to examine the list of host Targets that are being managed by this Enterprise Manager system. As expected, there is only one host in the list, which is **havipori.sainath.com**:

| Select | Name | Status | Pending Activation | Incidents | Compliance Violations | Average Compliance score | CPU Util % | Mem Util % | Total IO/sec |
|--------------------------|----------------------|--------|--------------------|-----------|-----------------------|--------------------------|------------|------------|--------------|
| <input type="checkbox"/> | havipori.sainath.com | | - | 0 0 0 0 | 0 0 0 | 100 | 18.8 | 74.14 | 26,539 |

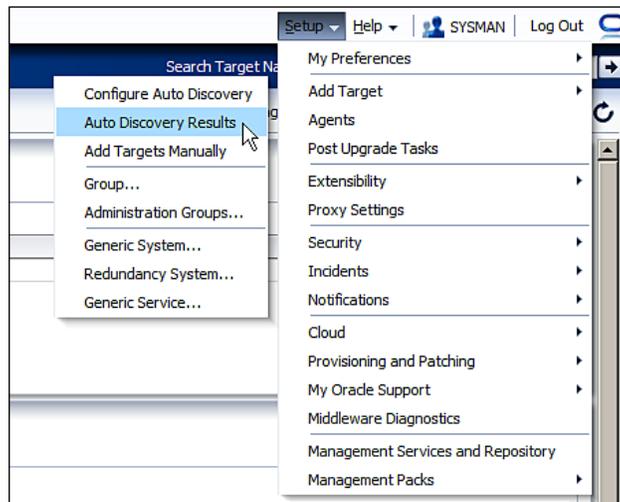
TIP For an explanation of the icons and symbols used in this page, see the Icon Key.

Related Links
[Customize Table Columns](#) [Run Host Command](#)

However, if you go to **Targets | Databases** from the menu, this shows us that there are no databases being monitored, not even the repository. This can be seen in the following screenshot. This is surprising but expected behavior in this version of Cloud Control 12c:



To resolve this issue of the missing database Targets, you need to go to **Setup | Add Targets | Auto Discovery Results**, as shown in the following screenshot:



This brings up the **Auto Discovery** screen, in which we can see a list of all the Targets that were discovered by auto-discovery. There is a separate tab for **Host Targets** and **Non-Host Targets**, and in the non-host list we can see the Oracle homes and databases that are present on **havipori.sainath.com**.

The auto-discovery in this case was performed automatically by the Enterprise Manager installation process, but as the instruction workflow shows, it is possible to set up auto-discovery using IP Scan on any single host or multiple hosts.

The next step is to select the Targets you want to manage, and click on the **Promote** button. This is shown in the following screenshot:

Auto Discovery Results Page Refreshed Nov 25, 2011 7:13:56 AM EST

Instruction
Review discovered unmanaged targets and promote targets to be managed by Enterprise Manager.

Configure Auto Discovery

- Setup discovery using IP Scan
- Setup discovery on Single Host
- Setup discovery on Multiple Hosts

Add Targets from Auto Discovery Results

- Add Non-Host Targets
- Add Discovered Hosts
- Ignore Discovered Targets

Add Targets Manually or Using Guided Process

- Add Targets Manually
- Add Related Targets
- Use Discovery Modules

Host Targets (0) **Non-Host Targets (7)** Ignored Targets (0)

Search

View ▾ Promote Rename Delete Ignore Refresh

| Target Name | Target Type | Discovered On | Host | Agent |
|-------------------------------|-------------------|-----------------------------------|----------------------|---|
| LISTENER_havipori.sainath.com | Listener | Nov 24, 2011 8:04:26 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| Oradbt1g_home1_1_havipori | Oracle Home | Nov 24, 2011 8:04:24 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| common12g1_24_havipori | Oracle Home | Nov 24, 2011 8:04:24 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| emrepos.sainath.com | Database Instance | Nov 24, 2011 8:04:25 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| jdk1_2_havipori | Oracle Home | Nov 24, 2011 8:04:24 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| orcl | Database Instance | Nov 24, 2011 8:04:27 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |
| sbh12g1_14_havipori | Oracle Home | Nov 24, 2011 8:04:24 PM GMT-05:00 | havipori.sainath.com | https://havipori.sainath.com:3872/emd/main/ |

However, an **Error** pop-up window appears, asking us to only select Targets of the same Target type when promoting. This happened because we had selected all the non-host Targets and had tried to promote them together, which did not work:



We decide to first promote the Oracle homes by selecting them to be promoted. The following screen appears, in which we specify whether **Oracle Home Type** is of **OUI Home Type** (Homes installed by Oracle Universal Installer) or of **WebLogic Home Type** (Homes installed by the WebLogic Server installation procedures). We can see that two of the paths belong to the BEA (WebLogic) Home, so we select **W** as their **Home Type**. For the Agent and the database, we select **O Home Type**, as they are homes installed by the Oracle Universal Installer:

| Target Name | * Oracle Home Type [O] (OUI Home) [W] (Weblogic Home) | * Path to Oracle Home | OUI Inventory this home belongs to | BEA Home this home belongs to |
|---------------------------|---|--|------------------------------------|-------------------------------|
| Oradb11g_home1_1_havipori | O | /u01/oracle/db/product/11.2.0/dbhome_1 | /u01/oracle/oralInventory | |
| common12g1_24_havipori | W | /u01/oracle/middleware/oracle_common | /u01/oracle/oralInventory | /u01/oracle/middleware |
| jdk1_2_havipori | W | /u01/oracle/middleware/jdk16 | /u01/oracle/oralInventory | /u01/oracle/middleware |
| sbn12g1_14_havipori | O | /u01/oracle/middleware/agent/sbin | /u01/oracle/oralInventory | |

When promoting the databases on the same host, Enterprise Manager insists that you select only a single Target to be promoted for that type of database instance. When this is done, you also have to enter the configuration details for the monitoring of each database, by clicking on the red spanner icon in the **Configure** column:

| Select | Name | Database System | Group | Configure | Metrics |
|-------------------------------------|---------------------|-------------------------|-------|-----------|---------|
| <input checked="" type="checkbox"/> | emrepos.sainath.com | emrepos.sainath.com_sys | | | |
| <input type="checkbox"/> | orcl | orcl_sys | | | |

Listeners
The following listeners have been discovered on this host.

| Select | Name | Listener Name | Oracle Home | Group | Port | Listener Directory |
|--------------------------|-------------------------------|---------------|--|-------|------|--|
| <input type="checkbox"/> | LISTENER_havipori.sainath.com | LISTENER | /u01/oracle/db/product/11.2.0/dbhome_1 | | 1521 | /u01/oracle/db/product/11.2.0/dbhome_1/network/admin |

Targets that have this configuration icon are only partially configured. In order to add one of these targets, click on this icon in the configuration column and complete the configuration.

In the **Configure Database Instance:Properties** screen, you need to type in the value for the **Monitor Password** field for the **dbsnmp** user (the monitor username), and also the **Listener Machine Name** information (such as the listener port). Then click on the **Test Connection** button, and proceed to save the configuration if the test was successful – this means Enterprise Manager would have successfully connected to the database using the **dbsnmp** Password and via the **Listener Port** port specified:

Configure Database Instance: Properties

* Name: emrepos.sainath.com
 Type: Database Instance
 * Database System: emrepos.sainath.com.sys

| Name | Value |
|-----------------------|---|
| Oracle Home Path | /u01/oracle/oh/production/11.2.0.4.0/ohhome |
| Monitor Username | dbemmp |
| Monitor Password | ***** |
| Role | Normal |
| Listener Machine Name | havipori.sainath.com |
| Port | 1521 |
| Database SID | emrepos |

Preferred Connect String
 Enter the connection string that OMS should use when connecting to the target database. If blank, the OMS would automatically construct one using the host, port, SID provided above.

In this way, proceed to fill in the configuration details for the other database as well; and when both the databases have a valid configuration, you can proceed to promote both the database Targets as seen in the following screenshot. The databases will now be valid, monitored Targets in Enterprise Manager Cloud Control 12c:

Targets Discovered on Host: havipori.sainath.com

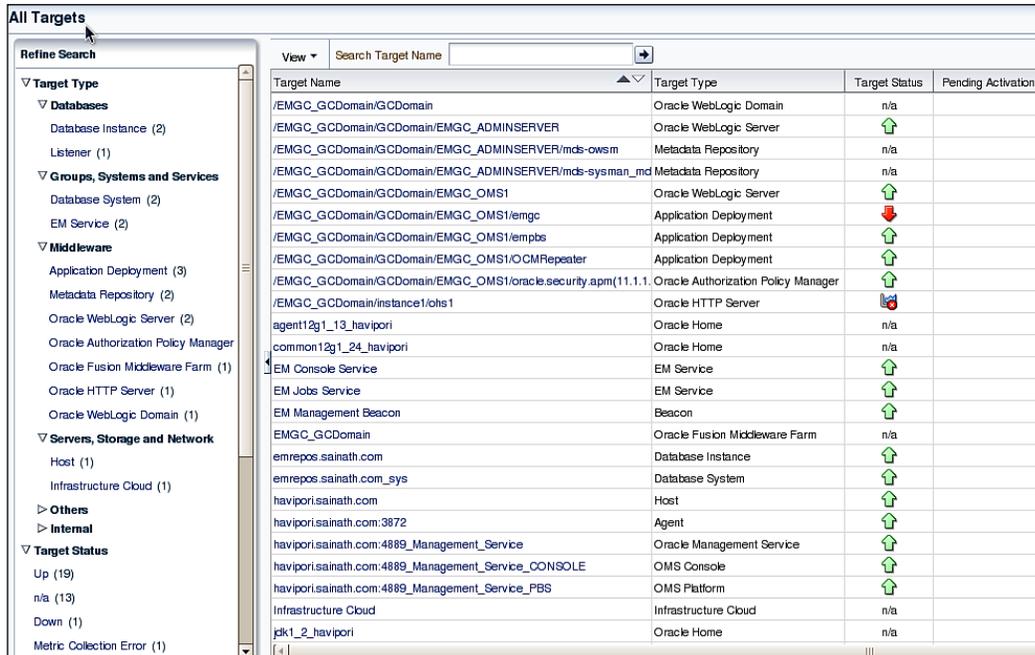
Summary
 Following Database systems will be created for the discovered databases and related targets. Rest of the targets in the second table will be saved but will not be part of any database system.

| Database Systems | | |
|-------------------------------|-------------------|----------------------|
| Name | Type | Host |
| emrepos.sainath.com_sys | Database System | |
| emrepos.sainath.com | Database Instance | havipori.sainath.com |
| LISTENER_havipori.sainath.com | Listener | havipori.sainath.com |
| orcl_ssys | Database System | |
| orcl | Database Instance | havipori.sainath.com |
| LISTENER_havipori.sainath.com | Listener | havipori.sainath.com |

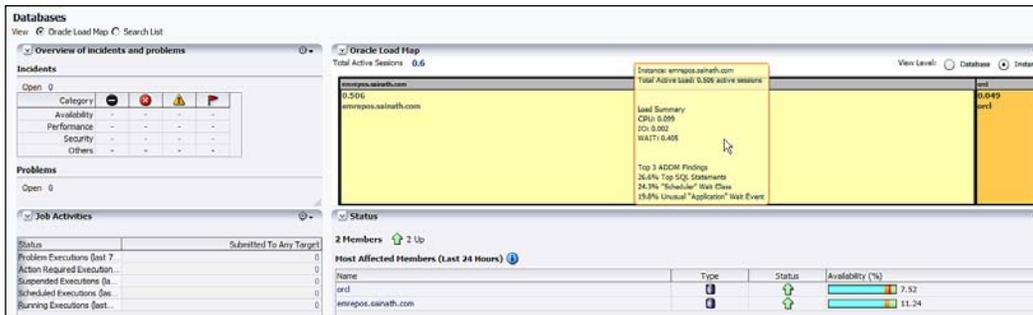
| Targets | | |
|----------------|------|------|
| Name | Type | Host |
| No items found | | |

If you now go to **Targets | All Targets** from the menu, you can see a list of all the Targets monitored by this Enterprise Manager system. Database systems and database Targets are now visible, these are the Targets we have just promoted.

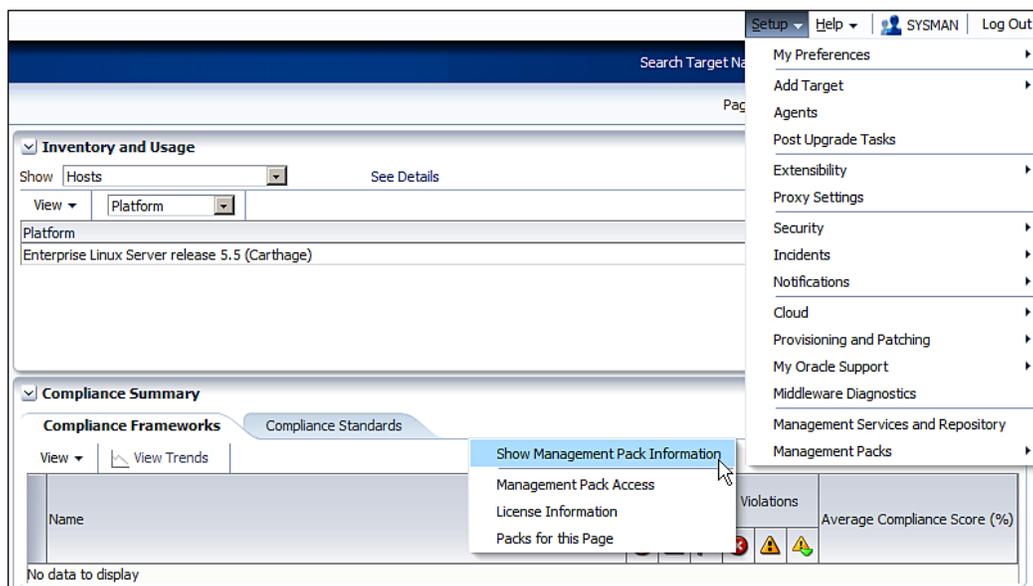
You can easily drill down into the Targets you would like, by selecting the **Target Type** option from the left-hand side pane. For example, you can select databases, middleware, servers, storage and network, among others. This becomes a search condition. You can then add to the search condition by selecting the platform, version, or operating system; for example, you can search for the database Targets and then narrow down the search to 10.1 version databases:



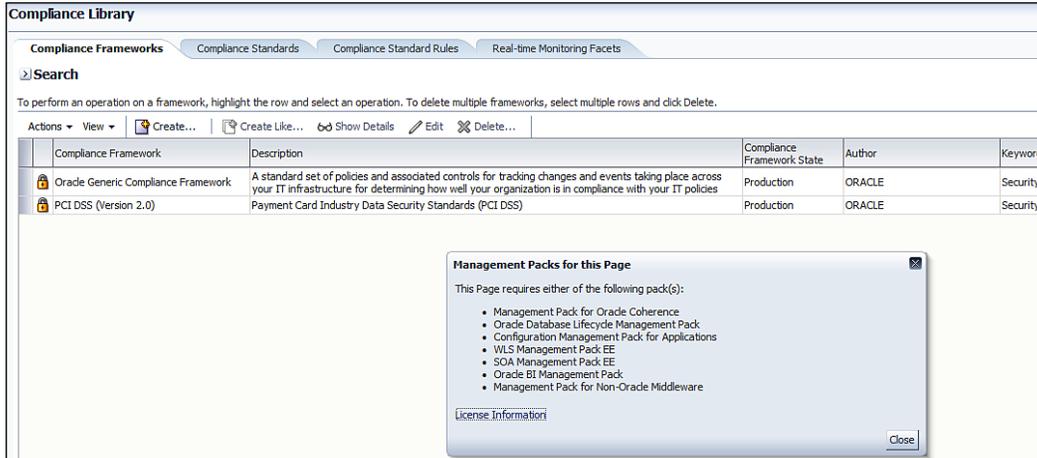
Moving back to **Targets | Databases**, we can see the two Databases appear in the **Oracle Load Map** section. This shows, at a glance, the databases with the heaviest load from among all our Target databases. Moving the cursor over the database box in this **Oracle Load Map** shows a pop-up box with the Load Details (**CPU, IO, WAIT**) and also the **Top Three (ADDM) Findings**, which is very convenient for the DBA. By clicking on the database box, the DBA can then drill down directly into the performance homepage for that database:



It is very important to know the licensing requirements for Enterprise Manager Cloud Control 12c. For this purpose, Enterprise Manager provides an easy way to find out which Management Packs are required. You can turn on this feature by going to **Setup | Management Packs | Show Management Pack Information**. You can also modify your management pack's access for different packs and different Targets by going to **Setup | Management Packs | Management Pack Access**, or you can select **Packs for this Page** from the same menu:



For example, going to **Enterprise | Compliance | Library** to view the **Compliance Library** page, and then navigating to **Setup | Management Packs | Packs** for this page brings up a list of packs that can be licensed (any one of them) to make use of the functionality on this page:



Post-installation tasks – Command line

We will now continue with some post-installation tasks to be performed at the command line.

After installation is complete, the following directory structure can be seen:

```
[oracle@havipori]$ cd /u01/oracle/middleware
[oracle@havipori middleware]$ tree -d -L 1
.
|-- Oracle_WT
|-- agent
|-- gc_inst
|-- jdk16
|-- logs
|-- modules
|-- oms
|-- oracle_common
|-- plugins
|-- user_projects
|-- utils
'-- wlsserver_10.3

12 directories
```

The Oracle Home for the OMS is obviously `/u01/oracle/middleware/oms`. This will have a `bin` folder that has the commands to control the Cloud Control components, such as `emctl`. You can check the detailed status of the OMS by moving to the `bin` folder of the OMS Oracle Home and issuing the following command:

```
cd /u01/oracle/middleware/oms/bin
```

```
./emctl status oms -details -sysman_pwd <password>
```

```
Oracle Enterprise Manager Cloud Control 12c Release 12.1.0.1.0
Copyright (c) 1996, 2011 Oracle Corporation. All rights reserved.
Console Server Host : havipori.sainath.com
HTTP Console Port   : 7788
HTTPS Console Port  : 7799
HTTP Upload Port    : 4889
HTTPS Upload Port   : 4900
OMS is not configured with SLB or virtual hostname
Agent Upload is unlocked.
OMS Console is unlocked.
Active CA ID: 1
Console URL: https://havipori.sainath.com:7799/em
Upload URL: https://havipori.sainath.com:4900/empbs/upload
```

WLS Domain Information

```
Domain Name       : GCDomain
Admin Server Host: havipori.sainath.com
```

Managed Server Information

```
Managed Server Instance Name: EMGC_OMS1
Managed Server Instance Host: havipori.sainath.com
```

This confirms that the OMS is operational.

If the OMS is down, you can start the OMS with the following command:

```
cd /u01/oracle/middleware/oms/bin
./emctl start oms
```

In another session, you can look at the operation logs by executing the following commands:

```
cd /u01/oracle/middleware/gc_inst/  
cd em/EMGC_OMS1  
cd sysman/log  
tail -f emctl.log
```

The first folder you have moved here, that is, `/u01/oracle/middleware/gc_inst/` is the value of OMS instance's home, and this is the place where the configuration files for the OMS Home are placed. Under this, you have the `sysman` folder, this contains the system management files for this Cloud Control installation. The directory `/sysman/config` contains configuration files for the OMS.

Under the Oracle Home for the OMS (`/u01/oracle/middleware/oms`), you have the `log` folder with logfiles for this OMS. If you want the logfiles for the repository, see `sysman/log/schemamanager` under `/u01/oracle/middleware/oms`. If you want the install logs, they can be seen in `/u01/oracle/middleware/oms/cfgtoollogs`. And as we saw, the operation logs are under `OMS_INSTANCE_HOME/em/EMGC_OMS1/sysman/log`.

On the other hand, the Agent folder structure is as follows:

```
cd /u01/oracle/middleware/agent  
[oracle@havipori agent]$ tree -d -L 2  
.  
|-- agent_inst  
|   |-- bin  
|   |-- diag  
|   |-- install  
|   '-- sysman  
|-- core  
|   '-- 12.1.0.1.0  
|-- plugins  
|   |-- oracle.sysman.beacon.agent.plugin_12.1.0.1.0  
|   |-- oracle.sysman.csa.discovery.plugin_12.1.0.1.0  
|   |-- oracle.sysman.db.agent.plugin_12.1.0.1.0  
|   |-- oracle.sysman.db.discovery.plugin_12.1.0.1.0  
|   |-- oracle.sysman.emas.agent.plugin_12.1.0.1.0  
|   '-- oracle.sysman.emas.discovery.plugin_12.1.0.1.0
```

```
| |-- oracle.sysman.emfa.discovery.plugin_12.1.0.1.0
| |-- oracle.sysman.emrep.agent.plugin_12.1.0.1.0
| |-- oracle.sysman.oh.agent.plugin_12.1.0.1.0
| |-- oracle.sysman.oh.discovery.plugin_12.1.0.1.0
| '-- oracle.sysman.xa.discovery.plugin_12.1.0.1.0
'-- sbin
    |-- cfgtoollogs
    |-- install
    '-- inventory
```

23 directories

The folder `/u01/oracle/middleware/agent/agent_inst` is the Agent instance's home. For controlling the Agent and starting/stopping it, use the `emctl` command, located in the `bin` folder of the Agent instance's home (`AGENT_INSTANCE_HOME/bin`).

This is obviously the correct folder to use for calling the `emctl` command, as it has the `sysman/emd` subfolders. Issue this command now to ensure that the Agent is operational:

```
cd /u01/oracle/middleware/agent/agent_inst/bin
./emctl status agent
Oracle Enterprise Manager 12c Cloud Control 12.1.0.1.0
Copyright (c) 1996, 2011 Oracle Corporation. All rights reserved.
-----
Agent Version      : 12.1.0.1.0
OMS Version        : 12.1.0.1.0
Protocol Version   : 12.1.0.1.0
Agent Home         : /u01/oracle/middleware/agent/agent_inst
Agent Binaries     : /u01/oracle/middleware/agent/core/12.1.0.1.0
Agent Process ID   : 4727
Parent Process ID  : 4685
Agent URL          : https://havipori.sainath.com:3872/emd/main/
Repository URL     : https://havipori.sainath.com:4900/empbs/upload
Started at        : 2011-11-26 00:35:07
Started by user    : oracle
Last Reload       : (none)
Last successful upload           : 2011-11-26 01:58:04
```

```
Last attempted upload                : 2011-11-26 01:58:04
Total Megabytes of XML files uploaded so far : 1.09
Number of XML files pending upload      : 0
Size of XML files pending upload(MB)    : 0
Available disk space on upload filesystem : 73.86%
Collection Status                      : Collections enabled
Last attempted heartbeat to OMS        : 2011-11-26 01:59:21
Last successful heartbeat to OMS       : 2011-11-26 01:59:21
```

Agent is Running and Ready

Note that the logfiles for the Agent are generated in the `sysman/log` folder under the `AGENT_INSTANCE_HOME`.

 **An important note regarding oratab entries**
In Enterprise Manager Cloud Control 12c, for the OMS and Agent Homes, the `oratab` entries are no longer to be placed in the file `/etc/oratab`. This file will still have the repository database home entry, but the OMS and Agent Homes will be present in a new file `/etc/oragchomelist`.

The `oragchomelist` file is as follows:

```
[oracle@havipori]$ cat /etc/oragchomelist
/u01/oracle/middleware/oms
/u01/oracle/middleware/agent/core/12.1.0.1.0:/u01/oracle/middleware/
agent/agent_inst
[oracle@havipori]$ cat /etc/oratab
orcl:/u01/oracle/db/product/11.2.0/dbhome_1:N
emrepos:/u01/oracle/db/product/11.2.0/dbhome_1:Y
```

If you want to have a detailed look at the installation logs post-installation, you can see them at the following locations:

- Under the Oracle Inventory location: `/u01/oracle/oraInventory/logs/installActions<timestamp>.log`
- Under the OMS Oracle Home: `/u01/oracle/middleware/oms/cfgtoollogs/oui/installActions<timestamp>.log`

- The OMS configuration logfiles can be seen under the `/u01/oracle/middleware/oms/cfgtoollogs/omsca/` directory
- Other general configuration logs can also be seen in the `/u01/oracle/middleware/oms/cfgtoollogs/cfgfw/` directory

You can refer to the *Basic and Advanced Installation Guides* document in the Enterprise Manager documentation for further details. You can also refer to the *Enterprise Manager Installation and Upgrade* page on OTN, which can be found at the following URL:

<http://www.oracle.com/technetwork/oem/install-upgrade-496677.html>

Autostartup of OMS

It may happen that when you restart the virtual machine after installation, you can see the database and OMS appear to start, but when you try to connect to Cloud Control in the browser, you are unable to see the console login screen. You may need to restart the OMS as follows:

```
emctl stop oms -all
emctl start oms
```

This is because of the startup scripts that are created by the OMS installation process. Essentially, the install process creates startup script links without considering the fact that the repository database may have been installed on the same machine (in Enterprise Manager Cloud Control 12c, the database is no longer installed by the OMS installation, and has to have been precreated). In that case, the database will need to be started and up and running along with the Oracle Listener, before the OMS startup script comes into action. This is not the case after the OMS has been installed, as can be seen below:

AS ROOT:

```
cd /etc/rc2.d
```

This directory, which is for run level 2, has a soft link pointing to the OMS startup script `gcstartup`:

```
S98gcstartup -> ../init.d/gcstartup
```

This actually calls the main script responsible for starting and shutting the OMS:

```
/u01/oracle/middleware/oms/install/unix/scripts/omsstup)
```

Whereas, in the directory `/etc/rc3.d`, which is for `run level 3`, there is a soft link pointing to the Database startup file `dbora`:

```
s97dbora -> ../init.d/dbora
```

Since the run levels are different, it means the database is starting after the OMS. To resolve this issue, you need to fix the order of the links in the run levels. Or, you can remove the database link and instead put the database startup and shutdown inside either the `gcstartup` or the `omsstup` script. Remember to test your changes and make sure the startup or shutdown works properly.

Release 2 now available

On September 13, 2012, Oracle announced general availability of Oracle Enterprise Manager Cloud Control 12c Release 2, now available on the OTN's download page. This is the first major release since the Cloud Control 12c launch in October 2011. This release contains many new features and enhancements in areas across Enterprise Manager Cloud Control 12c.

It is also the first ever Enterprise Manager release available on all platforms simultaneously. All major platforms have been released from day one (Linux 32/64 bit, Solaris (SPARC), Solaris x86-64, IBM AIX 64-bit, and Windows x86-64 (64-bit)). Enterprise Manager 12.1.0.2 is a complete release that includes the OMS as well as the Agent versions of 12.1.0.2.

You can do a fresh installation, or optionally an upgrade from EM versions 10.2.0.5, 11.1, or 12.1.0.1, with the Bundle Patch 1 not being mandatory. Note that upgrading to EM 12.1.0.2 from EM 12.1.0.1 is not a patch application (like in the case of Bundle Patch 1), but is achieved through a 1-System upgrade. You can upgrade Release 1 to Release 2 by following the instructions in the upgrade guide at http://docs.oracle.com/cd/E24628_01/upgrade.121/e22625/toc.htm.

To know what's new in this brand new release, refer to the Oracle Enterprise Manager Cloud Control introduction document, which provides a broad overview. The direct link is

http://docs.oracle.com/cd/E24628_01/doc.121/e25353/whats_new.htm#CEGIFFGA.

Use of Harvester

Your use of MOS is greatly enhanced if the configuration data of all your systems has been uploaded to MOS. This information is used to improve the service request submission process as well as for proactive support, such as suggesting the patches that are available for your installed systems.

The configuration data is normally uploaded to MOS via the **Oracle Configuration Manager (OCM)**, which collects data and uploads it once every 24 hours. OCM is installed automatically when any Oracle product is installed.

If you are using Oracle Enterprise Manager Cloud Control 12c, it is no longer required to deploy the OCM in the case of most managed Target types. The Oracle Enterprise Manager Harvester can be used instead. The Enterprise Manager Agents collect detailed configuration information from all the managed Targets and store this in the Enterprise Manager repository. The Enterprise Manager Harvester pulls this data from the repository for all the Targets, and sends it to MOS from the OMS server itself. This architecture is better for security purposes, as it means only the OMS servers need to be connected to MOS to upload the configuration data, rather than each Target's server. However, at the time of writing, except for Fusion applications, other Oracle Applications such as E-Business Suite, Siebel, PeopleSoft, and JD Edwards EnterpriseOne are not harvested Targets, and still need a separate installation of OCM on the servers of the Target.

Further information about the Enterprise Manager Harvester can be seen at

http://docs.oracle.com/cd/E24628_01/install.121/e24089/data_collection.htm#BABICDIH.

Upgrading an existing Enterprise Manager

The upgrade process in Enterprise Manager Cloud Control 12c has been considerably improved. There is a guided workflow throughout the entire process. It is to be noted that the Cloud Control 12c OMS can only work with Cloud Control 12c Agents, and this restriction is very important to understand for the upgrade, which has been planned to have Minimal Downtime with an end-to-end Automation.

The upgrade process boasts features such as preupgrade validations, an upgrade dashboard, and upgrade reports. Both big-bang and phased upgrades are possible, and you can easily revert to the old version of Enterprise Manager. It can include OS migration as well.

It is possible to directly upgrade from Enterprise Manager Grid Control 10.2.0.5 (but nothing earlier than this), or from Enterprise Manager Grid Control 11.1.0.0 to the new version. You have to apply the preupgrade console patch to the existing installation. This can be downloaded from the OTN at

<http://www.oracle.com/technetwork/oem/grid-control/downloads/oem-upgrade-console-502238.html>.

This patch then enables an extra screen, known as the Upgrade Console in the old version. As seen in the following screenshot, the **Deployments** tab in Enterprise Manager Grid Control 10.2.0.5 shows a new section called **Upgrade** after the application of the upgrade patch.

The screenshot shows the Oracle Enterprise Manager 10g Grid Control interface. The 'Deployments' tab is active, displaying a 'Deployments Summary' table and an 'Upgrade' section. The 'Upgrade' section includes a link to 'Enterprise Manager 12g Upgrade Console' and lists various configuration and patching options.

| Database Installations | Targets | Installations Applied | Interim Patches |
|--------------------------------|---------|-----------------------|-----------------|
| Oracle Database 11g 11.1.0.7.0 | 1 | 1 | No |
| Oracle Database 11g 11.2.0.1.0 | 1 | 1 | No |

Upgrade
Enterprise Manager 12g Upgrade Console

Configuration
Search
Compare Configuration
Compare to Multiple Configurations (Job)
View Saved Configurations
Download Policy Groups

Patching
Patching through Deployment Procedures
View/Upload Patch
Linux Patching
Patch Agent

Agent Installation
Install Agent
Agent Installation Status
Download Agent Software

Click on the upgrade link to open the **Upgrade Console** page of Enterprise Manager Cloud Control 12c, as seen in the following screenshot. This is a screen that gives you a guided workflow for the upgrade process, along with upgrade impact reports.

You can perform mass deployment of Enterprise Manager Cloud Control 12c Agents and the plugins required as per Target, and also manage the software for the Agents and the plugins. The Upgrade Console is responsible for running dynamic repository checks before the actual upgrade, and it is also capable of running last-minute readiness checks before the Agents belonging to the new version are activated.



In the preceding screenshot, we have chosen the **1-System** approach for the upgrade. This shows certain **Pre Upgrade Steps**, **Agent Upgrade Steps**, and **OMS And Repository Upgrade Steps**, which you can follow in a workflow to achieve the upgrade.

There are actually two upgrade approaches; the other way is known as the **2-System** approach.

In the first approach, there is a complete switchover to the new system with everything upgraded at the same time, including the OMS, repository, and all Agents. This will entail a certain amount of downtime. In this approach, both the new and the old installations will exist together, however only one of them is active at any particular time.

The 2-System approach, on the other hand, allows a staggered cutover with the least downtime possible. In this case, both the new and the old exist together and are also active at the same time – with the new Cloud Control 12c system and repository communicating to the new Cloud Control 12c Agents, and the previous Grid Control 10.2.0.5 or 11.1 system and repository talking to the previous Grid Control Agents. In this way, thousands of Targets need not be upgraded all at once, but in a staged approach over a period of time. In the end, everything is migrated over to Enterprise Manager Cloud Control 12c.

In the following screenshot we see that when we choose the **2-System** approach, some of the steps in the guided workflow are now different. For example, in the preupgrade phase, you need to identify a new system where Cloud Control 12c will be installed:

Upgrade Console
 Upgrade Console is the primary user interface and the starting point for upgrading your Enterprise Manager 10g Grid Control Release 5 (10.2.0.5.0) to Enterprise Manager 12g Release 1 (12.1.0.1.0). Select an upgrade approach that best suits your requirement and upgrade your existing Enterprise Manager system in a smooth and seamless manner.

Agent Upgrade Status

| | |
|-------------------------------|---|
| Successful | 0 |
| Failed | 0 |
| In Progress | 0 |
| Not Started | 1 |
| Not Supported | 0 |
| Agents with Valid Inventory | 1 |
| Agents with Invalid Inventory | 0 |

[Refresh Agents and Targets List](#)

Other Links

- [Agent Upgrade Status](#)
- [Targets Upgrade Status](#)
- [Problematic Agents](#)
- [Agents with Missing Core Software for Enterprise Manager 12g](#)
- [Agents Not Supported in Enterprise Manager 12g](#)
- [Targets with Missing Agent/Place-in Software for Enterprise Manager 12g](#)
- [Targets Not Supported in Enterprise Manager 12g](#)

Resource Centre

- [Overview of 1-System Upgrade Approach](#)
- [Overview of 2-System Upgrade Approach](#)

Select Upgrade Type

1-System TIP Shuts down the existing Enterprise Manager system and upgrades it on the same host

2-System TIP Installs a new Enterprise Manager system on a different host while the existing Enterprise Manager system continues to run until you switch over to the new system

1-System on a Different Host TIP Shuts down the existing Enterprise Manager system and upgrades it on a different host

Pre Upgrade Steps
 Perform the following steps before upgrading the OMS and the Management Agents.

| Phase Name | Description |
|--|---|
| Get Overview | Get an overview of the upgrade process. |
| Identify Host and Port for New Enterprise Manager System | Specify the port and host on which you want to install the new Enterprise Manager system. |
| Manage Software | Manage the software required for upgrading the Enterprise Manager system. |

OMS And Repository Upgrade Steps
 Perform the following steps to upgrade the OMS and the Management Repository. Optionally, you can choose to deploy and configure the Management Agents before upgrading the OMS and the Management Repository. In this case, perform the "Deploy and Configure Agents" step before upgrading the OMS and the Management Repository.

| Phase Name | Description |
|---|---|
| Backup Repository | Backup your Management Repository. |
| Provide Repository Backup Details | Provide information on when you backed up your Management Repository. |
| Upgrade OMS and Repository Manually | Manually upgrade your existing OMS and Management Repository. |
| Create Link to Upgraded Repository | Create a link between the earlier release of your Management Repository and the upgraded Management Repository. |

Agent Upgrade Steps
 Perform the following steps to upgrade the Management Agents. If you have a large number of agents, then you can choose to upgrade one set of Management Agents in one attempt, and the next set in the subsequent attempt. In this case, you can repeat the following steps for each attempt.

| Phase Name | Description | Not Started | In Progress | Failed | Successful |
|---|--|-------------|-------------|--------|------------|
| Deploy And Configure Agents | Install and configure Oracle Management Agents 12g Release 1(12.1.0.1.0) on all managed hosts | 1 | 0 | 0 | 0 |
| Generate Health Report of Deployed Agents | Generate health reports for the deployed Management Agents before switching them over to the new Enterprise Manager system | 1 | 0 | 0 | 0 |
| Sign-off Health Report of Deployed Agents | Verify and sign off the health reports generated for the deployed Management Agents | 0 | N/A | N/A | 0 |
| Switch Agents | Switch over the deployed Management Agents to the new Enterprise Manager system | 1 | 0 | 0 | 0 |



Note that it is not possible to use the same server in the 2-System approach. You have to use a different server for the new system in the upgrade, and this is not a well-received scenario in some companies.

For the purpose of this exercise, we will continue with the 1-System approach. We presume that there is an existing Enterprise Manager system of either the Grid Control 10.2.0.5 or the 11.1 version. The first step is to deploy and configure the Cloud Control 12c Agents on all the Targets (as everything is going to be upgraded together) in a different Oracle Home for the Agent.

Next, you can run a health check on all the deployed Agents to see if they are working properly. When you are satisfied, a switchover can be done to the new Agents. This has three steps: first the older Agent queues are to quiesce, these are then shut down, and lastly the new Cloud Control 12c Agents are started.

Finally, you need to upgrade your previous OMS version and repository manually. You do this by taking a full RMAN backup of your repository database. You then need to shut down the previous OMS, install the new Cloud Control 12c OMS and upgrade the repository. Once this is done, the Cloud Control 12c OMS can be started, and can communicate with the Cloud Control 12c Agents.

We can see the advantages of the 1-System approach immediately. Agent upgrades are now automated and use the Enterprise Manager job scheduling system, whereas previously this was not possible and any major version upgrade of the Enterprise Manager Agent required SSH Connectivity from the OMS to the Target – this was not a well-received point in some companies.

Full health checks of the Agents are now performed, and the entire upgrade process can be monitored unlike in the previous version upgrades. Another advantage is that unlike in previous versions where the Agent had to be upgraded in the same Oracle Home on the Target, it is now possible to upgrade out of place, that is, in a new Oracle Home on the same Target. The only downtime in this case is when you switch over to the new OMS, repository, and Agents. Previously, there was a much longer downtime when the OMS and repository were upgraded, and after that there was a huge upload of metric and alert data by the Agents to the OMS. This would create performance issues when there were thousands of Agents in large sites.

If you wanted to return to the preupgrade version of the Agent in previous versions, this was only possible via a system restore of the Agent's home on the Target. However, in the new version, it is possible to simply go back to the previous version as the old Agent home is still present on the Target. Just start up that Agent again.

The 1-System approach also implies that if you have Agents installed on different platforms, as everything is switched over together, you must make sure that the software for the Agent has been released by Oracle for that platform. In the previous version, it was possible to keep Agents on one platform on the preupgrade release, and only upgrade those platform Agents where the new software was available.

In the 2-System approach, presuming we have a Grid Control 10.2.0.5 or 11.1 system in production, these are the steps to follow: first deploy and configure the new Cloud Control 12c Agents on the Targets in a different Oracle Home, next take a full RMAN backup of the repository database, and then restore this backup to a new database, which is going to serve as your Cloud Control 12c repository.

You can then proceed with the installation of the new Cloud Control 12c OMS on a different server (not the same server), this installation process will also upgrade the new repository. The new system will start talking to the Cloud Control 12c Agents you have activated. At the same time, the previous Grid Control OMS is still operational with its own repository, and will continue to talk to the older Grid Control Agents. This kind of bit-by-bit approach is ideal for large sites that have tens of thousands of Targets. Finally, when every preupgrade Agent is shut down and a new Agent started in its place on the same Target, you can shut down, archive, and remove the preupgrade OMS.

As part of the Post Upgrade Steps to be followed, you can go to the **Post Upgrade Console**, which is available in the Cloud Control 12c system. In this console, you can perform deferred data migration, which means that all the historical metric data from the old system will be migrated over to the new system in due course. You can track the status of this data migration from the post-upgrade console, and you are also able to retry the migration in case of any errors.

In the case of the 2-System approach, as both the old and new systems are active for a certain amount of time, the old system still keeps collecting metric data for the non-upgraded Targets while the new system is collecting data for the upgraded Targets. This means data is being accrued in the old system even after the new system is active. This accrued data can also be migrated over to the new system, and this migration is automatic. You can also track this on the **Post Upgrade Console** page.

This console can also generate different reports about any setup-related changes, as well as configuration changes, which were manually done on the old system during the progress of the 2-System upgrade.

And finally, there is another ability of the post upgrade console – you can easily delete the older Agents, which are no longer required, and this can be done from the console.

So what are the main differences between the 1-System approach and the 2-System approach? For one, in the case of the 2-System approach, the Target monitoring by Enterprise Manager stays active throughout and there is no downtime, unlike the 1-System approach, where all the Enterprise Manager components go through a downtime. The latter is a big-bang approach where all the Agents are switched at once, whereas in the 2-System Approach, the Agents can be switched incrementally – migrate a certain number of Agents in phase one, and then a certain number in phase two, and so on until all the Agents are migrated.

The 2-System approach allows you to easily fall back to the previous state if required, whereas in the case of the 1-System approach, the only way to revert to the previous state is via a system restore. The drawback of the former is that it requires an additional server to house the new Enterprise Manager system, unlike in the case of the 1-System approach. On the other hand, in case of the former, one of the main disadvantages is that the Agent software for all your platforms have to be available – as it is a big-bang approach.

This means, for example, you have Enterprise Manager Grid Control 11.1 monitoring Targets on a platform where the Cloud Control 12c Agent has not been released yet. You cannot use the 1-System approach. So you are forced to use the 2-System approach in this case, and keep the previous version of the Agent along with the previous OMS and repository.

One more disadvantage of the 2-System approach is that additional firewall ports need to be opened for the Agent, as there are two separate systems in this approach. In the case of the 1-System approach, this is not so and no additional firewall ports are required to be opened. Also, accrued metric data for each Target needs to be migrated in the 2-System approach.

Let us continue the tour through the 1-System upgrade on our Enterprise Manager Grid Control 10.2.0.5 system. When you click on the **Manage Software** link on the **Upgrade Console** page, the following screen appears, which allows you to specify the software location for the new version Agents. Whichever Agent software is missing, is clearly shown in red in the following screenshot:

Agent Upgradability 100% Missing Agent Software (1)

Target Upgradability 100% Missing Agent/Plug-In Software (1)

Provide Software Location
Specify and validate the location where the Management Agent software and related Plug-in software are present for the required platforms.
* Software Location:
 TIP For multi-oms environment, specify a location that is shared by all the OMSes.
 TIP If any software was added or removed from this location, then revalidate all software by clicking Validate

Note
While copying the software to the staging location, follow these rules
• Copy the core Management Agent software as well as Management Plug-in software at the root level of the staging location.
• Copy the software as procured via the DVD or via MDS. Do not extract the contents of the software zip file. For example: core_agent_linux_12.1.0.0.8.zip, @_plug_2.0.zip

Software Required for Upgrade
Upgrade Console computes the availability of the required Agent and Plug-in software based on the binaries available in Software Location provided above.

Agent Software
Note: Management Agents without their core software cannot be upgraded.

| Core Agent Image | Platform | Version | Available in Software Location (OMS) |
|---------------------|-----------|------------|--------------------------------------|
| Agent Core Software | Linux x86 | 12.1.0.0.8 | Not Available |

Plug-In Software
Management Agents without the plug-in software cannot be upgraded. However, if chosen, the targets monitored by that plug-in will be deleted from the upgraded Enterprise Manager system.

| Plug-In Name | Plug-In Description | Platform | Available in Software Location (OMS) | Targets in System |
|----------------------|--|------------------|--------------------------------------|-------------------|
| oracle_ayaman.csa | Oracle Client System Analyzer | Generic Platform | Not Available | 1 |
| oracle_ayaman.db | Oracle Database Plug-in | Generic Platform | Not Available | 4 |
| oracle_ayaman.beacon | Oracle Beacon Plug-in | Generic Platform | Not Available | 1 |
| oracle_ayaman.emrep | Oracle Management And Repository Plug-in | Generic Platform | Not Available | 1 |
| oracle_ayaman.emag | Oracle Fusion Middleware Plug-in | Generic Platform | Not Available | 6 |

After specifying the software location and then clicking on the **Validate** button, the **Upgrade Console** page changes to show that the Agents and Targets are now **Upgradable**, as shown in green in the following screenshot:

The screenshot displays the 'Manage Software' interface. At the top, an 'Information' box lists successful validation and extraction of agent and plugin software. Below, two circular progress indicators show 100% upgradability for both agents (11) and targets (14). The 'Provide Software Location' section contains a text input field with the path '/u01/home/oracle/stage' and a 'Validate' button. A 'Note' box provides instructions for copying software. The 'Software Required for Upgrade' section includes a table with the following data:

| Core Agent Image | Platform | Version | Available in Software Location (OMS) |
|---------------------|-----------|------------|--|
| Agent Core Software | Linux x86 | 12.1.0.0.0 | /u01/home/oracle/stage/12.1.0.0.0_AgentCore_48.zip |

| Plug-In Name | Plug-In Description | Platform | Available in Software Location (OMS) | Targets in System |
|---------------------|---|------------------|--|-------------------|
| oracle.ayman.emrep | Oracle Management And Repository Plugin | Generic Platform | /u01/home/oracle/stage/plugin_bin/oracle.ayman.emrep/12.1.0.0.0/12.1.0.0.0_Agent_2000_0.zip | 1 |
| oracle.ayman.csa | Oracle Client System Analyzer | Generic Platform | /u01/home/oracle/stage/plugin_bin/oracle.ayman.csa/12.1.0.0.0/12.1.0.0.0_Agent_2000_0.zip | 1 |
| oracle.ayman.emas | Oracle Fusion Middleware Plugin | Generic Platform | /u01/home/oracle/stage/plugin_bin/oracle.ayman.emas/12.1.0.0.0/12.1.0.0.0_Agent_2000_0.zip | 6 |
| oracle.ayman.beacon | Oracle Beacon Plugin | Generic Platform | /u01/home/oracle/stage/plugin_bin/oracle.ayman.beacon/12.1.0.0.0/12.1.0.0.0_Agent_2000_0.zip | 1 |
| oracle.ayman.db | Oracle Database Plugin | Generic Platform | /u01/home/oracle/stage/plugin_bin/oracle.ayman.db/12.1.0.0.0/12.1.0.0.0_Agent_2000_0.zip | 4 |

Going back to the **Upgrade Console** page, click on the **Deploy and Configure Agents** link. This brings up the screen shown in the following screenshot. On this screen you can schedule an Enterprise Manager job that will deploy the Agent and plugin software on the Targets, as well as configure them. You can add the existing Agents to a list of Agents for which you are going to install the new Agent software. For each such Agent, you can see the old Agent home and specify the new Agent base directory and new Agent home on the screen. You also need to specify the Oracle Unix-user credentials, or you can use `sudo` or `power broker`, if you want.

Deploy And Configure Agents (Back) (Next)

Operation Name: Click a value from the operation.

Select Operation Type
 Select the operation type to only deploy, or both deploy and configure, or only configure the already deployed software binaries.
 Deploy Agent and Plug-in Software
 Configure Agent and Plug-in Software

Search Agents
 Search and select the Management Agents for which you want to perform this operation. Management Agents qualifying to run this operation only will be listed.

Agent: Platform:
 Group: Version:

Use Same Paths for All Agents Overwrite Any Existing Directories

Select All | Select None

| Select Agent | Old Agent Home | Agent Base Directory | Agent Instance Home | Status |
|--|---------------------------|---------------------------|------------------------------------|--------|
| <input checked="" type="checkbox"/> em10.oracle.com:3572 | /u01/home/oracle/agent10g | /u01/home/oracle/agent12g | /u01/home/oracle/agent12g/agentins | |

Agent Credentials
 Select the type of credentials to be used for this operation. Ensure that you use the same credentials that you used for the existing, earlier release of Management Agent. When you choose to override the credentials, specify one set of credentials that can be used for all Oracle Homes.

Use Oracle Home Preferred Credentials Override Oracle Home Preferred Credentials

• Username:
 • Password:
 • Confirm Password:

Run Privilege
 None
 Sudo • Run as:
 Power Broker • Run as: Profile:

TIP The privilege settings must be already set for the host targets if Sudo/Power Broker option is selected. Manage Privilege Delegation Settings

On the following screen, you can optionally specify any predeployment scripts that are to be run on the Target before deploying the Agent binaries. You can also specify a post-configuration script. On this screen you also need to supply the **Root Credentials** so that `root.sh` can be run on the Target after the new Agent installation is done, this is important for proper functioning of the new Agent. You can again use `sudo` or `power broker` for this purpose, if you do not want to supply the **root** password:

Upgrade Console > (Back) (Submit)

Pre-Deploy Options (Optional)
 Enable this option if you want to run a command or a script before deploying the software binaries of the Management Agents.
 Run Pre-Command/Script*

Post-Config Options (Optional)
 Enable this option if you want to run a command or a script after configuring the deployed Management Agents.
 Run Post-Command/Script*

Root Credentials
 Enter the root user account credentials to run the root.sh. This is optional if you have chosen to upgrade only Windows Agents. If you do not have the privileges to run these commands or scripts, then select a third-party authentication tool and enter the required details to switch over to another user account that has the privileges.

• Username:
 • Password:
 • Confirm Password:

None
 Sudo • Run as: (example: osagent)
 Power Broker • Run as: Profile: (example: admin)

The deploy job runs and succeeds, displaying the steps it has taken as shown in the following screenshot:

Job Run: DEPLOY_2011_06_30_13_52_02_925 Page Refreshed Jun 30, 2011 2:09:05 PM EDT [Delete Run](#) [Edit](#) [View Definition](#)

Summary

| | | | |
|--------------|-------------------------------------|-------------|---------------------------|
| Status | Succeeded | Type | PreDeployAgentSW |
| Scheduled | Jun 30, 2011 1:56:34 PM (UTC-04:00) | Owner | SYSMAN |
| Started | Jun 30, 2011 1:56:37 PM (UTC-04:00) | Description | Pre Deploy Agent Software |
| Ended | Jun 30, 2011 2:09:04 PM (UTC-04:00) | | |
| Elapsed Time | 12 minutes, 27 seconds | | |
| Notification | No | | |

Targets:

Status: [Go](#)

Expand All | Collapse All

| Name | Targets | Status | Started | Ended | Elapsed Time |
|--|----------------------|-----------|-------------------------------------|-------------------------------------|--------------|
| Execution: em10.oracle.com:3872 | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:56:37 PM (UTC-04:00) | Jun 30, 2011 2:09:04 PM (UTC-04:00) | 12.4 minutes |
| Previous | | | | | |
| Step: updateStatusInProgress | | Succeeded | Jun 30, 2011 1:56:42 PM (UTC-04:00) | Jun 30, 2011 1:56:42 PM (UTC-04:00) | 0 seconds |
| Step: performPreReq | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:56:47 PM (UTC-04:00) | Jun 30, 2011 1:56:47 PM (UTC-04:00) | 0 seconds |
| Step: copySwArchiveToHost | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:56:52 PM (UTC-04:00) | Jun 30, 2011 1:56:58 PM (UTC-04:00) | 6 seconds |
| Step: unzipAndDeploySoftware | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:57:02 PM (UTC-04:00) | Jun 30, 2011 1:59:06 PM (UTC-04:00) | 2.1 minutes |
| Step: copyPluginArchiveToHost | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:59:08 PM (UTC-04:00) | Jun 30, 2011 1:59:12 PM (UTC-04:00) | 4 seconds |
| Step: deployPluginArchiveToHost | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 1:59:13 PM (UTC-04:00) | Jun 30, 2011 2:09:54 PM (UTC-04:00) | 6.7 minutes |
| Step: updateStatusDeploySuccess | | Succeeded | Jun 30, 2011 2:09:58 PM (UTC-04:00) | Jun 30, 2011 2:09:58 PM (UTC-04:00) | 0 seconds |
| Step: checkIfDeploySuccess | | Succeeded | Jun 30, 2011 2:06:03 PM (UTC-04:00) | Jun 30, 2011 2:06:03 PM (UTC-04:00) | 0 seconds |
| Step: updateStatusConfigureInProgress | | Succeeded | Jun 30, 2011 2:06:08 PM (UTC-04:00) | Jun 30, 2011 2:06:08 PM (UTC-04:00) | 0 seconds |
| Step: preReqCheckForConfigureAgentAndPlugins | em10.oracle.com:3872 | Succeeded | Jun 30, 2011 2:06:13 PM (UTC-04:00) | Jun 30, 2011 2:06:14 PM (UTC-04:00) | 1 seconds |
| Next 11 - 17 of 17 | | | | | |

Going back to **Upgrade Console**, now click on **Generate Health Report of Deployed Agents**. This schedules an Enterprise Manager job for this purpose, as can be seen in the following screenshot. You can add the Agents into a list of Agents for which you want the health report. This job also succeeds shortly:

Generate Health Report of Deployed Agents [Back](#) [Submit](#)

Check the health of the Deployed Management Agents before switching them over to the new Enterprise Manager

Provide Inputs

Operation Name: Reset a check name for this operation

Lead Agents from Previous Operations: [Go](#)

Search Agents

Search and select the Management Agents for which you want to perform this operation. Management Agents qualifying to run this operation only will be listed.

Agent: Platform:

Group: Version: [Search](#)

[Add](#) [Add Related Agents](#) [Remove](#)

| Select All | Select Name | Old Oracle Home | New Oracle Home | New Instance Home | Status |
|-------------------------------------|----------------------|---------------------------|---------------------------|--|----------------------|
| <input checked="" type="checkbox"/> | em10.oracle.com:3872 | /u01/home/oracle/agent10g | /u01/home/oracle/agent12g | /u01/home/oracle/agent12g/agentinst_home | Info |

Agent Credentials

Select the type of credentials to be used for this operation. Ensure that you use the same credentials that you used for the existing, earlier release of Management Agent. When you choose to override the credentials, specify one set of credentials that can be used for all Oracle homes.

Use Oracle Home Preferred Credentials Override Oracle Home Preferred Credentials

Username:

Password:

Confirm Password:

Run Privilege

Name

Sudo (sample script)

Power Broker (sample script) Profile: (sample agent)

TIP: The privilege settings must be already set for the host targets if Sudo/Power Broker option is selected. Manage Privilege Delegation Settings.

On the **Upgrade Console** page, click on **Sign-off Health Report of Deployed Agents**. This displays the following screen, where you can view the detailed report and then verify and sign it off:

Sign-off Health Report of Deployed Agents
Verify and sign off the health report of the deployed Management Agents

(View Detailed Report) (Verify and Sign Off Report)

| Select Agent | Report Time | Ping Test | Broken Targets | Failed Metrics | Free Space in State Dir (GB) | Sign-Off User | User Verified |
|----------------------|---------------------|-----------|----------------|----------------|------------------------------|---------------|---------------|
| em10.oracle.com:3872 | 2011-06-30 14:13:39 | N/A | 0 | 1 | 24.496747 | | ✗ |

Failed Metrics Details

| Target Name | Plugin Name | Metric Name | Exception |
|-----------------|------------------|--------------|--|
| em10.oracle.com | oracle.aysman.db | db_cpu_usage | Result has repeating key value : 2072606569,11.2.0.1.0 |

Detailed Report for Agent https://em10.oracle.com:3872/emd/main/

- Agent_Version : 12.1.0.0.0
- EMD_URL : https://em10.oracle.com:3872/emd/main/
- REPOSITORY_URL : https://em10.oracle.com:1159/empba/upload
- Report_TimeStamp : 2011-06-30 14:13:39
- HeadSpaceUsage : 47234169
- EMStateDir_FreeSpace : 24.496747
- SuccessfulPing : N/A
- TargetType: oracle_oxam, TargetTypeVersion: 2.0
- TargetType: oracle_ucm, TargetTypeVersion: 1.0
- TargetType: oracle_coreid_identity_server, TargetTypeVersion: 1.1
- TargetType: oracle_bpm, TargetTypeVersion: 11.0.0.000
- TargetType: oracle_beacon, TargetTypeVersion: 3.0
 - TargetInstance: TargetName : em10.oracle.com_beacon, DisplayName : em10.oracle.com_beacon, PluginID : oracle.aysman.beacon,

Target Properties

- Name : disallow_redundancy_group, Value : 1, Encrypted : false
- Name : disallow_template, Value : 1, Encrypted : false
- Name : proxyPort, Value : , Encrypted : false
- Name : proxyPort, Value : , Encrypted : false
- Name : dontProxyFor, Value : , Encrypted : false

The next step is to click on **Switch Agents** in the **Upgrade Console** page. This switches over the new-version Agents to use the new Enterprise Manager system. You specify the Agents you want to switch over, and also the Oracle credentials. An Enterprise Manager job is scheduled again for this purpose:

Switch Agents (Back) (Submit)

Switch over the deployed Oracle Management Agents to the new Enterprise Manager system

Provide Inputs

Operation Name: SwitchAgents_2011_06_30_14_25_1

Load Agents from Previous Operations: [] (Go)

Search Agents

Search and select the Management Agents for which you want to perform this operation. Management Agents qualifying to run this operation only will be listed.

Agent: [] Platform: All

Group: [Select Group] Version: All (Search)

| Select Agent | Old Oracle Home | New Oracle Home | New Instance Home | Status |
|----------------------|---------------------------|---------------------------|--|--------|
| em10.oracle.com:3872 | /u01/home/oracle/agent10g | /u01/home/oracle/agent12g | /u01/home/oracle/agent12g/agentn1_home | (D) |

Agent Credentials

Select the type of credentials to be used for this operation. Ensure that you use the same credentials that you used for the existing, earlier release of Management Agent. When you choose to override the credentials, specify one set of credentials that can be used for all Oracle homes.

Use Oracle Home Preferred Credentials Override Oracle Home Preferred Credentials

Username: oracle

Password: []

Confirm Password: []

Run Privilege

None

Sudo Run as: []

Power Broker Run as: [] Profile: []

Tip: The privilege settings must be already set for the host targets if Sudo/Power Broker option is selected. Manage Privilege Delegation Settings.

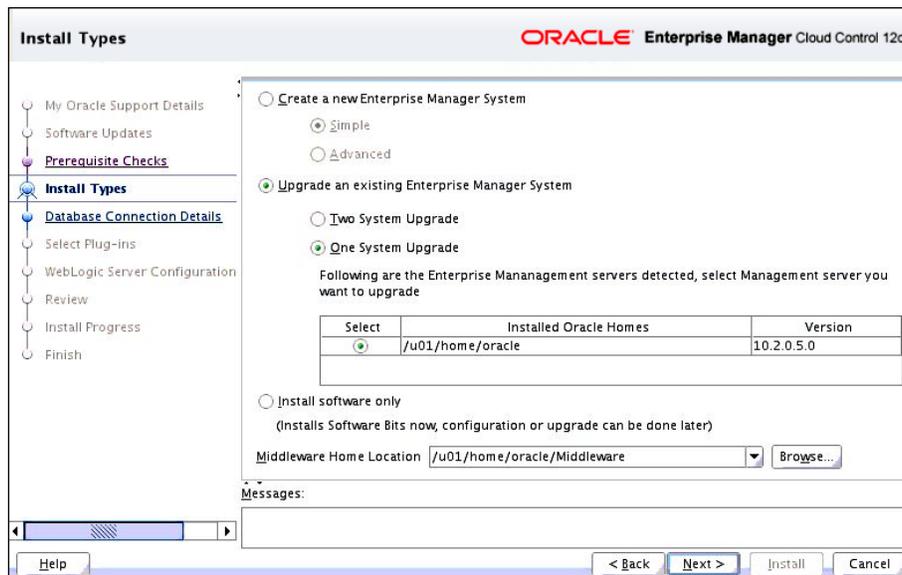
After the switch Agent job completes, **Upgrade Console** shows that the Agent upgrade status is successful. You can also see this from the last column in the **Agent Upgrade Steps** section on this page, as shown in the following screenshot:

| Phase Name | Description | Not Started | In Progress | Failed | Successful |
|---|--|-------------|-------------|--------|------------|
| Agent Upgrade Steps | Perform the following steps to upgrade the Management Agents. If you have a large number of agents, then you can choose to upgrade one set of Management Agents in one attempt, and the next set in the subsequent attempt. In this case, you can repeat the following steps for each attempt. | | | | |
| Install and Configure Agents | Install and configure Oracle Management Agents 12g Release 1 (12.1.0.1.0) on all managed hosts | 0 | 0 | 0 | 1 |
| Generate Health Report of Deployed Agents | Generate health reports for the deployed Management Agents before switching them over to the new Enterprise Manager system | 0 | 0 | 0 | 1 |
| Signoff Health Report of Deployed Agents | Verify and sign off the health reports generated for the deployed Management Agents | 0 | N/A | N/A | 1 |
| Switch Agents | Switch over the deployed Management Agents to the new Enterprise Manager system | 0 | 0 | 0 | 1 |
| OMS And Repository Upgrade Steps | | | | | |
| Perform the following steps to upgrade the OMS and the Management Repository. | | | | | |
| Phase Name | Description | | | | |
| Upgrade OMS and Repository Manually | Manually upgrade your existing OMS and Management Repository | | | | |

This completes the task that we had to do in the old version of Enterprise Manager, using **Upgrade Console**.

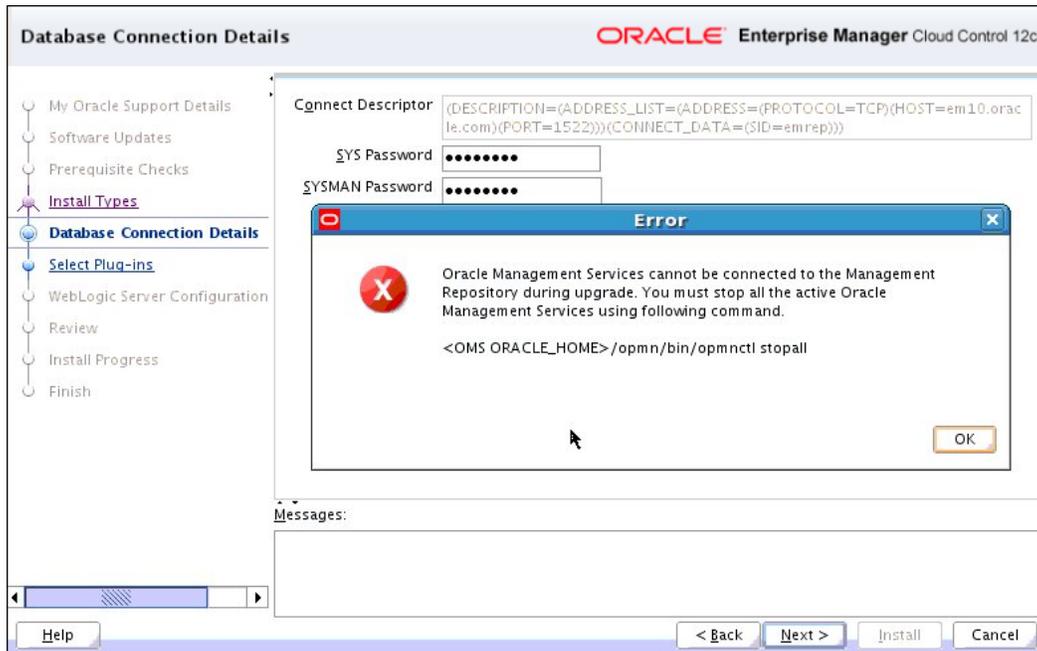
We can now start the actual installation of the new Enterprise Manager Cloud Control 12c software, using the `runInstaller` command. The initial screens are the same as in the case of creating a new Enterprise Manager system. This was seen in the previous section.

However, when you come to the **Install Types** screen, select **One System Upgrade** as shown in the following screenshot. This detects and shows us the currently installed (old) version of Enterprise Manager, which we now select for the upgrade. As it is a Grid Control 10.2.0.5 system, we also have to specify the value for the **Middleware Home Location** field and the place where WebLogic Server will be installed (as there was no WebLogic Server used by the Grid Control Version 10.2.0.5 of Enterprise Manager):



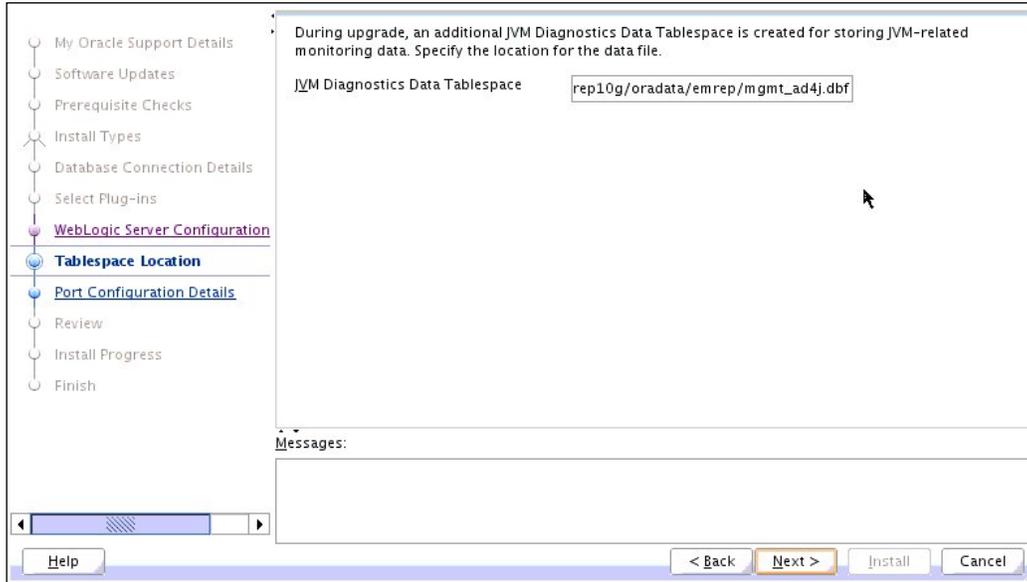
When you reach the **Database Connections Details** screen, you specify the details of the repository of the previous version; this will be upgraded during the upgrade process.

A warning may appear if the previous Enterprise Manager OMS is still connected to the repository that you are trying to upgrade. You need to shut down the previous OMS using the command specified on the screen, and then continue. This is the previous version of the **opmnctl stopall** command:

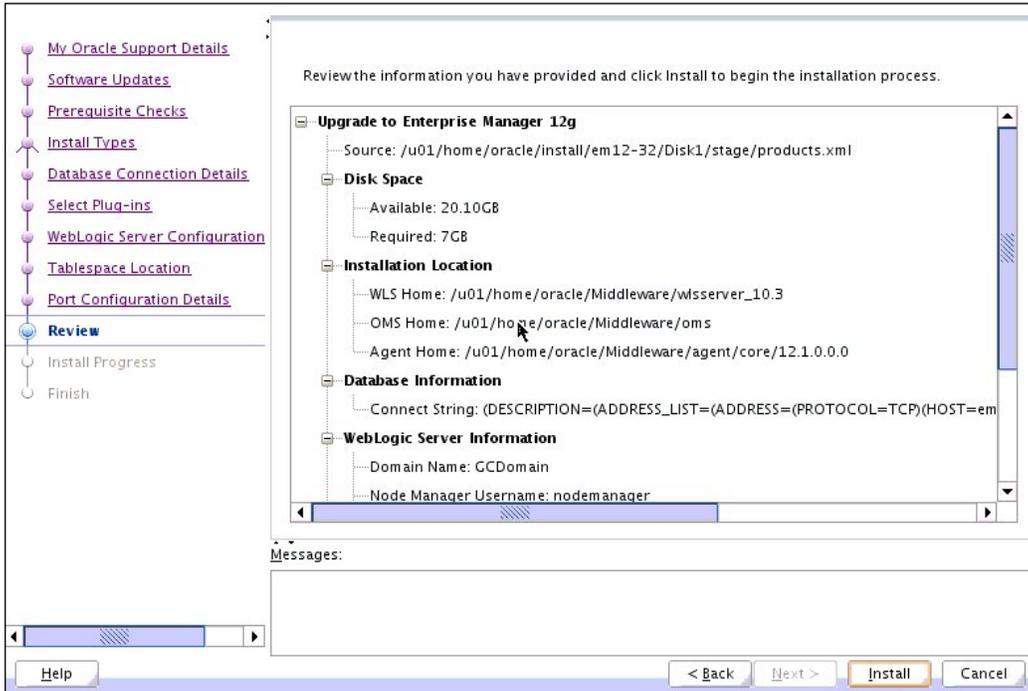


The upgrade then continues, and the next few steps are the same as that of a fresh installation – the ones we saw in the previous section. Select the plugins that you want, and then type in the WebLogic Server configuration details.

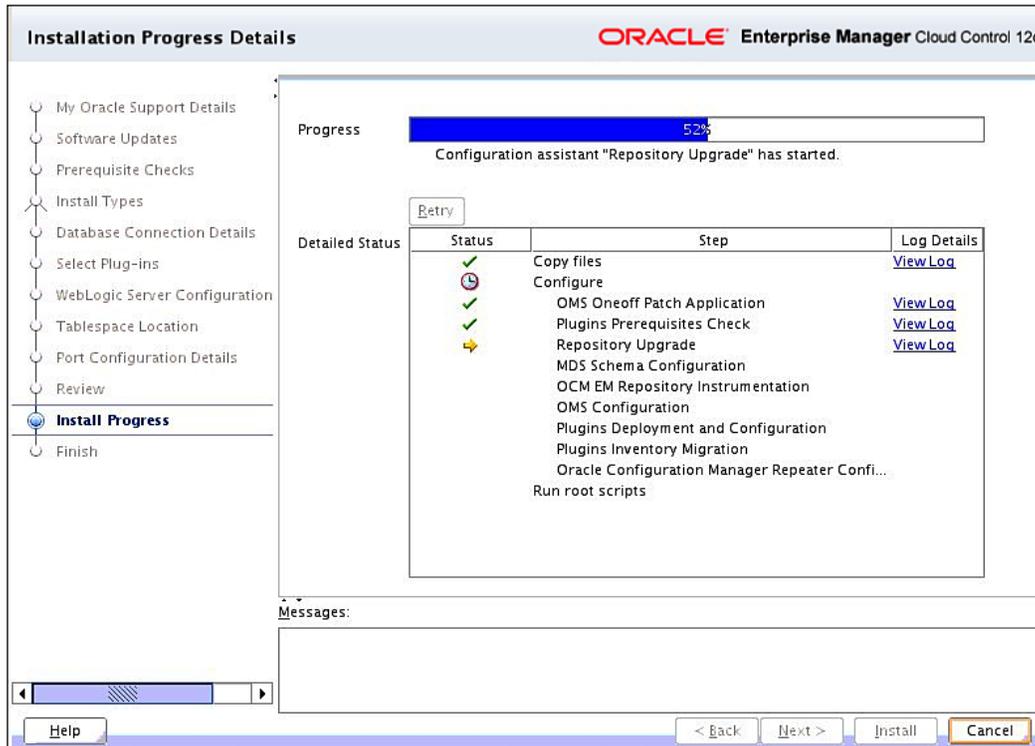
There is one additional step in the case of the upgrade. An extra Tablespace will be required in the new version for storing JVM diagnostics data, and you need to specify the location for the data file that will be created by the upgrade process, as shown in the following screenshot:



After this, you provide the port configuration details, just like in the case of a fresh installation, and finally you come to the **Review** screen, as shown in the following screenshot:



The installation of the upgrade now commences. As part of this process, the previous version's repository is also upgraded to the new version. This is followed by the OMS configuration and the plugin deployment and configuration:



After this process completes, and you run the `root` scripts, your previous version of Enterprise Manager will have been upgraded to the new Cloud Control 12c.

You can refer to the *Oracle Enterprise Manager Cloud Control Upgrade Guide* document in the Enterprise Manager documentation for further details, at

http://docs.oracle.com/cd/E24628_01/upgrade.121/e22625/toc.htm

You can also refer to the *Enterprise Manager Installation and Upgrade* page on OTN, which can be found at the following URL:

<http://www.oracle.com/technetwork/oem/install-upgrade-496677.html>.

Installing the Agent on Targets

The installation of your central Enterprise Manager Cloud Control 12c system is complete, including the Oracle Management Service, repository, and Agent. The next step is to install the Enterprise Manager Cloud Control 12c Agent on all your Targets, including production, test, and development servers. We will now look at the various methods to do this. Some of these methods are new, whereas some are the same as the previous Enterprise Manager Grid Control 11g version.

Agent Push

The Agent Push Application is now called the Add Host Targets wizard. This is the Oracle-recommended way for mass deployment of management Agents. You can deploy Agents on multiple platforms in a single deployment session. You access this by going to **Setup | Add Target | Add Targets Manually** and, on the screen that appears, clicking on the **Add Host** button. You can also access the wizard from Auto Discovery by going to **Setup | Add Target | Auto Discovery Results | Host Targets | Promote**.

Note that the Add Host Targets wizard can use SSH for connectivity between the OMS server and the Target hosts where the Agent is to be installed. The SSH can be set up using the supplied `sshusersetup.sh` script, as follows:

```
cd $<OMS_HOME>/oui/prov/resources/scripts
sshusersetup.sh -setup -user <user_name> -hosts <Target_hosts>
```

This wizard allows privilege delegation using tools such as Sudo, Powerbroker, or other tools; so, instead of using SSH as in the previous Enterprise Manager versions, you can easily use password-based authentication in the new Cloud Control 12c.

You can perform a fresh Agent installation, clone an existing Agent, or you can set up a shared NFS Agent; and all this can be done from the Enterprise Manager console using this wizard. However, the Agent upgrade is now done via the Upgrade Console, and no longer by this method

The fresh Agent installation method will deploy the base Agent software as supplied by Oracle without any additional patches, whereas the cloning method can be used to install from an existing-source Agent that you may have previously patched. On the other hand, the shared method simply uses an NFS-mounted shared Agent installation for multiple Targets.

The Add Host Targets wizard has new added advantages, for example, it allows you to retry and continue in case of any failure – with recommendations provided, as well as the exact cause of the failure explained. In the case of mass deployments, you can track the status of each host. The progress page shows the log locations that are under the following folders.

```
<OMS_HOME>/sysman/prov/agentpush/<time-stamp-dir> /* and
```

```
<OMS_HOME>/sysman/prov/agentpush/logs/*
```

The user interface is vastly simplified with most of the input fields computed automatically, such as the virtual host name, host port for the load balancer, and the Agent registration password. There is persistent storage of session information in the database, so that it can be tracked later on.

Various prerequisites are checked before deployment, such as the certification/compatibility of the Agent software on the Target platform, sufficient disk space, validity of host name, and whether HTTP/HTTPS communication is possible between the Target and the OMS. There are other requirements for the wizard: you should be able to ping the Target from the OMS server, and the `OpenSSH` daemon must be running on the Target host. In the case of Microsoft Windows Targets, the `Cygwin 1.7` software is also a prerequisite. This is a Unix-emulating command-line interface for Windows and provides the SSH connectivity.



Note that SSH/SCP is only used for initial Agent deployment. Once deployed, the OMS does not require SSH/SCP to talk with the Agent. If `Cygwin` software has been installed on the Target, it can be removed after the Agent is deployed.

In `Cloud Control 12c`, it is also possible to use locked Unix accounts to install the Agent. Simply use the `RunAs` field when supplying the named credentials, and in this field you can supply the locked account name – for example, `oracle` (which may be locked in certain corporates due to company policy). It is also possible to use a dummy password in the named credentials; if this is done, it will result in the wizard using SSH public-key authentication.

In the case of installing the Agent on Oracle **Real Application Cluster (RAC)**, the Add Host Targets wizard is able to install the Agent on any of the nodes of the RAC once the details of the nodes are supplied.

The wizard secures the Agents automatically by using the auto-generated password for Agent registration, and also executes the root scripts automatically. If you place Agent patches under the folder `<OMS_HOME>/install/oneoffs/`, then these will also be applied to the Agent by the wizard during the process of deployment.

When cloning from an existing Cloud Control 12c Agent, the wizard will itself create the source-Agent image. This is unlike the previous versions, where the user was responsible for creating the source image. A running Agent can easily be selected as the source.

You can go to **Setup | Add Target | Add Targets Manually | Add Host Targets | Add Host Results** to view the results of your Agent deployments, and drill down to the details of any particular deployment by clicking on the name. Any failed deployments can be retried or simply continued in the future. Using the Enterprise Manager job system for Agent deployments certainly makes a difference.

When you install the Enterprise Manager OMS on a particular platform, that installation will contain the Agent software only for the same OMS platform. If you now want to deploy an Agent to a different platform, you will need to download the Agent software for that platform using the self-update feature. This can be done either in online mode or offline mode. In offline mode, first the catalog for the Agent software needs to be downloaded manually, followed by the download of the Agent software for the other platform. These are then uploaded to the software library in Enterprise Manager Cloud Control 12c.

Other Methods of Agent installation

There are other methods of Agent installation that can be used. For example, you can do a silent Agent installation using a response file for the Oracle Installer. The difference from the earlier versions is that this installation is executed in two parts. First, you use the `emcli` command from the OMS Home and get the image of the Agent. You then download the image and transfer it to the Target. Next, in the Target itself, the image is unzipped and the script `agentDeploy.sh` is executed to deploy the Agent using the response file.

In the previous versions, there was another method for Agent deployment, known as the Agent Pull method, which used the `agentDownload` script. This is now superseded by the silent method in Cloud Control 12c, where you use the `agentDeploy.sh` script instead. The other difference is that you are now responsible for manually transferring the Agent image from the OMS to the Target folder, whereas previously the open source `wget` utility was used. Installation of this utility was, however, disallowed in many corporates, and so it is no longer used.

Installing the Agent software only, and configuring later, was not possible in the earlier releases; this is a new option in Cloud Control 12c, but only available in silent mode. This is done using the `agentDeploy.sh` script with the `-softwareOnly` argument.

Another method of Agent installation is by using a `.rpm` file. This method does not require any response file and is directly installed on the Target host. The beauty of this method is that the RPM of the Agent install can be included along with the installation of the operating system, either manually or by using Enterprise Manager's OS provisioning capabilities, known as Bare Metal Provisioning.

You can refer to the *Oracle Enterprise Manager Cloud Control Basic Installation Guide* document in the Enterprise Manager documentation for further details about Agent installation at

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

Advanced methods of Agent installation, such as the silent install, RPM install, cloning, and the shared Agent are described in detail in the *Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide* documenting the Enterprise Manager documentation at

http://docs.oracle.com/cd/E24628_01/install.121/e24089/part_installing_agent.htm#sthref190.

Recommended architecture for large sites

The promise is that, with the new Cloud Control 12c version of Enterprise Manager, the infrastructure and framework is now more scalable, performant, and reliable; and this would enable it to scale to millions of different Targets, instead of the tens of thousands in previous versions.

Even with this promise, we need to make sure that the Enterprise Manager system we set up is architected properly. One mistake that is often seen in implementations is that Enterprise Manager is not treated with the seriousness it deserves. It is looked upon as a management tool, whereas it should be treated like a proper production system with its own planned architecture. There should be a development Enterprise Manager Server where new patches and upgrades to the OMS or Agent are first experimented with, and there should be a dedicated test Enterprise Manager system with an architecture similar to production, where any changes to the OMS, repository, or Agent are tested before they are applied to production.

Ideally, there should be a dedicated Enterprise Manager super administrator (normally a Senior DBA) who is responsible for the Enterprise Manager system and treats it seriously, like any other production system.

When it comes to production, another common mistake is that the entire Enterprise Manager system is placed on a single server, including the OMS, repository, and Agent. This is similar to placing the engine of a Tata Jaguar in the body of a one-wheeled car, if such a thing was possible. Placing the Enterprise Manager system on a single server, no matter how powerful that server may be, has severe limitations in terms of performance, scalability, and redundancy. This will severely limit the use of Enterprise Manager as a production system, as ultimately the main parts of the Enterprise Manager OMS application are single Java processes.

The secret is to separate out the components of Enterprise Manager, to place the repository database on a separate server, and to use multiple OMS servers that point to the same repository. The latter itself may be a single database server, or it may be a database cluster using Oracle RAC, depending on your scalability and redundancy requirements. It is possible to use Oracle Data Guard for creating and maintaining a separate standby database for disaster-recovery requirements; however, the use of Active Data Guard to allow continuous query of the standby database is not certified for use by the Enterprise Manager OMS. Neither is **Oracle GoldenGate (OGG)** certified for the purpose of replicating the OMS. Regarding the disaster-recovery requirements for the OMS, we will talk more about this soon.

The hardware specifications recommended by the installation manual imply that low-cost servers can be used to function as the database server and the multiple OMS servers. It is possible to simply add more servers and scale as more and more Targets are monitored, more and more DBA activities are being performed (such as multiple RMAN backups and Data Guard standby databases being set up via Enterprise Manager), and performance consequentially degrades. You need to set up additional OMS servers pointing to the same repository, and this technique is normally used to set up such a horizontally-scalable architecture.

In the previous version, it was possible to add an additional OMS from the Enterprise Manager installer itself. The new Cloud Control 12c version, however, has changed this to a deployment procedure called Add Management Service to be executed from within your Enterprise Manager console. This can be accessed by navigating to **Enterprise | Provisioning and Patching | Procedure Library** and then launching the Add Management Service deployment procedure. This brings up the corresponding wizard. Full instructions can be found in the *Oracle Enterprise Manager Cloud Control Basic Installation Guide* document at the following URL: http://docs.oracle.com/cd/E24628_01/install.121/e22624/install_addln_oms.htm#CIHJJIEJ

When there are multiple OMS servers pointing to the same repository, it is advisable to have some sort of load balancing for all the requests that come through to these servers. It is possible to have a software load balancer do this entirely at the Network layer, however, a hardware load balancer (such as BIG-IP) is recommended. In the case of a large site with thousands of Targets, there should be three or more OMS servers that are load balanced in this manner.

The load balancer has its own IP address or domain name, and the multiple OMS servers are placed in its pool. The actual traffic to and fro from the Target is through the load balancer, which is then responsible for sharing the load and distributing the traffic to any of the OMS servers in its pool. In this way, traffic can be directed to specific ports on the OMS server, which uses different ports for different purposes – such as the administrator login to the console, or for accepting uploads of Target information (metric data, alerts, and so on) from the Agent.

The list of ports used by Enterprise Manager is no longer to be seen in the `portlist.ini` file as in the previous versions, instead the `emctl list properties` command must be used as follows:

```
[oracle@havi pori bin]$ cd /u01/oracle/middleware/oms/bin
[oracle@havi pori bin]$ ./emctl list properties -sysman_pwd "welcome1"
```

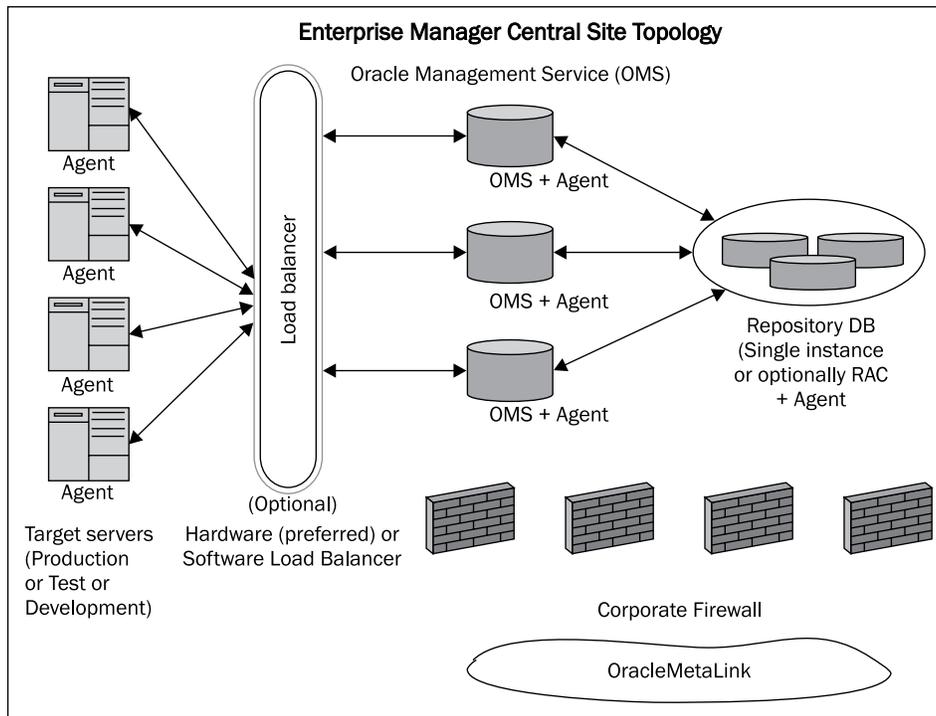
The load balancer must be set up to accept requests for these ports and route the requests to the appropriate port on an available OMS Server, and in this way the Cloud Control console logons by administrators will be load balanced, as also the metric data uploads that are coming from the Agents.

When we use a load balancer, we also have redundancy – you can bring down any of the production OMS servers for scheduled maintenance, such as for applying an OS-level upgrade or OMS-level upgrade or patch, and the load balancer would simply route all requests at that time to the surviving OMS servers. This would also apply to unscheduled downtime, such as one of the management services needing to be rebooted due to an application issue.

In all these cases, the DBAs would be able to continue using Enterprise Manager on the surviving OMS servers.

An added level of redundancy would be to use a second load balancer as a standby system. This standby load balancer would automatically mirror the production load balancer and it could immediately assume its role in case of any failure.

This highly-scalable, highly-available architecture that has just been outlined can best be portrayed by the following diagram:



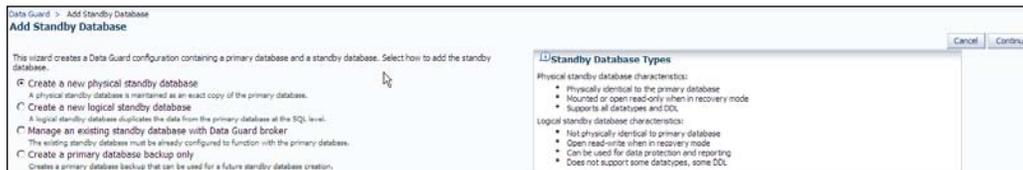
Note that it is not recommended to have OMS servers on different sites talking to the same repository, unless a network latency of 1 millisecond or less can be guaranteed consistently between the separate sites. Whenever possible, the OMS servers and repository server should be on the same local site. Low network latency is required for OMS and repository communications to be effective, and to not let the performance be degraded, which can happen with the higher network latencies normally seen in the case of separate sites.

Disaster-recovery tactics

We have mentioned that Oracle Data Guard can be used to set up a standby database for disaster-recovery purposes. This standby database can be a single instance or an active/active RAC database, depending on whether the production repository database is itself a RAC database or not. When setting up a standby system, it is always recommended to have a configuration that is similar to production, in case there is a real disaster. The standby system should be able to keep up with the production demands of performance and concurrency once the failover takes place, otherwise the standby system will be considered useless in reality.

As mentioned previously, Active Data Guard or Oracle GoldenGate is not certified to be used for the purpose of sharing the read-only load with the standby, or for multimaster replication. Only normal Data Guard should be used for the purpose of disaster recovery protection for the repository.

Note that the standby database can be set up from Enterprise Manager itself. You do this by moving to the database Target in the console, and then going to **Availability | Add Standby Database**. This brings up the wizard that adds a standby database, as shown in the following screenshot:



This automates the procedure of creating standby databases and is a considerable help to ease the burden on DBAs who would otherwise have to follow a series of manual steps to set up a standby – and we know that manual steps are error prone. Automating such routine DBA tasks with Enterprise Manager is one of the best-value propositions for this product.

However, this is just the database that we have protected for disaster recovery purposes. What about the OMS, which is another main component of Enterprise manager? According to the **Maximum Availability Architecture (MAA)** guidelines of Oracle, the OMS should also be protected against disaster. This can be done using shared storage for Agent uploads and the software library of Enterprise Manager.

The official documentation for setting up High Availability for Enterprise Manager is quite thorough, and can be found in the *Oracle Enterprise Manager Cloud Control Administrator's Guide* document, in *Part VII: Configuring Enterprise Manager for High Availability*, at the following URL:

http://docs.oracle.com/cd/E24628_01/doc.121/e24473/part_ha.htm#EMADM11807

You can also look at the MOS note ID 1369698.1: *12c Cloud Control HA: Steps to Install and Configure Multiple 12c OMS Behind a Server Load Balancer (SLB)*, which explains the setup of the load balancer in detail.

A new white paper has also been published on the OTN, describing the process for implementing Enterprise Manager with High Availability. This white paper uses a specific implementation example with level 3 MAA:

<http://www.oracle.com/technetwork/oem/framework-infra/wp-em12c-building-ha-level3-1631423.pdf>

At the time of writing, the restricted use license for the base Enterprise Manager product covers the repository's Enterprise Edition database, as well as the standby database for normal Data Guard. However, the Active Data Guard database option and the RAC database option are not covered by this restricted use license. If you want to use RAC for the repository database, the RAC license must be purchased. As we have mentioned earlier, Active Data Guard is not certified for use with Enterprise Manager.

Summary

In this chapter, we have been introduced to the new Oracle Enterprise Manager Cloud Control 12c as a possible way to help us manage and resolve the ever-prevalent chaos in data centers. We went through an overview of the new version, and the striking new features that hold a lot of promise, such as the modular architecture, self-update capabilities, revamped Agent, and consolidation of configuration capabilities.

In the bonus sections, we also went through the installation process in some detail, looking at a fresh installation of Enterprise Manager Cloud Control 12c. Later we looked at an upgrade process for a previously existing Grid Control version, and the pros and cons of the 1-System and 2-System upgrade approaches.

We talked about the methods of mass deployment of Agents on Targets, and then we examined the necessary scalable architecture to be used for very large sites with tens of thousands or even millions of Targets.

Finally, we looked at disaster-recovery setups for Enterprise Manager, as per MAA guidelines.

We are now introduced to the world of Enterprise Manager, and will now look into its manifold capabilities. In the next chapter, we will explore the performance management capabilities of the new Enterprise Manager Cloud Control 12c.