Solution-in-a-Box: Deploying Cost-effective IT Manageability Infrastructure Using Oracle Enterprise Manager and Oracle Database Appliance

Oracle Enterprise Manager 13c Release 2 Deployment on Oracle Database Appliance X7-2S / X7-2M

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Introduction

Oracle Enterprise Manager is Oracle's integrated enterprise IT management product line, which provides the industry's only complete, integrated and business-driven enterprise cloud management solution. Oracle Enterprise Manager creates business value from IT by leveraging the built-in management capabilities of the Oracle stack for traditional and cloud environments, allowing customers to achieve unprecedented efficiency gains while dramatically increasing service levels.

Oracle Database Appliance X7-2S (a small sized system) and Oracle Database Appliance X7-2M (a medium sized system) are pre-built, ready to deploy, database platforms. Each system consists of a server node, networking, and redundant storage. Oracle Enterprise Manager Cloud Control can be deployed on Oracle Database Appliance X7-2S / X7-2M to quickly create an easy to manage, enterprise IT management environment.

This white paper outlines the process of deploying Oracle Enterprise Manager Cloud Control 13c Release 2 on the Oracle Database Appliance X7-2S / X7-2M platform. An Oracle Database Appliance X7-2M system was used to conduct the setup and testing.

Audience

This white paper is intended for Oracle Database Architects and Database Administrators responsible for setting up manageability infrastructure, especially Oracle Enterprise Manager Cloud Control manageability infrastructure in their enterprise IT environments.

Objective

The purpose of this white paper is to outline the process of planning, installing, and deploying a basic Oracle Enterprise Manager Cloud Control 13c Release 2 environment on Oracle Database Appliance X7-2S / X7-2M. In this setup, the Oracle Management Repository (OMR) database and the Oracle Management System (OMS) are deployed on the same system. The installed configuration can then be used to manage various Oracle and non-Oracle target systems in an enterprise IT environment. These targets may include Oracle Database Appliance systems, Oracle Exadata Database Machine systems, and other Oracle or third-party IT hardware, Oracle databases, application servers, and software systems running in those environments.

Please note that while Oracle Database Appliance X7-2S / X7-2M provides a ready to deploy, easy to manage, and a cost effective platform for installing Oracle Enterprise Manager Cloud Control. You may deploy Oracle Data Guard for disaster recovery. For large, mission-critical deployments Oracle recommends using the Oracle Database Appliance X7-2HA (high availability) platform to configure a highly available configuration for your Enterprise Manager Cloud Control environment. This includes using multiple Oracle Management Servers (OMS), and Oracle Real Application Clusters (RAC) and Oracle Active Data Guard technologies to protect the Oracle Management Repository.

For more information please see Oracle Maximum Availability Architecture Best Practices for Enterprise Manager at http://www.oracle.com/technetwork/database/features/availability/em-maa-155389.html.

Oracle Enterprise Manager

Oracle Enterprise Manager provides a single and comprehensive management framework for Oracle environments including Oracle applications, Oracle databases, Oracle middleware, Oracle virtualization, and Oracle cloud deployments. Oracle Enterprise Manager supports Oracle/Sun hardware and Oracle engineered systems such as Exadata, Exalogic, Exalytics, and Oracle Database Appliance and it provides a complete stack or "application to disk" management solution.

Oracle Enterprise Manager Cloud Control Architecture

Oracle Enterprise Manager Cloud Control architecture includes three main components: An Oracle Management Repository (OMR) for centrally hosting manageability data received from monitored targets, an Oracle Management Service (OMS) to manage data processing and transactions, and an Oracle Management Agent (OMA) running on each managed target host to collect and transmit data back to OMS. A fourth element, the Oracle Enterprise Manager Cloud Control Console, which is a web based interface, provides the user interface for managing targets and configurations.
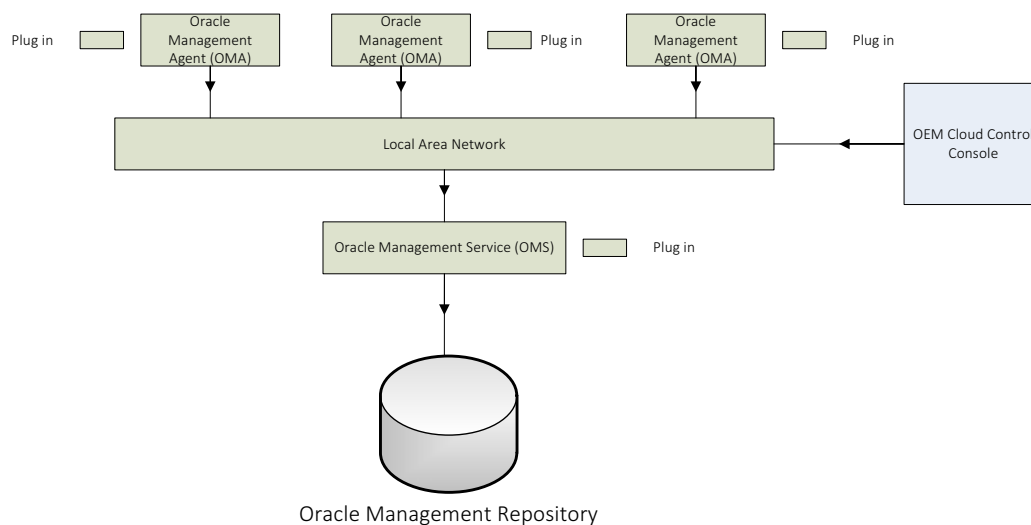

Figure 1: Oracle Enterprise Manager Single OMS Deployment

Oracle Management Repository

The Oracle Management Repository (OMR) is an Oracle database where all of the information collected by the Management Agents is stored. It consists of database objects such as database jobs, packages, procedures, views, and tablespaces. Technically, the Oracle Management Service uploads the monitoring data it receives from the Management Agents to the Management Repository. The Management Repository then organizes the data so that it can be retrieved by the Oracle Management Service and displayed in the Enterprise Manager Cloud Control console. Because data is stored in the Management Repository, it can be shared between multiple administrators accessing Enterprise Manager Cloud Control console. The Oracle Management Repository database must be created before Oracle Enterprise Manager Cloud Control 13c deployment. At the time of Oracle Enterprise Manager Cloud Control software installation, the Enterprise Manager Cloud Control Installation Wizard configures the Management Repository in that existing database.

Oracle Management Service

Oracle Management Service is a web-based application that orchestrates with the Management Agents and the Management Plug-ins to discover targets, monitor and manage those targets, and store the collected information in the Oracle Management Repository

(OMR) for future reference and analysis. Oracle Management Service also renders the user web interface for Enterprise Manager Cloud Control. Oracle Management Services is deployed in the Oracle middleware home (middleware home), which is the parent directory that contains the Oracle WebLogic Server home, the Oracle Management Service home, the Management Agent home, the plug-in home, the Java Development Kit (JDK), the Oracle Management Service instance base directory, as well as the Oracle Web tier directory, the Oracle common directory, and other relevant configuration files and directories. It may be noted that Oracle Database Appliance X7-2S/X7-2M is a bare metal platform and OMS is deployed directly on the server.

Oracle Management Agent

Oracle Management Agent (OMA) is an integral software component that is deployed on each monitored host. It is responsible for managing and maintaining the hosts and the targets such as databases, application servers, and so forth running on the hosts and communicating that information to the middle-tier Oracle Management Service. Management Agent also allows you to monitor non-Oracle components, such as third-party databases, through corresponding management plug-ins. You can also configure connectors on OMS to pass on incident information received from Oracle Management Agents to third party ticketing tools such as HP OpenView, CA Service Desk, etc.

Oracle Management Agent is one of the core distributed components of Enterprise Manager Cloud Control architecture that enables you to convert an unmanaged host to a managed host in the Enterprise Manager system. The Management Agent works in conjunction with the plug-ins to monitor the targets running on that managed host.

Therefore, at any point in time, if you want to monitor a target running on a host, you must ensure that you first convert that unmanaged host to a managed host by installing a Management Agent, and then discover the targets running on it to start monitoring them. An Oracle Database instance, an Oracle Listener, an ASM instance, and so forth are example of typical targets monitored by Oracle Enterprise Manager Cloud Control.

To install a Management Agent, you can use the Add Host Targets Wizard that is accessible from within the Enterprise Manager Cloud Control console, or you can use EM command-line interface (*emcli*). Oracle recommends that you use this wizard, or EMCLI, for the mass-deployment of Management Agents.

Oracle Management Plug-ins

The core Oracle Enterprise Manager Cloud Control features for managing and monitoring Oracle technologies, such as Oracle Database, Oracle Fusion Middleware, and Oracle Fusion Applications, are now provided through components known as plug-ins that can be downloaded and deployed using the new Self Update feature. This new "pluggable" framework enables Cloud Control to be updated with management support for the latest Oracle product releases, without having to wait for the next Cloud Control release to provide such functionality. For example, when a new version of Oracle Database is released, you can simply download and deploy the latest Oracle Database plug-in, which will include management support for that latest release of Oracle Database.

The following plug-ins are installed on Oracle Management Service and the Management Agent by default when a new Enterprise Manager system is deployed.

- Oracle Database Plug-in - Enables you to monitor and manage Oracle Database and related targets such as Oracle Real Application Clusters (Oracle RAC), Oracle Automatic Storage Management (Oracle ASM), and so on.

- Oracle Fusion Middleware Plug-in - Enables you to monitor and manage Oracle Fusion Middleware products such as Oracle WebLogic Domain, Oracle WebLogic Cluster, Oracle WebLogic Server, Oracle SOA Suite, Oracle Web Tier, Oracle GlassFish and so on.

- Oracle Exadata Plug-in - Enables you to monitor and manage Oracle Exadata targets.

- Oracle System Infrastructure - Enables you to discover, monitor, and manage Oracle hardware systems and Super Cluster engineered systems, including server hardware, chassis, racks, power distribution unit, network equipment, operating systems, virtualization software, and clustering software.

- Oracle Cloud Framework - Enables you to access basic features that are common across cloud services such as Middleware as a Service (MWaaS), Database as a Service (DBaaS), Infrastructure as a Service (IaaS), and Testing as a Service (TaaS).

In addition to the default plug-ins, you can optionally install other plug-ins available in the software kit (DVD, downloaded software bundle, and so on). The installer response file that you customize before OMS configuration is where you can select the optional plug-ins and configure them.

While this paper discusses deploying Oracle Enterprise Manager Cloud Control on Oracle Database Appliance, you can also use Oracle Enterprise Manager Cloud Control 13c Release 2 to manage Oracle Database Appliance systems as target hosts. The Oracle Enterprise Manager plug-in for Oracle Database Appliance is available to customers and enables monitoring and managing Oracle Database Appliance systems using Oracle Enterprise Manager Cloud Control.

Enterprise Manager Cloud Control Console

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

Oracle Database Appliance

Oracle Database Appliance X7-2S (and X7-2M) is a pre-built, pre-tuned system that can be used to deploy Oracle Databases as well as Oracle and third-party applications. It is a complete system comprising software, hardware, storage, and networking. Oracle Database Appliance X7-2S / X7-2M comes with Oracle Appliance Manager software that enables touch of a button deployment and management capability for the platform.

The reliability aspect of Oracle Database Appliance is crucial and makes it a suitable platform for deployment of Oracle Enterprise Manager Cloud Control. However, for disaster recoverability, you should use a standby system, in case the primary system is unavailable due to planned or unplanned outage.

Oracle recommends using a high availability platform along with multiple Oracle Management Servers (OMS), Oracle Real Application Clusters (RAC) and Oracle Data Guard technologies, to configure a highly available configuration for your Enterprise Manager Cloud Control environment. For more information please see Oracle Maximum Availability Architecture Best Practices for Enterprise Manager at http://www.oracle.com/technetwork/database/features/availability/em-maa-155389.html.

It should be noted that once deployed, Oracle Enterprise Manager naturally becomes a critical system for managing multiple IT systems and environments. It is usually one of the most critical environments in the data center and it must remain available, require minimal maintenance, and perform well to ensure the 'target' systems, some of which may be mission critical themselves, can be continuously monitored and managed. Oracle Database Appliance is an ideal platform for this purpose.

Figure 2: Oracle Database Appliance X7-2M

An Oracle Database Appliance X7-2M system was used to test deployment of Oracle Enterprise Manager Cloud Control 13c Release 2 for the writing of this white paper. Oracle Database Appliance X7-2S system comprises of one Oracle Sun X7-2S server with one 10-core Intel Xeon® Silver 4114 processor and 192GB memory (expandable to 384GB), running Oracle Linux operating system. High performance NVMe database storage is included. The storage consists of 12.8TB NVMe flash storage (expandable to 51.2 TB of NVMe flash storage in the Oracle Database Appliance X7-2M hardware model). The appliance provides 2x10GBase-T (copper) ports or 2x25GbE SFP ports for network connectivity. Oracle Enterprise Manager Cloud Control 13c Release 2 software is provided on Oracle Technology Network(OTN) (edelivery.oracle.com).

For additional details on Oracle Database Appliance X7-2S/X7-2M systems, see Oracle Database Appliance X7-2S / X7-2M Data Sheet at http://www.oracle.com/technetwork/database/database-appliance/learnmore/odax7-2sm-ds-3933491.pdf

Oracle Enterprise Manager Cloud Control Deployment

This section covers the process of deploying Oracle Enterprise Manager Cloud Control 13c Release 2 (13.2.1.0.0) on Oracle Database Appliance X7-2S or Oracle Database Appliance X7-2M. The installation and configuration process for the two systems is identical. The process outlined herein assumes that you are performing the Oracle Enterprise Manager Cloud Control 13c Release 2 deployment on a brand new Oracle Database Appliance X7-2S or X7-2M system and not on an existing in-use Oracle Database Appliance X7-2S or X7-2M (although you will certainly be able to do that, should you choose to).

Best Practice: Oracle Database Appliance X7-2S / X7-2M system used for Oracle Enterprise Manager Cloud Control deployment should not be used for other purposes, such as deploying applications other than Oracle Enterprise Manager Cloud Control. Similarly, the database created to host the Oracle Management Repository (OMR) should not be used for any other purposes, such as creating additional schemas for storing and accessing data. Since, Oracle Database Appliance X7-2S / X7-2M is a single server environment, it is recommended that you deploy a standby system for a degree of protection against planned and unplanned downtime.

It may be noted that Oracle Enterprise Manager Cloud Control includes a restricted-use license of the Oracle Database for use only with the Oracle Management Repository or other complementary repositories included with Enterprise Manager (such as, Ops Center, Real User Experience Insight, Load Testing, and Test Manager). Additional database options or additional servers for disaster recovery require separate licensing. Customers receive one single-instance database with the Cloud Control, or RMAN, repository. To protect the repository with Data Guard, customers need to purchase a license for the standby site.

Oracle Database Appliance X7-2S / X7-2M being a single server environment, it is not possible to deploy Oracle Real Application Clusters (RAC) on this system, nor is it possible / advisable to use two Oracle Database Appliance X7-2S/X7-2M systems to configure a cluster. For deploying a clustered active-active platform as Oracle Enterprise Manager Cloud Control infrastructure, you should consider using the Oracle Database Appliance X7-2HA system.

Mission critical Enterprise Manager Cloud Control infrastructure should be setup on High Availability platforms such as Oracle Database Appliance X7-2HA. Oracle Enterprise Manager Cloud Control 13c can be installed on an Oracle Database Appliance X7-2HA system (a two-node cluster system) in the bare metal configuration.

Only Enterprise Edition of Oracle Database is recommended for creating Enterprise Manager Cloud Control repository. You should not use the Standard Edition of Oracle Database for configuring the Enterprise Manager Cloud Control repository.

Deployment Planning

Before you deploy Oracle Enterprise Manager solution-in-a-box on Oracle Database Appliance, you should complete the following preparatory tasks.

Step 1: Plan network configuration

Before starting the deployment, you need to identify the network where Oracle Database Appliance will be installed. You must also provision IP addresses and hostnames in the DNS server for the appliance server. The following matrix can be helpful in capturing the network information and planning your configuration.

Type	Details
Server Public Network Name	
Server Public Network IP Address	
Public Network Netmask	
Public Network Gateway	
ILOM Interface Name	
ILOM Interface IP Address	
ILOM Network Netmask	
ILOM Network Gateway	
Domain Name	
DNS Server IP Address(es)	
NTP Server IP Address	

Table 1: Minimum network requirements for deploying Oracle Database Appliance X7-2S / X7-2M

In addition, it is recommended that you plan to deploy Oracle Auto Service Request (ASR) feature on Oracle Database Appliance. However, this is optional. If you do want to configure Oracle ASR for your Oracle Database Appliance X7-2S or X7-2M, you must do so at the time of initial deployment. The following information is required to configure ASR at the time of Oracle Database Appliance deployment.

Type	Hostname	IP Address
ASR Proxy Server Name		
ASR Proxy Server Port		
ASR Proxy Username		
ASR Proxy Password		

Table 2: ASR networking requirements for deploying Oracle Database Appliance X7-2M

Step 2: Conduct the database and OMR sizing exercise

When setting up the OMR database on Oracle Database Appliance, one of the key inputs is database size. You must plan for the size of the Oracle Management Repository (OMR) database in advance so you can create it with the correct size during or after initial deployment of your Oracle Database Appliance X7-2S / X7-2M system. Refer the suggested sizing guidelines in table 3 below.

You must choose the database shape based on any applicable licensing. Sizing your Oracle Enterprise Manager Cloud Control deployment is an important and key step in configuring an appropriate manageability infrastructure. An inappropriately or inadequately sized configuration can affect Enterprise Manager operations and your ability to properly monitor and manage your IT infrastructure.

	Workload			OMS Sizing			OMR Sizing		
Size	Agents	Targets	Concurrent users	CPU Cores	Memory	Storage	CPU Cores	Memory	Storage
Small	Up to 100	Up to 1,000	Up to 10	2	6 GB	100GB	2	4	200 GB
Medium	Up to 1,000	Up to 10,000	Up to 25	8	16 GB	100GB	4	6	200 GB
Large	More than 1,000*	More than 10,000	More than 25	16	32 GB	100GB	8	8	200 GB

Table 3: Suggested OMS and OMR sizing estimation

Oracle Appliance Manager provides pre-built templates (known as shapes) for different database sizes in terms of CPU and memory. These templates are named odb1, odb2, odb4, etc. Refer to table 4 for details of each template.

In general, two ping recorder threads exist for one OMS. These ping recorder threads are adequate for 2000 agents. If more than 2000 agents are deployed, increase the ping recorder threads by 1 for each additional 1000 agents. You can use the "emctl set property – name <property-name>" command to set the heartbeatPingRecorderThreads property ("oracle.sysman.core.omsAgentComm. ping.heartbeatPingRecorderThreads") to the desired value. Note that OMS restart is required to reflect the new property.

Note that an appropriate database size (*dbshape*) should be selected based on sizing calculations as per the sizing guidelines white paper mention above. The available shapes for Oracle Database Appliance X7-2S/X7-2M are as follows.

Shape	Resources
odb1s	1 CPU core, 4 GB memory
odb1	1 CPU core, 8 GB memory
odb2	2 CPU cores, 16 GB memory
odb4	4 CPU cores, 32 GB memory
odb6	6 CPU cores, 48 GB memory
odb8	8 CPU cores, 64 GB memory
odb10	10 CPU cores, 80 GB memory
odb12	**12 CPU cores, 96 GB memory**
odb16	**16 CPU cores, 128 GB memory**
odb20	**20 CPU cores, 160 GB memory**
…	…
odb36	**36 CPU cores, 384 GB memory**

Table 4: Oracle Database Appliance X7-2/**X7-2M** Database Shapes

Refer to Oracle Database Appliance X7-2 Deployment and Users Guide and Tables E-1 and E-2 for the complete list of Oracle Database Appliance X7-2M OLTP Database shapes available on the respective hardware models.

For larger Oracle Management Repository (OMR) databases use Oracle Database Appliance X7-2M. If your capacity requirements exceed than the resources available on the Oracle Database Appliance X7-2S/X7-2M system, you may use Oracle Database Appliance X7-2HA or you may choose to use Oracle Database Appliance X7-2S / X7-2M to host the Oracle Management Repository (OMR) database and host the Oracle Management Server (OMS) on a separate system external to the Oracle Database Appliance.

Deployment Tasks

You can deploy Oracle Enterprise Manager Cloud Control 13c Release 2 on either model of Oracle Database Appliance, i.e., Oracle Database Appliance X7-2S or Oracle Database Appliance X7-2M. However, since Oracle Database Appliance X7-2M provides a greater ability to scale (more CPU, memory, and ability to grow storage capacity), it may be considered a preferred platform between these two system models.

Step 3: Unpack and cable Oracle Database Appliance X7-2S / X7-2M hardware

Follow instructions included in the Oracle Database Appliance Setup Booklet X7-2S/X7-2M to setup and install Oracle Database Appliance X7-2 S / X7-2M system. This includes cabling of server, and powering up of the server node. The Oracle Database Appliance X7-2 S|M Setup Booklet can be viewed at https://docs.oracle.com/cd/E89147_01/doc.122/e88372.pdf

Step 4: Setup ILOM on Oracle Database Appliance X7-2S

Connect Keyboard, Video, and Mouse (KVM) to Oracle Database Appliance server and boot the server by pressing the power button on the front of the server. As the server starts to boot, press the F2 key to enter the BIOS setup menu and then configure ILOM network. Refer to My Oracle Support note 1393191.1 for instructions on how to setup ILOM using the BIOS menu.

Step 5: Setup Oracle Database Appliance X7-2S / X7-2M

Before Oracle Enterprise Manager Cloud Control is deployed, Oracle Database Appliance X7-2S / X7-2M deployment must be completed.

Detailed step-by-step instructions for deploying Oracle Database Appliance Platform are beyond the scope of this white paper. However, Oracle Database Appliance Setup Booklet X7-2S/X7-2M illustrates the setup process of Oracle Database Appliance X7-2S/X7-2M in detail.

During Oracle Database Appliance X7-2S/X7-2M deployment, Oracle Appliance Manager web console gives you the option to create the database. If you choose to create the repository database at this step, then you can skip the Setup Oracle Management Repository (OMR) database step below.

Step 6: Setup Oracle Management Repository (OMR) database

During Oracle Database Appliance deployment, Oracle Database software is installed on Oracle Database Appliance server node.

You can check the currently configured Oracle Homes using *odacli* command as follows.

```
# odacli list-dbhomes

ID                                     Name                 DB Version Home Location
-------------------------------------- -------------------- ---------- --------------------------------------------
2c397804-e9a8-45c3-9f25-921b185fde81   OraDB12102_home1     12.1.0.2   /u01/app/oracle/product/12.1.0.2/dbhome_1
```

If you did not create the Oracle Management Repository (OMR) database during the initial Oracle Database Appliance deployment, then you should create it now.

For details refer to Oracle Enterprise Manager Cloud Control 13c Release 2 Basic Installation Guide available at https://docs.oracle.com/cd/E73210_01/index.htm. Oracle Database Appliance X7-2S|M meets the basic requirements for deploying Oracle Enterprise Manager Cloud Control 13c Release 2.

```
# odacli create-database --dbname <> --dbshape <>
```
For example,
```
# odacli create-database --dbname emrep --dbshape odb6 -m
```

At the end of the above process, the Oracle Management Repository database is ready.

In order to enable support for virtually all languages of the world Oracle recommends that you choose the AL32UTF8 character set for the EM repository database. You can check your database character set as follows.

```
SQL> select value$ from sys.props$ where name = 'NLS_CHARACTERSET' ;
VALUE$
--------------------------------------------------------------------------------
AL32UTF8
```

Step 7: Set OMR database parameters

The following parameter settings are <u>minimum</u> recommended values for the Oracle Management Repository database. Oracle Database Appliance medium and large database templates satisfy these requirements. However, you can further adjust these parameters, as appropriate, if needed.

Parameter Name	Minimum suggested value
SESSION_CACHED_CURSORS	500
JOB_QUEUE_PROCESSES	20
OPEN_CURSORS	400
SGA_TARGET	3G
SHARED_POOL_SIZE	1G (ignore if setting SGA_TARGET)
PROCESSES	300
DB_SECUREFILE	PERMITTED

Table 5: OMR database parameter changes

The db_securefile database parameter default value is not "PERMITTED". Change it at this time using the following SQL command on the OMR database.

```
SQL> alter system set db_securefile="PERMITTED";
```
Once deployed, the Oracle Enterprise Manager Cloud Control system configuration and the hosting platform need to be monitored and managed just like any other production system.

As part of the repository database (12.2) configuration, please set the parameter "allow_insert_with_update_check" to TRUE. This is required for Oracle Enterprise Manager Cloud Control 13.2 deployment.

Step 8: Download Oracle Enterprise Manager Cloud Control 13c Release 2 software

Download Oracle Enterprise Manager Cloud Control 13c Release 2 software.

   a)   Go to http://www.oracle.com/technetwork/oem/enterprise-manager/downloads/index.html to download Oracle Enterprise Manager Cloud Control 13c Release 2 Plug-in Update 1 (13.2.0.0)
   b)   Select "Linux x86_64 (64-bit)" platform
   c)   Accept the terms if you agree and download all files

d) Refer to README for instructions

The following files are downloaded for release 13.2.0.0. Copy these files to the Oracle Database Appliance X7-2S / X7-2M server.

```
em13200p1_linux64.bin ( 5546,06,940 bytes) (cksum - 1368017785)
em13200p1_linux64-2.zip (2,123,211,088 bytes) (cksum - 935533122)
em13200p1_linux64-3.zip (741,526,563 bytes) (cksum - 3538781705)
em13200p1_linux64-4.zip (2,084,231,936 bytes) (cksum - 3056583812)
em13200p1_linux64-5.zip (109,191,154 bytes) (cksum - 444734883)
em13200p1_linux64-6.zip (2,146,696,423 bytes) (cksum - 1458071471)
em13200p1_linux64-7.zip (771,426,157 bytes) (cksum - 2439016911)
```

Step 8: Install OMS

Prepare the response file as outlined in Oracle Enterprise Manager Cloud Control 13c Release 2 Basic Installation Guide and configure Oracle Enterprise Manager Cloud Control.

Oracle Enterprise Manager Cloud Control 13.2 installation requires about 30GB of free space. Before proceeding with Oracle Enterprise Manager Cloud Control 13.2 software installation, please ensure that the file system where you intend to deploy has at least this much storage space available. If you need rerun the installation process for any reason, make sure you clean the previous run and free up space.

Start VNC server on Oracle Database Appliance X7-2S / X7-2M and ensure that your DISPLAY variable is set appropriately.

```
# su – oracle
# cd /<location-of-downloaded-EM13cR2-software>
$ ./em13200p1_linux64.bin
```

Depending on the free space availability in the default /tmp, the installer may ask to provide a location for the tmp area where there is at least 10GB of free space available. During the installer session, pre-requisite checks are conducted and required actions are highlighted. Be sure to address all pre-requisites before proceeding.

Be prepared to provide the following inputs on Oracle Enterprise Manager Cloud Control Installer screens. Refer to Enterprise Manager Cloud Control Basic Installation Guide 13c Release 2 for details.

At the end of installation capture the configuration details provided by the installer. Alternatively, run the following command on the host to obtain configuration information for the new setup.

```
# /u01/app/oracle/middleware/bin/emctl status oms -details
```

The Management Agent on the OMS is automatically configured when the OMS is configured.

Step 9 – Optionally, install Enterprise Manager Cloud Control 13c Plug-in for Oracle Database Appliance

Standard plug-ins are installed on Oracle Management Service and the Management Agent by default when a new Enterprise Manager system is deployed. However, the default plug-ins do not include the Oracle Enterprise Manager Plug-in for Oracle Database Appliance. In order to manage Oracle Database Appliance targets using Oracle Enterprise Manager Cloud Control 13c, you may deploy the Enterprise Manager 13c Plug-in for Oracle Database Appliance on the Oracle Management Service (OMS) and the Management Agents running on target Oracle Database Appliance server nodes.

For more details about Enterprise Manager Cloud Control 13c Plug-in for Oracle Database Appliance refer to Enterprise Manager Plug-in for Oracle Database Appliance User's Guide.

Step 10 – Add managed hosts

Select the targets you want Oracle Enterprise Manager Cloud Control to monitor and manage. Oracle Enterprise Manager Cloud Control can scan your infrastructure for potential targets, or you can manually add them.

During OMS deployment Management Agent is automatically deployed on the OMS server. As the Oracle Management Repository (OMR) resides on the same server an additional Oracle Management Agent is not required.

Oracle Management Agents can be deployed into the target hosts directly using Oracle Enterprise Manager Cloud Control console. For example, to install Management Agents on Oracle Database Appliance, navigate from the Enterprise Manager Cloud Control 13c Console to "Setup -> Add target -> Add Targets Manually -> Add Host targets -> Install Agent on Host" and provide the host name(s) for Oracle Database Appliance server node(s).

For more details about Enterprise Manager Cloud Control Plug-in for Oracle Database Appliance refer to Enterprise Manager Plug-in for Oracle Database Appliance User's Guide.

If your installation has Internet access, make sure your connection to My Oracle Support is enabled so you can view Service Request information, obtain Patch Recommendations and download Management Plug-ins and other entities to the Software Library.

Step 11: Discover external targets

Target monitoring is performed by Management Agents deployed to the target hosts. Download the Management Agents for each operating system your target hosts are running on and deploy them on the target systems. Then deploy the required plug-ins.

For example, in order to discover Oracle Database Appliance targets, you must first deploy the Management Agent and then the Enterprise Manager Plug-in for Oracle Database Appliance on the OMS. Oracle Management Agents should be deployed and be running on the target Oracle Database Appliance systems. You can then deploy the Enterprise Manager Plug-in for Oracle Database Appliance on the Management Agents running on the target hosts.

Then discover the Oracle Database Appliance targets by navigating from the Enterprise Manager Cloud Control 13c Console to "Setup -> Add target -> Add Targets Manually -> Add Using Guided Process" and selecting "Oracle Database Appliance" target for discovery. Note that you are required to provide the URL of the Management Agent running on the server node and "oracle" user credentials. Ensure that the "oracle" user has been setup with the "sudo" capability on both server nodes of the target Oracle Database Appliance.

For more details about Enterprise Manager Cloud Control 13c Plug-in for Oracle Database Appliance refer to Enterprise Manager Plug-in for Oracle Database Appliance User's Guide.

Step 12: Start Oracle Enterprise Manager Cloud Control Console

After Enterprise Manager Cloud Control deployment, OMS and OMR are in an up state. However, if needed, then you can manually start the OMR using SRVCTL and start OMS using emctl as follows.

```
oracle $> srvctl start database –d emrep
oracle $> $OMS_HOME/bin/emctl start oms
```

You can obtain the details of your deployment at any time by running the emctl status command. For example,

```
[oracle@myoda7m001 bin]$ ./emctl status oms -details
Oracle Enterprise Manager Cloud Control 13c Release 2
Copyright (c) 1996, 2016 Oracle Corporation.  All rights reserved.
Enter Enterprise Manager Root (SYSMAN) Password :
Console Server Host        : myoda7m001.example.com
HTTP Console Port          : 7788
HTTPS Console Port         : 7802
HTTP Upload Port           : 4889
HTTPS Upload Port          : 4903
EM Instance Home           : /u01/OracleHomes/gc_inst/em/EMGC_OMS1
OMS Log Directory Location : /u01/OracleHomes/gc_inst/em/EMGC_OMS1/sysman/log
OMS is not configured with SLB or virtual hostname
Agent Upload is locked.
OMS Console is locked.
```

```
Active CA ID: 1
Console URL: https://myoda7m001.example.com:7802/em
Upload URL: https://myoda7m001.example.com:4903/empbs/upload

WLS Domain Information
Domain Name            : GCDomain
Admin Server Host      : myoda7m001.example.com
Admin Server HTTPS Port: 7102
Admin Server is RUNNING

Oracle Management Server Information
Managed Server Instance Name: EMGC_OMS1
Oracle Management Server Instance Host: myoda7m001.example.com
WebTier is Up
Oracle Management Server is Up
JVMD Engine is Up

BI Publisher Server Information
BI Publisher Managed Server Name: BIP
BI Publisher Server is Up

BI Publisher HTTP Managed Server Port   : 9701
BI Publisher HTTPS Managed Server Port  : 9803
BI Publisher HTTP OHS Port              : 9788
BI Publisher HTTPS OHS Port             : 9851
BI Publisher is locked.
BI Publisher Server named 'BIP' running at URL:
  https://myoda7m001.example.com:9851/xmlpserver
BI Publisher Server Logs:
  /u01/OracleHomes/gc_inst/user_projects/domains/GCDomain/servers/BIP/logs/
BI Publisher Log       :
  /u01/OracleHomes/gc_inst/user_projects/domains/GCDomain/servers/BIP/logs/bipublisher/bipubl
  isher.log
[oracle@myoda7m001 bin]$
```

Note: The "OMS Console is locked" and "Agent Upload is locked" messages above indicate that the console must be accessed over HTTPS ports and agents must be secure and upload over HTTPS port. If you want to unlock the OMS Console and/or agent upload, then use the ""emctl secure unlock" command so that HTTP ports too can be used to access console and unsecure agents may upload over HTTP.

The connect string for OMS connection to OMR should show the following:

```
[oracle@myoda1 ~]$ $ $OMS_HOME/bin/emctl config oms -list_repos_details
Oracle Enterprise Manager Cloud Control 13c Release 2
Copyright (c) 1996, 2015 Oracle Corporation.  All rights reserved.
Repository Connect Descriptor :
  (DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=myoda7m001.example.com)(PORT=1521))
  ))(CONNECT_DATA=(SID=omr)))
Repository User : SYSMAN
```

Step 13: Connect to EMCC Console

Now point your browser to the Console URL as indicated above and login to console using username SYSMAN and password that you specified for SYSMAN in your response file (e.g., welcome1).
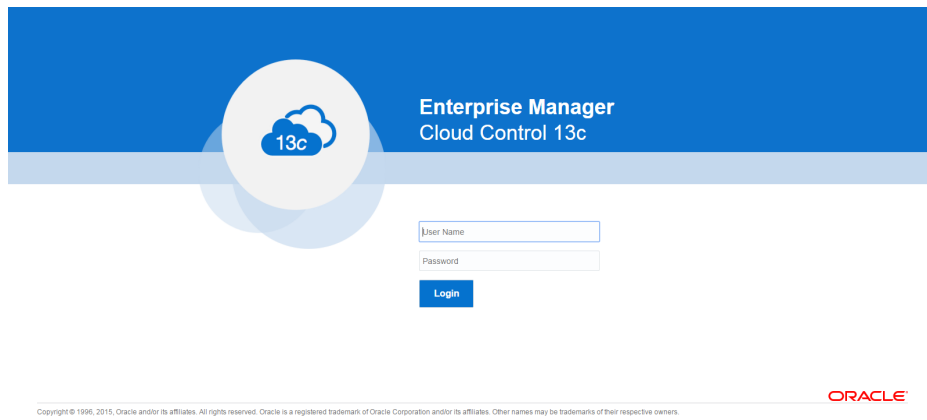
Figure 3: Oracle Enterprise Manager Cloud Control 13c Console Login

Step 14: Configure Oracle Enterprise Manager Cloud Control console view

Once you are connected to the console configure and customize the console view as per your preference.

Step 15: Secure the Enterprise Manager Cloud Control environment

Post deployment change the SYSTEM, SYS, and SYSMAN passwords. Additionally, the passwords for ROOT, ORACLE, and ILOM ROOT users on Oracle Database Appliance X7-2S / X7-2M server should be changed.

HTTP vs. HTTPS

The OMS application traffic includes browser-OMS traffic (i.e. the browser traffic created by users accessing Cloud Control) and agent-OMS traffic (i.e. the traffic created by the agents uploading their data to the OMS). Both browser-OMS traffic and agent-OMS traffic can be configured to use either HTTP or HTTPS.

Best Practice*: To ensure secure communication between Cloud Control components, it is recommended to use HTTPS for all agent-OMS and browser-OMS traffic.*

Step 16: Establish and Validate ASR Configuration

Oracle Auto Service Request (ASR) is a feature of Oracle Premium Support Services and is included with your Oracle Database Appliance. Upon specific hardware failures, Oracle ASR automatically connects to Oracle Support and securely transmits fault data and opens a service request. This allows for Oracle Support to act immediately towards resolution such as shipment of disk drives, power supplies, or fan units, etc. It is recommended to setup Oracle Auto Service Request on your Oracle Database Appliance X7-2S / X7-2M system at the time of initial deployment.

Best Practice: You should configure ASR at the time of Oracle Database Appliance X7-2S / X7-2M deployment. However, you can also configure it at a later date, if so required.

Note that Oracle ASR only monitors specific hardware faults and does not monitor the software components or workload. You can use Oracle Enterprise Manager Cloud Control 13c and Oracle Database Appliance command-line interface (odacli) to manage the software components.

Step 17: Operate

Once deployed, Oracle Enterprise Manager Cloud Control can be accessed from **https://<hostname>.<domain>:7803/em**. Once connected to the console, you can start managing your IT systems and various computing environments. You may discover new targets and start deploying Management Agents on those targets to manage them.

You can manage the Oracle Database Appliance system using Oracle Appliance Manager command-line interface (*odacli*). Refer to Appendix A for sample commands to start and stop Oracle Enterprise Manger Cloud Control processes.

Step 17: Optionally, add a standby site for disaster recovery

You can protect against site failures at your primary Oracle Enterprise Manager Cloud Control system or environment/site by creating a standby site similar to your production site/environment using Oracle Database Appliance X7-2S / X7-2M.

Conclusion

The ability of Oracle Enterprise Manager Cloud Control to monitor a broad range of systems and technologies in the data center make it a versatile and critical piece of IT infrastructure. Oracle Database Appliance X7-2S / X7-2M provides an ideal platform for deployment of basic architecture for Oracle Enterprise Manager Cloud Control. It is a cost-effective, complete Oracle Engineered System designed for simplicity. This white paper illustrates how to install and configure Oracle Enterprise Manager Cloud Control 13c Release 2 on Oracle Database Appliance X7-2S/ X7-2M and use it to manage various targets, including Oracle Database Appliance targets.

Appendix A – Oracle Enterprise Manager Cloud Control 13.2 Software Installation

Once you have downloaded the Oracle Enterprise Manager Cloud Control 13.2 software, copy it to the Oracle Database Appliance X7-2M/X7-2S system and execute the installer binary as follows:
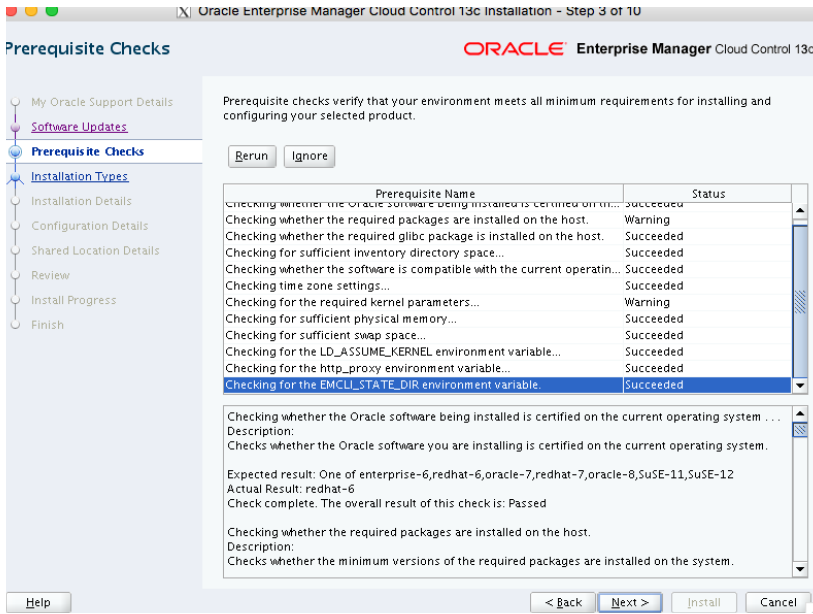
$ ./em13200p1_linux64.bin

Enter your email address and choose if you wish to receive security updates. Provide your My Oracle Support (MOS) credentials.

You may choose to skip this search for updates.

Check for any warnings or failures at this stage. Also see Appendix D for known issues.

You may choose to install software only or if you would prefer to keep it simple and not do additional customizations then create the complete configuration with this choice.
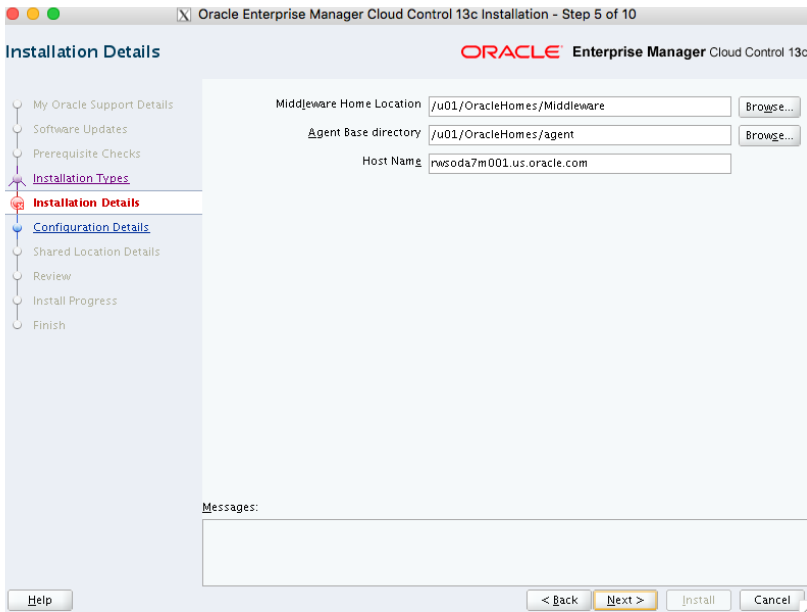
Specify the home location for Middleware and Agent as well as the hostname where Enterprise Manager Cloud Control application will be installed (local host name).
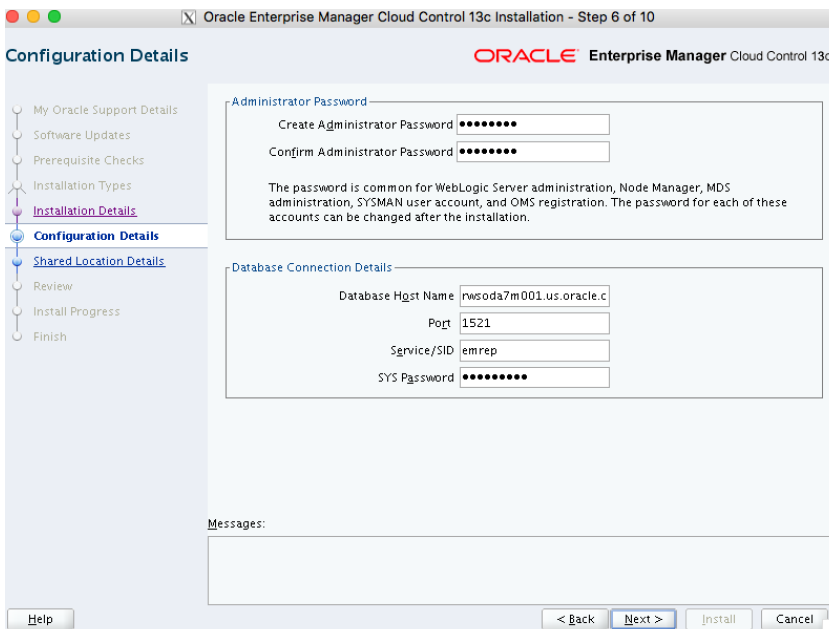
Provide admin password for the installation and also connection details for the Oracle Management Repository database.
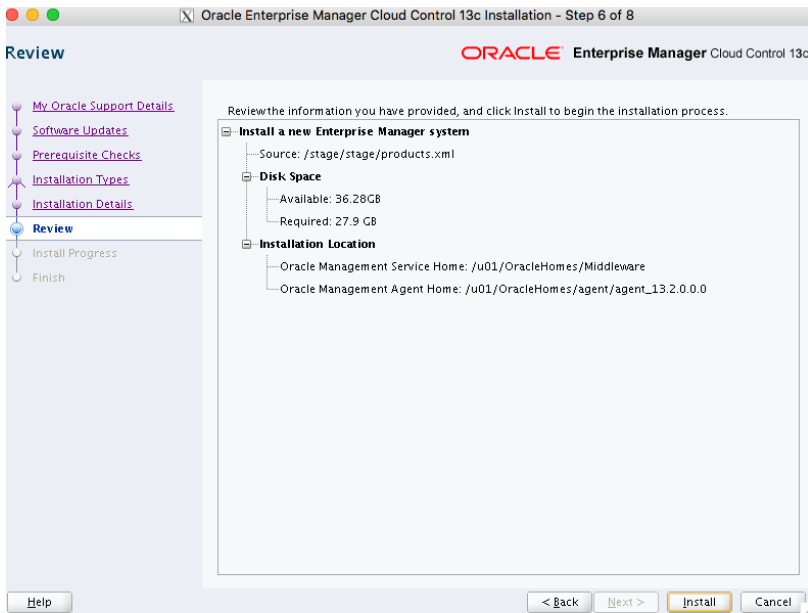
Ensure there is adequate space available for installation. When ready, press the Install button to start installation.

Appendix B - Starting and Stopping EM Environment

You can start and stop Oracle Enterprise Manager Cloud Control 13c using the Enterprise Manager Cloud command-line utility as follows.

Starting

$OMR_HOME/bin/srvctl start database –db omr

$OMS_HOME/bin/emctl start oms

$OMA_HOME/bin/emctl start agent

Stopping

$OMA_HOME/bin/emctl stop agent

$OMS_HOME/bin/emctl stop oms

$OMR_HOME/bin/srvctl stop database –db omr

Appendix C – Sample response file for EM deployment (new_install.rsp)

A sample installation response file is provided with the Oracle Enterprise Manager Cloud Control 13c Release 2 software. If you chose to do software only install, you can do the configuration later and use such a response file. You may update the default file included in the installed software to drive your deployment. An updated sample response file for Oracle Enterprise Manager Cloud Control 13c Release 2 deployment may look as follows:

```
##################################################################
## copyright (c) 1999, 2011, 2012 Oracle. All rights reserved.   ##
##                                                               ##
## Specify values for the variables listed below to customize    ##
## your installation.                                            ##
##                                                               ##
## Each variable is associated with a comment. The comment       ##
## identifies the variable type.                                 ##
##                                                               ##
## Please specify the values in the following format:            ##
##                                                               ##
##          Type          Example                                ##
##          String        "Sample Value"                         ##
##          Boolean       True or False                          ##
##          Number        1000                                   ##
##          StringList    {"String value 1","String Value 2"}    ##
##                                                               ##
## The values that are given as <Value Required> need to be      ##
## specified for a silent installation to be successful.         ##
##                                                               ##
##                                                               ##
## This response file is generated by Oracle Software            ##
## Packager.                                                     ##
##################################################################
##################################################################

RESPONSEFILE_VERSION=2.2.1.0.0

###########################################################################
# UNIX GROUP NAME and INVENTORY LOCATION
###########################################################################
#-------------------------------------------------------------------------
#Specify UNIX GROUP NAME and INENTORY LOCATION if there is no central inventory and
#inventory location is not passed using -invptrLoc
#UNIX_GROUP_NAME :<String> UNIX GROUP NAME.
#        Example    : UNIX_GROUP_NAME="dba"
#INVENTORY_LOCATION:<String>  INVENTORY LOCATION.
#        Example    : INVENTORY_LOCATION="/scratch/oracle/oraInventory"
#-------------------------------------------------------------------------
UNIX_GROUP_NAME="dba"
INVENTORY_LOCATION="/u01/app/oraInventory"

###########################################################################
# Inputs for Oracle Configuration Manager
###########################################################################
#-------------------------------------------------------------------------
#SECURITY_UPDATES_VIA_MYORACLESUPPORT:<Boolean> Whether security updates are req-
#        uired via My Oracle Support
```

```
#DECLINE_SECURITY_UPDATES:<Boolean> Whether security updates should be declined.
#MYORACLESUPPORT_USERNAME & MYORACLESUPPORT_PASSWORD:<String> User name and passw-
#       ord for My Oracle Support access, these will be effected only when SECU-
#       RITY_UPDATES_VIA_MYORACLESUPPORT=true
#-------------------------------------------------------------------------------
SECURITY_UPDATES_VIA_MYORACLESUPPORT=FALSE
DECLINE_SECURITY_UPDATES=TRUE
MYORACLESUPPORT_USERNAME=ravi.sharma@oracle.com
MYORACLESUPPORT_PASSWORD=CannotTell


################################################################################
#PARAMETERS FOR SOFTWARE UPDATES
################################################################################
#-------------------------------------------------------------------------------
#INSTALL_UPDATES_SELECTION:<String>
# Option 1. If you want to skip the software updates, provide
#       INSTALL_UPDATES_SELECTION="skip"
# Option 2. If you have already downloaded the updates then provide
#       INSTALL_UPDATES_SELECTION="staged"
# If you choose the Option 2 then make sure you also provide STAGE_LOCATION.
#STAGE_LOCATION:<String> Stage location for software updates. It will be effected
#       only when INSTALL_UPDATES_SELECTION is  set to "staged"
# Option 3: If you want to download the updates during the installation, make sure you
#           provide MYORACLESUPPORT_USERNAME_FOR_SOFTWAREUPDATES and
#  MYORACLESUPPORT_PASSWORD_FOR_SOFTWAREUPDATES
#           and set INSTALL_UPDATES_SELECTION="download"

#-------------------------------------------------------------------------------
INSTALL_UPDATES_SELECTION="skip"
STAGE_LOCATION=<Value Unspecified>
MYORACLESUPPORT_USERNAME_FOR_SOFTWAREUPDATES=<Value Unspecified>
MYORACLESUPPORT_PASSWORD_FOR_SOFTWAREUPDATES=<Value Unspecified>


################################################################################
#PROXY DETAILS FOR SECURITY UPDATES/ SOFTWARE UPDATES
################################################################################
#-------------------------------------------------------------------------------
#PROXY_USER:<String> User name for proxy access.
#PROXY_PWD:<String> Password for proxy access.
#PROXY_HOST:<String> Server providing proxy access.
#PROXY_PORT:<String> Port for proxy access.
#-------------------------------------------------------------------------------
PROXY_USER=<Value Unspecified>
PROXY_PWD=<Value Unspecified>
PROXY_HOST=<Value Unspecified>
PROXY_PORT=<Value Unspecified>


#-------------------------------------------------------------------------------
#ORACLE_MIDDLEWARE_HOME_LOCATION:<String> Middleware home location.
#-------------------------------------------------------------------------------
ORACLE_MIDDLEWARE_HOME_LOCATION="/u01/OracleHomes/Middleware"


#-------------------------------------------------------------------------------
#ORACLE_HOSTNAME:<String> Current Host name where the installer is invoked.
#By default the fully qualified hostname of the machine will taken(without providing this
  value)
#Value for this ORACLE_HOSTNAME has to be provided only if you want to configure with
  different hostname.
#-------------------------------------------------------------------------------
```

```
ORACLE_HOSTNAME="myoda7m001.example.com"

#-------------------------------------------------------------------------------
#AGENT_BASE_DIR:<String> Agent home location.
#-------------------------------------------------------------------------------
AGENT_BASE_DIR="/u01/OracleHomes/agent"

#-------------------------------------------------------------------------------
#WLS_ADMIN_SERVER_USERNAME:<String> Weblogic server user name.
#WLS_ADMIN_SERVER_PASSWORD / WLS_ADMIN_SERVER_CONFIRM_PASSWORD:<String> Weblogic
#       admin server password and confirm password.
#NODE_MANAGER_PASSWORD / NODE_MANAGER_CONFIRM_PASSWORD:<String> Node Manager
#       Password and Node Manager Confirm Password
#ORACLE_INSTANCE_HOME_LOCATION:<String> Oracle instance home location.
#-------------------------------------------------------------------------------
WLS_ADMIN_SERVER_USERNAME="weblogic"
WLS_ADMIN_SERVER_PASSWORD="welcome1"
WLS_ADMIN_SERVER_CONFIRM_PASSWORD="welcome1"
NODE_MANAGER_PASSWORD="welcome1"
NODE_MANAGER_CONFIRM_PASSWORD="welcome1"
ORACLE_INSTANCE_HOME_LOCATION="/u01/OracleHomes/gc_inst"

#-------------------------------------------------------------------------------
#CONFIGURE_ORACLE_SOFTWARE_LIBRARY:<Boolean>
#If you want to configure the Software Library at the time of installation, set
#this parameter to TRUE. Otherwise, set it to FALSE.
#Even if you do not configure it at the time of installation, your installation
# will succeed, and you can always configure it later from the Enterprise Manager
#Cloud Control Console. However, Oracle recommends that you configure it at the
#time of installation so that it is automatically configured by the installer,
#thus saving your time and effort.
#-------------------------------------------------------------------------------
CONFIGURE_ORACLE_SOFTWARE_LIBRARY=true

#-------------------------------------------------------------------------------
#SOFTWARE_LIBRARY_LOCATION:<String>
#If you have set CONFIGURE_ORACLE_SOFTWARE_LIBRARY to TRUE, then enter the
#absolute path leading up to a unique directory name on the OMS host where the
#Software Library can be configured. Ensure that the location you enter is a
#shared location on the OMS host. This helps when you install additional OMS
#instances that can use the same shared Software Library location.
#-------------------------------------------------------------------------------
SOFTWARE_LIBRARY_LOCATION="/u01/OracleHomes/swlib"

#-------------------------------------------------------------------------------
#DATABASE_HOSTNAME :<String> Hostname of the Repository database.
#       Example    : DATABASE_HOSTNAME="hostname.domain.com"
#LISTENER_PORT:<String>  Port on which the Repository database is running.
#       Example    : LISTENER_PORT="1521"
#SERVICENAME_OR_SID:<String> SID or Service name  of the Repository database.
#       Example     : SERVICENAME_OR_SID="emrep"
#SYS_PASSWORD:<String> Password of DBA user used to create repository schema.
#       Example    : SYS_PASSWORD="password"
#SYSMAN_PASSWORD / SYSMAN_CONFIRM_PASSWORD   : Password of sysman user.
#       Example: SYSMAN_PASSWORD="password"
#               SYSMAN_CONFIRM_PASSWORD="password"
#-------------------------------------------------------------------------------
DATABASE_HOSTNAME="myoda7m001.example.com"
LISTENER_PORT=1521
```

```
SERVICENAME_OR_SID="emrep"
SYS_PASSWORD="welcome1"
SYSMAN_PASSWORD="welcome1"
SYSMAN_CONFIRM_PASSWORD="welcome1"
#-------------------------------------------------------------------------------
#DEPLOYMENT_SIZE:<String> If you are planning to do simple install then us following
#DEPLOYMENT_SIZE="MINI"
#
#-------------------------------------------------------------------------------
DEPLOYMENT_SIZE="MEDIUM"


#-------------------------------------------------------------------------------
#MANAGEMENT_TABLESPACE_LOCATION:<String> Management table space location.
#       Example: MANAGEMENT_TABLESPACE_LOCATION = "/scratch/OracleHomes/oradata/mgmt.dbf"
#CONFIGURATION_DATA_TABLESPACE_LOCATION:<String> Configuration table space location.
#       Example: CONFIGURATION_DATA_TABLESPACE_LOCATION =
  "/scratch/OracleHomes/oradata/mgmt_ecm_depot1.dbf"
#JVM_DIAGNOSTICS_TABLESPACE_LOCATION:<String> JVM table space location.
#       Example: JVM_DIAGNOSTICS_TABLESPACE_LOCATION =
  "/scratch/OracleHomes/oradata/mgmt_deepdive.dbf"
#-------------------------------------------------------------------------------
MANAGEMENT_TABLESPACE_LOCATION="+DATA"
CONFIGURATION_DATA_TABLESPACE_LOCATION="+DATA"
JVM_DIAGNOSTICS_TABLESPACE_LOCATION="+DATA"


#-------------------------------------------------------------------------------
#AGENT_REGISTRATION_PASSWORD/AGENT_REGISTRATION_CONFIRM_PASSWORD:<String> Registration
  Password.
#STATIC_PORTS_FILE:<String> Location of the static_ports.ini file
#-------------------------------------------------------------------------------
AGENT_REGISTRATION_PASSWORD="welcome1"
AGENT_REGISTRATION_CONFIRM_PASSWORD="welcome1"
STATIC_PORTS_FILE=<Value Unspecified>


#-------------------------------------------------------------------------------
#PLUGIN_SELECTION:<StringList>  list of extra plugins to deployed.
#Default/Core plugins like oracle.sysman.db, oracle.sysman.emas, oracle.sysman.mos will be
  deployed by default.
# StringList contains list of strings and each string is PLUGIN_ID of that plugin.
#<DVD>/Disk1/plugins has list of plugins that are shipped as part of DVD.
# Example:If you want to install 12.1.0.2.0_oracle.sysman.empa_2000_0.opar and
  12.1.0.2.0_oracle.sysman.vt_2000_0.opar then pass
# PLUGIN_SELECTION={"oracle.sysman.empa","oracle.sysman.vt"}
#-------------------------------------------------------------------------------
#PLUGIN_SELECTION={}


###############################################################################
#Please Don't change the values of these variables
###############################################################################
#-------------------------------------------------------------------------------
#b_upgrade:<Boolean> To Specify whether it is Normal Install or Upgrade
#EM_INSTALL_TYPE:<String> Type of Grid Control install being performed
#CONFIGURATION_TYPE=<String> Can be "ADVANCED" or "LATER"
#-------------------------------------------------------------------------------
b_upgrade=false
EM_INSTALL_TYPE="NOSEED"
CONFIGURATION_TYPE="ADVANCED"
```

Appendix D Known Issues

The following are the known issues related to deploying Enterprise Manager Cloud Control 13.2 using an Oracle Database 12.2 repository on an Oracle Database Appliance X7-2M system.

1. During package validation in the pre-requisite checking stage, you may receive the message "Checking for glibc-devel-2.12-1.7-i686; Not found. Failed" and a final message that the pre-requisites checks at this stage failed. A bug is open to track this exception. No issues have so far been observed due to the lack of the 32-bit package. You may proceed with the deployment or manually install and manage the 32-bit package, if any issue is encountered due to this missing package. (Reference Bug 27358472)

2. While installing Oracle Enterprise Manager Cloud Control 13.2, during kernel parameter validation in the pre-requisite checking stage, you may received the message "Checking for ip_local_port_range=11000 - 65000; ip_local_port_range=9000 - 65500. Failed" and a message that the overall kernel parameters check failed. You may generally ignore this message or if necessary adjust the parameters, if any problem is observed in your environment. (Reference Bug 27766028)

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Author: Ravi Sharma
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