

Solution-in-A-Box: Deploying Highly Available Monitoring Infrastructure using Oracle Enterprise Manager Cloud Control 13cR2 and Oracle Database Appliance

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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 is a pre-built, ready to deploy, high availability (HA) database platform. It consists of two server nodes, networking, and redundant shared storage. Oracle Enterprise Manager Cloud Control can be deployed on Oracle Database Appliance to quickly create a highly available, reliable, and easy to manage, IT enterprise management environment.

Oracle Database Appliance Virtualized Platform is special deployment of Oracle Database Appliance and allows users to create Virtual Machines (VMs) on Oracle Database Appliance. Oracle VM Server for x86, a server virtualization and management solution, is key to Oracle Database Appliance Virtualized Platform. Oracle Database Appliance Virtualized Platform makes enterprise applications easier to deploy, manage, and support. It is backed worldwide by affordable enterprise-quality support for both Oracle and non-Oracle environments. Oracle VM facilitates the deployment and operation of enterprise applications on a fully certified platform to reduce operations and support costs while simultaneously increasing IT efficiency and agility. The combined ease of use, flexibility, and ability to effectively consolidate, offers unparalleled value for deploying mission critical applications such as Oracle Enterprise Manager Cloud Control.

This white paper outlines the steps to deploy Oracle Enterprise Manager Cloud Control 13c Release 2 (using Oracle provided templates) on the highly available Oracle Database Appliance platform deployed in a virtualized platform configuration.

Audience

This white paper is intended for Oracle Database Architects and Database Administrators responsible for setting up the Oracle Enterprise Manager Cloud Control manageability infrastructure for Oracle environments.

Objective

The purpose of this white paper is to outline the process of planning, installing, and deploying Oracle Enterprise Manager Cloud Control 13c Release 2 on Oracle Database Appliance. The ODA specific **Oracle VM Template for Deploying Oracle Enterprise Manager Cloud Control on ODA 13.2.0.0.0 for x86-64** template is used for deployment of Enterprise Manager Cloud Control Software on Oracle Database Appliance Virtualized Platform. The database for Oracle Management Repository is stored in a separate domain. The installed configuration can then be used to manage various target systems in an enterprise IT environment. These targets may include other Oracle Database Appliance systems, Oracle Exadata Database Machine systems, and other third-party IT hardware, Oracle databases, application servers, and other software systems running in those environments.

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.

The following section briefly discusses the high level components of Oracle Enterprise Manager architecture. For a more complete overview and functionality of the Oracle Enterprise Manager architecture and its components, please see the Oracle Enterprise documentation at <http://www.oracle.com/technetwork/oem/enterprise-manager/documentation/index.html>

Oracle Enterprise Manager Cloud Control Architecture

Oracle Enterprise Manager Cloud Control architecture includes three main components: 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 monitored 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.

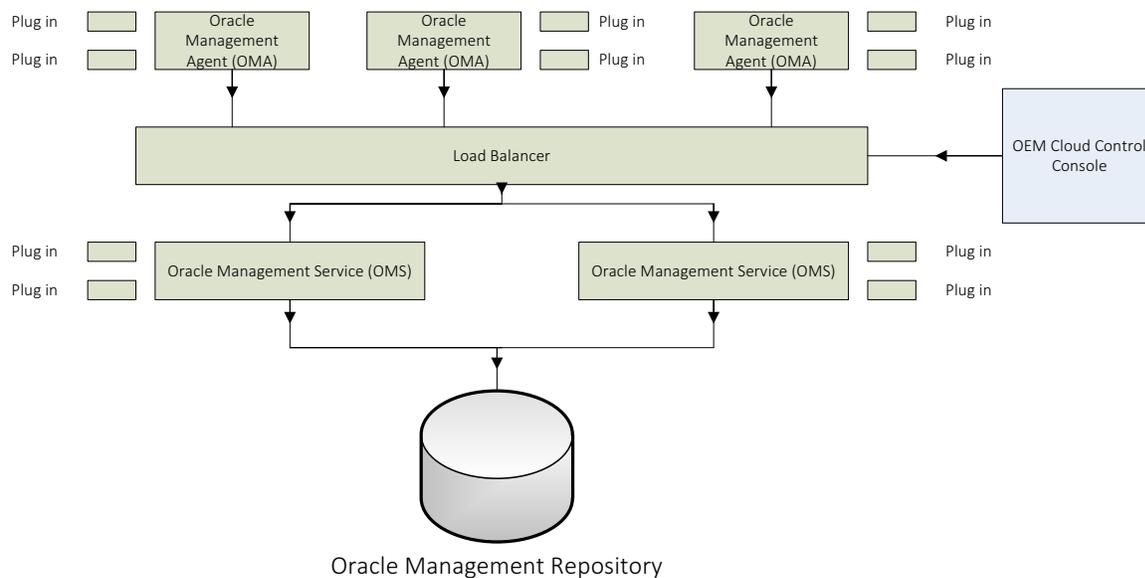


Figure 1: Oracle Enterprise Manager Product Architecture

Oracle Management Repository

The Oracle Management Repository (Management Repository) 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 Release 2 deployment. At the time of 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, the Oracle Web tier directory, the Oracle common directory, and other relevant configuration files and directories. On Oracle Database Appliance, Oracle Management Service can be deployed using a pre-configured VM template provided by Oracle. The template includes pre-deployed Oracle WebLogic Server. Use of Oracle provided template simplifies the Oracle Enterprise Manager Cloud Control deployment process significantly.

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, web servers, and other servers 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), etc.
- 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, etc..
- My Oracle Support Plug-in - Enables you to log in to My Oracle Support from within the Cloud Control console, search the knowledge library for notes and documents, raise service requests, and create patch plans and templates for patching monitored targets.
- Oracle Exadata Plug-in - Enables you to monitor and manage Oracle Exadata targets.

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.

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

The high availability aspect of Oracle Database Appliance is crucial and makes it a suitable platform for deploying Oracle Enterprise Manager Cloud Control. 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.

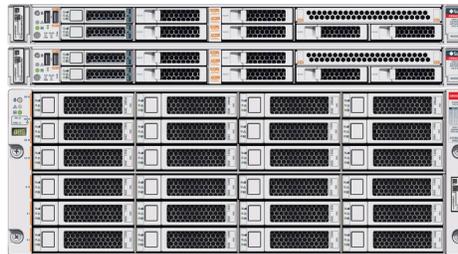


Figure 2: Oracle Database Appliance

Oracle Database Appliance (HA model) comprises of two Oracle servers running Oracle Linux operating system. These two servers are interconnected to form a cluster which provides high availability. Shared database storage is provided by a storage shelf. For example, on the Oracle Database Appliance X6-2 the full storage shelf consists of twenty 1.2 TB flash drives providing 24 TB of storage of data and four 200 GB solid state disk drives for redo. The SSDs host database REDO logs and the FLASH disks host database data and a shared repository running virtual machines. Optionally, a storage expansion shelf can be connected to the system to double the available raw storage capacity to 48TB.

Oracle Database Appliance Virtualized Platform Architecture

Oracle Database Appliance provides the ability to create a virtualized environment using Oracle VM Server. In the virtualized environment, multiple virtual servers, called domains, can be created on a single physical server. In the virtualized environment running on Oracle Database Appliance currently only one domain on each server exists to host databases. This domain is called the ODA_BASE, oakDom1 or Dom1 domain. The "database domain" has exclusive direct access to shared storage. The direct access is provided through a technique known as PCI pass-through which hides the shared storage from all other domains and makes it available to the ODA_BASE database domain. Direct access to shared storage eliminates the usual IO performance concern that exists for typical virtualized database environments.

An additional domain is created on each Oracle Database Appliance server node for hosting Oracle Management Service (OMS). Supplementary domains can be created to host additional instances of OMS providing for additional capacity and fault tolerance. You can learn more about Oracle Database Appliance Virtualized Platform by referring to Oracle Database Appliance Getting Started Guide.

In addition to the ODA_BASE domain, the administrative Dom0 domain exists on each server. Virtual machines are however managed through the ODA_BASE domain using Oracle Appliance Manager command-line interface (*oakcli*).

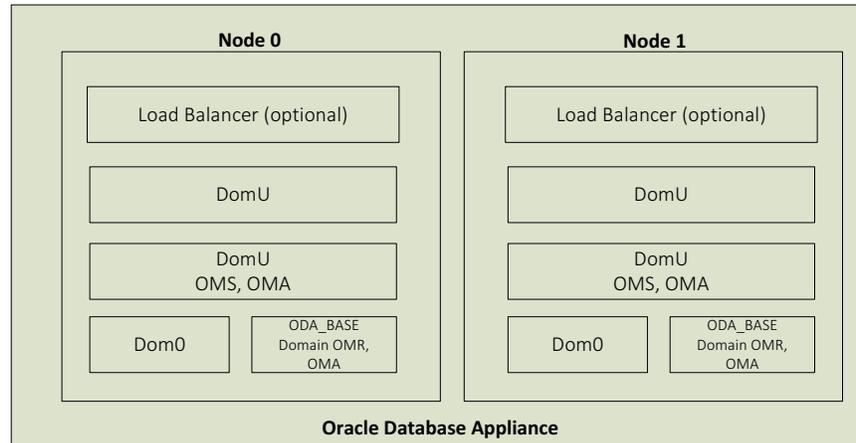


Figure 3: Oracle Database Appliance Virtualized Platform Architecture

Oracle Enterprise Manager Cloud Control software is provided through the Oracle EM Software template which is available from OTN (edelivery.oracle.com). This template is used to create the Virtual Machine that hosts Oracle Management Service (OMS).

On Oracle Database Appliance the ODA_BASE domain is created using pre-packaged templates downloaded from My Oracle Support. The ODA_BASE domain provides the host for Oracle Management Repository. This domain exists on each server node of Oracle Database Appliance.

Best Practice: For Oracle Enterprise Manager Cloud Control 13c Deployment on Oracle Database Appliance Virtualized Platform use Oracle provided Oracle EM Software Only Template named as “Oracle VM Template for Deploying Oracle Enterprise Manager Cloud Control on ODA 13.2.0.0.0 for x86-64” to create a virtual machine to host OMS and do not use the standard Oracle Enterprise Manager Cloud Control VM templates as those templates are not recommended for production use.

Oracle Enterprise Manager Cloud Control Deployment

This section covers the process of deploying Oracle Enterprise Manager Cloud Control 13c Release 2 (13.2.0.0.0) on Oracle Database Appliance. The process assumes that you are performing the deployment on a brand new Oracle Database Appliance and not on an existing in-use Oracle Database Appliance (although you can certainly do that).

The database to host the OMR should not be used for any other purposes.

Note: Enterprise Manager 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. To protect the repository with Oracle Real Application Clusters, you must license the second node for the database, and both nodes require an Oracle Real Application Clusters license.

Considering Oracle Enterprise Manager Cloud Control is a critical system for IT, it is recommended that its deployment be fully protected using high availability and disaster recovery technologies.

Deployment Planning

Before you deploy Oracle Enterprise Manager solution-in-a-box on Oracle Database Appliance, you must 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 Domain-0 as well as the Database server, the Enterprise Manager server, and the Software Load Balancer (SLB) servers, if you are planning to use them. The following matrix can be helpful in capturing the network information and planning your Solution-in-a-box: Oracle Enterprise Manager Cloud Control on Oracle Database Appliance configuration.

Type	Hostname	IP Address
Domain-0 (node 0) Public Network		
Domain-0 (node 1) Public Network		
Database Server (node 0) Public Network		
Database Server (node 1) Public Network		
Enterprise Manager Server 1 Public Network		
Enterprise Manager Server 2 Public Network		
Database SCAN (1 hostname, 2 IP Addresses)		
Database Virtual IP 1 Public Network		
Database Virtual IP 2 Public Network		
Public Network Netmask		
Public Network Gateway		
ILOM Interface (node 0)		
ILOM Interface (node 0)		
ILOM Network Netmask		
ILOM Network Gateway		
Domain Name		
DNS Server IP Address(es)		
NTP Server IP Address		

Table 1: Network requirements for Solution-in-a-box: Enterprise Manager Cloud Control on Oracle Database Appliance

In addition, it is recommended that you plan to deploy Oracle Auto Service Request (ASR) feature on Oracle Database Appliance. However, this is optional.

Type	Hostname	IP Address
ASR Proxy Server Name		
ASR Proxy Server Port		
ASR Proxy Username		
ASR Proxy Password		
ASR External ASR Manager IP Address (optional)		
ASR External ASR Manager Port (optional)		

Step 2: Plan database size

When setting up Oracle Database Appliance Virtualized Platform, 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 the ODA_BASE domain with the correct size that can accommodate your planned OMR database. Refer the sizing guidelines in the Oracle Enterprise Manager Advanced Installation and Configuration Guide (Chapter 13) at http://docs.oracle.com/cd/E73210_01/EMADV/toc.htm. Oracle Appliance Manager provides pre-built templates for different database sizes (Small, Medium, Large, etc.). Refer to Getting Started Guide at http://docs.oracle.com/cd/E83239_01/index.htm for database sizing information and how resources are allocated to the ODA_BASE domain based on your selection of ODA_BASE size and subsequently how the databases of different sizes and capacities can be created.

When estimating the database size and resource requirements, you should also take into account the resource requirements for Software Load Balancer (SLB) virtual machines, and optionally any virtual machines you may be planning to deploy on this Oracle Database Appliance unit.

Note: You must allocate CPUs to ODA_BASE domain and other user domains based on applicable and available licensing.

Deployment Tasks

Step 3: Unpack and cable Oracle Database Appliance hardware

Follow instructions included in the Oracle Database Appliance Setup Poster to setup and install Oracle Database Appliance hardware. This includes cabling of servers and storage, and powering up of the storage shelf and the two server nodes. The Oracle Database Appliance Setup Poster and additional documentation including the Getting Started Guide can be viewed and downloaded from http://docs.oracle.com/cd/E83239_01/index.htm.

Step 4: Setup ILOM on each Oracle Database Appliance server node

Connect Keyboard, Video, and Mouse (KVM) to Oracle Database Appliance server node 0 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 Virtualized Platform

Before Oracle Enterprise Manager Cloud Control is deployed, Oracle Database Appliance Virtualized Platform setup must be completed.

Note: Detailed step-by-step instructions for deploying Oracle Database Appliance Virtualized Platform are beyond the scope of this white paper. However, Oracle Database Appliance Setup Poster is available at http://docs.oracle.com/cd/E22693_01/doc.21/e35554.pdf and illustrates the setup process of Oracle Database Appliance Virtualized Platform in detail.

During database deployment the Oracle Appliance Manager Configurator gives you the option to create the database after the Grid Infrastructure and Database software has been installed and configured. Depending on your preference you may or may not create the database during this step. If you choose to create the database at this step, then skip the Setup Oracle Management Repository step below.

Step 6: Setup Oracle Management Repository (OMR) database

During Oracle Database Appliance deployment, Oracle software is installed on each Oracle Database Appliance server node. You can check the currently configured Oracle Homes using *oakcli*.

```
# oakcli show dbhomes
```

Oracle Home Name	Oracle Home version	Home Location
OraDb12102_home1	12.1.0.2.0	/u01/app/oracle/product/12.1.0.2/dbhome_1

If you did not create a database during the initial Oracle Database Appliance deployment, then you should create it now.

```
# oakcli create database -db emrep -oh <Oracle home location>
```

For example,

```
# oakcli create database -db emrep -oh OraDb12102_home1
```

```
INFO: 2017-03-09 10:41:49: Database parameter file is not provided. Will be using default parameters for DB creation
```

```
Please enter the 'root' password :
Please re-enter the 'root' password:
```

```
Please enter the 'SYSASM' password : (During deployment we set the SYSASM password to 'welcome1'):
```

```
Please re-enter the 'SYSASM' password:
```

```
Please select one of the following for Database type [1 .. 3] :
```

```
1 => OLTP
2 => DSS
3 => In-Memory
1
```

```
The selected value is : OLTP
```

```
Please select one of the following for Database Deployment [1 .. 3] :
```

```
1 => EE : Enterprise Edition
2 => RACONE
3 => RAC
3
```

```
The selected value is : RAC
```

```
Please select one of the following for Database Class [1 .. 5] :
```

```
1 => odb-01s ( 1 cores , 4 GB memory)
2 => odb-01 ( 1 cores , 8 GB memory)
3 => odb-02 ( 2 cores , 16 GB memory)
4 => odb-04 ( 4 cores , 32 GB memory)
5 => odb-06 ( 6 cores , 48 GB memory)
4
```

```
The selected value is : odb-04 ( 4 cores , 32 GB memory)
```

You will be prompted for the deployment type and database size. You may choose a single instance (EE), RAC One Node, or a Real Application Clusters (RAC) database as the deployment type for your Oracle Management Repository.

Also, an appropriate database size should be selected based on sizing calculations as per the sizing guidelines white paper mention above.

Note: If you previously configured Oracle Enterprise Manager Database Control, you must de-configure it before you can install and configure Oracle Enterprise Manager Cloud Control. Refer to Appendix B for more information about removing DB Control configuration.

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

Note: The `db_securefile` database parameter value must be set to `PERMITTED`. Change it at this time using **alter system set db_securefile="PERMITTED" sid="*" scope=BOTH;** SQL command on the **emrep** database. Also set **alter system set optimizer_adaptive_features=FALSE sid="*" scope=both;**

Best Practice: For high availability use RAC configuration for the OMR database.

Step 7: Create shared VM repository

Virtual Machines can be hosted on the local repository on Oracle Database Appliance server nodes or on a shared repository on the shared storage of Oracle Database Appliance. A shared repository provides more storage for VMs and that shared storage is highly available and concurrently accessible from either server node. For deploying Oracle Enterprise Manager Cloud Control OMS VMs, the shared repository implementation is recommended.

```
# oakcli create repo srepo -size 200G -dg DATA
```

The above command creates a shared VM repository named 'srepo' of size 200GB in the ASM disk group named DATA.

In case you had previously configured a shared VM repository but only needed to extend it now, then refer to My Oracle Support note 1634652.1 for more information about how to resize the VM shared repository.

Step 8: Download EM Software Template

Download EM Software Template from Oracle Software Delivery Cloud. Make sure that you download the correct VM template with the name - **Oracle VM Template for Deploying Oracle Enterprise Manager Cloud Control on ODA 13.2.0.0.0 for x86-64.**

- a) Go to Oracle Software Delivery Cloud <https://edelivery.oracle.com> and sign in to accept agreement
- b) Select "Linux/OVM/VMs" to filter products listed
- c) From the Product drop down menu select "Oracle VM Template for Deploying Oracle Enterprise Manager Cloud Control on ODA"
- d) From the "Select Platform" drop down menu, select "x86 64 bit" and click "Continue"
- e) Accept the terms if you agree and continue to file download page
- f) To individually download files click on the filename, to download all files click on the 'Download All' button
- g) Refer to README for instructions

Follow the README file for the template to assemble the pieces into a single concatenated file. Place this single concatenated file into the /OVS directory location on Dom0 of server node 0. For example,

```
# scp OVM_EM_SW_ODA_13200.tgz root@oda1n1-dom0:/OVS
```

You may transfer the downloaded pieces to /OVS or the locally concatenated file.

Step 9: Register IP addresses and host names for EM domains

Once ODA_BASE is setup on Oracle Database Appliance Virtualized Platform, the EM domains can be created. You must provision the IP addresses of the EM domains and the software load balancer (SLB) domain, if one is used. Additionally, two IP addresses are required for the virtual servers configured on the software load balancer. Use the IP addresses from Step 1.

Step 10: Import EM Software Template into Shared VM Repository

Before a VM can be created, the EM Software Template needs to be imported in the VM repository.

```
# oakcli import vmtemplate emswtmp1 -files /OVS/OVM_EM_SW_ODA_13200.tgz -repo srepo -node 0
```

The above command imports the downloaded template on server node 0 as a VM template named `emswtpl` into the shared VM repository `'srepo'`.

Step 11: Configure VM template

Configure the imported EM Software Templates for memory and network. Note you may use values different than what is given in examples below.

```
# oakcli configure vmtemplate emswtpl -memory 8192M -maxmemory 8192M
# oakcli configure vmtemplate emswtpl -network
"['type=netfront,bridge=net1']"
```

Note that by default the VM template assigns two vCPUs to the virtual machines. You may later change that using the `"oakcli configure template <template name> -vcpu <vcpu count>"` command.

You can optionally create a separate CPU pool for hosting the virtual machines. For example,

```
# oakcli create cpupool empool -numcpu 4 -node 0
# oakcli create cpupool empool -numcpu 4 -node 1
```

Step 12: Clone EM Server VMs

Once the VM template is imported into the VM repository, virtual machines can be cloned from it.

```
# oakcli clone vm emserver1 -vmtemplate emswtpl -repo srepo -node 0
```

The above command clones a virtual machines named `emserver1` into the share repository `srepo` using the VM template named `emswtpl`. The node number specifies on which node the cloning operation will take place. It is not the node where this VM will always run. You can control where the VM will run by specifying the `"-prefnode"` option of the `"oakcli configure vm"` command, which is described in the next step.

Clone additional OMS VM as follows:

```
# oakcli clone vm emserver2 -vmtemplate emswtpl -repo srepo -node 1
```

Step 13: Set EM Server VM attributes and start VMs

By virtue of residing in the shared repository, the VMs are available for running on either server node. You can set VM attributes as follows to assign a preferred node where each VM will run. For example,

```
# oakcli configure vm emserver1-failover true -prefnode 0
# oakcli configure vm emserver2-failover true -prefnode 1
```

Use of failover architecture for the Enterprise Manager Cloud Control 13c VMs allows to some degree for increased availability and optimal sizing.

Step 14: Start EM Server VM

Start the first OMS server VM.

```
# oakcli start vm emserver1
```

Step 15: Configure EM Server Virtual Machines

As the VMs are started, log on to each VM console. You can connect to the VM console by issuing the `"oakcli show vmconsole <vmname>"` command while connected to ODA_BASE domain using a VNC client. Once connected to the VM Console during its initial boot up, you will see prompts for network configuration on each VM's console as follows. Note that you must be prepared to provide the IP address, hostname, and other network information during this initial boot up of the VM. For example, when you connect to the console of the VM, you will see the following prompts:

```
Updating config-network.sh
On VM guest, so updating config-network-both
Do you want to enable dynamic IP configuration (DHCP) (Y|n)? n
Configuring network setting
A static IP address is recommended.
Enter IP address:[] 10.2.10.11
```

```
Enter netmask address:[ ]255.255.252.0
Enter hostname(e.g, host.domain.com):[localhost.localdomain] oda.example.com
Enter default gateway IP address:[ ] 10.2.10.1
Enter DNS server IP address:[ ]10.2.10.3
Restarting networking...
```

```
Shutting down interface eth0: [ OK ]
Shutting down loopback interface: [ OK ]
Bringing up loopback interface: [ OK ]
Bringing up interface eth0: [ OK ]
```

Cloning AgentHome

Cloning Middleware Homes

Running <OMS_HOME>/allroot.sh

Starting to execute allroot.sh

```
Starting to execute /u01/OracleHomes/Middleware/oms/root.sh .....
```

```
Finished execution of /u01/OracleHomes/Middleware/oms/root.sh .....

Changing password for user root.
passwd: all authentication tokens updated successfully.
Changing password for user oracle.
passwd: all authentication tokens updated successfully.
```

Note that the IP addresses provided above are for example purposes only. Once the VMs are configured, they will restart and you can connect to each VM.

Step 16: Configure Server Load Balancer

At this stage you can configure your Server Load Balancer (SLB) to provide high availability to clients if you have planned a multi-OMS configuration in your EM infrastructure.

You may configure a virtual load balancer and create the associated VM Domains on Oracle Database Appliance. The process of establishing a load balancer configuration is beyond the scope of this white paper. However, you may refer to documentation available from your Software or Hardware Load Balancer vendor for details.

Step 17: Configure Software Library

The Software Library is a shared file system where you will stage Management Plug-ins, Management Agent software, provisioning bundles and other entities that will be deployed into your Oracle Enterprise Manager Cloud Control 13c environment. If Oracle Software Library (Software Library) is configured on shared storage on the first OMS (for example, on external NFS storage), then ensure that Software Library is read-write accessible from the remote host where you plan to install the additional OMS.

The Software Library is a critical piece of Oracle Enterprise Manager Cloud Control 13c infrastructure.

On Oracle Database Appliance, starting with Oracle Database 12c, you can also configure the Software Library on the shared storage as an ACFS volume accessible to both OMS nodes. You may create the software library as an NFS mount point on the ODA_BASE domain and export it for accessibility from the two OMS server nodes (VMs).

Step 18: Prepare response file

The Oracle VM Template for Deploying Oracle Enterprise Manager Cloud Control 13c Release 2 (13.2.0.0.0) on ODA is a software only template. Once the first OMS virtual machine is started, you need to setup the Oracle Enterprise Manager Cloud Control configuration using the ConfigureGC.sh script. Before the ConfigureGC.sh script is run, prepare the response file that can be supplied to perform a silent (non-GUI) deployment. A sample response file is provided within the EM Software Template in the /u01/scripts directory. The file name is **new_install.rsp**.

Table 2 provides the description of various configurable parameters and illustrates the customization required to the new_install.rsp file before running ConfigureGC.sh script.

Parameter	Description
UNIX_GROUP_NAME	Enter the name of the UNIX group the user performing the installation belongs to. For example, "dba". Note: The installation is typically performed by the "oracle" user.
INVENTORY_LOCATION	Enter the absolute path to the Central Oracle Inventory. For example, "/u01/app/orainventory"
SECURITY_UPDATES_VIA_MYORACLESUPPORT	Enter TRUE if you want to download and install security updates. Then, enter the credentials for the following variables: MYORACLESUPPORT_USERNAME MYORACLESUPPORT_PASSWORD For example, enter FALSE if you do not want to download and install security updates.
DECLINE_SECURITY_UPDATES	Enter TRUE if you want to decline the security updates. In this case, you should have entered FALSE for SECURITY_UPDATES_VIA_MYORACLESUPPORT. Enter FALSE if you do not want to decline the security updates. In this case, you should have entered TRUE for SECURITY_UPDATES_VIA_MYORACLESUPPORT.
MYORACLESUPPORT_USERNAME	Specify the My Oracle Support username.
MYORACLESUPPORT_PASSWORD	Enter the password associated with the MYORACLESUPPORT_USERNAME (username) specified above.
INSTALL_UPDATES_SELECTION	By default, this variable is set to "skip" indicating that the software updates will not be installed during installation. If you want to install the software updates from My Oracle Support, then set this variable to "download". Then, enter the credentials for the following parameters: MYORACLESUPPORT_USERNAME_FOR_SOFTWAREUPDATES MYORACLESUPPORT_PASSWORD_FOR_SOFTWAREUPDATES If you want to install the software updates from a staged location, then set this variable to "staged". Then, for the STAGE_LOCATION parameter, enter the absolute path, which leads to the Updates directory, where the software updates are available.
STAGE_LOCATION	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"
MYORACLESUPPORT_USERNAME_FOR_SOFTWAREUPDATES	If you choose to skip software updates, then you can leave this to "Value Unspecified"
MYORACLESUPPORT_PASSWORD_FOR_SOFTWAREUPDATES	If you choose to skip software updates, then you can leave this to "Value Unspecified"

PROXY_USER	<p>If your connection to the Internet requires you to connect through a proxy , then enter the user name that can be used to access the proxy server.</p> <p>Note: This parameter applies only if you have set the SECURITY_UPDATES_VIA_MYORACLESUPPORT variable to TRUE and/or the INSTALL_UPDATES_SELECTION variable to "download".</p>
PROXY_PWD	<p>If your connection to the Internet requires you to connect through a proxy , then enter the password that can be used to access the proxy server.</p> <p>Note: Applies parameter only if you have set the SECURITY_UPDATES_VIA_MYORACLESUPPORT variable to TRUE and/or the INSTALL_UPDATES_SELECTION parameter to "download".</p>
PROXY_HOST	<p>If your connection to the Internet requires you to connect through a proxy ,then enter the name of the proxy host.</p> <p>Note: Applies only if you have set the SECURITY_UPDATES_VIA_MYORACLESUPPORT variable to TRUE and/or the INSTALL_UPDATES_SELECTION parameter to "download".</p>
PROXY_PORT	<p>If your connection to the Internet requires you to connect through a proxy, then enter the port used by the proxy server.</p> <p>Note: Applies only if you have set the SECURITY_UPDATES_VIA_MYORACLESUPPORT variable to TRUE and/or the INSTALL_UPDATES_SELECTION parameter to "download".</p>
ORACLE_MIDDLEWARE_HOME_LOCATION	<p>Enter the location where you want the installer to install. For example, "/u01/OracleHomes/Middleware". Ensure that the middleware location has write permission. Note: Ensure that the middleware home you enter here is used only for Enterprise Manager Cloud Control. Ensure that no other Oracle Fusion Middleware products or components are installed in the same middleware home.</p>
ORACLE_HOSTNAME	<p>Enter the hostname for the server where the first OMS is being installed. For example, "oda1om1.example.com"</p>
AGENT_BASE_DIR	<p>Enter the base directory where the management agent will be installed on the OMS server. For example, enter "/u01/OracleHomes/agent"</p>
WLS_ADMIN_SERVER_USERNAME	<p>By default, "weblogic" is the name assigned to the default user account that is created for the Oracle WebLogic Domain. If you want to accept the default name, then skip this variable. However, if you want to have a custom name, then enter the name of your choice here.</p>
WLS_ADMIN_SERVER_PASSWORD	<p>Enter a password that you want to set for the WebLogic user account. For example, "welcome1"</p>
WLS_ADMIN_SERVER_CONFIRM_PASSWORD	<p>Confirm the password you want to set for the WebLogic user account.</p>
NODE_MANAGER_PASSWORD	<p>By default, "nodemanager" is the name assigned to the default user account that is created for the node manager. Enter a password for this node manager user account. For example, "welcome1"</p>
NODE_MANAGER_CONFIRM_PASSWORD	<p>Confirm the password for the node manager user account.</p>
ORACLE_INSTANCE_HOME_LOCATION	<p>By default, <i>gc_inst</i> is considered the OMS Instance Base directory, and it is created in the Middleware Home. For example, "/u01/OracleHomes/Middleware/gc_inst"</p>
CONFIGURE_ORACLE_SOFTWARE_LIBRARY	<p>Choose whether a software library should be configured. For example, enter "Yes"</p>

SOFTWARE_LIBRARY_LOCATION	Enter location of the software library. For example, "/u01/OracleHomes/emswlib".
DATABASE_HOSTNAME	Enter the fully qualified name of the host where the existing database resides. Ensure that the host name does not have underscores. For example, "dbhost.example.com". If you are connecting to an Oracle RAC Database, and if the nodes have virtual host names, then enter the virtual host name of one of its nodes (e.g., mydb-scan.example.com). The connection to the database is established with a connect string that is formed using only this virtual host name. For example, "oda1-scan.example.com"
LISTENER_PORT	Enter the listener port to connect to the existing database. For example, "1521"
SERVICENAME_OR_SID	Enter the service name or the system ID (SID) of the existing database. For example, "emrep".
SYS_PASSWORD	Enter the database SYS user account's password. For example, "welcome1"
SYSMAN_PASSWORD	Enter a password that you want to use for creating a SYSMAN user account. For example, "welcome1"
SYSMAN_CONFIRM_PASSWORD	Confirm the SYSMAN user account's password that you specified above. For example, "welcome1"
EMGC_ASMDISKGROUPS	Enter ASM Diskgroups available on EM Repository database. For example, "DATA, RECO, REDO"
DEPLOYMENT_SIZE	Enter deployment size. Configuration settings are done depending on the deployment size. For example, "Medium".
MANAGEMENT_TABLESPACE_LOCATION	Enter the ASM disk group name or ACFS file name where the management tablespace can be stored. For example, MANAGEMENT_TABLESPACE_LOCATION="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/mgmt.dbf"
CONFIGURATION_DATA_TABLESPACE_LOCATION	Enter the ASM disk group name or ACFS file name where the configuration data tablespace can be stored. For example, CONFIGURATION_DATA_TABLESPACE_LOCATION="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/cnfg.dbf"
JVM_DIAGNOSTICS_TABLESPACE_LOCATION	Enter the ASM disk group name or ACFS file name where the JVM Diagnostics data tablespace can be stored. For example, JVM_DIAGNOSTICS_TABLESPACE_LOCATION="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/jvmd.dbf"
AGENT_REGISTRATION_PASSWORD	Enter a password to secure the communication between the OMS and the Management Agents. For example, "welcome1"
AGENT_REGISTRATION_CONFIRM_PASSWORD	Confirm the agent registration password.
STATIC_PORTS_FILE	If you want to accept the default ports, then leave this field blank (set as ""). If you want to use custom ports, then enter the absolute path to the staticports.ini file that lists the custom ports to be used for the installation.

Table 3: Response file updates for silent install

Refer to Appendix C for a sample of the response file used during testing.

Step 19: Configure first OMS

Once the response file is prepared, configure Oracle Enterprise Manager Cloud Control.

```
# su - oracle
$ mkdir /u01/OracleHomes/tmp
$ export TMP=/u01/OracleHomes/tmp
$ cd /u01/OracleHomes/Middleware/sysman/install
$ ./ConfigureGC.sh -silent -responseFile /u01/scripts/new_install.rsp
```

The data tier (OMR) is currently protected from node failure with the use of Oracle RAC, however if the OMS node that was just configured were to be lost then the Enterprise Manager 13c Cloud Control application will be unavailable until such a time that it can be recovered. For a high availability (HA) configuration, configuring an additional OMS provides the desired redundancy and is recommended.

Best Practice: *Configure two OMS servers for high availability.*

The Management Agent is automatically configured when the First OMS is configured. You can optionally configure the second OMS for high availability. For detailed information, refer to Oracle Enterprise Manager documentation at <http://www.oracle.com/technetwork/oem/enterprise-manager/documentation/index.html>

Step 20: Configure additional OMS (optional)

Normally, you can clone the first OMS to build the additional OMS. However, in our configuration since we are using the same VM template for the additional OMS as was used for the first OMS, to configure the additional OMS follow the steps below. These steps are performed on the second server where you intend to run the additional OMS.

- (a) Software Library – Make sure the software library is mounted and accessible from the second node.
- (b) Install Plug-ins on second OMS – Management Plug-ins are components that "plug in" to Cloud Control to provide various features and functionality. Download and deploy the latest versions of the Management Plug-ins you need.

```
$ export TMP=/u01/OracleHomes/tmp
$/u01/OracleHomes/Middleware/sysman/install/PluginInstall.sh -silent
PLUGIN_SELECTION="{oracle.sysman.emas,oracle.sysman.cfw,oracle.sysman.d
b,oracle.sysman.xa,oracle.sysman.si}"
```

- (c) Export OMS – Export the configuration details from the first OMS. To do so, run the following command from the Oracle home of the first OMS, and pass the location where the configuration details can be exported as a file.

```
$/u01/OracleHomes/Middleware/bin/emctl exportconfig oms -dir
<absolute_path_to_directory>
```

- (d) Copy OMS – Copy the exported configuration details file from the first OMS host to the additional OMS host.
- (e) Import OMS – Copy the configuration details onto the additional OMS. To do so, run the "omsca recover" command from the Oracle home of the additional OMS. For example,

```
/u01/OracleHomes/Middleware/bin/omsca recover -ms -backup_file
/tmp/opf_ADMIN_20170328_191305.bka -AS_HTTPS_PORT 7101 -MSPORT 7202 -
MS_HTTPS_PORT 7301 -EM_NODEMGR_PORT 7403 -EM_UPLOAD_PORT 4889 -
EM_UPLOAD_HTTPS_PORT 4903 -EM_CONSOLE_PORT 7802 -EM_CONSOLE_HTTPS_PORT 7799 -
config_home /u01/OracleHomes/Middleware/gc_inst -EM_BIP_PORT 9701 -
EM_BIP_HTTPS_PORT 9702 -EM_INSTANCE_HOST oda1n1-om2.us.oracle.com -
EM_BIP_OHS_PORT 9788 -EM_BIP_OHS_HTTPS_PORT 9851
```

You must ensure the port numbers are specified correctly as used in your environment.

Step 21 – Add repository database hosts and databases to Cloud Control

Each OMR database server host should have a Management Agent installed. Initiate an EM session by pointing your browser to newly deployed EM Console (<https://hostname.domain:7799/em>). Install the agents by navigating to Setup | Add Target| Add Targets Manually and then adding each of the two hosts using the Add Host Targets wizard.

Once the hosts are added, add the OMR database from Targets | Databases and using the Add Target wizard.

Step 22 - Configure the Management Agent on the additional OMS host by running the following command

Configure the Management Agent on the additional OMS host by running the agentDeploy.sh script as the 'oracle' user from the OMS home. For example,

```
$ /u01/OracleHomes/agent/agent_13.2.0.0.0/sysman/install/agentDeploy.sh
AGENT_BASE_DIR=/u01/OracleHomes/agent OMS_HOST=oda1n1-om2.example.com
EM_UPLOAD_PORT=4900 AGENT_REGISTRATION_PASSWORD=welcome1 -configOnly
```

Deploy required plug-ins on Management Agent.

Step 23 – Import Certificate

Import the trusted certificate on the additional OMS host, where you configured the Management Agent. When prompted for a password, enter 'welcome'.

```
$<AGENT_HOME>/bin/emctl secure add_trust_cert_to_jks
```

Step 24 - Discover WebLogic Target

Manually discover the Oracle WebLogic Server target.

- (a) Ensure that both the first and the additional OMS instances are up and running.
- (b) In the Cloud Control console, from the Targets menu, select All Targets.
- (c) On the All Targets page, search and click /EMGC_GCDomain/GCDomain/.
- (d) On the EMGC_GCDomain home page, from the WebLogic Domain menu, select Refresh WebLogic Domain.
- (e) On the Refresh WebLogic Domain page, click Add / Update Targets, and follow the steps guided by the wizard.
- (f) Enterprise Manager Cloud Control refreshes the WebLogic Domain and discovers the second managed server on the additional OMS host.

Discover and select the targets you want Cloud Control to monitor and manage. Cloud Control can scan your infrastructure for potential targets, or you can manually add your own.

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 25: 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.

For more information about setting up Oracle Management Agents on the second server node, refer to Oracle Enterprise Manager Cloud Control Advanced Installation and Configuration Guide 13c Release 2 (13.2.0.0).

Step 26: Start Oracle Enterprise Manager Cloud Control Console

After Enterprise Manager Cloud Control deployment, OMS and OMR are in an up state.

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

```
[oracle@om1 ~]$ /u01/OracleHomes/Middleware/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      : odahost1.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://odahost1.example.com:7802/em
Upload URL: https://odahost1.example.com:4903/empbs/upload

WLS Domain Information
Domain Name      : GCDomain
Admin Server Host : odahost1.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: odahost1.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://odahost1.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/bipublisher.log

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).

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

```
[oracle@om1 ~]$ /u01/OracleHomes/Middleware/bin/emctl config oms -  
list_repos_details  
Oracle Enterprise Manager Cloud Control 13c Release 2  
Copyright (c) 1996, 2016 Oracle Corporation. All rights reserved.  
Repository Connect Descriptor :  
(DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP) (HOST=odahost-  
scan.example.com) (PORT=1521))) (LOAD_BALANCE=ON) (CONNECT_DATA=(SERVICE_NAME=em  
rep)))  
Repository User : SYSMAN
```

Step 27: Connect to EMCC Console

Connect to EM console at (for example) <https://odahost1.example.com:7802/em>

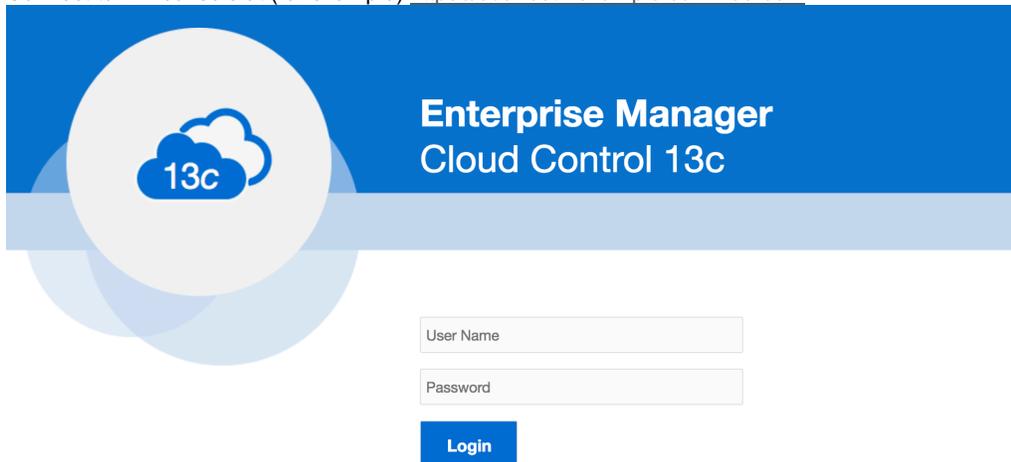


Figure 4: Oracle Enterprise Manager Cloud Control 13c Console Login

Once you are logged in, the screen appears where you can customize your view of Console.

Figure 5: Oracle Enterprise Manager Cloud Control 13c Console Personalization and Customization

Step 28: 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 29: Deploy Management Agents (OMA) on Targets hosts and discover targets

During deployment Management Agent is automatically deployed along with OMS in the OMS domain. For Oracle Management Repository (OMR), an Oracle Management Agent is deployed in the ODA_BASE domain.

Additional Oracle Management Agents can be deployed into the target hosts directly using Oracle Enterprise Manager Cloud Control console.

High Availability and Security

For OMR high availability a clustered (RAC) database should be used as the repository database. You can make that choice during OMR database creation. If you initially setup your database as a single instance environment, then you can subsequently convert it into a RAC environment using the *rconfig* utility. You can refer to My Oracle Support note 1472797.1 for more details on using the *rconfig* utility.

Best Practice: *If higher availability is desired, then use a clustered database (RAC) for Oracle Management Repository for protection against node or component failure.*

For OMS high availability, you should use a load balancer in front of the OMS servers. A software or hardware load balancer can be used for this purpose.

Best Practice: *Use a load balancer for high availability and performance for Oracle Management Service.*

Security

Post deployment the following passwords should be changed.

- SYSTEM
- SYS
- SYSMAN

Additionally, the following passwords on each Oracle Database Appliance should be changed.

- ROOT
- ORACLE
- ILOM ROOT

Your organization may have additional mechanisms to secure the environment. Oracle Database Appliance includes assistance with implementing Security Technical Implementation Guides (STIGs) compliance. Please refer to My Oracle Support note 1461102.1 for details on STIG compliance for Oracle Database Appliance.

HTTP vs. HTTPS

The OMS application traffic includes browser-OMS traffic (ie. the browser traffic created by users accessing Cloud Control) and agent-OMS traffic (ie. 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.

Post-Deployment Tasks

Step 30: Set OMR database parameters

The following parameter settings are minimum recommended values for the Oracle Management Repository database. Choose an appropriate Oracle Database Appliance database template (e.g., odb-04 or higher) that may satisfy these requirements. For more information about Oracle Database Appliance database templates refer to Oracle Database Appliance documentation at https://docs.oracle.com/cd/E22693_01/. Note however, that you can adjust the parameters as needed.

Parameter Name	Suggested value
SESSION_CACHED_CURSORS	500
JOB_QUEUE_PROCESSES	20
OPEN_CURSORS	400
SGA_TARGET	3G
SHARED_POOL_SIZE	1G
PROCESSES	300

Once deployed, the Oracle Enterprise Manager Cloud Control system and configuration needs to be monitored and managed just like any other production system.

Step 31: Establish and Validate ASR Configuration

Oracle Auto Service Request (ASR) is a feature of Oracle Premium Support Services and is included in 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 Oracle Database Appliance.

You may have configured ASR at the time of Oracle Database Appliance deployment. If not, then you can configure it at this stage. Note that Oracle ASR only monitors specific hardware faults and does not monitor the software components. You can use Oracle Enterprise Manager Cloud Control 13c Release 2 and Oracle Appliance Manager (oakcli) to manage the software components.

Step 32: Operate

Once connected to the console, you may discover new targets and start deploying Management Agents on those targets.

You can manage Oracle Database Appliance using Oracle Appliance Manager command-line interface (*oakcli*). Refer to Appendix A for sample commands to start and stop Oracle Enterprise Manger Cloud Control 13c processes.

Conclusion

Oracle Enterprise Manager Cloud Control 13c capability to monitor a broad range of systems and technologies in the data center make it a critical piece of IT infrastructure and it must be highly available. Oracle Database Appliance is an Oracle Engineered System designed for simplicity and high availability. Oracle Database Appliance Virtualized Platform provides an ideal platform for deploying the entire Oracle Enterprise Manager Cloud Control 13c topology within a single, affordable, easy to manage system. This white paper illustrates how to install and configure Oracle Enterprise Manager Cloud Control 13c on Oracle Database Appliance and use it to manage targets.

Appendix A - Starting and Stopping EM Environment

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

1) Stopping OMA

```
oracle >$ OMA_HOME/bin/emctl stop agent
```

2) Stopping OMS

```
oracle >$ OMS_HOME/bin/emctl stop oms
```

3) Stopping OMR

```
[oracle@odadb1 ~]$ srvctl status database -d emrep
Instance emrep1 is running on node odadb1
Instance emrep2 is running on node odadb2
[oracle@odadb1 ~]$ srvctl stop database -d emrep
[oracle@odadb1 ~]$ srvctl status database -d emrep
Instance emrep1 is not running on node odadb1
Instance emrep2 is not running on node odadb2
```

4) Starting OMR

```
[oracle@odadb1 ~]$ srvctl status database -d emrep
Instance emrep1 is not running on node odadb1
Instance emrep2 is not running on node odadb2
[oracle@odadb1 ~]$ srvctl start database -d emrep
[oracle@odadb1 ~]$ srvctl status database -d emrep
Instance emrep1 is running on node odadb1
Instance emrep2 is running on node odadb2
```

5) Starting OMS

```
oracle> $ OMS_HOME/bin/emctl start oms
```

6) Starting OMA

```
oracle >$ OMA_HOME/bin/emctl start agent
```

Appendix B - Removing DB Control

If you have a pre-existing Oracle Database Control configuration on Oracle Database Appliance servers, then before you can create the Enterprise Manager Cloud Control 13c configuration you must remove the old Database Control configuration.

1. Verify whether your database has the Database Control SYSMAN schema. To do so, log in to the database as SYS user and run the following query:

```
SQL> SELECT COUNT(*) FROM ALL_USERS WHERE USERNAME='SYSMAN';
```

If the above query result is "0" then the Database Control SYSMAN schema does not exist. You can skip the next steps. However, if the result of this query is 1, then the database has this schema, so you will need to de-configure it.

2. Before de-configuring the Database Control, set the environment variable ORACLE_HOME to the Oracle home of the database, and ORACLE_SID to the SID of the database.

For example, in bash shell, you can set them in the following way:

```
export ORACLE_HOME=/u01/app/oracle/product/11.2.0/dbhome_1
export ORACLE_SID=emrep
```

3. De-configure the Database Control.

You may have created the OMR database as a single instance database or as a RAC database. To de-configure Database Control for a Enterprise Edition single instance database, run the following command from the Oracle home of the database as the user who installed the database. If the command hangs, then restart the database and rerun the command.

```
$(ORACLE_HOME)/bin/emca -deconfig dbcontrol db -repos drop -SYS_PWD <sys
password> -SYSMAN_PWD <sysman password>
```

To de-configure Database Control for a Real Application Cluster (RAC) database, run the following command from the Oracle home of the database as the user who installed the database. If the command hangs, then restart the database and rerun the command.

```
$(ORACLE_HOME)/bin/emca -deconfig dbcontrol db -repos drop -cluster -SYS_PWD
<sys password> -SYSMAN_PWD <sysman password>
```

Note: If the de-configure operation hangs, then refer to My Oracle Support note 375946.1.

Appendix C - Sample new_install.rsp file

```
#####
## 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 INVENTORY 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/oralInventory"
#-----
UNIX_GROUP_NAME="dba"
INVENTORY_LOCATION="/u01/app/oralInventory"

#####
# 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=<Value Unspecified>
MYORACLESUPPORT_PASSWORD=<Value Unspecified>

#####
#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="odahost1.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=FALSE

#-----
#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=<Value Unspecified>

#-----
#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"
# Example : EMGC_ASMDISKGROUPS="DATA,RECO,REDO"
#-----
DATABASE_HOSTNAME="odahost-scan.example.com"
LISTENER_PORT=1521
SERVICENAME_OR_SID="emrep"
SYS_PASSWORD="welcome1"
SYSMAN_PASSWORD="welcome1"
SYSMAN_CONFIRM_PASSWORD="welcome1"
EMGC_ASMDISKGROUPS="DATA,RECO,REDO"
#-----
#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="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/mgmt.dbf"
CONFIGURATION_DATA_TABLESPACE_LOCATION="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/cnf
g.dbf"
JVM_DIAGNOSTICS_TABLESPACE_LOCATION="/u02/app/oracle/oradata/datastore/.ACFS/snaps/emrep/datafile/jvmd.dbf
"

```

```

#-----
#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=""

#-----
#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={}

#-----
#FROM_LOCATION:<String> Complete path to the products.xml.
#Example: FROM_LOCATION = "../stage/products.xml"
#-----
FROM_LOCATION="../oms/Disk1/stage/products.xml"

#-----
#DEINSTALL_LIST:<StringList> List of components to be deinstalled during a dein-
# stall session.The following choices are available. The value should con-
# tain only one of these choices.The choices are of the form
# Internal Name, Version : External name.
# Please use the internal name and version while specifying the value.
# oracle.sysman.top.agent, 10.2.0.0.0 : Oracle Management Agent 10.2.0.0.0
# oracle.sysman.top.em_seed, 10.2.0.0.0 : Oracle Enterprise Manager Repository Database 10.2.0.0.0
# oracle.sysman.top.oms, 10.2.0.0.0 : Oracle Enterprise Manager Grid Console 10.2.0.0.0
#Example: DEINSTALL_LIST = {"oracle.sysman.top.agent","10.2.0.0.0"}
#-----
DEINSTALL_LIST={"oracle.sysman.top.oms","12.1.0.4.0"}

#-----
#REMOVE_HOMES:<StringList> List of the homes to be removed during a deinstall
# session. Each home is represented by its full path.
#Example: REMOVE_HOMES = {<full_path_of_home1>,<full_path_of_home2>, ...}
#-----
REMOVE_HOMES=<Value Unspecified>

#####
#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"

#-----
#TOPLEVEL_COMPONENT:<StringList> The top level component to be installed in the
# current session.The following choices are available. The value should
# contain only one of these choices.
# The choices are of the form Internal Name, Version : External name.
# Please use the internal name and version while specifying the value.
# oracle.sysman.top.agent, 10.2.0.0.0 : Oracle Management Agent 10.2.0.0.0
# oracle.sysman.top.em_seed, 10.2.0.0.0 : Oracle Enterprise Manager Repository Database 10.2.0.0.0

```

```
# oracle.sysman.top.oms, 10.2.0.0.0 : Oracle Enterprise Manager Grid Console 10.2.0.0.0
#Example: TOPLEVEL_COMPONENT = {"oracle.sysman.top.agent","10.2.0.0.0"}
#-----
TOPLEVEL_COMPONENT={"oracle.sysman.top.oms","12.1.0.4.0"}
#####
```



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Solution-in-a-box: Deploying Highly Available Monitoring Infrastructure using Oracle Enterprise Manager Cloud Control 13cR2 and Oracle Database Appliance

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