How to Monitor Oracle VM Manager with Oracle Enterprise Manager 13c

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Introduction

We will discuss the monitoring features of Oracle Enterprise Manager 13c with Oracle VM Manager. Oracle Enterprise Manager has an Oracle VM Infrastructure Cloud Portal as well as the ability to create the logical concept of Systems. Systems within Oracle Enterprise Manager provide a portal and incident management framework where any events are actioned based upon incident rules or corrective actions. Systems are the grouping together of Oracle Enterprise Manager Targets, which relate to each other and form the concept of a system. This is a very flexible framework where users can define their own systems using discovered Oracle Enterprise Manager Targets. This paper will discuss and define an approach to monitoring Oracle VM Server as a System and provide examples of incident rules and corrective actions.

Configuration of Oracle Enterprise Manager 13c to monitor and manage Oracle VM Manager

There are some configuration steps required to enable the monitoring of Oracle VM Server by Oracle Enterprise Manager. These steps involve configuration on both Oracle Enterprise Manager and the Oracle VM Manager. The high-level steps are as follows:

- Install and configure Oracle Enterprise Manager Agent on the Oracle VM Manager host

- Install the latest Virtualization (VT) and MySQL plug-in on the Oracle Enterprise Manager Server and Oracle Enterprise Manager Agent on the Oracle VM Manager host

- Register the Oracle VM Manager with the Oracle Enterprise Manager Infrastructure Cloud Portal

- Create a monitoring user for the Oracle VM Manager MySQL repository database

- Discover the Oracle VM Manager MySQL repository database as a target within Oracle Enterprise Manager

- Discover the Oracle VM Manager Weblogic Domain and Server

- Create an Oracle VM Manager System within Oracle Enterprise Manager

- Configure the Oracle VM Manager System with custom monitoring charts, monitoring templates, incident rules and corrective actions

Install and configure Oracle Enterprise Manager Agent on the Oracle VM Manager host

Enable the oracle user account

The oracle user account already exists on Oracle VM Manager Servers. We need to know the oracle user password to enable the Oracle Enterprise Manager Agent installation. Ensure the oracle user on the Oracle VM Manager has a password and you can log in as oracle using the ssh command. Log into the Oracle VM Manager as the root user and run the following command to see if the oracle password is set:

```
[root@mymanager ~]# grep oracle /etc/shadow

oracle:!!:17204:0:99999:7:::
```

If the above command returns a line where the password field contains "!!" or does not begin with a $, then the password is not set. If a password exists that, we do not know then log into each Oracle VM Manager and run the following series of commands to create and test a password for the oracle user.

```
[root@mymanager ~]# passwd oracle

[root@mymanager ~]# su - oracle
```

```
[oracle@mymanager ~]$ su - oracle

password:

[oracle@mymanager ~]$ exit

[root@mymanager ~]# exit
```

Create the Oracle Enterprise Manager Agent directory

We need to create an Oracle Enterprise Manager Agent home directory on the Oracle VM Manager host before attempting to deploy the Oracle Enterprise Manager Agent.

The Oracle Enterprise Manager Agent home directory can reside in any location on the Oracle VM Manager host. Oracle suggests the following location where the Oracle VM Manager application resides; throughout this whitepaper, we reference this as <agent home>. Even if you uninstall or reinstall the Oracle VM Manager, this <agent home> directory is preserved.

```
[root@mymanager ~]# mkdir -p /u01/app/oracle/product/emagent

[root@mymanager ~]# chown oracle:dba /u01/app/oracle/product/emagent
```

Add the oracle user to the Oracle VM Manager host sudoers file

If you are uncomfortable, configuring the oracle user to use sudo to run commands as the root user then you can manually run the privilege commands on the Oracle VM Manager host at the end of the Agent installation. By configuring oracle to run commands as root enables a hands-off installation of the Oracle Enterprise Manager Agent.

Execute the following command as the root user on the Oracle VM Manager host.

```
[root@mymanager ~]# visudo
```

Add the following entry based upon this example and your agent home location. The following string should be on a single line in the file opened by the visudo command.

```
oracle ALL=(root) /usr/bin/id, <agent home>/*/agentdeployroot.sh, <agent
home>/core/agent_13.2.0.0.0/root.sh, /bin/sh, <agent home>/sbin/nmosudo
```

ℹ️ **Note**

```
Oracle recommends that you check the latest documentation for your version of Enterprise Manager
to verify this process hasn't changed since this document was published.

For further details on sudo configuration, consult the Enterprise Manager 13.2 basic install guide
for Standalone Agent install.  Note the section on sudo/pbrun/sesu/su for executing commands as
the root user.
```

Add a firewall rule if needed

If a firewall is in place, we need to configure it to allow the Oracle Enterprise Manager Agent to communicate with the Oracle Enterprise Manager Server. The default port for an Oracle Enterprise Manager Agent is 3872; however, it is possible to use any port as long as it is free.

The following example is for the default port of 3872 and using iptables.

```
[root@mymanager ~]# iptables -A INPUT -m state --state NEW -m tcp -p tcp --dport 3872 -j ACCEPT
```

Save and restart iptables as shown below:

```
[root@mymanager ~]# service iptables save

[root@mymanager ~]# service iptables restart
```

Install the required software for the Oracle Enterprise Manager Agent

Ensure the following software packages exist on the Oracle VM Manager host using the following command; install any missing packages using yum.

```
[root@mymanager ~]# yum install binutils gcc glibc-common glibc-devel libaio libstdc++ make sysstat
```

Enable the Oracle Enterprise Manager Agent push on the Oracle Enterprise Manager Server

We need to change a configuration file on the Oracle Enterprise Manager Server that allows the Oracle Enterprise Manager Agent deployment to complete even if sudo is disabled. This change will allow the process of deploying an Oracle Enterprise Manager Agent to complete as a single flow without any additional steps or configuration changes on the Oracle VM Manager host. This step does not require the Oracle Enterprise Manager Server to restart.

Perform the following steps on the Oracle Enterprise Manager Server.

```
Log into the Oracle Enterprise Manager Server as the oracle user

Edit: $EMSERVER_HOME/sysman/prov/agentpush/agentpush.properties

Change: oracle.sysman.prov.agentpush.enablePty=false to
oracle.sysman.prov.agentpush.enablePty=true
```

Create the oracle user named credential

Using the Oracle Enterprise Manager UI, add a named credential for the Oracle Enterprise Manager Agent install user, which in our case, is oracle. As the sysman or any other superuser account, navigate to the named credentials page as show in Figure 1 below.
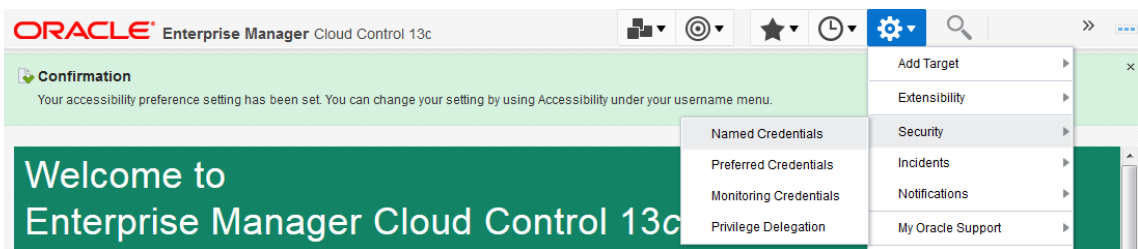

Figure 1: Accessing page for named credentials

Create the named credential for the oracle user as shown in Figure 2 below.

Figure 2: How to create a new named credential

Complete the numbered items shown in Figure 3 below.

Figure 3: Complete the form for named credentials

There is no requirement to complete Access Control (8); only items 1 through 7 in the above screenshot need to be populated. Once completed save the named credential. It is not possible to test this credential on the Oracle VM Manager host, as this requires the Oracle Enterprise Manager Agent to be present. Click on the Save button shown in Figure 4 below.
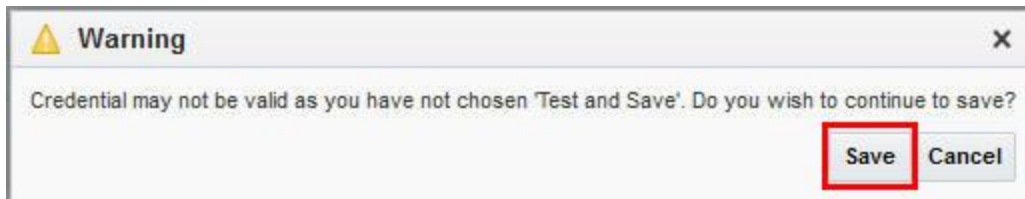

Figure 4: Save the named credential without testing

The following table provides additional information about numbered items in Figure 3.

TABLE 1: EXPLANATION OF NUMBERED ITEMS IN FIGURE 3 ABOVE

Item	Description
1	Provide the name you devised for the named credential, for example oracle_ovmm
2	A short description that will help systems administrators understand the role and purpose of the named credential
3	Always choose "Host" and "Host Credentials"
4	Select "Global"
5	The administrator user account used which in our case is oracle
6	The password for the oracle user
7	If sudo has been configured then select sudo and run as root, otherwise leave to none and be aware the privileged scripts will need to be run as root on the Oracle VM Manager host to complete the Oracle Enterprise Manager Agent install
8	Only required if additional security policies are required

Install the Oracle Enterprise Manager Agent

Add the targets manually using Figure 5 below as an example.
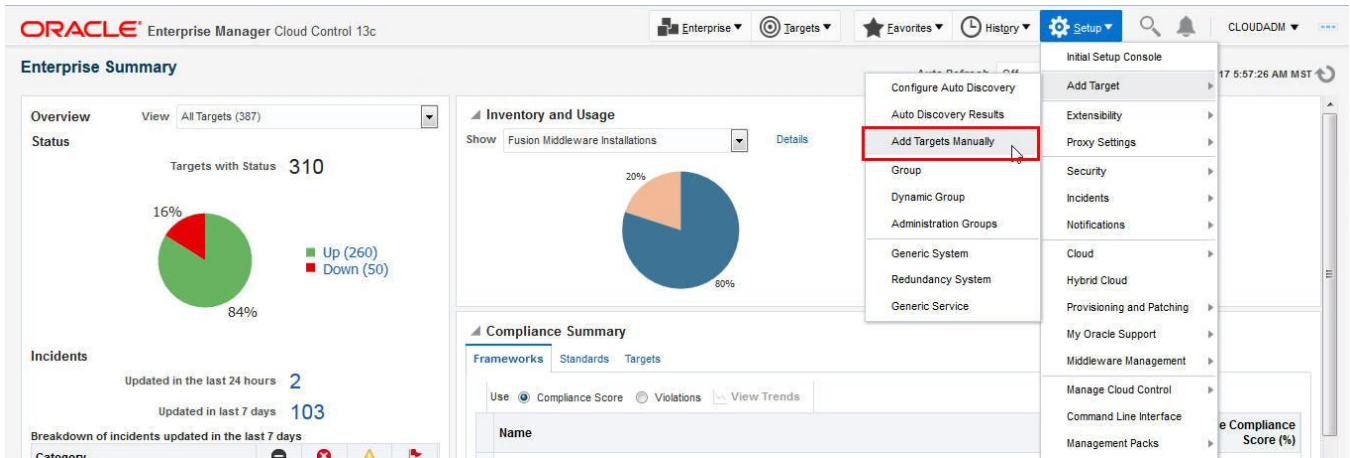
Figure 5: Choose to add targets manually

Add a host target as shown in Figure 6 below.
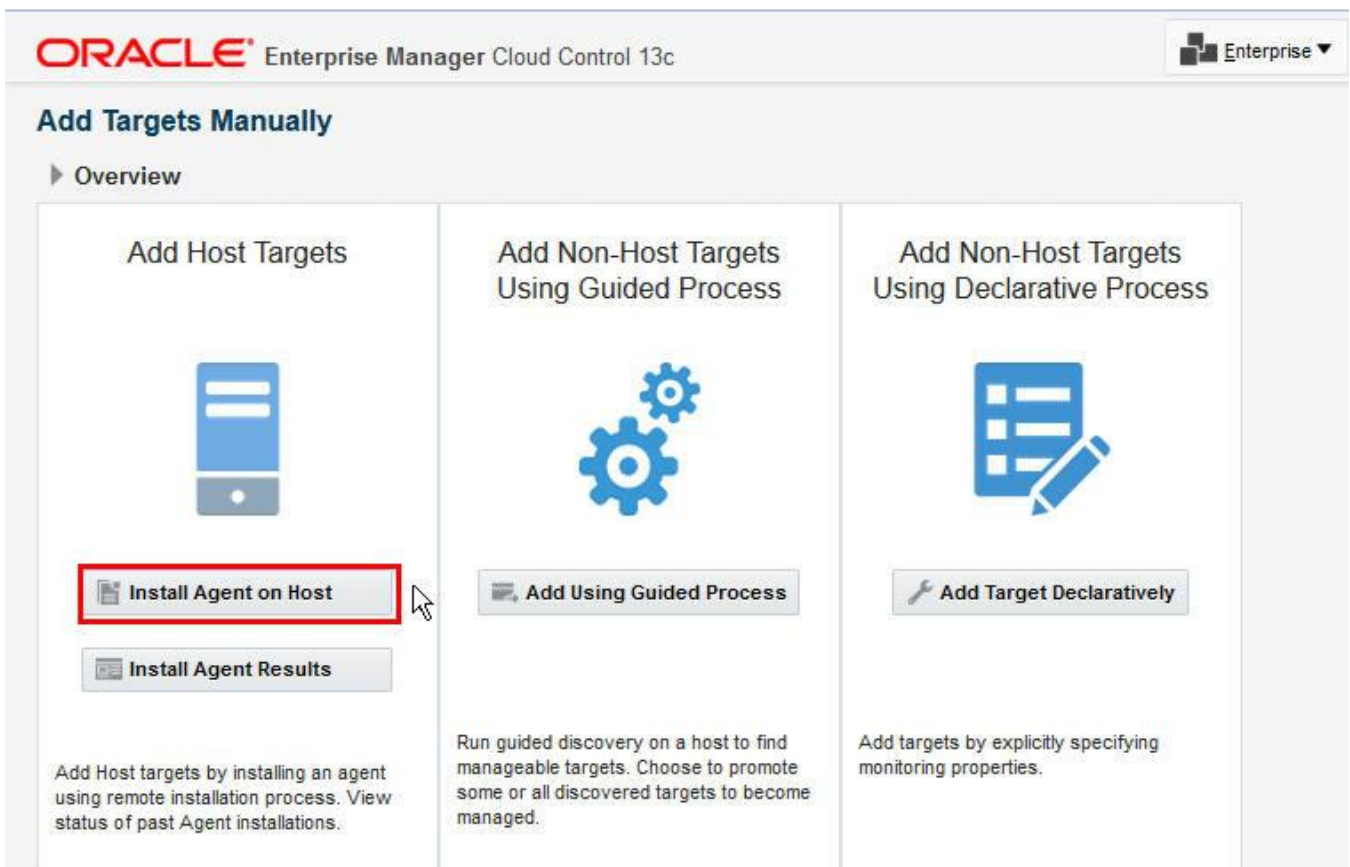
Figure 6: Choose to Install Agent on Host

Choose Add as shown in Figure 7 below and then provide the hostname for the Oracle VM Manager host and platform.
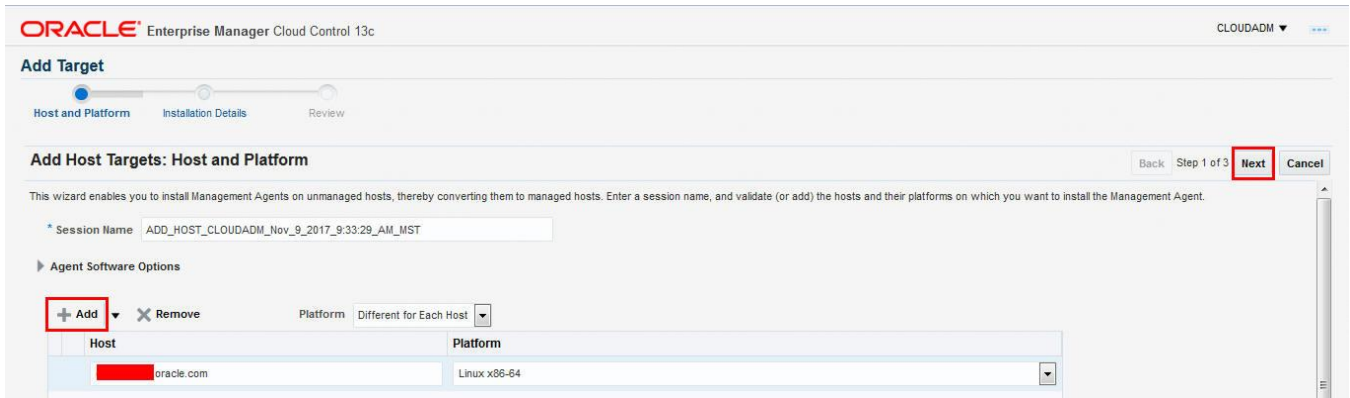
Figure 7: Add the Oracle VM Manager host as a target host

Populate the page as shown in Table 2 below; refer to table 2 below for detailed explanations about each of the required fields indicated by the callouts in the screen shot.

Figure 8: Complete form to deploy the agent

TABLE 2: EXPLANATION OF NUMBERED ITEMS IN FIGURE 8 ABOVE

Item	Description
1	Use the value of <agent home> defined earlier when creating the Oracle Enterprise Manager Agent home directory
2	This value is automatically populated with the correct string based on the installation base directory when this field is selected; the default value should not be modified once it is automatically populated.
3	Choose the oracle user named credentials for the Oracle VM Manager host created earlier
4	Choose the oracle user named credentials for the Oracle VM Manager host created earlier
5	If you created the sudo access for the oracle user then leave the default setting. You can delete this value if you did not create the root access for oracle user. The last step of the agent install will fail and you will need to run a script manually on the Oracle VM Manager host. Follow the instructions given by Oracle Enterprise Manager when the process fails in the last step.
6	This shows the default service port for communication between the Oracle Enterprise Management Server and the agent. Change this if you are using a different service port.
7	There are normally no additional values to provide under operational details.

This step will deploy the Oracle Enterprise Manager agent to the Oracle VM Manager host.

Figure 9: Choose to deploy the agent

You should watch the progress closely to ensure all steps are completed. If any step fails, you will be given a chance to rectify any problem and then retry again from the point of failure.
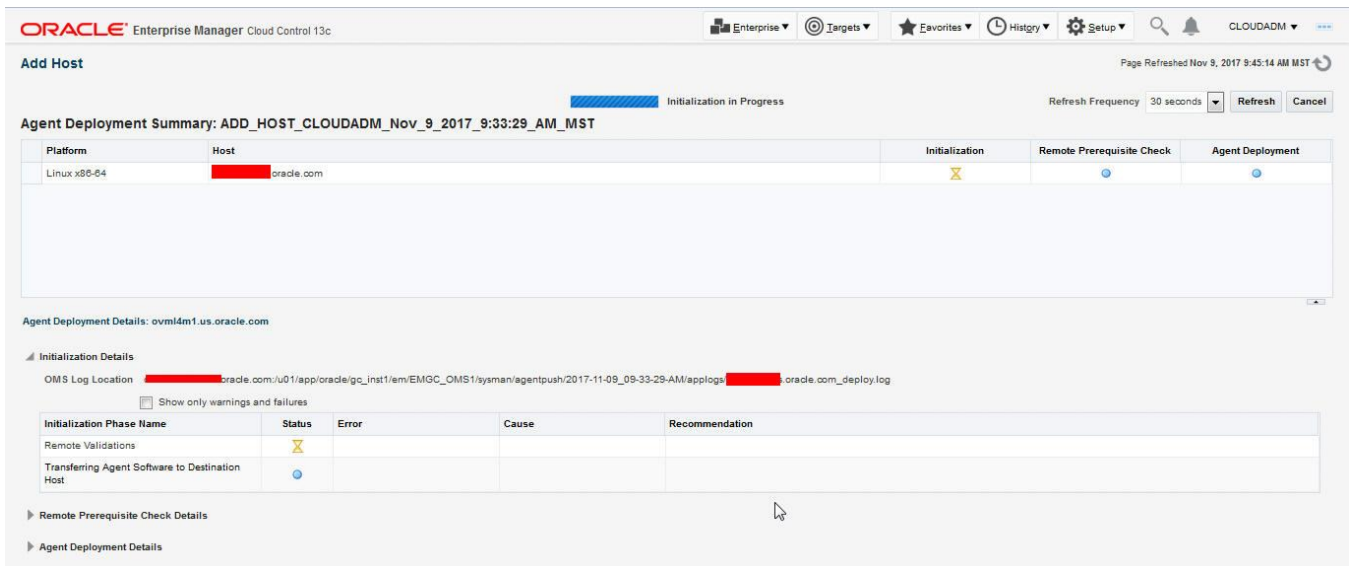
Figure 10: Monitor the progress of the agent installation

Note: If sudo is not configured the agent install will display a warning and state that privilege scripts need to be run manually as the root user.

Figure 11: Example warning if no sudo access configured for the oracle user

For this use case select to "Continue All Hosts" and once the agent install has completed, run the following privileged scripts as the root user on the Oracle VM Manager host. The agent install flow will advise on the exact location of the scripts.

```
<agent home>/agent_13.2.0.0.0/root.sh

/u01/app/oraInventory/orainstRoot.sh
```

Install the latest Virtualization (VT) and MySQL plug-in on the Oracle Enterprise Manager Server and Oracle Enterprise Manager Agent on the Oracle VM Manager host

Oracle Enterprise Manager Virtualization (VT) plug-in

The Virtualization plug-in allows you to discover and manage Oracle Private Cloud Appliances, Oracle VM servers, server pools, guests and storage repositories for all of your Oracle VM environments. Firstly from Setup > Extensibility > Plugins view the latest and deployed VT plug-in for both the Management Server and Agents.
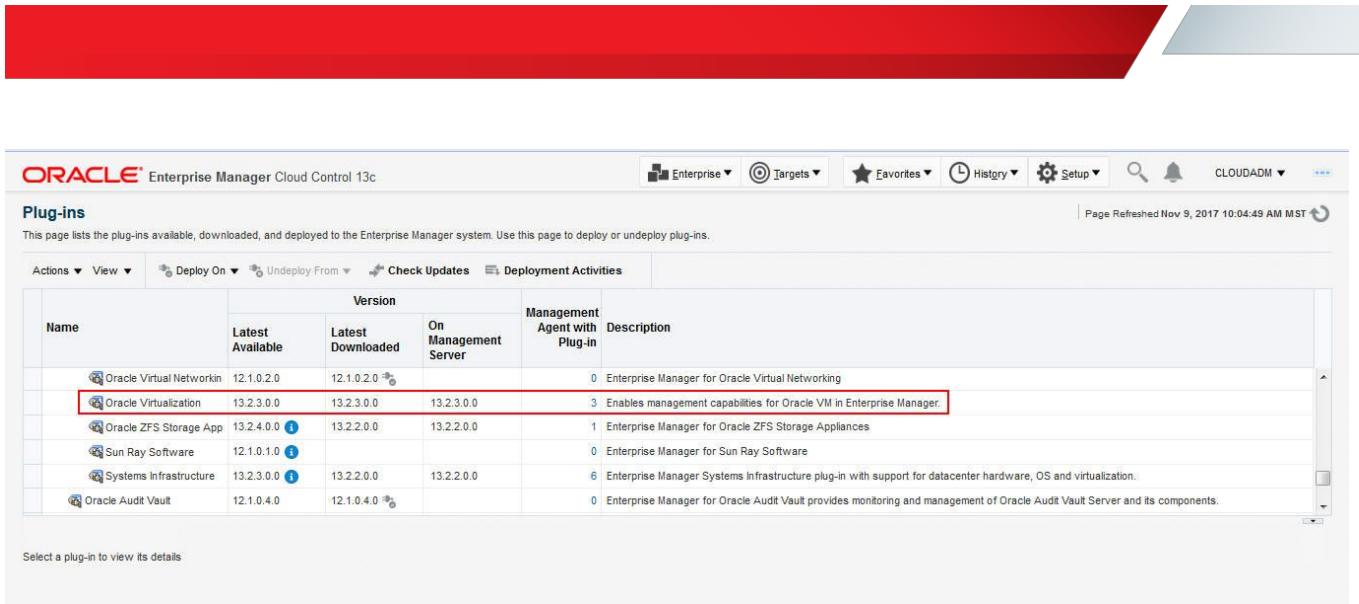
Figure 12: VT plug-in view

We can see from this output that the latest available is downloaded and deployed on the management server. We recommend that any existing agent versions are checked by clicking on the Management Agent with Plug-in number. We can see from Figure 13 that all Agents are at the latest and same version.
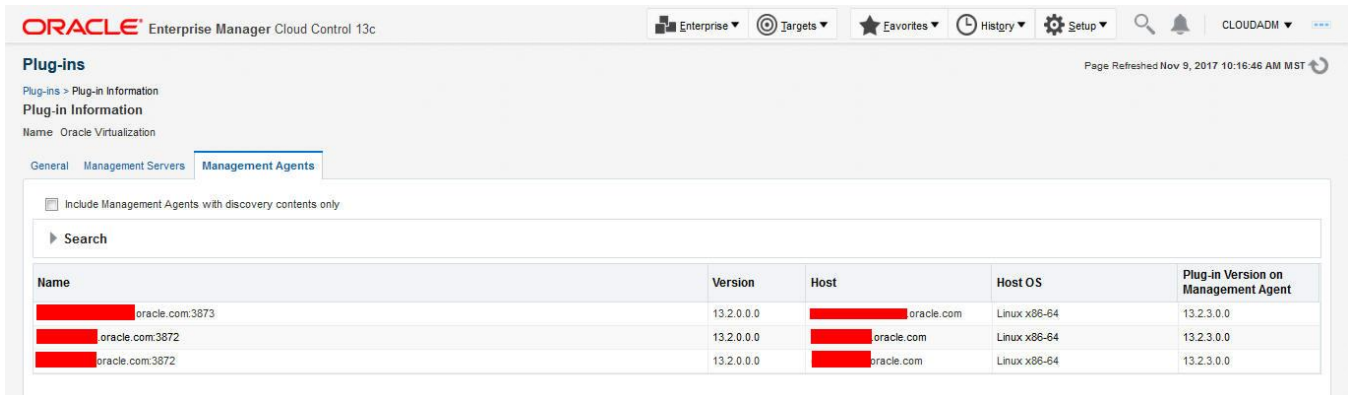
Figure 13: VT Management Agent plug-in view

As we have newly installed the Agent onto the Oracle VM Manager host, we need to install the VT plugin on this agent. Refer to the documentation for this procedure. If the VT plugin for either the Management Server or Agent(s) are below the latest version we recommend that these be updated referring to the documentation.

Oracle Enterprise Manager MySQL plug-in

As with the VT plug-in for the Oracle VM Manager, we require the MySQL plug-in in order to discover and monitor the Oracle VM Manager MySQL repository database.

Figure 14: MySQL plug-in view

We can see from Figure 14 the blue icon (ringed in red for definition). This indicates that there is a newer version available to download. As per the VT plugin please refer to the documentation to upgrade the plug-in for MySQL on both the Oracle Management Server and Oracle Manager host agent. It is likely that the plug-in upgrade on the Oracle Management Server will require downtime.

Register the Oracle VM Manager with the Oracle Enterprise Manager Infrastructure Cloud Portal

This example will cover the registration of an Oracle VM Manager host running Oracle VM Server for x86 version 3.4.X. From this version, Oracle Enterprise Manager 13c uses web services API's to communicate with the Oracle VM Manager host. Earlier versions of Oracle VM Server require different approaches to register. Refer to this documentation with reference to your version of Oracle VM Server.

We need to run the following commands on the Oracle VM Manager host to prepare for the registration of the Oracle VM Manager from Oracle Enterprise Manager.

As the root user, export the Oracle VM Manager certificate to a temporary location.

```
/u01/app/oracle/ovm-manager-3/ovm_upgrade/bin/ovmkeytool.sh exportca > /tmp/ovmm.cert
```

As the agent user (in our case oracle), import the Oracle VM Manager certificate using the password "welcome".

```
<agent home>/agent_13.2.0.0.0/bin/emctl secure add_trust_cert_to_jks -trust_certs_loc
/tmp/ovmm.cert -alias ovmm
```

This should return the following output to confirm:

```
Message   :   Certificate was added to keystore

ExitStatus: SUCCESS
```

From the Oracle Enterprise Manager UI, navigate to the Oracle VM Infrastructure Home Portal to register the Oracle VM Manager.
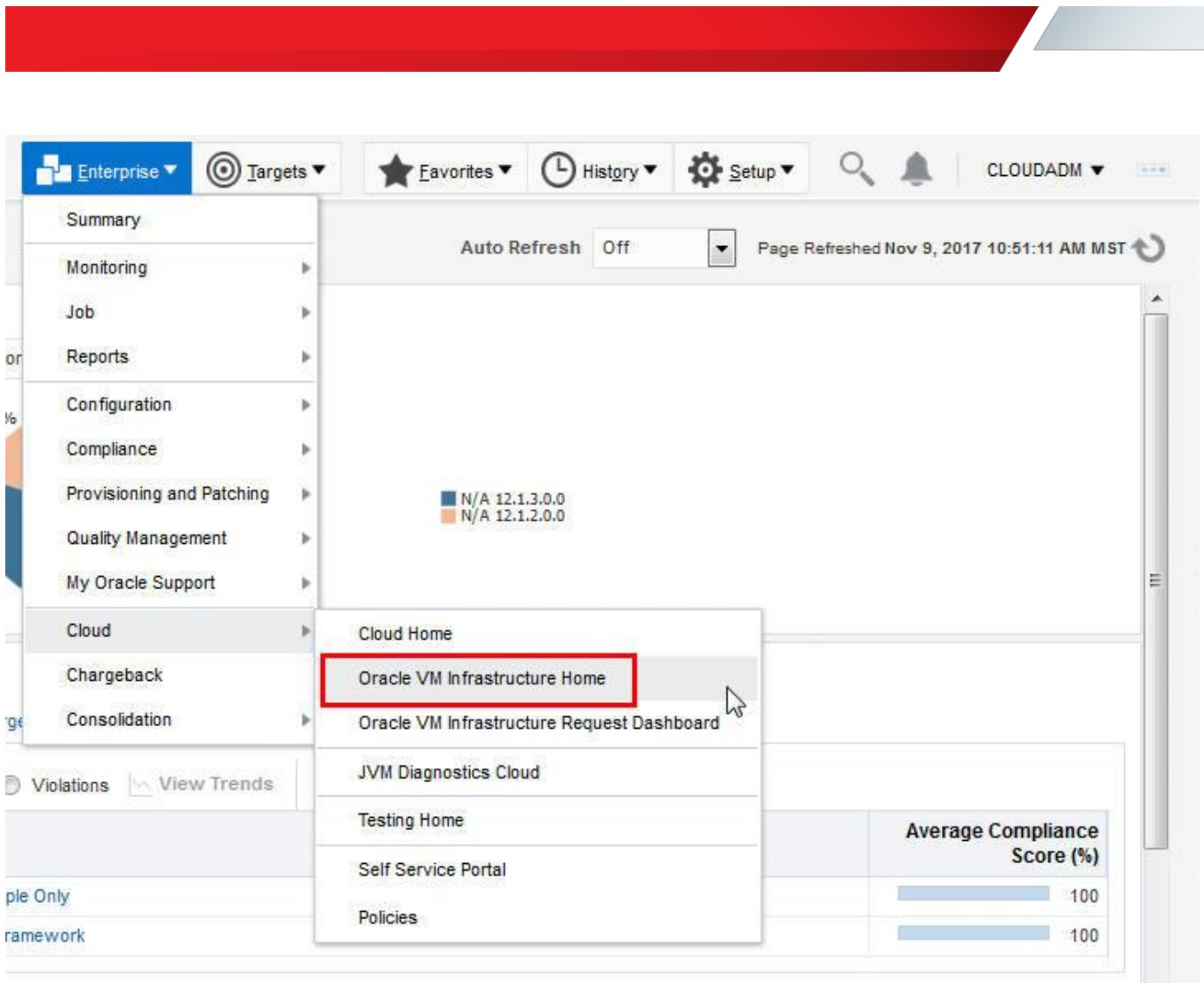
Figure 15: Navigate to the Oracle VM Infrastructure Home Portal

Once at the Portal from the Oracle VM Infrastructure Home menu select to Register OVM Manager.
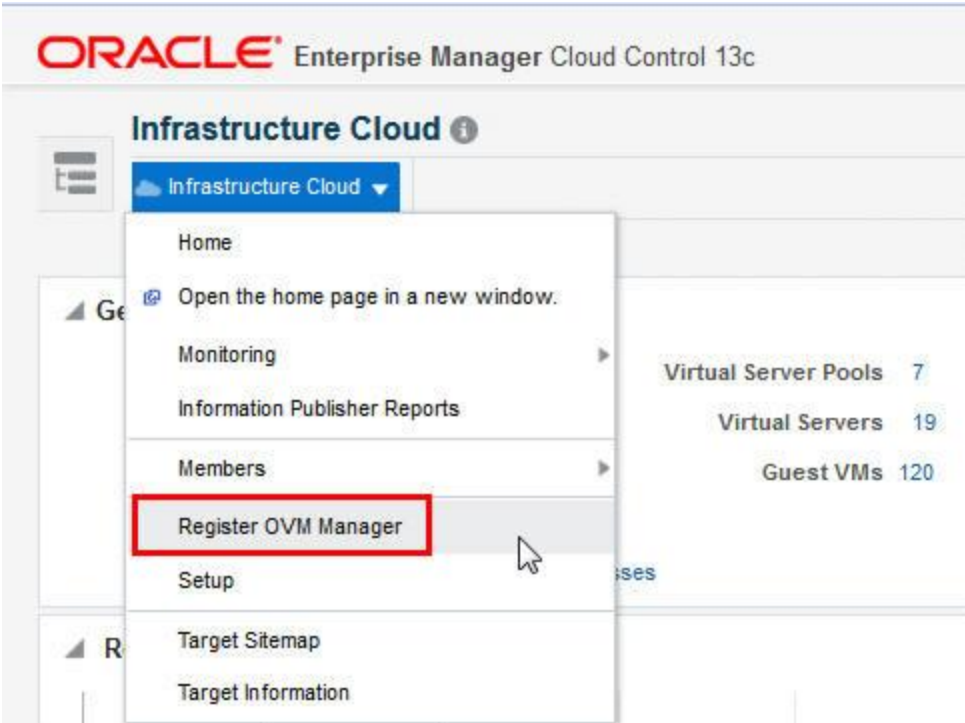
Figure 16: Select to Register OVM Manager

Populate the page as shown in Table 3 above; refer to table 3 above for detailed explanations about each of the required fields indicated by the callouts in the screen shot.

Note: When you select the Monitoring Agent (Item 2 below), you must have installed the VT plug-in on the agent we installed on the Oracle VM Manager host in the earlier section. If the Oracle VM Manager host does not appear here as a choice then check the agent has the VT plug-in installed.

Figure 17: Register OVM Manager

TABLE 3: EXPLANATION OF NUMBERED ITEMS IN FIGURE 17 ABOVE

Item	Description
1	Enter the name of the Oracle VM Manager, which will then appear as the target name
2	Use the radio button to select the Oracle Enterprise Manager agent on the Oracle VM Manager host. **Note:** This agent must have the VT plugin installed
3	As Oracle VM 3.4.X does not require tcps to be configured only "tcps://" is required for this field
4	This is the URL for the Oracle VM Manager including the port of :7002/ for example "https://myovmm.oracle.com:7002/"
5	This section is for the user to monitor the Oracle VM Manager, usually this is the "admin" user
6	This is for the "admin" user password
7	This field is ticked to synchronize by default, which is the recommended setting. If this is unticked then regular manual synchronizations are required
8	This section is if you want a different user to administer the Oracle VM Manager. Usually the user used for monitoring is also used for administration

Click on Submit to run the Registration job.

The job should complete successfully and the Oracle VM Manager should appear in the Infrastructure Cloud Portal.

Figure 18: Oracle VM Managers within the Infrastructure Cloud Portal

Create an monitoring user for the Oracle VM Manager MySQL repository database

We need to create a separate user (in our example "oemagent" with password "mychoiceofpassword") within the Oracle VM Manager MySQL repository database. This user is required for monitoring purposes. When running the "mysql" command as the oracle user use the password for the Oracle VM Manager admin user.

The new mysql user must have the following privileges:

- SELECT
- REPLICATION CLIENT
- SHOW DATABASES
- PROCESS

As the oracle user on the Oracle VM Manager host.

```
$ mysql -u root -S /u01/app/oracle/mysql/data/mysqld.sock -p

Enter password:


mysql> CREATE USER 'oemagent'@'localhost' IDENTIFIED BY 'oemagent';

Query OK, 0 rows affected (0.07 sec)


mysql> GRANT SELECT, REPLICATION CLIENT, SHOW DATABASES, PROCESS ON *.* TO 'oemagent'@'localhost'
IDENTIFIED BY 'mychoiceofpassword';


mysql> exit

Bye
```

Now we need to log in as the MySQL user and check our access.

```
$ mysql -u oemagent -S /u01/app/oracle/mysql/data/mysqld.sock -p

Enter password:


mysql> show databases;

+--------------------+

| Database |

+--------------------+

| information_schema |

| appfw |

| mysql |

| ovs |

| performance_schema |

+--------------------+

5 rows in set (0.03 sec)


mysql> exit

Bye
```

Discover the Oracle VM Manager MySQL repository database as a target within Oracle Enterprise Manager

We now need to add the MySQL target to Oracle Enterprise Manager. There are two choices: a manual process or using Oracle Enterprise Manager Auto-discovery. This paper will describe the manual process steps. For Auto-Discovery, follow the steps within the MySQL documentation. One advantage of using Auto-Discovery is there is no need to declare ports as Oracle Enterprise Manager will find these are part of Auto-Discovery.

For a manual discovery, from the Oracle Enterprise Manager UI, navigate to the Add Targets Manually Page (Setup > Add Target > Add Targets Manually).
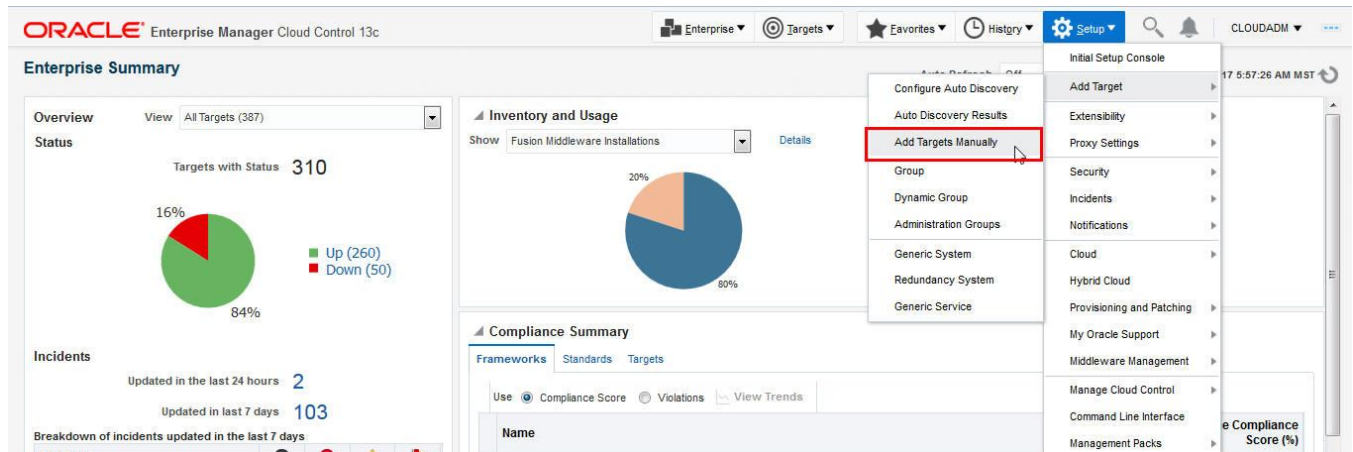
Figure 19: Add Targets Manually

Then from the overview screen select Add Target Declaratively.
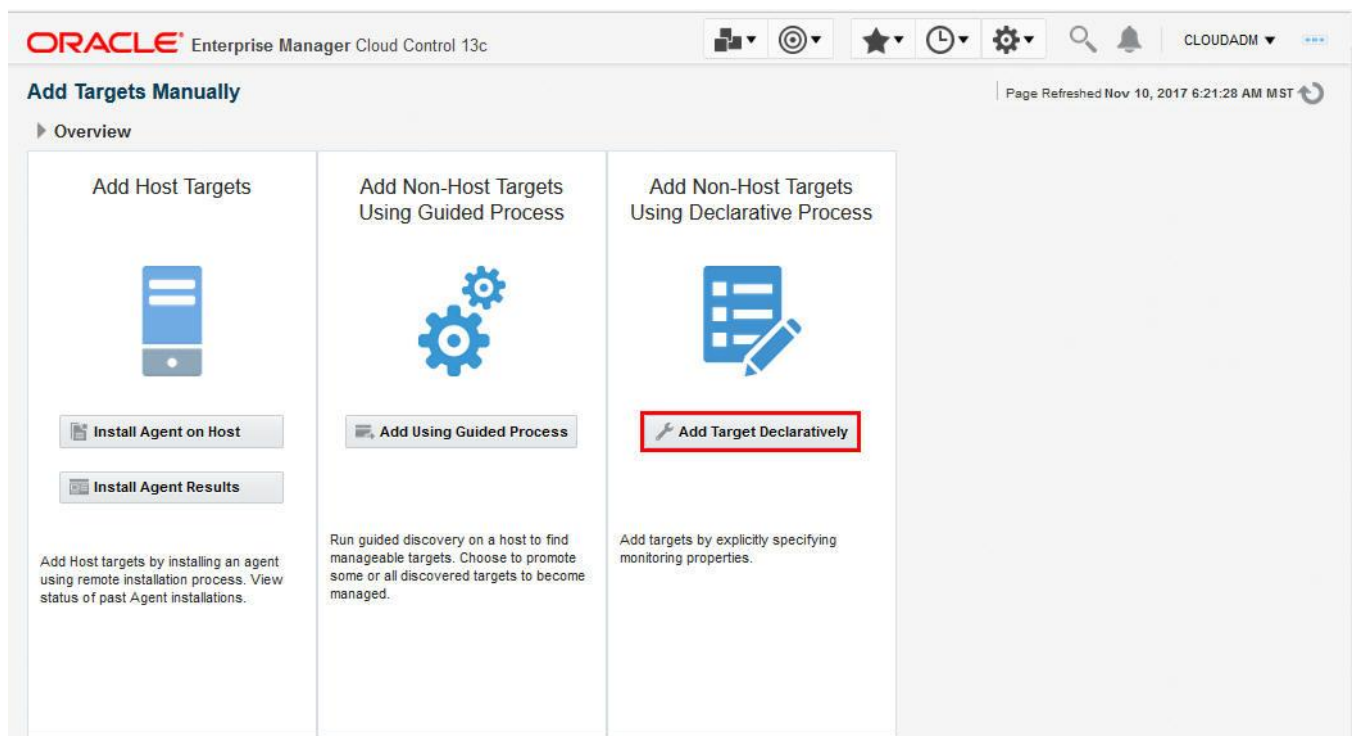
Figure 20: Add Targets Declaratively

In the Host field and using the radio button search for the Oracle VM Manager, host target. Once selected, in the Target Type field enter MySQL, select the Target Type then click the Add button.
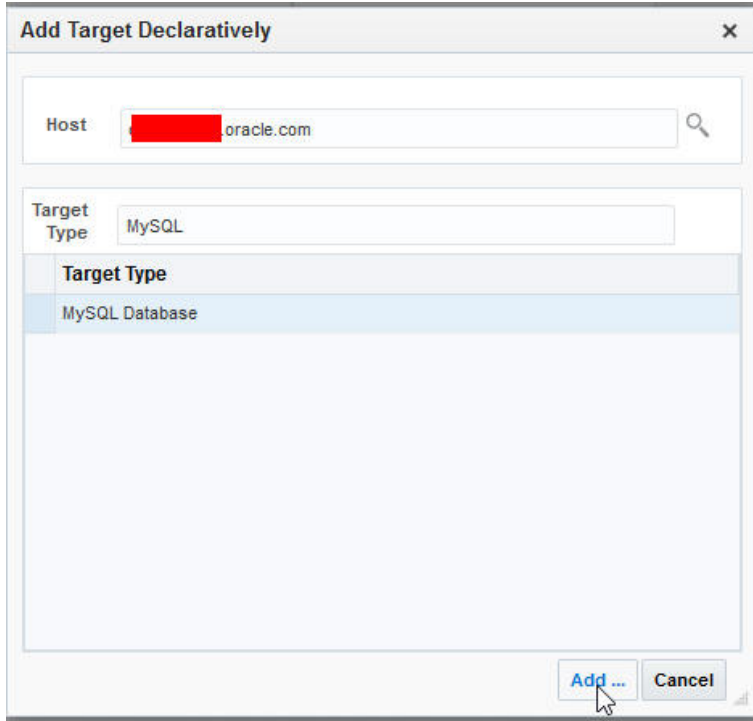
Figure 21: Add Targets Declaratively

Populate the page as shown in Table 4 above; refer to table 4 above for detailed explanations about each of the required fields indicated by the callouts in the screen shot.
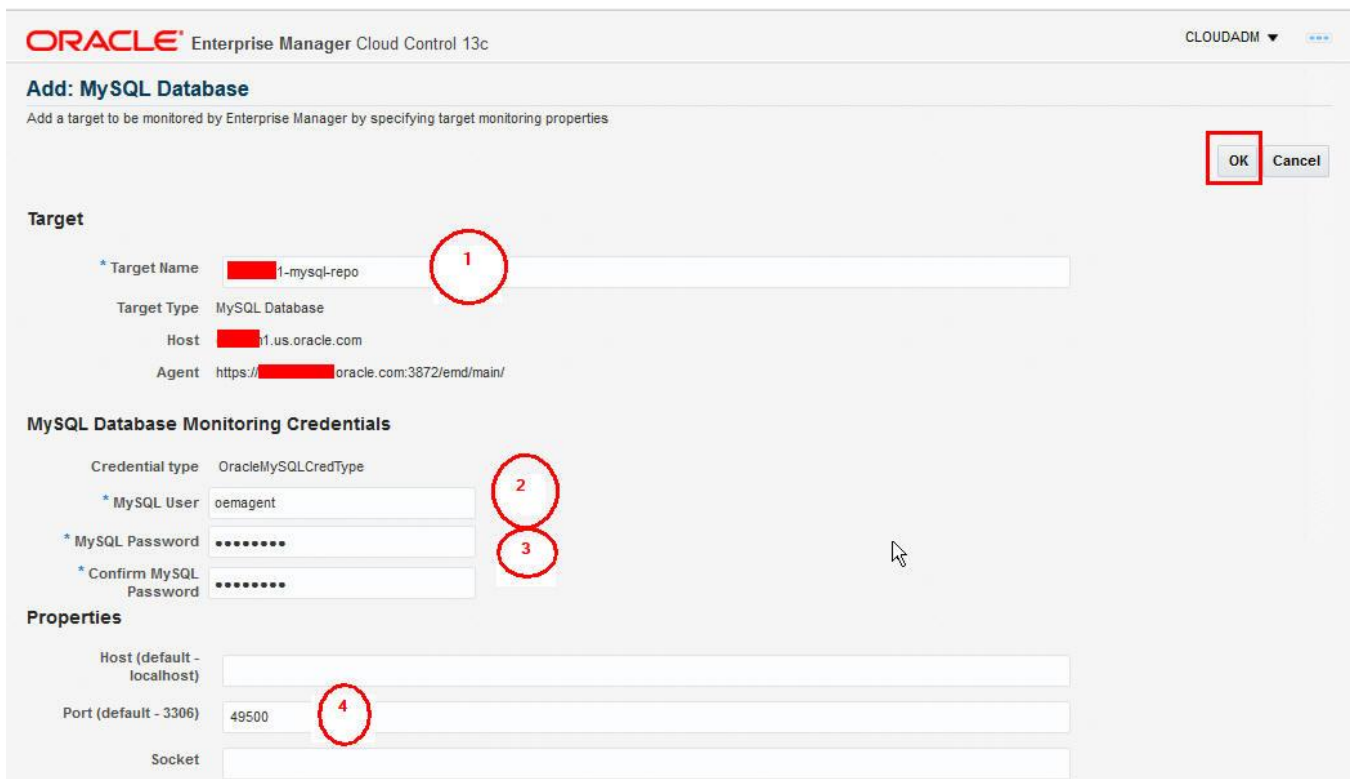
Figure 22: Add MySQL Database

TABLE 4: EXPLANATION OF NUMBERED ITEMS IN FIGURE 22 ABOVE

Item	Description
1	Enter the name of the Oracle VM Manager MySQL Repository database, which will then appear as the target name
2	This is for the mysql user created in the earlier steps (n our case "oemagent")
3	This is for the "oemagent" mysql password (in our case "mychoiceofpassword"

4	This is the port. To ascertain this port on the Oracle VM Manager host look in the `/u01/app/oracle/mysql/data/my.cnf` file
	
	`For example: $ cat /u01/app/oracle/mysql/data/my.cnf|grep port`
	
	`port=49500`

Once the fields are completed click OK. The Target will be added successfully.
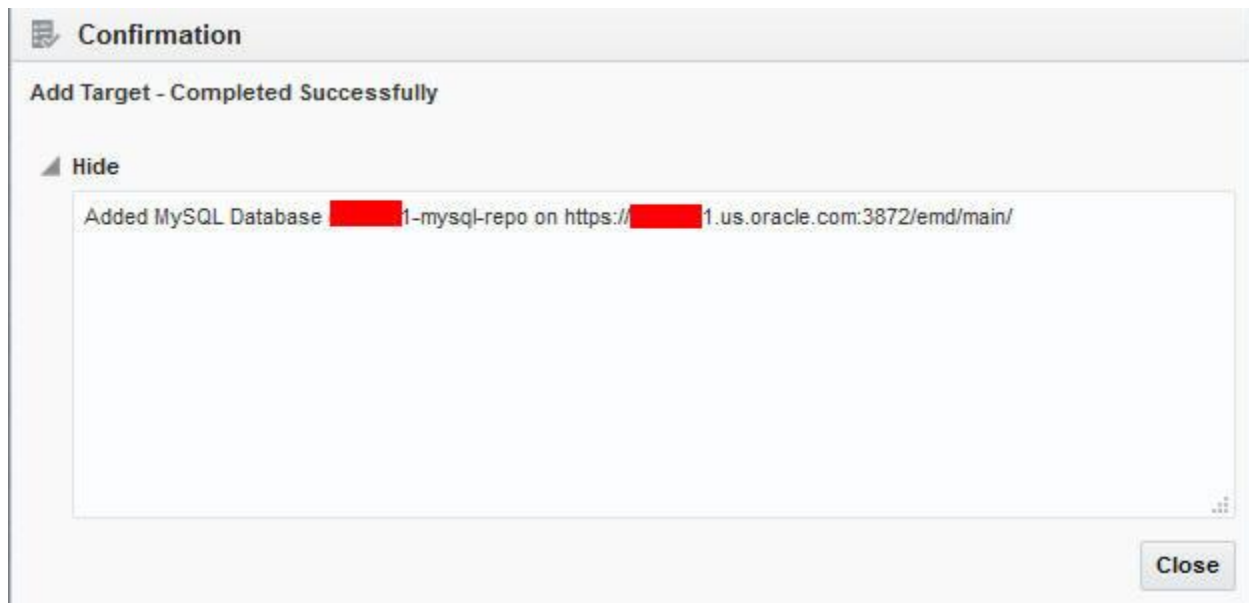
Figure 23: MySQL Database target added successfully

To confirm all is OK go to Targets > All Targets

On the left hand side under Databases click on MySQL Database and click on the newly added MySQL target. This will display the Home page for the MySQL Repository.

Figure 24: MySQL Database target home page

Discover the Oracle VM Manager Weblogic Domain and Server

We now need to add the WebLogic Domain and Server target to Oracle Enterprise Manager. There are two choices: a manual process or using Oracle Enterprise Manager Auto-discovery. This paper will describe the manual process steps. For Auto-Discovery, follow the steps within the Oracle Enterprise Manager documentation. One advantage of using Auto-Discovery is there is no need to declare ports as Oracle Enterprise Manager will find these are part of Auto-Discovery.

For a manual discovery, from the Oracle Enterprise Manager UI, navigate to the Add Targets Manually Page (Setup > Add Target > Add Targets Manually).
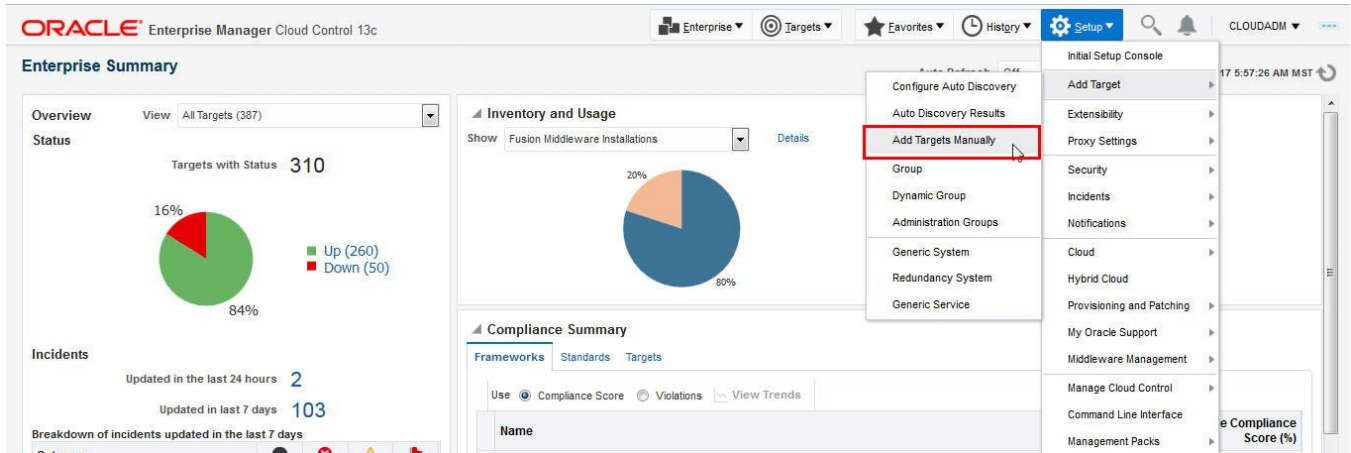
Figure 25: Add Targets Manually

Then from the overview screen select Add Non-Host Targets Using Guided Process.
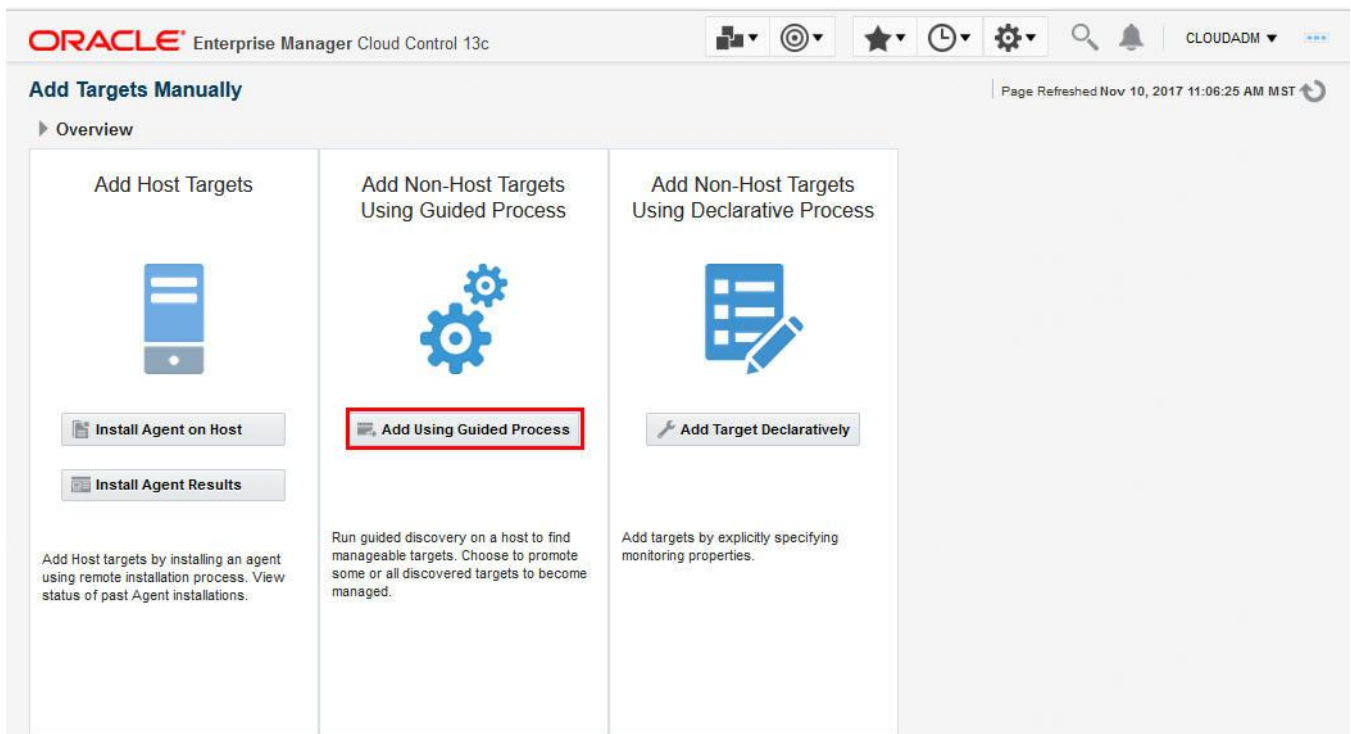
Figure 26: Add Targets Using Guided Process

From the Add Using Guided Process box click on Oracle Fusion Middleware / Weblogic Domain and Add.
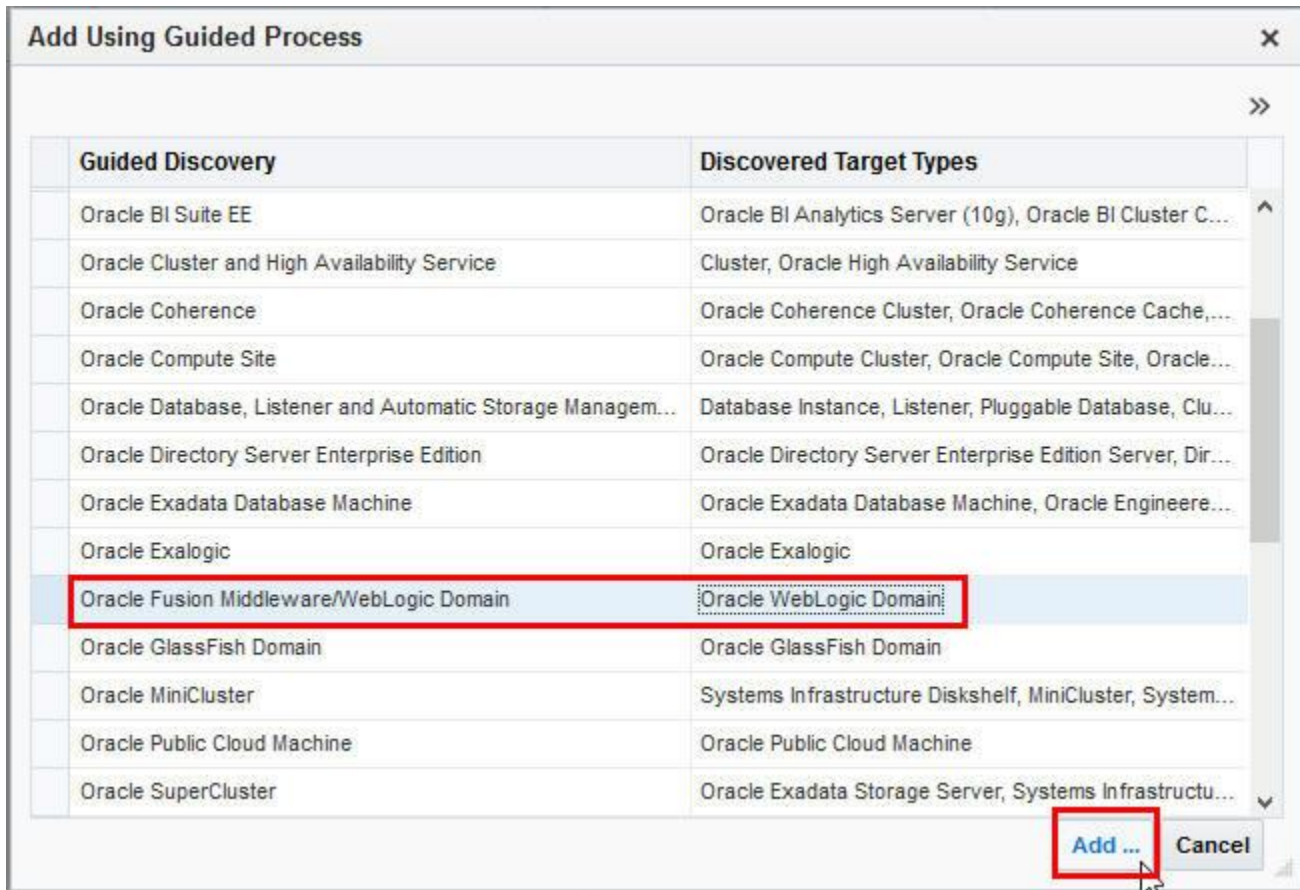
Figure 27: Add Targets Using Guided Process

Populate the page as shown in Table 5; refer to table 5 below for detailed explanations about each of the required fields indicated by the callouts in the screen shot.
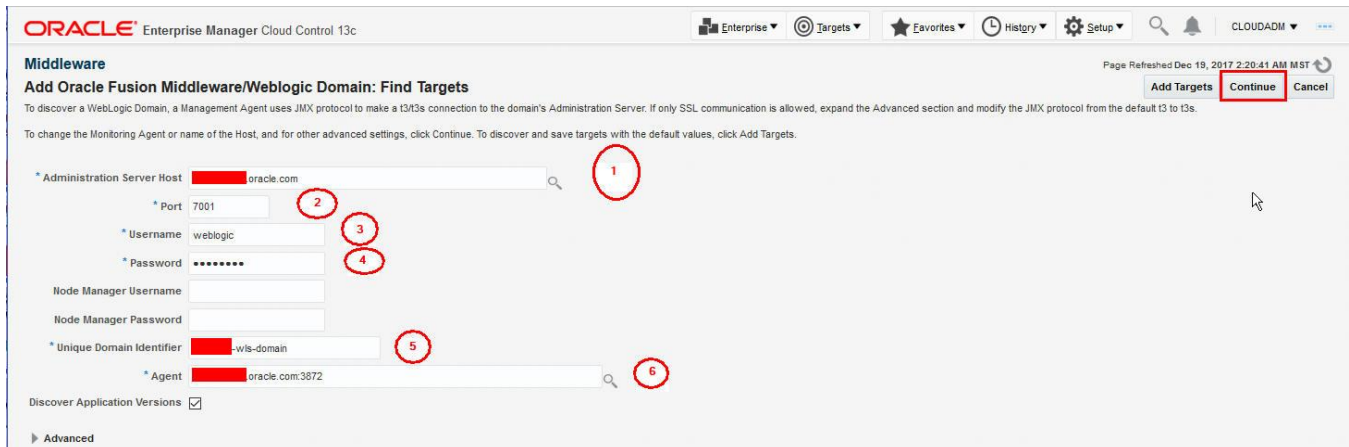
Figure 28: Add Weblogic Domain

TABLE 5: EXPLANATION OF NUMBERED ITEMS IN FIGURE 27 ABOVE

Item	Description
1	Use the radio button and search and select the Oracle VM Manager host
2	Leave this port at 7001 which is the default
3	This is for the WebLogic username which is "weblogic"
4	This is for the "weblogic" user password which is the same as the Oracle VM Manager "admin" user password
5	The Unique Domain Identifier is set by default to Farm01, however you may have many Oracle Weblogic domains, therefore set this to something unique and meaningful
6	The Agent field is automatically populated when you select the Oracle VM Manager host in item 1

Once this is complete click Continue, then Close to assign the targets.

Figure 29: Assign Weblogic targets

Figure 30: Assign Targets

Click Add Targets, this adds the discovered targets to Enterprise Manager. Once this has completed click Close. New targets are saved and assigned to the agent to monitor.

Figure 31: Save Targets

When Save targets completes click the OK button on the top right hand corner of the page to finish.

Figure 32: OK to finish

Click on the newly added Weblogic Domain, which takes you to the home page. It may take a few minutes for all the components to start reporting.
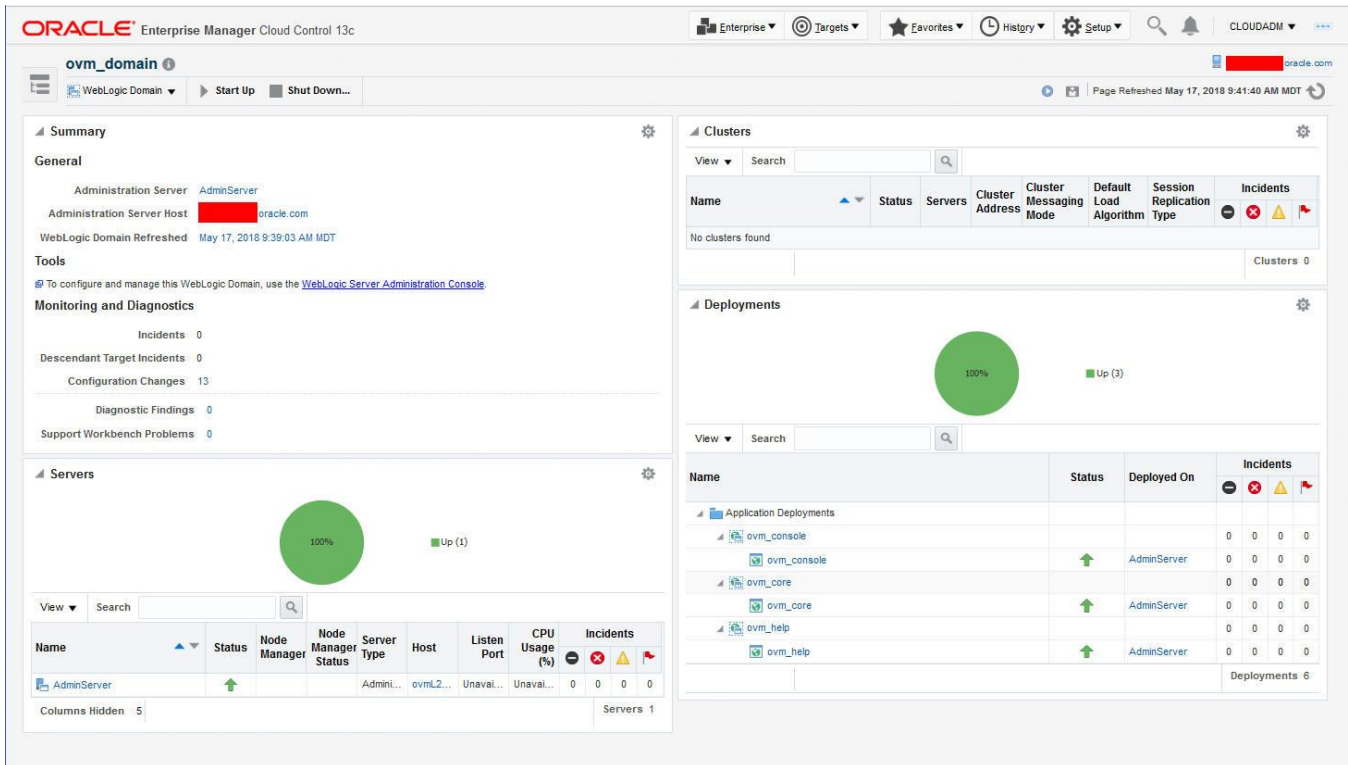
Figure 33: Weblogic Domain target home page

Create an Oracle VM Manager System within Oracle Enterprise Manager

On the Oracle VM Manager host, we have installed the Oracle Enterprise Manager Agent, registered the Oracle VM Manager, configured the WebLogic Domain/ Server and configured the MySQL repository database. We now need to create an Enterprise Manager System using these components in order to manage and monitor them as a single entity.

From the Oracle Enterprise Manager UI, navigate to Targets > Systems. Click + Add which will expose the drop down menu and click on Generic System. This will start the Add System wizard.
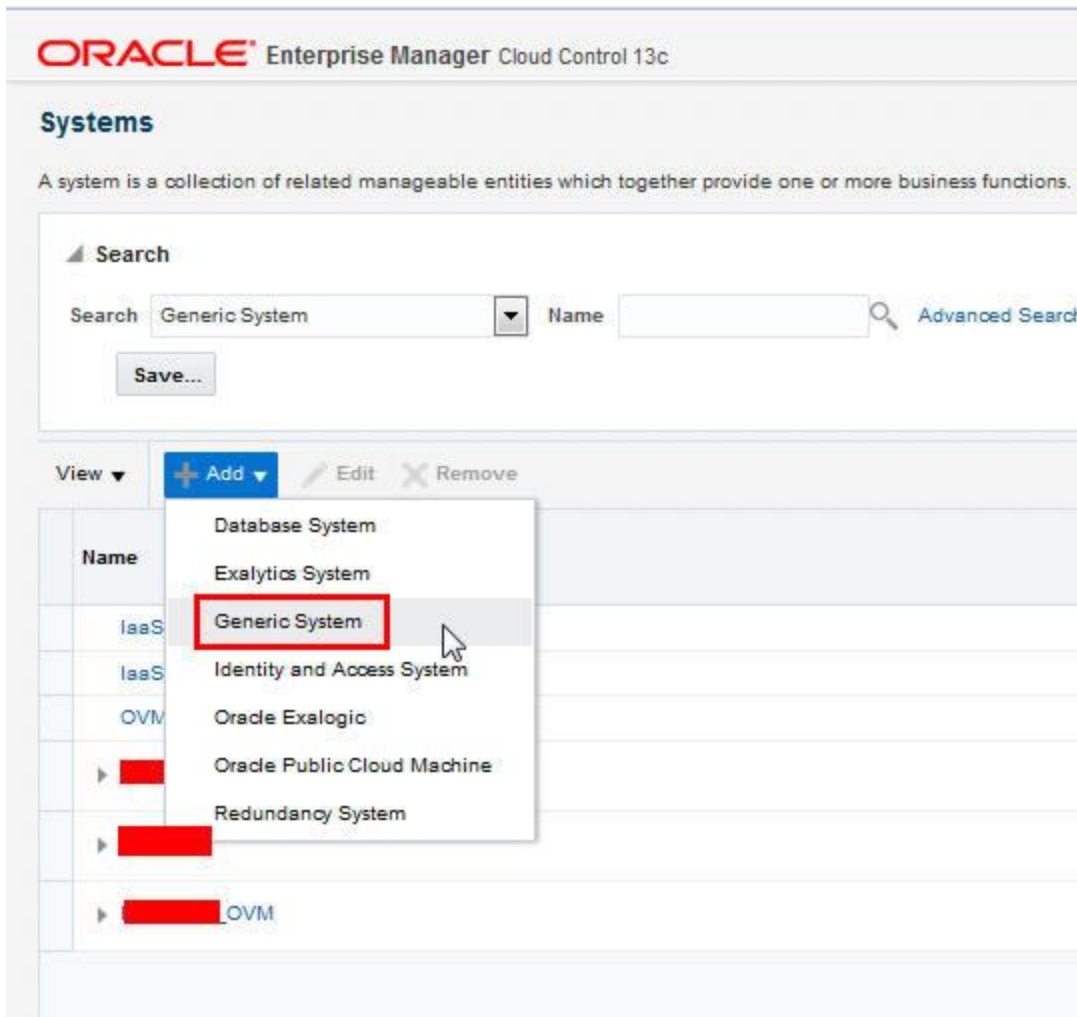
Figure 34: Add a Generic System

Give the System a meaningful name and if required input some useful comments. Under the Members panel Click + Add and using the search filters select the following targets:

- Oracle VM Manager Host

- Oracle VM Manager MySQL Database

- Oracle VM Manager

- Oracle VM Manager Oracle WebLogic Domain

- Oracle VM Manager Oracle WebLogic Server

Once all five are selected click Next.
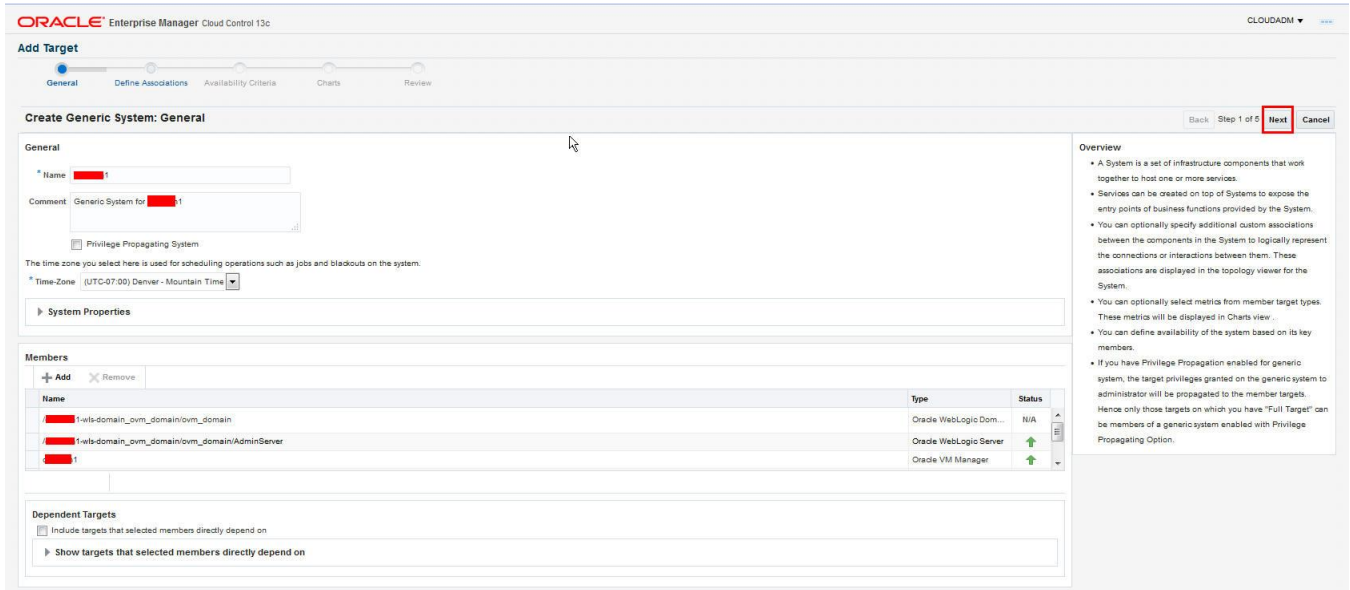
Figure 35: Add a Generic System General Page

On Step 2 of 5 Define Associations, click Next.
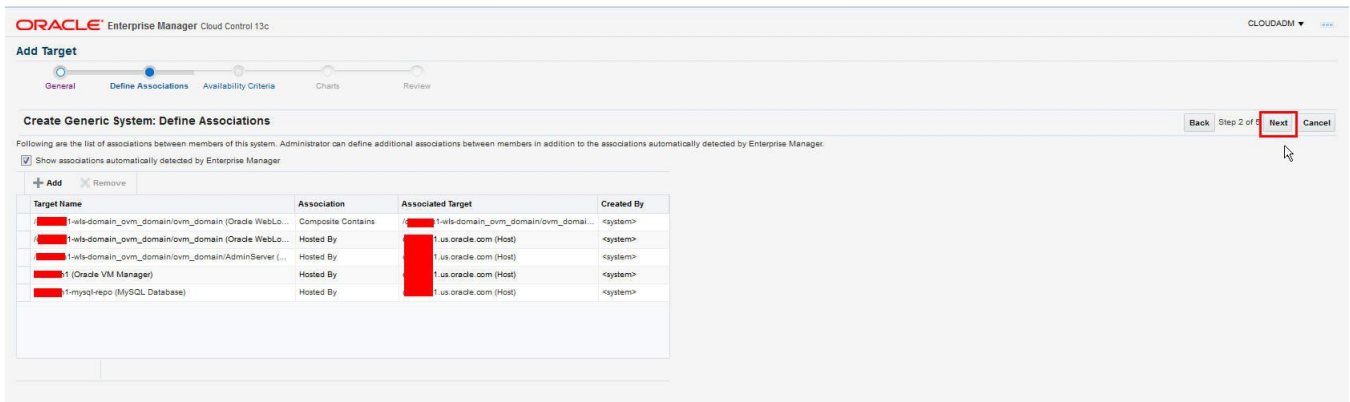
Figure 36: Add a Generic System Define Associations Page

The Availability Criteria page allows the user to define how the System is classed as up. The Availability Criteria can be set to any of the Key Members being up or all of them. With the Oracle VM Manager included in this System there may be Virtual Machines that are down for some reason. If the All of the Key Members is chosen, any down Virtual Machines will cause the System to appear down which may not be useful.

Select which Members are required for the up calculation and click Next.
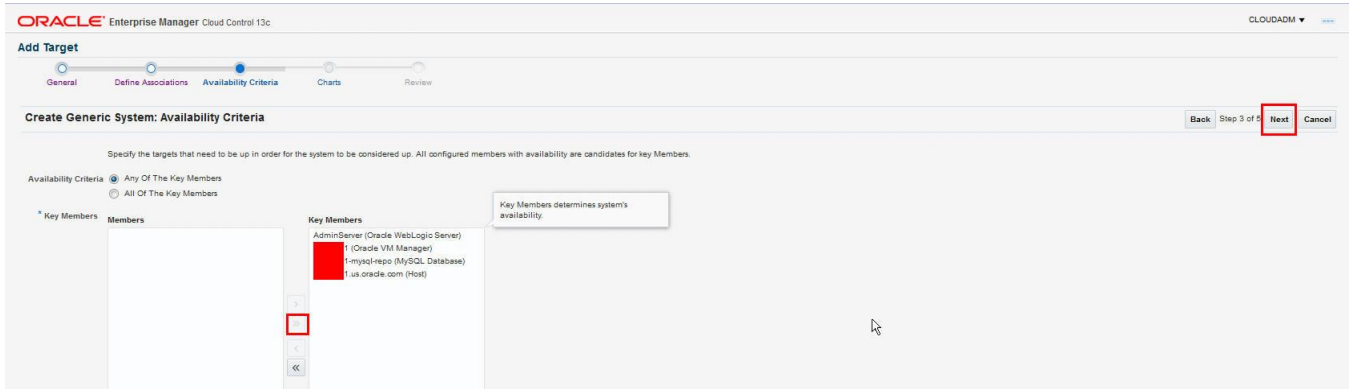
Figure 37: Add a Generic System Availability Criteria Page

The Charts section is ticked by default to include Oracle suggested charts. Charts are very useful and can be added per target type (for example MySQL Instance Activity Uptime). Add any required chart types and click Next to review or Finish.

Figure 38: Add a Generic System Charts Page

Once the System is created, we are shown a list of the Systems. To access the newly created System simply click on it.

Figure 39: Oracle VM Manager Generic System Home Page

If you click the Dashboard icon at the top (red oblong), we can see the System components and see if any are down. Notice the Oracle VM Manager has some classed as down which would be the Virtual machines as discussed earlier.

Figure 40: Oracle VM Manager Generic System Dashboard

Configure the Oracle VM Manager System with custom monitoring charts, monitoring templates, incident rules and corrective actions

Custom monitoring charts

If we from the Generic System drop down menu select Monitoring > Charts we can see the Oracle recommended charts for our system. As discussed these can be edited, removed and new ones pertinent to the target type added.
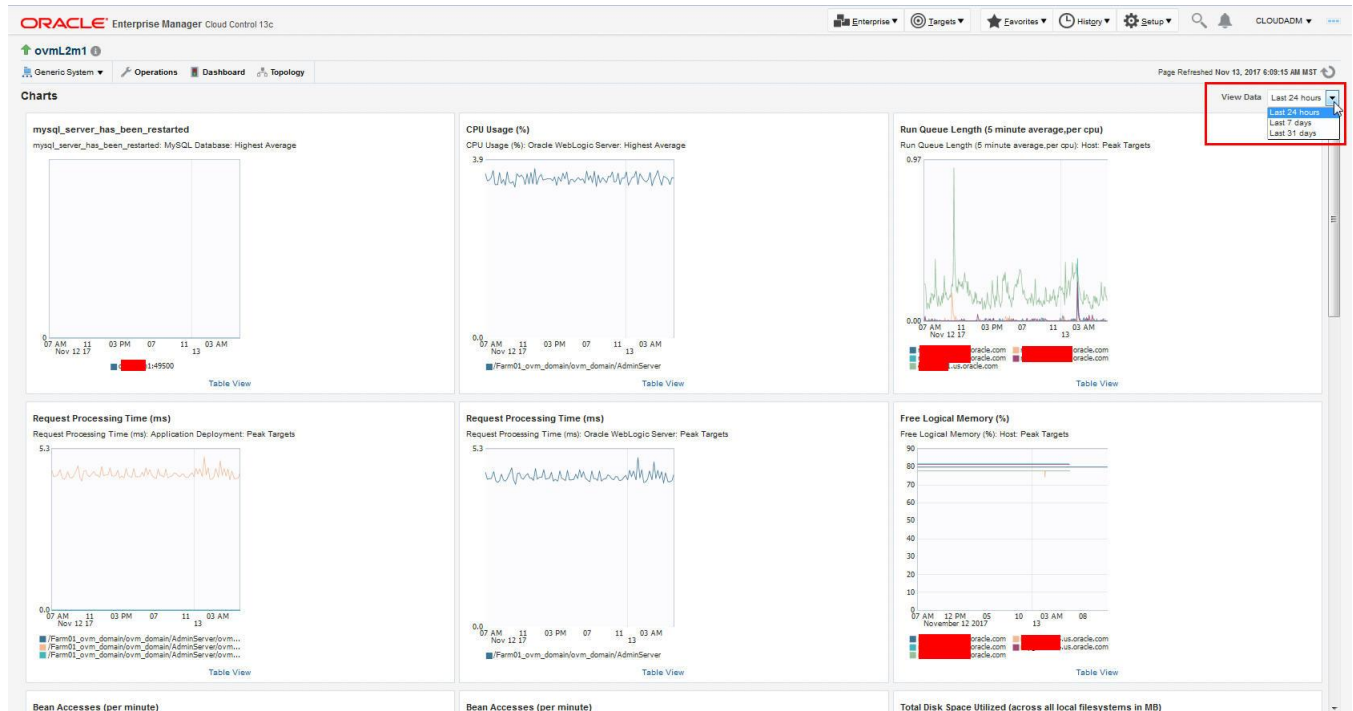
Figure 41: Oracle VM Manager Generic System Charts

Notice in the red oblong the View Data pull down menu. This can be used to increase the chart views from 24hours to 7 and 31 days.

To add, remove or edit the charts from the Generic System main menu > Target Setup > Edit System. This runs the Setup wizard again with an opportunity to manipulate the charts on Step 4 of 5.Here you can choose to exclude the Oracle suggested charts by unticking the box.

If you click + Add you are presented with a drop down menu of the Target Types within the System. Select the target Type (in our example MySQL).
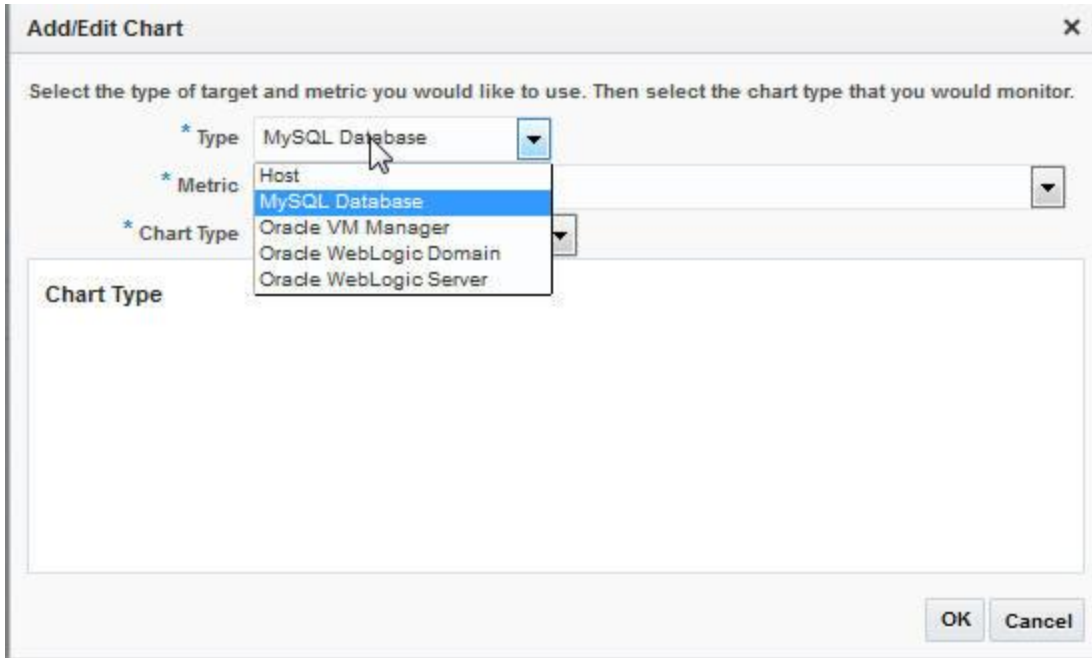
Figure 42: Add / Edit Chart (Select Type)

Then Select the Metric Type.
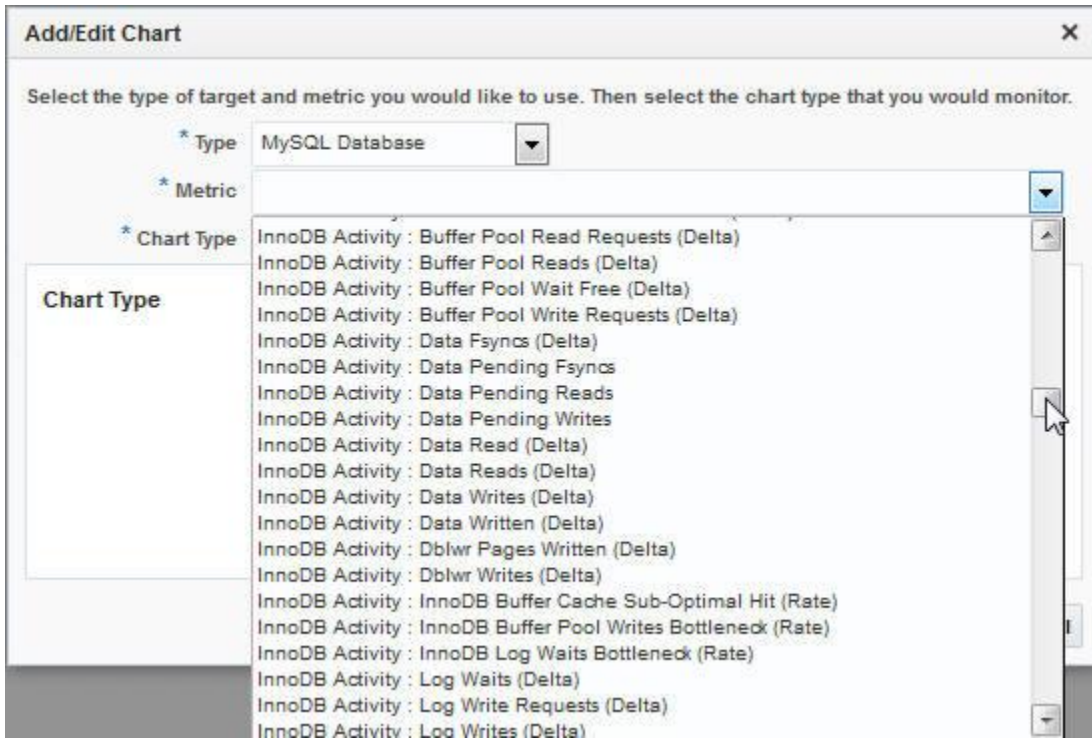
Figure 43: Add / Edit Chart (Select Metric)

Finally select the Chart type.
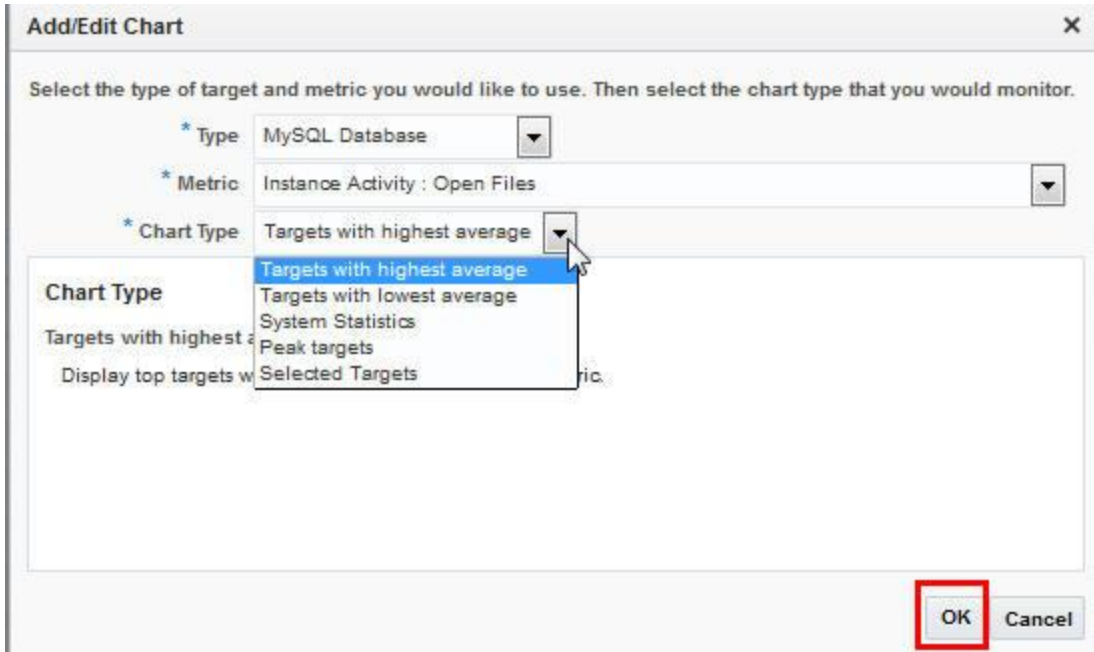
Figure 44: Add / Edit Chart (Select Metric)

If you choose Targets with highest or lowest average then you are able to select the number from 1 – 5. Select OK to finish and then Finish to exist the wizard. To check the new chart from the Generic System main menu > Monitoring > Charts.

Monitoring templates

Within Oracle Enterprise Manager, you can create a monitoring template. This is very useful if you have custom requirements within your data centre monitoring where you are monitoring to certain thresholds. Some metrics within Oracle Enterprise Manager have thresholds already set which are based upon best practice. The templates are useful as this saves time as you can apply these to individual targets, groups, systems or an Infrastructure Cloud. This means any new additions to for example a System or Infrastructure Cloud will inherit this required threshold settings.

For example, it is useful to know when your Oracle VM Server Repository file systems are filling up. There is a metric within the Oracle VM Server Pool target: Oracle VM Server File system % Used. This example Monitoring Template generates a warning at 70% full and critical at 80%. Monitoring templates are available via Enterprise > Monitoring > Monitoring Templates.
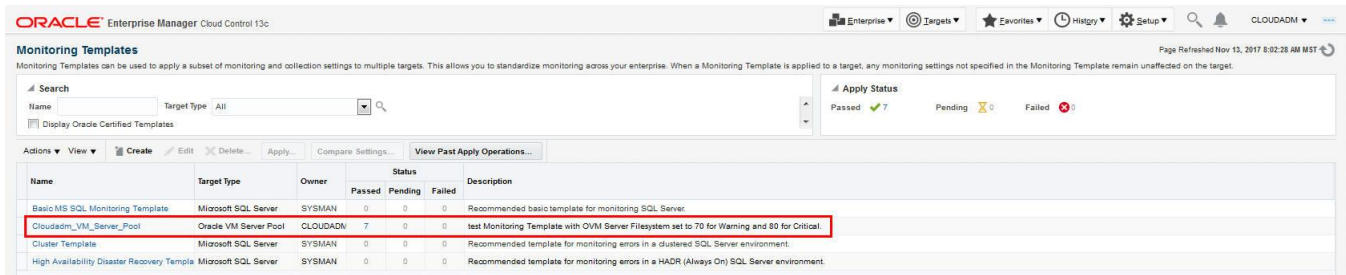
Figure 45: Monitoring templates

The template shown in Figure 45 ringed with the red oblong is one I created to satisfy the use case described earlier. Any user can create templates as long as they have the correct privileges for the managed targets. If we highlight my template and then click on Edit this enables us to edit this template.
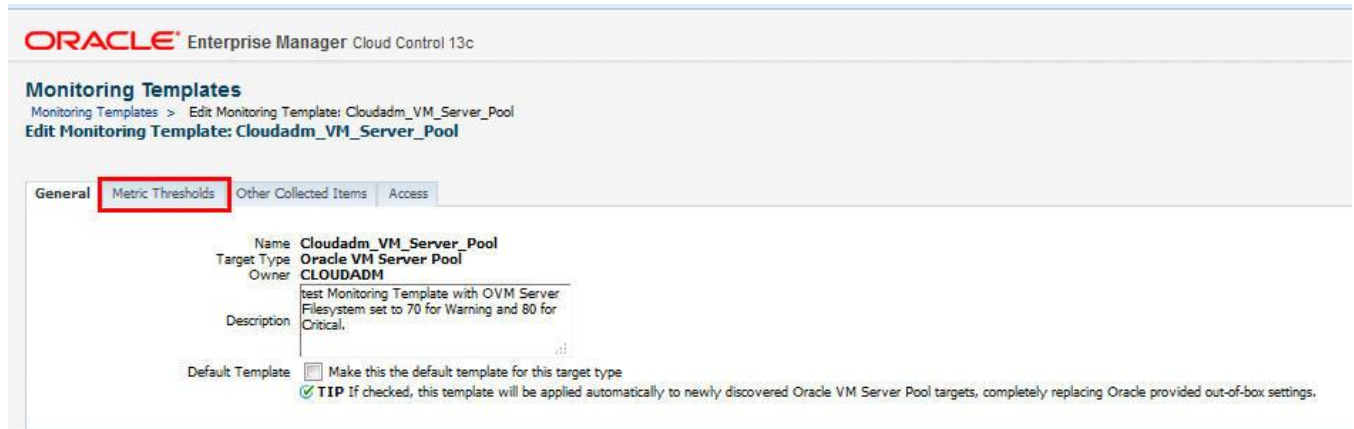
Figure 46: Edit a Monitoring template

If we then click on Metric Thresholds we can see and edit any thresholds within the target.
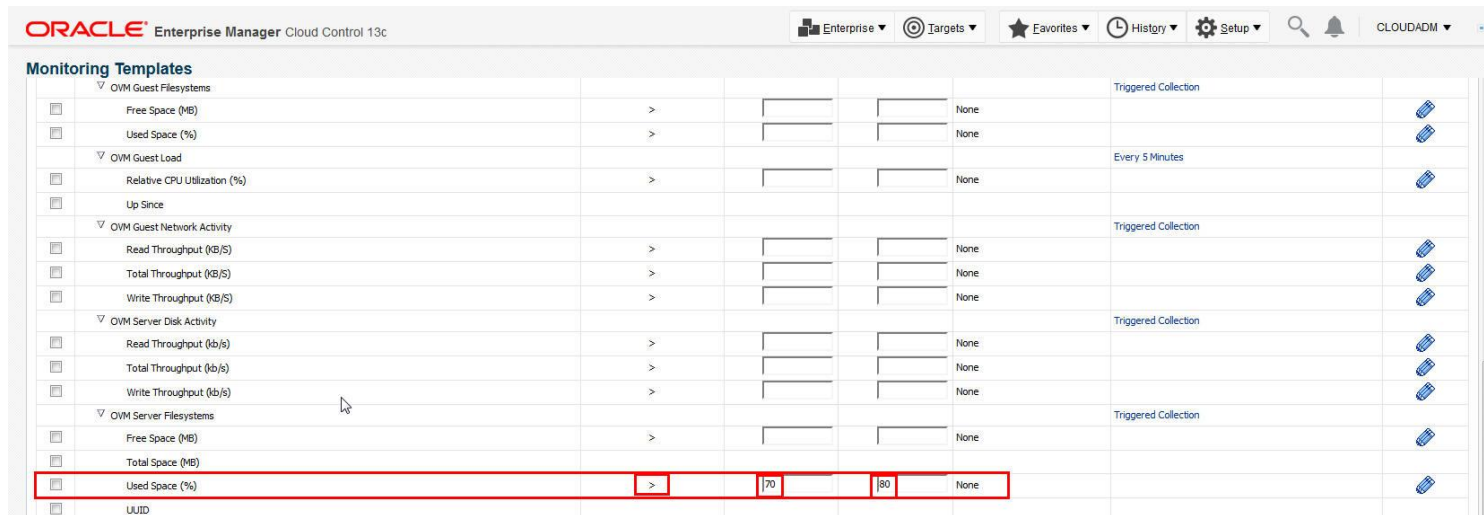
Figure 47: Edit a Monitoring template metric

We can see the Used Space (%) metric with an operand of Greater than (>), 70 for Warning and 80% for Critical. If we return to the main Monitoring template page, we can highlight this template and apply it to our Oracle VM Manager System. There are options with respect to applying the metrics to the target. The default is only override metrics that are common to both the target and template. For more options on the options, refer to the documentation.

Figure 48: Apply a Monitoring template

We click the Add button, which brings up a selection panel where we can choose the target type of System.

Figure 49: Apply a Monitoring template to a Generic System target

Click Finish to complete the application and after a few moments, the number in the Passed field will increase by the new number of targets that have the monitoring template applied.

Name	Target Type	Owner	Status			Description
			Passed	Pending	Failed	
Basic MS SQL Monitoring Template	Microsoft SQL Server	SYSMAN	0	0	0	Recommended basic template for monitoring SQL Server.
Cloudadm_VM_Server_Pool	Oracle VM Server Pool	CLOUDADM	9	0	0	test Monitoring Template with OVM Server Filesystem set to 70 for Warning and 80 for Critical.
Cluster Template	Microsoft SQL Server	SYSMAN	0	0	0	Recommended template for monitoring errors in a clustered SQL Server environment.
High Availability Disaster Recovery Template	Microsoft SQL Server	SYSMAN	0	0	0	Recommended template for monitoring errors in a HADR (Always On) SQL Server environment.

Figure 50: Apply a Monitoring template Passed number

If we click on this number (in our example 9) this takes us to a list of applications of the monitoring template by date and number of targets the template was applied to. If we click on these new targets, we are shown the new apply operations by target.

Passed Apply Operation for Cloudadm_VM_Server_Pool(Oracle VM Server Pool)

Target Name	Agent	Metrics With Key Value Settings	Replace Metrics	Applied On	Applied By	Message
____A	https://____oracle.com...	Retain extra keys in target	No	Nov 13, 2017 9:01:06 A...	CLOUDADM	
__l2	https://c____oracle.com...	Retain extra keys in target	No	Nov 13, 2017 9:01:06 A...	CLOUDADM	

Figure 51: Apply a Monitoring template apply operations

Incident rules

For full information on the Oracle Enterprise Manager Incident management framework, review this document. You can take action on events or incidents. An example of an event could be a metric within a target exceeding a set threshold. An incident is useful as it can address complex situations where multiple events are related and may indicate higher-level issues.

To access the Incident Rules framework from the Oracle Enterprise Manager UI, navigate to Setup > Incidents > Incident Rules. There are some system-defined rules, which have a padlock beside them indicating they cannot be changed.

Figure 52: Incident Rules

The following actions are available from an Incident Rule:

- Send an email (the email server must be enabled within Oracle Enterprise Manager and email addressed defined for Administrators)

- Page someone

- Send an SNMP V1 or V3 trap (these SNMP targets need to be configured within Oracle Enterprise Manager)

- Run an OS command

- Run a PL/SQL procedure

- Create an incident

- Send the information to an external connector (these connectors must be available and configured within Oracle Enterprise Manager)

The following example Incident Rule is to capture when an Oracle Enterprise Manager Agent is down. The rule sends the Cloud Administrator an email when the Agent goes down and when it comes back up.

The rule is based upon a single Agent; however, it could be based upon a group of Agents.

Figure 53: Edit an Incident Rule

Figure 53 shows the events I am interested in. These could be set to all events; however, I have set to up, down, unreachable and unreachable end. I can also set corrective actions here as part of the rule.

Figure 54: Select Events

In the Add Conditional Actions page, we can select the ideal conditions. We can also have many options such as Create an Incident, Send SNMP, Submit a corrective action or forward to an event connector.

Figure 55: Add Conditional Actions - Top

Figure 56: Add Conditional Actions – Bottom

The next Incident Rule is involved when a metric threshold is exceeded for both a warning and critical state. This metric is the % used figure for the Oracle VM Server repo file system. This rule is used in conjunction with the Monitoring Template example described earlier. The rule will create an Incident within the Incident Manager of any System this target is associated with. By default all Critical Warnings are displayed, however I feel a Warning that my file system is becoming full is worthy of an incident being generated.

Figure 57 shows the rule set where we are monitoring all targets of type Oracle VM Server Pool where this metric is captured.

Figure 57: Edit an Incident Rule

Figure 58 shows where we are interested in a specific metric event and the severity, which is both Warning and Critical.
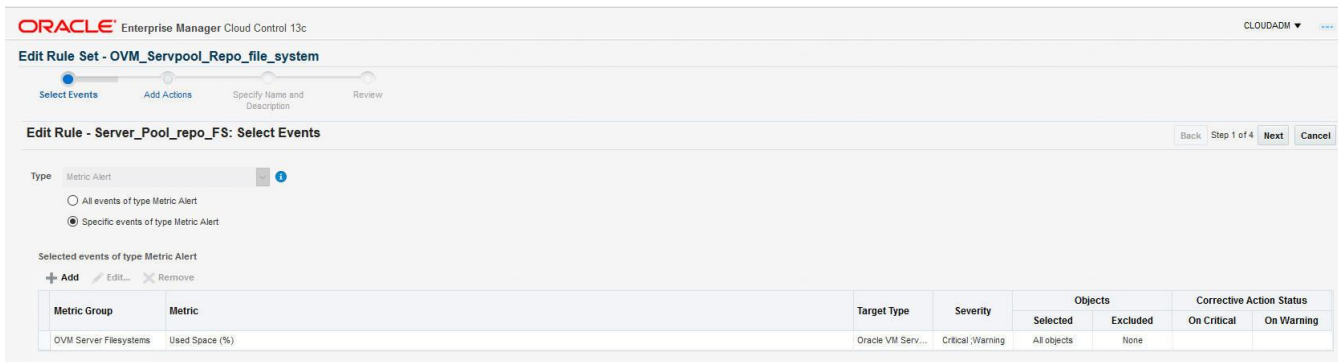
Figure 58: Select Events

Figure 59 shows that we create a new incident. There are also options to compress events into a single incident. We recommend you review the documentation and your end use cases for further configuration.
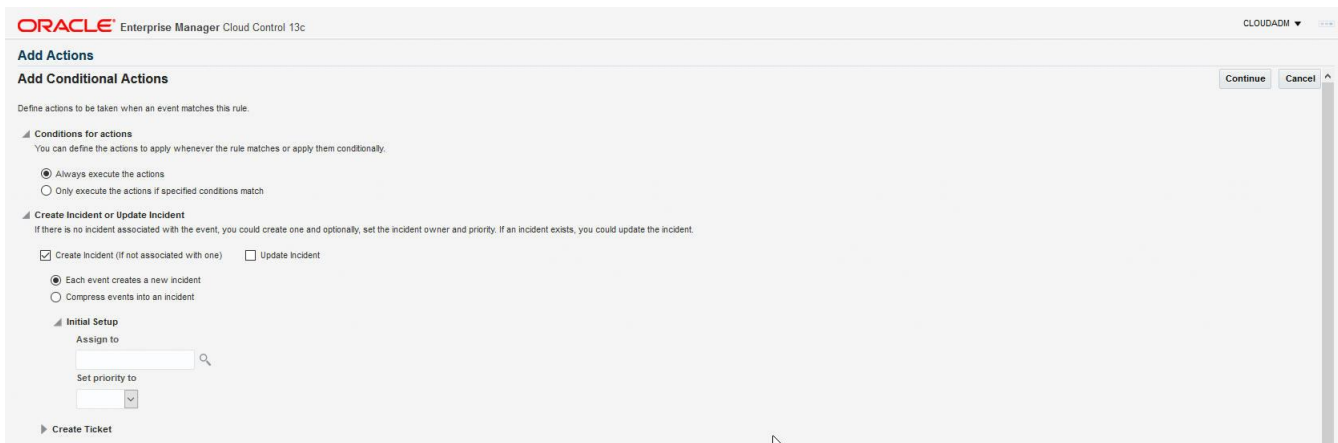

Figure 59: Add Conditional Actions

Corrective Actions

Corrective Actions enable you to specify automated responses to metric alerts. You define corrective actions for individual metrics for monitored targets. Further information is found in the documentation.

 To access the Corrective Actions framework from the Oracle Enterprise Manager UI, navigate to Enterprise > Monitoring > Corrective Actions.
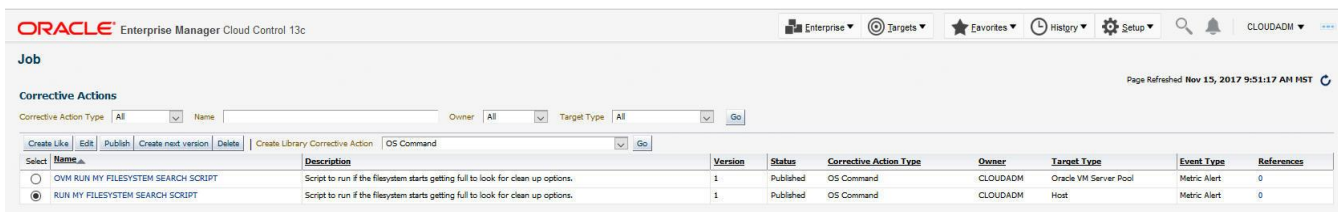
Figure 60: Corrective Actions

Here I have created two Corrective Actions, which run simple scripts with respect to clean up if file systems are becoming full. There are two separate actions, which are available to both the Host and Oracle VM Server Pool targets. Corrective Actions can also be applied at the target level; for example, the Oracle VM Server Pool target where I run my clean up script if my metric threshold reaches critical on % used space.

Firstly, I need to access the Oracle VM Server Pool target Monitoring page where my Monitoring Template is set. From the Oracle Enterprise Manager UI, go to Targets > All Targets and on the left hand page select the Oracle VM Server Pool you are interested in.

From the Oracle VM Server Pool page menu click on Monitoring > Metric and Collection Settings. Figure 61 shows the Used Space (%) metric. We click on the pencils icon on the right hand side.
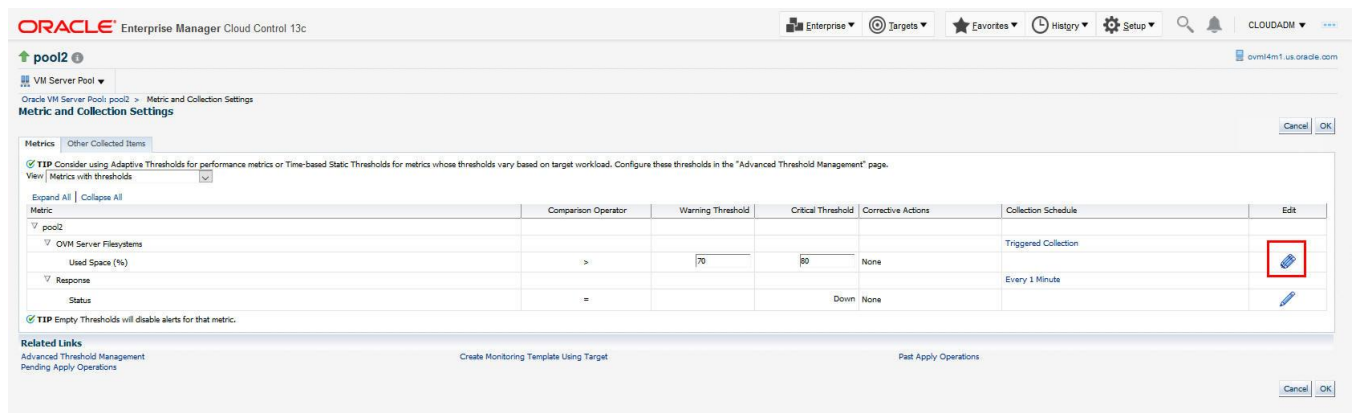
Figure 61: Oracle VM Server Pool Metric and Collections Settings

Figure 62 shows us the Monitored Objects section where we need to click on Edit.
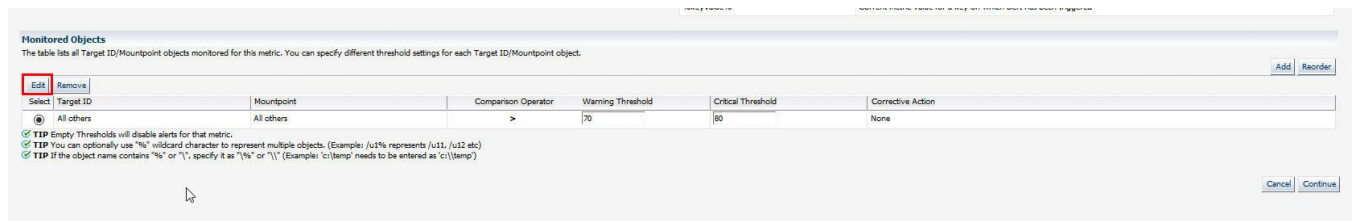
Figure 62: Oracle VM Server Pool Monitored Objects

Figure 63 shows where we can click to add a Corrective Action for Warning or Critical thresholds being reached.

Figure 63: Add a Corrective Action for Warning or Critical

Figure 64 shows where can select a Corrective Action along with the Credentials to run the script by; when set click continue to finish. With the Corrective Action in this example, a script will be triggered when the Warning metric threshold exceeds the set limit.
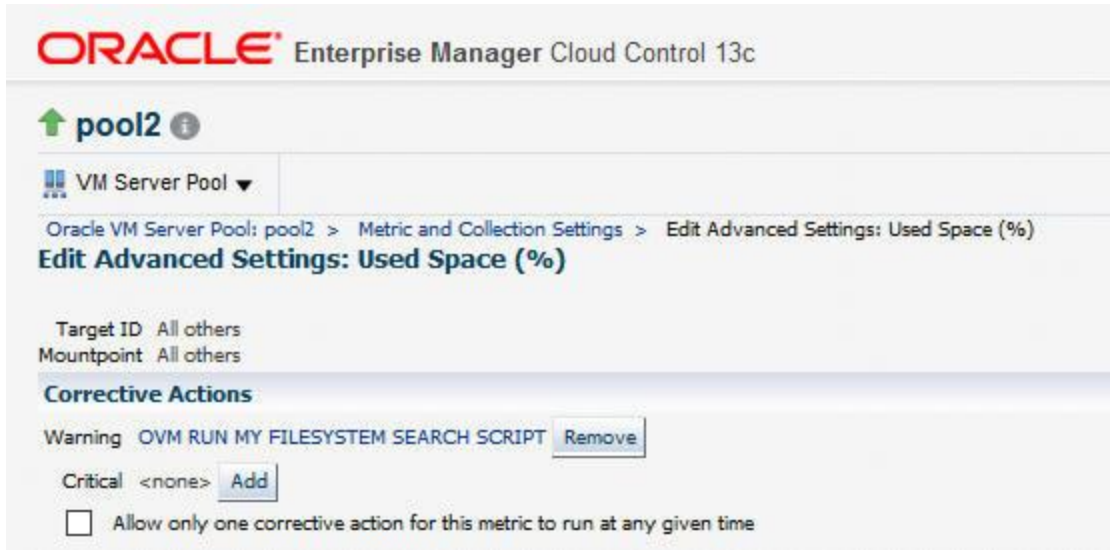
Figure 64: Select a Corrective Action for Warning

Conclusion

This paper describes how to monitor an Oracle VM Manager host as a system including all the key components such as the Oracle Linux host, Database and Application Services. It is possible to monitor groups of Oracle VM Managers using this System approach.

In summary this papers described the following:

- Installed and configured an Oracle Enterprise Manager Agent on the Oracle VM Manager host

- Installed the latest Virtualization (VT) and MySQL plug-in on the Oracle Enterprise Manager Server and Oracle Enterprise Manager Agent on the Oracle VM Manager host

- Registered the Oracle VM Manager with the Oracle Enterprise Manager Infrastructure Cloud Portal

- Created a monitoring user for the Oracle VM Manager MySQL repository database

- Discovered the Oracle VM Manager MySQL repository database as a target within Oracle Enterprise Manager

- Discovered the Oracle VM Manager Weblogic Domain and Server

- Created an Oracle VM Manager System within Oracle Enterprise Manager

- Configured the Oracle VM Manager System with custom monitoring charts, monitoring templates, incident rules and corrective actions

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Integrated Cloud Applications & Platform Services

How to Monitor Oracle VM Manager with Oracle Enterprise Manager 13c

Author: Simon Hayler

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