



An Oracle White Paper
October 2011

Oracle VM 3: Quick Start Guide

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Introduction

This quick start guide provides a conceptual look at designing and implementing an Oracle VM environment using Oracle VM 3. The guide is designed to give the reader a conceptual overview of all of the activities needed to get a Oracle VM guest up and running by stepping through a simplified implementation of a three node cluster using the four major phases shown below in figure 1.

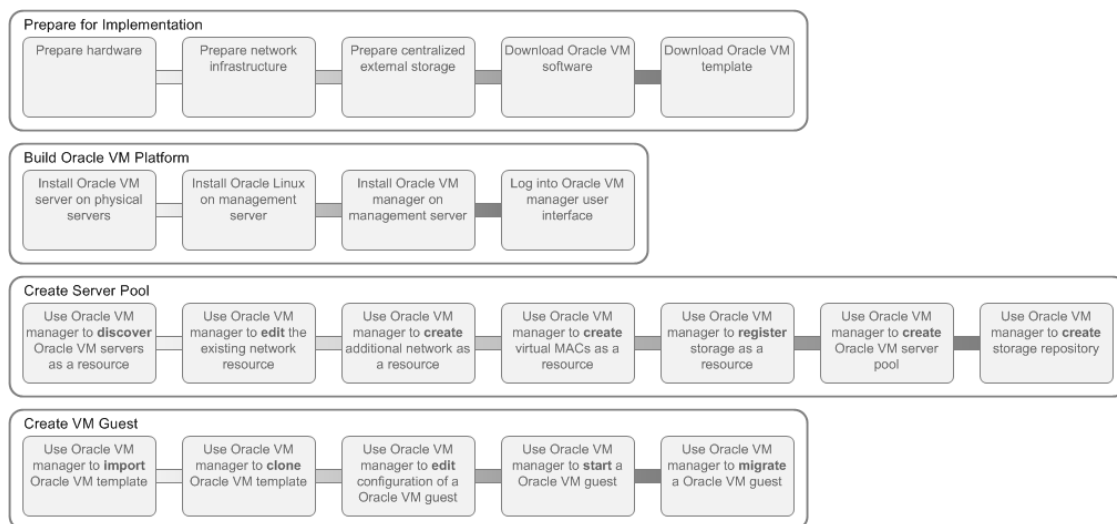


Figure 1: The implementation process flow is broken into four major phases

This document touches briefly on many important and complex concepts and does not provide a detailed explanation of any one topic since the intent is to present the material in the most expedient manner. The goal is simply to help the reader become familiar enough with the product to successfully design and implement an Oracle VM environment. To that end, it is important to note that the activities of design, unit testing and integration testing which are crucial to a successful implementation have been intentionally left out of the guide.

Prepare for Implementation

The first phase focuses on what you need to get started, including basic hardware, operating system and application downloads, storage and networking.

Important Note to Oracle VM 2.x Users

Oracle VM 3 and Oracle VM 2.x are similar from deployment perspective. Multiple Oracle VM Servers are grouped into server pools. Each server pool can have up to 32 physical servers, and every server in a given pool has access to shared storage which can be NFS, Fibre Channel or iSCSI (or a any combination of these). This allows VMs associated with the pool to start and run on any physical server within the pool. However, Oracle VM 3 is different from Oracle VM 2.x in the following respects:

- Oracle VM Server 3 requires 64-bit x86 hardware, but can support either 64-bit or 32-bit guest virtual machines.
- The Oracle VM Manager 3 runs on 64-bit Oracle Linux 5.5 OS or later. The Oracle VM Manager 3 also requires a separate server outside of the server pool. This can be either a physical server or installed as a guest VM of Oracle VM server.
- Oracle VM Manager controls the virtualization environment, creating and monitoring Oracle VM servers and the virtual machines. Oracle VM Manager 3 serves as the only administrative interface to the Oracle VM servers, unlike Oracle VM 2.x that were jointly administered from the management server, as well as locally from the command-line for each Oracle VM Server.
- Oracle VM 3 storage repository is not compatible in any way with the storage repository used by Oracle VM 2.x. The Oracle VM 2.x storage repository cannot be directly used by Oracle VM 3. But the existing VM images can be imported into Oracle VM 3 environment.

To learn more about Oracle VM 3, please refer to the white paper [Oracle VM 3: Architecture and Technical Overview](#).

Important Note for All Readers

Please note that the object names, locations and configuration examples are simply used to convey concepts and are not meant to be taken literally. The repository names, VNIC numbers, host names, network names, number of networks configured and assignment of network uses are simply examples and should not be construed as the way your particular environment should be configured.

What You Need to Get Started

This tutorial includes three physical servers running Oracle VM Server 3, one separate physical server for Oracle VM Manager 3 and a single external storage unit. Your actual configuration may have as few as one physical server or the maximum of thirty-two physical servers, but you will still need a separate physical server or Oracle VM guest running on a separate physical for Oracle VM Manager and centralized external storage that can be accessed by all physical servers in the server pool.

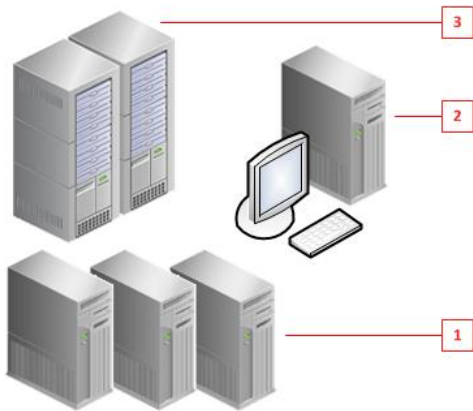


Figure 2: This tutorial includes three physical servers for the server pool, one physical server for the Oracle VM Manager and a storage array

TABLE 1: REQUIRED HARDWARE

1	The figure above shows three 64-bit x86 physical servers running Oracle VM Server 3.0 and will be used to create the server pool to host your Oracle VM guest images. Oracle VM Server 3.0 is optimized to run as efficiently as possible and consumes less than 4-gigabytes of disk space and as little as 2-gigabytes of RAM (minimum of 4-gigabytes recommended).
2	The figure above shows a separate 64-bit x86 physical server running Oracle VM Manager 3.0.
3	The figure above shows a storage array serving disk space using Network File System (NFS), SCSI over Ethernet (iSCSI) or SCSI over Fibre Channel (FCP/SAN)

Prepare Hardware



A successful implementation begins by ensuring all servers are configured exactly the same. This means PCI cards should occupy the same slots in all servers, network cables from each subnet should be connected to the same ports on the servers and the firmware revisions should be exactly the same on each physical server.

Also ensure that console access works flawlessly through the service processor on each physical server.

Prepare Network Infrastructure



You will need to assign several IP addresses depending on your implementation. In this tutorial, we will use a single front end public network. The following table shows the IP assignments used for our tutorial:

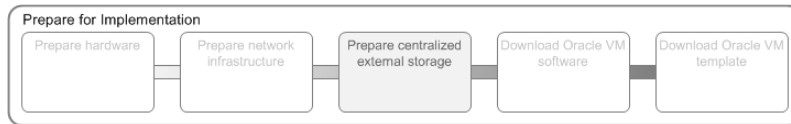
HOSTNAMES FOR SCENARIO

HOSTNAME	PURPOSE	NETWORK
MyManager	Physical server or VM guest running Oracle Linux 5.6 or later where Oracle VM Manager will be installed.	Management subnet (eth0)
MyServerPool	“Virtual IP” for the HA feature of the server pool. This is a re-locatable IP that Oracle VM Manager automatically moves to whichever Oracle VM Server it chooses to be the server pool master.	Management subnet (eth0)
MyServer1m	Oracle VM Server 3 will be installed using the IP assigned to this hostname.	Management subnet (eth0)
MyServer2m	Oracle VM Server 3 will be installed using the IP assigned to this hostname.	Management subnet (eth0)
MyServer3m	Oracle VM Server 3 will be installed using the IP assigned to this hostname.	Management subnet (eth0)
MyServer1p	Hostname/IP that will be assigned to a second network device on a public subnet to allow users to connect to Oracle VM guests and handle NFS traffic	Public subnet (eth1)
MyServer2p	Hostname/IP that will be assigned to a second network device on a public subnet to allow users to connect to Oracle VM guests and handle NFS traffic	Public subnet (eth1)
MyServer3p	Hostname/IP that will be assigned to a second network device on a public subnet to allow users to connect to Oracle VM guests and handle NFS traffic	Public subnet (eth1)
MyGuest1	Hostname/IP for the single Oracle VM guest that will be created as part of this tutorial	Public subnet (eth1)

Table 2: Table showing hostnames used in this tutorial

Oracle VM Manager 3 supports multiple subnets on different physical interfaces/VLANs; typical implementations will include separate VLANs for “public”, “storage” and “private/management” subnets. We will use a single subnet for this particular tutorial to keep things simple.

Prepare Centralized External Storage



You will need to create and present (or export) two directories (NFS) or disks (iSCSI or FCP) separately:

- Server pool file system. One disk will need to be 12-gigabyte in size. It's used as a shared OCFS2 pool file system for the cluster heartbeat function, configuration and other clustering information.
- Storage repository. One disk will need to be much larger in size than the pool file system. This disk/file system is used for the storage repository that contains all Oracle VM guest images as well as all storage related resources for the server pool. A 72-gigabyte disk/file system is used for this tutorial.

To learn more about sizing considerations for storage on Oracle VM 3, please refer to the white paper [Oracle VM 3: Server Pool Deployment Planning Considerations for Scalability and Availability](#)

Download Oracle VM Software



Download the Oracle VM 3 product from the [Oracle Software Delivery Cloud](#). There are three parts to the download:

- Oracle VM Server 3 ISO image. Oracle VM Server for x86 installs directly on server hardware with x86 Intel or AMD processors and does not require a host operating system. An Oracle VM Server is comprised of a hypervisor and privileged domain (Dom0) that allows multiple domains or virtual machines (i.e. Linux, Solaris, Windows, etc.) to run on one physical machine. The Dom0 runs a process called Oracle VM Agent. The Oracle VM Agent receives and processes management requests, provides event notifications and configuration data to the Oracle VM Manager. Oracle VM Server 3 requires 64-bit x86 hardware, but can support either 64-bit or 32-bit guest virtual machines.
- Oracle VM Manager 3 installer ISO image. Oracle VM Manager 3 is an Oracle Fusion Middleware application, based on the Oracle WebLogic Server application server and Oracle Database. The Oracle VM Manager runs on 64-bit Oracle Linux 5.5 OS or later. For its management repository, Oracle VM Manager uses an Oracle Database, which can be installed either on the same management server or a separate server. Oracle Database 11g Express Edition (XE) is bundled with Oracle VM Manager 3 for customer evaluation purposes, but Oracle Database Standard Edition (SE) or Enterprise Edition (EE) is required for production support as the management repository. All necessary licenses, including licenses for WebLogic Server and Database (SE or EE), are included at no additional charge.

- Oracle Linux 5, update 6 ISO image. This is needed for the physical server where Oracle VM Manager 3.0 will be installed. Although the process is not covered in this document, the Oracle VM Manager 3.0 can be installed onto a VM guest running Oracle Linux 5, update 6 somewhere on the network, but must be independent of your Oracle VM 3 servers. This tutorial assumes the Oracle Linux 5, update 6 will be installed on a physical server.

Download Oracle VM Template



Download an Oracle VM template that will be used in the final steps to create an Oracle VM guest. This guide assumes that the Oracle Linux 5, update 6 template for paravirtualized guests as the download candidate.

Templates are downloaded from the [Oracle Software Delivery Cloud](#) as shown in Figure 3 below:

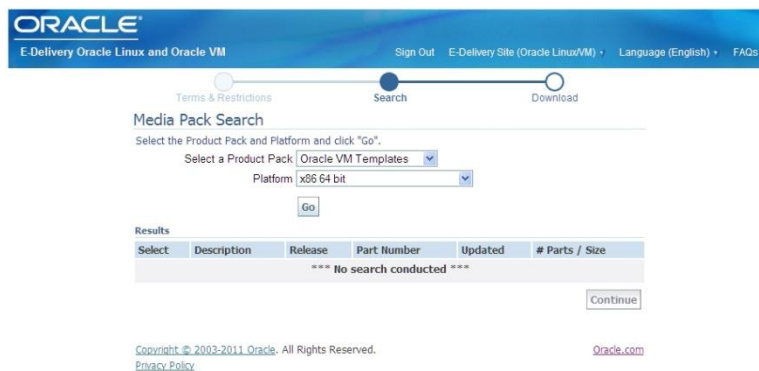


Figure 3: Initial screen after user agreement showing search criteria

The next screen shows the media pack to select. The media pack contains the actual zip file images that can be downloaded.

ORACLE
E-Delivery Oracle Linux and Oracle VM

Sign Out E-Delivery Site (Oracle Linux/VM) Language (English) FAQs

Terms & Restrictions Search Download

Media Pack Search

Select the Product Pack and Platform and click "Go".

Select a Product Pack **Oracle VM Templates**

Platform **x86 64 bit**

Go

Results

Select	Description	Release	Part Number	Updated	# Parts / Size
<input type="radio"/>	Oracle VM Templates for Oracle E-Business Suite Release 12.1.3 Vision Media Pack for x86_64 (64 bit)	12.1.3.0.0	B63152-01	APR-11-2011	11 / 38G
<input type="radio"/>	Oracle VM Templates for JD Edwards EnterpriseOne 9.0 Update 2 and Tools 8.98.4.1 Media Pack for x86_64 (64 bit)	3.0.0.0.0	B62414-02	APR-06-2011	14 / 17G
<input type="radio"/>	Oracle VM Templates for Oracle Database Media Pack for x86_64 (64 bit)	2.2.0.0.0	B51906-02	FEB-17-2009	2 / 4.9G
<input checked="" type="radio"/>	Oracle VM Templates for Oracle Enterprise Linux 5 Media Pack for x86_64 (64 bit)	2.2.0.0.0	B52026-07	MAY-11-2011	6 / 4.8G
<input type="radio"/>	Oracle VM Templates for Oracle Linux 4 Media Pack for x86_64 (64 bit)	2.2.0.0.0	B52054-06	APR-22-2011	5 / 4.4G
<input type="radio"/>	Oracle VM Templates for JD Edwards EnterpriseOne 9.0 Update 1 with PFLIC	2.0.0.0.0	B59862-02	SEP-02-2010	14 / 14G

Figure 4: Showing Oracle VM template media pack to select

The next screen in Figure 5 shows the template that should be downloaded:

ORACLE
E-Delivery Oracle Linux and Oracle VM

Sign Out E-Delivery Site (Oracle Linux/VM) Language (English) FAQs

Terms & Restrictions Search Download

Oracle VM Templates for Oracle Enterprise Linux 5 Media Pack for x86_64 (64 bit)

Search Again

TIP View the Readme file(s) to help decide which files you need to download.

Print this page with the list of downloadable files. It contains a list of the part numbers and their corresponding description that you may need to reference during the installation process.

Oracle VM Templates for Oracle Enterprise Linux 5 Media Pack v7 for x86_64 (64 bit)

Readme View Digest

Select	Name	Part Number	Size (Bytes)
<input type="button" value="Download"/>	Oracle Linux 5 Update 2 template - PV Large x86_64 (64 bit)	V15489-01	1.1G
<input type="button" value="Download"/>	Oracle Linux 5 Update 2 template - PV Small x86_64 (64 bit)	V15490-01	931M
<input type="button" value="Download"/>	Oracle Linux 5 Update 3 template - PV Small x86_64 (64 bit)	V16223-01	675M
<input type="button" value="Download"/>	Oracle Linux 5 Update 4 template - PV Small x86_64 (64 bit)	V18922-01	753M
<input type="button" value="Download"/>	Oracle Linux 5 Update 5 template - PV x86_64 (64 bit)	V21107-01	662M
<input type="button" value="Download"/>	Oracle Linux 5 Update 6 template - PV x86_64 (64 bit)	V26302-01	744M

Figure 5: Showing Oracle Linux 5, update 6 template to select

Perform the following tasks once the download has completed:

- Copy or move the downloaded zip file to an internal web server that will be accessible from the Oracle VM Manager that will eventually be installed as part of this tutorial. The web server will be used by Oracle VM Manager to **import** the template in later steps.
- Unzip the file

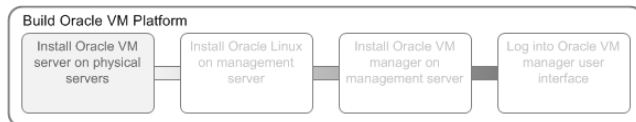
Next Steps

The preparation phase should be completed once all of the above tasks have been accomplished. We will now move on to the next major phase of building the platform for our Oracle VM environment.

Build Oracle VM Platform

Oracle VM 3 has been redesigned from the ground up to manage the configuration of network, storage and operating system entirely from the Oracle VM Manager user interface. The amount of pre-configuration work on the Oracle VM Servers should be non-existent once Oracle VM Server is installed as-is with no modifications.

Install Oracle VM Server on Physical Servers



IMPORTANT NOTE: Oracle VM 3 servers are completely configured and managed by the Oracle VM Manager 3. There are **no** steps that are performed manually on the Oracle VM Servers and there is no reason to log into or perform any work on the Oracle VM Servers to prepare them for use.

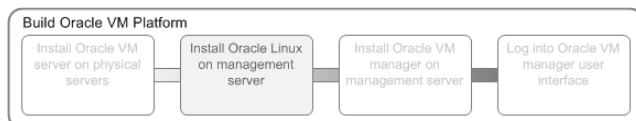
You may choose to install from the ISO image downloaded from the Oracle Software Delivery Cloud or use the ISO to create a Kickstart repository (Kickstart is not covered or used at all in this tutorial). The Oracle VM Installation and Upgrade Guide explains in detail how to install Oracle VM Server and can be found on the [Oracle VM Documentation](#).

You will need the following information during the install:

- Password for root
- Password for Oracle VM Agent. This password will be used from the Oracle VM Manager in later steps and allows Oracle VM Manager to **discover servers**.
- Network configuration information for the primary network. You can use DHCP or static IP addresses. If you use a statically assigned IP address you will need the usual information such as hostname, gateway and netmask.
- Note that any additional networks on the Oracle VM Servers are configured through the Oracle VM Manager in later steps.

There is nothing else to configure on the Oracle VM Servers once the install has completed, with the system up and running. We will now install and configure Oracle VM Manager.

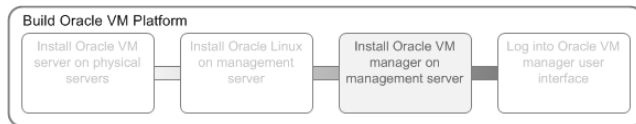
Install Oracle Linux on Management Server



Install Oracle Linux on a physical, bare metal server as described earlier.

Oracle Linux is needed for the physical server where Oracle VM Manager 3.0 will be installed. Although the process is not covered in this document, the Oracle VM Manager 3.0 can be installed onto a VM guest running Oracle Linux 5, update 6 somewhere on the network, but must be independent of your Oracle VM 3 servers. This tutorial assumes the Oracle Linux 5, update 6 will be installed on physical, bare metal server.

Install Oracle VM Manager on Management Server



Oracle VM Manager will handle configuring resources on the Oracle VM Servers including adding the storage created during the steps in the last section, additional networks, etc. To install Oracle VM Manager, create and mount an 8-gigabyte file system named /u01 on the physical server that Oracle Linux 5, update 6 was installed. Then copy the Oracle VM installer ISO that was downloaded earlier to /tmp and mount it to /mnt.

```
# mount -o ro,loop /tmp/MyOracleVMinstaller.iso /mnt
# cd /mnt
# ./createOracle.sh
```

Start the installer as root from /mnt once the createOracle.sh has completed. The example below shows a simple installation which installs Oracle Database XE, Oracle WebLogic Server, Oracle Application Development Framework (ADF), Java, and Oracle VM Manager on the local management server. Use this installation option for testing and non-production environment. For production deployment, please refer to [Oracle VM Installation and Upgrade Guide](#) to choose the option of Standard Install or Standard Install with a remote database.

```
# cd /mnt
# ./runInstaller.sh

Oracle VM Manager Release 3.0.1 Installer

Oracle VM Manager Installer log file:
/tmp/ovmm-installer.selfextract_ZD2420/install-2011-08-01-132546.log

Please select an installation type:
1: Simple
2: Standard
3: Uninstall
4: Help

Select Number (1-4): 1
```

The installer will ensure prerequisites are met before continuing and then prompt for a password that will be the default password used for all products being installed as well as the log in password for the Oracle VM Manager user interface after the installer has completed.

```

Verifying installation prerequisites ...
*** WARNING: Recommended memory for the Oracle VM Manager server installation is 3950 MB RAM

One password is used for all users created and used during the installation.
Enter a password for all logins used during the installation:
Enter a password for all logins used during the installation (confirm):

```

The installer will prompt the user to continue after it has verified the passwords and space requirements.

```

Verifying configuration ...
Start installing the configured components:
  1: Continue
  2: Abort
Select Number (1-2): 1

```

The actual install process will begin by displaying something like the following over the next few minutes. The entire install process takes about 20 to 30 minutes.

```

Retrieving Oracle Database 11g XE ...
Installing Oracle Database 11g XE ...
Configuring Oracle Database 11g XE ...
Installing Java ...
Creating database schema 'ovs' ...
Retrieving Oracle WebLogic Server 11g ...
Installing Oracle WebLogic Server 11g ...
...
Installing Oracle VM Manager Shell & API ...
Copying Oracle VM Manager shell to '/usr/bin/ovm_shell.sh' ...
Installing ovm_admin in '/u01/app/oracle/ovm-manager-3/bin' ...
Enabling Oracle VM Manager service ...
Oracle VM Manager installed.

```

The following information will be displayed after the Oracle VM Manager installer has completed. The post-install message contains important information about the Oracle VM Manager and should be saved to a text file for future reference:

```

Installation Summary
-----
Database configuration:
  Database host name       : localhost
  Database instance name (SID) : XE
  Database listener port   : 1521
  Application Express port  : 8080
  Oracle VM Manager schema : ovs

```

```

WebLogic Server configuration:
Administration username      : WebLogic

Oracle VM Manager configuration:
Username                     : admin
Core management port        : 54321
UUID                         : 0004fb00650100002f72ae7c96ce1dc6

Passwords:
There are no default passwords for any users. The passwords to use for Oracle VM Manager, Oracle Database 11g XE, and Oracle
WebLogic Server have been set by you during this installation. In the case of a default install, all passwords are the same.

Oracle VM Manager UI:
http://MyManager:7001/ovm/console
https://MyManager :7002/ovm/console
Log in with the user 'admin', and the password you set during the installation.

Please note that you need to install tight-vnc on this computer to access a virtual machine's console.

For more information about Oracle Virtualization, please visit:
http://www.oracle.com/virtualization/

Oracle VM Manager installation complete.

```

Figure 6: Important post-installation information displayed by the Oracle VM Manager installer. Keep a copy of the information handy.

The final task needed to complete the installation is to install a VNC client. This will allow you to use Oracle VM Manager to launch console sessions on running Oracle VM guests.

```

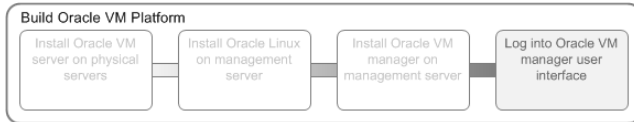
# rpm -ivh http://oss.oracle.com/oraclevm/manager/RPMS/tightvnc-java-1.3.9-3.noarch.rpm
Retrieving http://oss.oracle.com/oraclevm/manager/RPMS/tightvnc-java-1.3.9-3.noarch.rpm
Preparing...      ##### [100%]
 1:tightvnc-java  ##### [100%]

```

Figure 7: Process for installing VNC server

This particular figure shows TightVNC being installed, but the free RealVNC can be substituted and in some cases may have better mouse control. Also, Oracle Linux 6 comes with a variation of TightVNC called TigerVNC and should be used instead of TightVNC if the Oracle VM Manager is installed on Oracle Linux 6.

Log Into Oracle VM Manager



There is nothing else to configure at this point and you should be able to connect to the Oracle VM Manager user interface (UI) with any supported browser as shown in the figure below. The browser URL for the Oracle VM Manager UI is noted in the post-installation information you saved from above and should look something like the following:

```
http://MyManager:7001/ovm/console
```

Log into the Oracle VM Manager UI using “admin” and the password you set when you ran the installer for Oracle VM Manager.

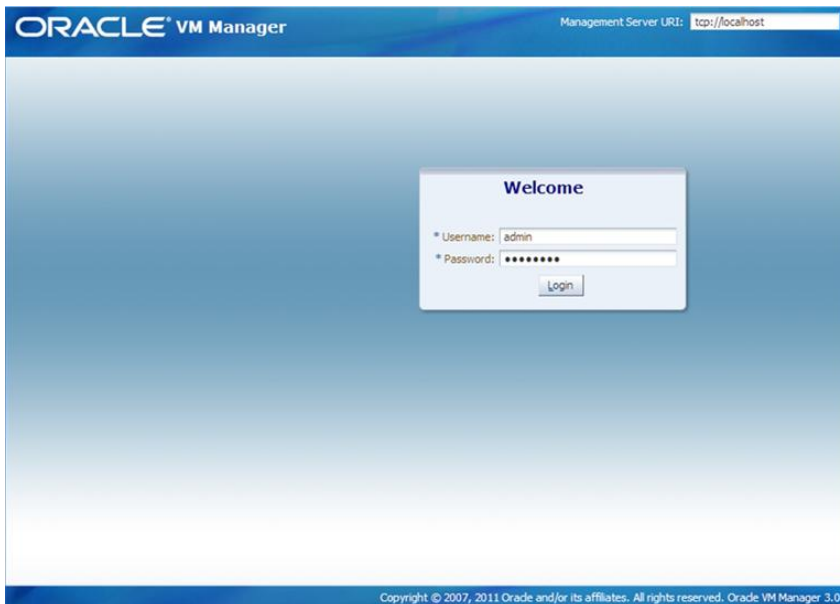


Figure 8: The login screen for Oracle VM Manager user interface

Next Steps

The hardware platform for the Oracle VM environment should now be completed. We will now move on to the next major phase of creating the Oracle VM Server pool.

Create Oracle VM Server Pool

This phase is focused on adding physical servers, networking and storage as resources for Oracle VM Manager to use when creating server pools and Oracle VM guests.

Quick Tour of the User Interface

The “Home” view should be the first screen seen after logging into Oracle VM Manager. Oracle VM Servers, networking and external storage are added as resources on this screen.

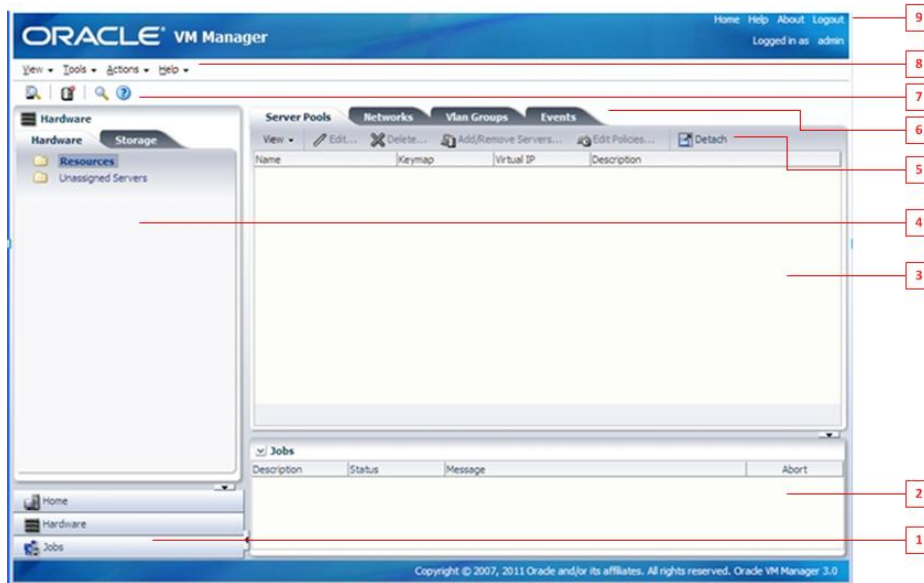


Figure 9: A quick tour of the user interface

A quick tour of the Oracle VM Manager console shows the following components:

TABLE 3: ORACLE VM MANAGER USER INTERFACE COMPONENTS

NUMBER	COMPONENT NAME	DESCRIPTION
1	Navigation views	Shortcuts to change views in the navigation pane directly above
2	Jobs pane	The jobs pane displays messages, status and results of tasks that are initiated by using any of the tools or menus in any of the panes or views. Jobs do not pertain to scheduled tasks and the jobs pane is not context sensitive
3	Management pane	The management pane shows tasks, tools and tabs that are context sensitive to the currently displayed view in the navigation pane
4	Navigation pane	The navigation pane allows the user to drill down through objects in the navigation tree
5	Management pane toolbar	Context sensitive to the currently displayed tab in the management pane
6	Management pane tabs	Subdivides the management pane into groups of similar tasks and information

7	Navigation pane toolbar	The tools are context sensitive to currently displayed view in the navigation pane
8	Navigation pane menu bar	The menus are context sensitive to currently displayed view in the navigation pane
9	Global links	

Discover Oracle VM Servers as Resource



The “Home” view should be the first screen seen after logging into Oracle VM Manager.

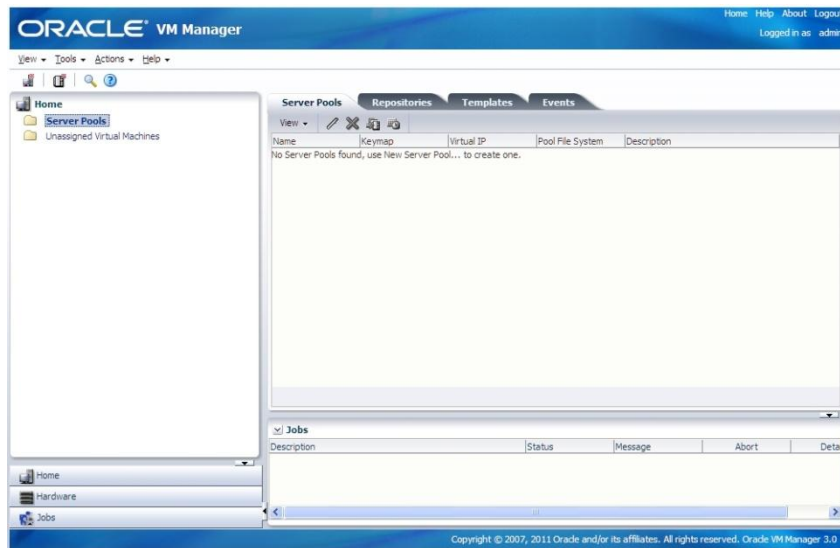


Figure 10: The first screen after logging into the user interface is the “Home” view

Use the “Hardware” shortcut in the views pane to change the view to Hardware. Oracle VM Servers, networking and external storage are added as resources in the hardware view. **Discover** Oracle VM Servers to add them as resources by right clicking on the **Resources** folder in the navigation tree and selecting **Discover Servers** from the menu.

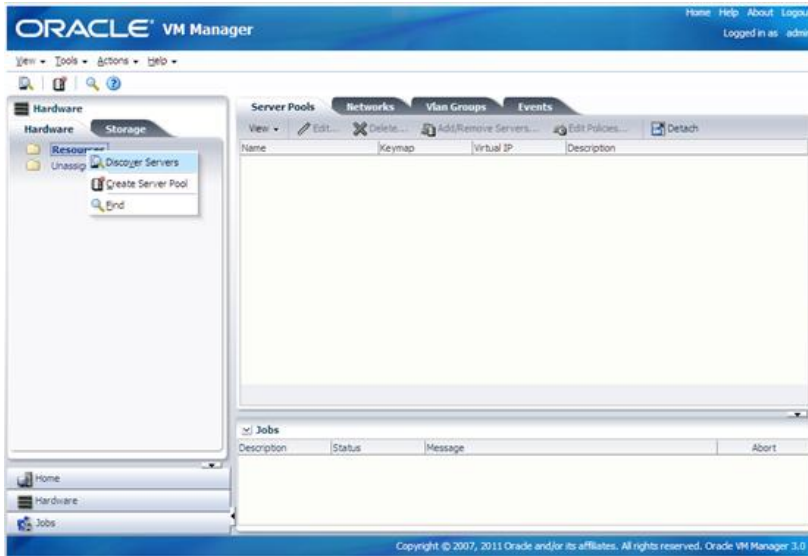


Figure 11: Using the menu to discover Oracle VM Servers

Add your servers as shown in the following figure. You may use a range of IP addresses as shown or add them one at a time.

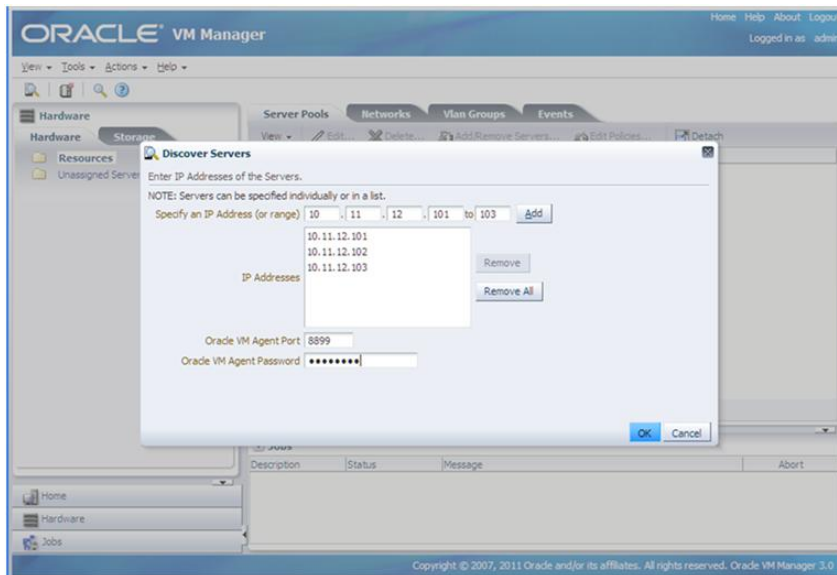


Figure 12: The dialog box for server discovery

The discovery process will add all the servers to the “Unassigned” server resources pool as seen in Figure 13 where the Oracle VM Servers will remain until they are assigned to the server pool created in later steps.

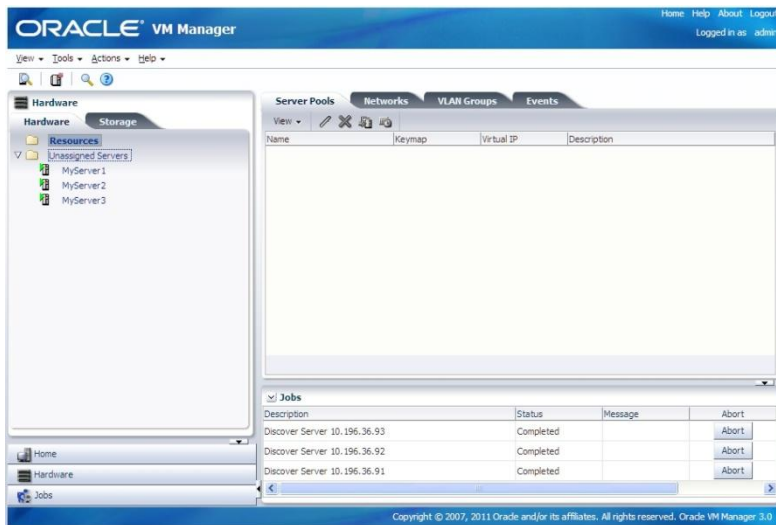


Figure 13: Discovered Oracle VM Servers are “unassigned” until they are added to a server pool

Edit Existing Network



Please note that the object names, locations and configuration examples are simply used to convey concepts and are not meant to be taken literally. The repository names, VNIC numbers, host names, network names, number of networks configured and assignment of network uses are simply examples and should not be construed as the way your particular environment should be configured.

Oracle VM 3 allows finer control over networking. Assigning network roles and subnets to network devices on the Oracle VM Servers is now controlled through the Oracle VM Manager, alleviating the need to log onto the Oracle VM Servers to configure networking by hand.

Most data centers will have multiple subnets with specific roles such as production front end where all users can connect to servers, databases and applications (public network), dedicated storage (storage network), dedicated out-of-band server management (management network), etc.

To keep things relatively simple, yet show some of the new powerful features of Oracle VM 3, this tutorial incorporates two subnets: a **management** subnet used for out-of-band management of the Oracle VM environment and a **public** subnet used for general access to storage and Oracle VM guests (as well as databases & applications).

A single network was discovered by Oracle VM Manager during the discover servers step above. In the case of this tutorial, the existing network that was discovered is the management network. Before moving on to the next step of adding a public network for storage and general access to Oracle VM guests, we will change the name of the existing management network. This is not a required change and is only meant to help reduce confusion of network roles in subsequent steps.

Please adjust the names and roles of subnets in the following steps to conform to your particular network environment. If you only have a single subnet, then just modify the existing network and assign all “uses” to that one subnet, then skip the “create network” step.

Ensure **Resources** is selected in the navigation pane, then select **Networks** from management tab as show in Figure 14 below, then chose the **edit** icon from the management toolbar just below the Networks tab:

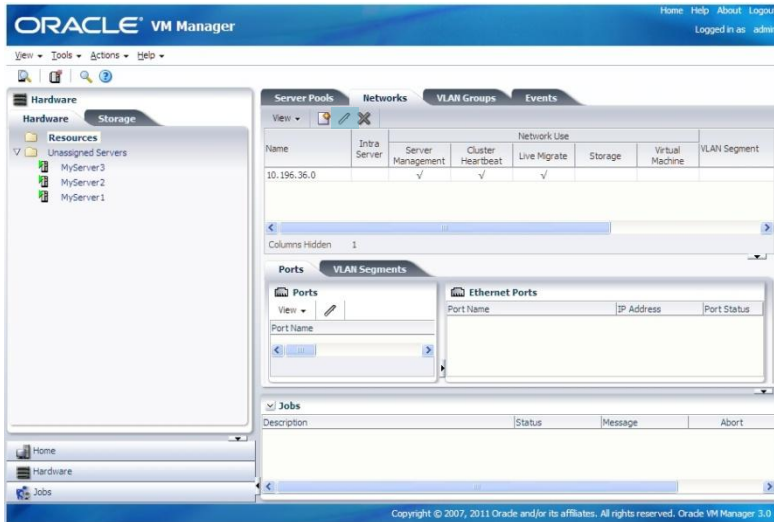


Figure 14: Select network management tab in the Resources view

A dialog box from the Edit Network wizard will allow the network name to be changed from the default subnet address to any string. In this case, the name will be changed to “Management Network” as shown in Figure 15 to allow easy identification in later steps.

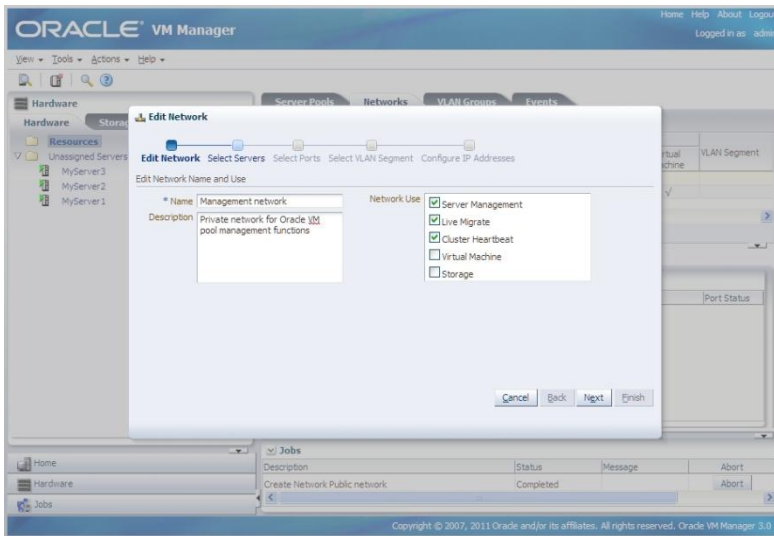


Figure 15: Change the network name to "Management Network"

The wizard will then step through the remaining four tasks – simply accept the default on all subsequent dialog boxes until the **Finish** button becomes active. The result should look like Figure 16 below:

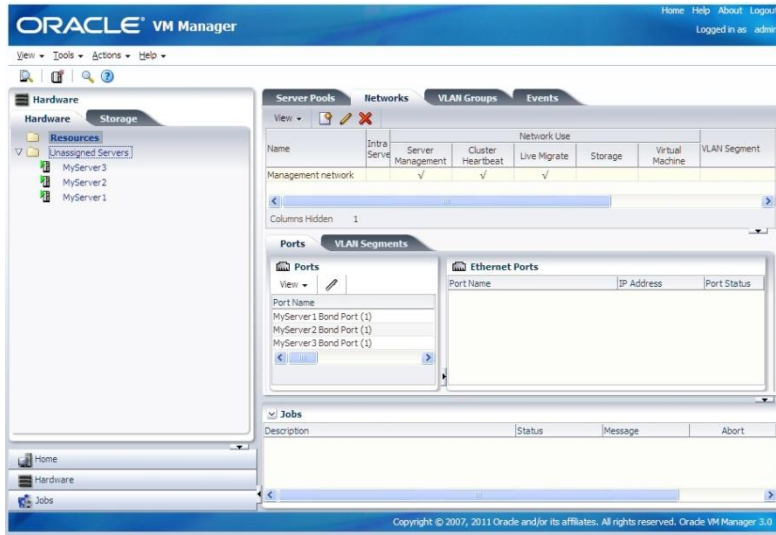


Figure 16: First network renamed to "Management network"

Create Additional Network as Resource



IMPORTANT NOTE: Do not follow this step if you only have a single network connection on your servers. Go back to the previous step and add the network roles for Storage and Virtual Machine to the existing network.

A new **public** network will be created to allow Oracle VM Servers and Oracle VM Manager to access storage as well as databases, applications, etc. running on Oracle VM guests. The **create network** task basically configures another network interface/bridge on the Oracle VM Servers with the network information provided by the Oracle VM administrator using the Oracle VM Manager **create network wizard**.

Choose the **create network** icon from the **management toolbar** just under the network tab as shown in Figure 17 below:

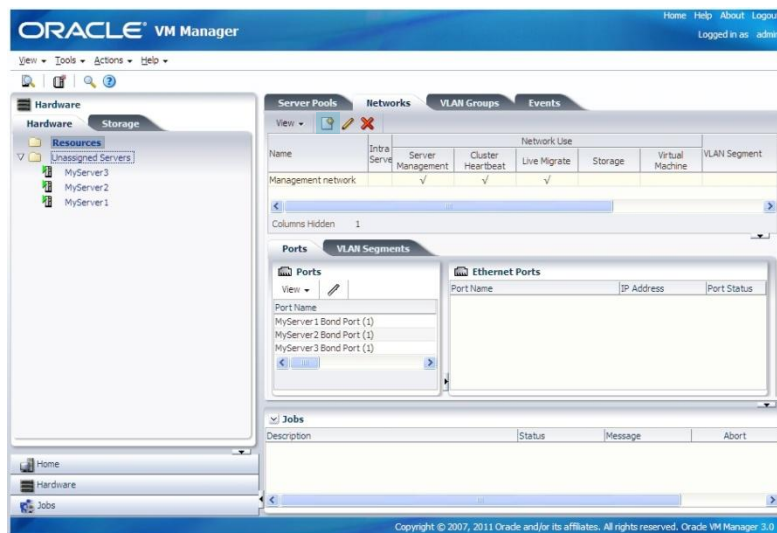


Figure 17: Choose the "Create Network" icon from the network tab as seen in the hardware management pane

Choose "Create a network with bonds/ports only" as show in Figure 18 below:

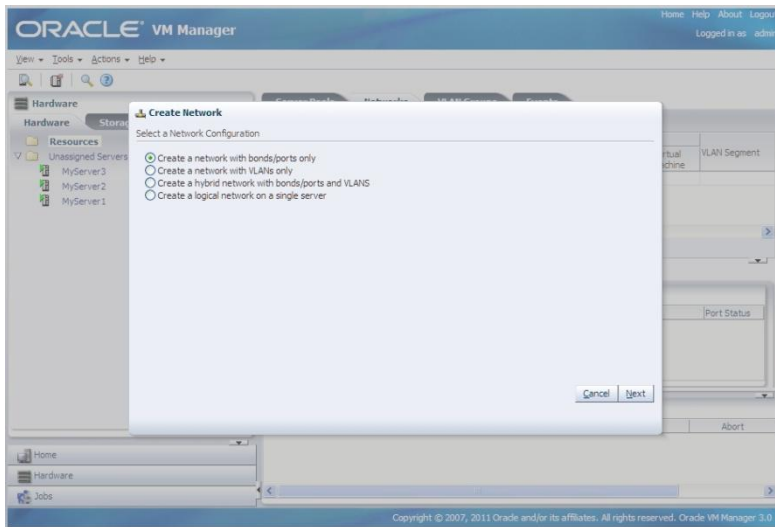


Figure 18: Initial dialog box using the Create Network wizard

Provide a name for the new network and choose the **virtual machine** and **storage** check boxes as seen in Figure 19 below. The “Network use” refers to the type of traffic for the subnet.

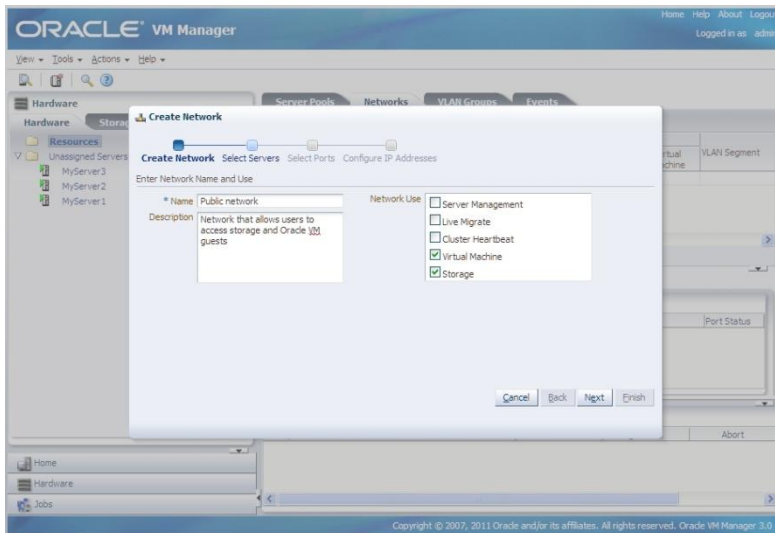


Figure 19: Step 1 - Enter a network name, description and “use” in the first step of the wizard

Select the Oracle VM Servers where the new network will be created/configured:

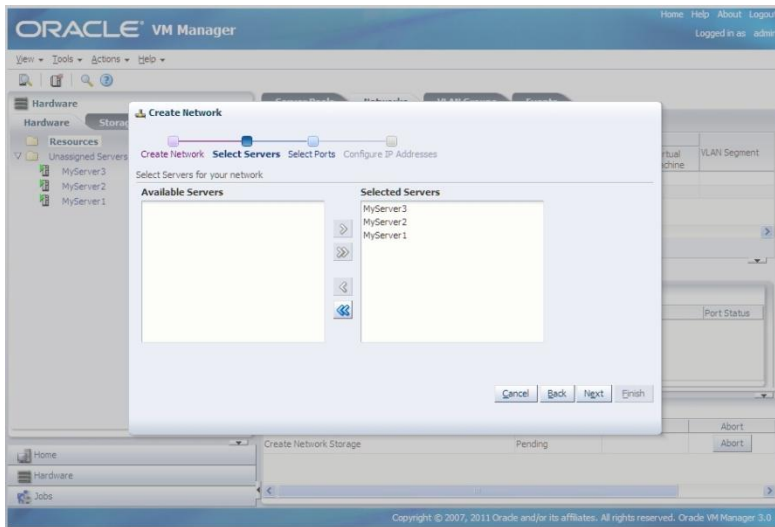


Figure 20: Step 2 – Choose the Oracle VM Servers

The next step shown in Figure 21 warrants a little explanation. The port/interfaces do not show the Linux name for the interface such as eth0 or eth1, but they translate as port(1) is eth0, port(2) is eth1, etc. Choose the appropriate interface to configure on each Oracle VM Server, whatever is relevant to your environment.

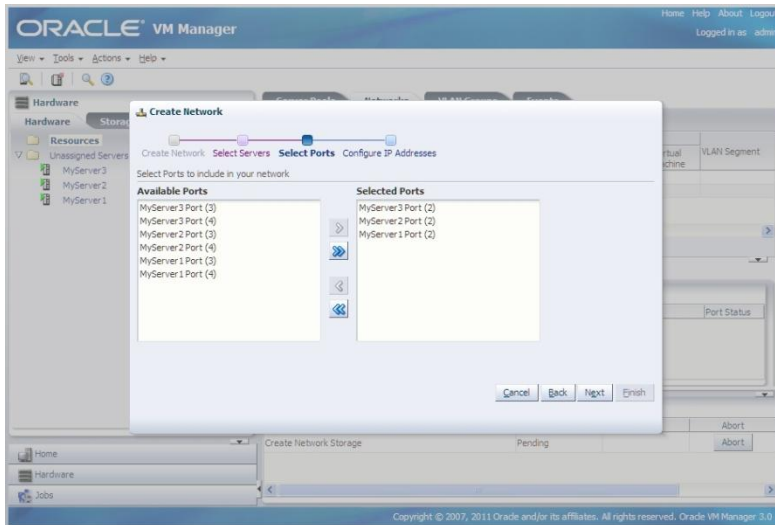


Figure 21: Step 3 – Choose the physical interfaces on the Oracle VM Servers

Finally, provide the IP address information of the subnet you are configuring for storage and Oracle VM guests on each Oracle VM Server.

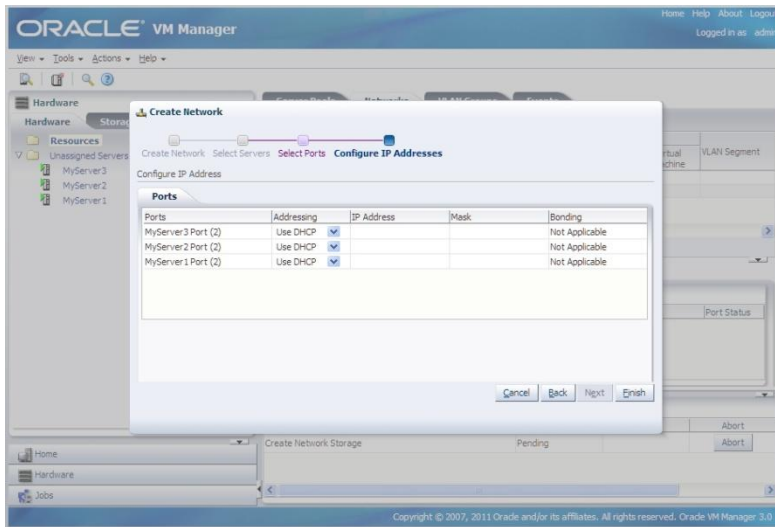


Figure 22: Step 4 – Provide the IP address information for each Oracle VM Server

Figure 23 shows the **public network** after it has been configured on each Oracle VM Server.

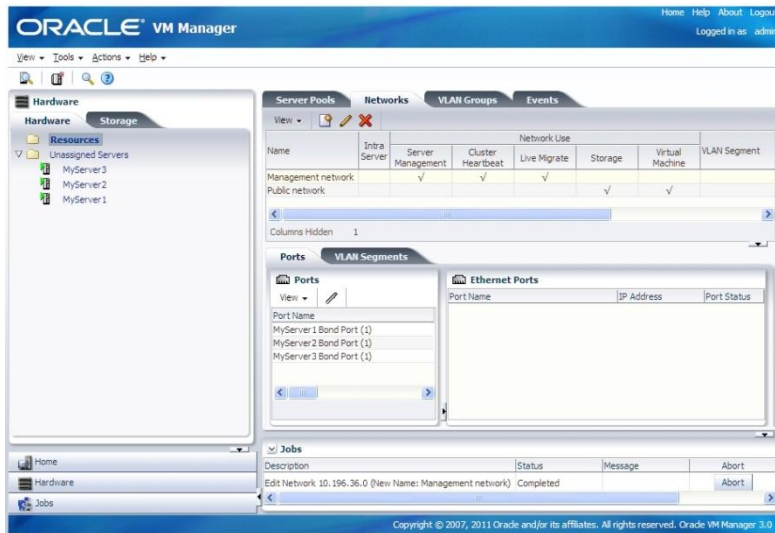
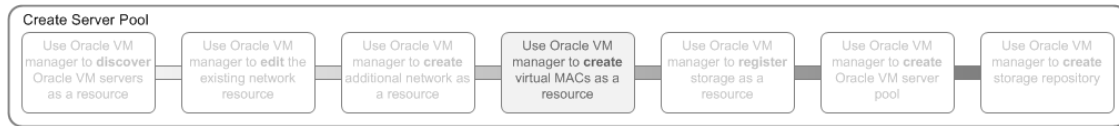


Figure 23: Showing the new public network after it has been created

Create Virtual MAC Addresses as Resource



The last network task needed is to create a pool of virtual Ethernet addresses (MAC) for the Oracle VM guests. The virtual Ethernet addresses will be randomly assigned from the pool as each Oracle VM guest is created. Note that specific MAC addresses can be assigned to specific Oracle VM guests, but the Oracle VM administrator must change the MAC after one has been randomly assigned as we will see in a later step.

To begin, choose “Vnic Manager” from the Tools pull down menu at the top of user interface as seen in Figure 24 below:

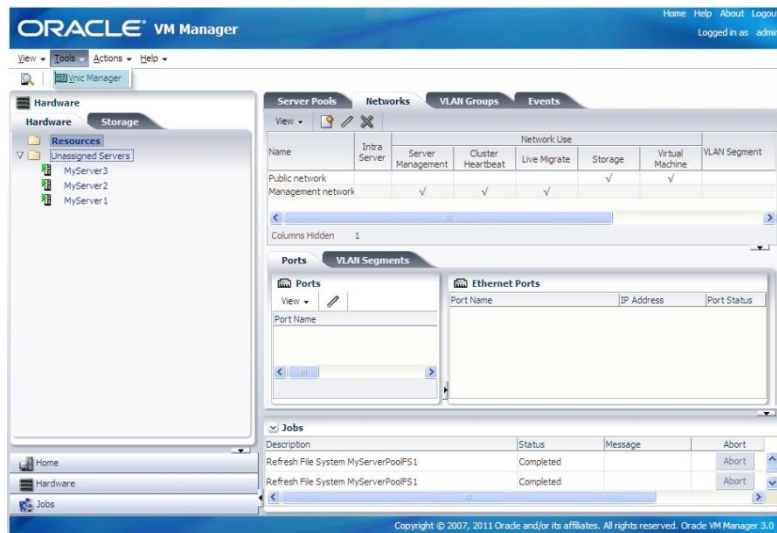


Figure 24: Choose Vnic Manager from the Tools pull down menu

Enter any valid hex numbers for the last three octets in the Vnic dialog (the first three octets cannot be changed) and then choose **Generate**.

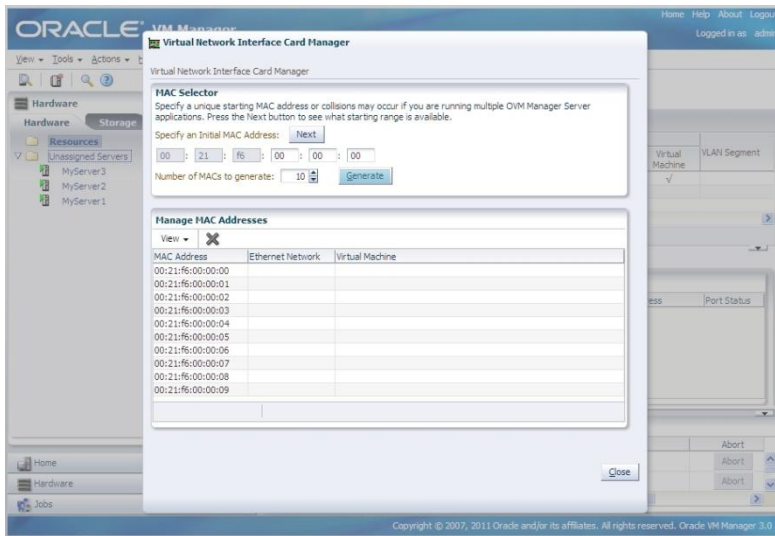


Figure 25: MAC address generator in the Vnic Manager dialog box

Choose **Close** once the pool of MAC addresses has been generated. The pool of MAC addresses will be now be available and automatically assigned to any Oracle VM guests created. More Ethernet addresses can be generated later if needed.

Register Storage as Resource



Storage must be configured on centralized external arrays before Oracle VM Manager can assign it to the Oracle VM Servers. This means NFS mounts must exist on the storage array and be exported to the Oracle VM Servers, but not mounted on the Oracle VM Servers. If Fibre Channel or iSCSI are being used for the server pool file system and storage repository, then LUNs must exist on the storage arrays and be mapped/zoned to the Oracle VM Servers. External storage should have already been completed during the prepare for implementation phase earlier in the tutorial.

Using Local Disk to Create a Server Pool

If you decide to create a server pool using local disk on a single Oracle VM Server, then please skip the rest of this section and proceed to Appendix C: on page 63. Once the server pool creation has been completed as shown in the appendix, return to the next section entitled “Create Oracle VM Guest” on page 40.

Using External Storage to Create a Server Pool

Three different external storage protocols can be used to create the server pool:

- Option 1 using NFS to add external storage as a resource. Covered in this section.
- Option 2 using iSCSI to add external storage as a resource. See Appendix A.
- Option 3 using FCP to add external storage as a resource. See Appendix B.

To begin, right click **file servers** in the navigation pane and choose **register file server** as show in Figure 25 below:

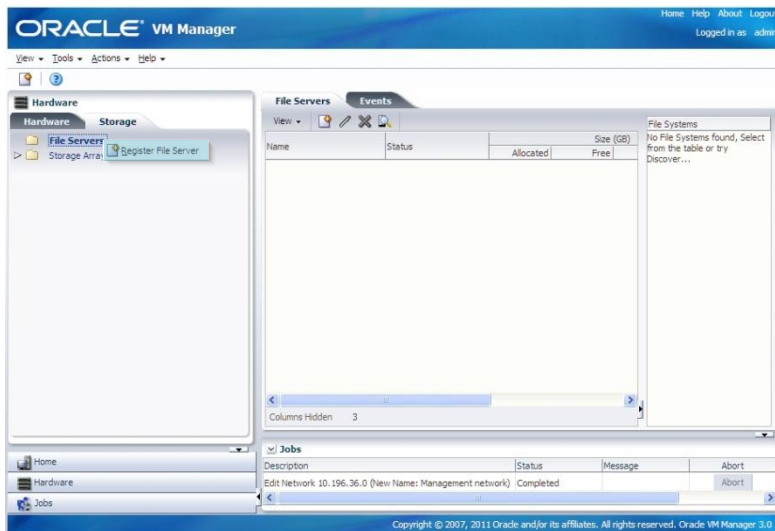


Figure 26: Register file server

Provide the appropriate information for your NFS server as shown in the **register file server wizard** in Figure 27 below:

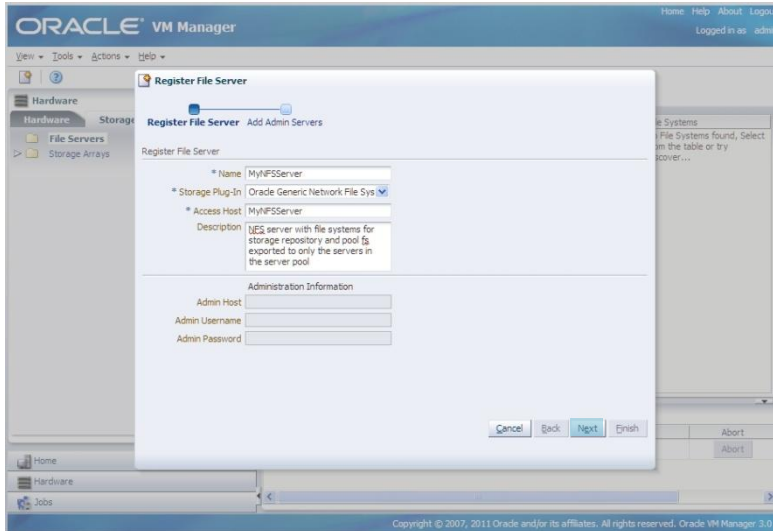


Figure 27: Step 1 – Register file server wizard dialog

Next, select one or more Oracle VM Servers that will act as NFS administration servers.

This step has nothing to do with which servers the NFS mounts are assigned/mounted, only which Oracle VM Servers will be tasked with keeping track of, or managing the NFS mounts points on all the Oracle VM Servers. This might make a little more sense if you think of having a server pool with fifty servers, but only three of them manage the NFS mounts for all fifty.

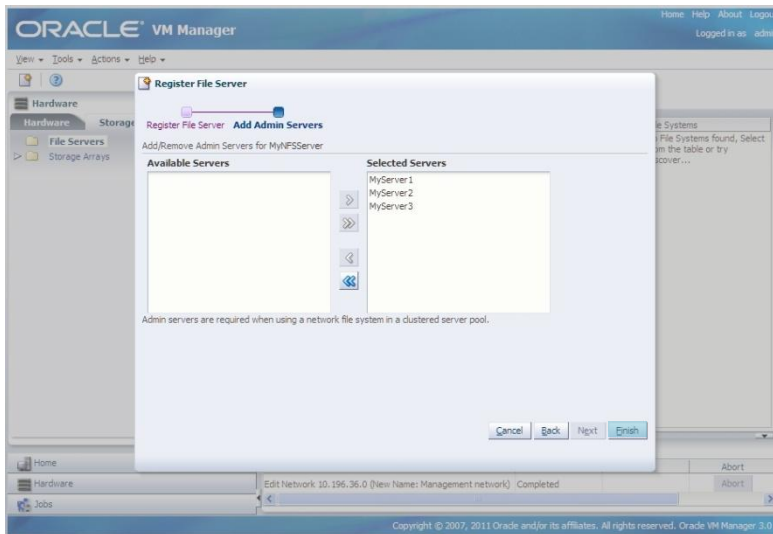


Figure 28: Step 2 – Choose a Oracle VM Server or servers to manage NFS mounts for all servers in the server pool

Oracle VM Manager will then discover all NFS mounts that have been exported to any of the Oracle VM Servers that were found during the previous **discover servers** step, not just the servers you chose

as Admin Servers. Oracle VM Manager will then display all the NFS exports it found in the navigation tree under the name of your NFS server as shown in Figure 29 below:

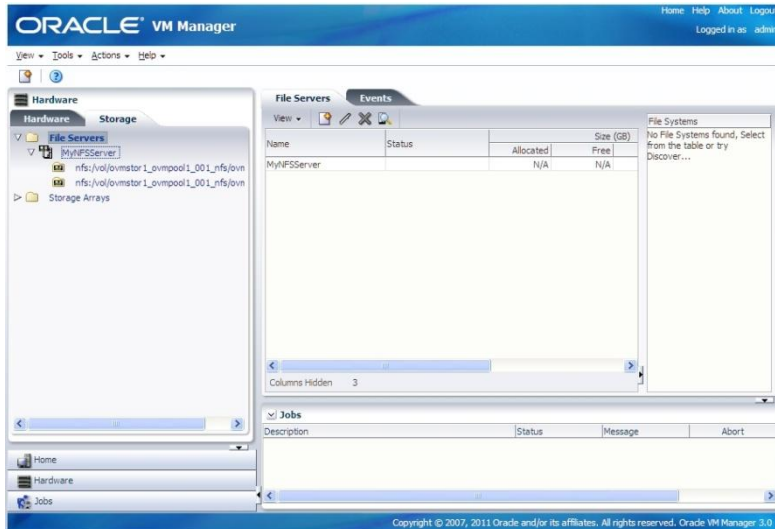


Figure 29: NFS mounts are added to the navigation tree under the NFS server name

Each NFS object must be refreshed after being discovered. This process assigns the task of refreshing the NFS export to a particular Oracle VM Server

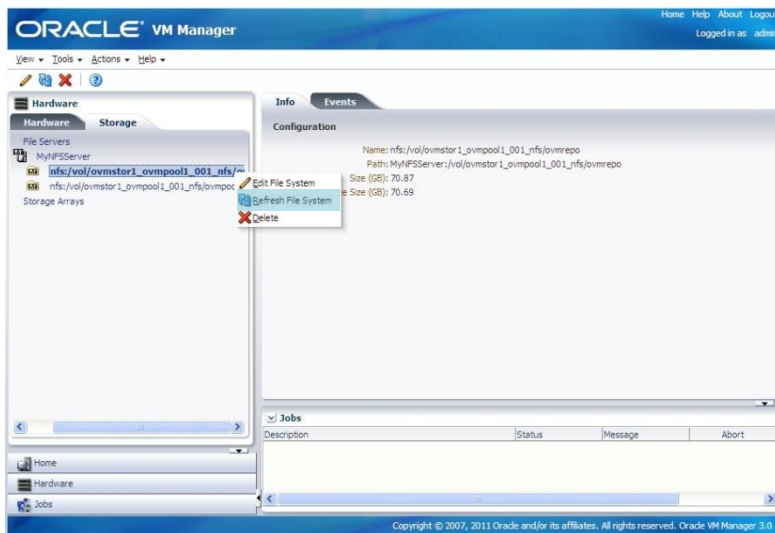


Figure 30: Each NFS mount needs to be refreshed

Now select any Oracle VM Server from the pull down list to execute the refresh task this one time.

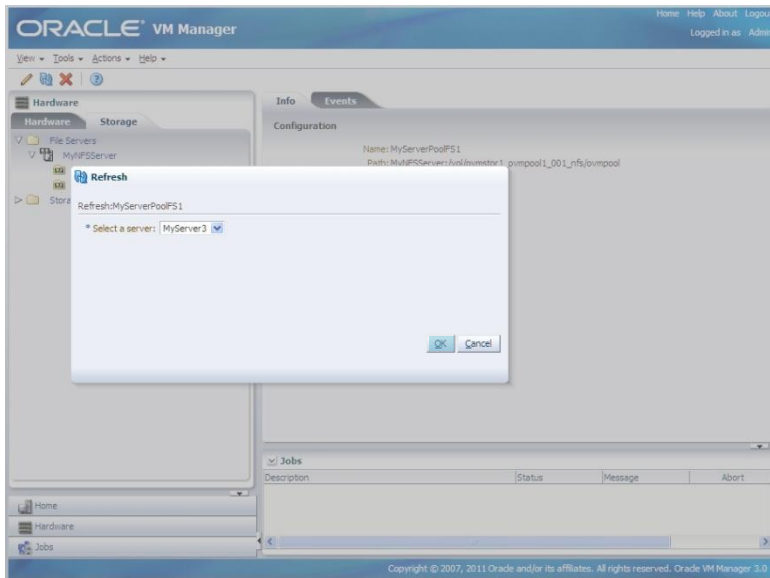


Figure 31: Select a single Oracle VM Server to be tasked with refreshing the NFS export

Oracle VM manger adds the full path of the NFS export as the name of the storage resource. The full path can be hard to read sometimes, so we are going to change the names of the NFS mounts to something a little easier to read before moving on to the next step. This step is not required and simply shows the features of Oracle VM Manager to help create a more manageable, user friendly environment.

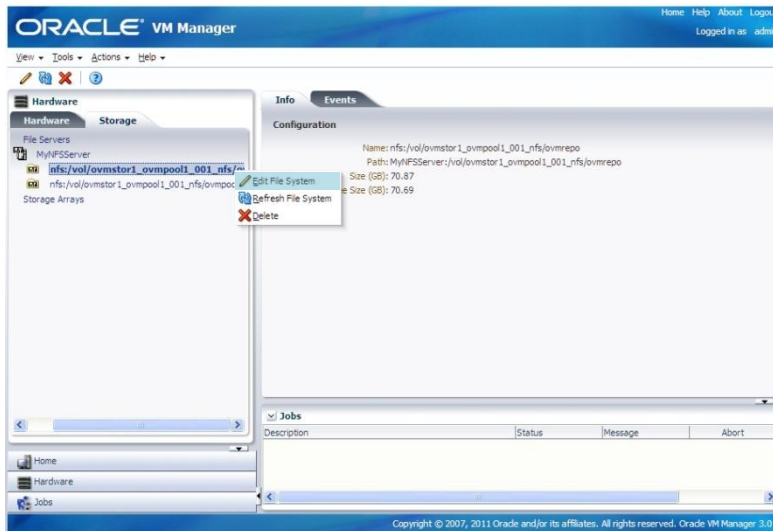


Figure 32: Edit each of the long NFS mount names to make it easier to identify them

Right click on each NFS object, select **Edit File System** as shown in Figure 32 above and change the **Name** of the object in the dialog box (not shown). The result should be something like the names shown in Figure 33 below so it is easy to identify both the storage repository and server pool file system.

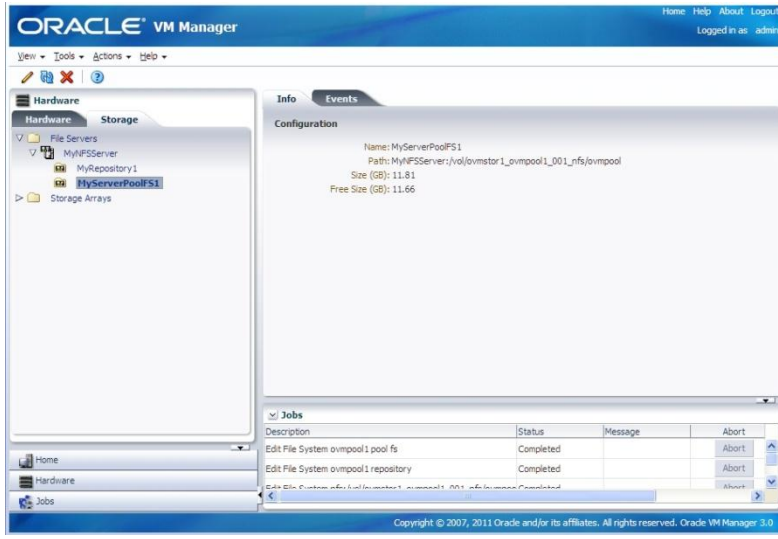


Figure 33: Showing the power of renaming NFS mounts to make it easier to keep track of them

Create Server Pool



A server pool can now be created once all the other resources such as Oracle VM Servers, networking and storage have been added to Oracle VM Manager.

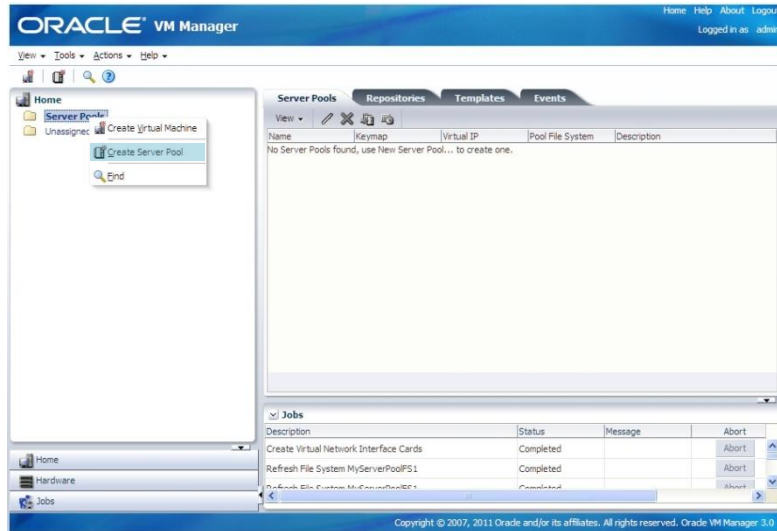


Figure 34: Choose “Create Server Pool” from the navigation tree menu

Figure 35 illustrates the information needed to create a server pool. Simply enter a user friendly **server pool name**, the relocatable **virtual IP** and the NFS export used for the **server pool file system** that were created during the preparation phase. The virtual IP is an address that will always be associated with the Oracle VM Server currently designated as the server pool master. Servers are not added to the server pool until later.

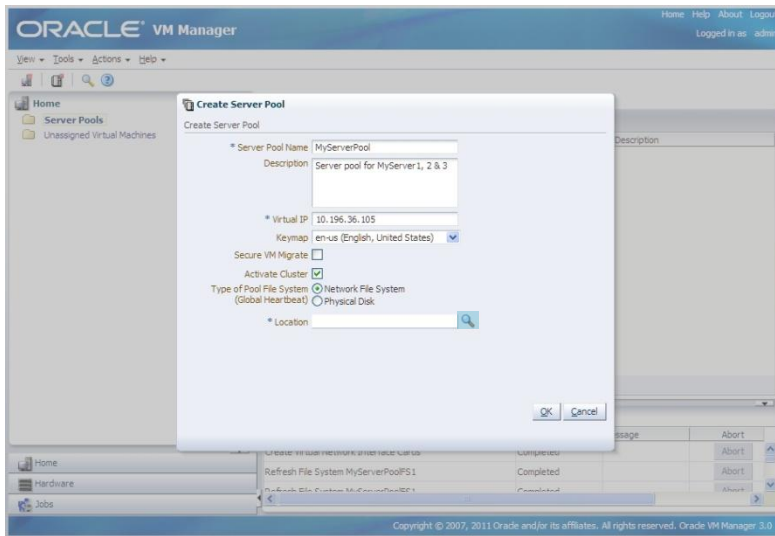


Figure 35: Choose “Location” in the “Create Server Pool” wizard to specify the NFS mount for server pool file system
Click on the “location” icon shown in Figure 35 to select the server pool file system seen in Figure 36 below.

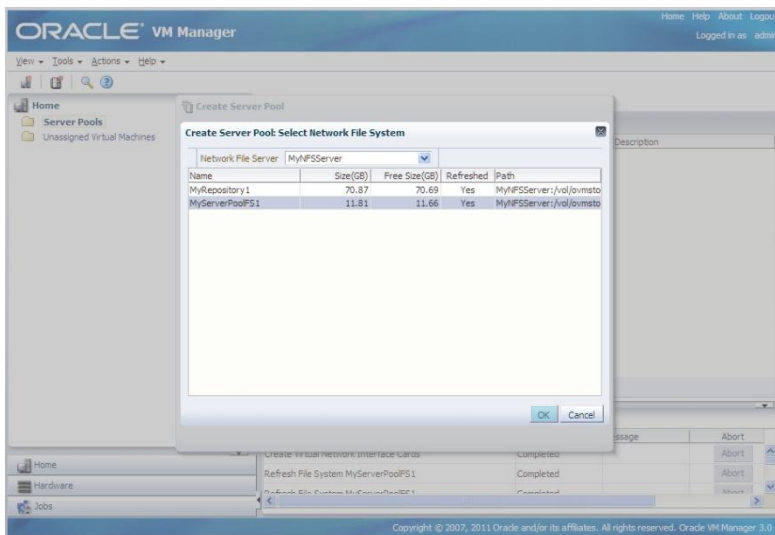


Figure 36: Select the NFS mount to be used for the server pool file system from the dialog box

The create server pool dialog box should now look similar to that in Figure 37 below. The server pool will be created without Oracle VM Servers or a storage repository once the “OK” button is selected.

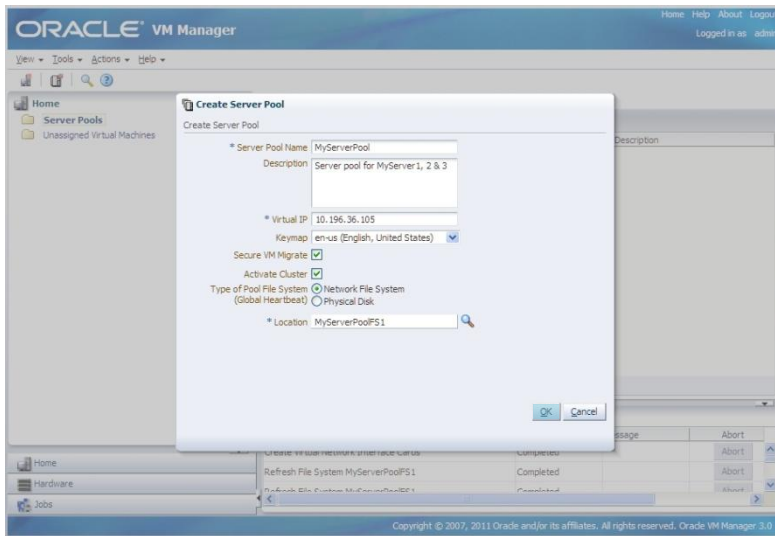


Figure 37: Completed “Create Server Pool” dialog

Oracle VM Servers can be added to the newly created server pool. Simply right click the server pool name and select **Add/Remove Servers**.

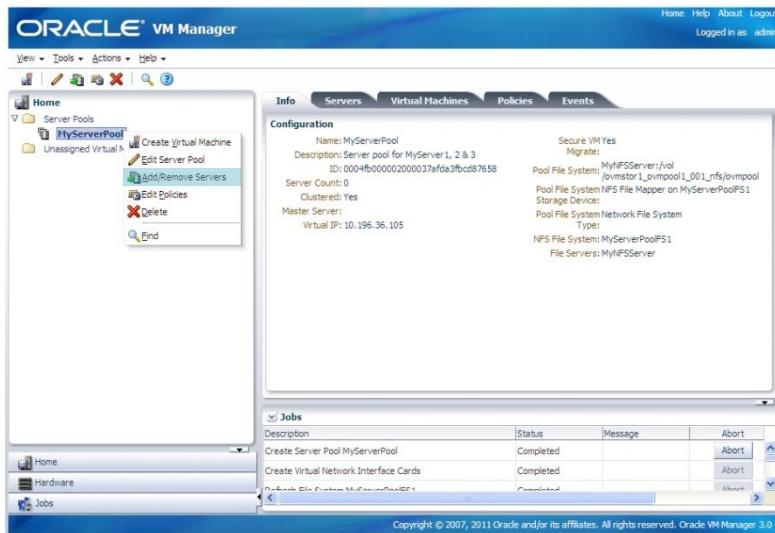


Figure 38: Choose “Add/Remove Servers” from the newly created server pool

Select the Oracle VM Servers that will be included in the server pool as shown in Figure 39 below

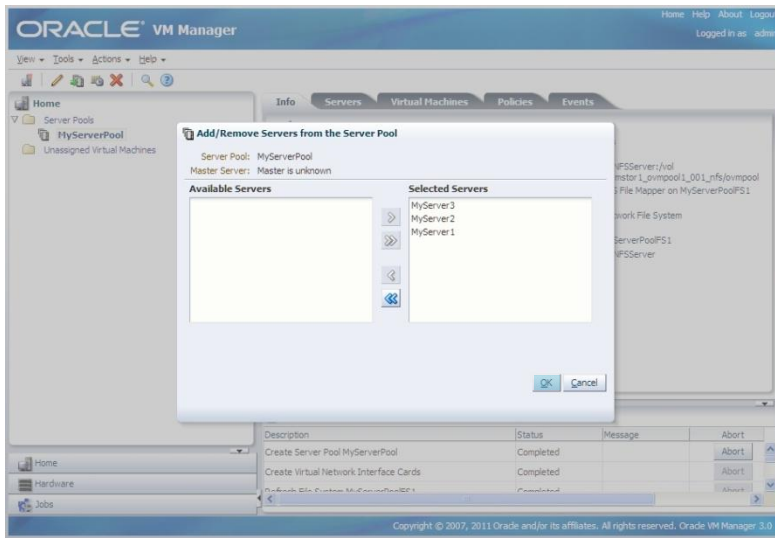


Figure 39: Select Oracle VM Servers that will be part of the server pool

The Oracle VM Servers will move from the unassigned folder and appear under the server pool name in the navigation tree.

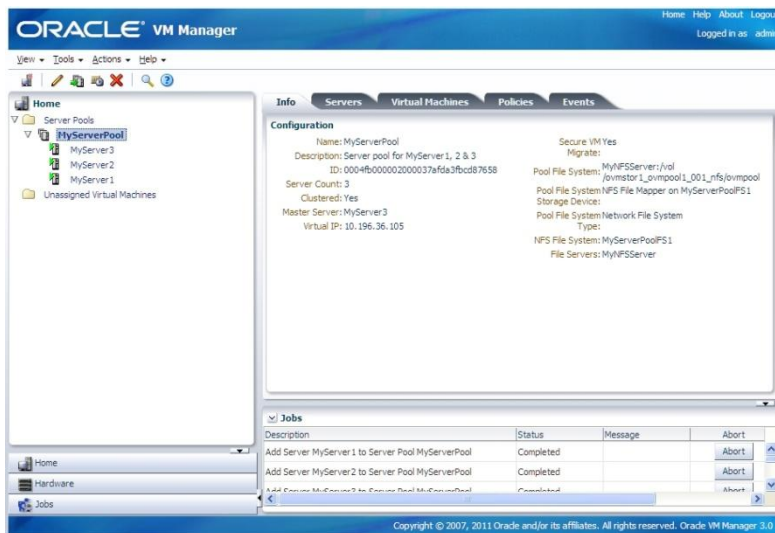


Figure 40: Oracle VM Servers added to the navigation tree for the server pool

The server pool is almost completed and just needs a storage repository.

Create Storage Repository



The final step in the process of creating a server pool is to assign an NFS mount to act as the centralized storage repository where all the Oracle VM guest files, templates and other resources will reside for the entire server pool.

Select Storage for Repository

Select the **Repositories** tab and then choose the **Create Repository** icon on the management pane toolbar just under the tab.

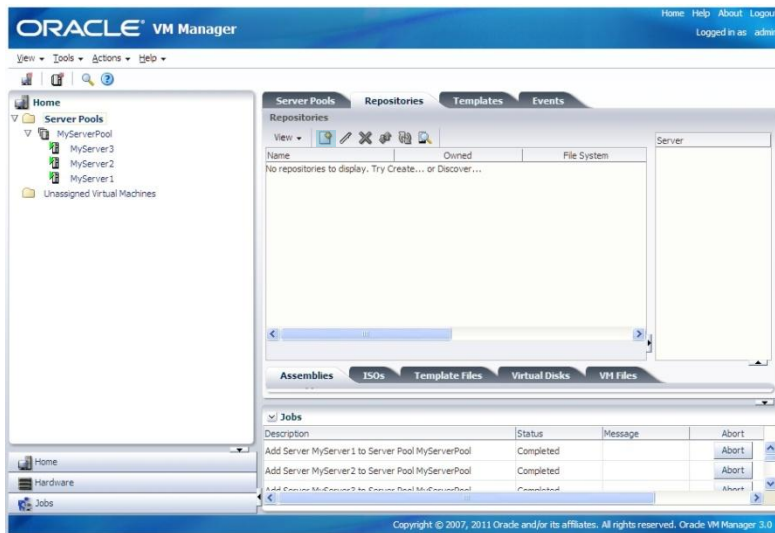


Figure 41: Choose the “Repositories” tab from the management pane and select create repository icon

Add an easy to remember **Name** for the storage repository, choose **Network File Server** for the **Repository Location** and then select the magnifying glass icon to bring up the **Select Network File System** dialog box.

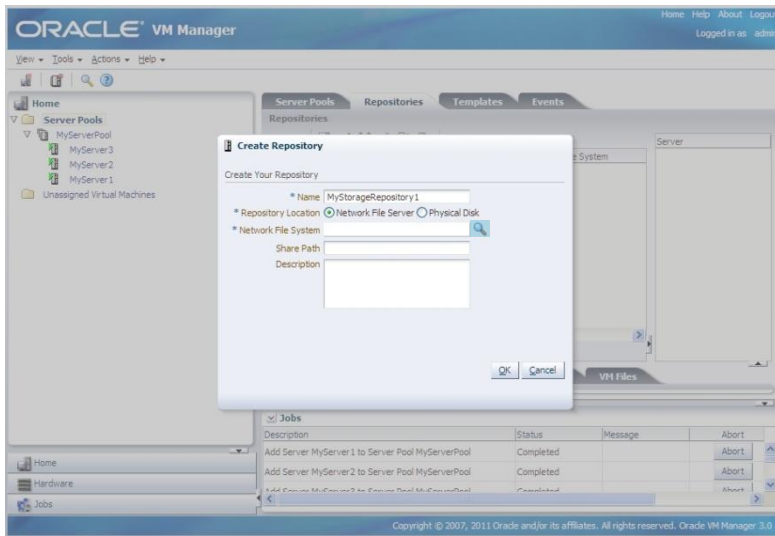


Figure 42: Choose “Network File System” to select an NFS mount to use as the storage repository

Use the Select Network File System dialog to choose the NFS export that was created much earlier for use as a storage repository as shown in Figure 43 below.

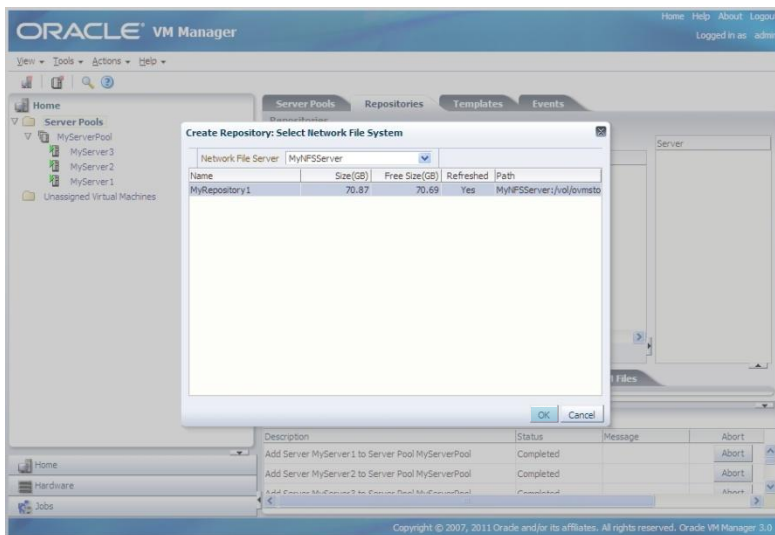


Figure 43: Select the NFS mount to use as the storage repository from the remaining choices in the wizard

Add an optional **Description** and choose **OK**.

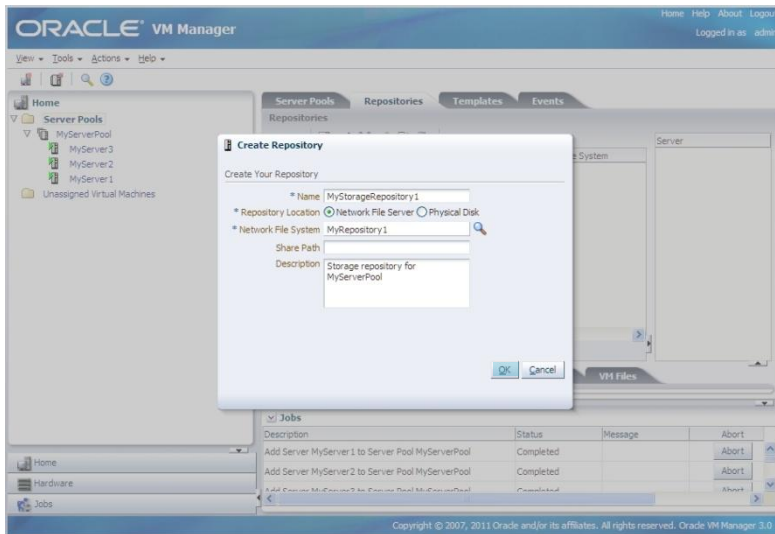


Figure 44: Choose OK from the completed dialog box for “Create Repository” wizard

At this point, the storage repository has been created, but is not yet assigned to any server pool. So, the final step in creating a server pool is to assign the newly created storage repository to the Oracle VM Servers that will need access to the centralized storage. To assign a repository to the Oracle VM Servers, select the newly created **storage repository**, then choose the **Present-Unpresent Selected Repository** icon (up/down green arrow) from the toolbar just below the repositories tab as shown in Figure 45 below.

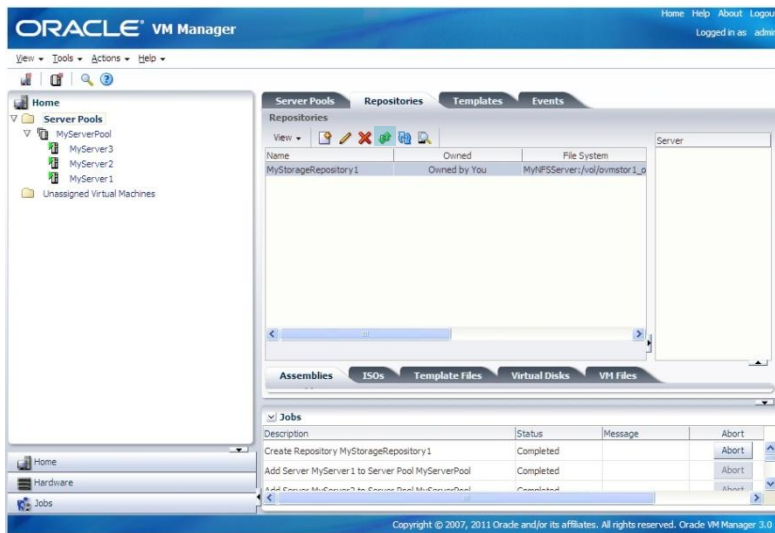


Figure 45: Oracle VM Manager displays the newly added storage repository

Assign Storage Repository to Oracle VM Servers

Select the Oracle VM Servers as shown below, then choose **OK**.

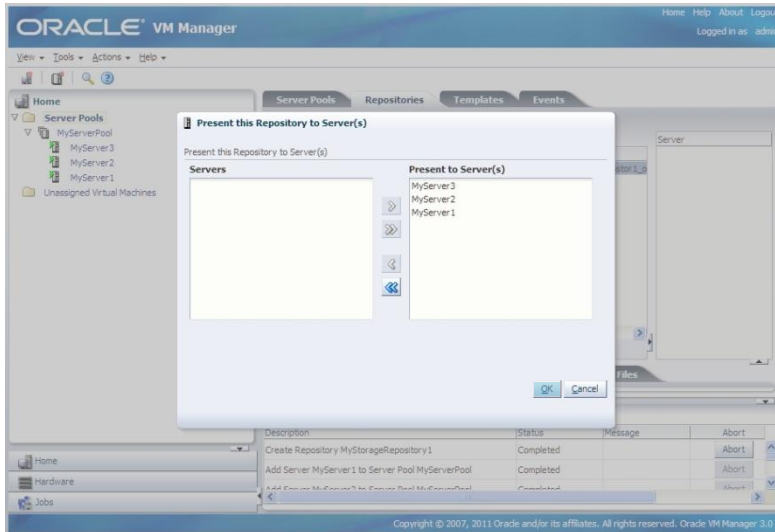


Figure 46: The final step is to select the Oracle VM Servers where the storage repository will be mounted

The storage repository will now show the Oracle VM Servers it is assigned as shown in the **Server** pane whenever a storage repository is selected in the **Repositories** tab

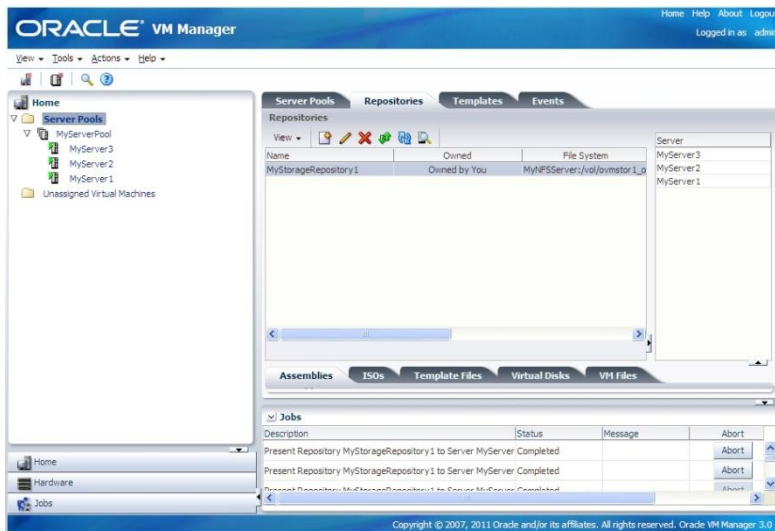


Figure 47: Showing a completed server pool

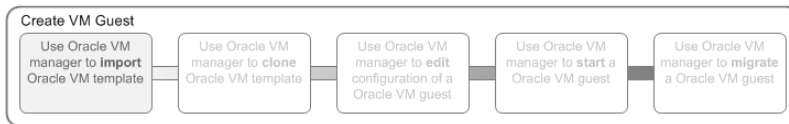
Next Steps

The task of creating the Oracle VM Server pool should now be completed. We will now move on to the last major phase of this tutorial by creating a single Oracle VM guest.

Create Oracle VM Guest

The Oracle VM cluster is now ready for Oracle VM guest images to be created. A standard Oracle VM guest template will be used to create an Oracle VM guest in this tutorial.

Import Oracle VM Guest Template



You should have downloaded a Oracle VM template to a location on a web server as part of the last step in the “Prepare for Implementation” phase much earlier in the tutorial. The template can now be “imported” (copied) into the Oracle VM template directory from the location where you put it on the site specific http server. This process will copy the file to the Oracle VM template directory on the server pool’s storage repository.

To begin, select **Server Pools** in the navigation tree, then chose the **Templates** tab as shown in Figure 48 below.

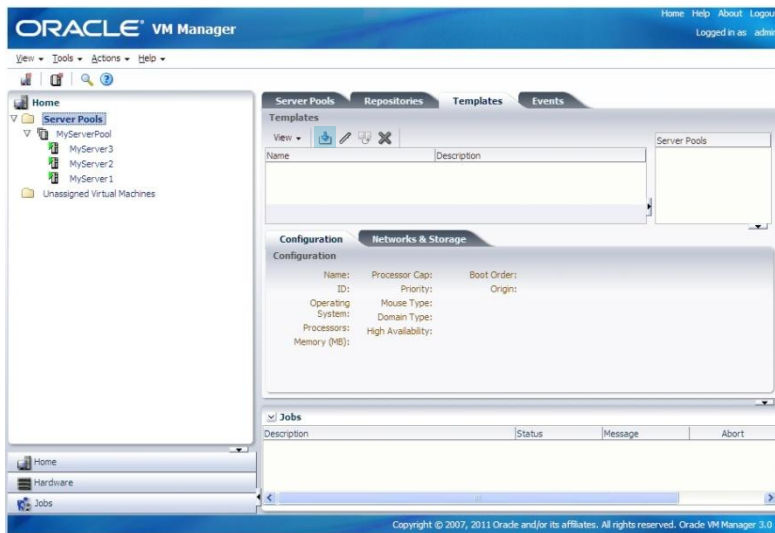


Figure 48: Select Templates tab

Select the Import Template icon from the tab toolbar to open the Import Template dialog box shown in Figure 49. This process essentially copies the Oracle VM template from a http server to the storage repository using wget.

Choose the storage repository, enter the URL of where the Oracle VM template is located and choose a Server to accomplish the task. Choosing one of the Oracle VM Servers is essentially assigning a server to act as a temporary utility server charged with copying the Oracle VM template from the web server to the storage repository. This is a dynamic and temporary assignment of the Oracle VM Server only needed for this one task.

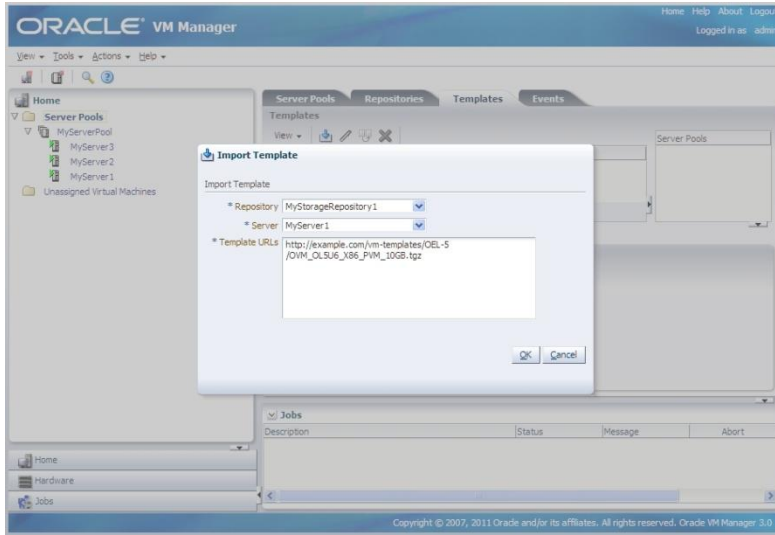
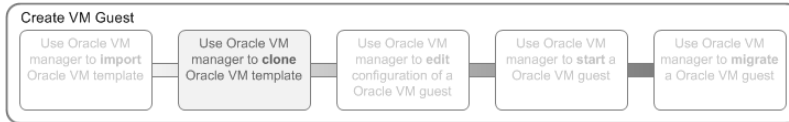


Figure 49: Showing the Import Template dialog box

The import process will take several minutes to complete.

Clone Oracle VM Guest Template



Oracle VM guests are created by **cloning** a Oracle VM template to create the guest image. The Oracle VM template for Oracle Linux can be **cloned** once the template has been imported to the Oracle VM template directory within the storage repository. The process of cloning copies the image of the template from the template directory on the storage repository to the Oracle VM guest image directory and extracts all the files associated with a running Oracle VM guest and modifies the vm.cfg file.

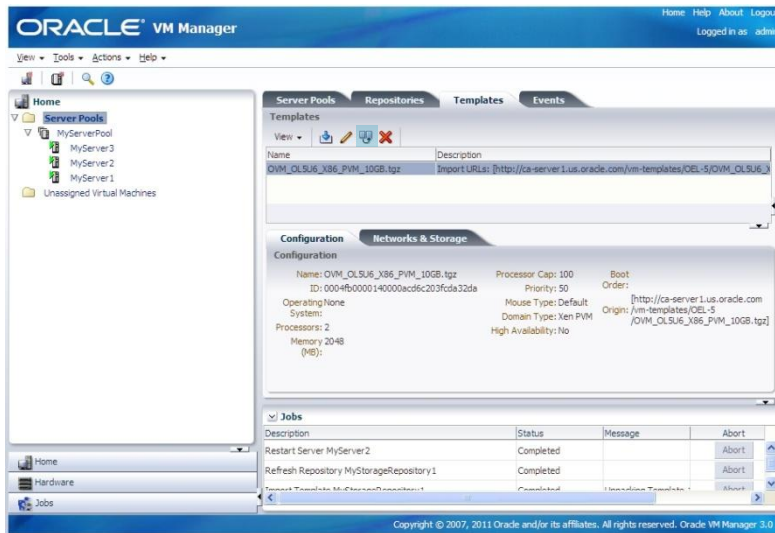


Figure 50: Select the Clone Template from the Templates tab

Start the cloning process by selecting the **Server Pools** folder in the navigation tree from the **Home** navigation pane, then choosing the **Clone Template** icon from the **Templates** tab as show in Figure 50 above.

The **Clone Virtual Machine or Template** dialog box show in Figure 51 allows you to add a user friendly, meaningful and easy to remember name for your Oracle VM guest name, a description of the guest image and assign the Oracle VM guest to a particular server pool. In this case, you will assign the Oracle VM guest to the only server pool that exists at the moment.

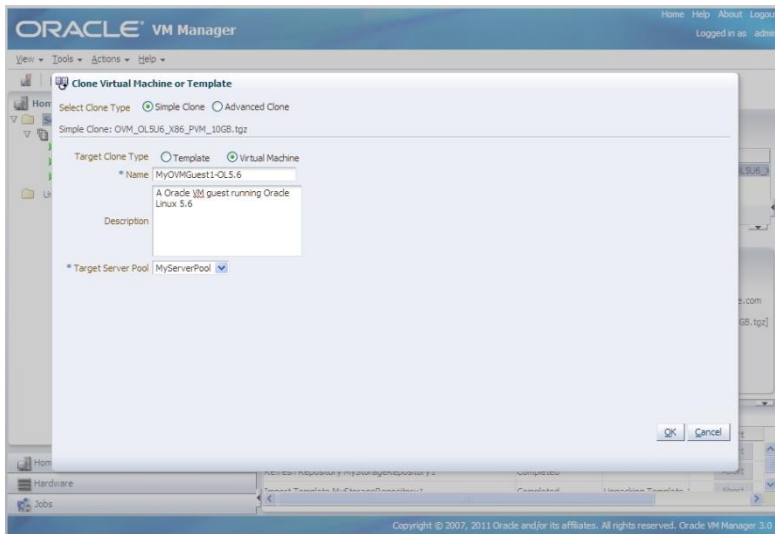


Figure 51: Cloning a template to create an Oracle VM guest

The Oracle VM guest will temporarily appear in the Unassigned Virtual Machines folder in the navigation tree while the cloning process is running.

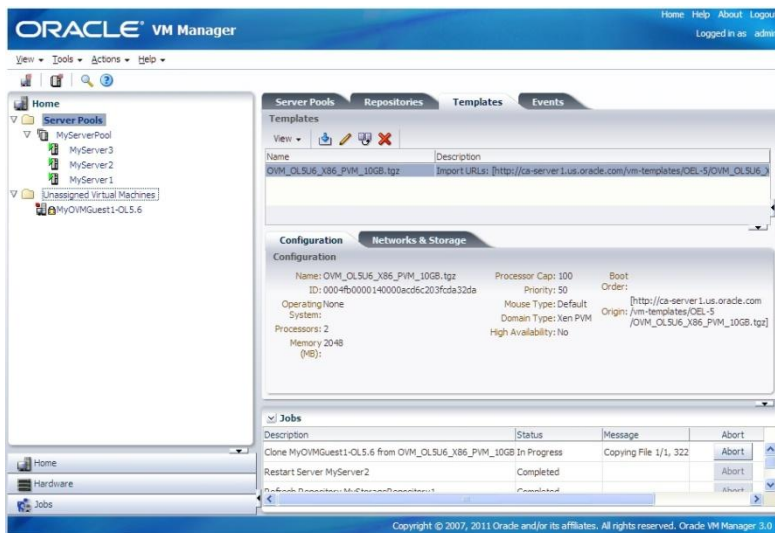


Figure 52: Interim status of Oracle VM guest while the cloning process is running

The cloning process will take quite a few minutes to complete since it is copying the files and updating the vm.cfg file.

The Oracle VM guest image will be moved to one of the Oracle VM Server folders within the assigned server pool folder once the cloning process has completed as shown in Figure 53 below, but it will not be started.

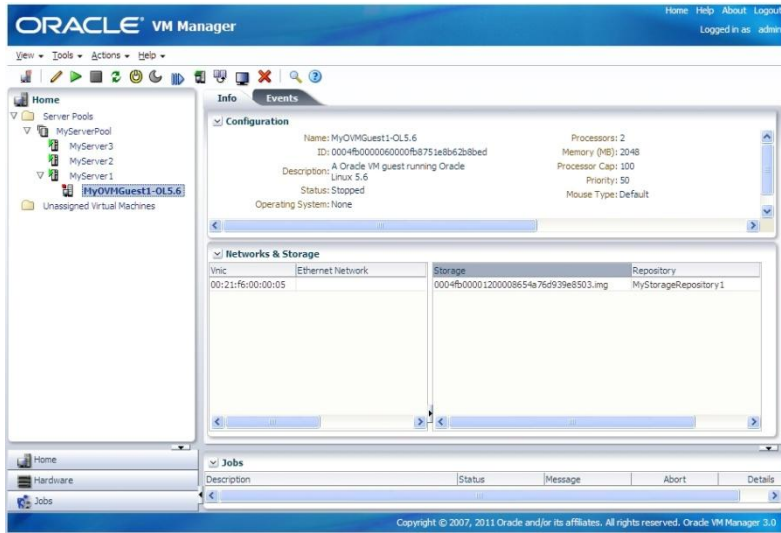
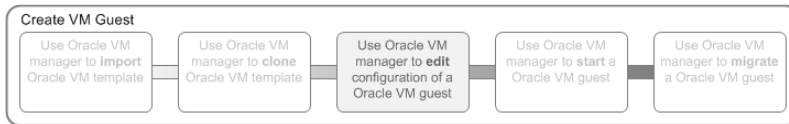


Figure 53: The completed Oracle VM guest is automatically started on a random Oracle VM Server in the server pool. We can take a moment at this point to edit the configuration of the Oracle VM guest before it is started as explained in the next step.

Edit Oracle VM Guest Configuration



The Oracle VM guest configuration will now be changed to enable live migration through the **High Availability** feature of Oracle VM. This feature allows Oracle VM guests to automatically move from a failed Oracle VM Server to another viable Oracle VM Server. It also allows you to migrate Oracle VM guests manually for server maintenance or any other reason such as adjusting performance/utilization of Oracle VM Servers.

Open the Edit Virtual Machine wizard by right clicking on the Oracle VM guest name in the navigation tree and selecting **Edit Virtual Machine** from the menu.

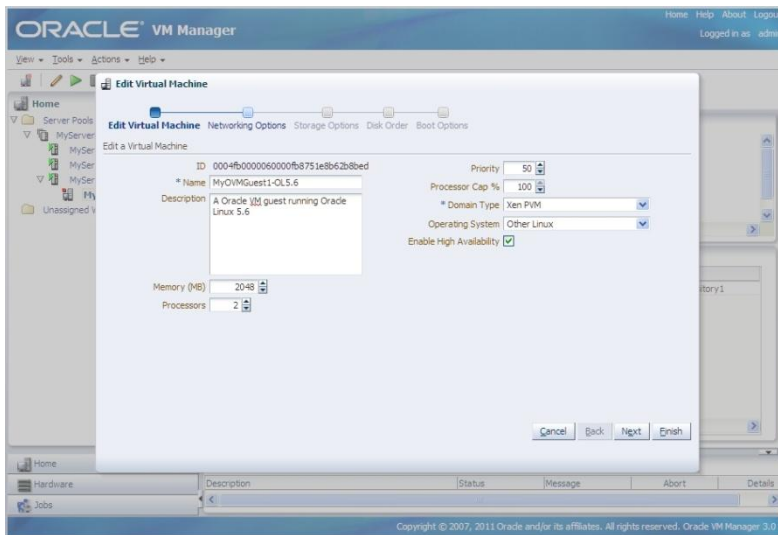


Figure 54: Enable high availability

The Edit Virtual Machine is a wizard that modifies the `vm.cfg` file of the Oracle VM guest image and will allow you to change many aspects of the Oracle VM guest configuration. For the purpose of this tutorial, we will only enable the high availability feature for the Oracle VM guest by checking the **Enable High Availability** checkbox. Accept the change by selecting the **Finish** button.

Start Oracle VM Guest



We will now start the Oracle VM guest once the high availability feature has been enabled. Simply right click on the name of the Oracle VM guest from the navigation tree and select **Start**. We can observe the progress of the startup once the Oracle VM guest begins to start by opening a console session.

Simply right click on the name of the Oracle VM guest and select **Launch Console** as shown in Figure 55 below.

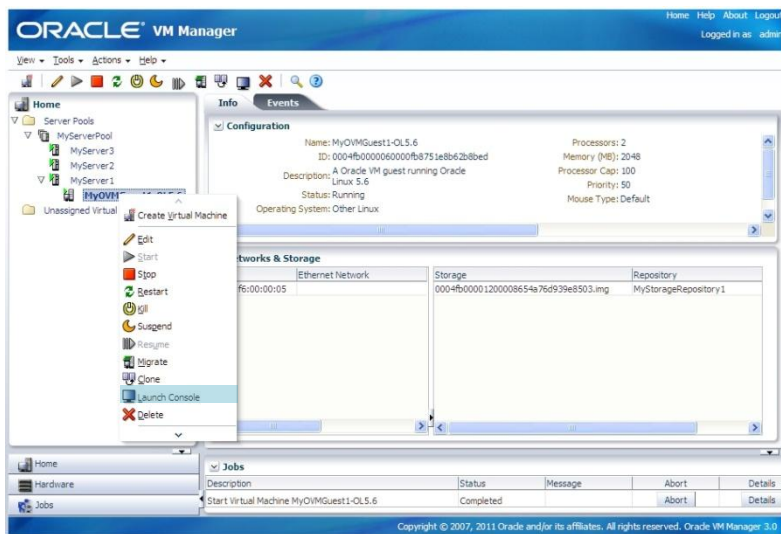


Figure 55: Open a console for the Oracle VM guest to ensure it started correctly

You will be prompted for the user name and password to open the console session. This is the same user and password you used to log into the Oracle VM Manager user interface.

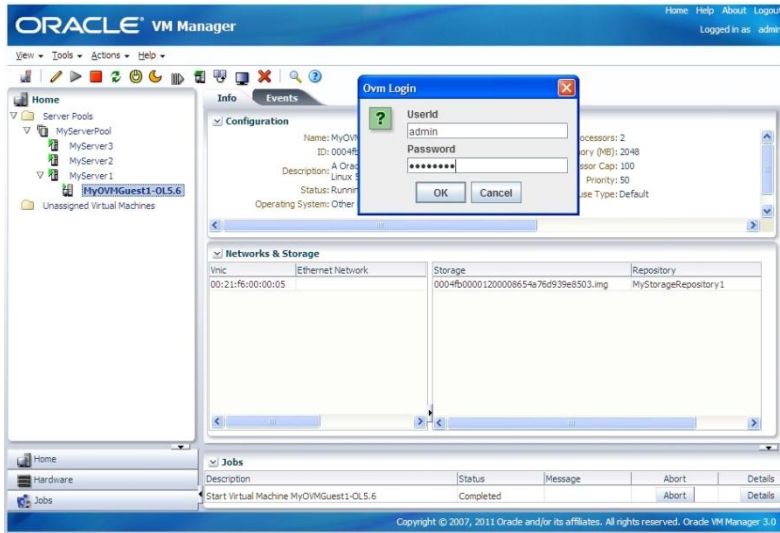


Figure 56: Provide the same user name and password used to access Oracle VM manger user interface
The Figure below gives you an idea of what the console session will look like once it starts.

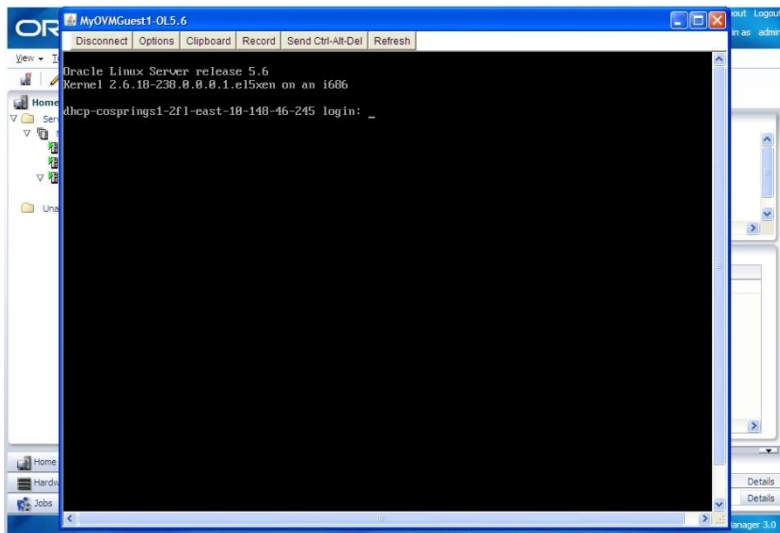


Figure 57: Showing a console session for the Oracle VM guest that was just created
You can close the console session at any time.

Migrate Oracle VM Guest



The final task is to ensure our Oracle VM cluster is fully functional by performing a live migration of the Oracle VM guest that was just created.

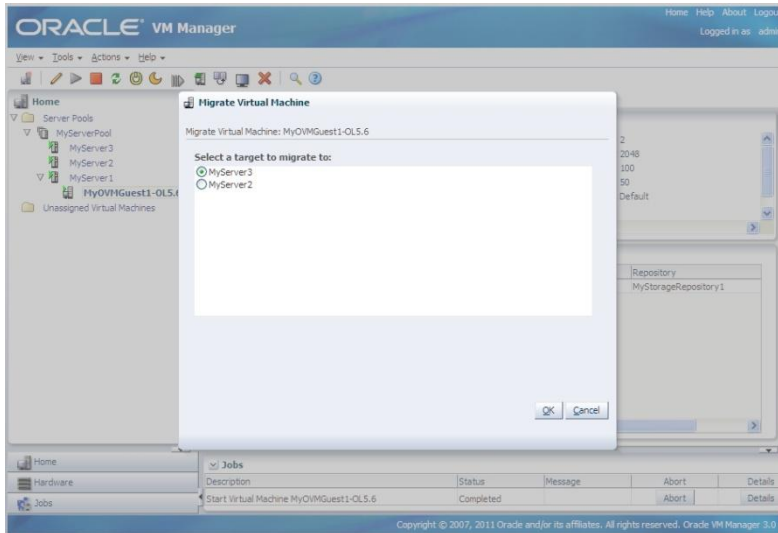


Figure 58: Testing an Oracle VM guest to ensure live migration works correctly

Note that a lock icon appears on the names of the Oracle VM Servers where the Oracle VM guest is currently running and the Oracle VM Server where the Oracle VM guest is migrating.

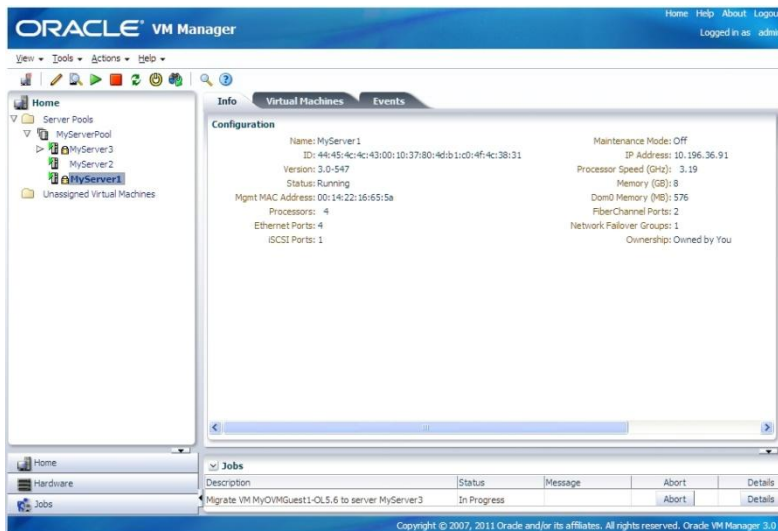


Figure 59: Interim status while Oracle VM guest is migrating to another Oracle VM Server

The Oracle VM guest should appear under the Oracle VM Server where it is running in the navigation tree.

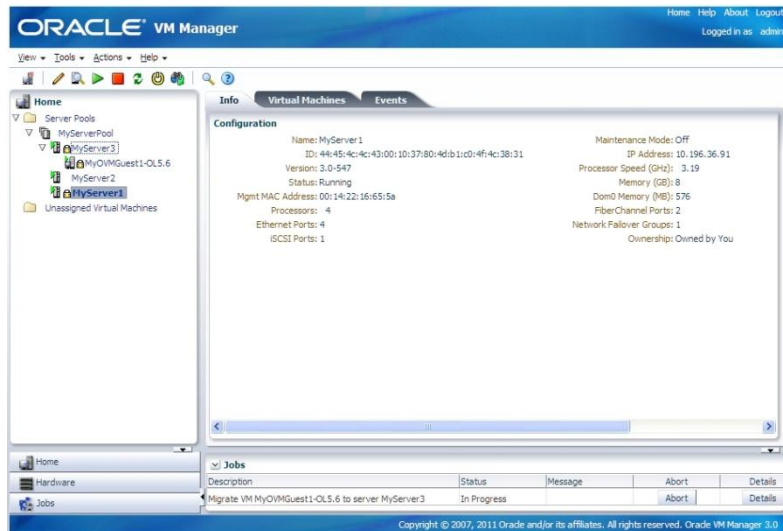


Figure 60: Successful migration of Oracle VM guest

Congratulations! The Oracle VM environment is successfully completed once the Oracle VM guest successfully migrates to another Oracle VM Server in the server pool.

Conclusion

At this point, the tutorial has been completed and the reader should have a good understanding the process for creating a full implementation of an Oracle VM environment. There are many important aspects that were not covered in this tutorial that need to be considered. Chief among the things that were not touched on in this brief document is the need for a disciplined approach to designing and implementing an Oracle VM environment. A disciplined approach means doing one thing at a time, making sure it works by thoroughly testing what was just put into place before moving on to the next step – a classic waterfall design and implementation methodology. Do not leave testing until the very end; test things as they are implemented.

Thank you for choosing Oracle VM 3 as the foundation of a fully integrated product stack in your data center. Oracle VM 3 demonstrates Oracle's commitment to deliver application driven server virtualization solutions. The new capabilities introduced in Oracle VM provide increased levels of scalability, manageability, and ease-of-use to help customers make the most demanding enterprise applications easier to deploy, manage, and support.

The best way to experience all the benefits of Oracle VM 3 is to download the software from Oracle Software Delivery Cloud at: <http://edelivery.oracle.com/oraclevm>, and try it out in your environment.

For more information about Oracle's virtualization, visit www.oracle.com/virtualization.

Appendix A: Register Storage, Option 2 using iSCSI



Figure 61: Illustration showing relative position of the material covered in this section within the overall process flow

The above process flow shows where this section appears in the overall process flow for creating a server pool. This section assumes the reader has already completed the other four steps in the Create Server Pool section of this document such as discovering servers, configuring network resources and creating a pool of MAC addresses. The reader should be at the point of Registering a Storage Array as shown in the process flow above.

Critical Notes About the Process

This document does not attempt to explain iSCSI concepts and it is assumed the reader is already familiar with iSCSI concepts and terms. The reader should know the difference between an iSCSI target (storage array) and initiator (client) and well as what the terms IQN and nodename represent.

Please keep this tutorial simple by creating and presenting only the two basic LUNs needed to complete the tutorial: (a) the server pool file system, and; (b) the storage repository as discussed in the **Prepare Centralized External Storage** section on page 5 of this document.

The process of registering iSCSI storage array is currently a back and forth affair where you configure some things on the Oracle VM Servers using Oracle VM Manager, then configure some things on the storage array responsible for serving iSCSI to your Oracle VM Servers and finally back to Oracle VM Manager to complete the task registering a storage array.

Registering iSCSI Disks in Oracle VM Manager

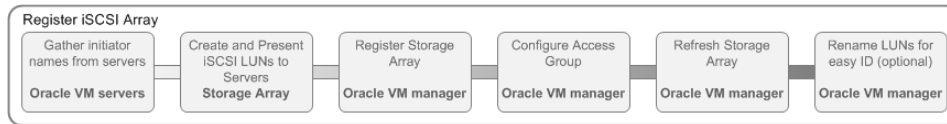


Figure 62: Process flow for registering iSCSI storage array

The process flow for registering external iSCSI storage is illustrated in Figure 62 above shows the specific step we will progress through in this section to configure iSCSI storage for this tutorial.

Gather Initiator Names from Oracle VM Servers

You will need to give your storage administrator the initiator names (IQN) from each of the Oracle VM Servers. The initiator names can be found on the Oracle VM Servers in a file named `/etc/iscsi/initiatorname.iscsi` as shown in Figure 63 below.

```

[root@MyServer1m ~]# cat /etc/iscsi/initiatorname.iscsi
InitiatorName=iqn.1998-12.com.oracle:ed33e7d3dd6
[root@MyServer1m ~]# _
  
```

Figure 63: Cat `/etc/iscsi/initiatorname.iscsi` on each Oracle VM Server

Create and Present iSCSI LUNs to Oracle VM Servers

You will need to request that your storage administrator create the two LUNs for the **pool file system** and **storage repository** as discussed in section **Prepare Centralized External Storage** on page 5 of this document. Your storage administrator will present the LUNs to each of the initiator names found in the previous step. Once this step is completed, you will be able to move onto the next step which is to register the storage array.

Register Storage Array

Once the iSCSI LUNs are ready and presented to all of the Oracle VM Servers, the next step is to **Register Storage Array** by right clicking the **Storage Arrays** folder in navigation tree on the Storage Tab of the Hardware View as shown in Figure 64 below. The key is to create a new storage array rather than use either of the default “Unmanaged” arrays.

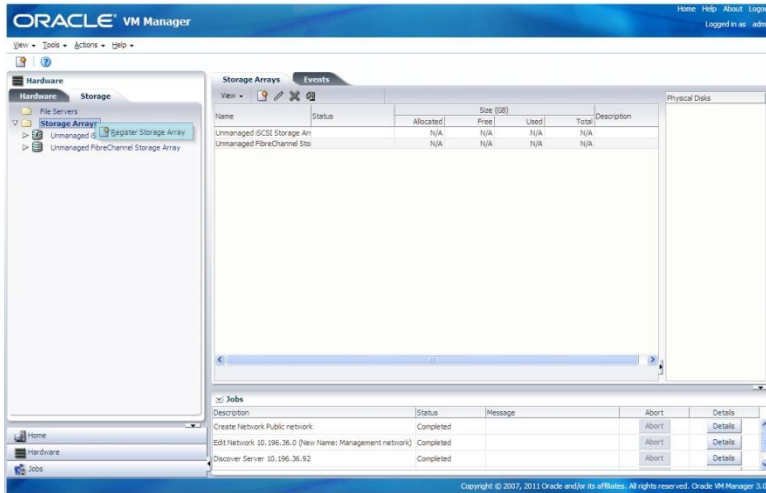


Figure 64: Right click and select Register Storage Array

As shown in Figure 65 below, enter any **user friendly name** that is appropriate for your environment, choose **iSCSI Storage Server** for Storage Type, **Oracle Generic SCSI Plugin** and finally enter the **hostname or IP** address of the storage array where the iSCSI LUNs that have been presented to each of the Oracle VM Servers reside.

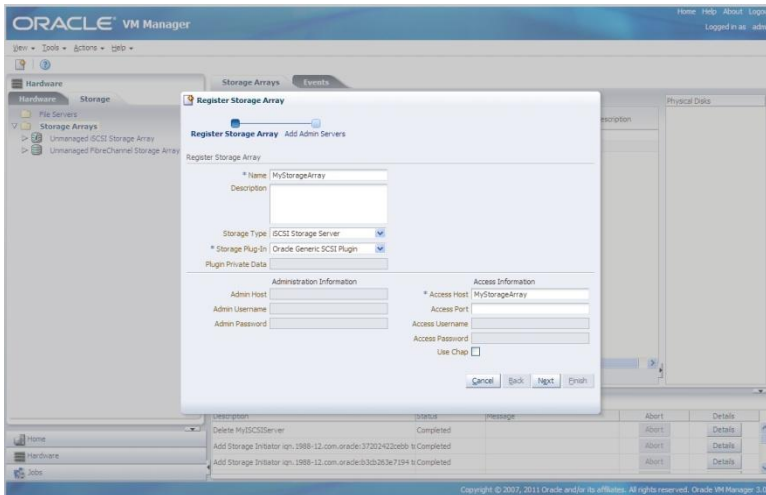


Figure 65: Enter a name, choose storage, iSCSI plug-in and hostname or IP of the storage array

Select Oracle VM Servers that will play the role of **admin server** for completing iSCSI management operations. Admin servers are simply servers that are allowed to execute Oracle VM agent transactions on behalf of the Oracle VM Manager – the more the better.

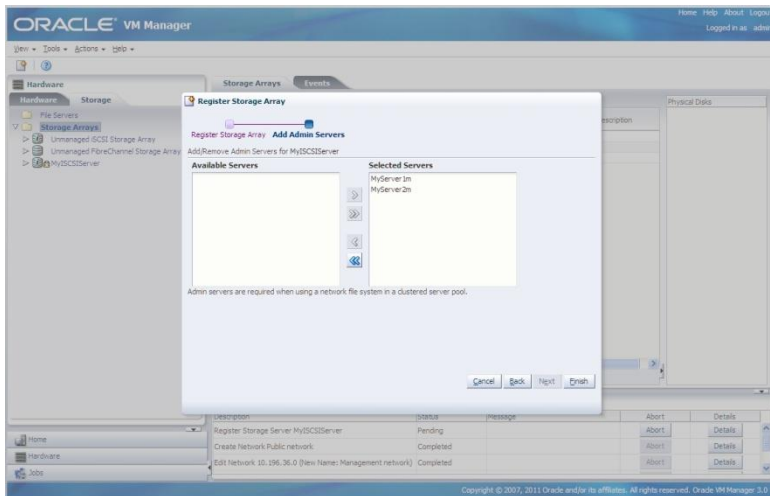


Figure 66: Select Oracle VM Servers to act as admin servers for managing iSCSI disk operations

Configure Access Group

At this point, we have only told the Oracle VM Manager that an iSCSI array exists; we have not actually created or established any connection between the Oracle VM Servers and the iSCSI array. It is important to note that the process of registering an iSCSI array does not discover any iSCSI LUNs, so don't expect to find any LUNs yet. The process of **configuring an access group** is responsible for creating the iFace definitions on the Oracle VM Servers and establishing a session between initiators (Oracle VM Servers) and the target (iSCSI storage array). To add an access group, simply navigate to the **Default access group** found under the folder for the **iSCSI storage array you registered** in the previous step. Right click on the **Default access group** object in the navigation tree and select **Edit Access Group** as shown in Figure 67 below.

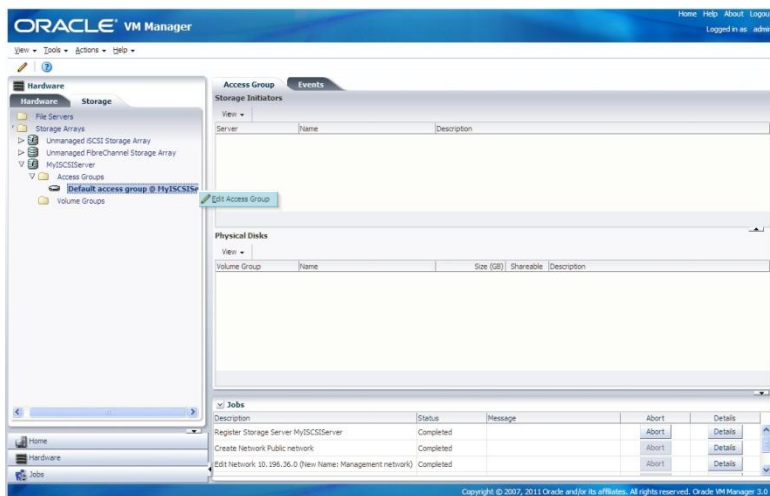


Figure 67: Navigate to Access Groups folder and select Edit Access Group to create an access group for the storage array

Select the initiator names for all Oracle VM Servers. These are the same initiator names you gave to your storage administrator in the first and second steps of this section. Once you select OK, the Oracle VM Manager will instruct the Oracle VM agents on each Oracle VM Servers to create the default iface record and establish a working session by logging into target.

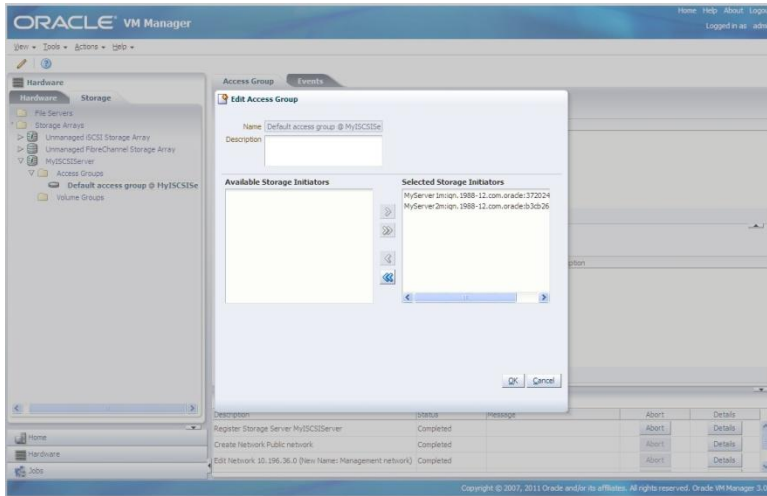


Figure 68: Select initiator names from all Oracle VM Servers

You should now see the fully configured access group as shown in Figure 69 below once the access group creation has completed. The iSCSI LUNs will not be accessible until the next step of refreshing the storage array is completed.

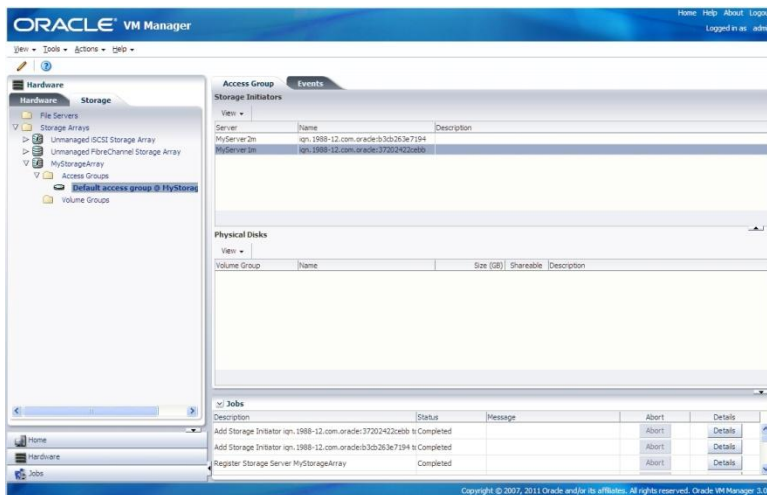


Figure 69: Completed access group

Refresh Storage Array

This will discover the actual LUNs and make them available to the Oracle VM Manager. Highlight the folder of the iSCSI storage array you created, then right click and select **Refresh Storage Array**.

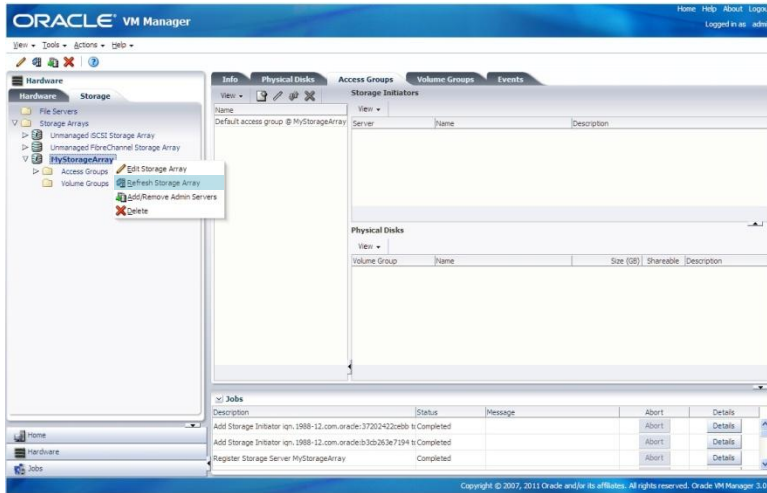


Figure 70: Select Refresh Storage Array

The iSCSI LUNs will be discovered and made available to the Oracle VM Manager as shown in Figure 71 below under the **Generic_iSCSI_Volume_Group** under **Volume Groups** of the iSCSI array you registered. The LUN names that appear will likely be different than what is shown below since they are named using whatever your storage vendor uses to identify their LUNs.

TIP: Please note that if the iSCSI LUNs don't all appear under the **Generic_iSCSI_Volume_Group** folder, please also look in the **Unmanaged iSCSI Storage Array** folder. Sometimes the LUNs appear under the default generic unmanaged iSCSI storage array folder when they have not been presented correctly from the iSCSI array you registered.

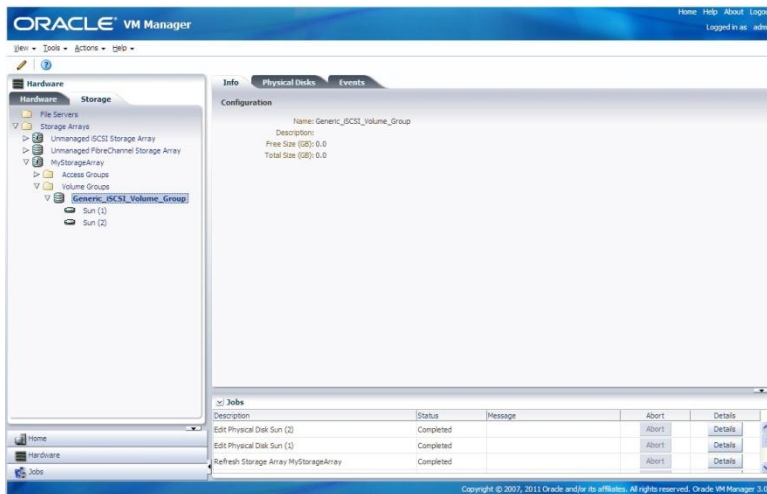


Figure 71: iSCSI LUNs as they might appear after the refresh has completed

You may now move to the final optional step in this section or turn back to the next step in the overall process which should be the **Create Server Pool** section on page 32 of this document.

Rename LUNs for Easy Identification (optional)

Renaming the LUNs to use an easy to remember name will help you keep the use and role of the LUN straight in subsequent steps in the overall process flow in the rest of the tutorial contained in this document. Simply right click on each LUN shown in the **Generic_iSCSI_Volume_Group** (which also be renamed by-the-way) under **Volume Groups** of the iSCSI array you registered and then select **Edit Physical Disk**.

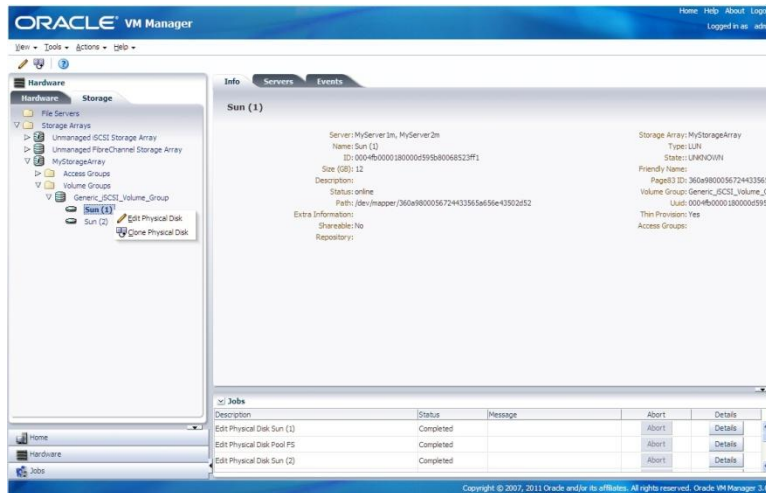


Figure 72: Select Edit Physical Disk to change LUN names

Simply change the existing generic name of the LUN in the dialog box (not shown) to something that makes sense in your environment – this will be just like the other property dialog boxes in other steps you’ve already accomplished.

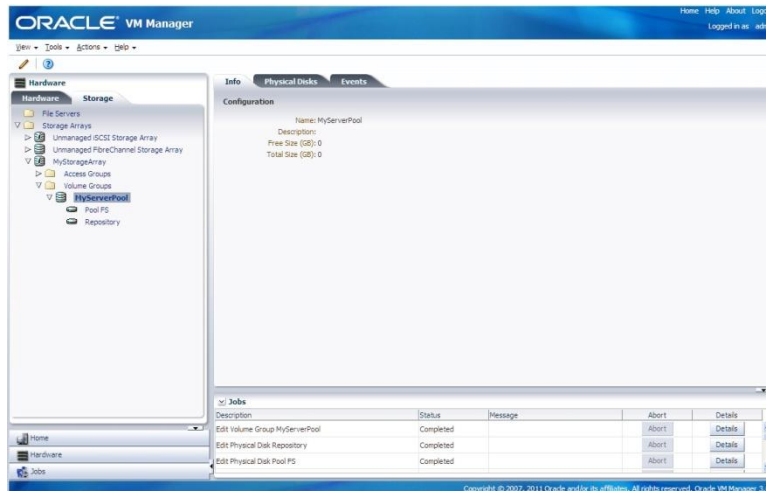


Figure 73: LUN names should look something like the above (actual names are up to the reader)

The LUNs should now look something like the screen shot shown above. You may now turn back to the next step in the overall process which should be the **Create Server Pool** section on page 32 of this document.

Appendix B: Register Storage, Option 3 using FCP



Figure 74: Illustration showing relative position of the material covered in this section within the overall process flow

The above process flow shows where this section appears in the overall process flow for creating a server pool. This section assumes the reader has already completed the other four steps in the Create Server Pool section of this document such as discovering servers, configuring network resources and creating a pool of MAC addresses. The reader should be at the point of Registering a Storage Array as shown in the process flow above.

Critical Notes About the Process

As a reminder, all of the following activities related to Oracle VM 3 are accomplished using Oracle VM Manager. There are no tasks that require the user to log into or use the command line on any Oracle VM Servers.

This document does not attempt to explain FCP concepts and it is assumed the reader is already familiar with FCP concepts and terms. The reader should know how to create and present LUNs from a Fibre Channel storage array.

Please keep this tutorial simple by creating and presenting only the two basic LUNs needed to complete the tutorial: (a) the server pool file system, and; (b) the storage repository as discussed in the **Prepare Centralized External Storage** section on page 5 of this document.

At the time of this writing, only generic Storage Connect Plug-ins are packaged with Oracle VM 3. This means that the Fibre Channel disks (LUNs) will have to be created and presented to the Oracle VM Servers using whatever process the reader currently uses outside of Oracle VM 3. In other words, log into the external Fibre Channel array, create the LUNs as discussed in the **Prepare Centralized External Storage** section of this document and finally present or map the LUNs from the array to the Oracle VM Servers. All of this work is done on the storage array and there is no need to log into any of the Oracle VM Servers. Return to this document once the work has been completed on the storage array.

Registering Fibre Channel Disks in Oracle VM Manager

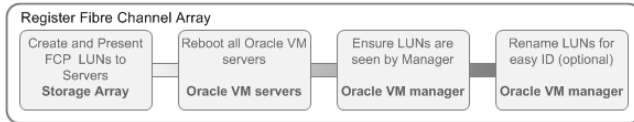


Figure 75: Process flow for registering FCP storage array

The process flow for registering external Fibre Channel (FCP) storage illustrated in Figure 62 above shows the specific steps we will progress through to configure FCP storage in this section.

Create and Present FCP LUNs to Oracle VM Servers

The Fibre Channel LUNs must first be created on the Fibre Channel storage array and presented to each Oracle VM Server using the World Wide Port Name (WWPN). The method for creating and presenting FCP LUNs to Oracle VM Servers is beyond the scope of this document. Contact your storage administrator for further help.

Reboot all Oracle VM Servers

You must reboot the servers after the Fibre Channel LUNs have been created and presented to the Oracle VM Servers by your storage administrator. The Oracle VM Servers can be restarted using Oracle VM Manager as shown below in Figure 76.

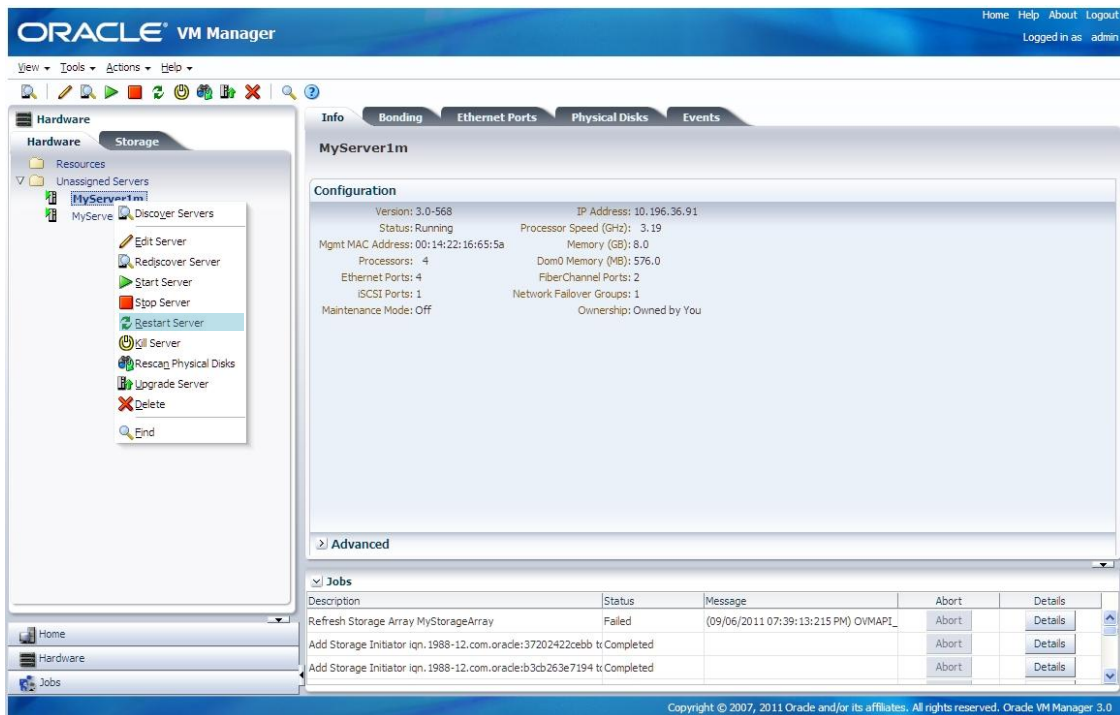


Figure 76: Restart servers

Ensure FCP LUNs are Visible in Oracle VM Manager

Fibre Channel (FCP) is a little different from the other two storage protocols because the Register Storage Array process is not used. This is because any Fibre Channel disks that are presented to servers are automatically discovered during the boot process of a Oracle VM Server. Essentially Fibre Channel disks are just “there” as if they were internal disks. After discovering servers in the first step of the Create Server Pool section, the disks should be visible on the navigation tree of the **Hardware View storage tab** under the **Unmanaged FibreChannel Storage Array** folder as shown in Figure 77 below; there should not really be anything for the reader to do in order for Oracle VM Manager to see the disks.

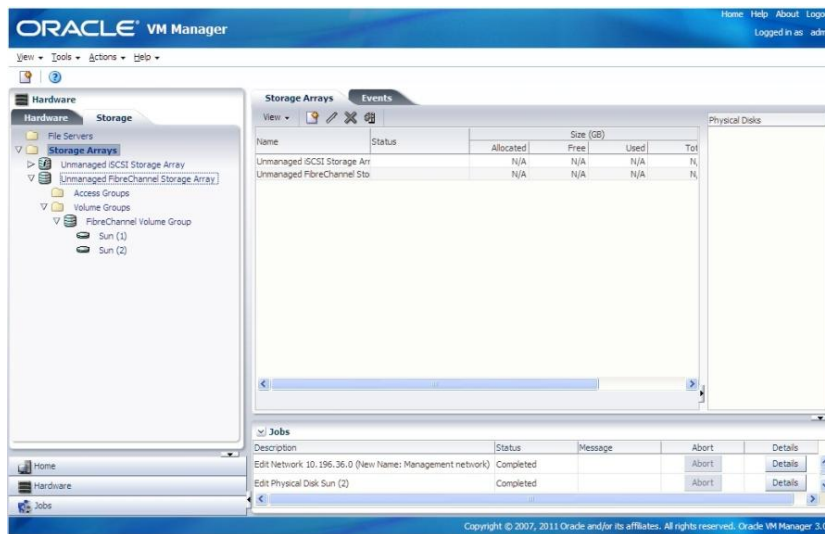


Figure 77: Fibre Channel LUNs should be automatically discovered within the Unmanaged FibreChannel Storage Array folder

If the LUNs do not simply appear under the **Unmanaged FibreChannel Storage Array**, then there is a problem such as the Fibre Channel HBA settings on the Oracle VM Servers are not correct, the zone or zone configuration is not correct on the Fibre Channel switches or the configuration is not correct on the Fibre Channel storage array. Trouble shooting Fibre Channel issues is very complex and beyond the scope of this document.

Keep in mind that there is nothing that needs to be configured on the Oracle VM Servers to enable the use of Fibre Channel LUNs. If anything is wrong on the Oracle VM Servers it will something like the Fibre cable is not connected to the HBA or the Fibre Channel HBA is not configured correctly at the firmware level.

Rename LUNs for Easy Identification (optional)

The final optional task in this section will be to change the names of the Fibre Channel disks to make it easier to ascertain their purpose or role in subsequent steps. Simply select each disk in turn in the navigation tree and right click to choose **Edit Physical Disk** from the menu and change the names of physical devices to something more meaningful as shown in Figure 78 below.

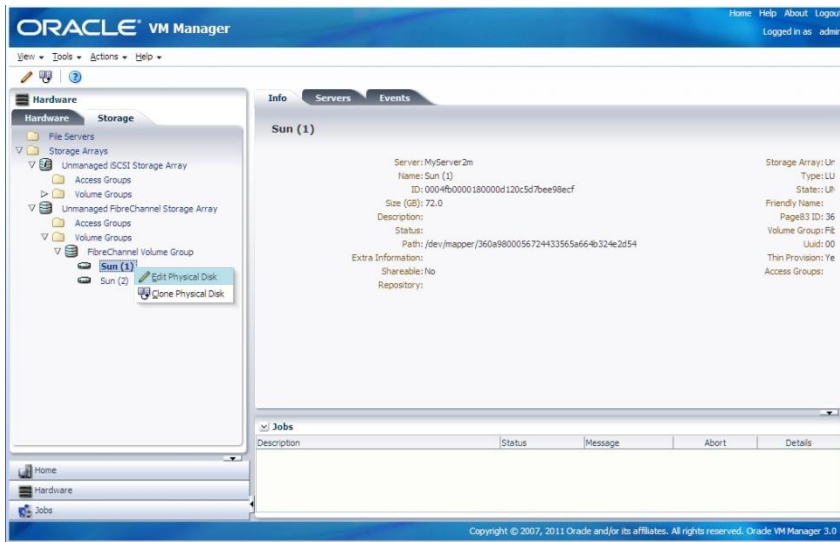


Figure 78: Right click to select Edit Physical Disk

Associating particular LUNs as presented in the manager to the actual underlying LUN on the storage array involves some investigation that is beyond the scope of this document, so just use the difference in LUN sizes to determine which LUN is intended for the pool file system and which one is the storage repository. Use the dialog box shown in Figure 79 below to add any friendly name of your choice that describes the role of the selected LUN, such as “Repository”.

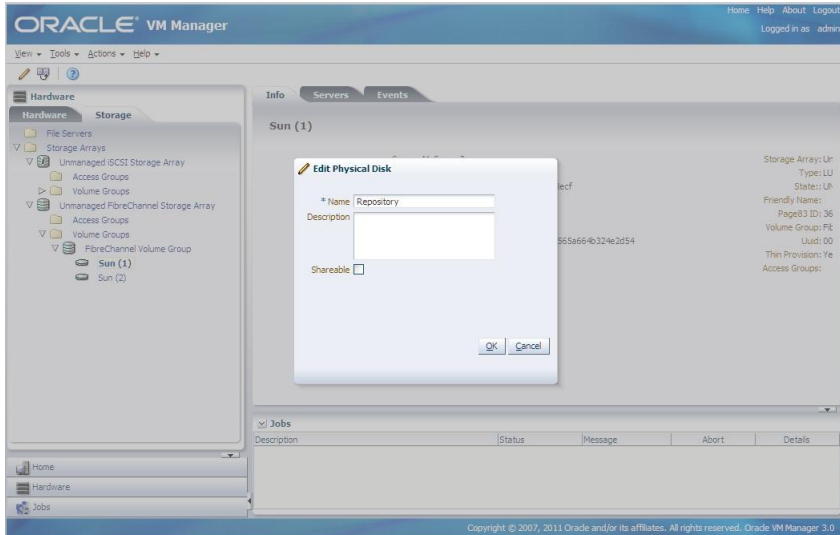
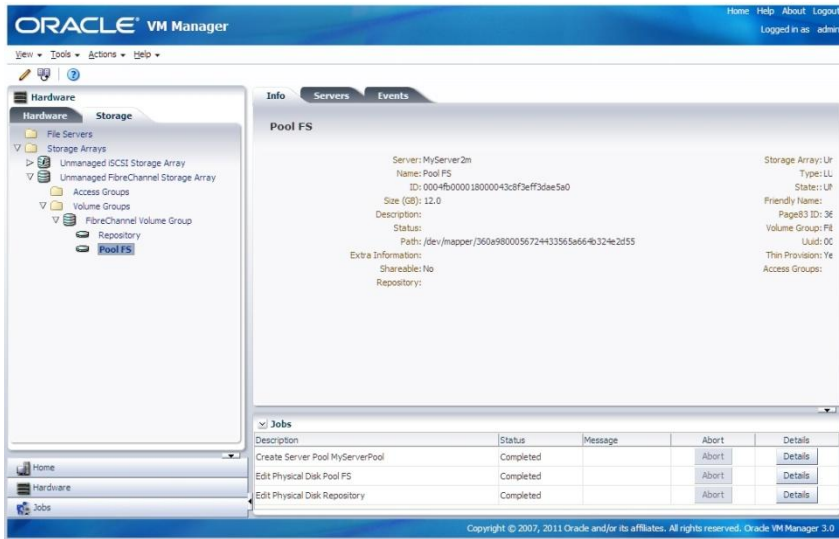


Figure 79: Change the name of the Physical Disk to make it easier to identify in subsequent steps

The LUNs should now look something like the screen shot shown below.



You may now turn back to the next step in the overall process which should be the **Create Server Pool** section on page 32 of this document.

Appendix C: Create a Server Pool Using Local Disk Only

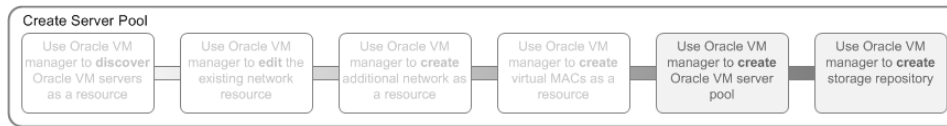


Figure 80: Illustration showing relative position of the material covered in this section within the overall process flow

The process of creating a single node server pool using local disk diverges quite a bit from the processes used to create a server pool using NFS, iSCSI or FCP. So, all remaining steps for creating a server pool are covered in this appendix. The reader will still need to complete the process of creating an Oracle VM guest once all the tasks in this appendix have been completed – see **Next Steps** at the end of this appendix for more detail.

Local disk is made available during the server discovery process so there is no need to register storage as with NFS or iSCSI. The key to this process is to create a non-clustered server pool.

Critical Notes About the Process

Local disks must contain no partitions. The process of creating a server pool using local disk will fail if a local disk has a partition. All partitions should have been cleared during the installation of Oracle VM Server. If not, then you should be able to remove any existing partitions and/or file systems using Oracle VM Manager. This process is not covered in this document since it is assumed any partitions would have been cleared during the installation of Oracle VM Server.

Using local disk as a storage repository is extremely limited in scope and precludes the use of any Oracle VM high availability features including Live Migration or the reassignment of the master server role.

Keep in mind that a non-clustered server pool still requires a Virtual IP. The Virtual IP is used by the Oracle VM Manager to designate the first Oracle VM Server as pool master server. However, the Virtual IP is only assigned to the very first Oracle VM Server and is never moved to any other Oracle VM Server in a non-clustered server pool. So, although Oracle VM will allow you to add multiple servers to a non-clustered server pool, the Oracle VM manager will not be able to manage any remaining servers if the one and only master server fails.

Oracle VM provides the capabilities and tools to allow different organizations to shape solutions that fit the needs of their business requirements. Although not a best practice, Oracle VM 3 has the flexibility to manage a single node server pool using only local disk on each Oracle VM Server or even utilize a mixture storage technologies with some Oracle VM Servers using local disk while others (or all) in the same server pool use shared, centralized external storage.

Create the Server Pool

The first step is to create a **non-clustered** server pool. A non-clustered server pool does not require a server pool file system which is the key to creating a server pool using local disk. Ensure the **Home** view is displayed, then right-click the **Server Pool** folder and select **Create Server Pool** from the menu.

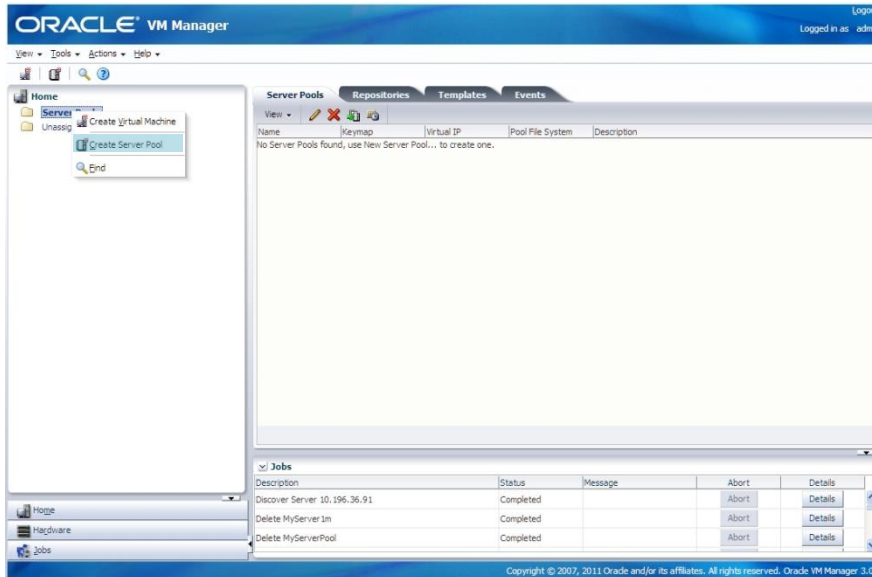


Figure 81: Select Create Server Pool to begin the process

Add a **Server Pool Name**, **Virtual IP** (still required even with a single node server pool) and uncheck the **Activate Cluster** box as show in Figure 82 below.

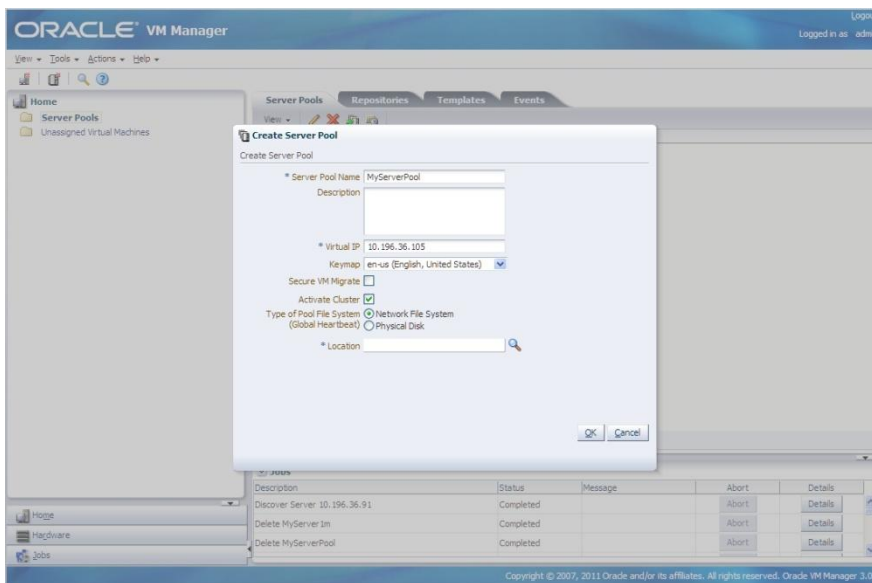


Figure 82: Dialog box for the Create Server Pool wizard

It is important to **uncheck** the **Activate Cluster** box in the **Create Server Pool** wizard. It is not possible to use local disk for the pool file system, so the pool file system buttons will become unavailable once the **Activate Cluster** box has been unchecked as shown in below.

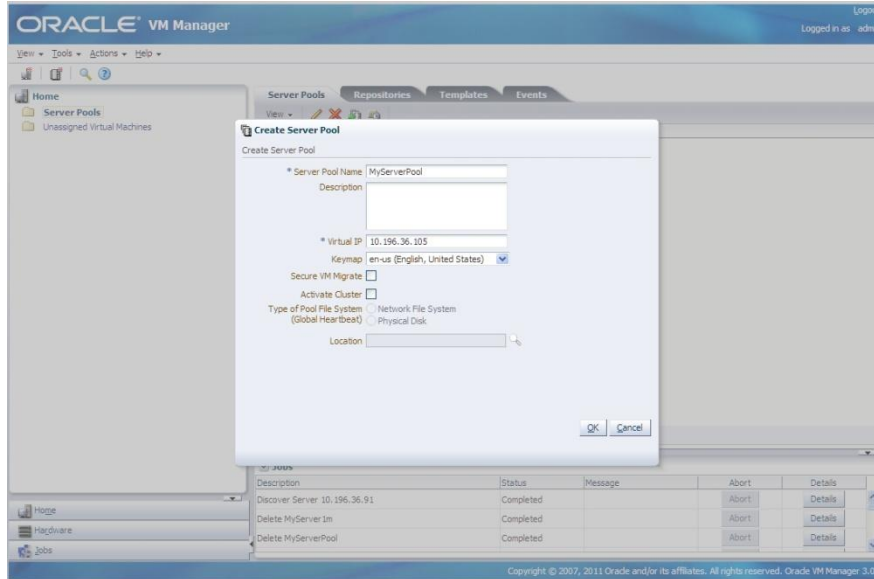


Figure 83: Create Server Pool dialog with Activate Cluster box unchecked

The server pool is initially created without any servers or storage repositories. Figure 84 below shows an example of what the completed server pool should look like at this point in the process.

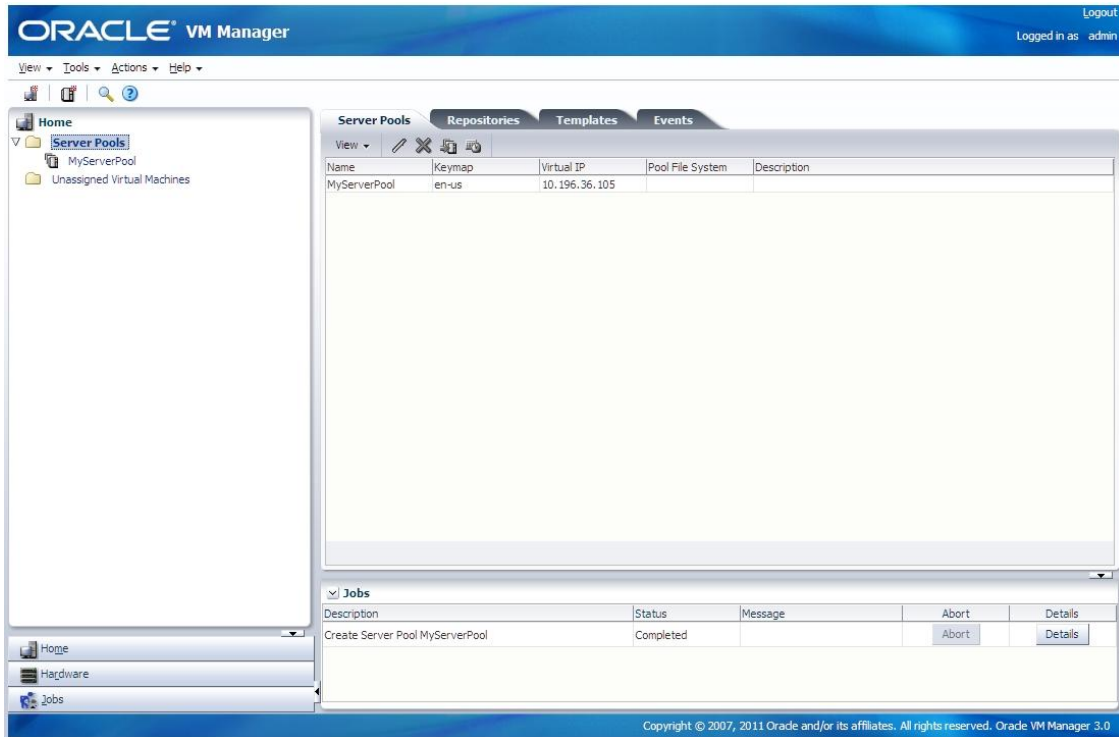


Figure 84: Showing a completed server pool with no Oracle VM Server yet

Add an Oracle VM Server to the Pool

The next step in the process of creating a server pool using local disk is to add the Oracle VM Server to the server pool. This step makes the local physical disk visible to the Oracle VM Manager so the storage repository can be created in a later step. **Do not skip this step** or the Oracle VM manager will not be able to display any local disks to use for the storage repository in later steps.

Begin by highlighting the server pool, right-click and select **Add/Remove Servers** from the menu as shown in Figure 85 below.

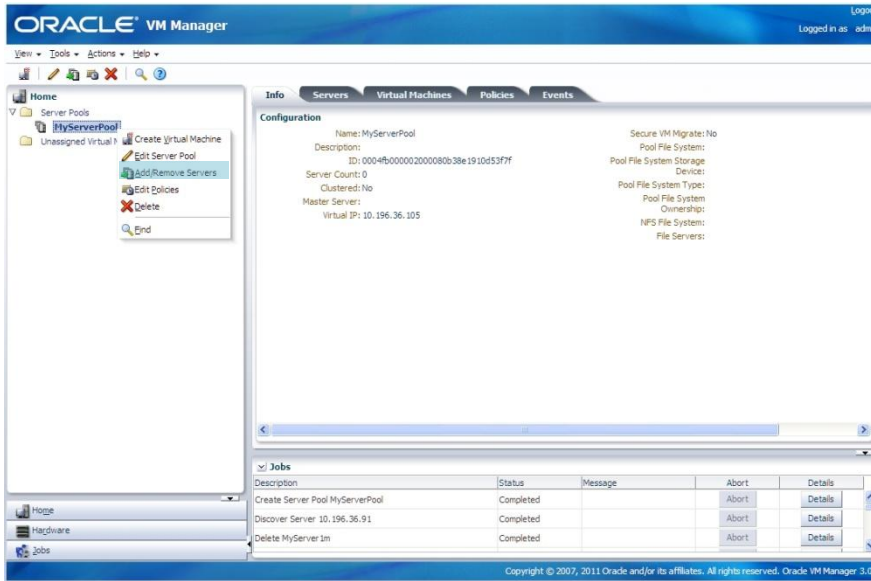


Figure 85: Select Add/Remove Servers to add the server to the pool

Select and move the Oracle VM Server to the **Selected Servers** box as shown below in Figure 86, then choose **OK**.

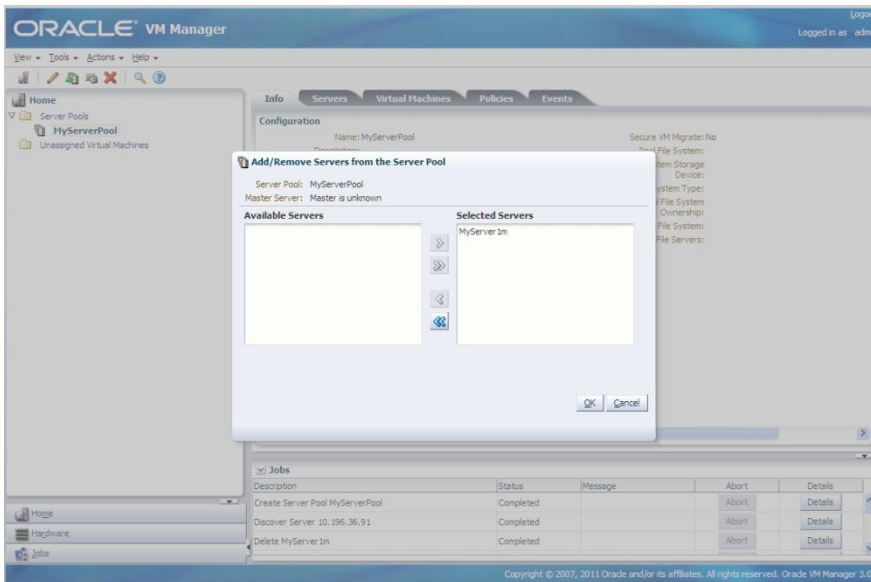


Figure 86: Select only one Oracle VM Server to add to the pool

The next screen shot in Figure 87 below illustrates the server pool as it should look at this point in the process before the storage repository is added in the last step of the creating a server pool using local disk.

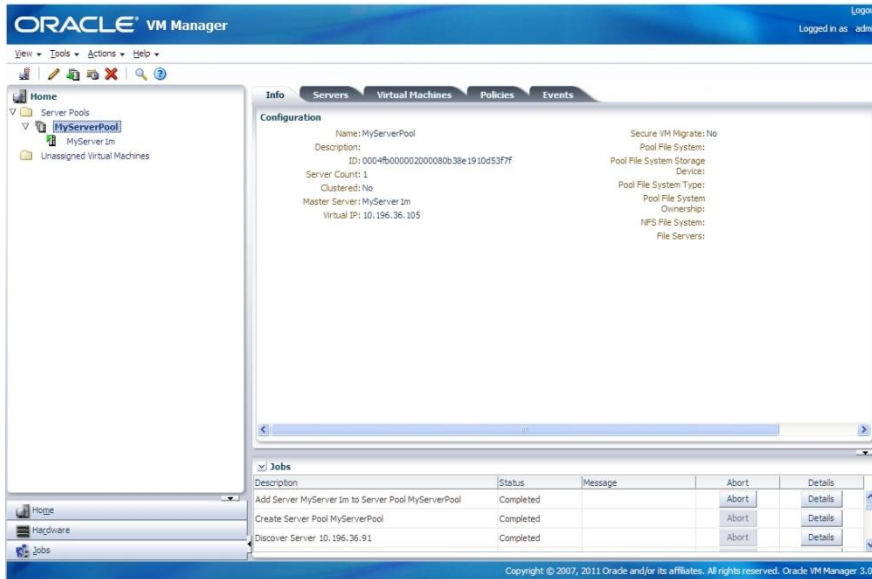


Figure 87: Showing server pool with one Oracle VM Server

Create the Storage Repository

The final step in the process will include creating a storage repository using the local disk that should now be visible once the previous step has been completed. Highlight the **Server Pools** folder in the navigation tree then select the **Repositories** tab. Select the Create Repository icon from the Management Pane toolbar just below the tab as shown in Figure 88 below.

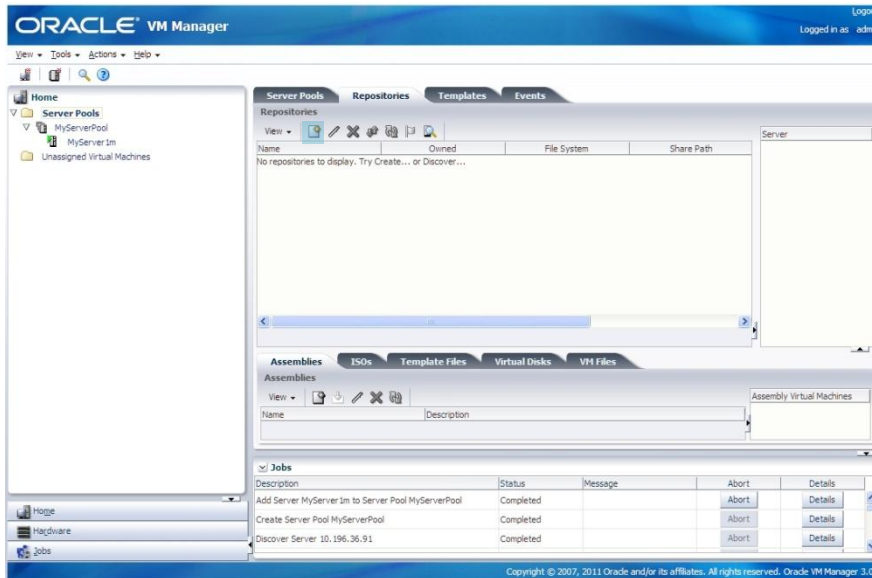


Figure 88: Select the Create Repository icon from the management pane toolbar

Add a repository **Name**, select the **Physical Disk** radio button and then select the **Physical Disk** browse icon to choose a local disk for the repository.

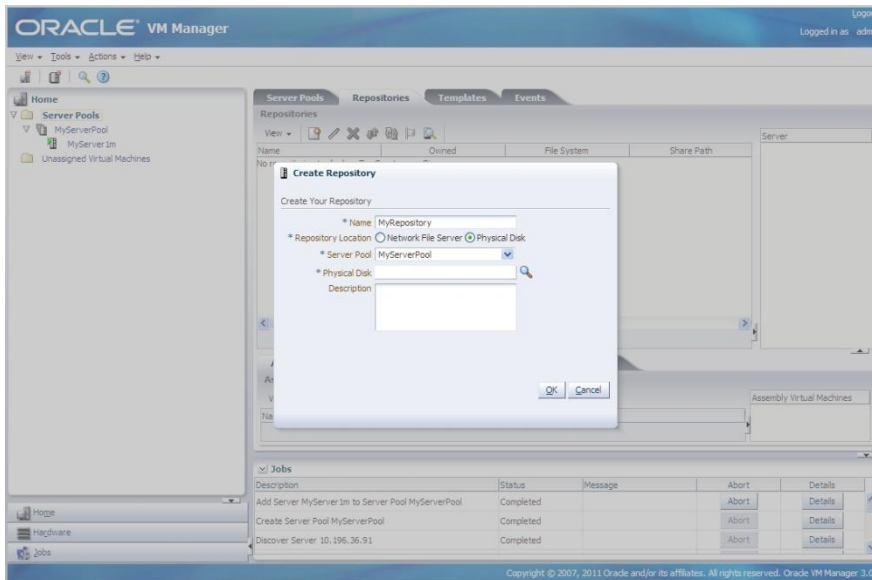


Figure 89: Add a repository Name and physical disk using the Create Repository wizard

The Select **Physical Disk** dialog will allow you to choose a local physical disk to use for the storage repository. It is normal not to see any local physical disks when the dialog box opens initially as shown in Figure 90; local physical disks will be displayed once the correct “storage array” is selected from the combo box.

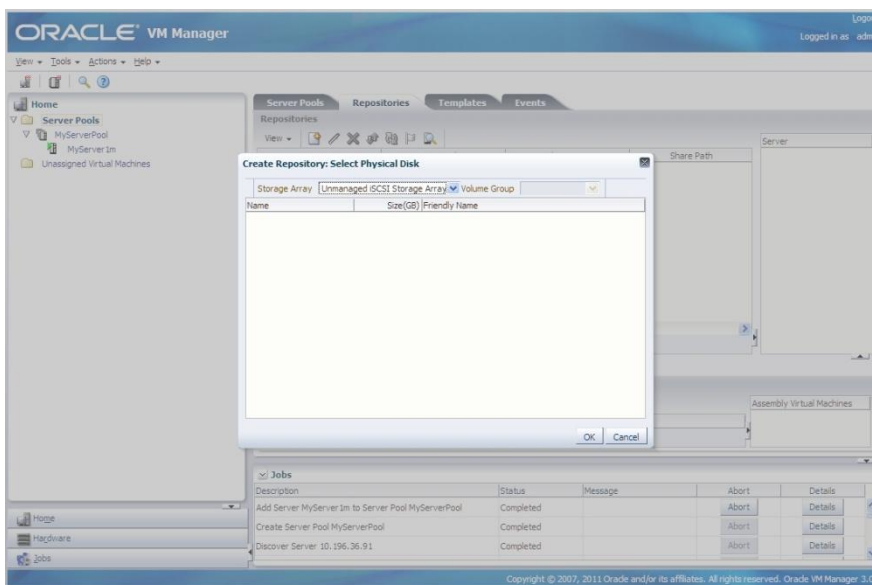


Figure 90: The Select Physical Disk dialog box does not show any disks normally

Pull down the **Storage Array** combo box and select the “**Generic Local Storage Array @ MyServer1**” (your server name may differ). This action will display all disk drives that are local to the Oracle VM Server. Simply **select a disk** to use for the repository and then choose **OK** to complete the selection.

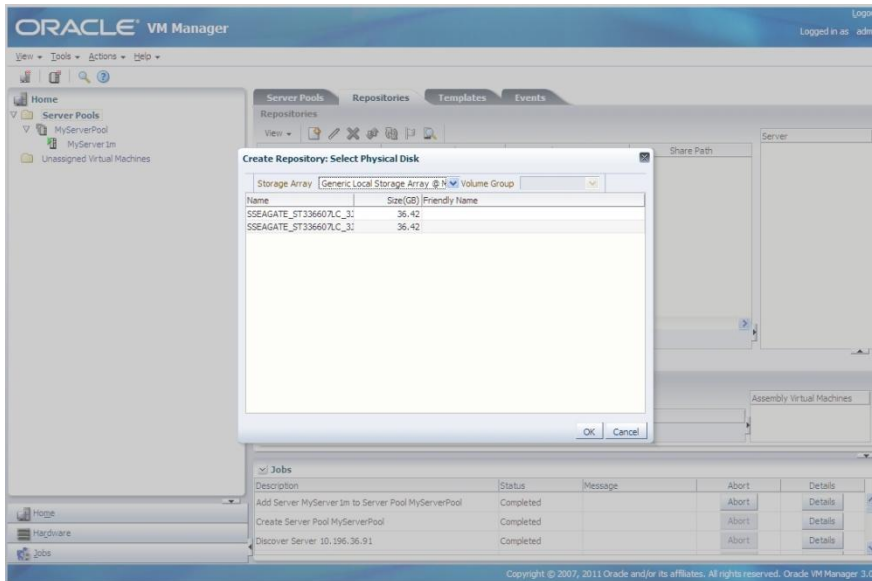


Figure 91: Choosing the physical disk available on the Oracle VM Server

The following screen shot shows all the required fields populated with the choices needed to create a repository using local disk. Simply choose **OK** to complete the create repository task.

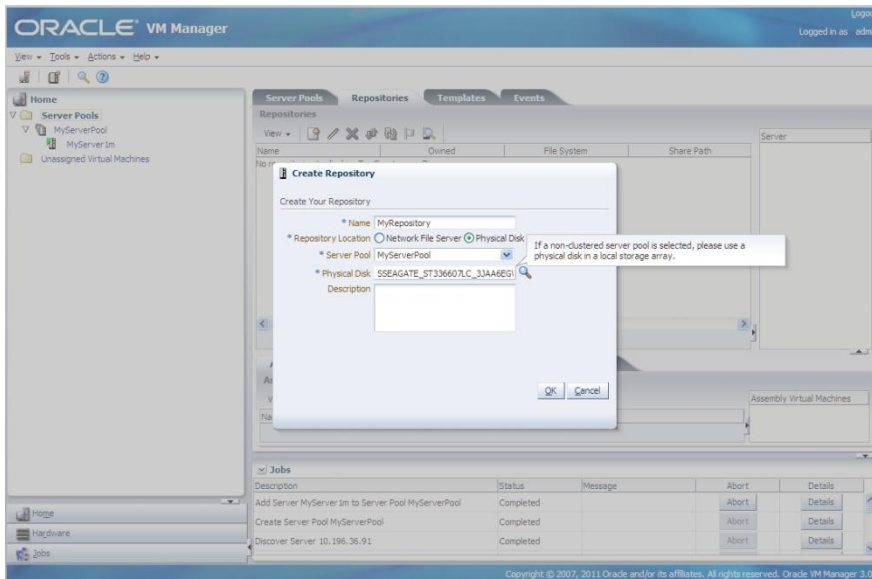


Figure 92: Showing the Create Repository wizard with all required information

The last step is very important and includes assigning the repository to the Oracle VM Server containing the local disk that was used to create the repository. Simply highlight the newly created repository in the management pane then select the **Present/Un-Present Selected Repository** icon from the **Management Pane toolbar** just below the tab as shown in Figure 93 below.

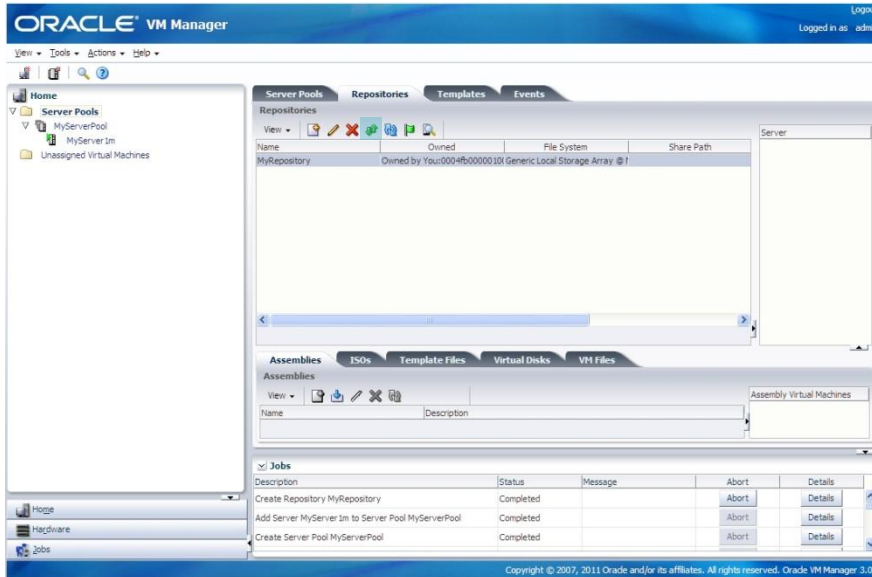


Figure 93: Showing the newly created repository with no assigned server yet

Select and move the Oracle VM Server from the left pane to the right pane and choose **OK** to complete the selection and assignment of the repository to the server.

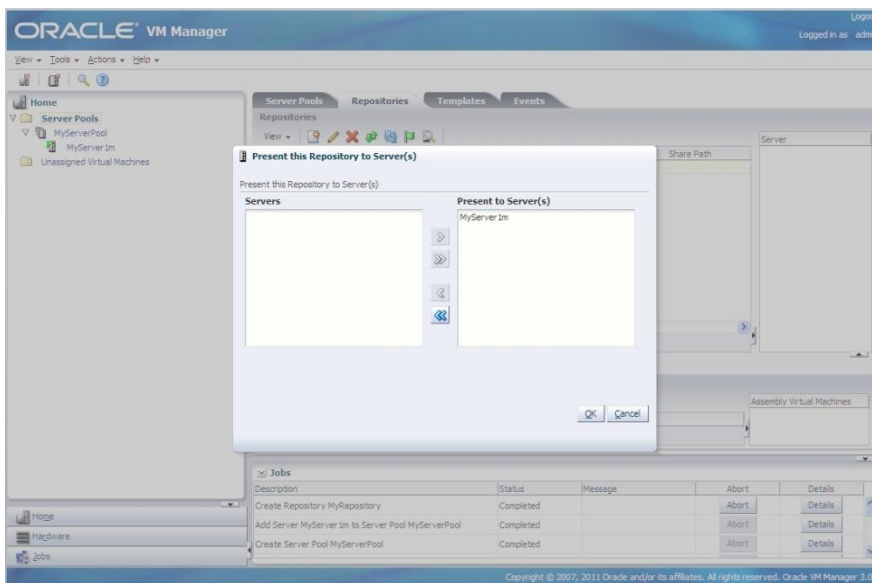


Figure 94: Select server to present to the repository

The completed storage repository should look something like the screen shot below. Note that the Oracle VM Server name appears in the Server pane to the far right of the screen shot when the repository name is highlighted in the Management Pane.

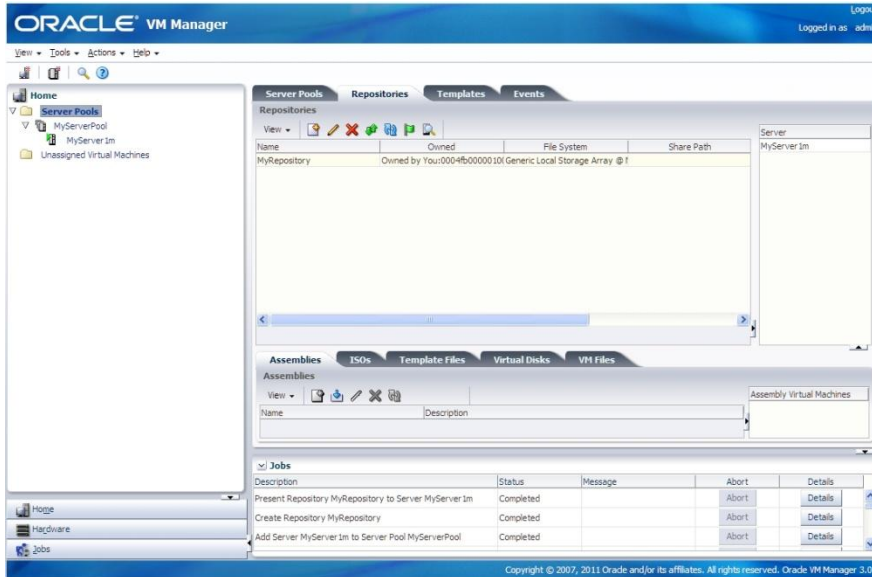


Figure 95: Showing completed server pool with repository assigned to the server

This last step completes the entire activity of creating a basic serve pool using a local disk from a single Oracle VM Server.

Next Steps

You should now have a completed single node server pool using local disk. The next step is to create an Oracle VM guest following the instructions found in the **Create Oracle VM Guest** section beginning on page 40 of this document.



Oracle VM 3: Quick Start Guide
October 2011
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