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OPTIMIZED SOLUTIONS

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Oracle Optimized Solution for Enterprise Cloud Infrastructure — Implementation Guide (x86-Linux)

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Overview/Introduction

The Oracle Optimized Solution for Enterprise Cloud Infrastructure provides an integrated, complete infrastructure with recommendations and best practices for deploying and optimizing an enterprise cloud infrastructure for a highly virtualized environment. It addresses every layer of the infrastructure stack with Oracle hardware and software components including the Oracle VM Server for x86 virtualization solution, Oracle's Sun Blade 6000 modular systems, and Oracle’s Sun ZFS Storage Appliances. This provides a robust, flexible foundation for running enterprise applications, middleware, and database software.

This document describes the setup procedure for cabling and initial configuration of Integrated Lights Out Manager (ILOM) as well as the installation and configuration of Oracle VM Server and Oracle VM Manager in a High Availability (HA) environment.

A future version of this document will also include information on the installation and usage of Oracle Enterprise Manager 12c. For the interim period, please consult the Oracle Enterprise Manager 12c product documentation.

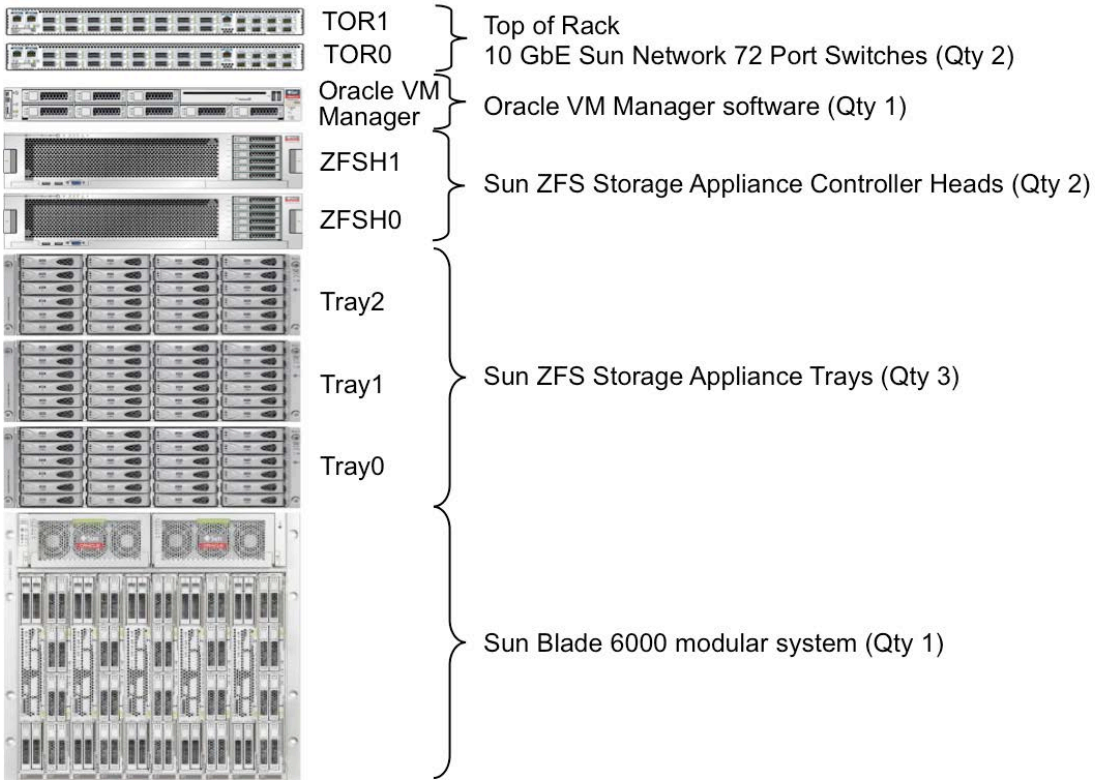
Software Levels

The table below shows the minimum software levels for the Oracle software components that are used in the Oracle Optimized Solution for Enterprise Cloud Infrastructure.

ORACLE PRODUCT NAME	SOFTWARE RELEASE
Oracle Linux	Oracle Linux 5 Update 6 (64 bit)
Oracle Database	Oracle Database 11*g* Release 2 (11.2.0.1)
Oracle VM 3	Oracle VM Server for x86 Version 3.0.3 Oracle VM Manager Version 3.0.3
Sun ZFS Storage 7320 or Sun ZFS Storage 7420	Firmware Version 2010.08.17.3.0,1-1.25
Oracle's Sun Blade 6000 Ethernet Switched NEM 24p 10 GbE Network Switch	SP Firmware 3.0.5.2
Oracle's Sun Network 10 GbE Switch 72p Network Switch	SP Firmware 3.0.5.2

Cabling Configuration

In this Oracle Optimized Solution environment, it is recommended to layout the rack configuration as shown in the figure below.

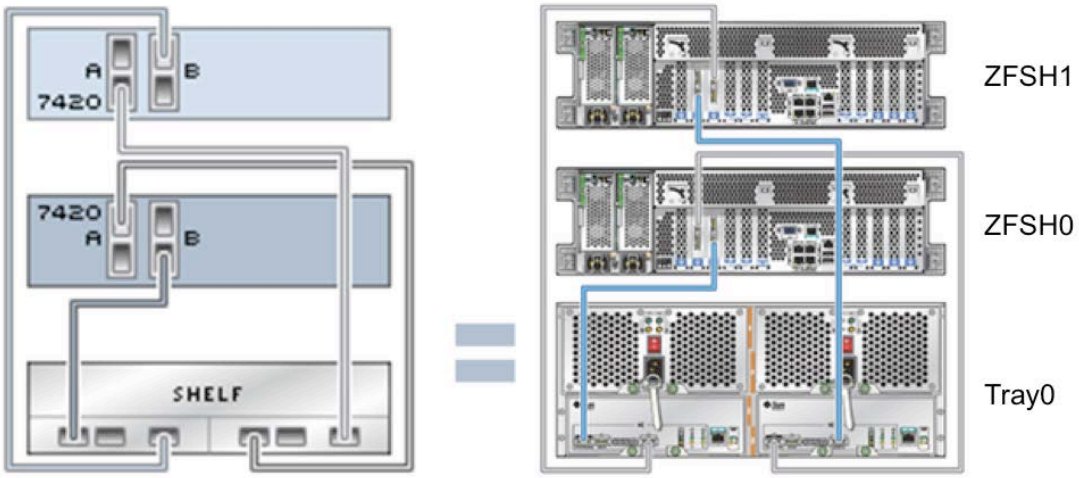


Sun ZFS Storage 7420 Cluster Cabling

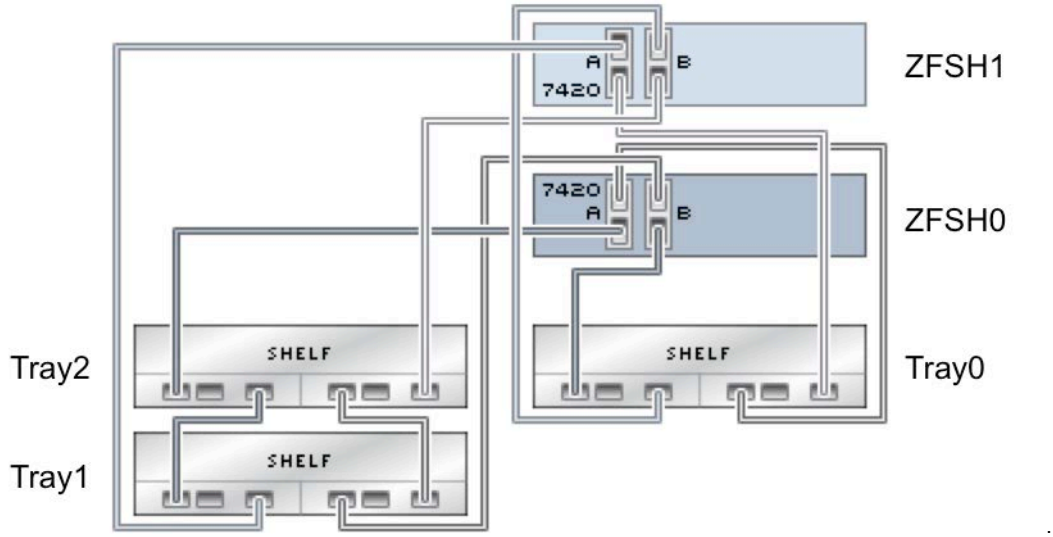
The Sun ZFS Storage 7420 cluster is available with two, three, or four HBA cards installed, each of which can support up to six disk shelves. The two figures that follow show samples of stable, balanced and redundant cluster configurations with two HBAs, as well as steps to migrate from one state to another.

NOTE: The figures below are not necessarily representative of proper slot locations for the HBAs.

The images below show recommended cabling for a Sun ZFS Storage 7420 cluster with one disk shelf and a second cluster configuration with three disk shelves. Product photo images are shown adjacent to a first diagram so that readers can see the correspondence from the logical diagram to the physical equipment.

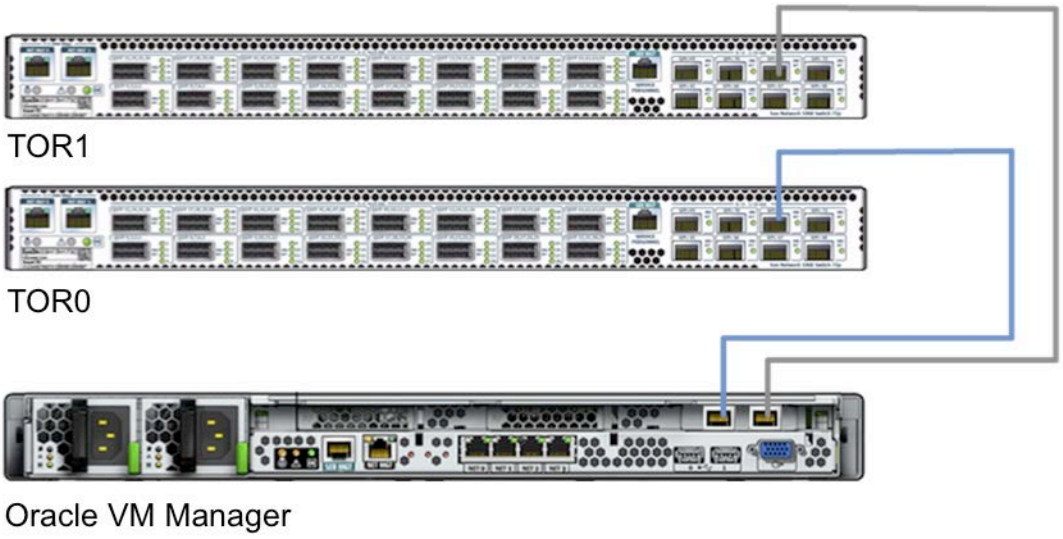


When using a Sun ZFS Storage 7420 cluster with three disk shelves, please cable the storage as shown below.



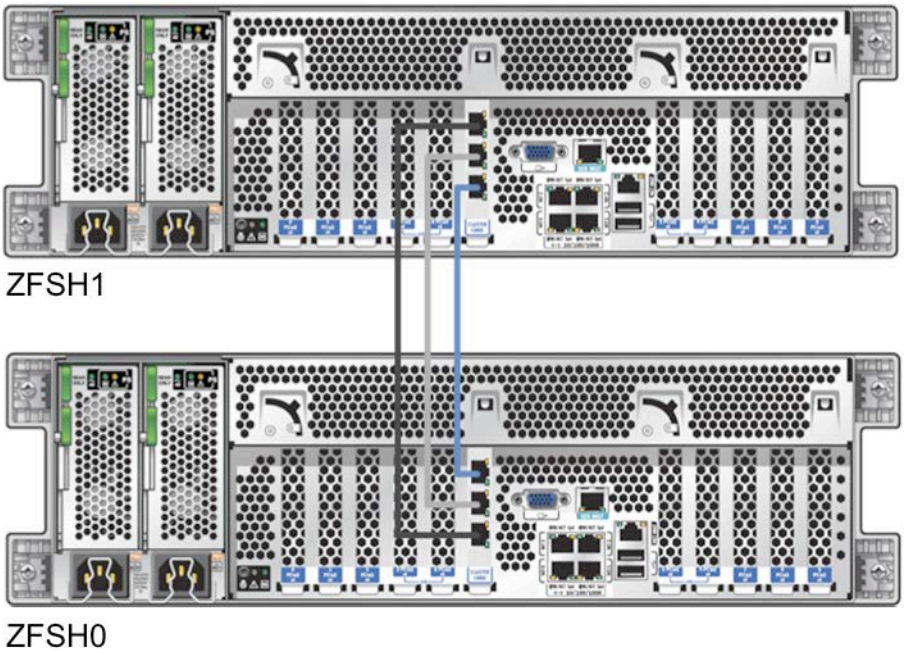
Network Cabling for Oracle VM Manager to Top of Rack Switches

This section details the 10 GbE connectivity between the Sun Network 10 GbE 72 Port Switch and the 10 GbE dual-ported HBAs on the Sun Fire X4170 M2 server that will host Oracle VM Manager. Please make the connections as shown in the figure below.



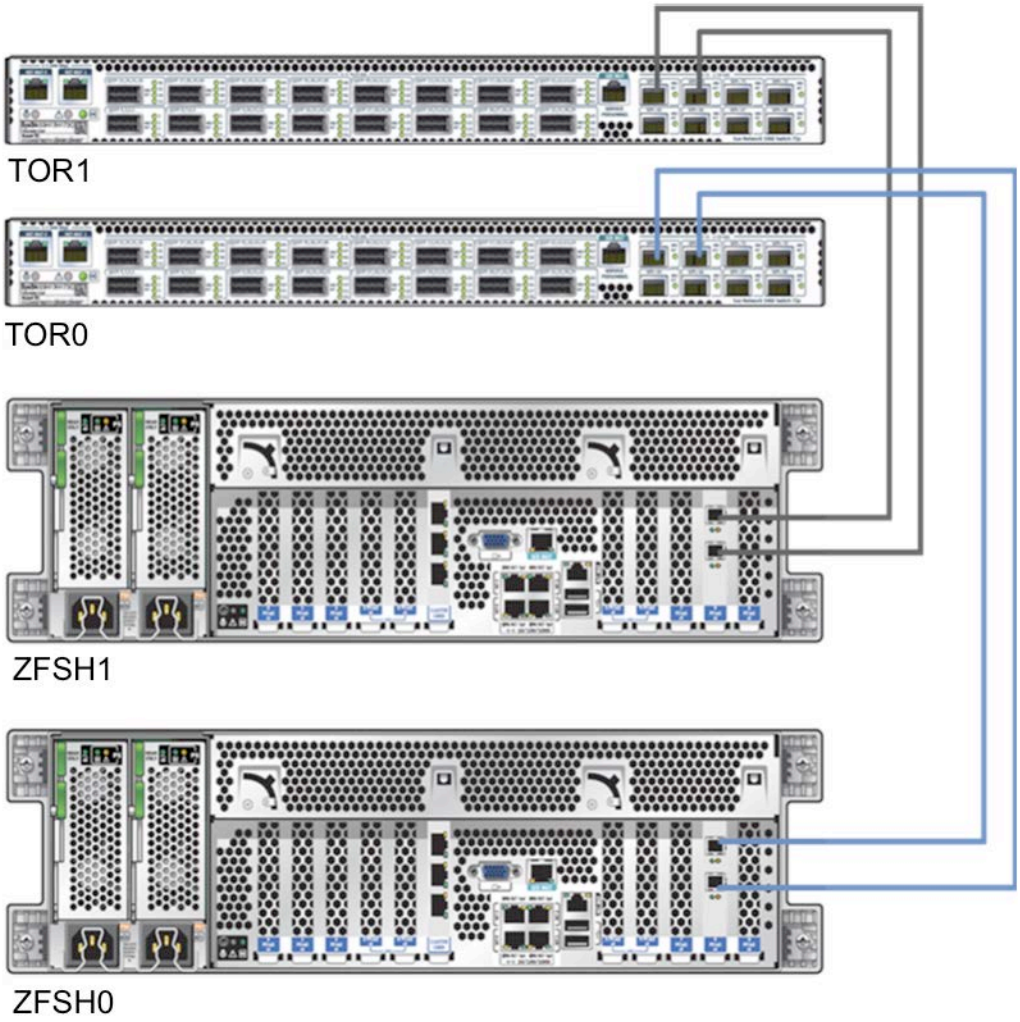
Network Cabling for Cluster Network Card on Sun ZFS Storage Appliances

Please connect the cluster cards for the two Sun ZFS Storage Appliance controllers as shown below.



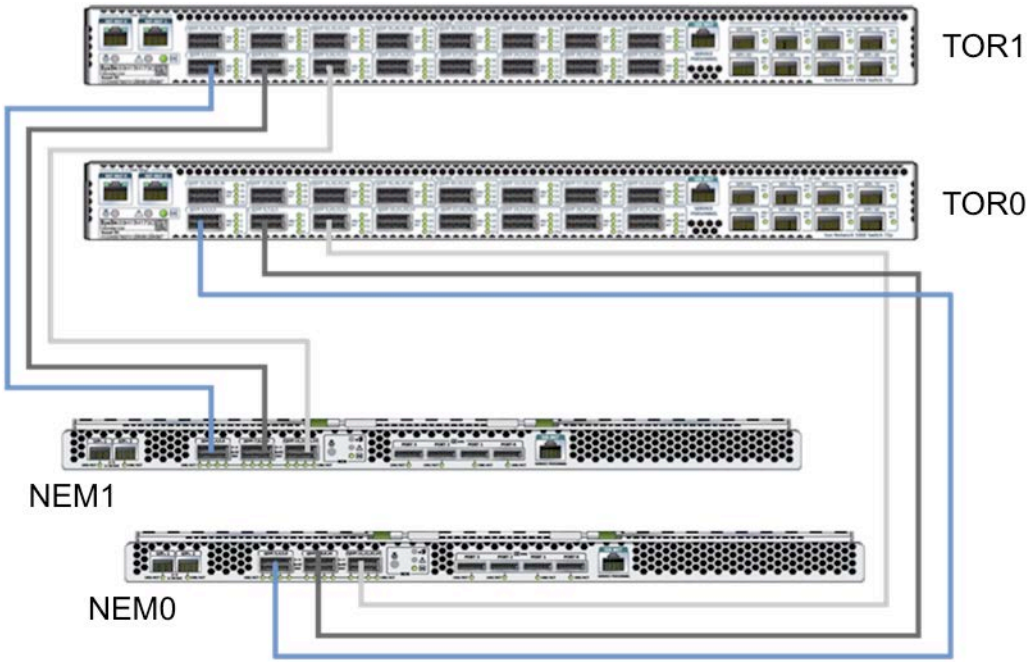
Network Cabling for Sun ZFS Storage Appliances to Sun Blade 6000 Network Express Modules (NEMs)

This section will detail the 10 GbE connectivity between the Sun Blade 6000 Network Express Modules (NEMs) and the 10 GbE dual-ported HBAs on the Sun ZFS Storage 7420 controllers. Please make the connections as shown below.



Network Cabling from NEMs to Top of Rack Switches

This section will detail the 10 GbE connectivity between the Sun Blade 6000 Network Express Modules (NEMs) and the Sun Network 10 GbE 72 Port Switch. Please make the connections as shown below.



Network Cabling Interconnect for Top of Rack Switches

For the purpose of high-availability, the two top of rack switches have a QSFP interconnect to ensure network communication is maintained for the enterprise cloud infrastructure environment.

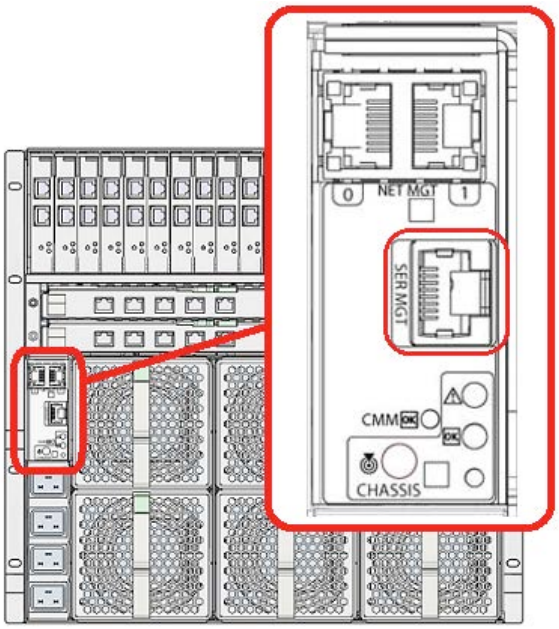
Initial Hardware Configuration

This section describes the steps to setup the enterprise cloud infrastructure. The steps are based upon the assumption that the rack components have all been physically installed, cabled, and powered on.

Sun Blade 6000 Chassis Initial Configuration

Please confirm that all components such as Network Express Modules (NEMs), blade servers, and Express Modules (EMs) have been installed into the Sun Blade 6000 chassis and that the chassis is

powered on. Connect a laptop to the CMM SER MGT Port of the chassis with a serial connection. The CMM SER MGT Port is illustrated in the figure below.



Verify the serial connection with the following serial settings:

- 8N1: Eight data bits, no parity, one stop bit
- 9600 baud
- Disable hardware flow control (CTS/RTS)
- Disable software flow control (XON/XOFF)

Log into the CMM ILOM with the default login credentials:

- Username: root
- Password: changeme

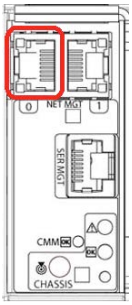
Type the following command to access the /CMM/network directory

```
# cd /CMM/network/
```

Use the following commands to specify the IP, netmask, and gateway addresses for the CMM ILOM:

```
# set pendingipaddress=<IP_Address>
# set pendingipnetmask=<netmask_address>
# set pendingipgateway=<netmask_address>
# set pendingipdiscovery=static
# set commitpending=true
```

When the IP address has been set of the CMM ILOM, you can log into NET MGT port 0. To do this, confirm that the NET MGT port 0, shown below, is connected to the corporate network.



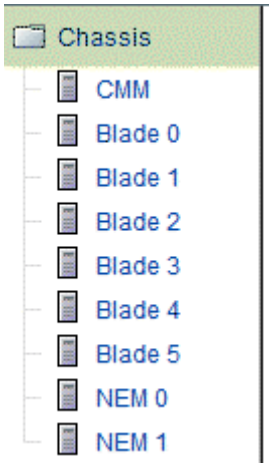
Open a Web-browser on a computer that is also on the corporate network and enter the CMM ILOM IP address into the browser (i.e.: http://<CMM_ILOM_IP_Address>).

From the CMM ILOM NET MGT Web interface, the NEMs and blade server ILOMs can be configured easily.

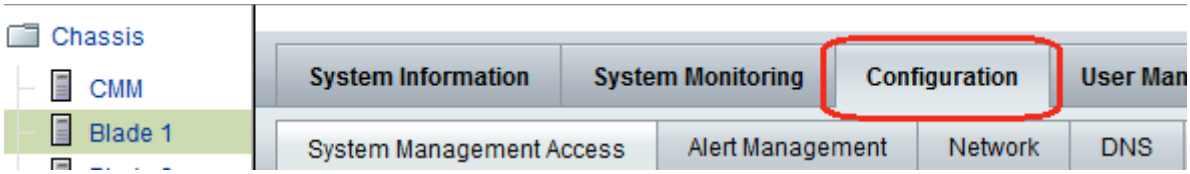
Blade Server Initial Configuration

Log into the CMM ILOM (http://<CMM_ILOM_IP_Address>)

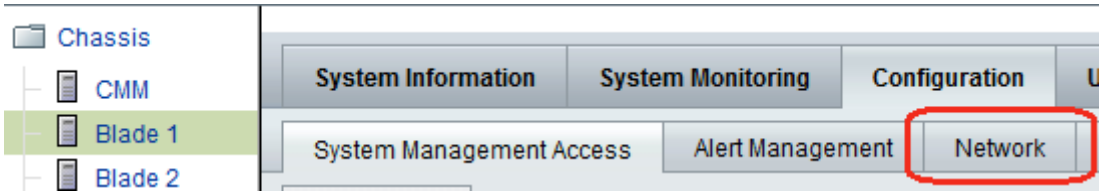
To set the ILOM IP Address of the blade servers, select a blade server (Blade #) from the left hand column, example shown below:



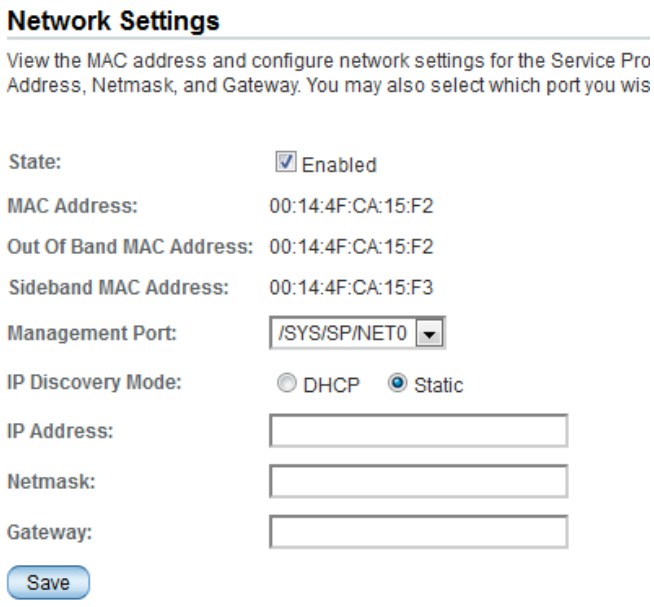
After selecting a server from the available blade servers, select the Configuration tab in the main window.



Then select the sub-tab Network



In the Network Settings section, confirm State is enabled, select Management Port to /SYS/SP/NET0, IP Discovery Mode is static, and enter the correct network information for the blade server's ILOM.



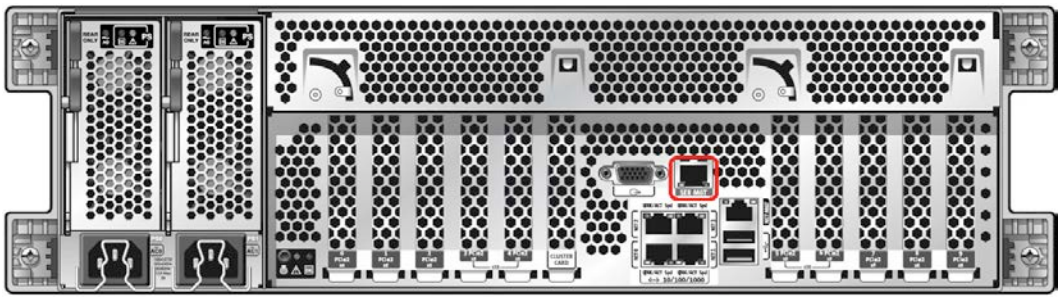
When completed, select Save.

Perform this step with all blade servers and NEMs in the Sun Blade 6000 chassis.

Initial Storage Configuration for Sun ZFS Storage 7420 Cluster

For high availability and optimal performance, an Intel processor-based Sun ZFS Storage 7420 cluster is used as the storage platform environment.

To perform the initial configuration of this storage environment, connect a serial cable from the SERMGT port on the back panel of the first controller (ZFSH0), shown below, to the serial port on the administrative client. Use a DB9 to RJ45 adapter if necessary. Perform the ILOM configuration on both Sun ZFS Storage 7420 controllers, but only perform the NET-0 network configuration procedure on one of the Sun ZFS Storage 7420 controllers (ZFSH0). The clustering configuration will automatically perform the configuration on the second Sun ZFS Storage 7420 controller (ZFSH1).



Connect an Ethernet cable from network port NET0 to the corporate network on both Sun ZFS Storage 7420 controllers. Also connect an Ethernet cable from the Management Network (NET MGT) port

Power on the disk shelves attached to the storage system by plugging the two power cords into the universal power connectors, connecting the cords to the external power source and turning on the disk shelf power switches. Wait several minutes until the power indicators are lit a steady green.

Connect power cables to power supply 0 and power supply 1 on both storage controllers and wait until the Power/OK LED on the front panel next to the Power button lights and remains lit. This will take approximately two minutes.

Open a terminal window or terminal emulator with the below serial settings:

- 8N1: Eight data bits, no parity, one stop bit
- 9600 baud
- Disable hardware flow control (CTS/RTS)
- Disable software flow control (XON/XOFF)

The initial screen should present the following prompt:

->

If not presented with this prompt, rather are prompted to enter the network configuration for the Storage Controller, please continue to with the network configuration for NET-0 as described later in this section, and return to the ILOM IP configuration after the configuration has been completed. To

get into the ILOM console, rather than the Sun ZFS Storage 7420 console, type the following key sequence ESC+((Esc+ Shift+9)

To configure the ILOM for the Sun ZFS Storage 7420 controller, enter the following command:

```
-> cd /SP/network
-> set pendingipaddress=<IP_Address>
-> set pendingipnetmask=<netmask_address>
-> set pendingipgateway=<netmask_address>
-> set commitpending=true
```

Please complete this on the second Sun ZFS Storage 7420 controller (ZFSH1) as well.

When completed, return to ZFSH0 and enter the following command to start the initial configuration of the Sun ZFS Storage 7420 controller network:

```
-> start /SP/console
```

When prompted in the serial session to press any key to begin the initial configuration, press any key.

Enter the appropriate values for the network configuration on only this Storage Controller. To do this, select the appropriate network interface (NET-0, NET-1, etc…) and enter the following information:

- Hostname of the Sun ZFS Storage 7420 controller.
- DNS domain name for your domain, for example us.oracle.com.
- IP address for the Sun ZFS Storage 7420 controller.
- IP netmask for the network on which your Sun ZFS Storage 7420 controller resides.
- Network gateway information.
- DNS server IP address.
- Desired root user password.

Press the Enter key when completed.

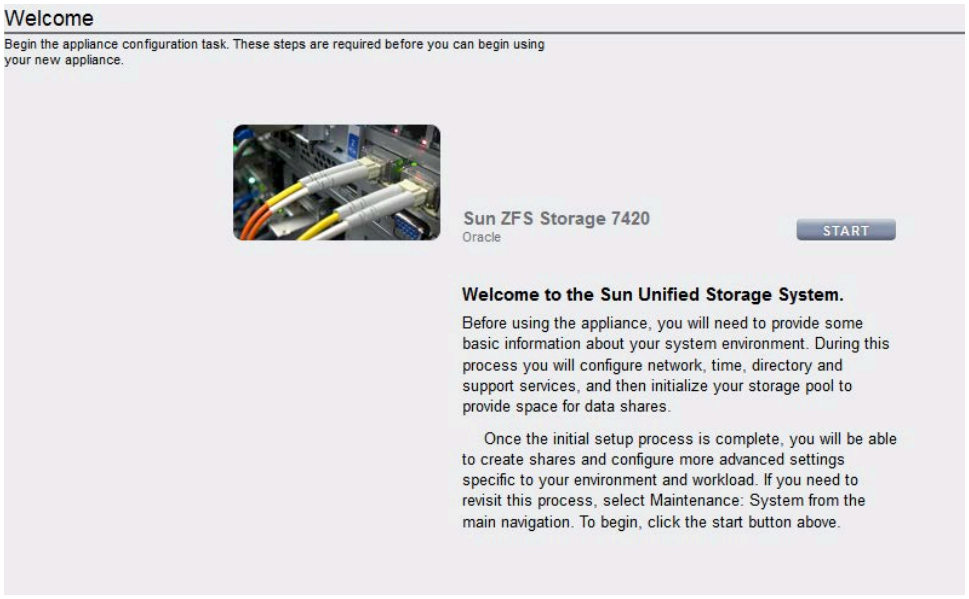
After properly configuring the storage controller via the serial management port, the serial session will show the URLs that can be used to run the remainder of the Sun ZFS Storage 7420 controller initial configuration. The next steps will be performed via the browser-based user interface (BUI).

The next initial step is to setup the cluster of the two Sun ZFS Storage 7420 controllers.

Open a Web browser and enter the URL for the storage controller (https://<ZFS_IP_Address>:215 or https://<FQDN_of_ZFS>:215)

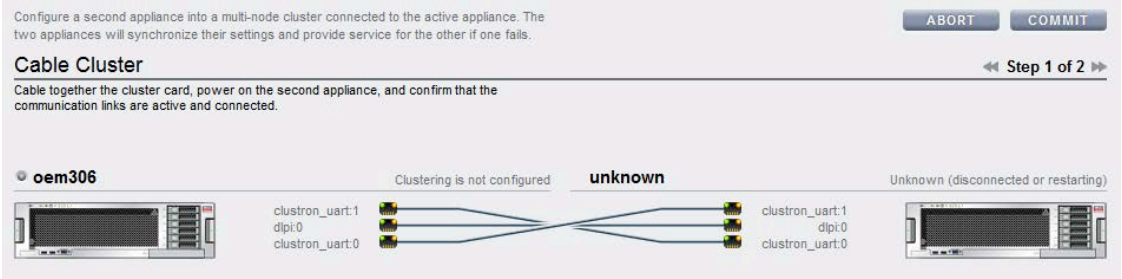
Log in with root credentials.

Click the Start button to begin the configuration process for the clustered storage controllers.

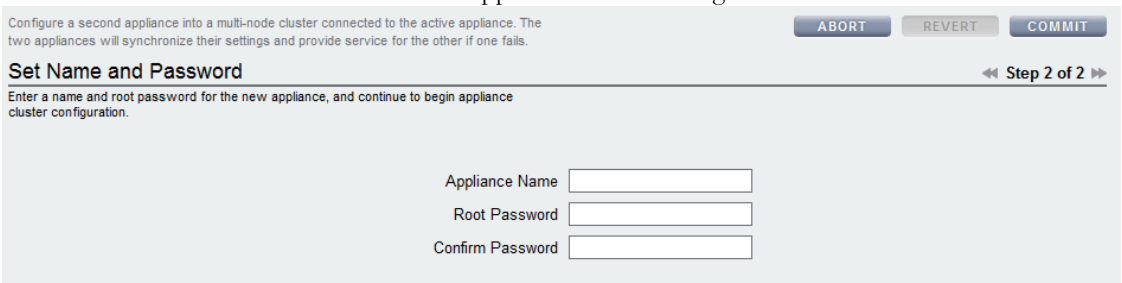


At the Configure Clustering screen, click on the CLUSTER button to configure the cluster.

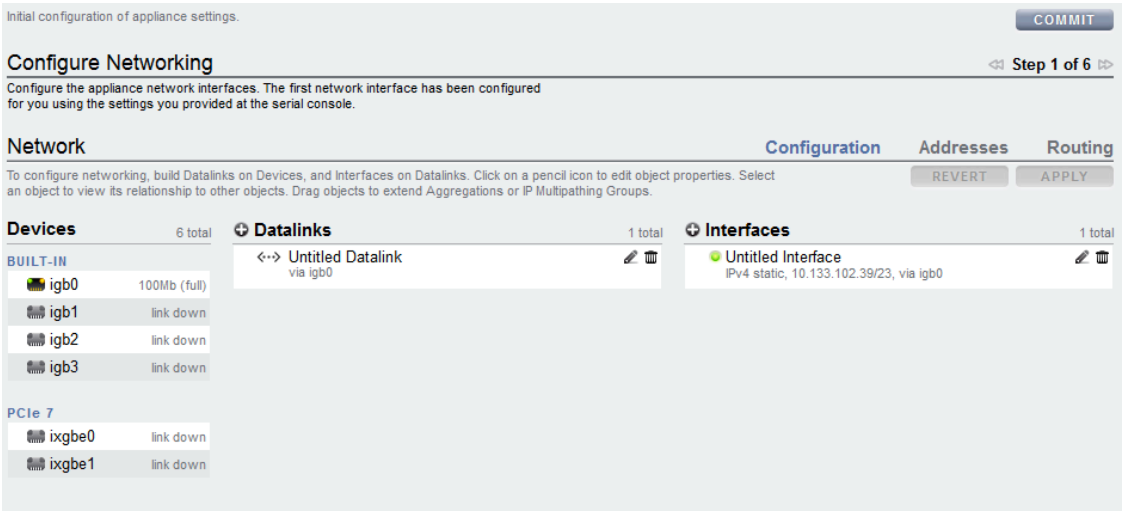
At the Cable Cluster screen, confirm that the connection links on the Sun ZFS Storage 7420 controller cluster cards are active. Click the COMMIT button when confirmed.



At the Set Name and Password screen, enter the name and root password for the new appliance. Click the COMMIT button to continue with the appliance cluster configuration.

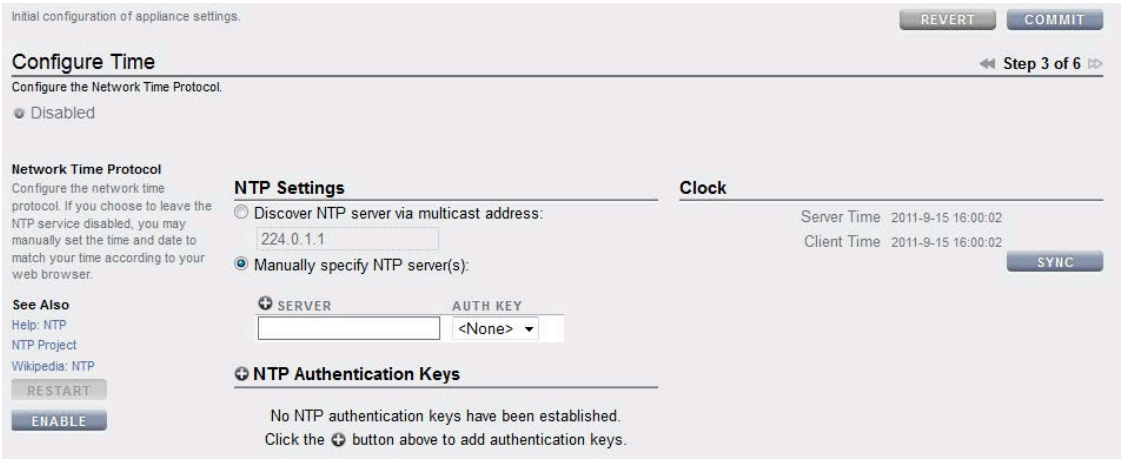


At the Configure Networking screen, no additional settings need to be made at this time. Click COMMIT.

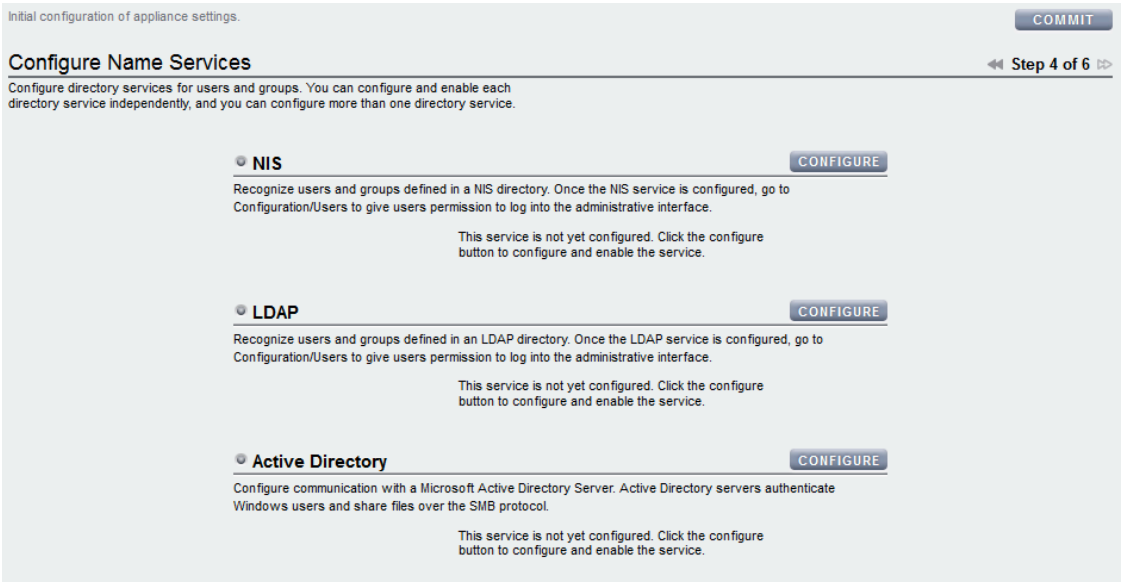


At the Configure DNS screen, enter the DNS Domain and DNS sever information. When completed, click COMMIT.

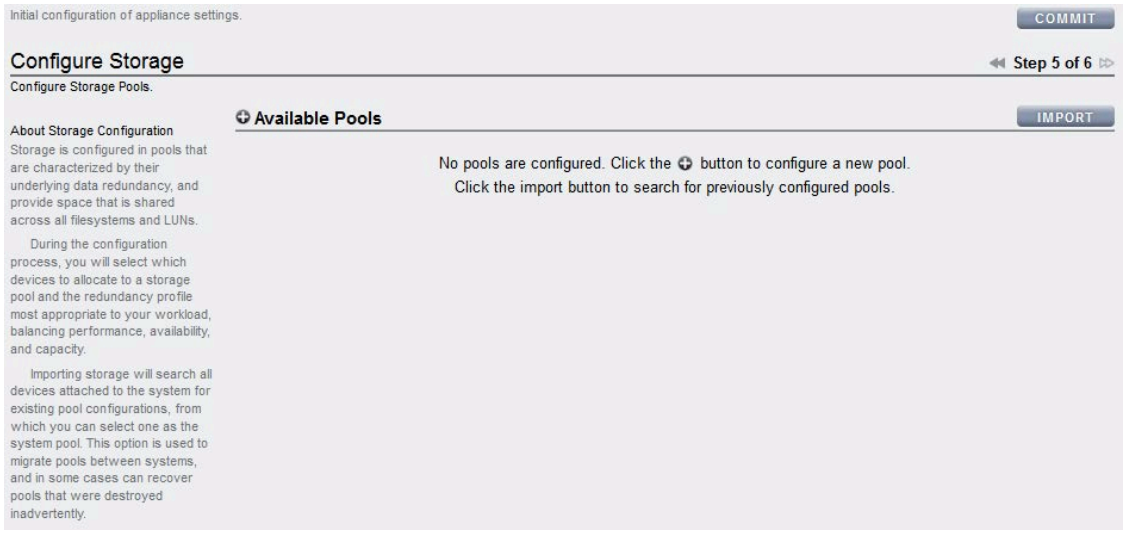
At the Configure Time screen, enter the NTP server information if an NTP server exists on the network. Otherwise click the SYNC button to manually set the time and date to match the time and date with your Web browser. Click COMMIT when completed.



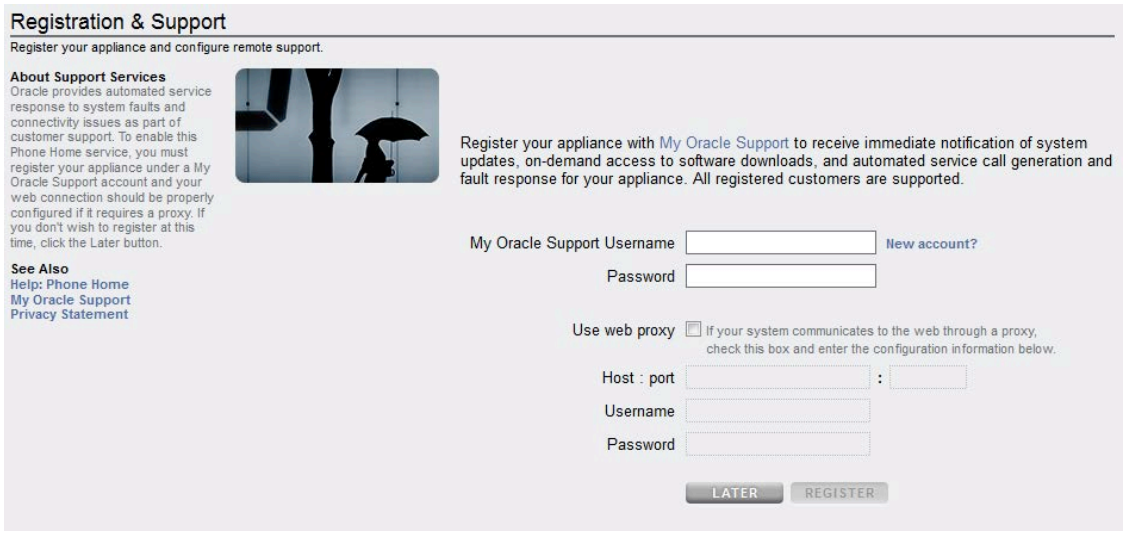
At the Configure Name Services screen, configure the directory services for users and groups as desired. Each directory service can be enabled and configured independently, and more than one directory service can be enabled. When completed configuring the directory services, click COMMIT.



At the Configure Storage screen, on storage pools will be created at this time. Click the COMMIT button.

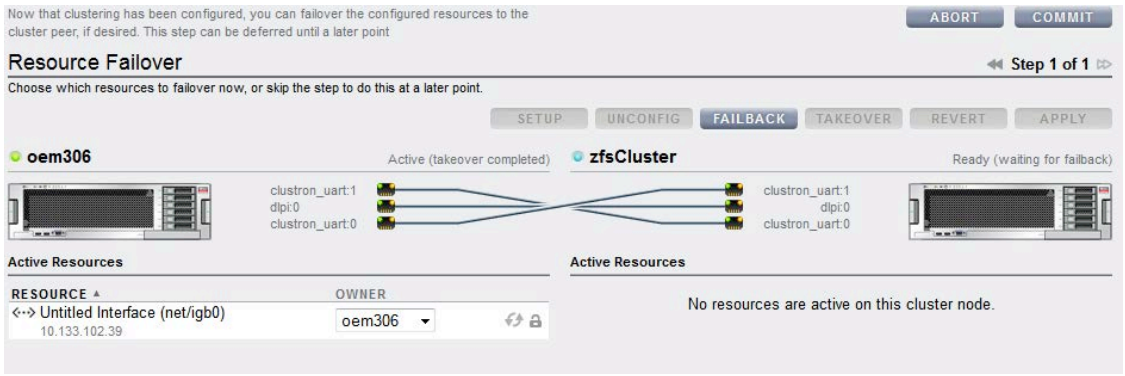


At the Registration & Support screen, enter the My Oracle Support account information and any Web proxy information if the Sun ZFS Storage Appliance communicates to the Web through a proxy server. When completed, click the REGISTER button to complete the registration. When successfully completed, click COMMIT.

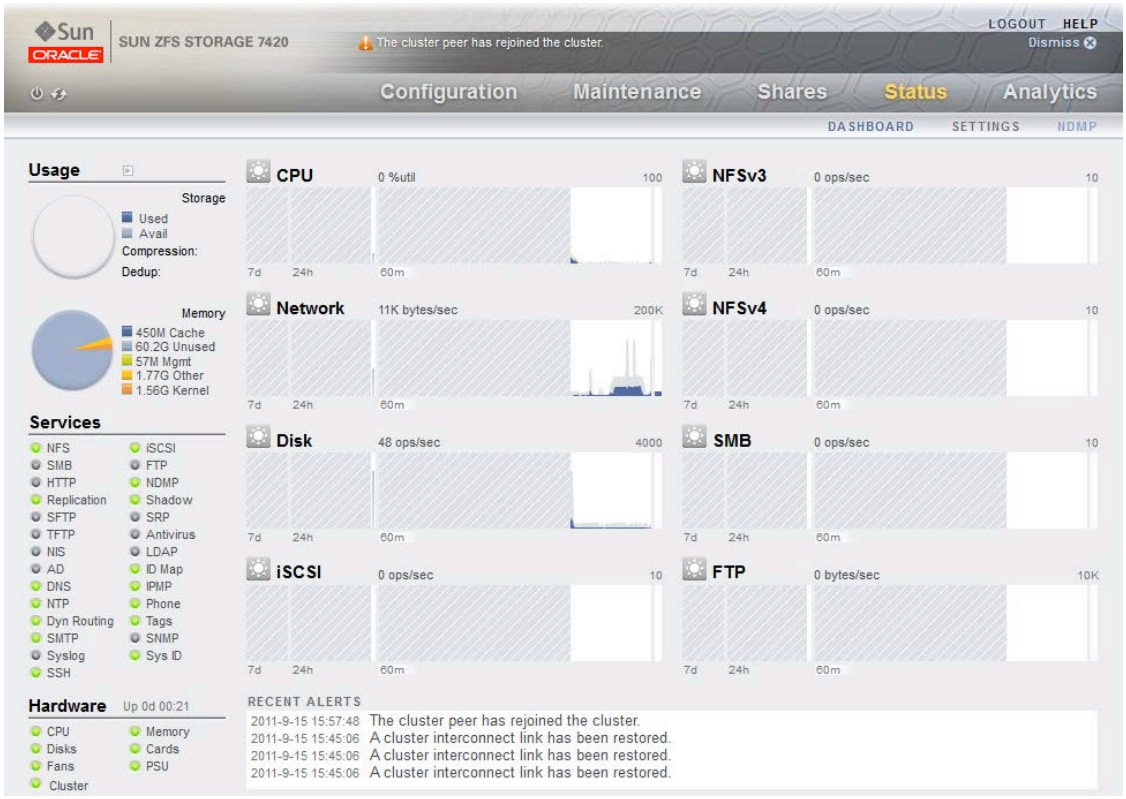


At this point, the Sun ZFS Storage 7420 controllers have been successfully configured in a clustered configuration. If desired, failover the configured resources to the cluster peer by clicking the FAILBACK button.

When completed, click the COMMIT button.



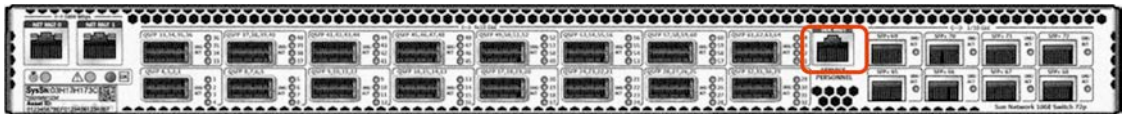
The initial configuration of the Sun ZFS Storage 7420 cluster controllers is completed and the storage status information screen should be displayed.



Sun Network 10 GbE Switch 72p Configuration

The Sun Network 10 GbE Switch 72p top of rack switch will reside in the same base network such that no additional VLANs will be configured in this process. If there is a need to configure different VLANs on the NEMs, please refer to the Sun Network 10 GbE Switch 72p VLAN Administration Guide at http://download.oracle.com/docs/cd/E19934-01/index.html

To perform the initial configuration, connect a serial cable from the SER MGT port on the Oracle Sun Network switch, shown below, to the serial port on the administrative client. Use a DB9 to RJ45 adapter if necessary. Perform the ILOM configuration on both Oracle Sun Network 10 GbE switches.



Connect an Ethernet cable from network port NET MGT 0 to the corporate network on both Sun Network 10 GbE Switch 72p network switches.

Connect power cables to the power supplies on both switches and verify that the status LEDs for each power supply on both Sun Network 10 GbE Switch 72p network switches indicates normal operation. The AC LED lights and the OK LED should become lit. The Attention LED should remain unlit. At this time the controller is effectively on and booting up, which may take up to two minutes.

Open a terminal window or terminal emulator with the below serial settings:

- 8N1: Eight data bits, no parity, one stop bit
- 9600 baud
- Disable hardware flow control (CTS/RTS)
- Disable software flow control (XON/XOFF)

The initial screen should present the following login prompt:

```
SUNSPnnnnnnnnnnnn login:
```

Enter the username and password when prompted. The default user is root and the default password is changeme.

The ILOM prompt should appear as follows:

```
->
```

Change to the network directory:

```
-> cd SP/network
```

By default, the switch uses DHCP as the IP discovery method. To set the IP discovery mode to static, enter the following command:

```
-> set ipdiscovery=static
```

Configure an externally accessible IP address on the switch with the following commands:

```
-> set pendingipaddress=<IP_Address>
-> set pendingipnetmask=<netmask_address>
-> set pendingipgateway=<netmask_address>
-> set commitpending=true
```

Set the switch state to enabled:

```
-> set state=enabled
```

Verify the information that has been entered:

```
-> show
```

Please confirm that the configuration is correct per the information that has been entered. When completed exit the switch ILOM with the following command:

```
-> exit
```

Please perform these configuration steps on the second Sun Network 10 GbE Switch 72p.

Switch Network Configuration

This section covers the configuration of the Sun Network 10 GbE Switch 72p and the Sun Blade 6000 Ethernet Switched NEM 24p 10 GbE network switches. This configuration utilizes Link Aggregation Control Protocol (LACP) for performance and availability. The procedures outlined in this section are based on the ports used in the cabling diagrams. Please ensure that either the ports in the configuration match what is in this document, or please modify the procedures outlined in this section to match the configured environment.

The Network Express Modules (NEMs) in the Sun Blade 6000 chassis and the TOR switches will reside in the same base network, such that no additional VLANs will be configured in this process. If there is a need to configure different VLANs on the NEMs, please refer to the Sun Blade 6000 Ethernet Switched NEM 24p 10 GbE documentation, which is available at:

http://download.oracle.com/docs/cd/E19285-01/index.html.

The Sun Ethernet Fabric Operating System VLAN Administration documentation is also available at:

http://download.oracle.com/docs/cd/E19934-01/index.html.

Before configuring the network, please confirm that the NEMs and TORs SP firmware version is at or above level 3.0.5.2. If the SP firmware is not at or above this level, please refer to the Sun Blade 6000

Ethernet Switched NEM 24p 10 GbE product notes or the Sun Network 10 GbE Switch 72p product notes on how to upgrade the SP firmware. To check the current level of firmware, please `ssh` directly into the NEMs, not via the CMM, and issue the following command:

```
-> version
```

Refer to the SP firmware version line for the current SP firmware level.

Now to configure the switch ports, ssh into TOR0, the bottom Sun Network 10 GbE Switch 72p, and run the commands listed below. Please check with the network administrators that the channel-groups numbers suggested are not already in use and that the spanning-tree priority level is set to an acceptable level such that TOR0 is the root switch for this enterprise cloud infrastructure environment.

```
-> cd /SYS/fs_cli/
TOR0 SEFOS# config term
TOR0 SEFOS(config)# set gvrp disable
TOR0 SEFOS(config)# set gmrp disable
TOR0 SEFOS(config)# set port-channel enable
TOR0 SEFOS(config)# int port-channel 10
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/1-12
TOR0 SEFOS(config-if-range)# channel-group 10 mode active
TOR0 SEFOS(config-if-range)# no shut
TOR0 SEFOS(config)# int vlan 1
TOR0 SEFOS(config-if)# no ip address
TOR0 SEFOS(config-if)# shut
TOR0 SEFOS(config-if)# end
TOR0 SEFOS(config)# int port-channel 100
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/29-32
TOR0 SEFOS(config-if-range)# channel-group 100 mode active
TOR0 SEFOS(config-if-range)# no shut
TOR0 SEFOS(config-if-range)# end
TOR0 SEFOS(config)# spanning-tree priority 28672
TOR0 SEFOS(config)# end
TOR0 SEFOS(config)# int port-channel 200
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# exit
TOR0 SEFOS(config)# int range ex 0/69-70
TOR0 SEFOS(config-if-range)# channel-group 200 mode active
TOR0 SEFOS(config-if-range)# no shut
TOR0 SEFOS(config-if-range)# exit
```

```
TOR0 SEFOS(config)# int ex 0/71
TOR0 SEFOS(config-if)# no shut
TOR0 SEFOS(config-if)# end
```

Next, `ssh` into the TOR1, the top Sun Network 10 GbE Switch 72p, and run the commands listed below. Again, please check with the network administrators that the channel-group and port-channel numbers suggesteed are not already in use and that the spanning-tree priority level is set to an acceptable level such that TOR0 is the root switch for this enterprise cloud infrastructure environment.

```
-> cd /SYS/fs_cli/
TOR1 SEFOS# config term
TOR1 SEFOS(config)# set gvrp disable
TOR1 SEFOS(config)# set gmrp disable
TOR1 SEFOS(config)# set port-channel enable
TOR1 SEFOS(config)# int port-channel 11
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/1-12
TOR1 SEFOS(config-if-range)# channel-group 11 mode active
TOR1 SEFOS(config-if-range)# no shut
TOR1 SEFOS(config)# int vlan 1
TOR1 SEFOS(config-if)# no ip address
TOR1 SEFOS(config-if)# shut
TOR1 SEFOS(config-if)# end
TOR1 SEFOS(config)# int port-channel 100
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/29-32
TOR1 SEFOS(config-if-range)# channel-group 100 mode active
TOR1 SEFOS(config-if-range)# no shut
TOR1 SEFOS(config-if-range)# end
TOR1 SEFOS(config)# int port-channel 201
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# exit
TOR1 SEFOS(config)# int range ex 0/69-70
TOR1 SEFOS(config-if-range)# channel-group 201 mode active
TOR1 SEFOS(config-if-range)# no shut
TOR1 SEFOS(config-if-range)# end
TOR1 SEFOS(config)# int ex 0/71
TOR1 SEFOS(config-if)# no shut
TOR1 SEFOS(config-if)# end
```

The next step is to configure the NEMs. Please `ssh` into NEM0, the bottom NEM, and run the commands listed below. Please make any corresponding changes that were made in relation to port-channel and channel group numbers that were made to TOR0. Please also check that the spanning-tree priority level is set to an acceptable level such that TOR0 is still root switch for this enterprise cloud infrastructure environment.

```
-> cd /NEM/fs_cli/
NEM0 SEFOS# config term
NEM0 SEFOS(config)# set gvrp disable
NEM0 SEFOS(config)# set gmrp disable
NEM0 SEFOS(config)# set port-channel enable
NEM0 SEFOS(config)# int port-channel 10
NEM0 SEFOS(config-if)# no shut
NEM0 SEFOS(config-if)# exit
NEM0 SEFOS(config)# int range ex 0/3-14
NEM0 SEFOS(config-if-range)# channel-group 10 mode active
NEM0 SEFOS(config-if-range)# no shut
NEM0 SEFOS(config-if-range)# end
NEM0 SEFOS(config)# int vlan 1
NEM0 SEFOS(config-if)# no ip add
NEM0 SEFOS(config-if)# no ip address
NEM0 SEFOS(config-if)# shut
NEM0 SEFOS(config-if)# end
NEM0 SEFOS(config)# spanning-tree priority 61440
NEM0 SEFOS(config)# end
```

Then `ssh` into NEM1, the top NEM, and run the commands listed below. Please make any corresponding changes that were made in relation to port-channel and channel group numbers that were made to TOR1. Please also check that the spanning-tree priority level is set to an acceptable level such that TOR0 is still root switch for this enterprise cloud environment.

```
-> cd /NEM/fs_cli/
#### Ports to TOR0 #############
NEM1 SEFOS# config term
NEM1 SEFOS(config)# set gvrp disable
NEM1 SEFOS(config)# set gmrp disable
NEM1 SEFOS(config)# set port-channel enable
NEM1 SEFOS(config)# int port-channel 11
NEM1 SEFOS(config-if)# no shut
NEM1 SEFOS(config-if)# exit
NEM1 SEFOS(config)# int range ex 0/3-14
NEM1 SEFOS(config-if-range)# channel-group 11 mode active
NEM1 SEFOS(config-if-range)# no shut
NEM1 SEFOS(config-if-range)# end
```

```
NEM1 SEFOS(config)# int vlan 1
NEM1 SEFOS(config-if)# no ip add
NEM1 SEFOS(config-if)# no ip address
NEM1 SEFOS(config-if)# shut
NEM1 SEFOS(config-if)# end
NEM1 SEFOS(config)# spanning-tree priority 61440
NEM1 SEFOS(config)# end
```

Finally, after confirming communication between the devices on the network, please run the following command on each of the TORs and NEMs to save the configuration:

```
# copy running-config startup-config
```

Configuring the Sun ZFS Storage 7420 Network

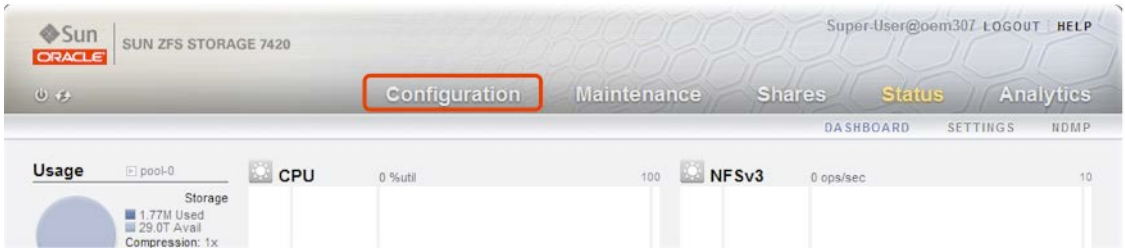
The procedures discussed in this section of the document will cover Sun ZFS Storage 7420 configuration steps other than the initial setup. This includes configuring the Link Aggregation Control Protocol (LACP) of the shared storage network datalinks for high-availability, and creating NFS shared storage.

Sun ZFS Storage 7420 Network Datalink Configuration

Log into the Sun ZFS Storage Appliance BUI by opening a Web browser and enter the URL for the Sun ZFS Storage 7420 controller (https://<ZFS_IP_Address>:215 or https://<FQDN_of_ZFS>:215)

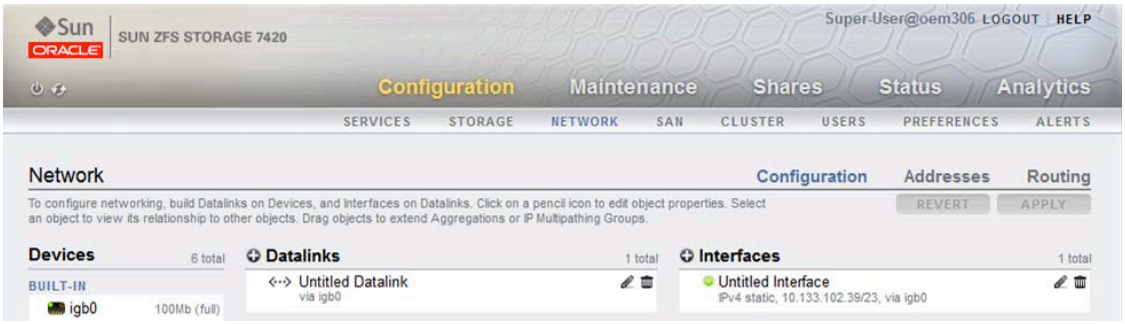
Log in with root credentials.

Select Configuration from the top navigation menu.

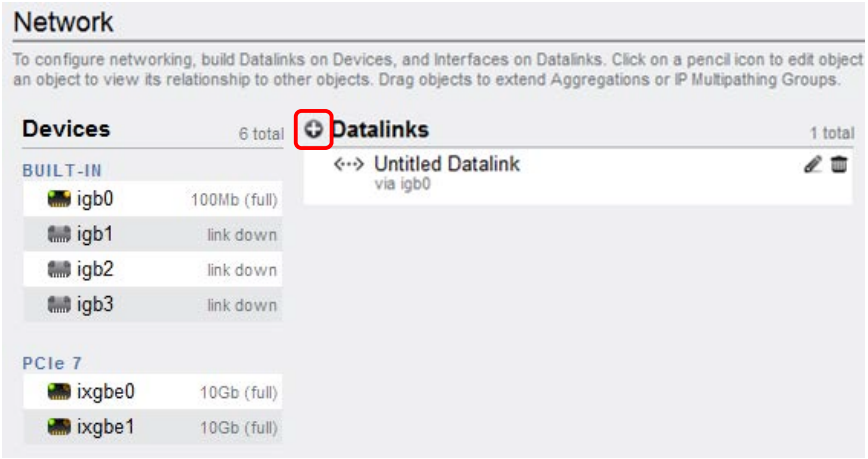


Select NETWORK from the Configuration sub-navigation menu

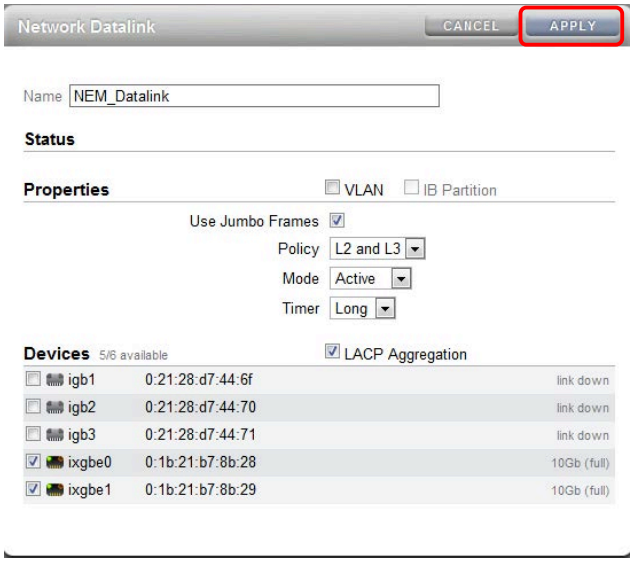
By default, an untitled Datalink is created with its interface already configured. This is the Sun ZFS Storage Appliance management interface. There is no need to modify the management interface at this time.



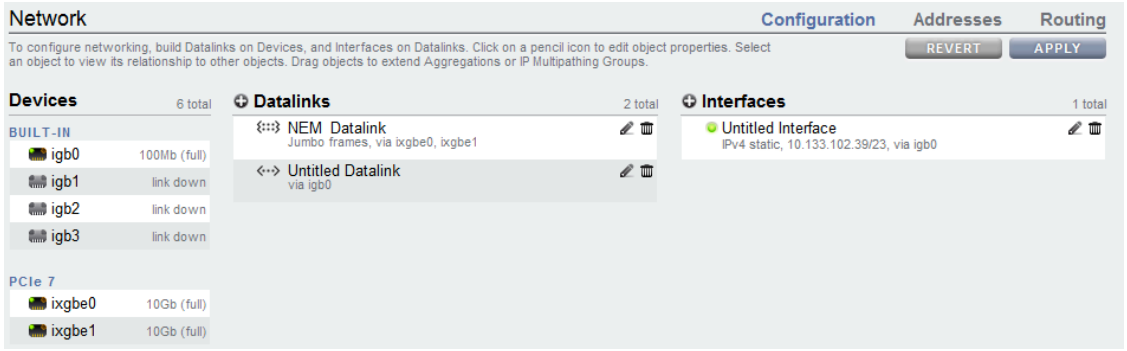
Add additional datalinks that will be used for the shared storage network. To do this, in the Datalinks click on the plus sign next to Datalinks.



In the Network Datalink screen, enter the datalink name, check the LACP Aggregation checkbox and select the two 10 GbE network connections (ixgbe0 and ixgbe1). Also, select Policy as "L2 and L3" since the NEMs support both these network layers. Select Mode as "Active" and Timer as "Long". When completed, click on the Apply button.

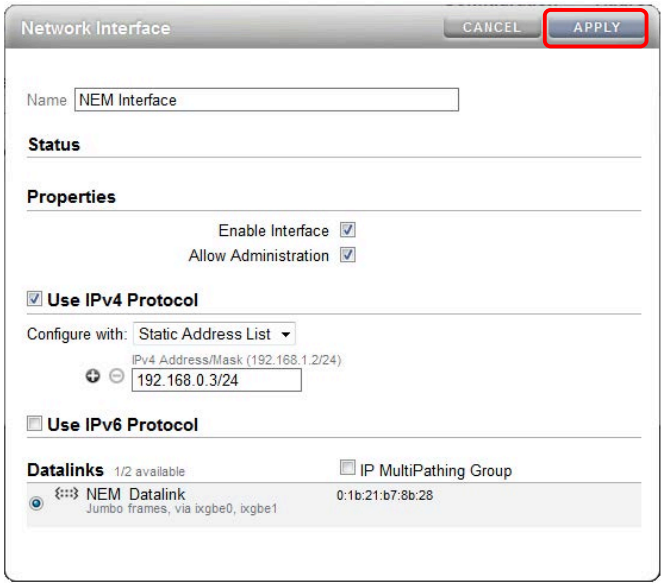


The created LACP datalink will appear under the Datalinks section.

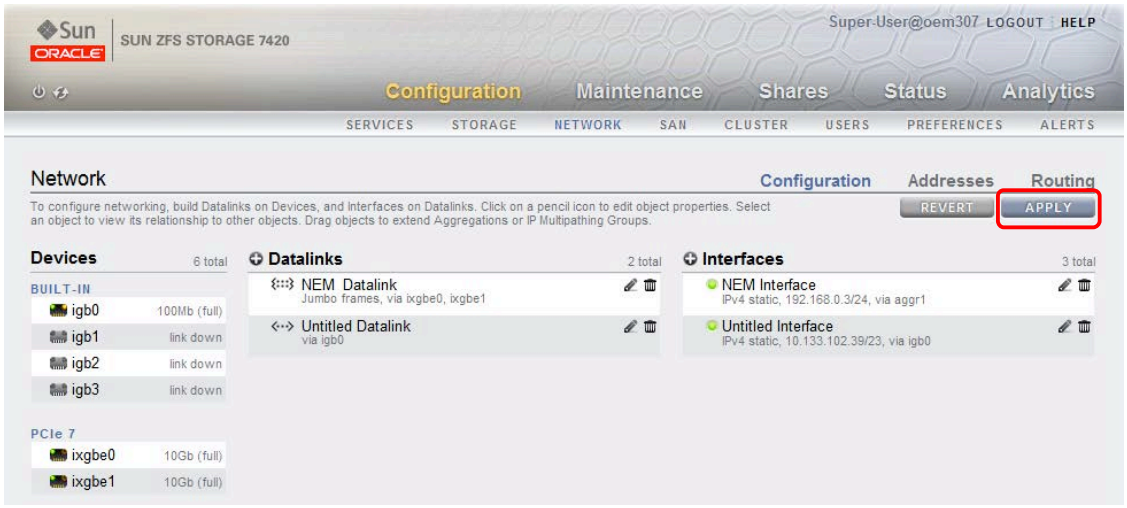


The next step is to create an interface for the newly created datalink. To do this, in the Interfaces section click on the plus sign next to Interfaces.

In the Network Interface screen, enter the interface name and IP address/Netmask for the selected datalinks. When completed, click on the Apply button.



To complete the LACP network configuration for the network shared storage, click Apply button.



Shared Storage Configuration for Sun ZFS Storage 7420 Cluster

This section introduces Projects and Shares that will be linked to the created storage pools.

The procedure that will be followed

Introduction to Projects:

All file systems and LUNs are grouped into projects. A project defines a common administrative control point for managing shares. All shares within a project can share common settings, and quotas can be enforced at the project level in addition to the share level. Projects can also be used solely for

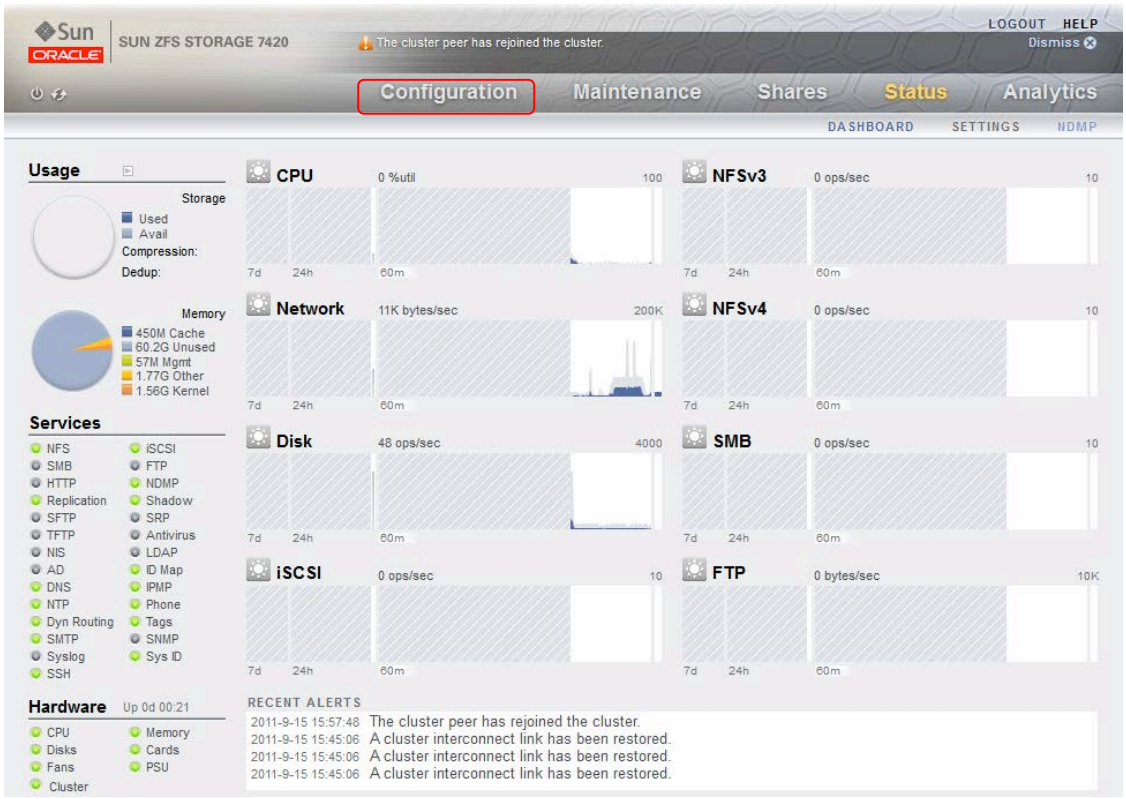
grouping logically related shares together, so their common attributes (such as accumulated space) can be accessed from a single point. You can create all shares within this default project. However, Oracle recommends that you create additional projects for organizational purposes.

Introduction to Shares

Shares are file systems and LUNs that are exported over supported data protocols to clients of the appliance. File systems export a file-based hierarchy and can be accessed over NFS in the case of Exalogic machines. The project/share tuple is a unique identifier for a share within a pool. Multiple projects can contain shares with the same name, but a single project cannot contain shares with the same name. A single project can contain both file systems and LUNs, and they share the same namespace.

Creating Storage Pools

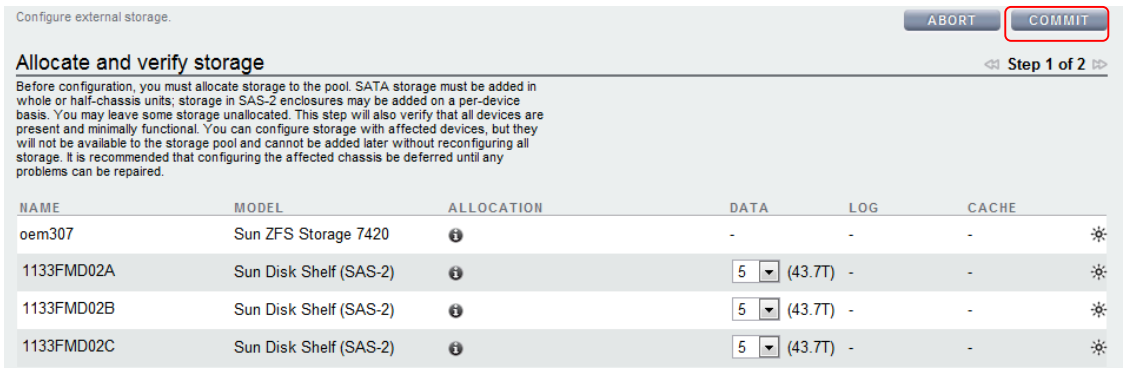
Select Configuration from the top navigation menu.



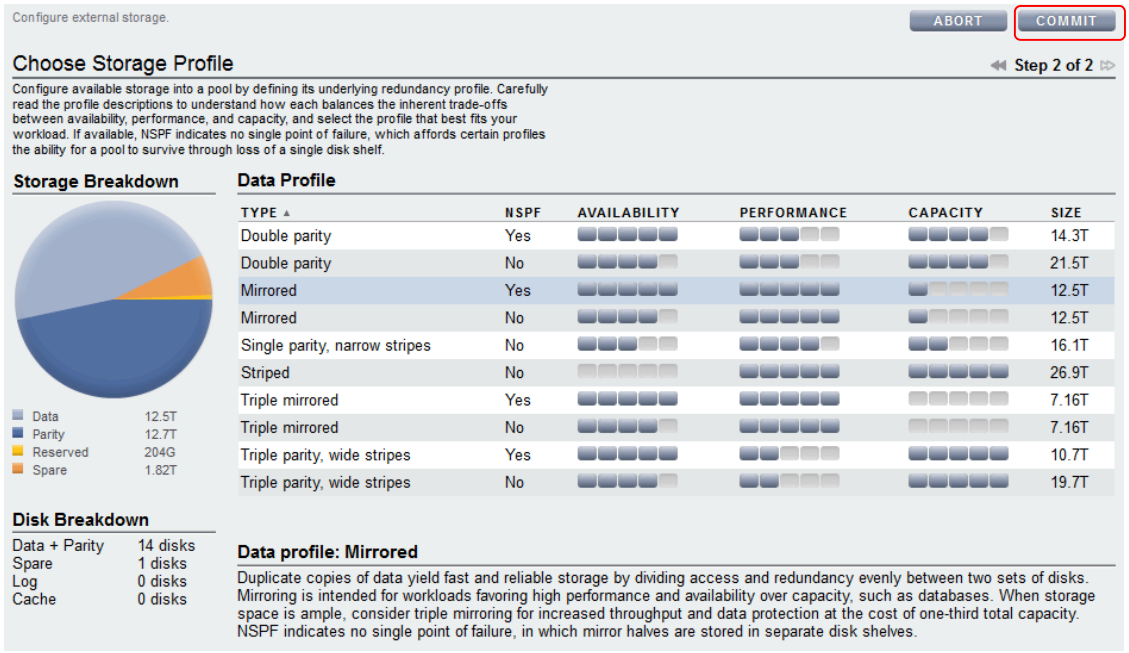
Select STORAGE from the Configuration sub-navigation menu and in the Available Pools section click on the plus sign to create a storage pool.

Enter the name of the storage pool that will be created. Click Apply when completed.

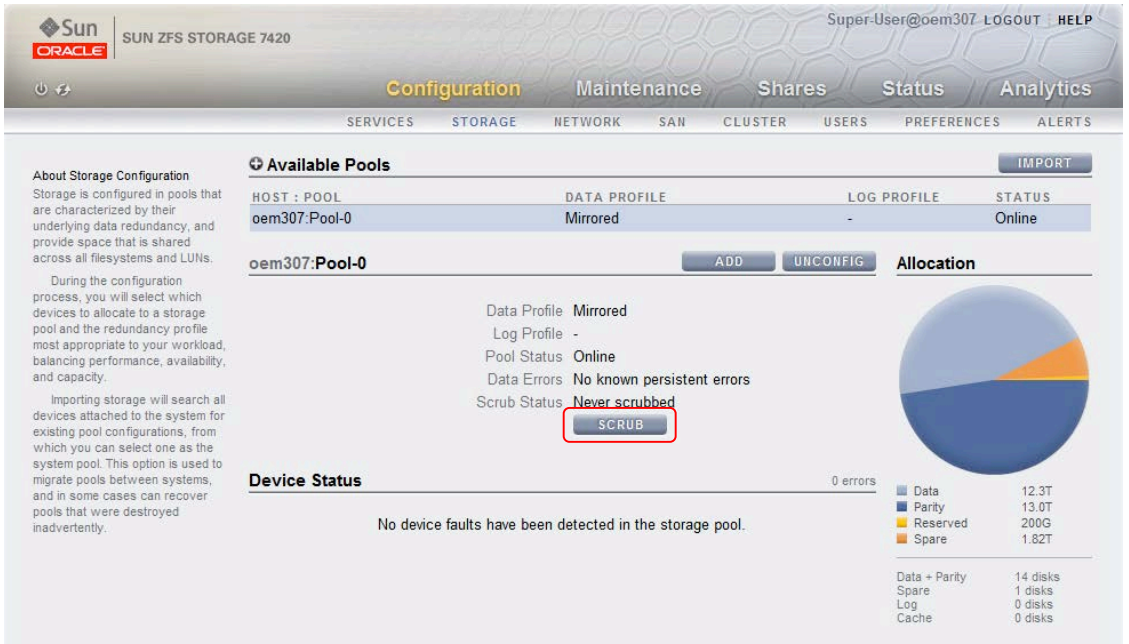
Select the number of disks to use from each of the attached disk trays by clicking on the drop-down menu in the DATA section. Click COMMIT when completed.



In the Choose Storage Profile section, select the disk RAID type based on the desired availability, performance, and capacity. Detailed information on the data profile is found by clicking on a profile type (e.g. Double parity, Mirrored, Single parity, etc…) and the detailed information is displayed at the bottom of the page. Click COMMIT when completed.



The created pool will be displayed on the following page. It is recommended to click the SCRUB button at this time in the created server pool section

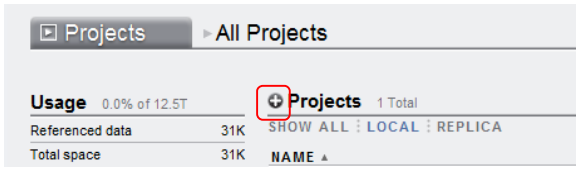


Creating Storage Projects

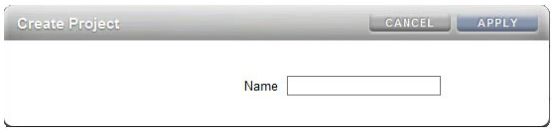
Shares are grouped together as Projects. For example, you can create a project for Dept_1. Dept_1 will contain department-level shares.

In the Browser User Interface (BUI), you can access the Projects user interface by clicking Shares > Projects. The Project Panel is displayed.

To create the project, click on the + button above the list of projects in the project panel.



Enter a name for the project, such as proj_ovm.



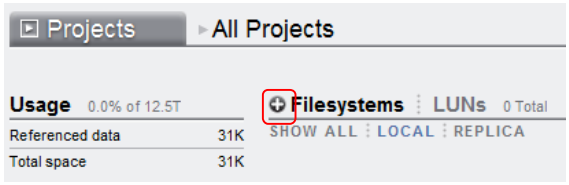
The new project proj_ovm is listed on the Project Panel, which is on the left navigation pane.

Creating Shares

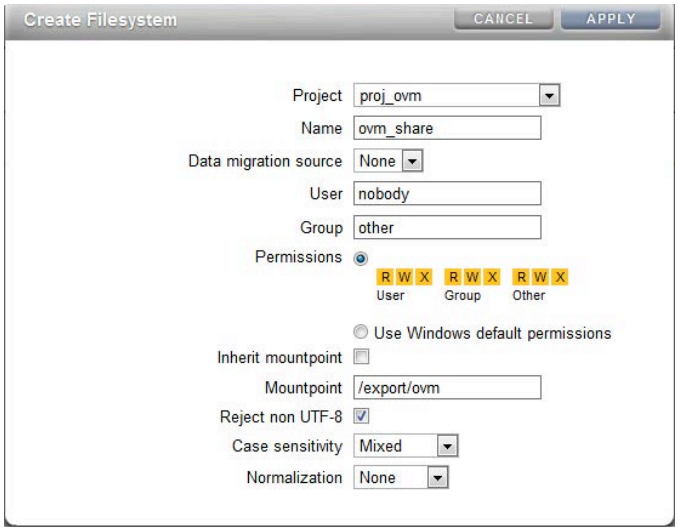
Shares are file systems and LUNs that are exported over supported data protocols to compute nodes. File systems export a file-based hierarchy and can be accessed over NFS.

To create a custom share, such as ovm_share under the proj_ovm project, in the Browser User Interface (BUI), access the Projects user interface by clicking Shares > Shares.

Click the + button next to Filesystems to add a file system.



The Create Filesystem screen is displayed.



In the Create Filesystems screen, choose the target project from the Project pull-down menu. For example, choose proj_ovm.

In the Name field, enter a name for the share. For example, enter ovm_share.

From the Data migration source pull-down menu, choose None.

Select the Permissions option. The table below lists the access types and permissions:

ACCESS TYPE	DESCRIPTION	PERMISSIONS TO GRANT
User	User that is the current owner of the directory.	The following permissions can be granted: R - Read - Permission to list the contents of the directory. W - Write - Permission to create files in the directory. X - Execute - Permission to look up entries in the directory. If users have execute permissions but not read permissions, they can access files explicitly by name but not list the contents of the directory.
Group	Group that is the current group of the directory.	
Other	All other accesses.	

This feature can be used to control access to the file system, based on the access types (users and groups) in proj_ovm.

The mountpoint can either be inherited by selecting the Inherit mountpoint option or manully set a mountpoint.

NOTE: The mount point must be under /export. The mount point for one share cannot conflict with another share. In addition, it cannot conflict with another share on cluster peer to allow for proper failover.

When inheriting the mountpoint property, the current dataset name is appended to the project's mountpoint setting, joined with a slash ('/'). For example, if the domain_home project has the mountpoint setting /export/domain_home, then domain_home/config inherits the mountpoint /export/domain_home/config.

Next. to enforce UTF-8 encoding for all files and directories in the file system, select the Reject non UTF-8 option. When set, any attempts to create a file or directory with an invalid UTF-8 encoding will fail.

From the Case sensitivity pull-down menu, select Mixed, Insensitive, or Sensitive to control whether directory lookups are case-sensitive or case-insensitive.

Case Sensitivity Values

BUI VALUE	DESCRIPTION
Mixed	Case sensitivity depends on the protocol being used. For NFS, FTP, and HTTP, lookups are case-sensitive. This is default, and prioritizes conformance of the various protocols over cross-protocol consistency.
Insensitive	All lookups are case-insensitive, even over protocols (such as NFS) that are traditionally case-sensitive. This setting should only be used where CIFS is the primary protocol and alternative protocols are considered second-class, where conformance to expected standards is not an issue.

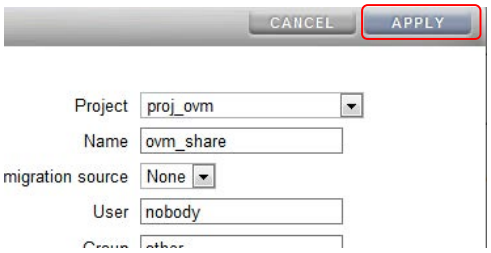
BUI VALUE	DESCRIPTION
Sensitive	All lookups are case-sensitive. In general, do not use this setting.

From the Normalization pull-down menu, select None, Form C, Form D, Form KC, or Form KD to control what unicode normalization, if any, is performed on filesystems and directories. Unicode supports the ability to have the same logical name represented by different encodings. Without normalization, the on-disk name stored will be different, and lookups using one of the alternative forms will fail depending on how the file was created and how it is accessed. If this property is set to anything other than None (the default), the Reject non UTF-8 property must also be selected.

Normalization Settings

BUI VALUE	DESCRIPTION
None	No normalization is done.
Form C	Normalization Form Canonical Composition (NFC) - Characters are decomposed and then recomposed by canonical equivalence.
Form D	Normalization Form Canonical Decomposition (NFD) - Characters are decomposed by canonical equivalence.
Form KC	Normalization Form Compatibility Composition (NFKC) - Characters are decomposed by compatibility equivalence, then recomposed by canonical equivalence.
Form KD	Normalization Form Compatibility Decomposition (NFKD) - Characters are decomposed by compatibility equivalence.

After entering the values, click Apply



The shared NFS storage directory and mountpoint are now shown in filesystem screen.

Sun
ORACLE
SUN ZFS STORAGE 7420
Super-User@oem307 LOGOUT HELP
Configuration
Maintenance
Shares
Status
Analytics
SHARES
PROJECTS
SCHEMA
Projects
All Projects
Usage 0.0% of 12.5T
Referenced data 93K
Total space 93K
Filesystems
LUNs 1 Total
SHOW ALL LOCAL REPLICA
NAME
SIZE
MOUNTPOINT
proj_ovm / ovm_share
31K
/export/ovm

Oracle VM Server for x86 Build

Oracle VM Server for x86 is installed using console redirect via the ILOM. Refer to appendix A1 on how to access the server's ILOM.

Mirror the Local Drives

The first thing to do on the server that will host Oracle VM Server for x86 is to mirror (RAID 1) the local disks to ensure that a single disk failure will not cause a failure for Oracle VM Server. To do this, please refer to the appendix section A2 "Configuring Disk Mirroring."

Obtain Oracle VM Server media

To obtain the Oracle VM 3 media, please go to Oracle VM e-delivery (https://edelivery.oracle.com/oraclevm), and select the Oracle VM media pack for the latest release. From the Oracle VM media pack, select to download the Oracle VM Server. After downloading this file, uncompress the package to be able to access the ISO file used for Oracle VM installation.

Oracle VM Server for x86 Installation

In the KVM redirection window, select Devices > CD-ROM Images… and point to the OracleVM-Server for x86 ISO image that was downloaded from Oracle edelivery.

Power on the server through the ILOM Web interface (Remote Control – Remote Power Control, and select Power On. Click Save.) If the server is already powered on, select to power cycle the server and click save.

During system boot, press F8 when prompted to bring up the "Select boot device" screen. Use the arrow keys to highlight the "AMI Virtual CDROM" and hit ENTER

The first screen at boot should be the following prompt.

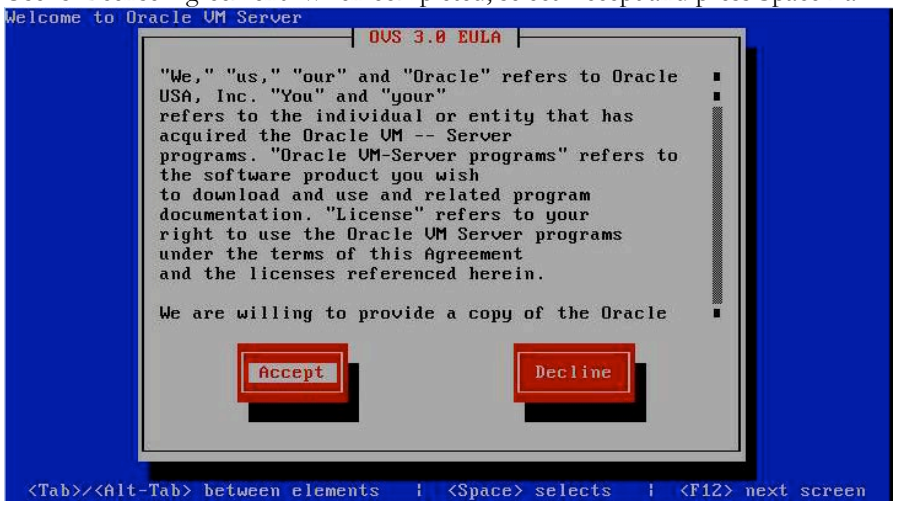
Hit the ENTER key at this point to start the installation configuration.

At the CD Found screen, select to either test the CD media before installation or skip this process. If desired, to make sure the CDROM has been created correctly the installer can test it for errors. To test the CDROM, select OK and press Space Bar. The CDROM is tested and any errors are reported. To test the ISO media, confirm that OK is highlighted and hit Enter.

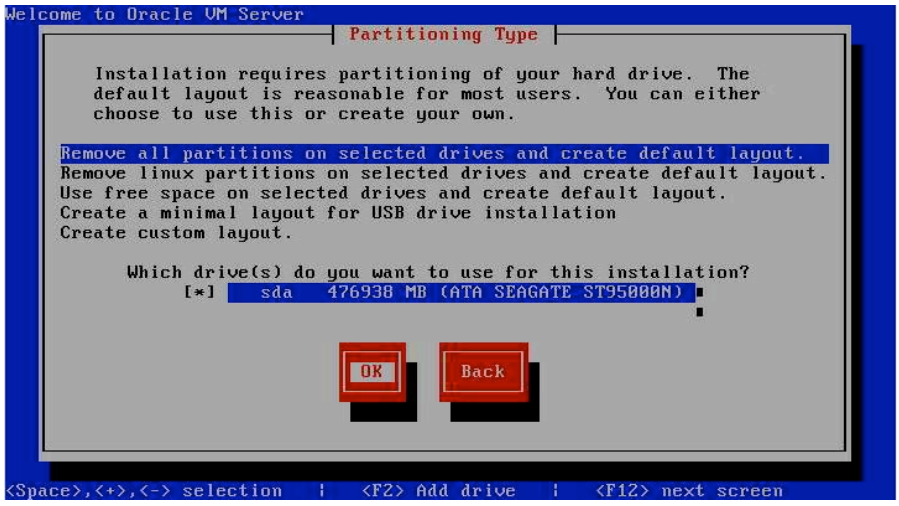
To skip the test, select Skip and press Space Bar.

At the Keyboard Selection screen, select the appropriate keyboard layout type from the list of available options. The keyboard that is selected becomes the default keyboard for the hypervisor. Select OK and press Space Bar.

At the Oracle VM Server End User License Agreement screen, read the Oracle Virtual Server End-User's License Agreement. When completed, select Accept and press Space Bar.



At the Partitioning Type screen, select to Remove all partitions on the selected drives and create default layout. Select the drive to partition. If the two local hard drives were properly mirrored, only a single drive should be presented. When completed, select OK and press Space Bar.



Agree to format all of the selected drives by selecting Yes and press Space Bar.

At the Review Partition Layout screen, select whether or not to review the partitioning layout. To review the partition layout where the partition layout can be modified, select Yes and press Space Bar. To skip the review process, select No and press Space Bar.

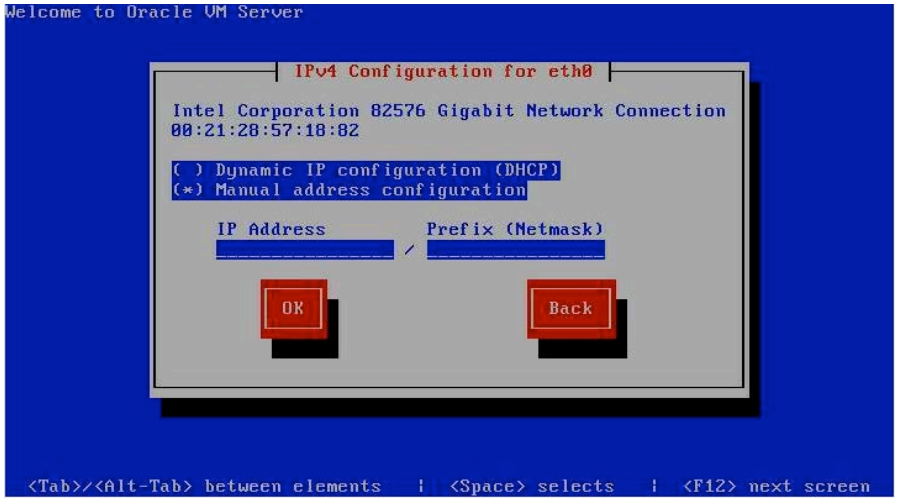
Note: There should be no reason to modify the partition table for this installation.

Select to install the Boot Loader on the first /dev/sda (MBR). Select OK and press Space Bar.

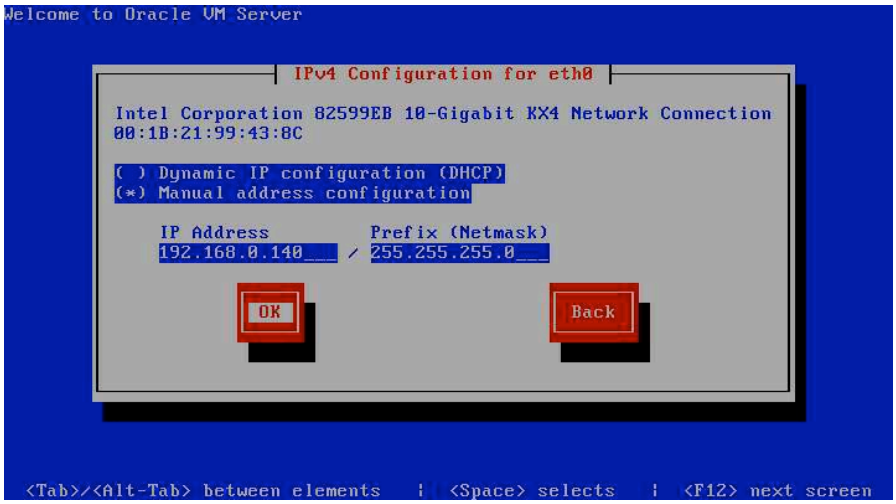
At the Oracle VM Management Interface screen, select which ethernet interface to that will connect to the Oracle VM management network. After selecting the proper interface, select OK and press Space Bar.

At the IPv4 Configuration for the management network, select if the management network interface on the Oracle VM Server is going to get its IP address via DHCP or of it will be statically set. If the IP address will be assigned via a DHCP server, select Dynamic IP configuration (DHCP) and select OK and press Space Bar. Otherwise, if the IP address is statically set, manually enter the IP Address and

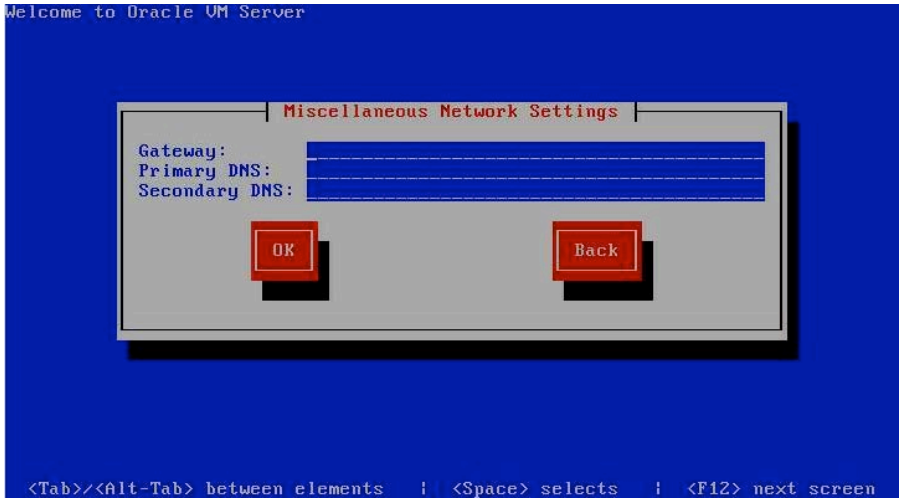
Netmask for this Oracle VM Server.



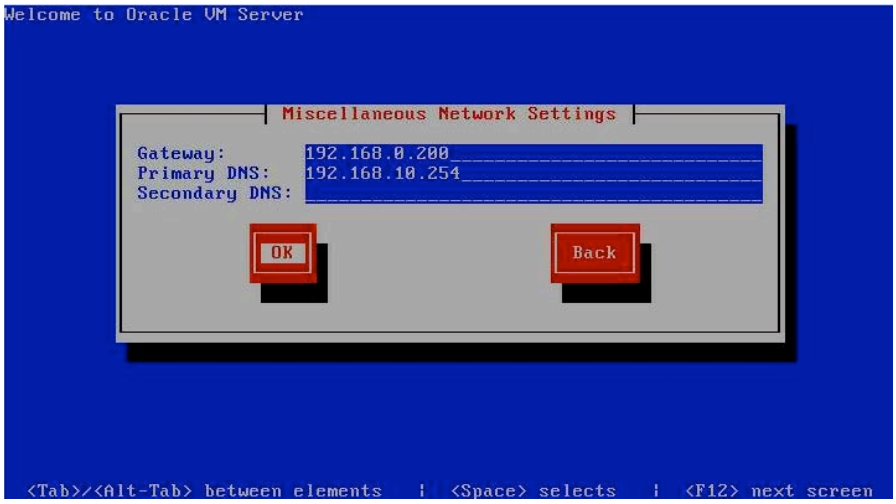
When completed, select OK and press Space Bar.



At the Miscellaneous Network Settings screen, enter the correct information for the network's gateway and DNS server(s).

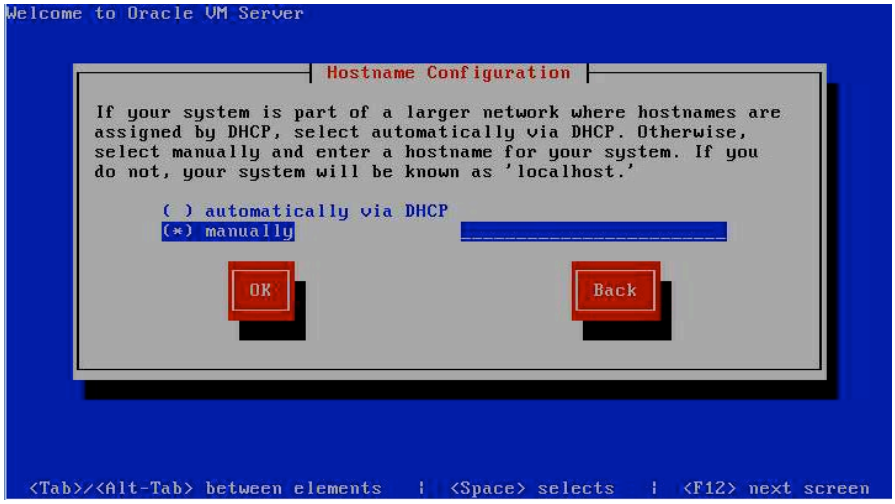


When completed, select OK and press the Space Bar.



At the Hostname Configuration screen, select whether the hostname will be assigned via the DHCP server, or manually. If manually, enter the fully qualified hostname of the server, for example myserver.example.com.

When completed, select OK and press Space Bar.



At the Time Zone Selection screen, select the appropriate time zone and whether or not to use UTC. Select OK and press Space Bar.

At the Oracle VM Agent password screen, enter the password to be used for the Oracle VM Agent in the Password field. This password is used by Oracle VM Manager to manage and monitor the Oracle VM server, as well as the VM guests running on the Oracle VM server.

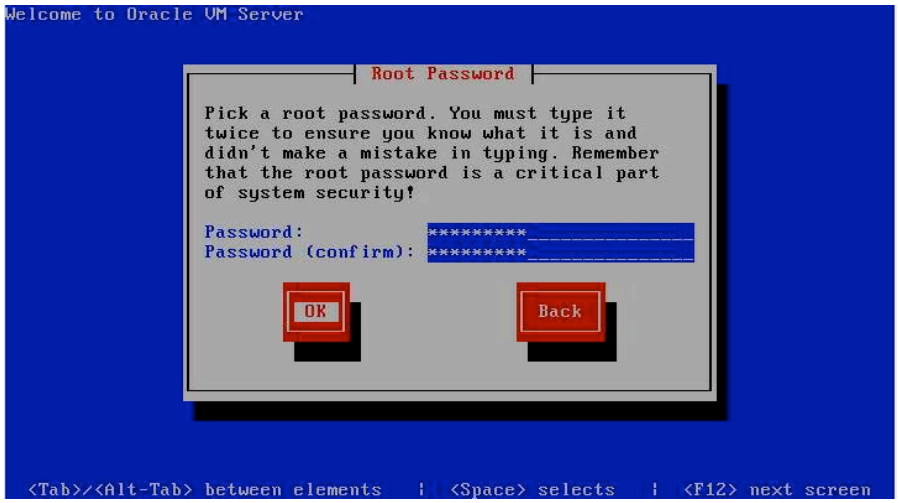
Re-enter the password in the Password (confirm) field.

Select OK and press Space Bar.

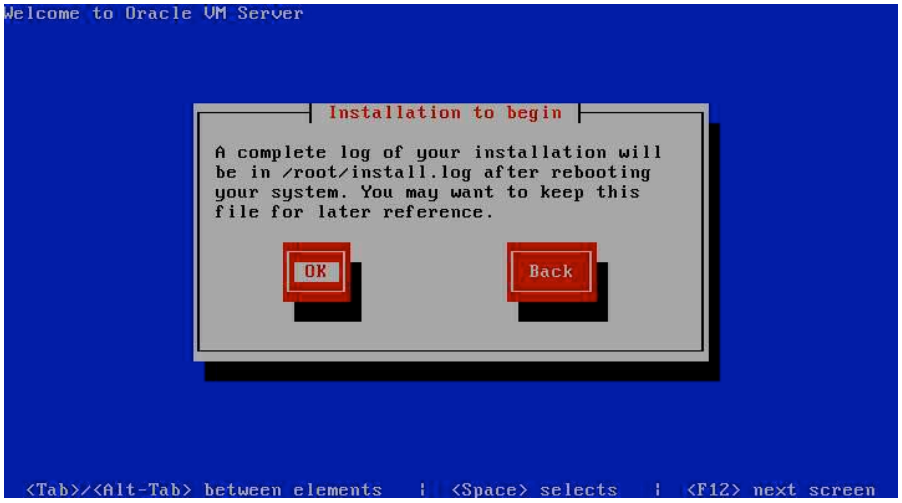
At the Root Password screen, enter the password for the root user in the Password field. The root password must be at least six characters long.

Re-enter the password in the Password (confirm) field.

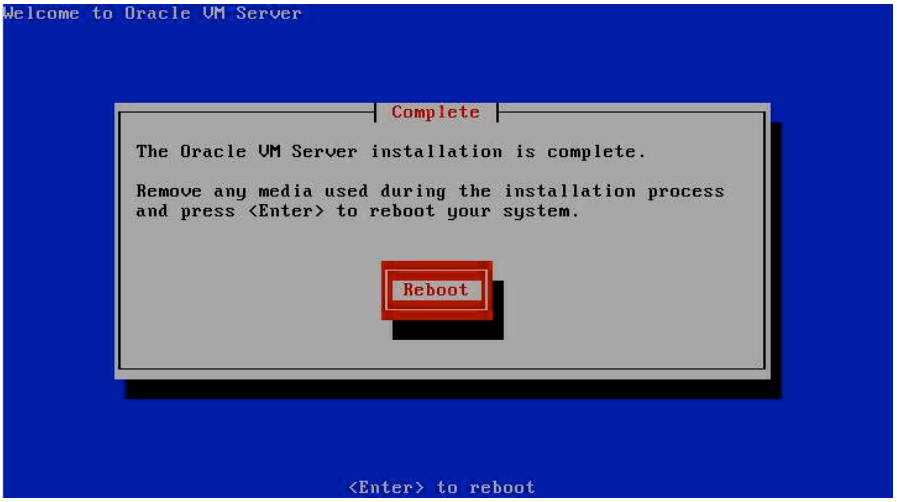
Select OK and press Space Bar.



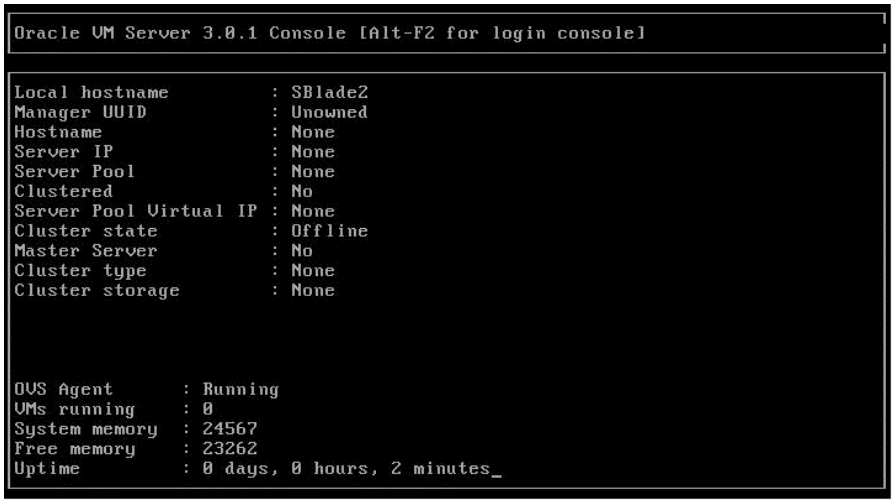
At the Installation to begin screen, select OK and press Space Bar to begin with the Oracle VM Server installation.



When the Oracle VM 3 installation and configuration is completed, the Complete screen is displayed. Un-mount the ISO image from the ILOM and press Space Bar to reboot the server.



After reboot, the Oracle VM Server status console is displayed. The status console displays useful information about the server's hardware and configuration as well as its cluster and server pool membership.


Oracle VM Server 3.0.1 Console [Alt-F2 for login console]
Local hostname : SBlade2
Manager UUID : Unowned
Hostname : None
Server IP : None
Server Pool : None
Clustered : No
Server Pool Virtual IP : None
Cluster state : Offline
Master Server : No
Cluster type : None
Cluster storage : None
OVS Agent : Running
VMs running : 0
System memory : 24567
Free memory : 23262
Uptime : 0 days, 0 hours, 2 minutes_

Oracle VM Manager Build

This section details the steps to install and configure Oracle VM Manager on Oracle Linux 5 Update 6.

Oracle VM Manager Platform (Linux Installation)

This installation of Oracle VM Manager will be performed on Oracle Sun Fire x86 servers running Oracle Linux 5 (x86_64) Update 6. For installation of Oracle VM Manager with hardware or software not listed in this guide, please refer to the Oracle VM Installation Guide found at: http://download.oracle.com/docs/cd/E20065_01/index.htm

The local OS disks were mirrored (RAID 1) to reduce the chance of a disk failure taking down the system. To review the procedure to setup disk mirroring on this server, please refer to appendix A2 "Configuring Disk Mirroring".

The operating system was installed using the default Oracle Linux configurations and packages with the following details:

- The Base Package Group, with no optional packages or additional task support groups. The components of the Base Package Group are shown in the table below.

COMPONENTS OF THE BASE PACKAGE GROUP

GROUP	SUB-GROUPS
Desktop Environment	GNOME Desktop Environment
Applications	Editors Games and Entertainment Graphical Internet Graphics Office Productivity Sound and Video
Servers	Printing Support
Base System	Administration Tools Base Java Legacy Software Support X Windows System

- IPv4 Configured
- Firewall Enabled with SSH checked as a trusted service
- SELinux set to Permissive mode

- Registered operating system with Unbreakable Linux Network

For detailed steps on installing the Oracle Linux Operating System, please refer to appendix A3 "Oracle Linux 5 Update 6 Installation Procedure".

Bond Ports on the 10 GbE Network

To ensure connectivity to the Sun ZFS Storage Appliances , the two 10 GbE network ports will be bonded in an active-passive configuration on the Oracle VM Manager. In this configuration, the 10 GbE ports are eth0 and eth1. Please identify the two 10 GbE ports for each environment as eth# might be different.

To bond the ports, perform the following in a terminal session.

Open the /etc/modprobe.conf file

```
# vi /etc/modprobe.conf
```

Add the following two lines to the modprobe.conf file. The arp_ip_target should be a gateway IP address, or another IP address on the network that is reliably pingable since this is a part of the active-backup port failover.

```
alias bond0 bonding
options bonding mode=active-backup arp_interval=1000
arp_ip_target=<Network_Gateway_IP>
```

Create a file ifcfg-bond0 in the /etc/sysconfig/network-scripts directory.

```
# vi /etc/sysconfig/network-scripts/ifcfg-bond0
```

Add the following lines to the ifcfg-bond0 file, please enter the appropriate IP address, gateway, netmask and eth# ports for :

```
DEVICE=bond0
IPADDR=<IP_Address_of_bond>
NETMASK=<Netmask_for_network>
GATEWAY=<Gateway_for_network>
BOOTPROTO=none
USERCTL=no
TYPE=Bonding
ONBOOT=yes
BONDING_MASTER=yes
BONDING_SLAVE0=<First_physcial_port_associated_with_bond>
BONDING_SLAVE1=<Second_physical_port_associated_with_bond>
```

Modify the first physical port associated with bond0

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth#
```

Add the following lines, and comment out any other IP Addresses, gateway, and netmask information:

```
ONBOOT=yes
MASTER=bond0
SLAVE=yes
```

Modify the second physical port associated with bond0

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth1
```

Add the following lines, and comment out any other IP Addresses, gateway, and netmask information:

```
ONBOOT=yes
MASTER=bond0
SLAVE=yes
```

Oracle Database 11*g* Release 2 Installation

The Oracle VM Manager installer provides Oracle Database 11*g* Express Edition (Oracle XE) for Linux 64-bit, but this should only be used in non-production environments. Oracle XE is not a supported product and Oracle Support Services cannot provide bug fixes or patches for this product. If deploying Oracle VM Manager in a production environment, please use Oracle Database 11*g* Standard or Enterprise Edition.

For details on how to prepare Oracle Linux for Oracle Database installation and how to install Oracle Database, please refer to appendix A4 "Oracle Database 11*g* Release 2 Installation Procedure".

Obtain Oracle VM Manager Media

To obtain the Oracle VM Manager media, please go to Oracle VM edelivery (https://edelivery.oracle.com/oraclevm), and select the Oracle VM media pack for the latest release. From the Oracle VM media pack, select to download the Oracle VM Manager. After downloading this file, uncompress the package to be able to access the ISO file used for Oracle VM Manager installation.

Required Pre-Requisites Check

For detailed information on the hardware and software requirements, please refer to the Oracle VM Installation Guide. This can be found at the Oracle VM documentation library (http://download.oracle.com/docs/cd/E20065_01/index.htm).

Prepare the Oracle Linux Operating System

Oracle VM provides a script, createOracle.sh, that will create the appropriate Linux groups, users, directories and sets the required parameters for Oracle VM Manager installation and operation. This script is found on the Oracle VM Manager installation media. More details on this script can be found in the Oracle VM Installation Guide found at the Oracle VM documentation library.

Copy the downloaded Oracle VM Manager Installation ISO to the Oracle VM Manager server. Once copied, mount the ISO file to an existing directory using the following command:

```
# mount -o loop OracleVM-Manager-version.iso /mnt
```

Run the Environmental Configuration Script (createOracle.sh) to prepare the operating system for Oracle VM Manager installation. Go to the mounted Oracle VM Manager directory:

```
# cd /mnt
```

Execute the createOracle script:

```
# ./createOracle.sh
```

In addition to running the createOracle script, appropriate firewall ports need to be opened as well to allow remote access to the Oracle VM Manager UI and VM Manager core API. To make this configuration change, open the iptables file located in the /etc/sysconfig directory using the vi editor.

```
# vi /etc/sysconfig/iptables
```

Locate the following lines in iptables:

```
*filter
:INPUT ACCEPT [0:0]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [0:0]
```

Under these lines, insert the following to allow remote access to the Oracle VM Manager UI:

```
-A INPUT -m state --state NEW -m tcp -p tcp --dport 7001 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 7002 -j ACCEPT
-A INPUT -m state --state NEW -m tcp -p tcp --dport 15901 -j ACCEPT
```

To remotely connect to the Oracle VM Manager core API, add the following line:

```
-A INPUT -m state --state NEW -m tcp -p tcp --dport 54321 -j ACCEPT
```

When completed, exit iptables saving the changes, and restart the iptables service

```
# /etc/init.d/iptables restart
```

Oracle VM Manager Installation

After the script has completed successfully, run the Oracle VM Manager installer by running the following command from the mounted Oracle VM Manager directory:

```
# ./runInstaller.sh
```

At the following prompt, select option 2 for the standard installation type:

```
Please select an installation type:
```

```
1: Simple
2: Standard
3: Uninstall
4: Help
```

When prompted with the following message to install Oracle Database 11*g* Express Edition (XE), select option 2 to connect to the database that was installed earlier.

```
Oracle Database Repository
==========================
Would you like to install Oracle Database 11g Express Edition (XE) or connect to
an existing Oracle database?
1: Install Oracle Database 11g XE
2: Use an existing Oracle database
Select Number (1-2): 2

Use the following script to complete the remainder of the Oracle VM Manager
installation: (Please note SID value same as Oracle DB installation procedure in
appendix. Change if SID is different than what was used during Oracle Database sample
installation)

Enter the Oracle Database hostname [localhost]: ovmmanager.us.oracle.com
Enter the Oracle Database System ID (SID) [XE]: ovmdb
Enter the Oracle Database System password: <custom_password>
Enter the Oracle Database listener port [1521]: 1521
Enter the Oracle VM Manager database schema [ovs]: ovs
Enter the Oracle VM Manager database schema password: <custom_password>
Enter the Oracle VM Manager database schema password (confirm): <custom_password>

Oracle Weblogic Server 11g
======================
Enter the Oracle WebLogic Server 11g user [weblogic]: weblogic
Enter the Oracle WebLogic Server 11g user password: <custom_password>
Enter the Oracle WebLogic Server 11g user password (confirm): <custom_password>

Oracle VM Manager application
=========================
Enter the username for the Oracle VM Manager administration user [admin]:admin
Enter the admin user password: <custom_password>
Enter the admin user password (confirm): <custom_password>

Verifying configuration ...

Start installing the configured components:
   1: Continue
   2: Abort

   Select Number (1-2): 1
```

When completed entering this information and the configuration has been verified, agree to start installing the configured components when prompted and continue with the installation.

At the end of the installation, the following message should be displayed:

```
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 simple install, all passwords are the same.

Oracle VM Manager UI:
       http://example.com:7001/ovm/console
```

```
       https://example.com: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/
```

The Oracle VM Manager installation is complete.

Post Oracle VM Manager Installation Task

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. To install the VNC client, Tight VNC, run the following command on your Linux server:

```
# rpm -ivh http://oss.oracle.com/oraclevm/manager/RPMS/tightvnc-java-1.3.9-3.noarch.rpm
```

[Output]

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

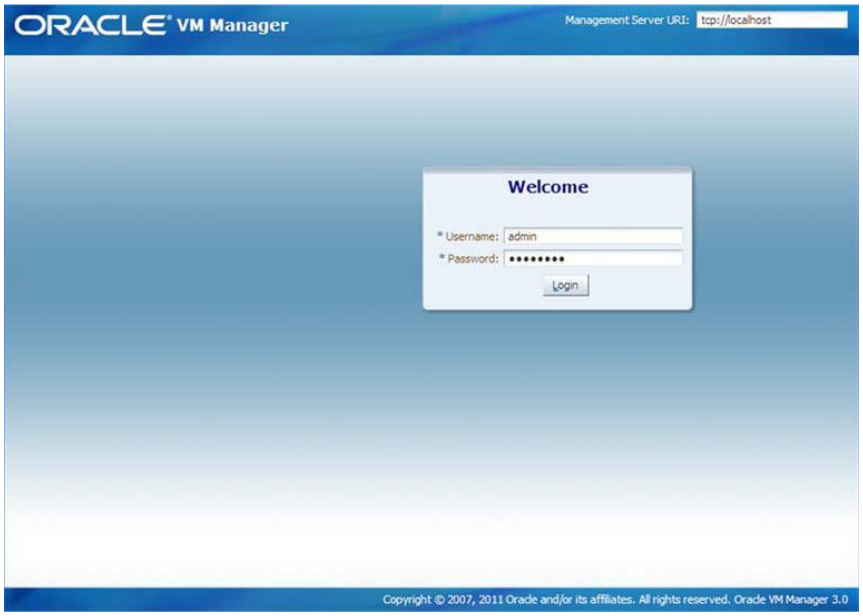
Configuring Oracle VM 3 Virtual Environment

This section will go through the process of setting up a general Oracle VM 3 environment. This includes the following steps:

- Accessing the Oracle VM Manager UI
- Discovering Oracle VM Server for x86 host systems
- Edit existing network resources
- Create additional network resources
- Create virtual MAC addresses as a resource

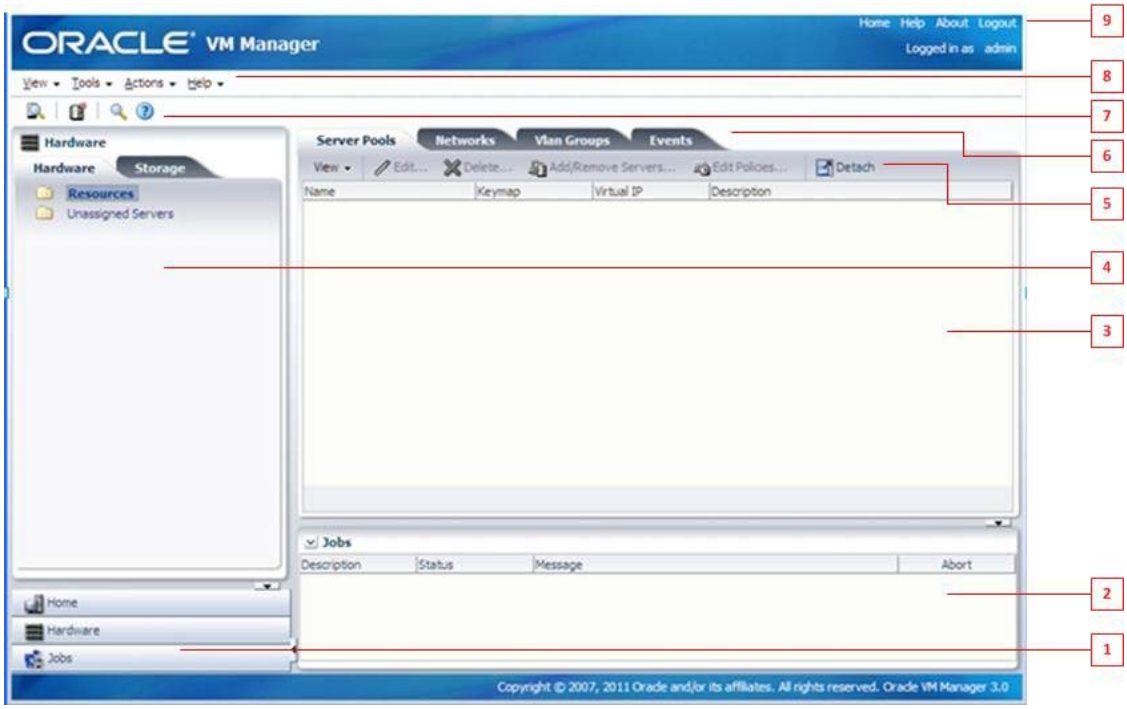
Accessing the Oracle VM Manager

Log into the Oracle VM Manager Web User Interface (https://<fully_qualified_domain_name_of_OVM_Server>:7002/ovm/console) using "admin" and the password set during the installation of Oracle VM Manager.



Oracle VM Manager Web User Interface

The "Home" view should be the first screen seen after logging into Oracle VM Manager. Oracle VM Server for x86 host systems, networking and external storage are added as resources on this screen.

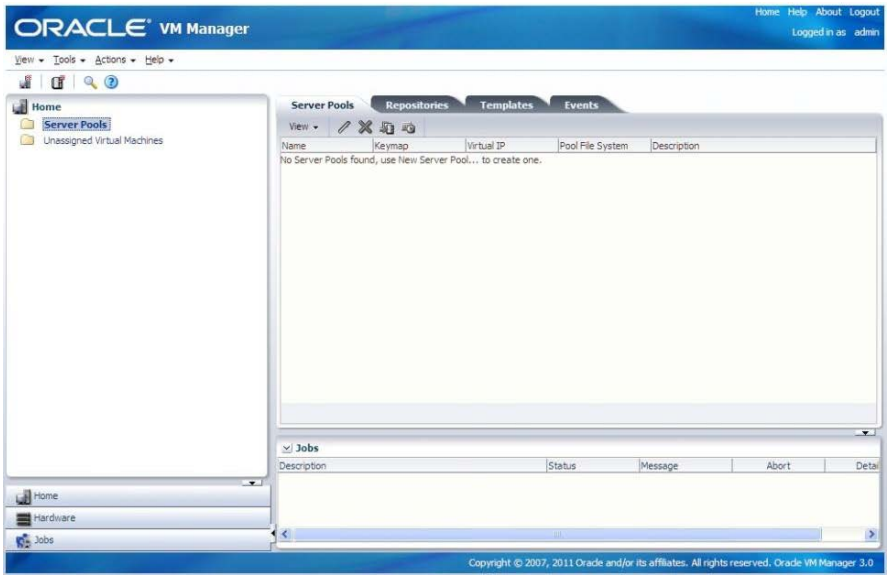


A quick tour of the Oracle VM Manager console shows the following components:

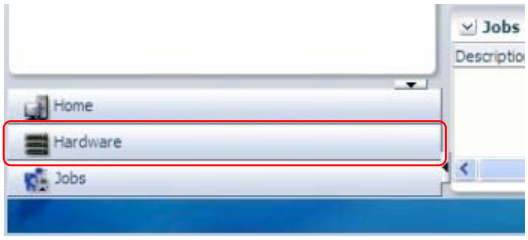
NUMBER	COMPONENT NAME	DESCRIPTION
1	Navigation Views	Shortcuts to change views in the navigation pane directly above
2	Jobs Pane	The jobs pane displays messages, status and results of tasks that are initiated by using any of the tools or menus in any of the panes or views. Jobs do not pertain to scheduled 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 Server for x86 host systems as a Resource

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

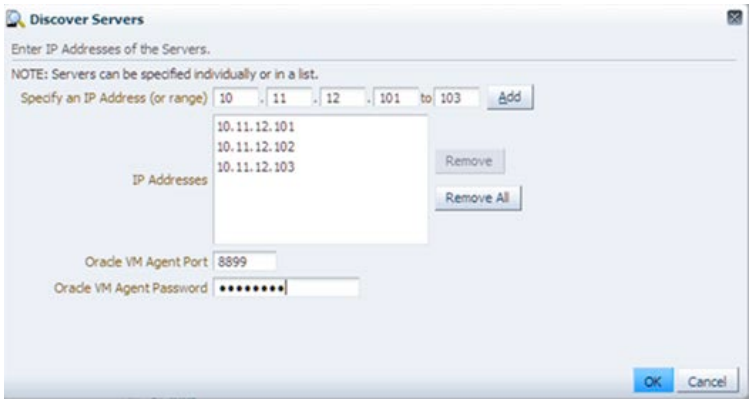


Use the "Hardware" shortcut in the navigation views pane to change the view to Hardware.

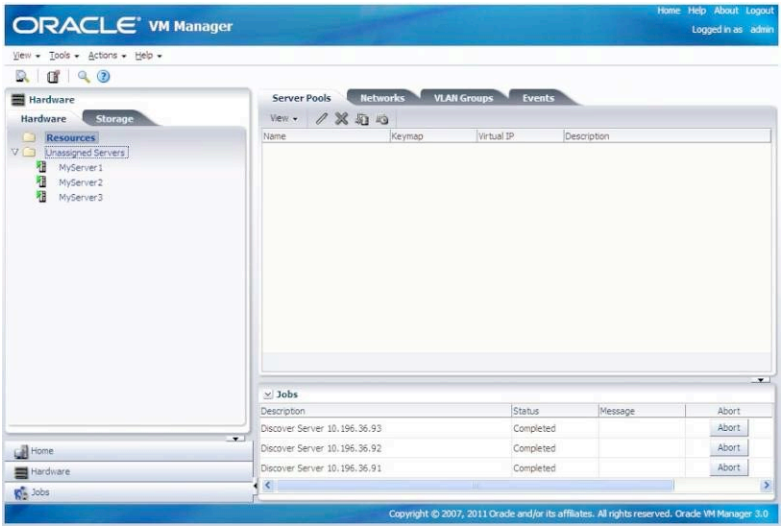


Networking and external storage are added as resources in the hardware view. Use Discover Servers to add them as resources by right-clicking on the Resources folder in the navigation tree and selecting Discover Servers from the menu.

Add the Oracle VM Server for x86 host systems as shown in the following figure. You may use a range of IP addresses as shown or add them one at a time.



The discovery process will add all the servers to the "Unassigned" server resources pool, as seen below, where the Oracle VM Server for x86 host systems will remain until they are assigned to the server pool created in later steps.



Edit Existing Network

Oracle VM 3 allows finer control over networking. Assigning network roles and subnets to network devices on the Oracle VM Server for x86 host systems is now controlled through the Oracle VM Manager, alleviating the need to log onto the Oracle VM Server for x86 host systems to configure networking by hand.

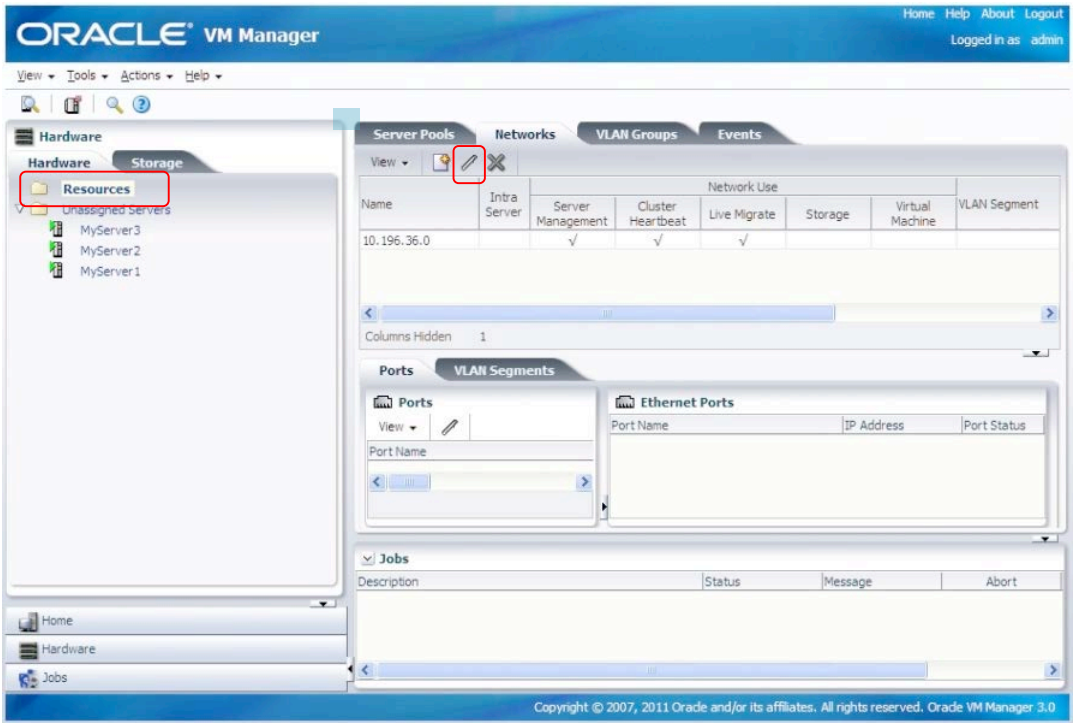
Most data centers will have multiple subnets with specific roles such as production front end where all users can connect to servers, databases and applications (public network), dedicated storage (storage network), dedicated out-of-band server management (management network), etc.

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 and applications).

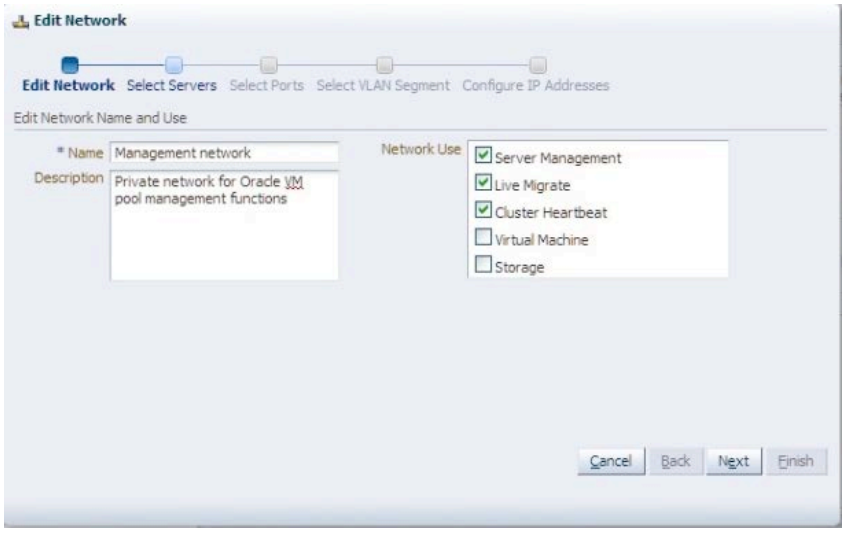
A single network was discovered by Oracle VM Manger during the discover servers step above. In the case of this tutorial, the existing network that was discovered is the management network. Before moving on to the next step of adding a public network for storage and general access to Oracle VM guests, 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 only a single subnet exists within the network, then just modify the existing network and assign all "uses" to that one subnet, then skip the "create network" step.

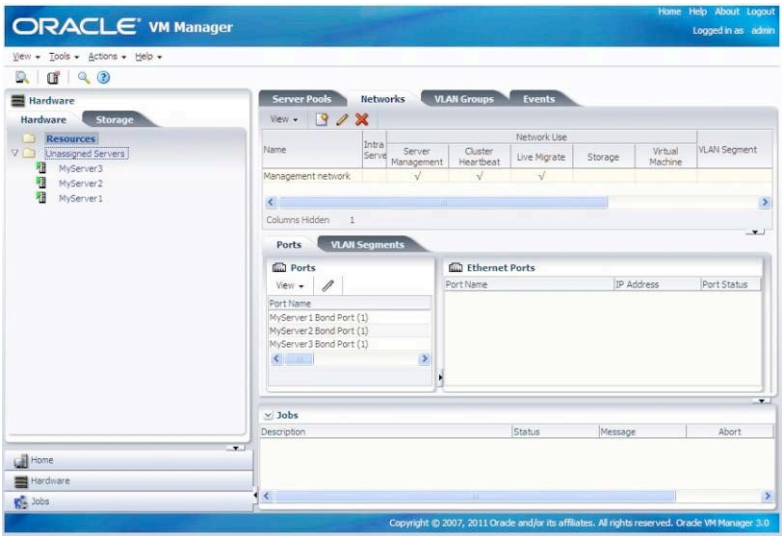
Ensure Resources is selected in the navigation pane, then select Networks from management tab as show in the below screenshot, then chose the edit icon from the management toolbar just below the Networks tab:



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 the figure below to allow easy identification in later steps. Also select this network to include storage and virtual machine unless the Sun ZFS Storage 7420 controllers and virtual machines have been configured to exist on another network.

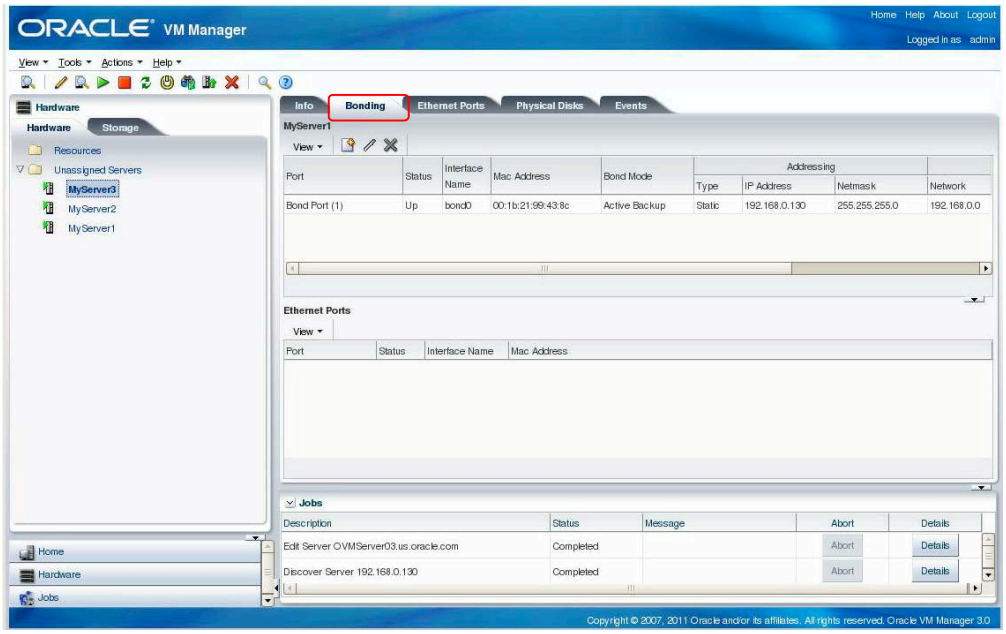


The wizard will then step through the remaining four tasks – simply accept the default on all subsequent dialog boxes until the Finish button becomes active. The result should look like the following:

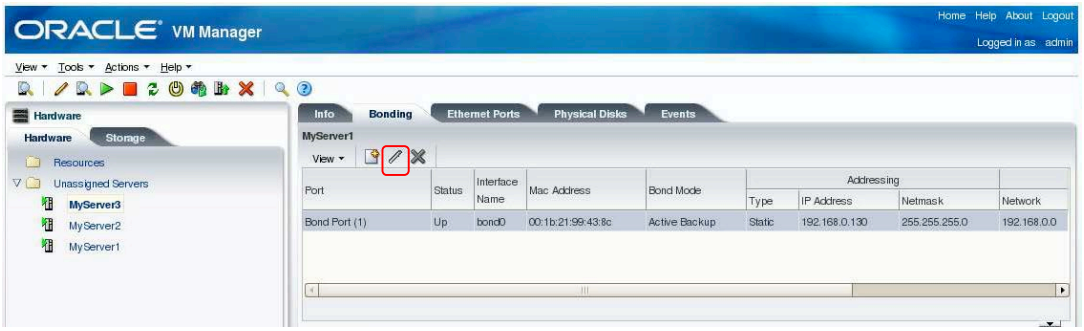


Bond Management Network Ports

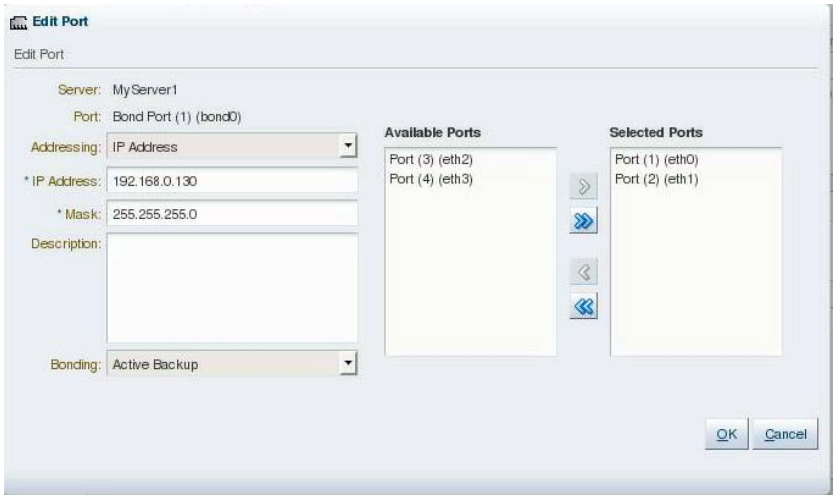
For the purpose of high availability, the management network ports should be bonded in case of a NEM failure, or another network issue. To do this, select a server from the Unassigned Servers tree and click on the Bonding tab



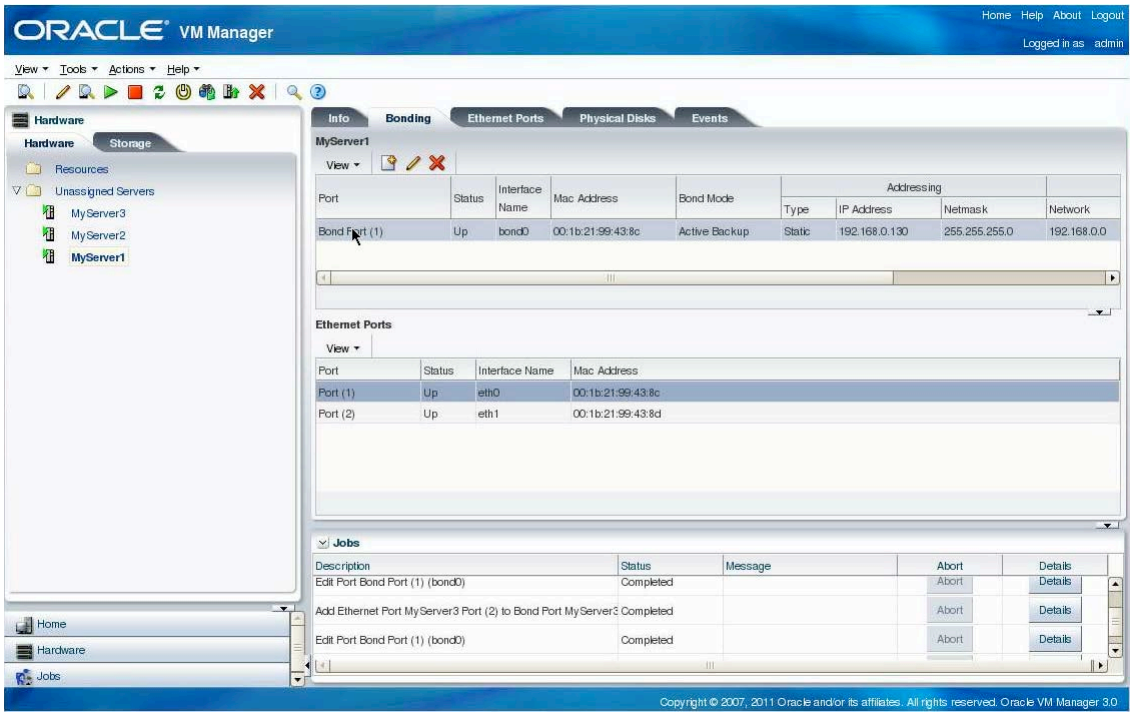
Select the already existing bond (bond0) and select the edit icon.



Add the other management network port to the bond. Click OK when completed.



Multiple ports will now show as being associated with the bond after the configuration has been completed.

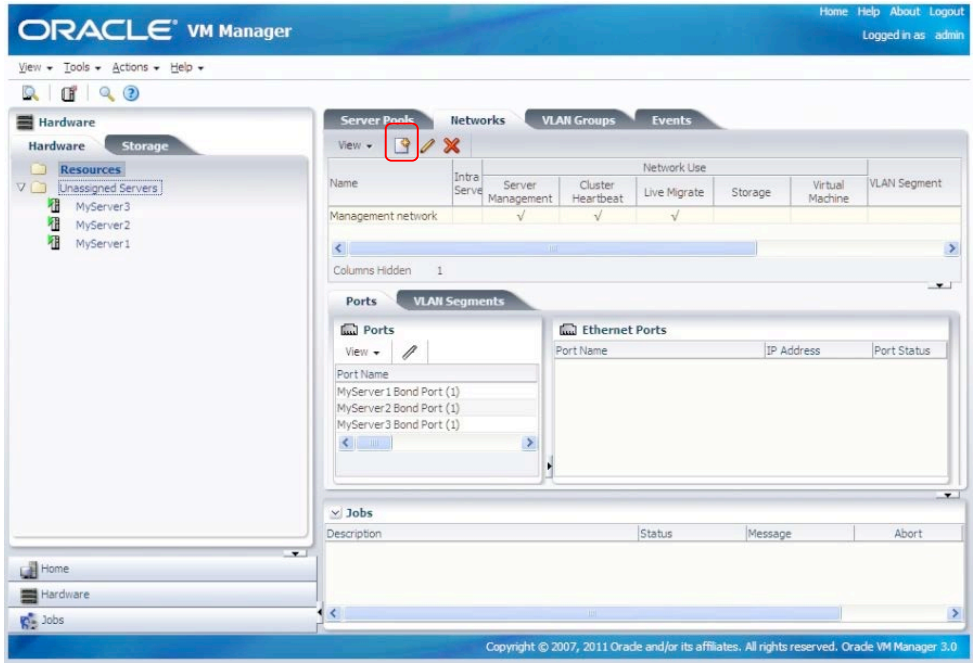


Perform this for all the Oracle VM Server for x86 host systems in the environment.

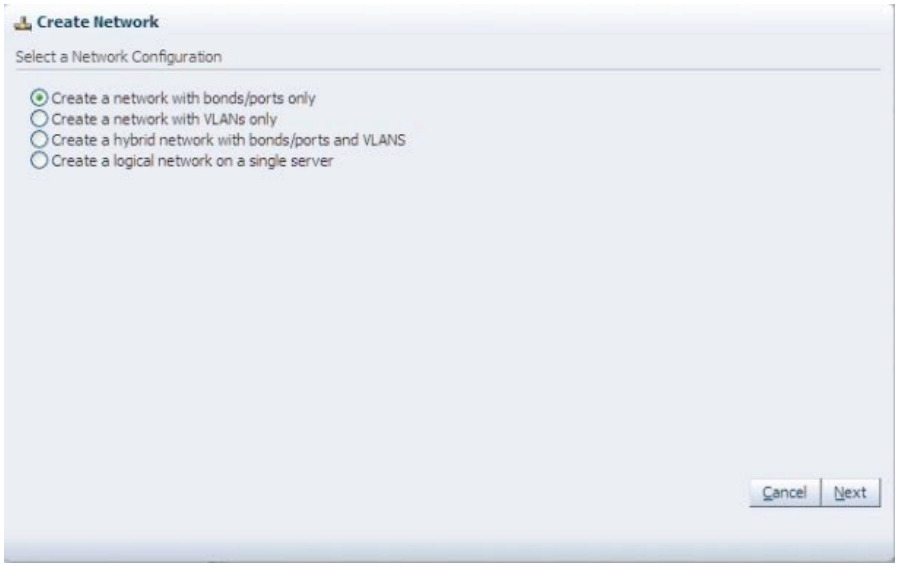
Create Additional Network as Resource

A new public network will be created to allow Oracle VM Server for x86 host systems 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 Server for x86 host servers with the network information provided by the Oracle VM administrator using the Oracle VM Manager Create Network wizard.

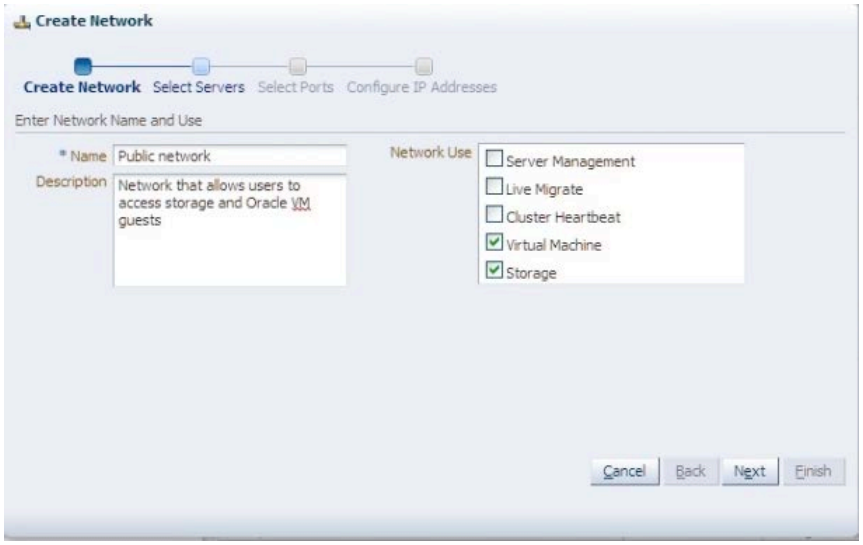
Choose the create network icon from the management toolbar just under the network tab as shown in the figure below:



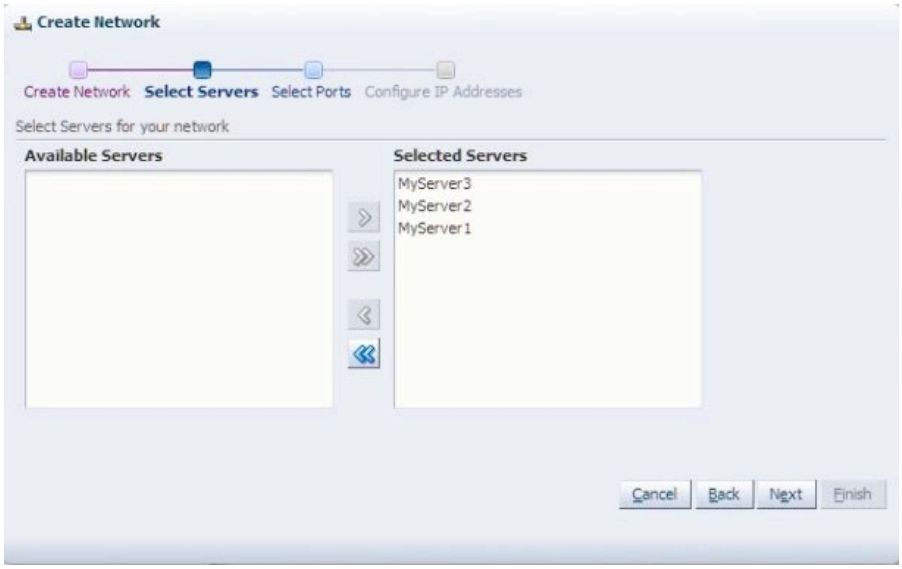
Choose "Create a network with bonds/ports only". Click Next when completed.



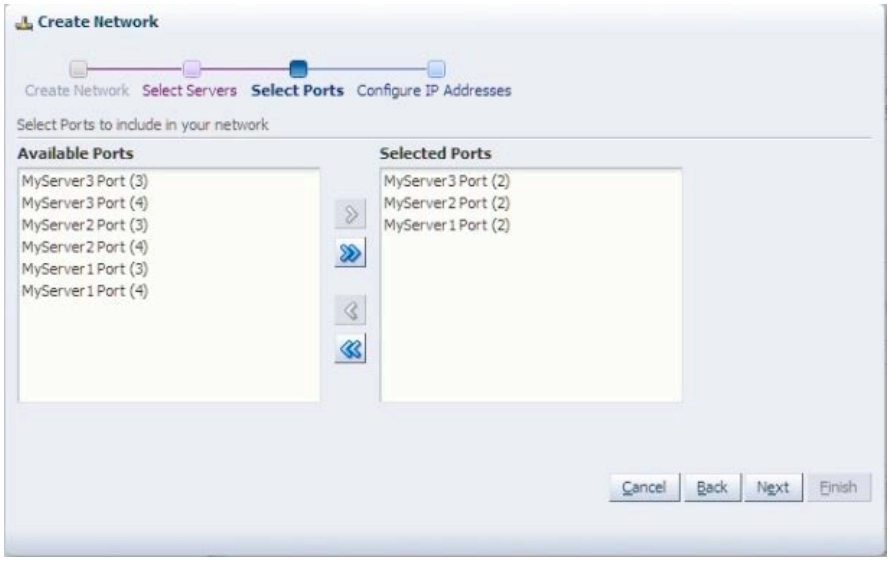
Provide a name for the new network and choose the virtual machine and storage check boxes as seen in below. The "Network use" refers to the type of traffic for the subnet.



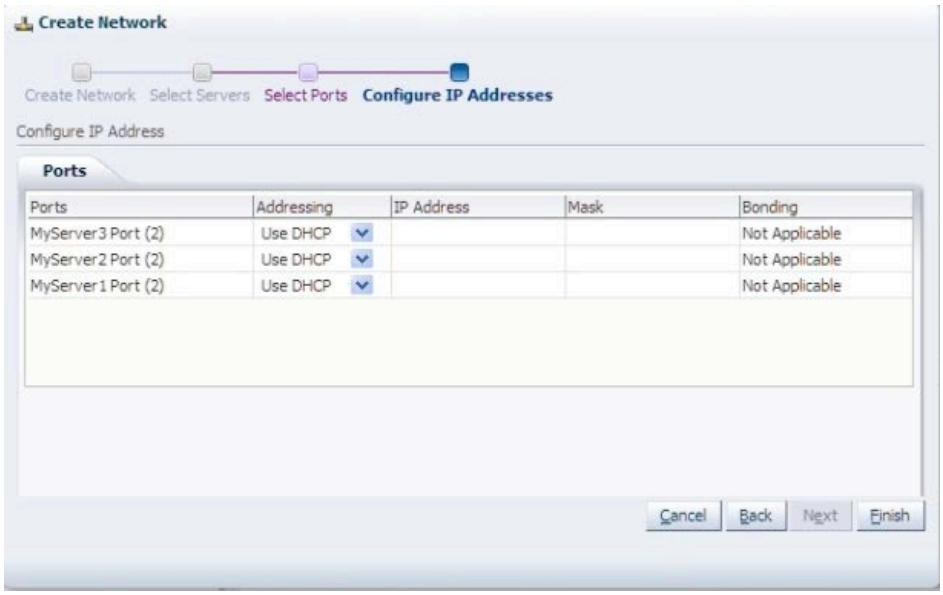
Select the Oracle VM Server for x86 host systems where the new network will be created/configured:



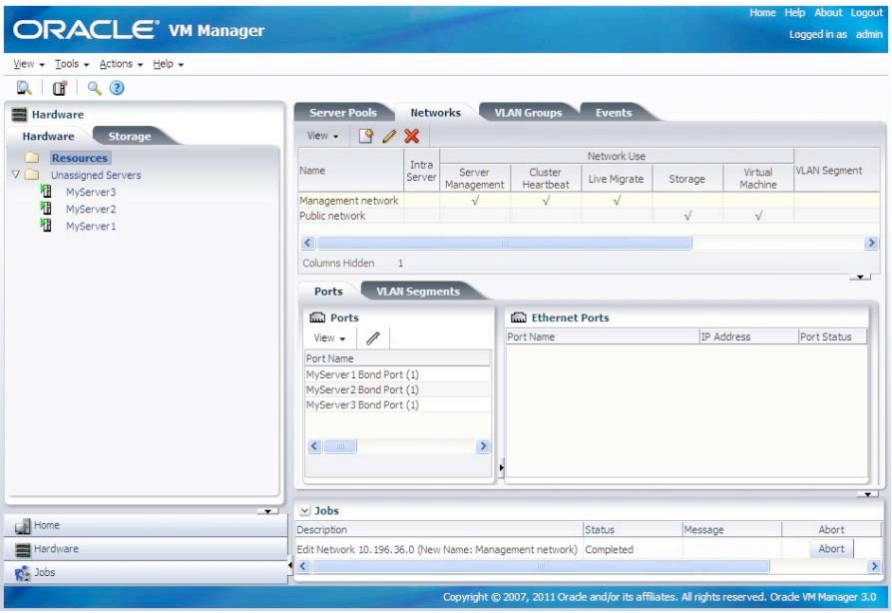
The port/interfaces, shown below, do not show the Linux name for the interface such as eth0 or eth1, but they translate as port(1) is eth0, port(2) is eth1, etc. Choose the appropriate interface to configure on each Oracle VM 3 server host, whatever is relevant to the environment.



Finally, provide the IP address information of the storage subnet and Oracle VM guests on each Oracle VM Server for x86 host systems.



The figure below shows the public network after it has been configured on each Oracle VM Server for x86 host systems

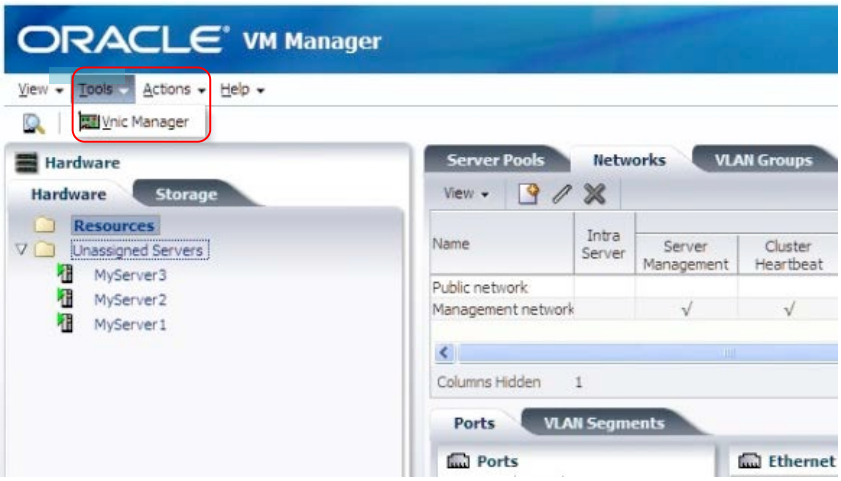


Create Virtual MAC Addresses as Resource

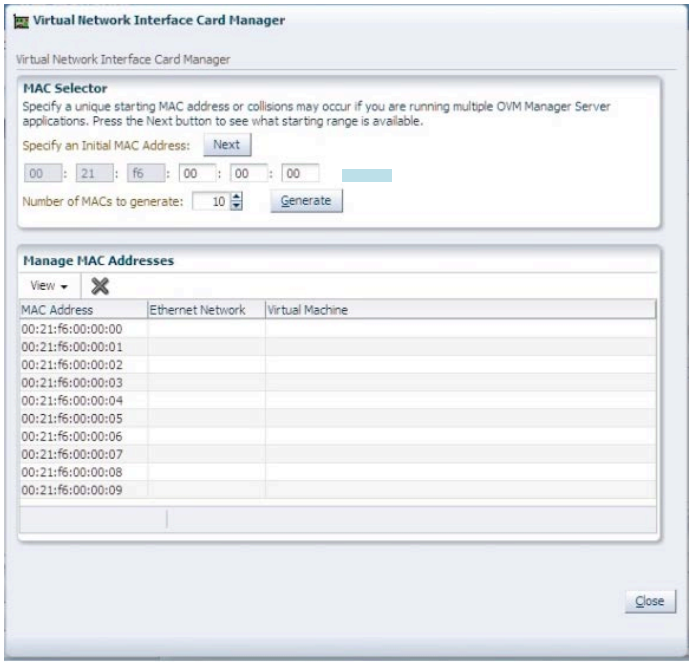
The last network task needed is to create a pool of virtual Ethernet addresses (MAC) for the Oracle VM guests. The virtual Ethernet addresses will be randomly assigned from the pool as each Oracle VM guest is created.

Note: 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 will be see in a later step.

To begin, choose "Vnic Manager" from the Tools pull down menu at the top of user interface as shown below:



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.



Choose Close once the pool of MAC addresses have 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 Server for x86 host systems. This means NFS mount points must exist on the storage array and be exported to the Oracle VM Server for x86 host systems, but not mounted on the Oracle VM Server for x86 host systems. 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 Server for x86 host systems.

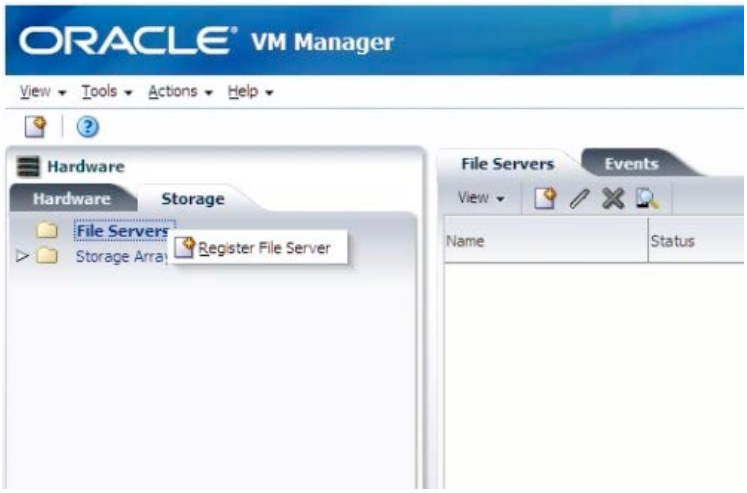
Three different external storage protocols as well as local disk can be used to create the server pool:

- Option 1 using NFS to add external storage as a resource.
- Option 2 using iSCSI to add external storage as a resource.
- Option 3 using FCP to add external storage as a resource.
- Option 4 using local disk as a storage resource for a single node server pool.

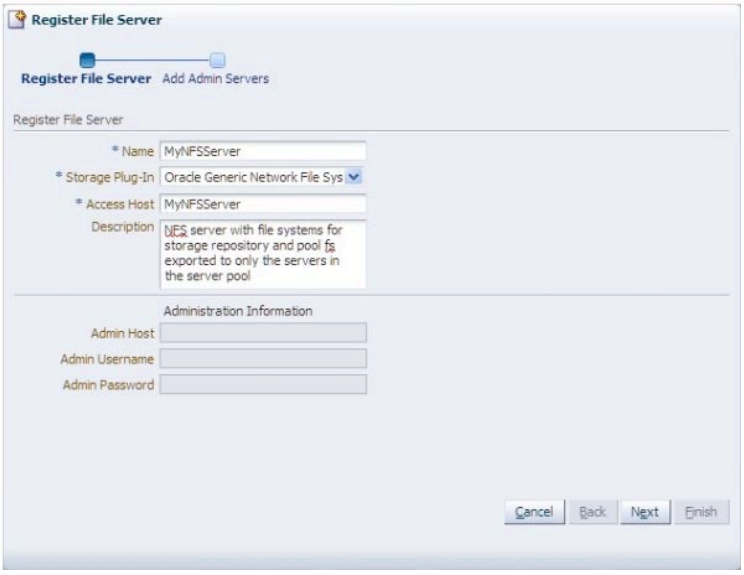
Local disk is very limited in scope and can only be used when creating a server pool containing a single Oracle VM Server for x86 host systems. Server pools with a single Oracle VM Server for x86 host systems cannot take advantage of Oracle VM 3 high availability features including live migration.

This document will cover the NFS configuration. If iSCSI, Fibre Channel, or local disks are used, please refer to the Oracle VM User's Guide found at the following link: http://download.oracle.com/docs/cd/E20065_01/index.htm

To begin, select the Storage tab and right-click on File Servers in the navigation pane and select "Register File Server".

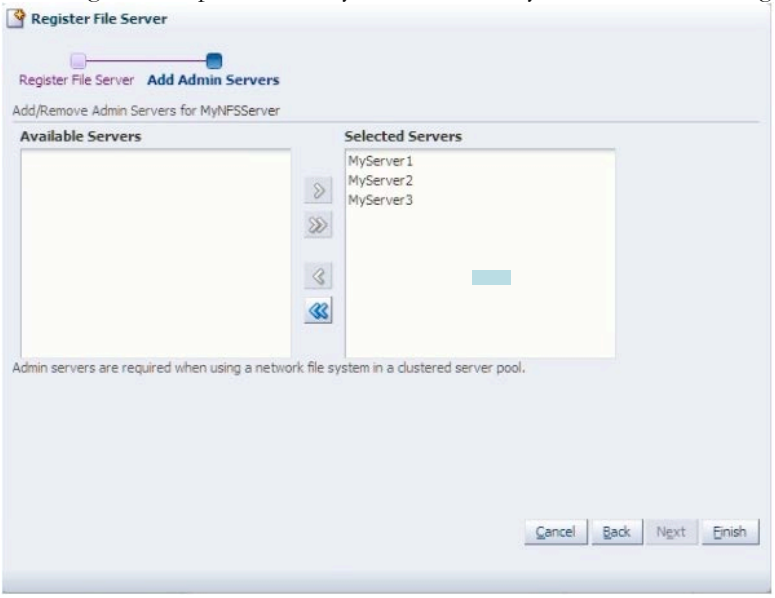


Provide the appropriate information for your NFS server as shown in the register file server wizard below. For access host, enter either the IP address of the file server or the fully qualified domain name of the file server.

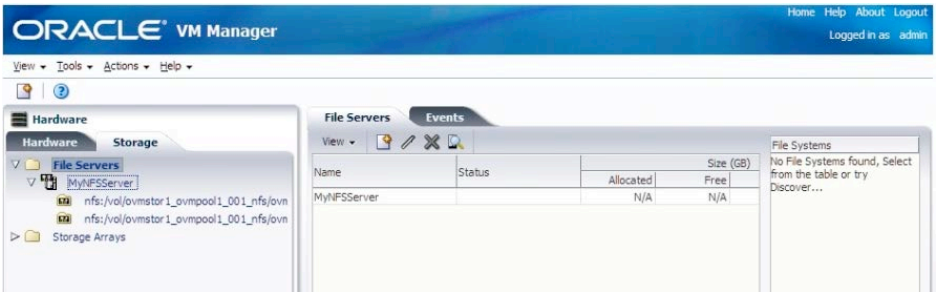


Next, select one or more Oracle VM Server for x86 host servers that will act as NFS administration servers.

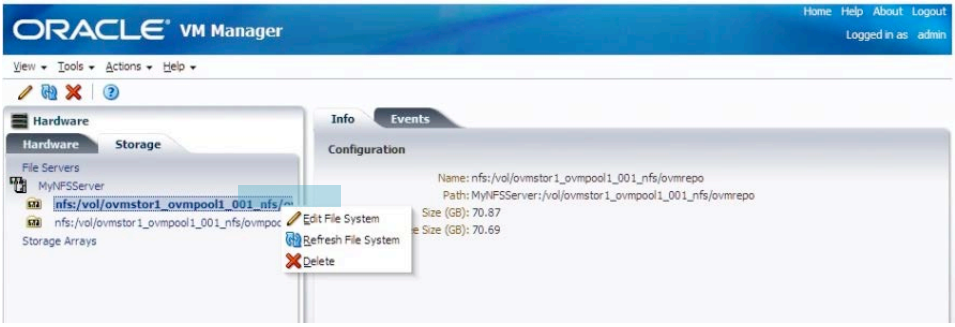
This step has nothing to do with which servers the NFS mounts are assigned/mounted, only which Oracle VM Server for x86 host systems will be tasked with keeping track of, or managing the NFS mounts points on all the Oracle VM Server for x86 host systems. This might make a little more sense if you think of having a server pool with fifty servers, but only three of them manage the NFS mounts for all fifty.



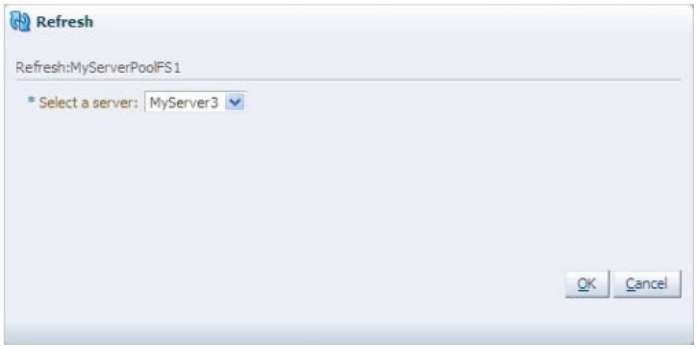
Oracle VM Manager will then discover all NFS mounts that have been exported to any of the Oracle VM Server for x86 host systems that were found during the previous discover servers step, not just the servers you chose as Admin Servers. Oracle VM Manager will then display all the NFS exports it found in the navigation tree under the name of the NFS server.



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 for x86 host systems. To refresh the NFS exports, right-click on the NFS mounts and select "Refresh File System".

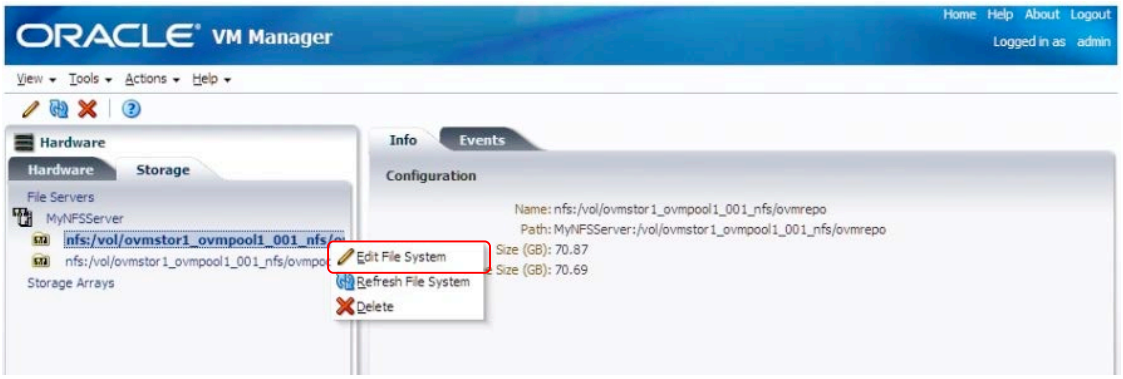


Select a single Oracle VM Server for x86 host systems to be tasked with refreshing the NFS export.

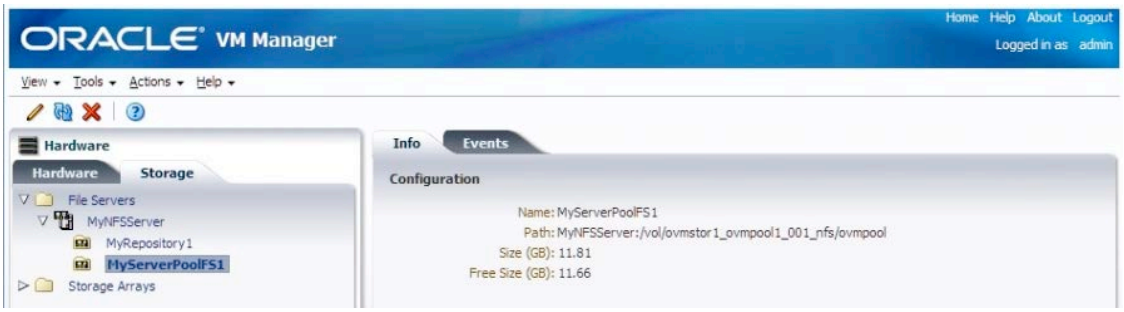


Oracle VM Manger adds the full path of the NFS export as the name of the storage resource. The full path can be hard to read sometimes, so the names of the NFS mounts will manually be changed to

something a little easier to read before moving on to the next step. This step is not required and simply shows the improved features of Oracle VM Manager to help create a more manageable, user friendly environment. To change the name, right-click on the NFS mount and select "Edit File System"



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

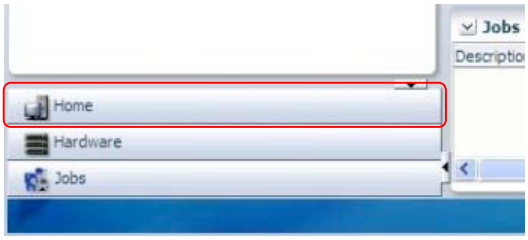


Create Oracle VM 3 Server Pool

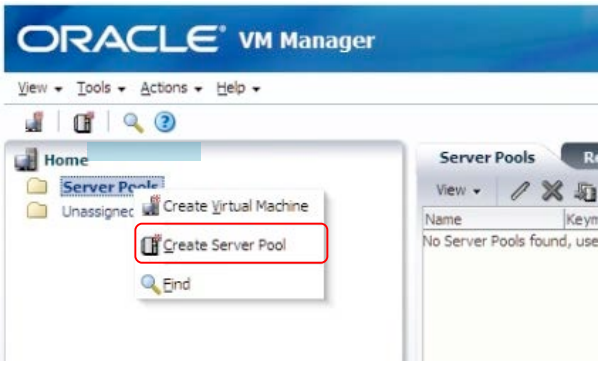
This phase is focused on adding physical servers, networking and storage as resources for Oracle VM Manager to use when creating server pools and Oracle VM guests.

A server pool can now be created once all the other resources such as Oracle VM Server for x86 host systems, networking and storage have been added to Oracle VM Manager.

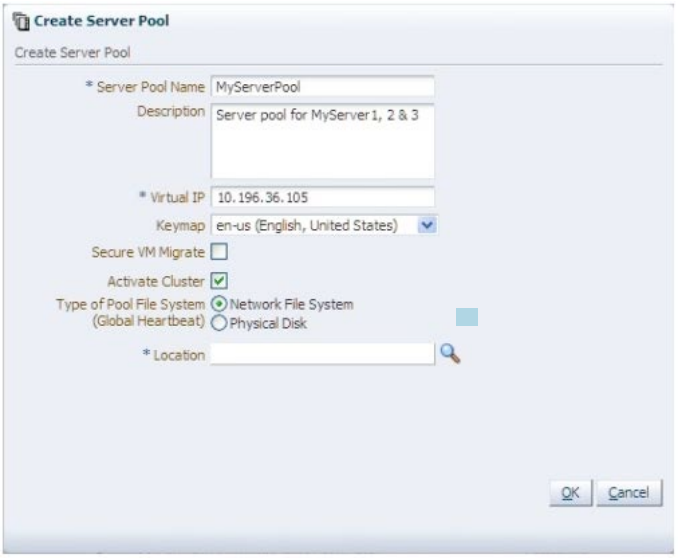
Select the "Home" shortcut in the navigation views pane to change the view to Home.



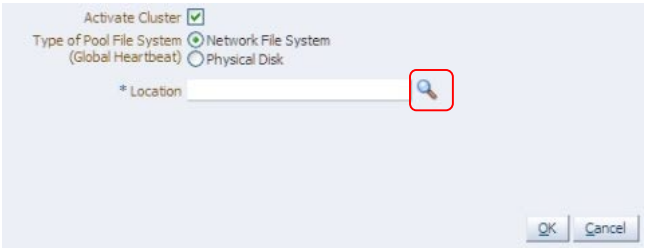
Right-click on the "Server Pool" directory and select "Create Server Pool".



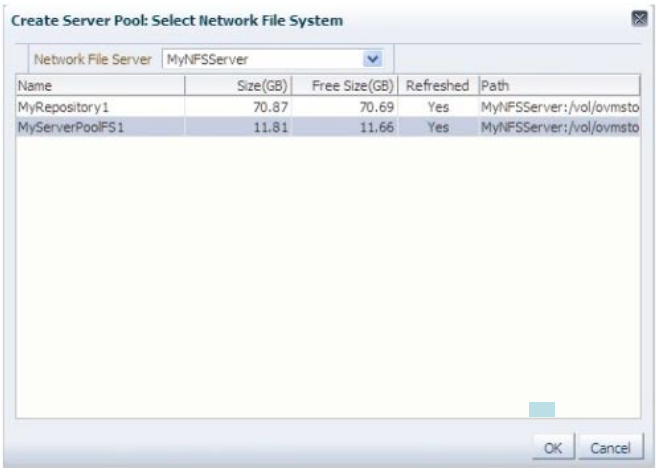
Enter the server pool name, the relocatable virtual IP and the NFS export used for the server pool file system. The virtual IP is an address that will always be associated with the Oracle VM for x86 host systems currently designated as the server pool master. Servers are not added to the server pool until later.



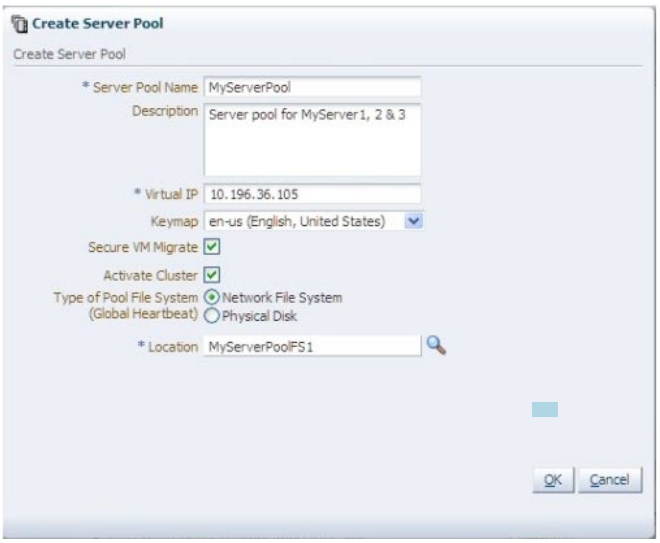
Click on the "location" icon, shown below, to select the server pool file system.



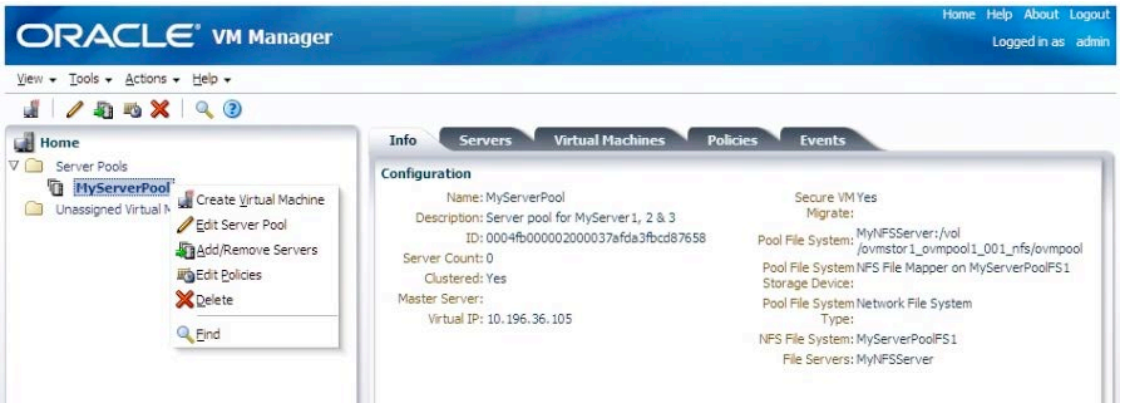
Select the NFS mount to be used for the server pool file system from the dialog box



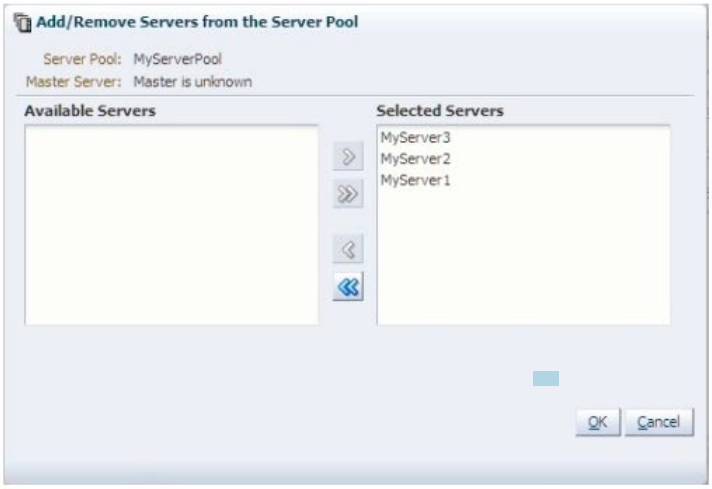
The server pool will be created without Oracle VM Server for x86 host systems or a storage repository once the "OK" button is selected.



Oracle VM Server for x86 host systems can be added to the newly created server pool. Simply off click the server pool name and select Add/Remove Servers.



Select the Oracle VM Server for x86 host systems that will be included in the server pool as shown below:

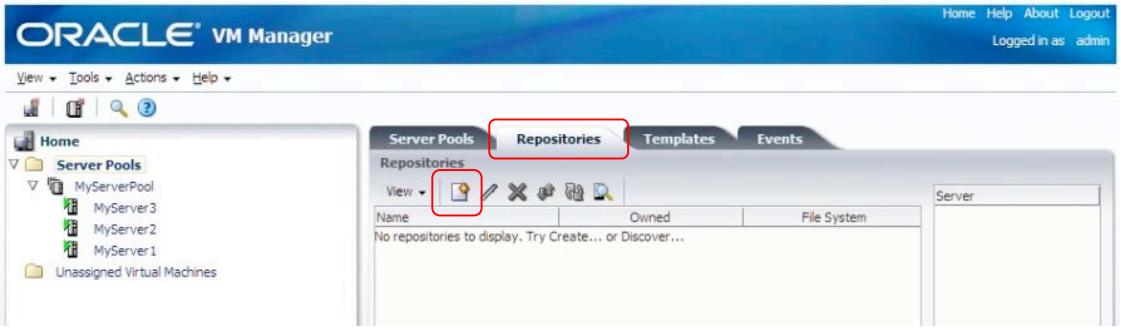


The Oracle VM Server for x86 host systems will move from the unassigned folder and appear under the server pool name in the navigation tree.

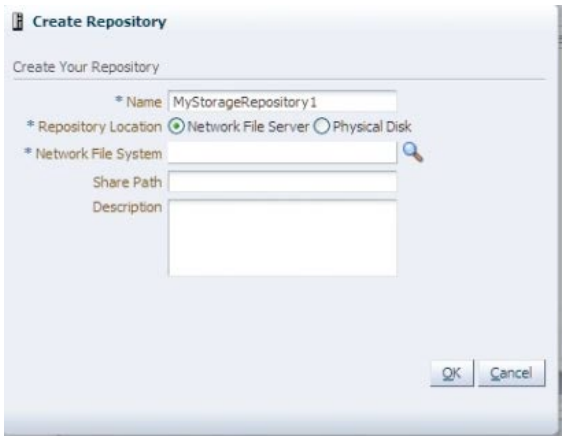
The server pool is almost completed and just needs a storage repository.

Create Storage Repository

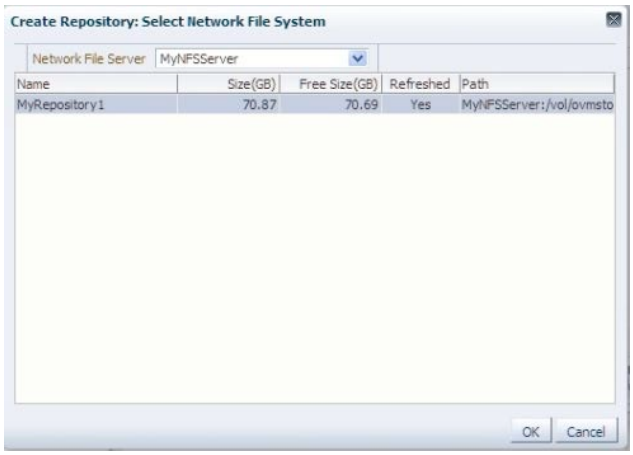
The final step in the process of creating a server pool is to assign an NFS mount to act as the centralized storage repository where all the Oracle VM guest files, templates and other resources will reside for the entire server pool. Select the Repositories tab and then choose the Create Repository icon on the management pane toolbar just under the tab.



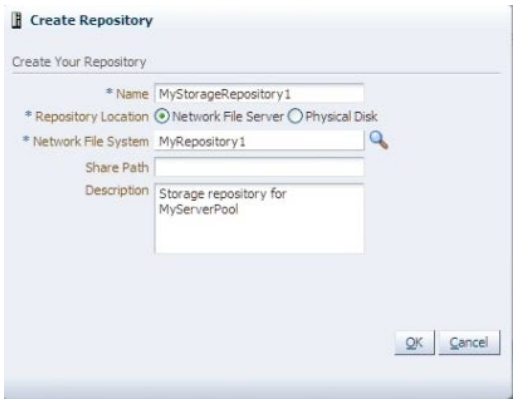
Enter a name for the storage repository, choose Network File Server for the Repository Location and then click on the magnifying glass icon to bring up the Select Network File System dialog box.



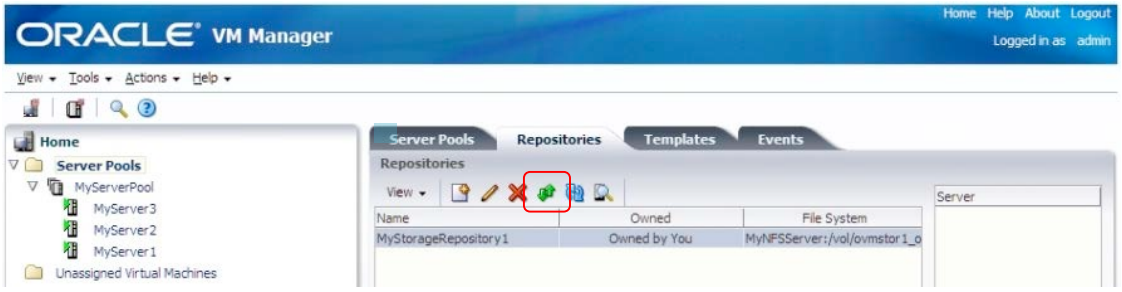
Use the Select Network File System dialog to choose the NFS export that was created much earlier for use a storage repository. Click OK when completed.



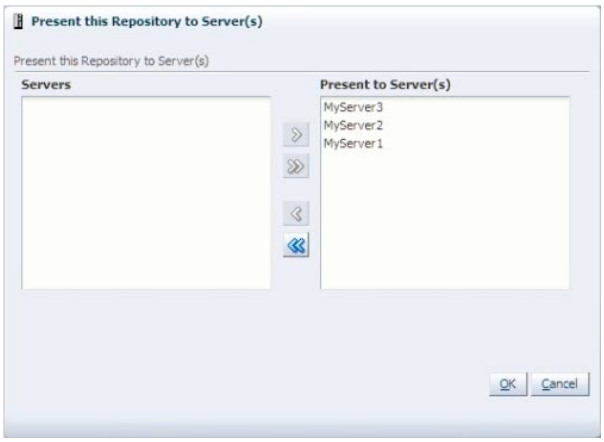
Add an optional Description and click OK to complete the creation of a storage repository.



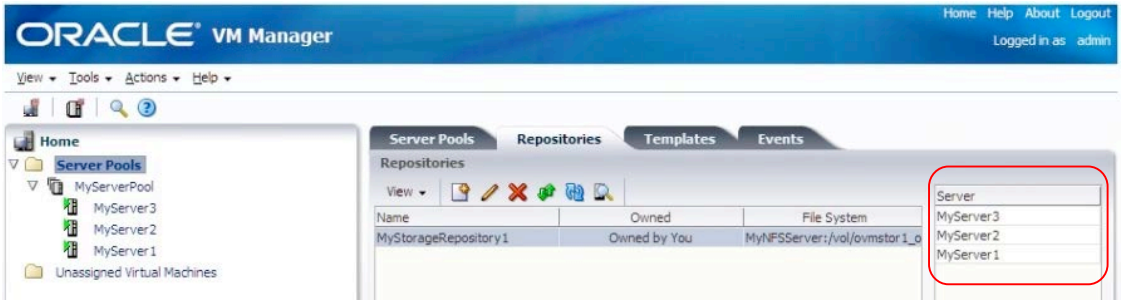
At this point, the storage repository has been created, but is not yet assigned to any server pool. So, the final step in creating a server pool is to assign the newly created storage repository to the Oracle VM Server for x86 host systems that will need access to the centralized storage. To assign a repository to the Oracle VM Server for x86 host systems, select the newly created storage repository, and then choose the Present-Unpresent Selected Repository icon (up/down green arrow) from the toolbar just below the repositories.



Select the Oracle VM Server for x86 host systems that will have access to the repository and then click OK.



The storage repository will now show the Oracle VM Server for x86 host systems it is assigned as shown in the Server pane whenever a storage repository is selected in the Repositories tab



Create Oracle VM Guest

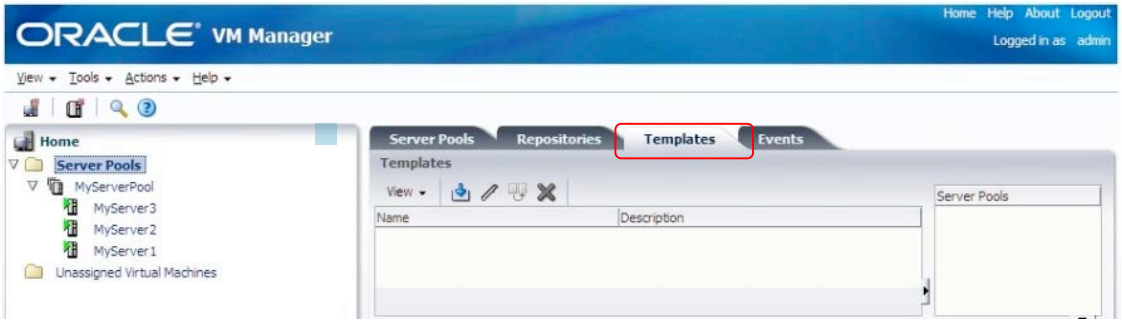
The Oracle VM cluster is now ready for Oracle VM guest images to be created. A standard Oracle VM guest template will be used to create an Oracle VM guest in this tutorial.

Import Oracle VM Guest Template

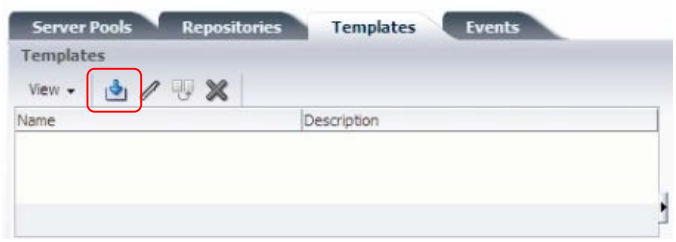
Please refer to the appendix section "A5. Download Oracle VM Template" on how to download and prepare the Oracle VM template that will be used in this portion of the document.

Once downloaded, 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.

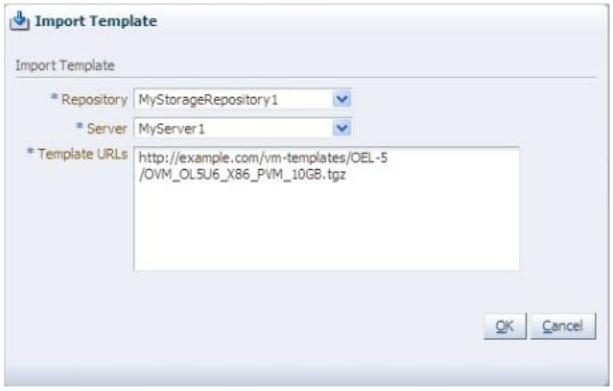
To begin, select Server Pools in the navigation tree, then chose the Templates tab as shown below:



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



In the Import Template screen, 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 Server for x86 host systems 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 for x86 host systems only needed for this one task.

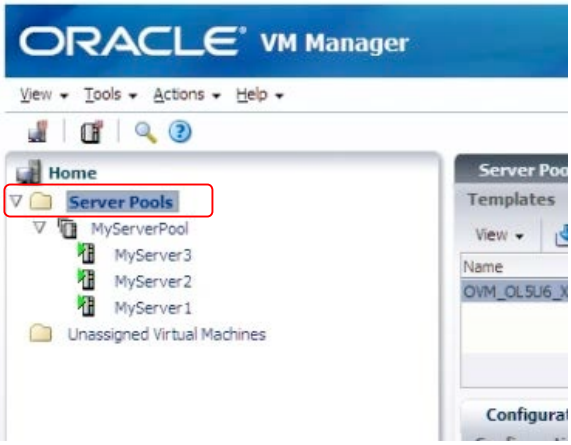


The import process will take several minutes to complete.

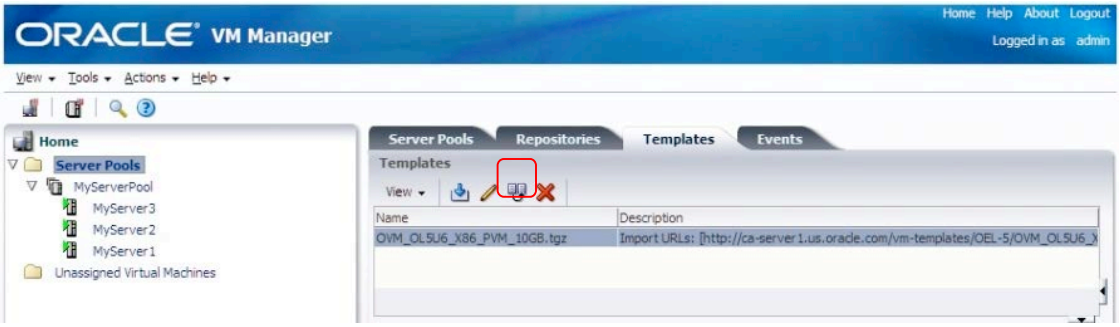
Clone Oracle VM Guest Template

Oracle VM guests are created by cloning an 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.

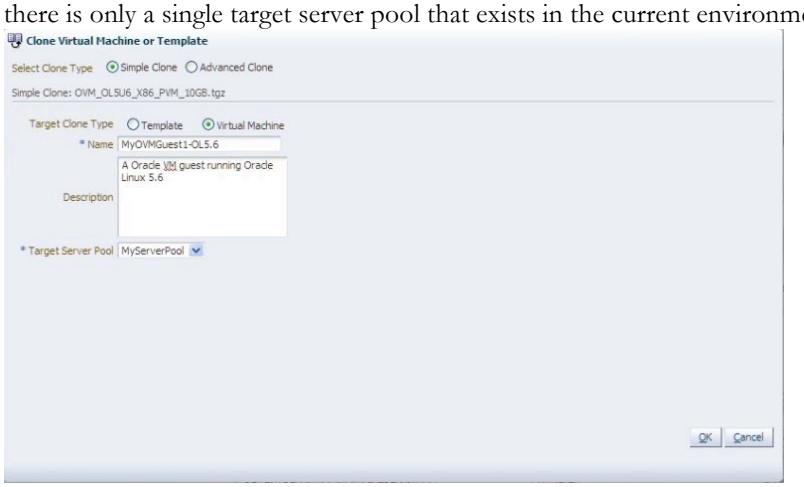
Start the cloning process by selecting the Server Pools folder in the navigation tree from the Home navigation pane.



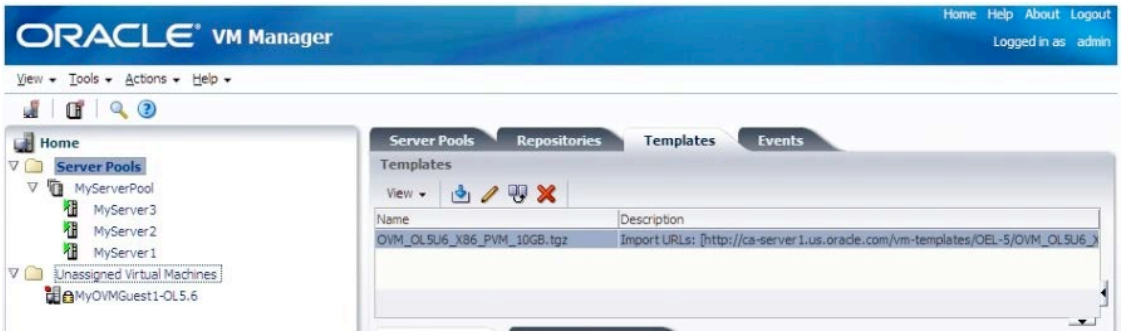
Then choose the Clone Template icon from the Templates tab as show below



The Clone Virtual Machine or Template dialog box show below enter the Oracle VM guest name, a description of the guest image and assign the Oracle VM guest to a particular server pool. In this case, there is only a single target server pool that exists in the current environment.

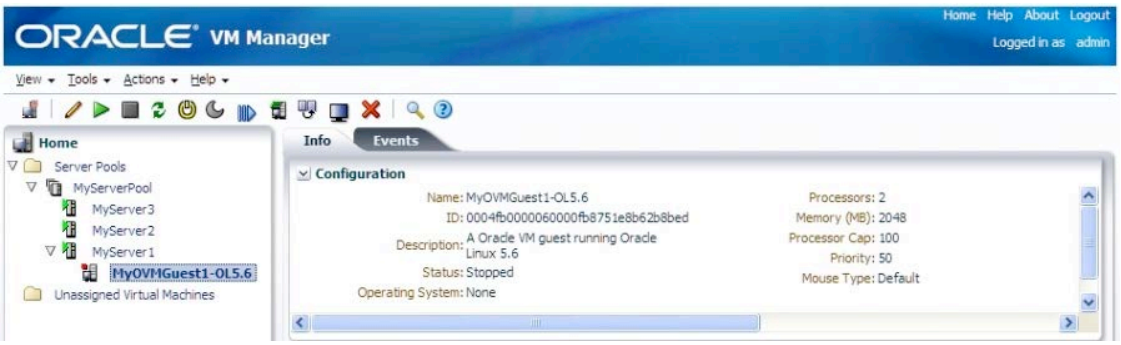


The Oracle VM guest will temporarily appear in the Unassigned Virtual Machines folder in the navigation tree while the cloning process is running.



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, but it will not be started.

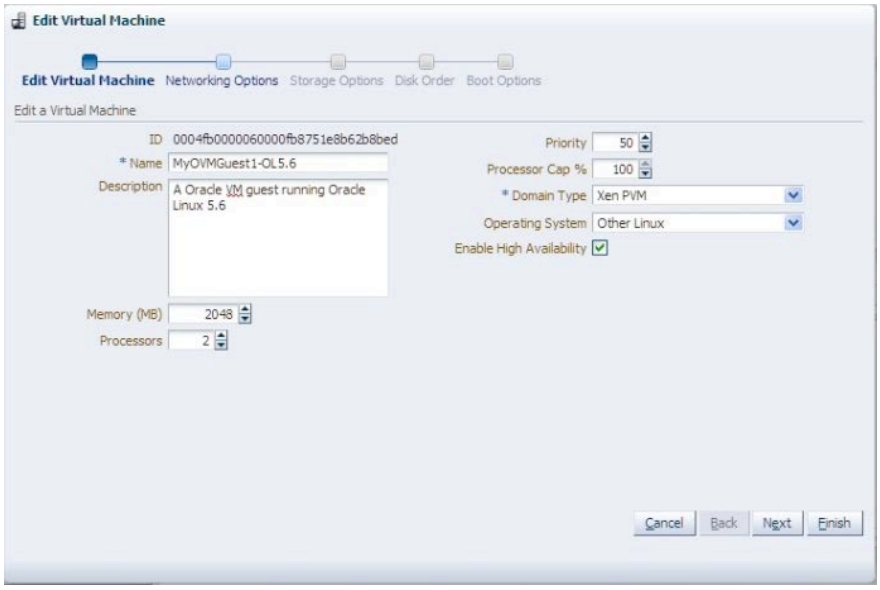


Edit Oracle VM Guest Configuration

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 host system to another viable Oracle VM Server host system. 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 Server host systems.

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

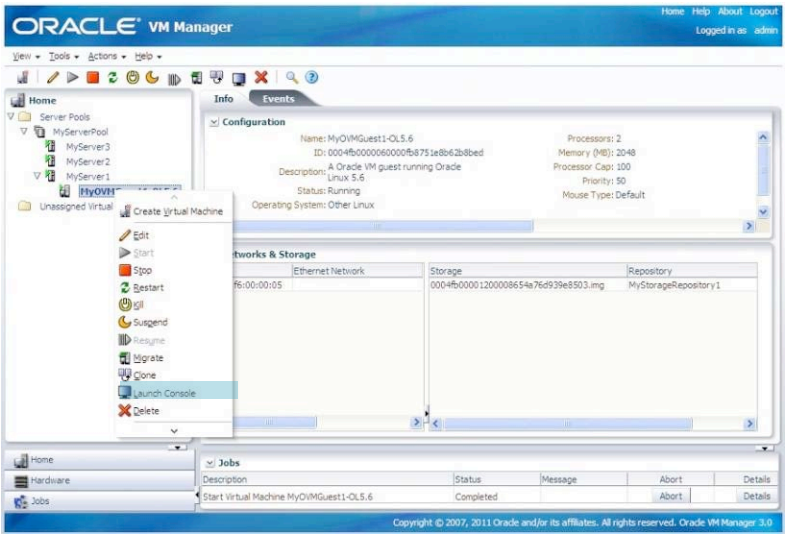
The Edit Virtual Machine is a wizard that modifies the vm.cfg file of the Oracle VM guest image and will allow you to change many aspects of the Oracle VM guest configuration. For the purpose of this tutorial, only the high availability feature will be enabled for the Oracle VM guest. Do this by checking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



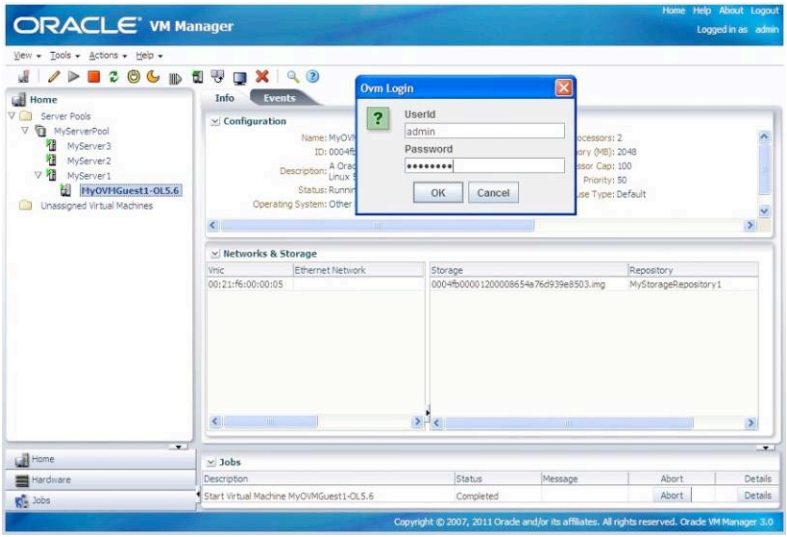
Start Oracle VM Guest

Start the Oracle VM guest once the high availability feature has been enabled. Simply right-click on the Oracle VM guest from the navigation tree and select Start. The progress of the startup can be monitored once the Oracle VM guest begins to start by opening a console session.

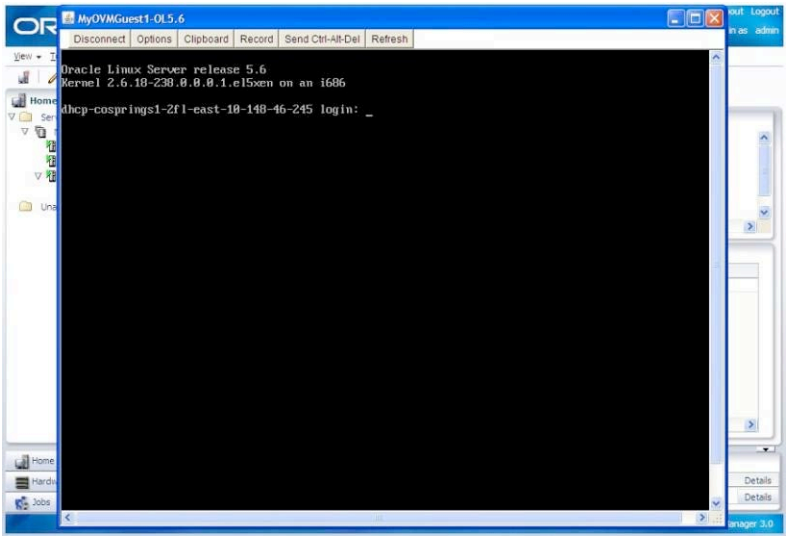
Simply right-click on the name of the Oracle VM guest and select Launch Console as shown below:



A prompt requesting the user name and password to open the console session will appear. This is the same user and password used to log into the Oracle VM Manager user interface.



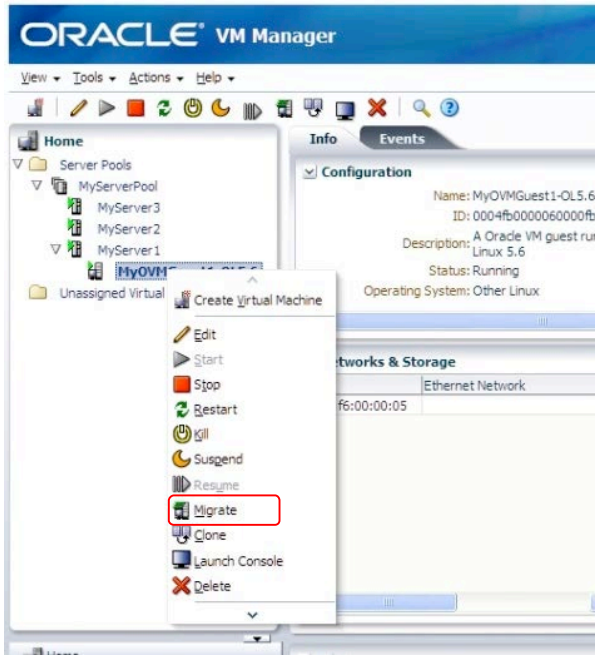
The figure below gives shows what the console session will look like once it starts.



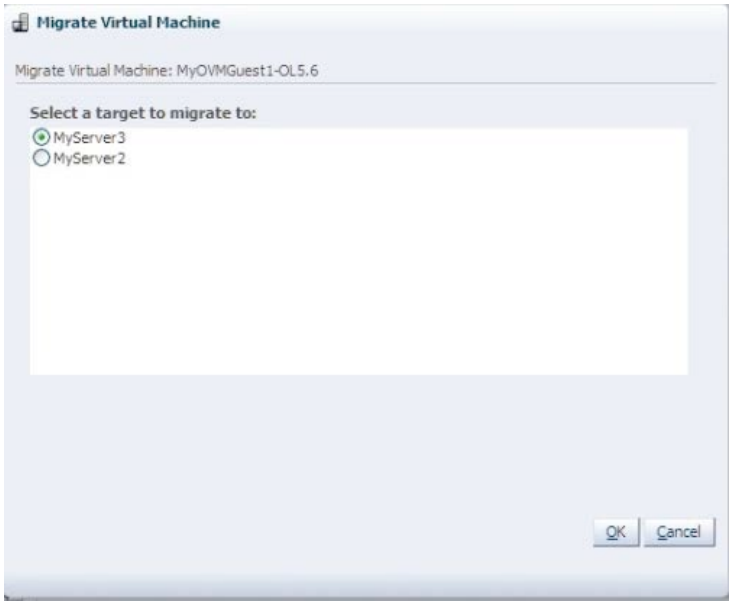
The console session can be closed at any time.

Migrate Oracle VM Guest

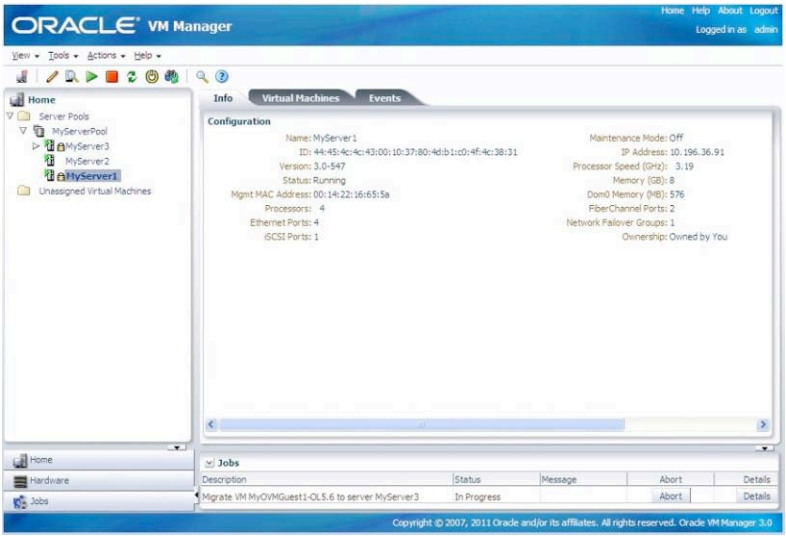
The final task is to ensure our Oracle VM cluster is fully functional by performing a live migration of the Oracle VM guest that was just created. To perform this, right-click on the virtual machine and select "Migrate" from the menu.



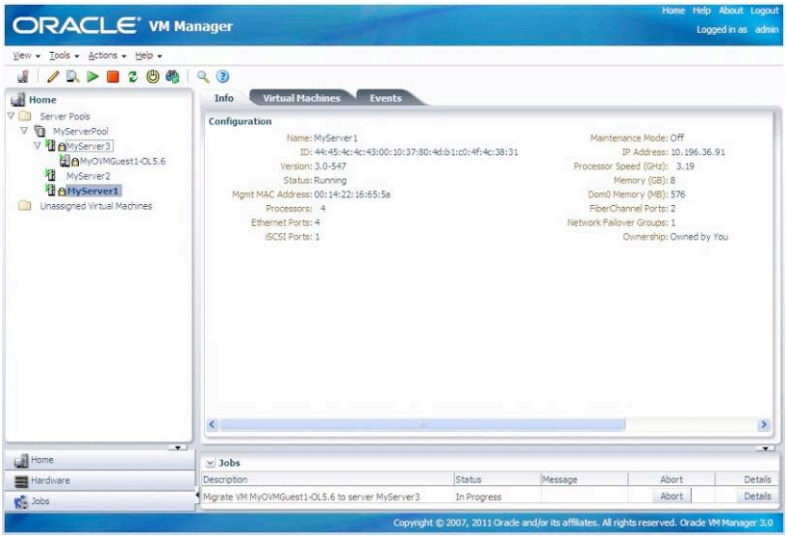
Select the host Oracle VM Server for x86 virtual machine to live migrate to and click OK to continue.



Note that a lock icon appears on the Oracle VM Server for x86 host systems where the Oracle VM guest is currently running as well as the Oracle VM Server for x86 host system where the Oracle VM guest is migrating.


ORACLE VM Manager
Home Help About Logout
Logged in as admin
View Tools Actions Help
Home
Server Pools
MyServerPool
MyServer3
MyServer2
MyServer1
Unassigned Virtual Machines
Info
Virtual Machines
Events
Configuration
Name: MyServer1
ID: 44:45:4c:4c:43:00:10:37:80:4d:b1:c0:4f:4c:38:31
Version: 3.0-547
Status: Running
Mgmt MAC Address: 00:14:22:16:65:5a
Processors: 4
Ethernet Ports: 4
iSCSI Ports: 1
Maintenance Mode: Off
IP Address: 10.196.36.91
Processor Speed (GHz): 3.19
Memory (GB): 8
Dom0 Memory (MB): 576
FiberChannel Ports: 2
Network Failover Groups: 1
Ownership: Owned by You
Home
Hardware
Jobs
Jobs
Description
Status
Message
Abort
Details
Migrate VM MyOVMGuest1-OL5.6 to server MyServer3
In Progress
Abort
Details
Copyright © 2007, 2011 Oracle and/or its affiliates. All rights reserved. Oracle VM Manager 3.0

The Oracle VM guest should appear under the Oracle VM Server for x86 host systems where it is running in the navigation tree.



Congratulations! The Oracle VM 3 environment has successfully completed the Oracle VM guest migration to another Oracle VM Server for x86 host systems in the server pool.

Appendix

A1. Remotely Accessing Hardware

Console redirection is heavily used to configure the server BIOS and for the Operating System and application installation. Console redirection is possible through the hardware's ILOM. The hardware components in the Oracle Optimized Solution for Enterprise Cloud Infrastructure contain an ILOM and have been configured in earlier steps. To access the server's ILOM, open a Web browser and enter the following in the address bar:

http://<ILOM_IP_Address>/

Default Login Credentials:

Username: root

Password: changeme

Select Remote Control tab, and under the Redirection tab, click on the "Launch Remote Console" to startup the KVM remote console. (Java is required for this functionality).

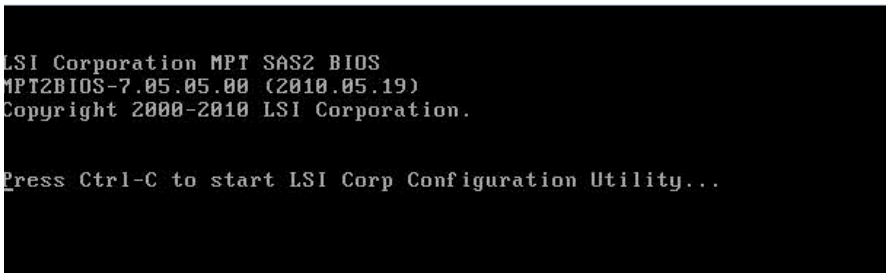
If the server needs to be remotely powered on, select the Remote Control tab, and under the Remote Power Control tab, select Power On from the Select Action drop down menu. When done click the Save button, this will power on the server.

A2. Configuring Disk Mirroring

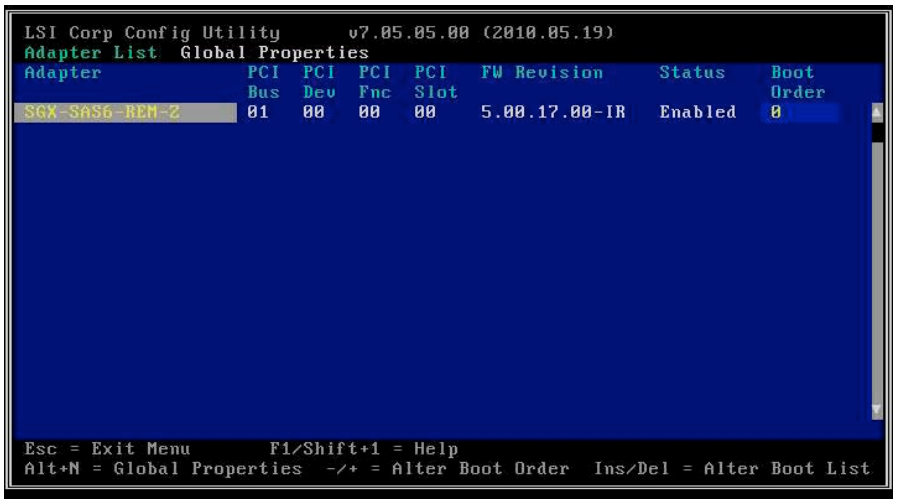
As a warning, this process will erase all data on the local disks.

To setup disk mirroring, remotely access the server using the server's ILOM as directed in appendix A1. If the system is currently powered on, please reboot the system. If the system is powered off, please power on the system.

During the server's boot up process, press Control and C keys at the following prompt to enter the LSI disk configurator.

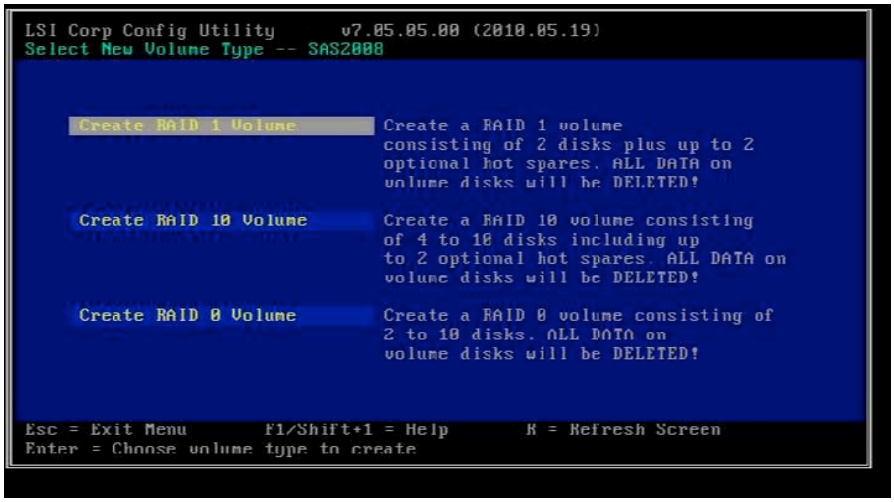


In the LSI Configurator, select the local disk adapter by pressing Enter

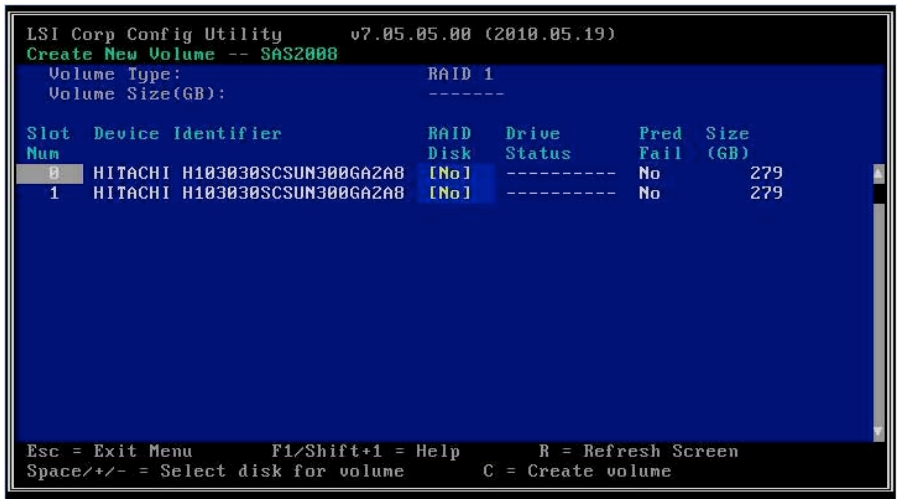


Using the arrow keys, scroll down to the "RAID Properties" and press Enter.

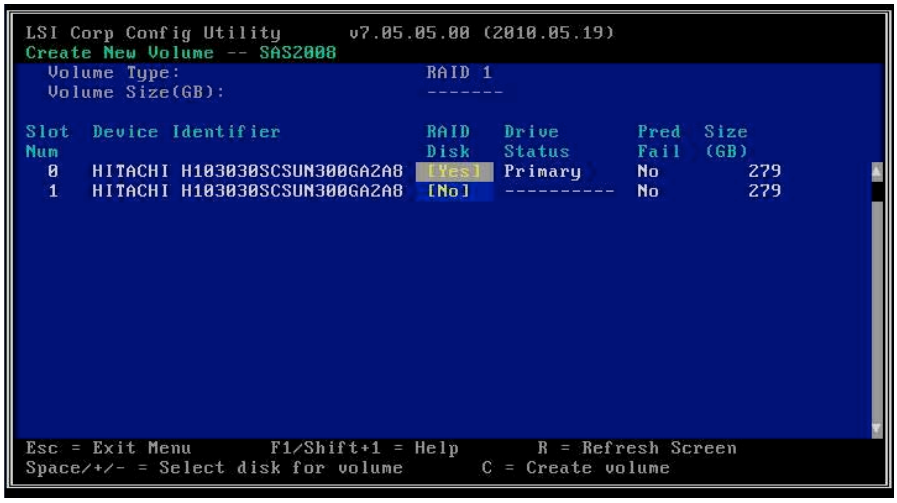
Select “Create RAID 1 Volume” by pressing Enter.



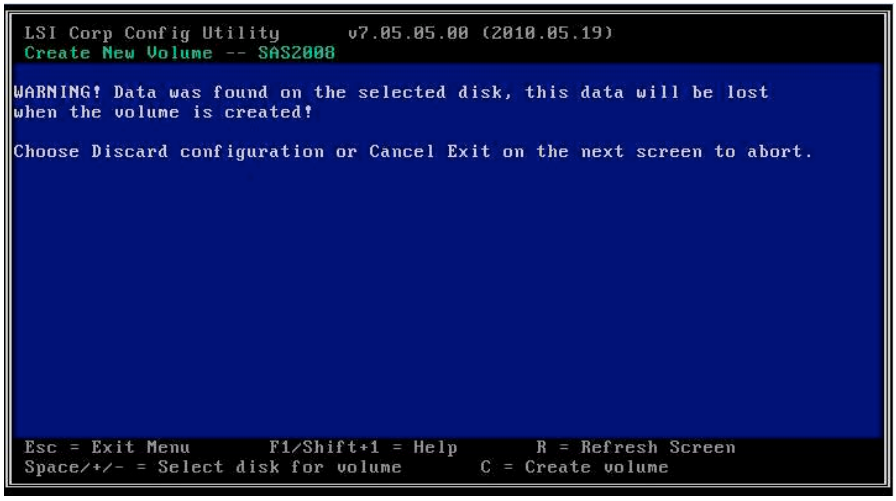
Using the arrow keys, scroll over to the RAID Disk columns for Disk 0 to highlight the value “[No]”.



When highlighted on the RAID Disk column, press the spacebar to change the RAID Disk value from No to Yes as shown below.

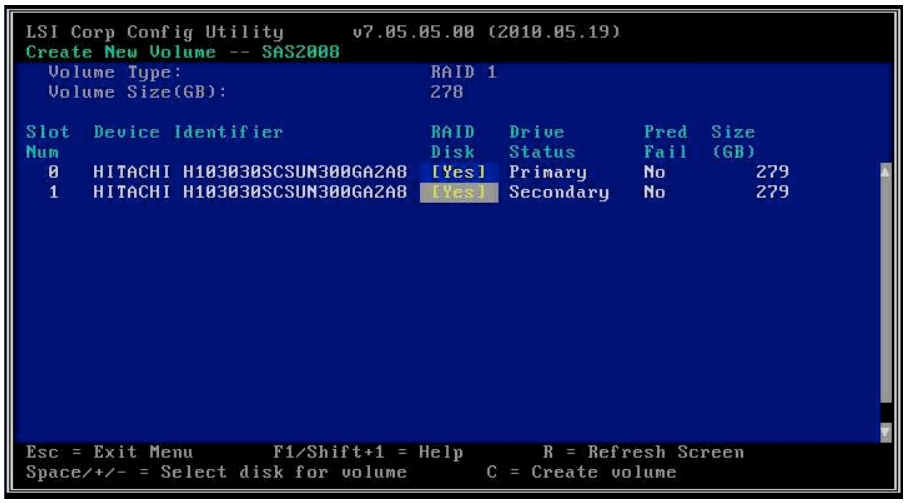


If the following message appears, press the Esc to exit this warning screen.



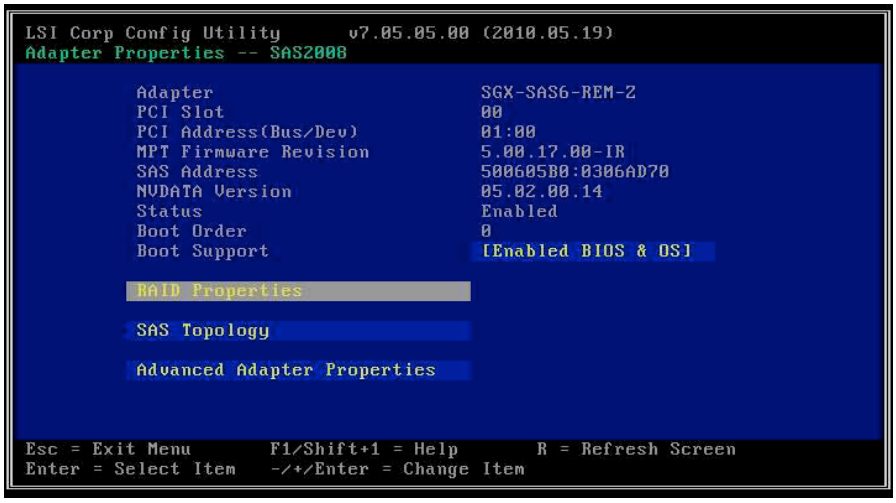
Please perform the same action for Disk 1, modifying the Disk Raid value from No to Yes.

When completed, press the 'C' button to create the RAID volume.

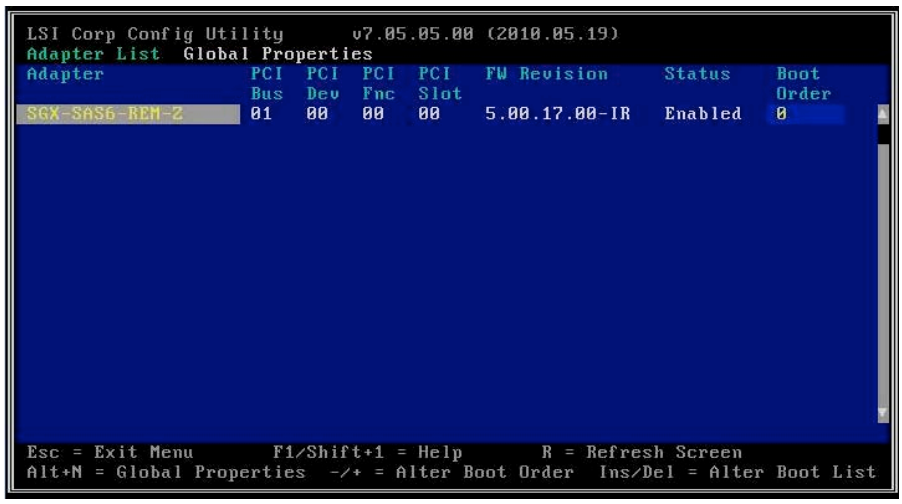


Using the arrow keys, scroll down the "Save changes then exit this menu" and press Enter.

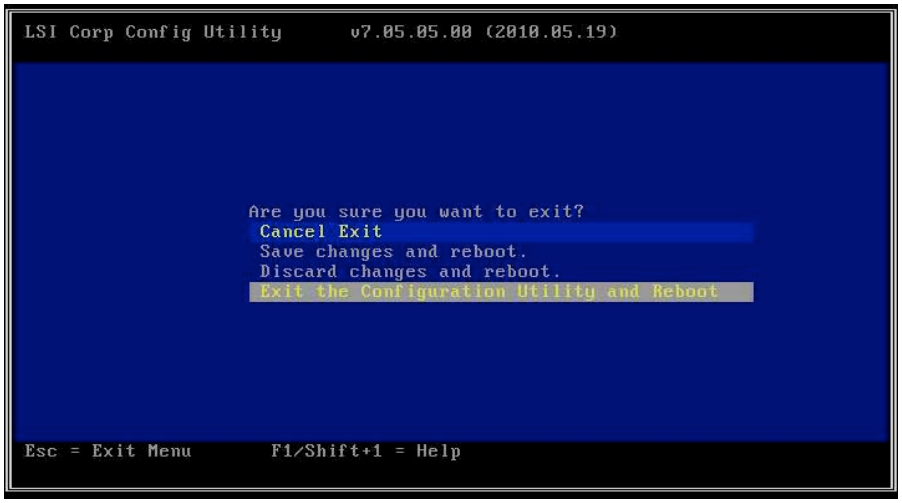
When completed, the screen will be back at the Adapter Properties window. Press the Esc key to exit.



Back at the Adapter List, press the Esc key to exit.



Scroll down to "Exit the Configuration Utility and Reboot". This will reboot the system with the local disks in a mirrored (RAID 1) configuration.



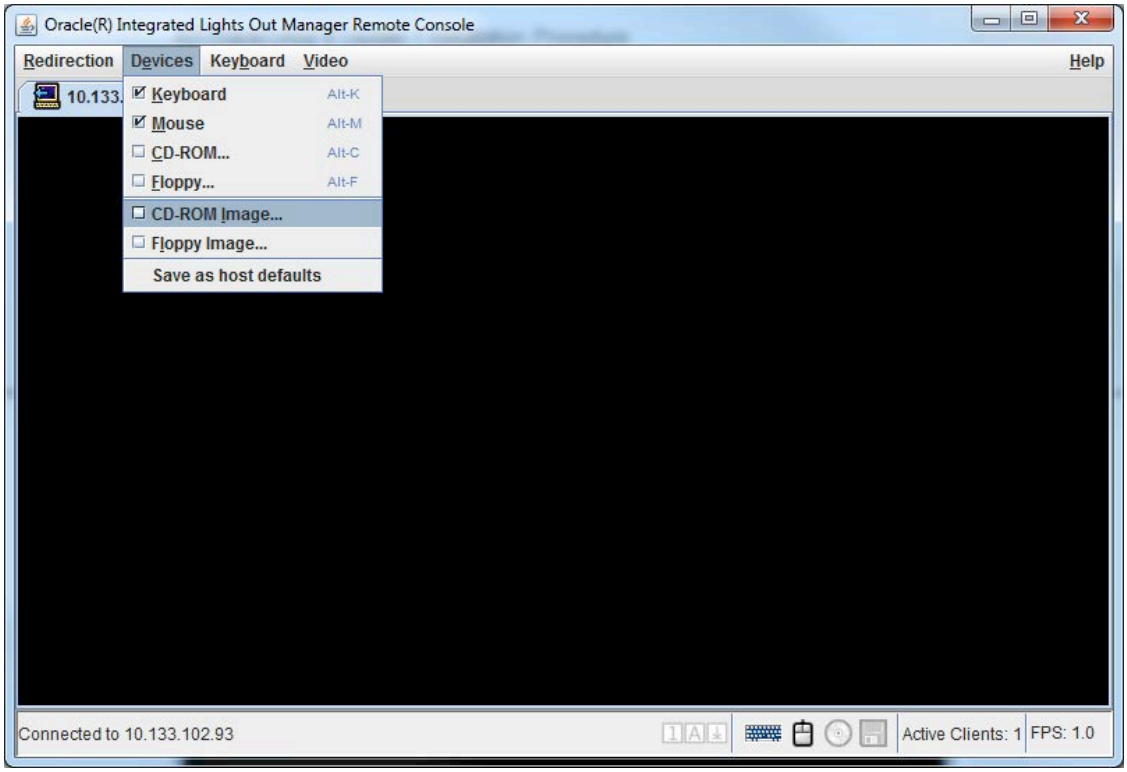
A3. Oracle Linux 5 Update 6 Installation Procedure

The installation procedure described in this section will be completed using the server's ILOM to remotely mount the Oracle Linux 6 Update 1 ISO 64-bit image. This OS image can be found at http://edelivery....com

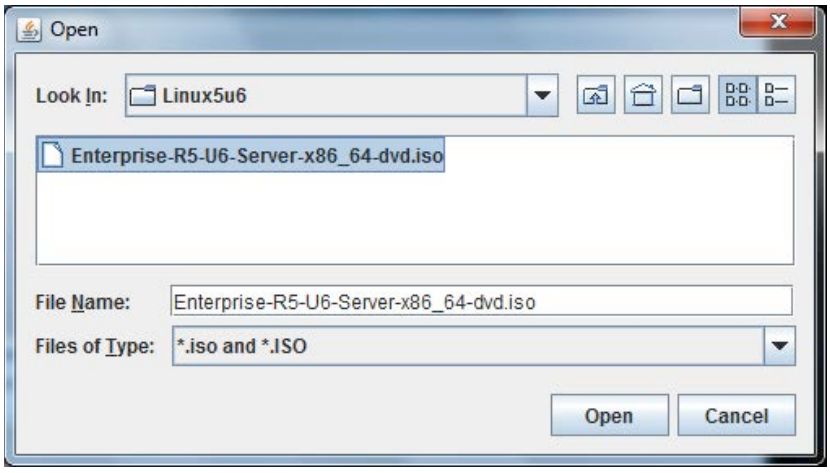
Access the server's ILOM using a Web browser and entering the server's ILOM IP address in the URL. Log into the server's ILOM with the proper username and password (default username: root, default password: changeme).

Once logged in, select the Remote Control tab, and Redirection sub-tab. Within this page, select the Redirection button. This will open a Java based GUI that will act as the console redirect from where the installation will be performed.

At this point, mount the Oracle Linux ISO image, by selecting Devices > CD-ROM Image…

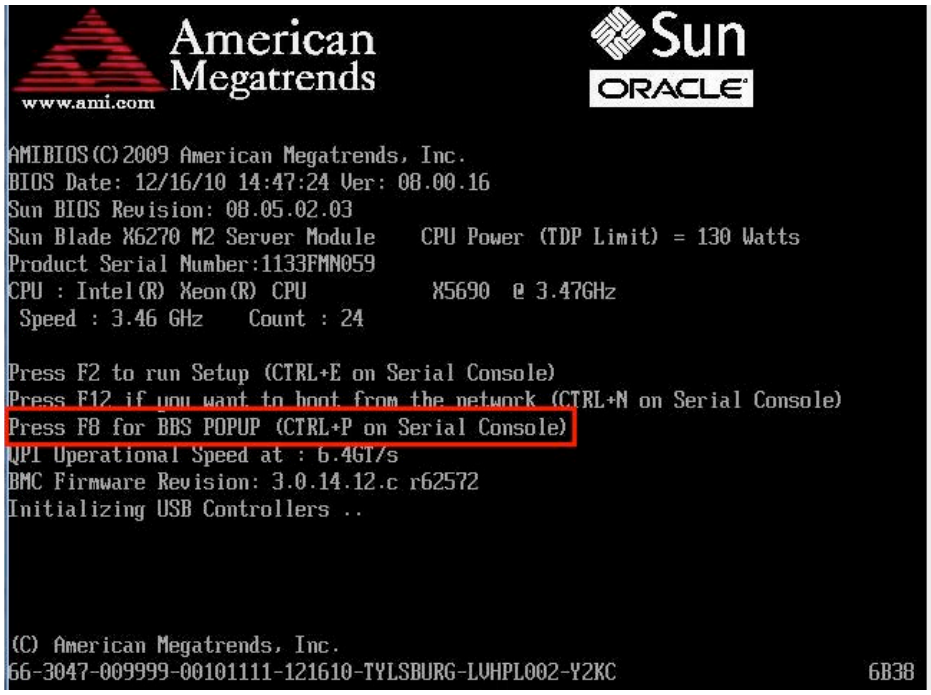


Navigate to the Oracle Linux ISO image and select open.



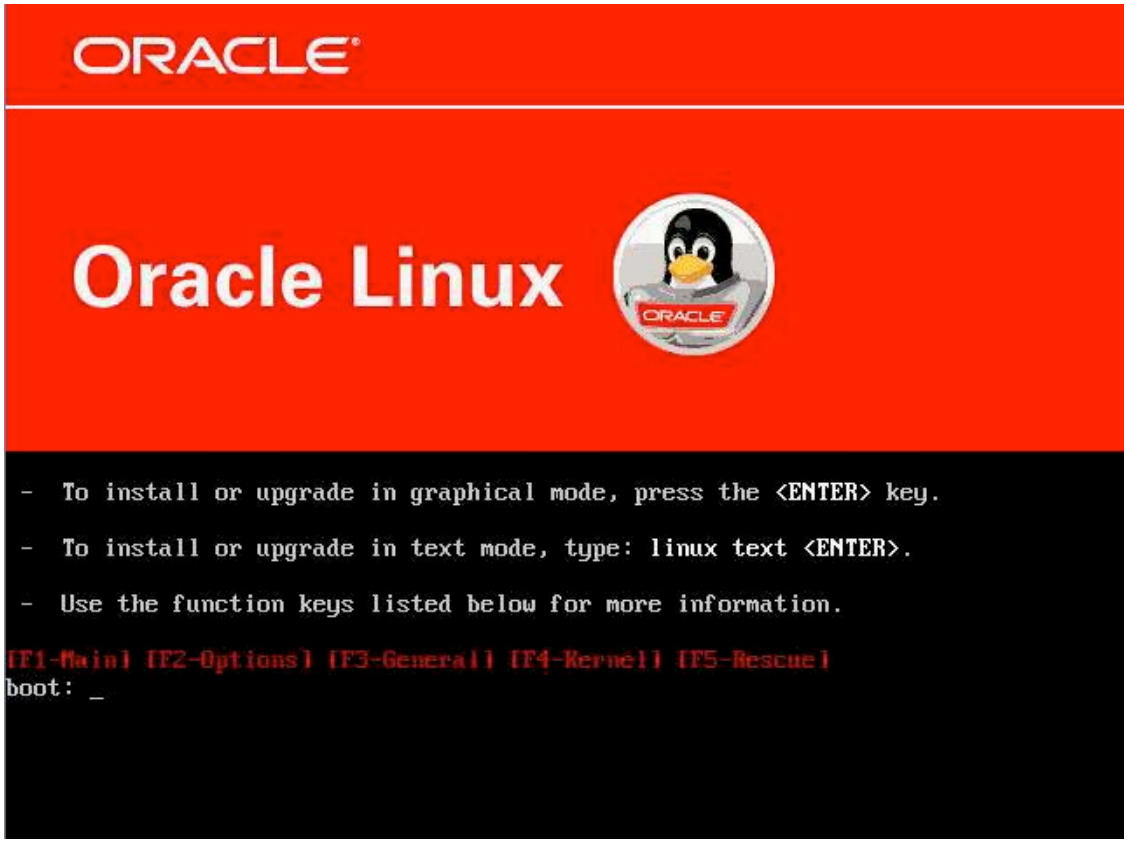
At this point the ISO image is virtually mounted on the server. Next reboot, or power on, the server from the ILOM Web interface under the Remote Control tab, and Remote Power Control sub-tab. Select the proper power option (Power Cycle or Power On) and select Save.

This will power on the server and can be seen from the console redirection window. During the boot process, when prompted press F8 to bring up the Select Boot Device window

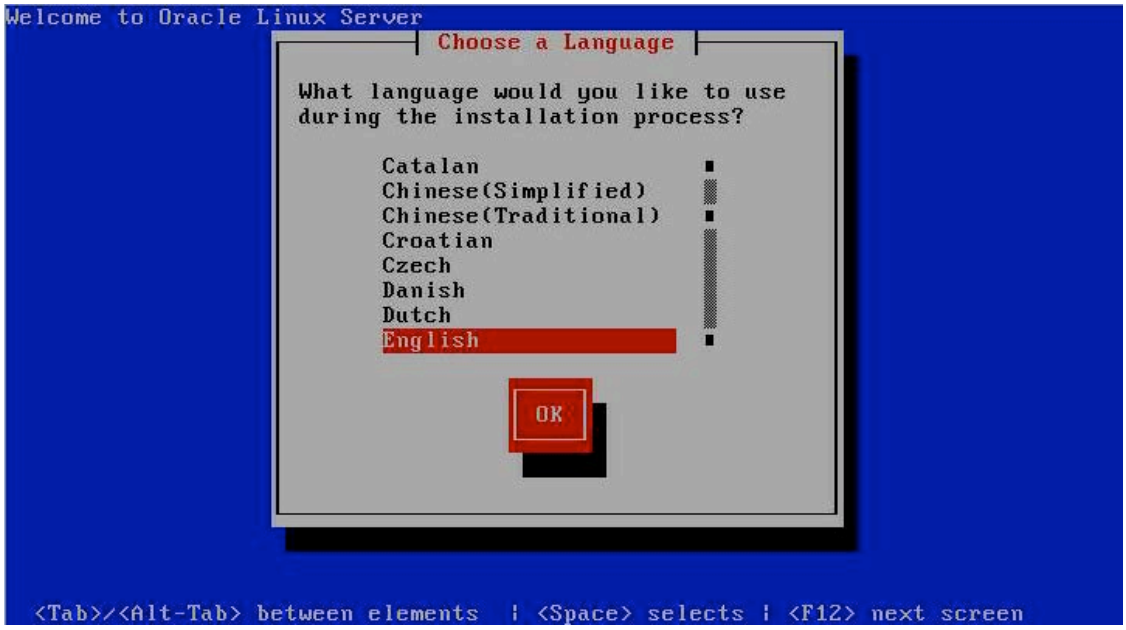


At the Select Boot Device window, select the AMI Virtual CDROM device to boot from the ISO mounted image.

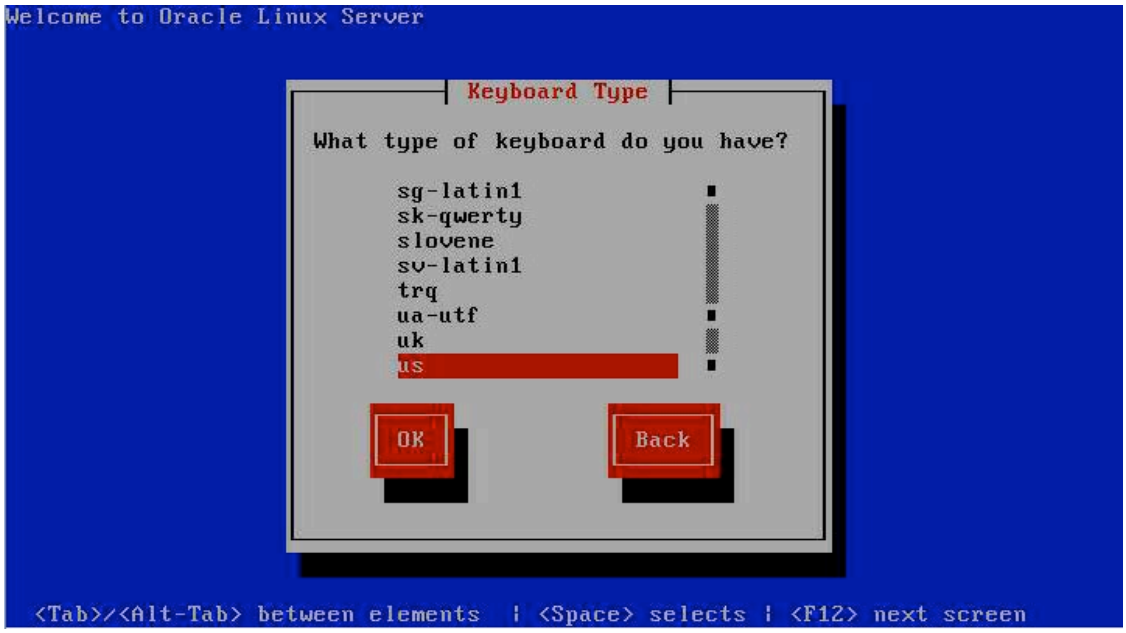
Press Enter at the following screen to install Oracle Linux Server



Use the up and down arrow keys to select the language to use for the Oracle Linux OS. When completed use the Tab key to select OK and press Space Bar to complete the language selection.

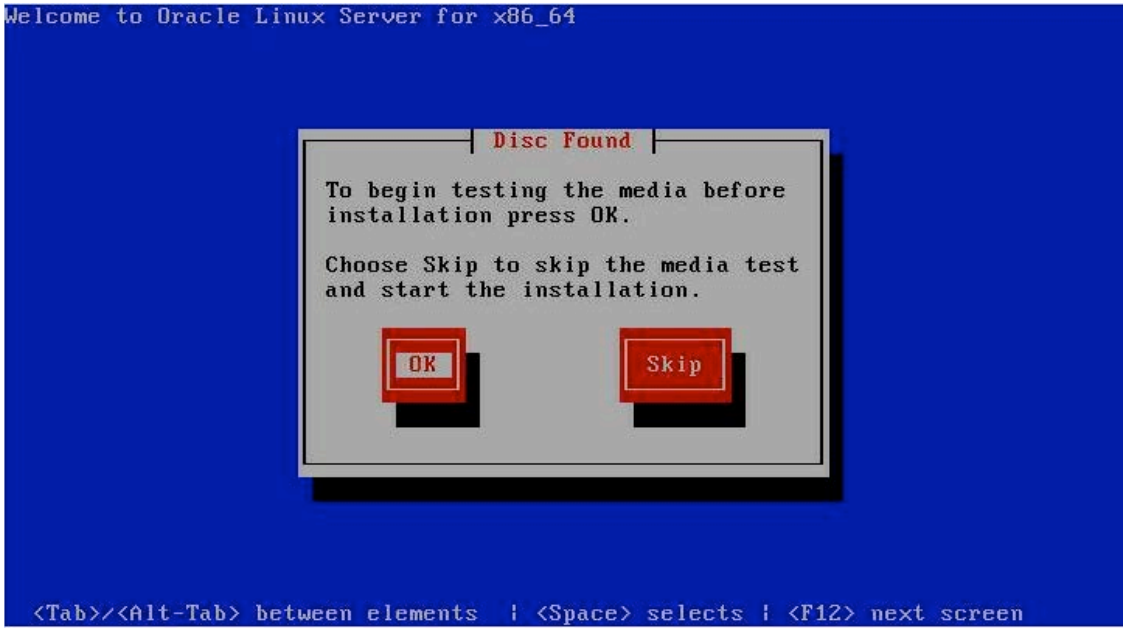


Select the appropriate keyboard type using the arrow keys. When completed select OK.



For the installation method, since the installation is being performed from a Linux ISO image via CD-ROM virtual redirection, select the installation method as Local CDROM. Select OK to confirm.

Use the Tab key to select whether to test the ISO installation media or to skip the test. When the desired option is highlighted press the space bar.



At the initial Oracle Linux Installation GUI, if desired click on the Release Notes button to review the release note for this current release of Oracle Linux. Click the Next button to proceed with the installation.

Select the local drive(s) to use for this installation of Oracle Linux, as well as how the disk(s) will be formatted. If the default partitioning layout is not desired, check the box next to "Review and modify portioning layout". If this step is selected, knowledge of how to manually partition Linux sections (e.g.: swap, boot sections, etc…) is required ad is not discussed in this manual. Click Next to continue with the installation.

Depending on the partitioning option selected in the drop down menu in the previous screen, a message stating that the drive(s) selected will remove existing data on the drive(s) may appear. This is part of the disk format and partitioning. Click the Yes button to agree to remove all data from the disk(s).

Configure the appropriate network ports by selecting the appropriate interface (eth#) and selecting the **Edit** button. Also, if needed enter the fully qualified domain name and other network settings such as gateway IP and DNS server IP. When completed click Next.

Select the appropriate time zone as well as whether or not to use UTC for the system clock or not. When completed, select Next.

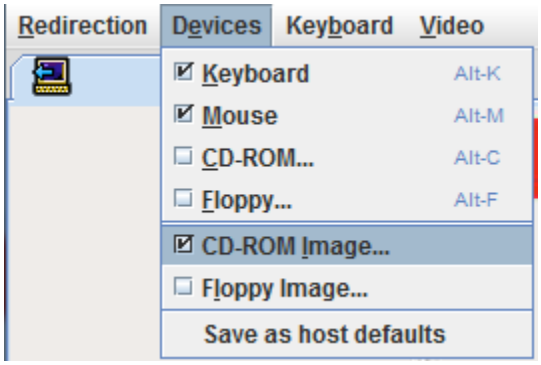
Enter the password for root user. Re-enter the password to confirm the original password entry. Click Next to continue.

For the installation in this manual, no additional software packages were selected in this process. Click Next to continue.

Click Next to being the installation of Oracle Linux.

The following screen will appear to show the status of the Oracle Linux installation.

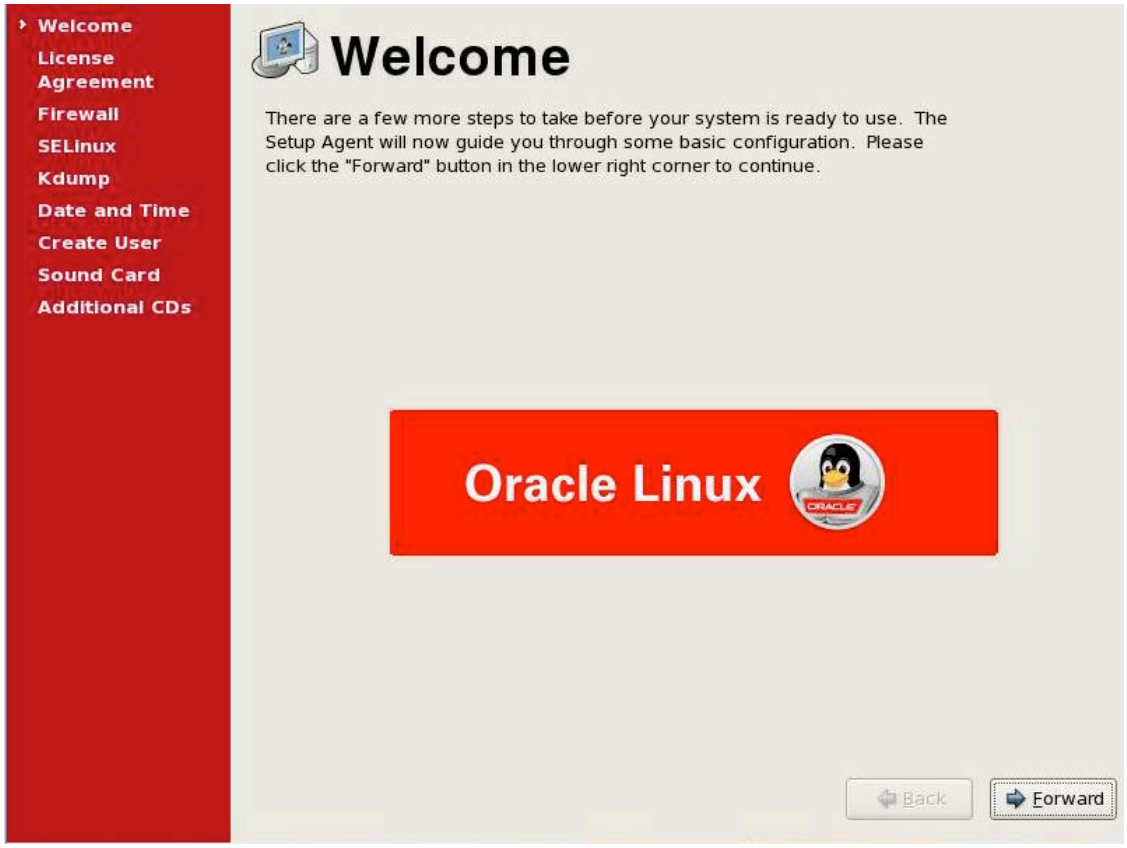
When installation has completed, it is required to remove the installation media and reboot the server. To remove the media from the virtual CDROM redirection, from the Oracle® Integrated Lights Out Manager Remote Console window, select Devices > CD-ROM Image…



When prompted to stop CD-ROM redirection, click Yes.

At this point reboot the server.

At the first reboot after Oracle Linux installation, some additional tasks are required to complete the installation process. At the following welcome screen, click the Forward button to begin.



Agree to the End License User Agreement by selecting "Yes, I agree to the License Agreement" and clicking the Forward button.

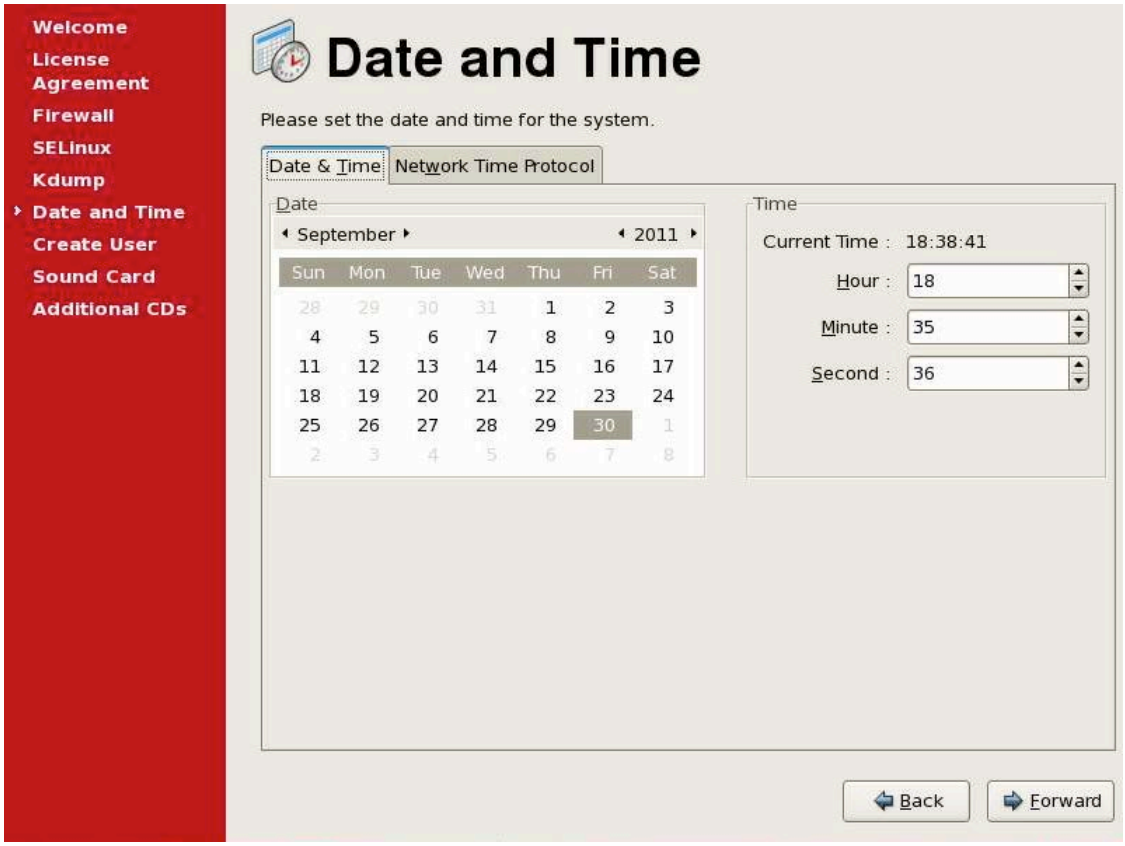
For this installation, firewall settings were left in their default configuration (Firewall is enabled, with SSH as a trusted service). Click the Forward button to continue.

In the SELinux screen, change the SELinux Setting to Permissive. If SELinux Setting is set to Enforcing, installation of Oracle applications like Oracle Database and Oracle VM Manager is more difficult. If SELinux Setting of Enforcing is required, please configure the Oracle Linux system to allow installation of Oracle applications.

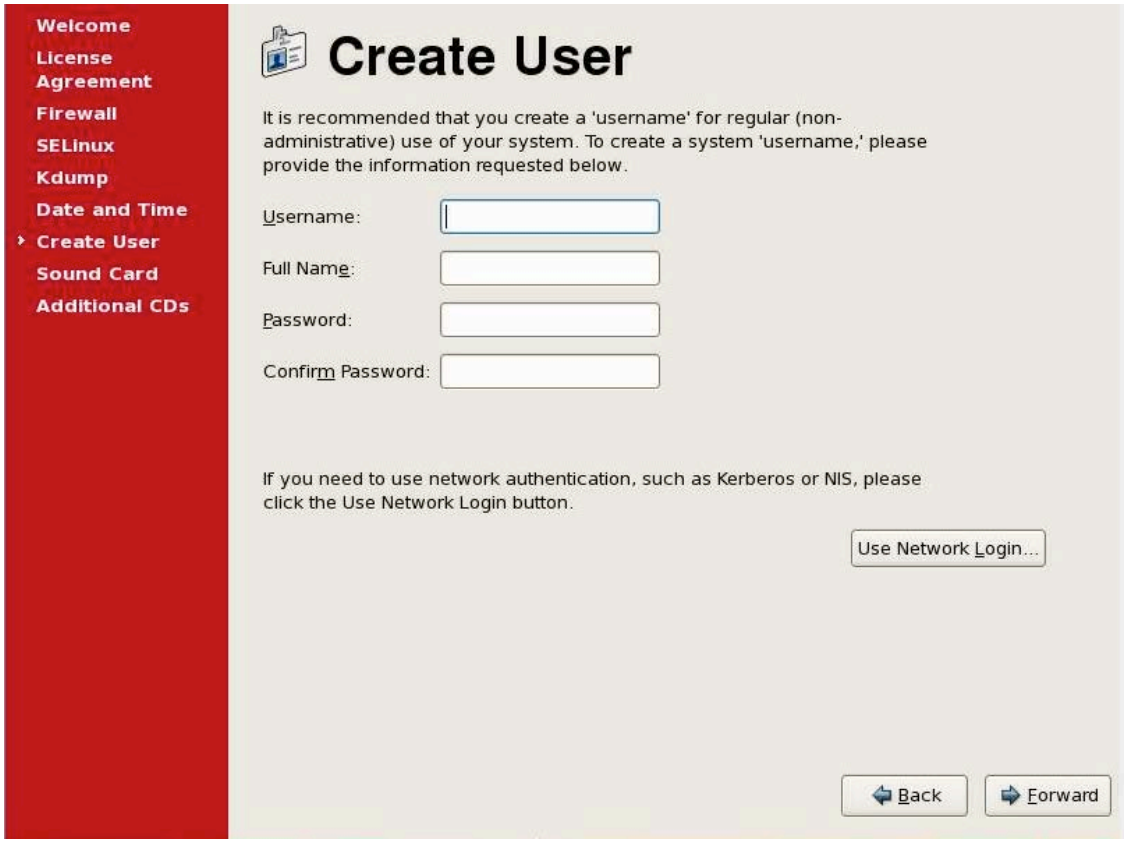
Click Forward button to continue.

At the Kdump screen, select whether or not enable kdump as well as the allocated kdump memory space. Click the Forward button to continue.

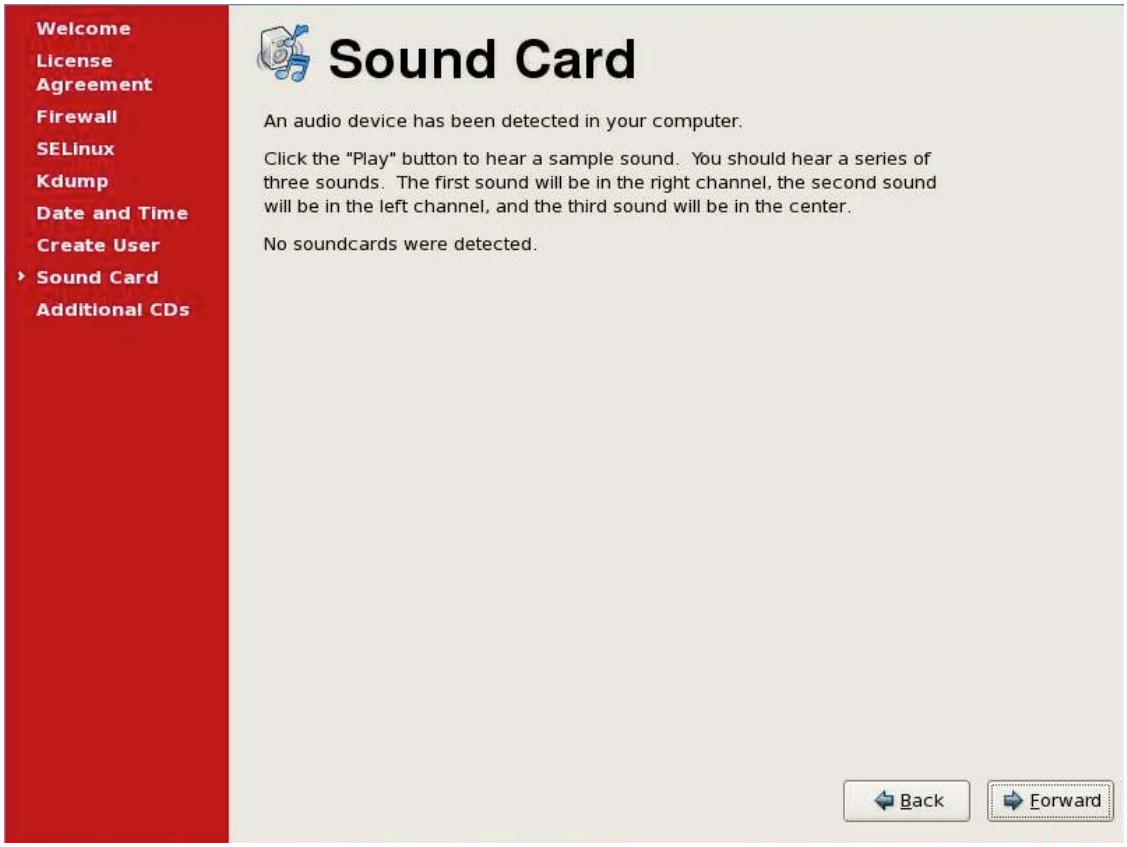
Set the date and time for the Oracle Linux system manually, or connect a NTP server by selecting the "Network Time Protocol" tab. Click Forward to continue.



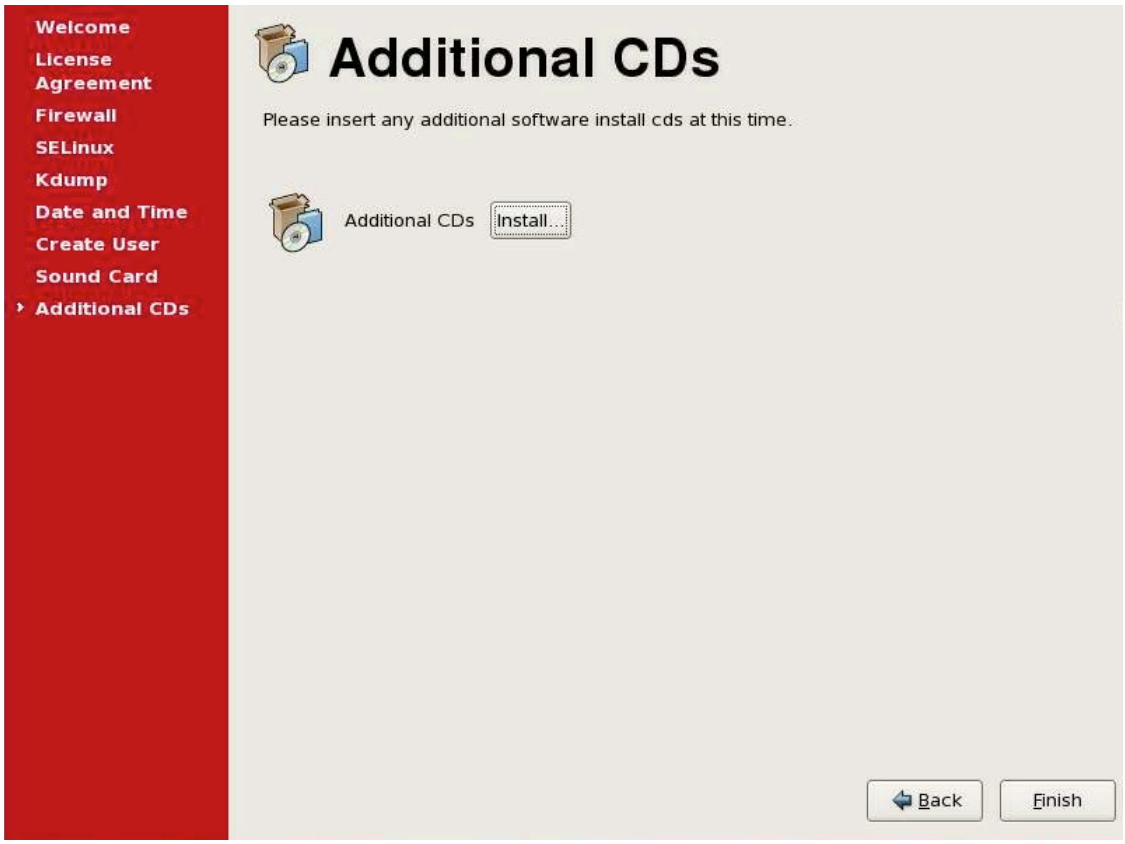
Create an additional user (other than root) for non-administrative use. Enter the username, full name, and password for this user, or configure network login by click on the "Use Network Login…" button. When completed, click the Forward button to continue.



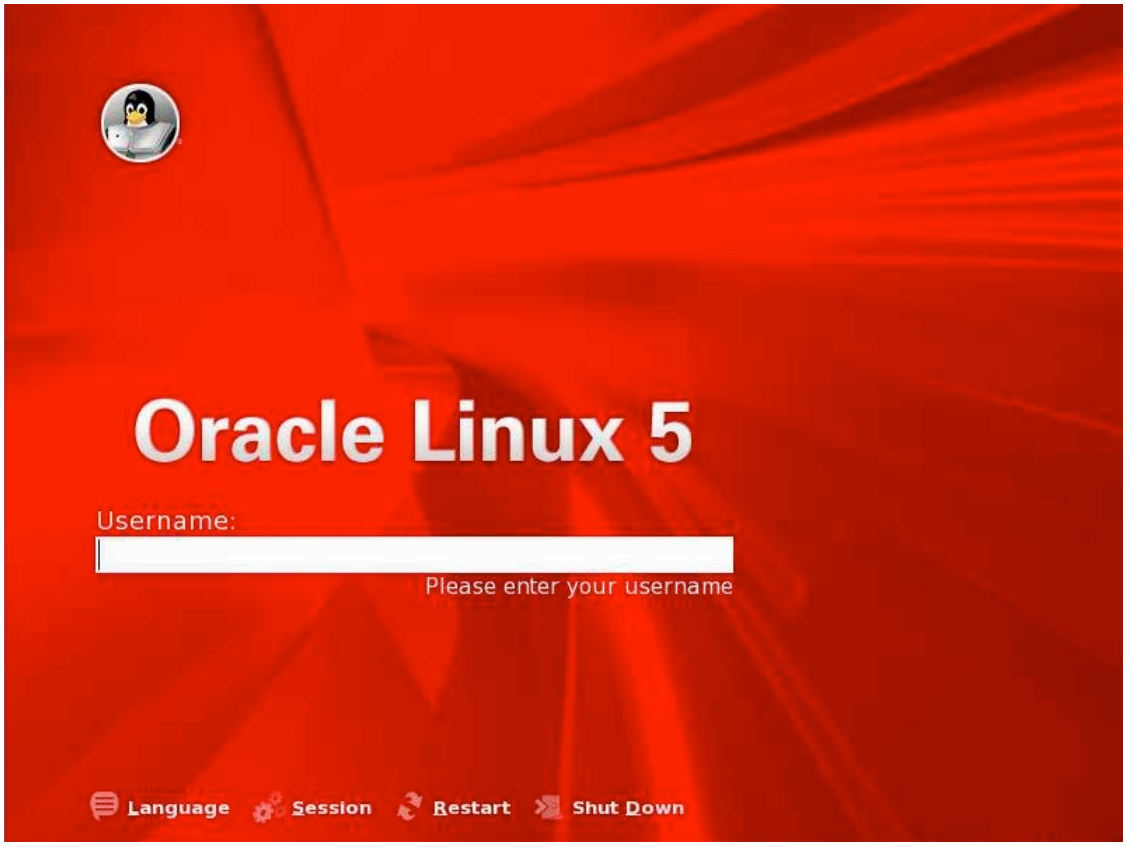
At the Sound Card screen, no soundcard should be detected. Click Forward to continue.



At the Additional CDs screen, there are no additional software products for installation in this document at this time. Click the Finish button to complete this initial configuration.



At this time, the initial configuration is completed and the following screen should appear. If SELinux Setting was set to Disable, a reboot may be required.



A4. Oracle Database 11*g* Release 2 Installation Procedure

The procedures listed in this section are to install Oracle Database 11*g* running on Oracle Linux 5 Update 6. Please ensure that the Oracle Linux 5 Update 6 system is connected to the Unbreakable Linux Network (ULN) as a portion of this installation will install required packages for Oracle Database. For additional details on Oracle Database 11*g* that are not discussed in this section, please refer to the Oracle Database 11*g* Release 2 Installation Guide for Linux (http://download.oracle.com/docs/cd/E11882_01/install.112/e16763.pdf).

Installation Requirements

Please confirm the following requirements are met before installing Oracle Database 11*g*.

Physical Memory and Swap Space Requirement Check

Physical Minimum RAM: 4 GB

Swap Space recommendations are shown in the table below.

RAM	SWAP SPACE
Between 4 GB and 8 GB	2 times the size of RAM
Between 8 GB and 32 GB	1.5 times the size of RAM up to 32 GB
More than 32 GB	32 GB

Physical Disk Space Requirement Check

For available disk space, please confirm that the required space identified in the table below is available. These numbers are based on Oracle Database 11*g* Release 2 Standard Edition on Oracle Linux 5 Update 6 x86-64 bit edition. For other configurations, please refer to the Oracle Database Installation Guide 11*g* Release 2 (11.2) for Linux.

DISK SPACE RELATED TO	REQUIRED FREE SPACE
/tmp directory	1 GB
Software Files	3.73 GB
Data Files	1.48 GB

Screen Resolution Requirement Check

The minimum resolution for Oracle Database 11*g* Release 2 (11.2) is 1024 x 768. Please check the current screen resolution by selecting System > Administration > Display from the Oracle Linux User Interface. If the screen resolution is not set to the proper level, please do so before proceeding.

Configure Name Resolution

An error may occur with Oracle Universal Installer if the database host name is not able to resolve itself. To avoid this, before installing Oracle Database 11*g* Release 2, confirm that the host names are resolved through the /etc/hosts files.

Verify that the /etc/hosts file is used for name resolution. Check the hosts file entry in the nsswitch.conf file running the following command:

```
# cat /etc/nsswitch.conf | grep hosts
```

The output of this command should contain an entry for files (for example: an output of hosts: files dns).

Next, verify that the hostname has been set by using the hostname command as follows:

```
# hostname
```

The output should be similar to the following

```
myhost.example.com  or myhost.localhost
```

Confirm the domain name has not been set dynamically by using the domainname command as follows:

```
# domainname
```

The output should not return any results or return a value of (none)

Finally, verify that the hosts file contains the fully qualified host name and local host separately by running the following command:

```
# cat /etc/hosts
```

The output of this command should contain separate entries for the qualified host name and the local host. For example, the output should look similar to the following:

```
127.0.0.1            localhost.localdomain  localhost
192.168.0.16         myhost.example.com     myhost  #if on domain
192.168.0.17         myhost.localhost       myhost  #if not on domain
```

If the output looks like the following, then the hosts file needs to be modified:

```
127.0.0.1               myhost.example.com myhost localhost.localdomain localhost
```

or

```
127.0.0.1               myhost.localhost myhost localhost.localdomain localhost
```

To modify the hosts file, open the hosts file with the vi editor.

```
# vi /etc/hosts
```

Separate out the two lines for local host and host name entries, like the following two examples:

[Example: on a domain]

```
127.0.0.1            localhost.localdomain  localhost
192.168.0.16         myhost.example.com     myhost
```

[Example: not on a domain]

```
127.0.0.1            localhost.localdomain  localhost
192.168.0.16         myhost.localhost       myhost
```

Exit out of the vi editor with wq, saving the changes.

Installation of Required Packages

For the installation of Oracle Database on Oracle Linux, Oracle provides the Oracle Validated rpm package that automatizes the install of the numerous components required to setup Oracle Database on Linux, and execute most of the required Linux configuration steps. Run the following command to install the Oracle Validated rpm:

```
# yum install  oracle-validated
```

When prompted to "Is this ok [y/N]:", enter y to progress with the Oracle Validated installation. For further details, please refer to the following document
http://blogs.oracle.com/AlejandroVargas/resource/Installing-the-Oracle-Validated-rpm-on-EL5.pdf

Note: The yum installation command is shortened to oracle validated instead of oracle-validated-<version>.rpm. Running the longer command may result in an error reporting "public key for oracle-validated is not installed".

Allow User *oracle* xhost Permissions

```
#xhost local:oracle
```

Obtain Oracle Database 11*g* R2 Installation Media

Open a Web browser and enter the following URL in the address bar:

http://www.oracle.com/technetwork/database/enterprise-edition/downloads/112010-linx8664soft-100572.html

In order to download Oracle software, please review the OTL License Agreement and click the radio button "Accept License Agreement".

Click on the following items to download:

```
linux.x64_11gR2_database_1of2.zip
linux.x64_11gR2_database_2of2.zip
```

Place these files in a single directory on the server where Oracle Database 11*g* Release 2 will be installed.

Unzip the files using the following command:

```
$ unzip <file name>
```

Example

```
$ unzip linux.x64_11gR2_database_1of2.zip
```

After completing the unzip command for the files, the database directory should be created.

Installing Oracle Database 11*g* Release 2

Note: SELinux security settings can cause problems with the installation of Oracle Database 11*g* Release 2. If the SELinux security setting is set to Enforcing, the installation procedure will eventually fail at Oracle Net Configuration Assistant job. If SELinux security is not required, it is recommended to set SELinux to permissive or disabled, or set the current session to permissive. This may require a restart to perform. If SELinux security is required to be set to Enforcing, configure SELinux to allow Oracle Database 11*g* Release 2 to install.

Change user to oracle

```
# su - oracle
```

After configuring the oracle user's environment and being logged in as the oracle user, start the Oracle Universal Installer to install Oracle Database 11*g* Release 2 by running the following command:

```
$ /unzipped_database_directory/database/runInstaller
```

If running this installation command from the ILOM Remote Console, and receive the following message :

```
Checking monitor: must be configured to displayat least 256 colors
>>> Could not execute auto check for display colors using command /usr/bin/xdpyinfo.
Check if the DISPLAY variable is set.  Failed <<<
```

Please confirm that the user *oracle* has xhost privileges.

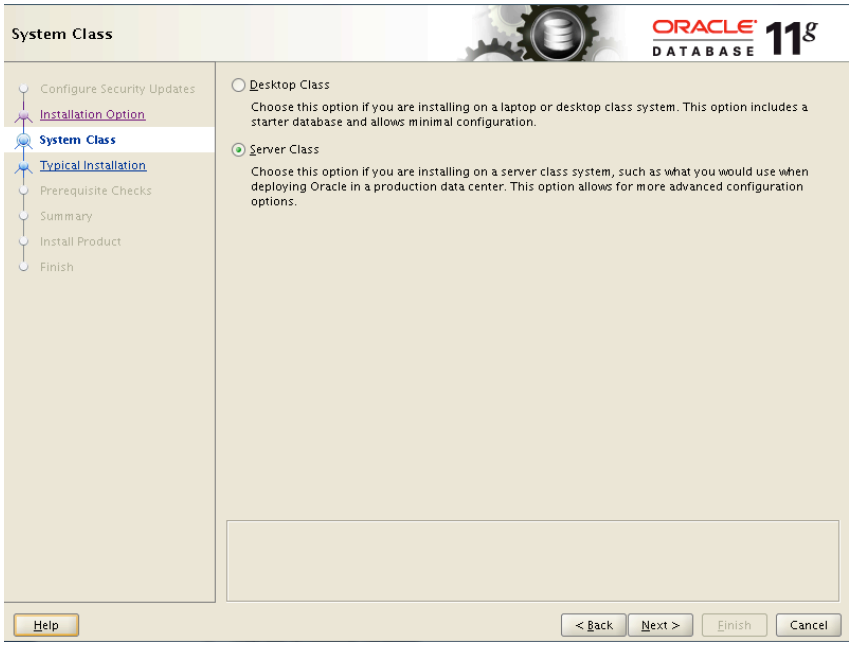
In the Oracle Database 11*g* Release 2 Installer, please perform the following:

- Enter your e-mail address, preferably your My Oracle Support e-mail address or user name in the Email field.
- You can select the "I wish to receive security updates via My Oracle Support" check box to receive security updates if you have a My Oracle Support account.
- Enter your My Oracle Support password in the My Oracle Support Password field. If you do not have a My Oracle Support password, uncheck the "I wish to receive…"

NOTE: If you check this option, please ensure that you have a valid Oracle Support account and the password is entered correctly, if not, the installation will not be able to register with the Oracle Configuration Manager server and the installation of the optional tool Oracle Configuration Manager Configuration will fail. This tool, that is not necessarily required to run, automates a step of running the orainstRoot.sh script. At the end of the installation, the installer will be prompted to manually run this script as well as the already required root.sh script.

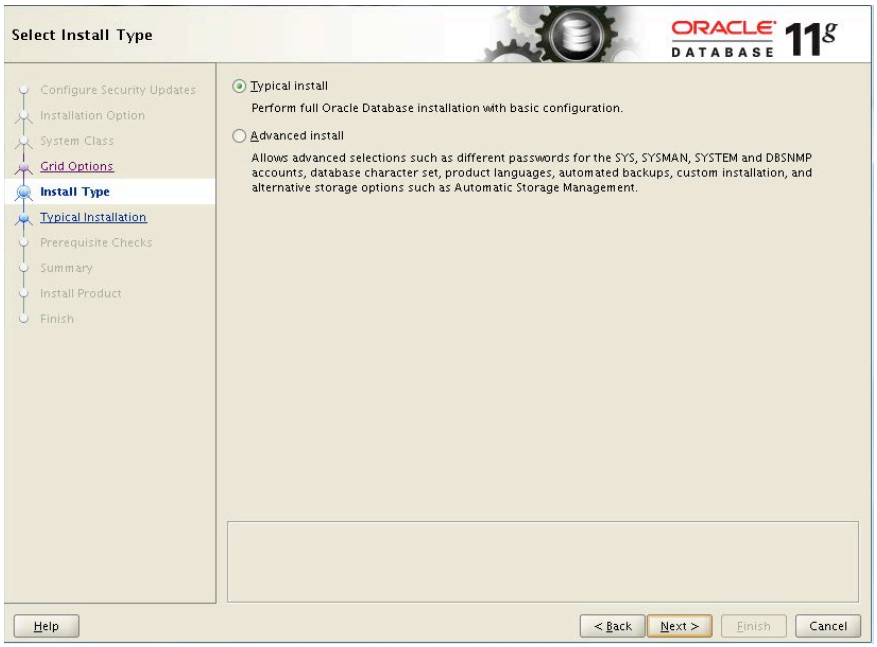
- Click Next.

- Select "Create and configure a database" from the list of available options.
- Click Next.

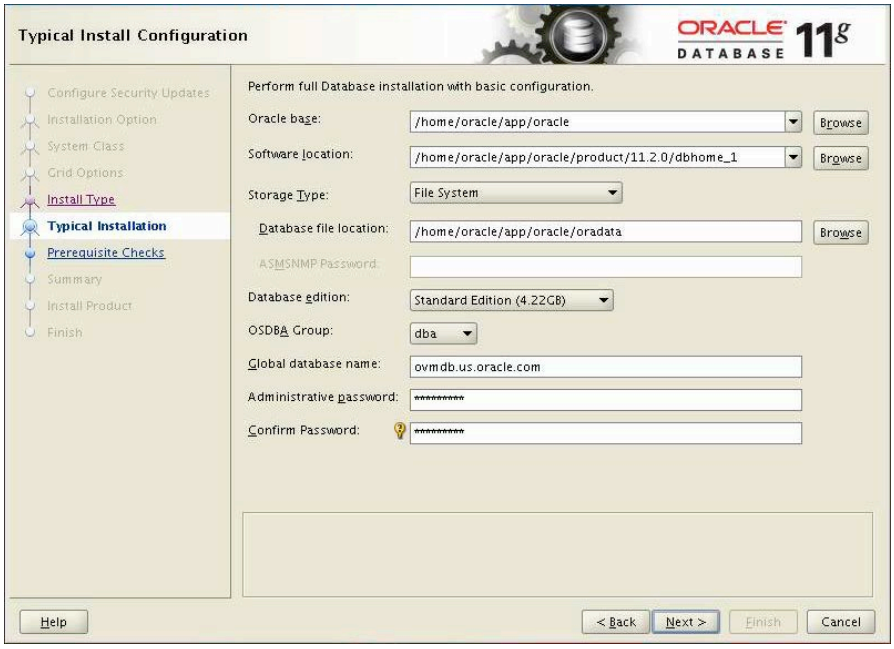


- Select "Server Class" from the following options to install the database,
  - Desktop Class: Choose this option if you are installing on a laptop or desktop class system.
  - Server Class: Choose this option if you are installing on a server class system, such as what you would use when deploying Oracle in a production data center.
- Click Next.

- Select “Single instance database installation” for the type of database installation you want to perform:
  - Single instance database installation: This option installs the database and the listener.
  - Real Application Clusters database installation: This option installs Oracle Real Application Clusters and the listener.
- Click Next.



- Select Typical Installation as the installation type from the following options
  - Typical Installation: This installation method is selected by default. It lets you quickly install Oracle Database using minimal input.
  - Advanced Installation: This installation method enables to perform more complex installations.
- Click Next.



- Enter the following information as per your requirements:
  - Oracle base: The Oracle base path appears by default. You can change the path based on your requirement.
  - Software location: In the Software Location section, accept the default value or enter the Oracle home directory path in which you want to install Oracle components. The directory path should not contain spaces.
  - Storage Type: Select File System as the database storage option.
  - Database file location: If you select File System as your storage type, then click Browse and specify a database file location based on your requirements.
  - Database Edition: Select Standard Edition.
  - OSDBA Group: The OSDBA group is selected by default. You can also select the OSDBA group from the list.
  - Global database name: Specify the Global Database Name using the following syntax:

    ovmdb.us.oracle.com
  - Administrative password: Enter the password for the privileged database account.
  - Confirm Password: Reenter, and confirm the password for the privileged database account.
- Click Next.

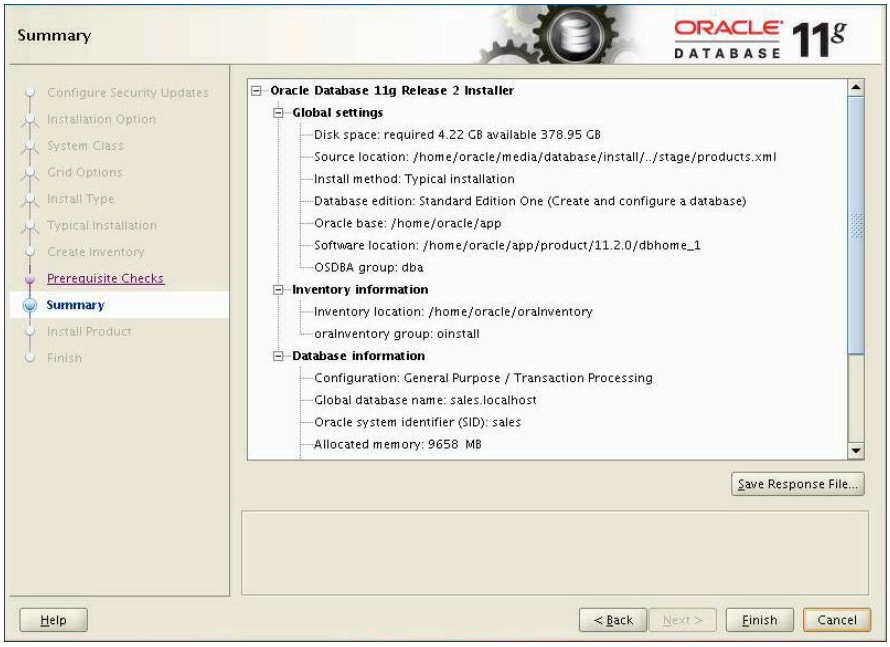
This screen is displayed only during the first installation of Oracle products on a system.

- Specify the full path of the Oracle Inventory directory. Ensure that the operating system group selected is oinstall.
- Click Next.

The Oracle Universal Installer checks the system to verify that it is configured correctly to run Oracle software. If you have completed all the pre-installation steps in this guide, all the checks should pass.

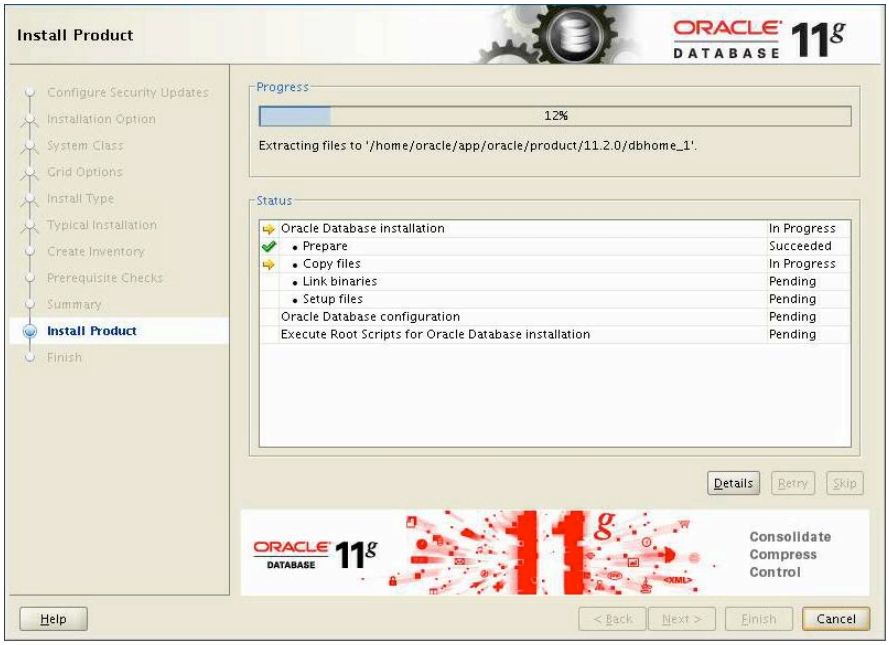
If a check fails, then review the cause of the failure listed for that check on the screen. If possible, rectify the problem and rerun the check. Alternatively, if you are satisfied that your system meets the requirements, then you can select the check box for the failed check to manually verify the requirement.

Note: Oracle recommends that you use caution in checking the Ignore All option. If you check this option, then Oracle Universal Installer may not confirm that your system is able to install Oracle Database successfully.



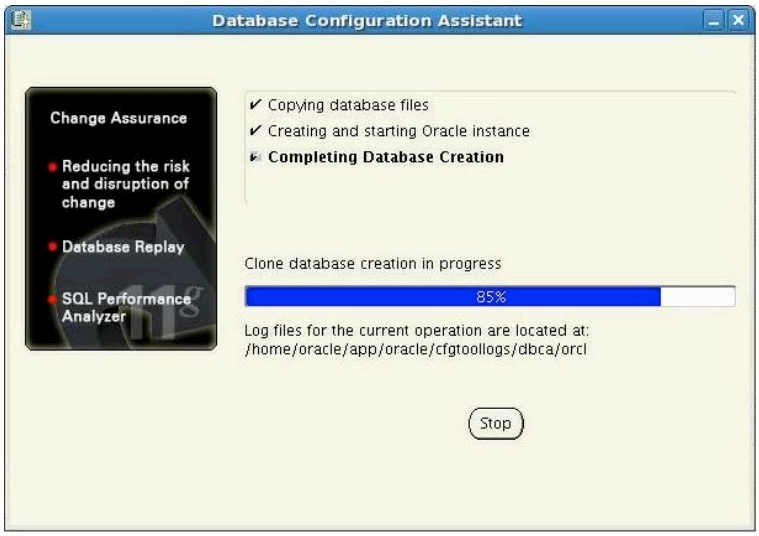
- Review the information displayed on this screen
- Click Finish.

Note: Starting with Oracle Database 11*g* Release 2 (11.2), you can save all the installation steps into a response file by clicking Save Response File. Later, this file can be used for a silent installation.

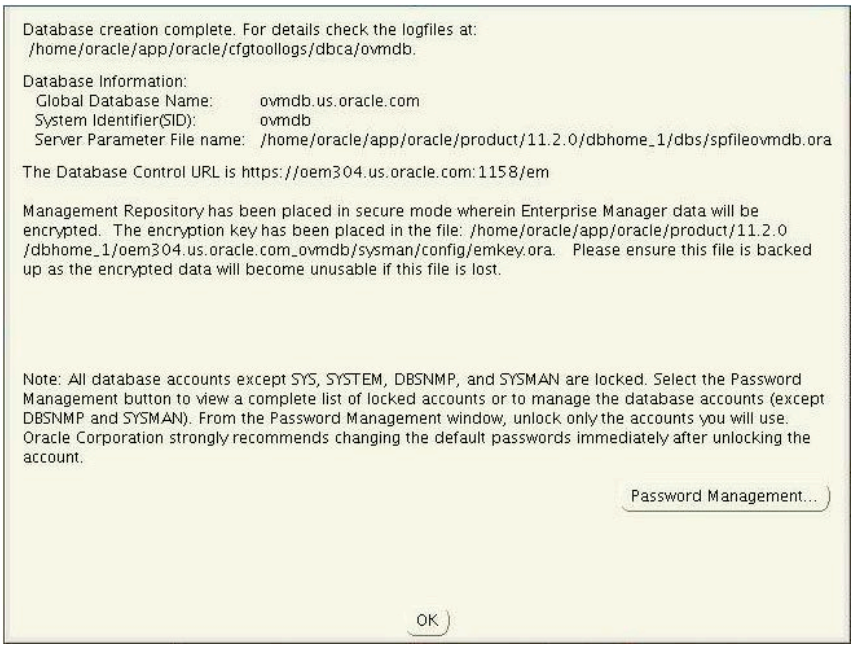


This screen states the progress of a database installation.

- After the database is installed, you are prompted to execute some root configuration script for new inventory as the root user.
  - Click Next.
- This screen then displays the status information for the configuration assistants that configure the software and creates a database instance as seen below:



- Finally, a message is displayed at the end of Database Configuration Assistant process as seen in the following screen:



  - Click "OK."
- Follow the instructions from the Execute Configuration scripts screen

- Open a terminal window, and log in as root

```
$ su - root
```

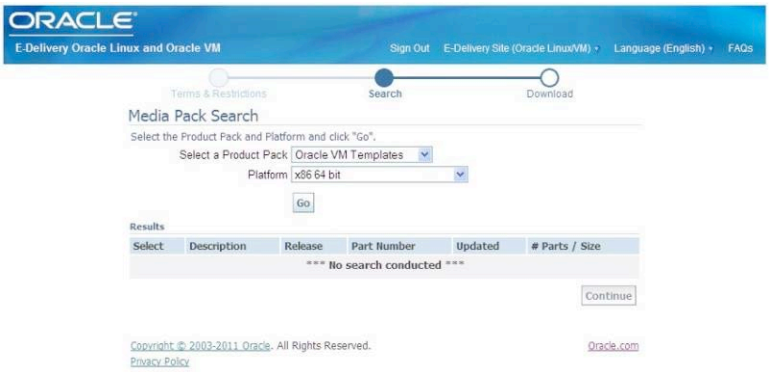
- Run the scripts as instructed from the Execute Configuration scripts screen and follow the necessary prompts.
- Click "OK" in the Execute Configuration scripts window to close this screen

- Note the Enterprise Manager Database Control URL that will be used to manage the Oracle Database.
- Click Close to finish the installation.

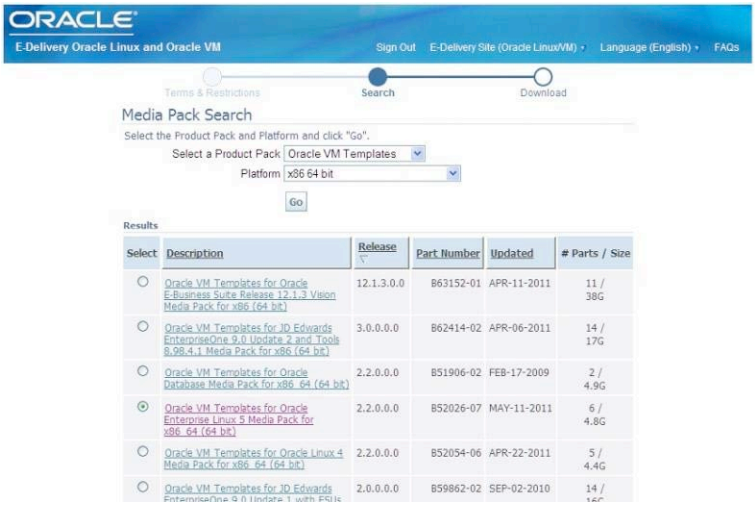
A5. Download Oracle VM Template

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.

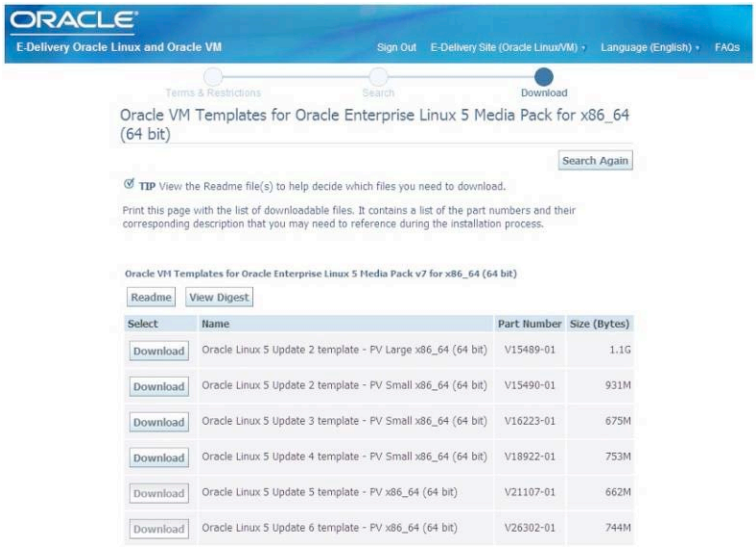
Templates are downloaded from Oracle's E-Delivery Web site (https://edelivery.oracle.com/oraclevm). Select the Product Pack as "Oracle VM Templates" with the Platform as "x86 64 bit' as shown below. Click the Go button when completed.



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



In the next screen, select Oracle Linux 6 Update 6 template – PV x86_64 (64-bit)



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

Oracle Optimized Solution for Enterprise Cloud Infrastructure — Implementation Guide (x86-Linux)
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