



Hardware and Software
Engineered to Work Together



Oracle VM Server for x86: Administration

Activity Guide

D85765GC20

Edition 2.0 | May 2016 | D95876

Learn more from Oracle University at oracle.com/education/

Copyright © 2016, Oracle and/or its affiliates. All rights reserved.

Disclaimer

This document contains proprietary information and is protected by copyright and other intellectual property laws. You may copy and print this document solely for your own use in an Oracle training course. The document may not be modified or altered in any way. Except where your use constitutes "fair use" under copyright law, you may not use, share, download, upload, copy, print, display, perform, reproduce, publish, license, post, transmit, or distribute this document in whole or in part without the express authorization of Oracle.

The information contained in this document is subject to change without notice. If you find any problems in the document, please report them in writing to: Oracle University, 500 Oracle Parkway, Redwood Shores, California 94065 USA. This document is not warranted to be error-free.

Restricted Rights Notice

If this documentation is delivered to the United States Government or anyone using the documentation on behalf of the United States Government, the following notice is applicable:

U.S. GOVERNMENT RIGHTS

The U.S. Government's rights to use, modify, reproduce, release, perform, display, or disclose these training materials are restricted by the terms of the applicable Oracle license agreement and/or the applicable U.S. Government contract.

Trademark Notice

Oracle and Java are registered trademarks of Oracle and/or its affiliates. Other names may be trademarks of their respective owners.

Author

Dave Goff

Technical Contributors and Reviewers

John Priest, Barry Isaacman, Rowan Puttergill, Don Naro, Tom Lisjac, Greg King, Yasar Akthar, Jeff Savit

This book was published using: Oracle *tutor*

Table of Contents

Practices for Lesson 1: Introduction	1-1
Practices for Lesson 1: Overview.....	1-2
Practice 1-1: Become Familiar with the Hosts and Networks in Your Lab Environment.....	1-3
Practice 1-2: Access Your Lab Machine and Switch to the root User	1-6
Practice 1-3: Access a Running Host with an Active Network Interface.....	1-8
Practice 1-4: Access a Running Host with the xm vncviewer Command	1-11
Appendix A: List, Start, and Stop the Virtual Machines with the xm Command	1-16
Practices for Lesson 2: Planning and Installation	2-1
Practices for Lesson 2: Overview.....	2-2
Practice 2-1: Verify that the Virtual Host for ovsrv02.example.com Is Running	2-3
Practice 2-2: Install the Oracle VM Server on the Second Server, ovsrv02.example.com	2-4
Practice 2-3: Examine the Host Where the Oracle VM Manager Is Installed	2-20
Practice 2-4: Install the Oracle VM Manager on ovmmgr01.example.com.....	2-23
Practice 2-5: Perform Post-Installation Verification	2-31
Practice 2-6: Verify Access to the Oracle VM CLI and Set Up Public Key-Based SSH Authentication to Connect to the CLI	2-34
Practices for Lesson 3: Managing Servers and Networks	3-1
Practices for Lesson 3: Overview.....	3-2
Practice 3-1: Discover Oracle VM Servers from the Oracle VM Manager UI and the Oracle VM CLI	3-3
Practice 3-2: Create the Virtual Machine Network.....	3-14
Practice 3-3: Create a Cluster Heartbeat Network	3-23
Practice 3-4: Check Bonds and Bridges on the Oracle VM Servers.....	3-33
Practice 3-5: Create a Network with VLAN Support.....	3-36
Appendix A: Tips on Using the Oracle VM CLI	3-51
Practices for Lesson 4: Managing Storage.....	4-1
Practices for Lesson 4: Overview.....	4-2
Practice 4-1: Verify the NFS Storage on Your Lab Machine	4-3
Practice 4-2: Discover the Generic NFS File Server from the Oracle VM Manager or the Oracle VM CLI.....	4-4
Practice 4-3: Verify the Presence of iSCSI Targets and LUNs on Your Lab Machine.....	4-17
Practice 4-4: Discover the iSCSI Generic Storage Array	4-21
Practice 4-5: Explore the Available Operations on Physical Disks	4-32
Practice 4-6: Install the Oracle ZFS Storage Appliance Plug-In	4-47
Practices for Lesson 5: Server Pools and Repositories	5-1
Practices for Lesson 5: Overview.....	5-2
Practice 5-1: Refresh the Rediscovered NFS Repository	5-3
Practice 5-2: Create a Clustered Server Pool	5-13
Practice 5-3: Create an iSCSI Repository	5-20
Practice 5-4: Import Resources into the Repository	5-27
Practice 5-5: Move pvm_64bit_template to iscsi_repos Repository	5-35
Practice 5-6: Perform Disk and Cloning Operations for Resources in the Repositories	5-43
Practice 5-7: Create a Repository on Local Storage	5-50
Practice 5-8: (Optional) Configure a Repository Export to Allow Backup of the Contents of the Repository ..	5-67
Practices for Lesson 6: Managing Virtual Machines.....	6-1
Practices for Lesson 6: Overview.....	6-2
Practice 6-1: Reserve MAC Addresses for the VNICs of Your Future Virtual Machines	6-3
Practice 6-2: Prepare Your Web Server for Installing a Guest OS in a Virtual Machine.....	6-6

Practice 6-3: Create pvm1, a Paravirtualized Virtual Machine	6-9
Practice 6-4: Install Oracle Linux as the Guest OS in the Virtual Machine.....	6-21
Practice 6-5: Clone the pvm_64bit_template Template into a New Virtual Machine	6-50
Practice 6-6: Create a Clone Customizer and Use It for Cloning Operations.....	6-63
Practice 6-7: Migrate Virtual Machines.....	6-74
Practice 6-8: Use the High Availability (HA) Feature.....	6-81
Practice 6-9: Use the Anti-Affinity Feature	6-92
Practice 6-10: View VNIC Usage from the Oracle VM Manager	6-104
Appendices: Remote Access Options	7-1
Appendices: Remote Access Options – Overview	7-2
Appendix A: Using TigerVNC to Connect to dom0.....	7-3
Appendix B: Using NoMachine Version 4 to Connect to dom0	7-9
Appendix C: Using an NX Client to Connect to dom0	7-25
Appendix D: Using an NX Player to Connect to dom0	7-29
Appendix E: Using TightVNC to Connect Directly to VM Guests	7-35

Practices for Lesson 1: Introduction

Chapter 1

Practices for Lesson 1: Overview

Practices Overview

In these practices, you get familiar with your lab environment by performing the following tasks:

1. Become familiar with the hosts and networks in your lab environment.
2. Access your lab machine and switch to the `root` user.
3. Access a running host with an active network interface by using the `ssh` command.
4. Access a running host by using the `vncviewer` command.

Appendix

Appendix A: List, start, and stop virtual machines with the `xm` command

Practice 1-1: Become Familiar with the Hosts and Networks in Your Lab Environment

Overview

For the practices of this lesson, you are assigned a lab machine on which you perform all your lab exercises. Your lab machine has been set up to support your entire Oracle VM environment.

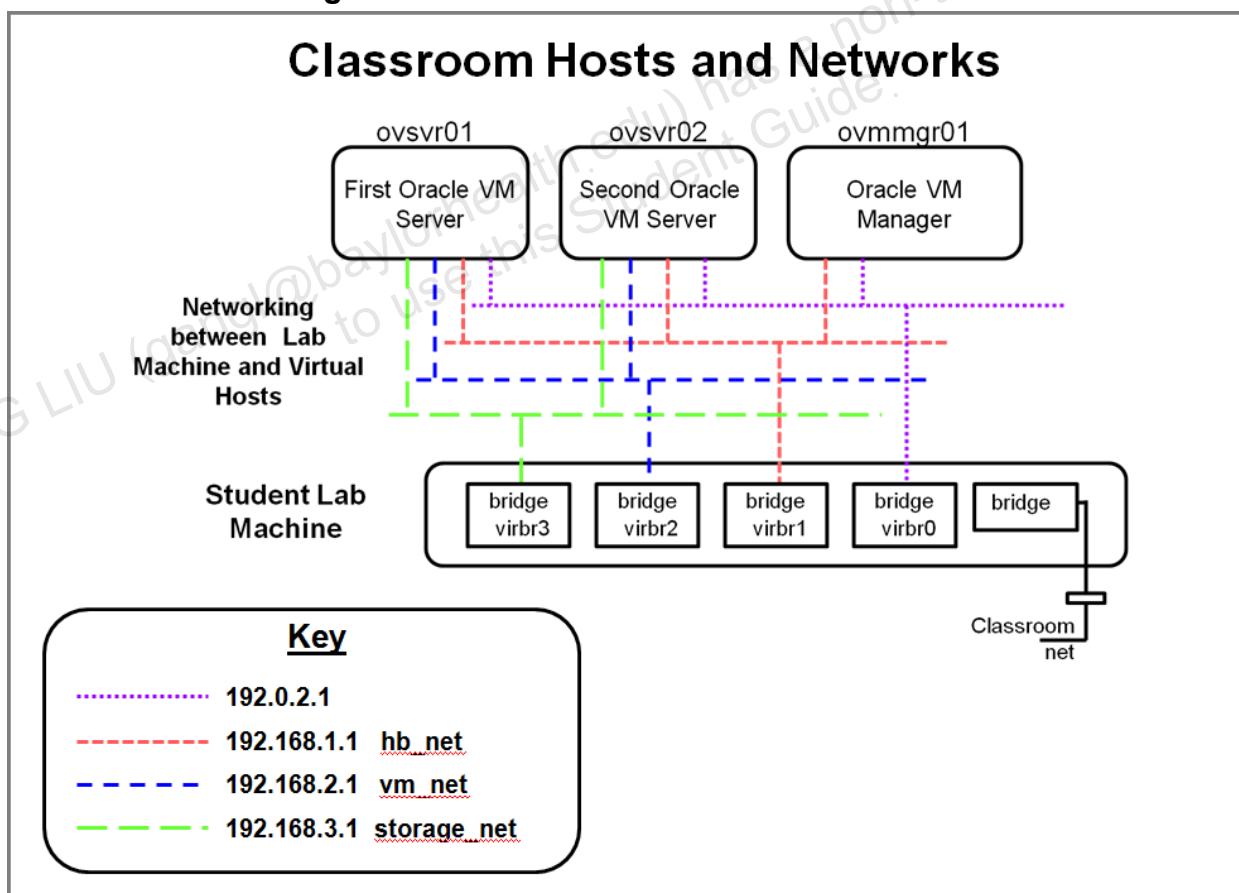
In this practice, you locate the major elements that are used for all the lab practices in this course:

- Your lab machine
- The hosts available on your lab machine to build your Oracle VM environment
- The networks that link your lab machine and the hosts in your environment

Assumptions

The tasks in this practice assume that the hosts in your lab environment are deployed as virtual machines. If your lab environment is composed of physical hosts, some information might change.

Lab Environment Diagram



1. Your lab machine is a server, which you access directly (in the classroom) or remotely.
2. Your environment contains three hosts that run as virtual machines on your lab machine. You build your Oracle VM environment with the following three hosts:
 - ovsvr01.example.com is the host name of your first Oracle VM server.
 - The host is already installed and running as an Oracle VM server.
 - The IP address is 192.0.2.101.
 - ovsvr02.example.com is the host name of your second Oracle VM server.
 - The virtual machine for this host does not have any guest OS installed on it. You install Oracle VM Server for x86 on this host when you do the practices for the next lesson, “Planning and Installation.”
 - The IP address reserved for this host is 192.0.2.102.
 - ovmmgr01.example.com is the host name for your Oracle VM Manager machine.
 - The virtual machine has Oracle Linux 7 Update 1 installed as the guest OS.
 - You install the Oracle VM Manager software on this host during a practice for the next lesson, “Planning and Installation.”
 - The IP address for this host is 192.0.2.121.
- When you need access to these hosts as part of a practice, you log in to them from your lab machine.
3. Your environment contains several networks.
 - Classroom network: This network allows your lab machine to communicate with the outside. Your Oracle VM environment does not use this network.
 - Management network: This network allows your three virtual hosts to communicate with your lab machine. It also allows the hosts to communicate with each other.
This network is configured on the 192.0.2.0 subnet:
 - Your lab machine participates in this network, and is assigned the IP address 192.0.2.1.
 - The first host is assigned the IP address 192.0.2.101 (first Oracle VM server).
 - The second host is assigned the IP address 192.0.2.102 (second Oracle VM server).
 - The third host is assigned the IP address 192.0.2.121 (host to act as the Oracle VM Manager).
 - Virtual Machine network: This network allows the virtual machines deployed from your Oracle VM environment to communicate with each other, and also to communicate with your lab machine.
This network is configured on the 192.168.1.0 subnet:
 - Your lab machine participates in this network, and is assigned the IP address 192.168.1.1.
 - The first host is assigned the IP address 192.168.1.101 (first Oracle VM server).
 - The second host is assigned the IP address 192.168.1.102 (second Oracle VM server).
 - The host that acts as the Oracle VM Manager is not participating in this network.

- Heartbeat network: This network allows the two Oracle VM servers deployed as part of your Oracle VM environment to communicate with each other, for the heartbeat function of your Oracle VM server pool.
This network is configured on the 192.168.2.0 subnet:
 - Your lab machine participates in this network, and is assigned the IP address 192.168.2.1.
 - The first host is assigned the IP address 192.168.2.101 (first Oracle VM server).
 - The second host is assigned the IP address 192.168.2.102 (second Oracle VM server).
 - The host that acts as the Oracle VM Manager is not participating in this network.
- VLAN traffic network: This allows the two Oracle VM servers deployed from your Oracle VM environment to support VLAN traffic on a single Ethernet port.

This network is configured on the 192.168.3.0 subnet:

- Your lab machine participates in this network, and is assigned the IP address 192.168.3.1.
- The first host is assigned 192.168.3.101 (first Oracle VM server).
- The second host is assigned 192.168.3.102 (second Oracle VM server).
- The host that acts as the Oracle VM Manager is not participating in this network.

Your lab machine has been set up to support the networks described in the preceding paragraphs. You create and configure the networks that are needed for your Oracle VM environment in the practices for the lesson titled “Managing Servers and Networks.”

Note: Your lab machine uses bridges to implement the networking infrastructure needed for your Oracle VM environment. A bridge acts as a virtual switch to connect virtual machines. Bridges are discussed in the lesson titled “Managing Servers and Networks.”

Practice 1-2: Access Your Lab Machine and Switch to the root User

Overview

In this practice, you access your lab machine and open a terminal window.

- If you are accessing your lab machine locally, you are already logged in to your GNOME session.
- If you are accessing your lab machine remotely, you need a connection program to access your lab machine. TigerVNC is the preferred way to access your lab machine remotely. Information about TigerVNC and other remote access options is provided in the Remote Access Options Appendix.

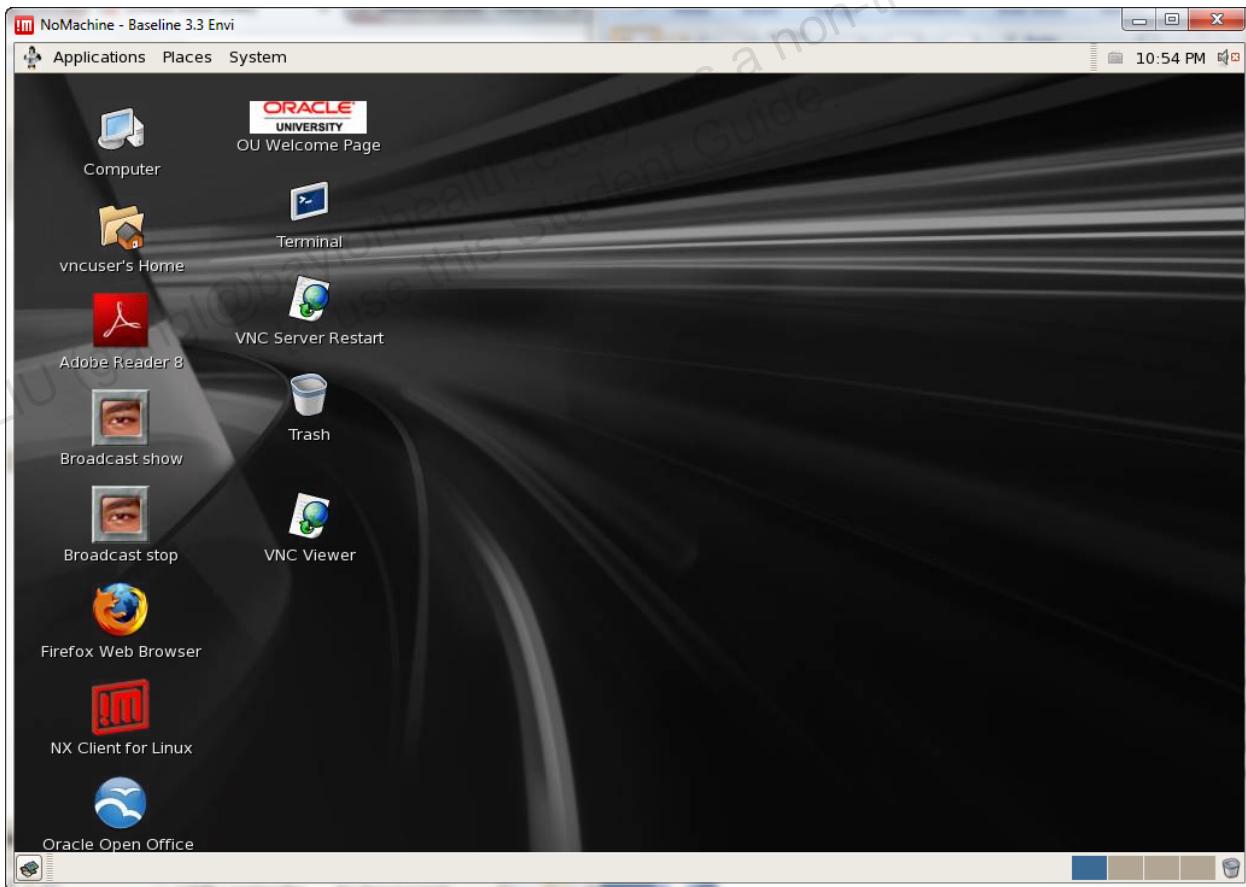
After accessing your lab machine, you open a terminal window and you switch to the `root` user.

Tasks

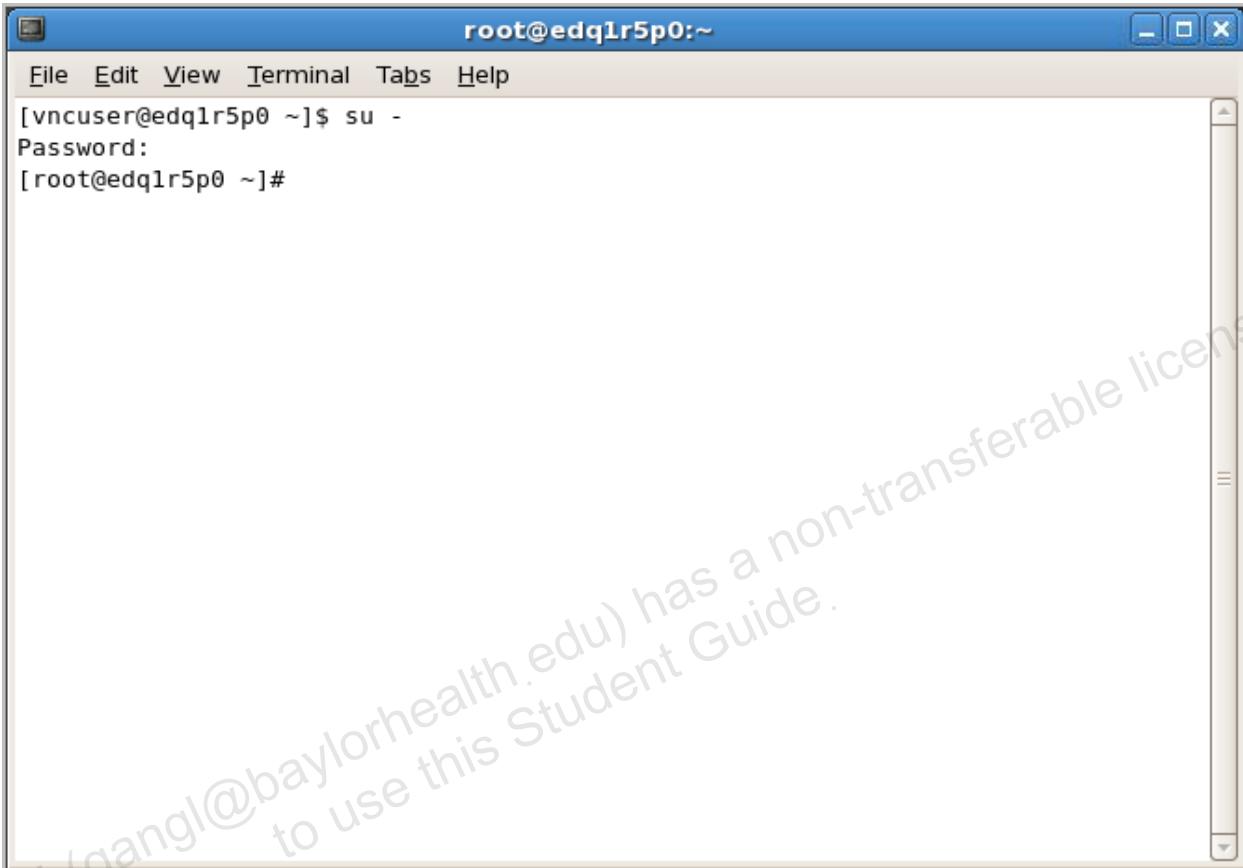
1. Access your lab machine.

- User ID: `vncuser`
- Password: `vnctech`

The GNOME desktop appears on your lab machine.



2. Double-click the Terminal icon on your desktop to start a terminal session.
3. Switch to the root user.
 - a. From the terminal window, execute the su – command.
 - b. When prompted for the password, enter oracle.



The screenshot shows a terminal window titled "root@edq1r5p0:~". The window has a menu bar with "File", "Edit", "View", "Terminal", "Tabs", and "Help". The main area displays a command-line session:

```
[vncuser@edq1r5p0 ~]$ su -
Password:
[root@edq1r5p0 ~]#
```

A large watermark reading "ANG LIT/gangl@baylorhealth.edu has a non-transferable license to use this Student Guide." is diagonally across the image.

You now have root privileges.

Practice 1-3: Access a Running Host with an Active Network Interface

Overview

In this practice, you access `ovsvr01.example.com` (your first Oracle VM server), which is already installed and active. You use the `ssh` command to access this host.

Note: At the start of your lab practices, the three virtual hosts on your lab machine are in the running state, and you can access `ovsvr01.example.com` and `ovmmgr01.example.com` by using the `ssh` command. If one of your virtual hosts is not running, refer to Appendix A for information about how to list the status of your virtual machines and how to start a virtual host by using the `xm` command.

Tasks

1. From your lab machine's desktop, open a terminal window.
2. In the terminal window, switch to the `root` user.

```
bash-3.2$ su -  
Password: oracle  
[root@<your lab machine> ~]#
```

3. Use the `ssh` command to access `ovsvr01.example.com`. When prompted to continue with the connection, enter `yes` to access the RSA key fingerprint.

```
[root@<your lab machine> # ssh ovsvr01.example.com  
The authenticity of host 'ovsvr01.example.com (192.0.2.101)'  
can't be established.  
RSA key fingerprint is ...  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'ovsvr01.example.com,192.0.2.101'  
(RSA) to the list of known hosts.  
root@ovsvr01.example.com's password: oracle  
Last login: ...  
Warning: making manual modifications in the management domain  
might cause inconsistencies between Oracle VM Manager and the  
server.  
  
[root@ovsvr01 ~]#
```

Note: Notice the warning about making manual modifications to this Oracle VM server.

You are now logged in to `ovsvr01.example.com`.

4. Display the Oracle VM server's release information.

```
[root@ovsvr01 ~]# cat /etc/ovs-release  
Oracle VM server release 3.4.1  
[root@ovsvr01 ~]#
```

5. Display the host information.

```
[root@ovs01 ~]# cat /etc/hosts
127.0.0.1    localhost localhost.localdomain localhost4
localhost4.localdomain4
::1          localhost localhost.localdomain localhost6
localhost6.localdomain6
192.0.2.101   ovs01.example.com
[root@ovs01 ~]#
```

6. Display the name resolution information.

```
[root@ovs01 ~]# cat /etc/resolv.conf

nameserver 192.0.2.1
[root@ovs01 ~]
```

Your lab machine acts as the DNS server.

7. Ping ovs01.example.com (the current Oracle VM server) and ovmmgr01.example.com (the Oracle VM Manager).

```
[root@ovs01 ~]# ping -c 3 ovs01.example.com
PING ovs01.example.com (192.0.2.101) 56(84) bytes of data.
64 bytes from ovs01.example.com (192.0.2.101): icmp_seq=1 ttl=64
time=0.022 ms
64 bytes from ovs01.example.com (192.0.2.101): icmp_seq=2 ttl=64
time=0.036 ms
64 bytes from ovs01.example.com (192.0.2.101): icmp_seq=3 ttl=64
time=0.034 ms

--- ovs01.example.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2001ms
rtt min/avg/max/mdev = 0.022/0.030/0.036/0.008 ms
[root@ovs01 ~] #
```

```
[root@ovs01 ~]# ping -c 3 ovmmgr01.example.com
PING ovmmgr01.example.com (192.0.2.121) 56(84) bytes of data.
64 bytes from ovmmgr01.example.com (192.0.2.121): icmp_seq=1 ttl=64
time=0.492 ms
64 bytes from ovmmgr01.example.com (192.0.2.121): icmp_seq=2 ttl=64
time=0.337 ms
64 bytes from ovmmgr01.example.com (192.0.2.121): icmp_seq=3 ttl=64
time=0.274 ms

--- ovmmgr01.example.com ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2003ms
rtt min/avg/max/mdev = 0.274/0.367/0.492/0.094 ms
[root@ovs01 ~] #
```

Note: At this time, you can ping ovsrv01.example.com and ovmmgr01.example.com. You cannot ping ovsrv02.example.com, because the Oracle VM Server for x86 software is not installed on this virtual host yet.

8. Exit your terminal session on ovsrv01.example.com.

From the command-line prompt, enter the exit command.

```
[root@ovsrv01 ~]# exit  
Connection to ovsrv01.example.com closed.  
[root@<your lab machine> #]
```

You are returned to the session on your lab machine.

Practice 1-4: Access a Running Host with the `xm vncviewer` Command

Overview

In this practice, you access a virtual host by using the `xm vncviewer` command.

If a virtual host is running, but does not have an active network interface, you cannot use the `ssh` command to access this host. In this situation, use the `xm vncviewer` command.

Note: In a practice for the lesson titled “Planning and Installation,” you use `xm vncviewer` to access the host `ovs02.example.com` to install the Oracle VM Server for x86 software on that host.

Tasks

1. If necessary, open a terminal window on your lab machine and switch to the `root` user.

- a. Use the `su -` command to switch to the root user. Be sure to include the `-`.
 - The root user password is `oracle`.

```
bash-3.2$ su -
Password: oracle
[root@<your lab machine> ~]#
```

- b. Issue the `xm vncviewer <VM_name>` command to connect to a virtual machine. The following example connects to the `ovs01` VM.

```
[root@<your lab machine> ~]# xm vncviewer ovs01
```

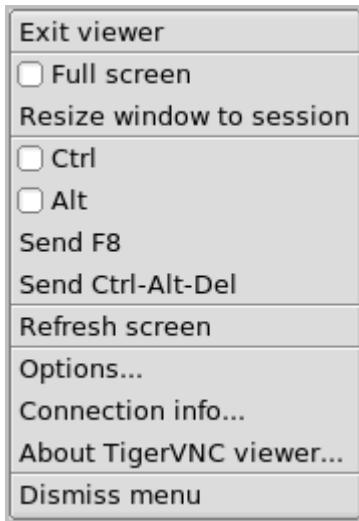
The console for ovsrv01.example.com appears.

```
Xen-ovsvr01 - TigerVNC  
Oracle VM Server 3.4.1 Console [Alt-F2 for login console]  
  
Local hostname      : ovsrv01.example.com  
Manager UUID       : Unowned  
Hostname           : None  
Server IP          : None  
Server Pool         : None  
Clustered          : No  
Cluster state      : Unknown  
Cluster type        : None  
Cluster storage     : None  
  
OVS Agent          : Running  
VMs running        : 0  
System memory       : 3583  
Free memory         : 2692  
Uptime              : 0 days, 0 hours, 1 minutes
```

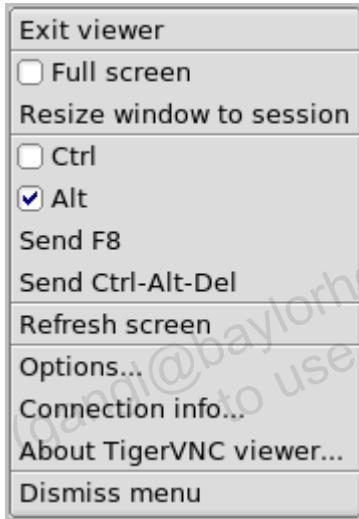
Note

- If the console screen is blank, press Enter.
- You must position the cursor in the VNC window for keystrokes to be transmitted to the VNC client.
- You must press and hold Alt + F2 to access the login prompt. Because you are accessing your Oracle VM server by using VNC, you cannot directly press the Alt + F2 key sequence. Use the instructions in the next steps to access the login prompt.

- c. Press the F8 key to display the VNC Menu.

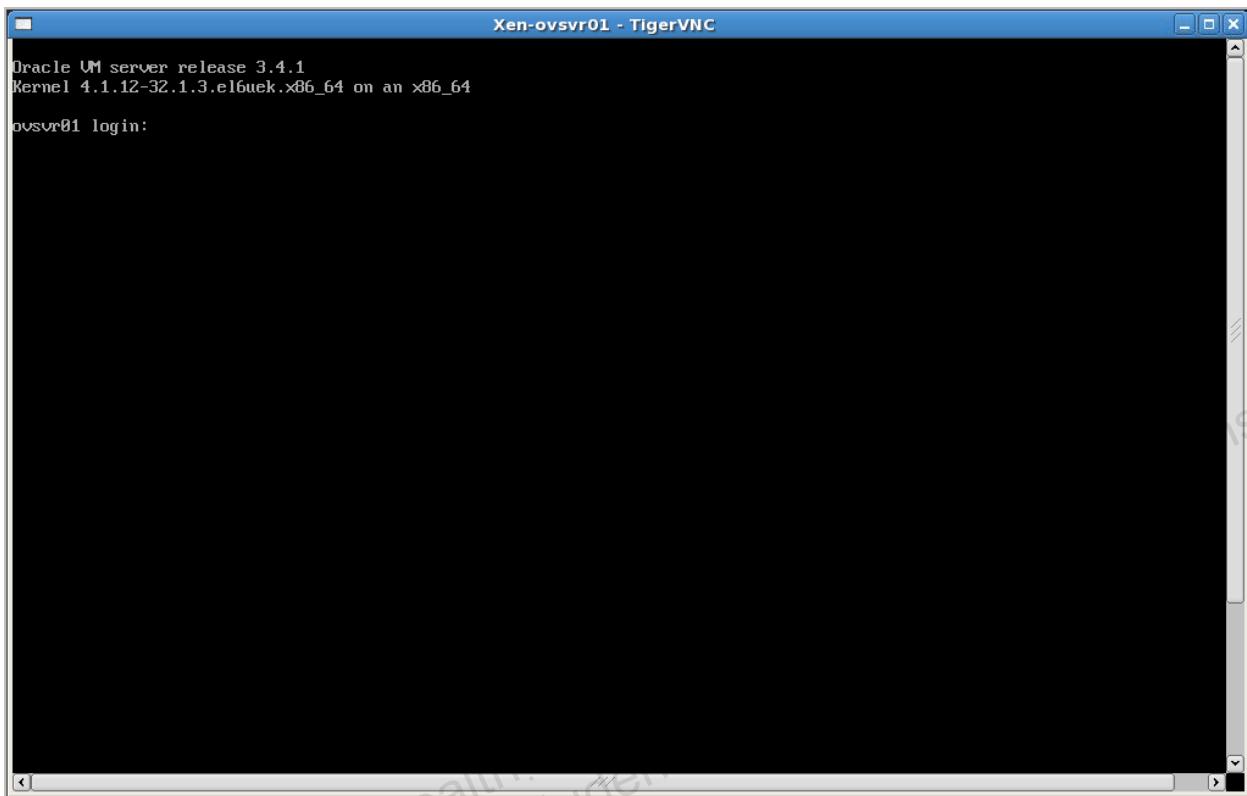


- d. Select Alt from the VNC Menu.

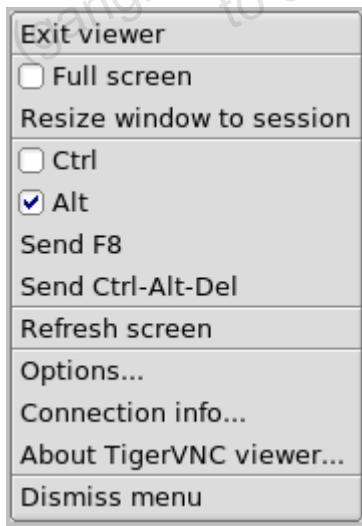


The VNC Menu window closes automatically.

- e. Press F2 to complete the Alt + F2 sequence that is required to display the login prompt.
The login prompt appears.

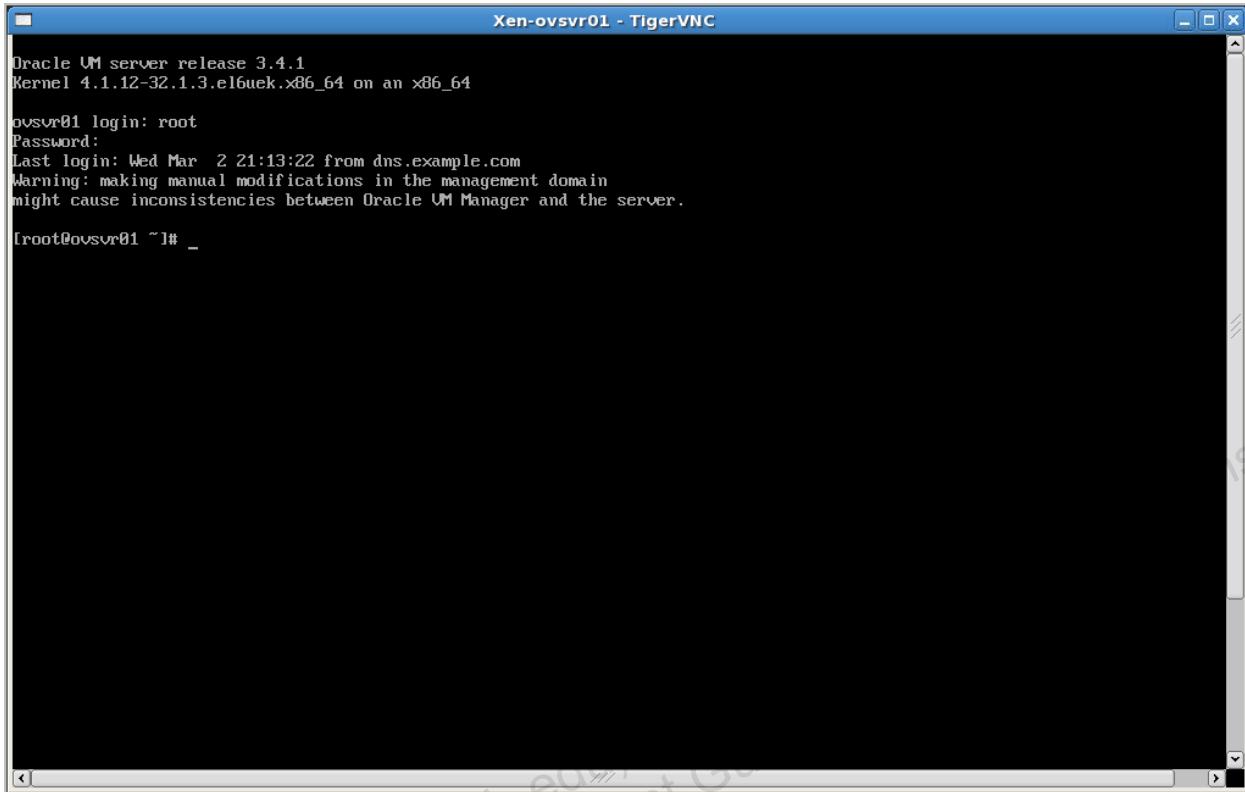


- The Alt key is still active in the VNC Menu.
f. Press the F8 key to display the VNC Menu.
g. Select Alt to deactivate this selection on the VNC Menu.



The VNC Menu window closes automatically.

h. Log in as root. The password is oracle.



The screenshot shows a VNC viewer window titled "Xen-ovsvr01 - TigerVNC". Inside the window, a terminal session is running on an Oracle VM server. The output of the session is as follows:

```
Oracle VM server release 3.4.1
Kernel 4.1.12-32.1.3.el6uek.x86_64 on an x86_64

ovsvr01 login: root
Password:
Last login: Wed Mar  2 21:13:22 from dns.example.com
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the server.

[root@ovsvr01 ~]# _
```

You have successfully accessed your virtual Oracle VM server by using the vncviewer command.

i. Exit the console.

- Enter the exit command to return to the login prompt.
- Click the Close (x) button to exit the VNC Viewer.

Appendix A: List, Start, and Stop the Virtual Machines with the `xm` Command

Overview

You use the information in this appendix if you have to manipulate your virtual machines with the `xm` command.

Warning: Generally, there is no need to start or stop virtual machines with the `xm` command. You use the information in this appendix only if one of your virtual machines is not running when you access your lab environment.

Your lab environment supports three hosts as virtual machines. The information for these virtual machines is summarized in the following table:

Host	Virtual Machine Name	Host Name for Guest Running in Virtual Machine
1	ovsvr01	ovsvr01.example.com
2	ovsvr02	ovsvr02.example.com
3	ovmmgr01	ovmmgr01.example.com

Assumptions

All `xm` commands are executed from the command-line prompt of your lab machine, from a terminal session, logged in as `root`.

Tasks

- List all running virtual machines by using the `xm list` command.

```
[root@<your lab machine> ~]# xm list
Name      ID   Mem      VCPUs     State    Time(s)
Domain-0    0   2048          2        r-----  621.3
ovmmgr01   1   7168          2        -b----- 132.1
ovsvr01    2   3584          1        -b----- 120.3
ovsvr02    3   2048          1        -b----- 108.9
[root@<your lab machine> ~]#
```

Note: The possible states for a domain are listed in the following table:

Domain State	Explanation
r	Running
b	Blocked – Possibly waiting on I/O or in a sleep state
p	Paused – If the administrator paused the domain
s	In the process of shutting down (temporary state)
c	Crashed
d	Dying – Shutting down or crashing (temporary state)

Note: Your output for the `xm list` command does not match the output shown in the preceding example. This is normal. The `ID` (Domain ID) is different, as well as the `State` or `Time (s)` information.

Normally, there are four virtual machines running:

- `ovsvr01`, your first Oracle VM server
- `ovsvr02`, your second Oracle VM server
- `ovmmgr01`, your Oracle VM Manager
- Domain-0, which represents your lab machine, which is running as the privileged domain

If a host is not listed, this means that this virtual machine is not running. Use the `xm create` command described in the next step to start a virtual machine.

2. If you need to start one of your virtual machines, use the `xm create` command.

Warning: Do not start virtual machines with the `xm` command unless one of your virtual machines is not running.

The `xm create` command requires the name of the configuration file for the virtual machine as a parameter.

The following example starts the `ovsvr02` virtual machine.

- To start the `ovsvr02` virtual machine, locate the virtual machine's configuration file in the `/OVS/running_pool/<VM name>` directory, where `VM name` is `ovsvr02`.

```
[root@<your lab machine> ~]# cd /OVS/running_pool/ovsvr02
```

- List the files in the `ovsvr02` directory.

```
[root@<your lab machine> ovsvr02]# ls
system.img  vm.cfg
[root@<your lab machine> ovsvr02]#
```

- From this location, issue the `xm create` command by using the configuration file name for the virtual machine. The configuration file name is always `vm.cfg` in your lab environment.

```
[root@<your lab machine> ~]# xm create vm.cfg
Using config file "./vm.cfg".
Started domain ovmmgr (id=39)
[root@<your lab machine> ~]#
```

Other virtual machines are started in the same manner. For example, if you want to start the `ovmmgr01` virtual machine, change directory to `/OVS/running_pool/ovmmgr01` and issue the `xm create vm.cfg` command from this location.

- d. Use the `xm list` command to verify that your virtual machine started successfully.

```
[root@<your lab machine> ~]# xm list
Name           ID   Mem  VCPUs State  Time(s)
Domain-0       0    2048   2      r----- 5314.7
ovmmgr01      1    7168   2      -b----- 165.2
ovsvr01        2    3584   1      -b----- 101.4
ovsvr02        4    2048   1      r----- 12.0
[root@<your lab machine> ~]#
```

3. If you need to shut down or restart a virtual machine, use the `xm` command with the `shutdown` or `reboot` option.
- The following is an example of using `xm shutdown <VM name>` to shut down a virtual machine:

```
[root@<your lab machine> ~]# xm shutdown ovsvr01
```

The virtual machine continues to appear in the output of the `xm list` command until it is completely shut down.

- The following is an example of using `xm reboot <VM name>` to restart a virtual machine:

```
[root@<your lab machine> ~]# xm reboot ovsvr01
```

The virtual machine reappears in the output of the `xm list` command, with a new Domain ID.

Practices for Lesson 2: Planning and Installation

Chapter 2

Practices for Lesson 2: Overview

Practices Overview

In these practices, you perform the following:

1. Verify that the virtual host for `ovsvr02.example.com` is running.
2. Install Oracle VM Server for x86 on the second server, `ovsvr02.example.com`.
3. Examine the host where the Oracle VM Manager is installed.
4. Install the Oracle VM Manager on `ovmmgr01.example.com`.
5. Perform post-installation verification.
7. Verify access to the Oracle VM CLI and set up public key-based SSH authentication to connect to the CLI.

Practice 2-1: Verify that the Virtual Host for ovsrv02.example.com Is Running

Overview

In this practice, you verify that the virtual host on which you install the Oracle VM server is running. The virtual machine for the Oracle VM server host is called ovsrv02.

Tasks

1. Log in to your lab machine.
2. Double-click the Terminal icon on your desktop to open a terminal window.
3. In the terminal window, change user to root.

```
bash-3.2$ su -  
Password:  
[root@<your lab machine> ~]#
```

4. Execute the xm list command.

```
[root@<your lab machine> # xm list  
Name           ID   Mem  VCPUs      State      Time(s)  
Domain-0        0    2048       2      r----  640.8  
ovmmgr01       1    7168       2      -b---  135.9  
ovsvr01         2    3584       1      -b--- 3614.2  
ovsvr02         3    2048       1      -b---  111.8  
[root@<your lab machine> #]
```

The virtual host ovsrv02 must appear in the list of running virtual machines.

Note: In your environment, the IDs listed in the output of the xm list command will differ.

If the virtual host ovsrv02 is not running, see Appendix A in the practices for the first lesson for instructions on how to start this virtual machine by using the xm command.

Practice 2-2: Install the Oracle VM Server on the Second Server, ovsvr02.example.com

Overview

In this practice, you install Oracle VM Server for x86 on the second host.

Assumptions

This practice requires a host to serve as the second Oracle VM server. For training, this host is either a virtual machine or it is a physical server available in your lab environment.

This host, whether a virtual or a physical host, must have access to the installation media that contains the Oracle VM Server for x86 software.

The examples in this practice assume that the second Oracle VM server is installed in a virtual machine called ovsvr02.

Tasks

1. Access the console for ovsvr02:

Use the `xm vncviewer ovsvr02` command.

```
[root@<your lab machine>] # xm vncviewer ovsvr02
```

The console window appears.

Note: The main Oracle VM Server installation screen can appear as shown in task 2, step b, or the “CD Found” screen as shown in task 2, step a. This is normal. If you get the main Oracle VM Server installation screen, press the Enter key to proceed, as explained in task 2, step b.

2. Proceed with the installation of the Oracle VM Server for x86 software.
 - a. On the “CD Found” screen (as shown in the following screenshot), press the Tab key to select Skip, and then press Enter to bypass the media test:



- b. Click OK on the Welcome to Oracle VM Server! screen.

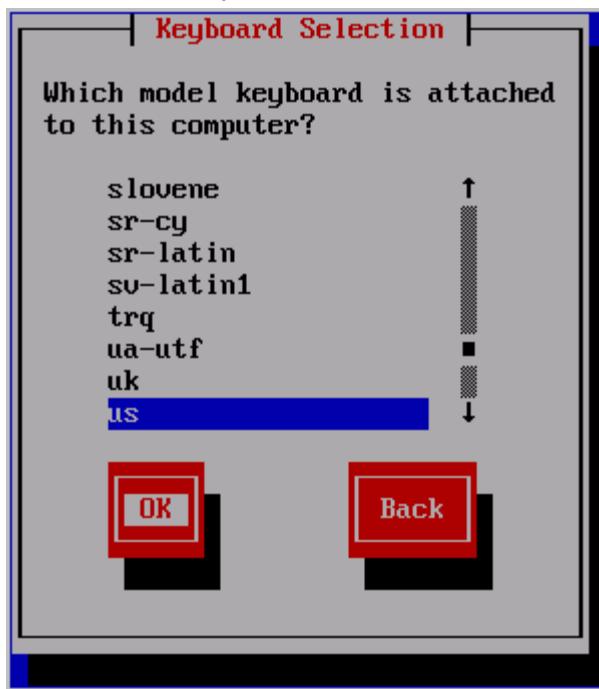


- c. On the Language Selection screen, select the language to use during the installation process. For example, choose English.

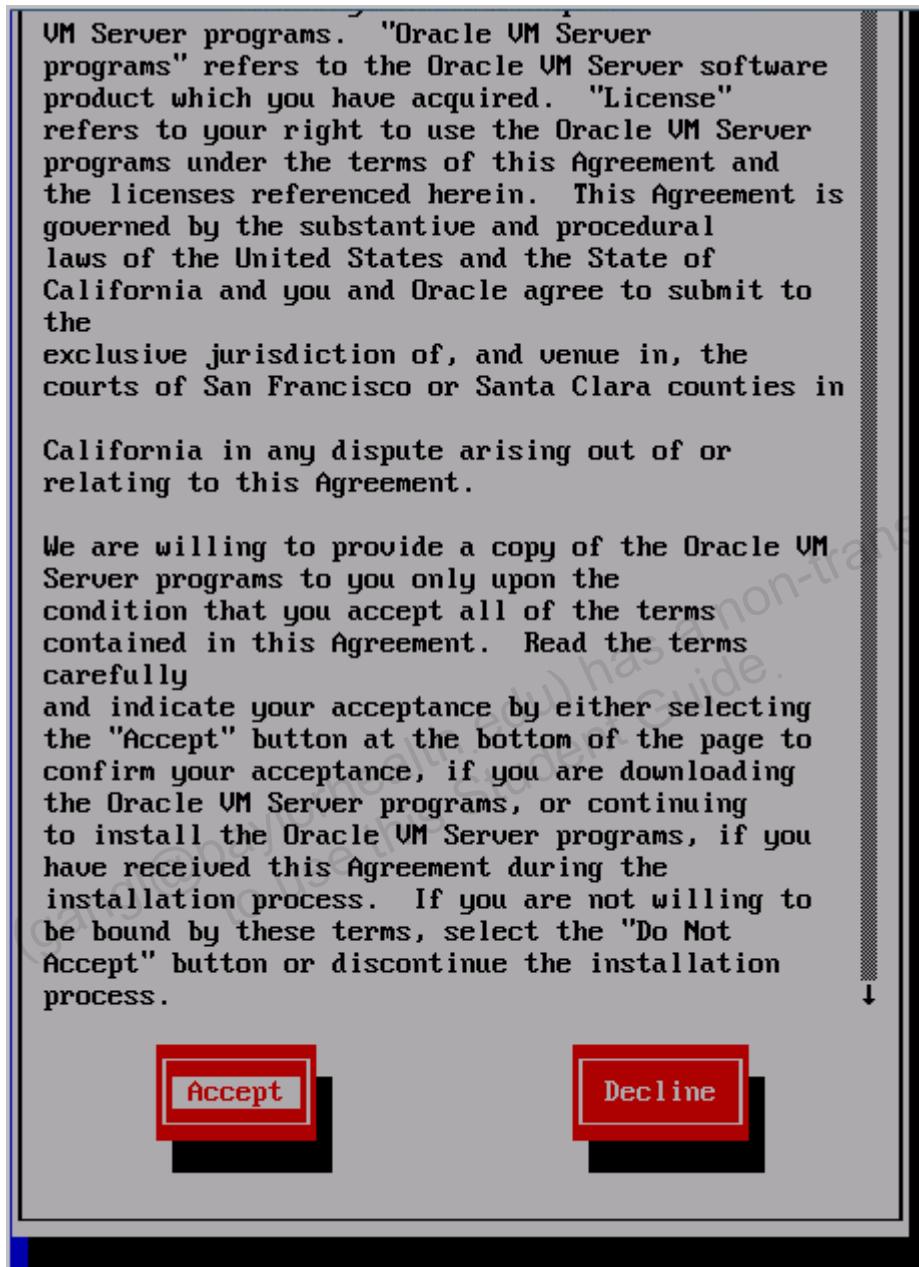


Press the Tab key to select OK, and then press the Enter key to continue.

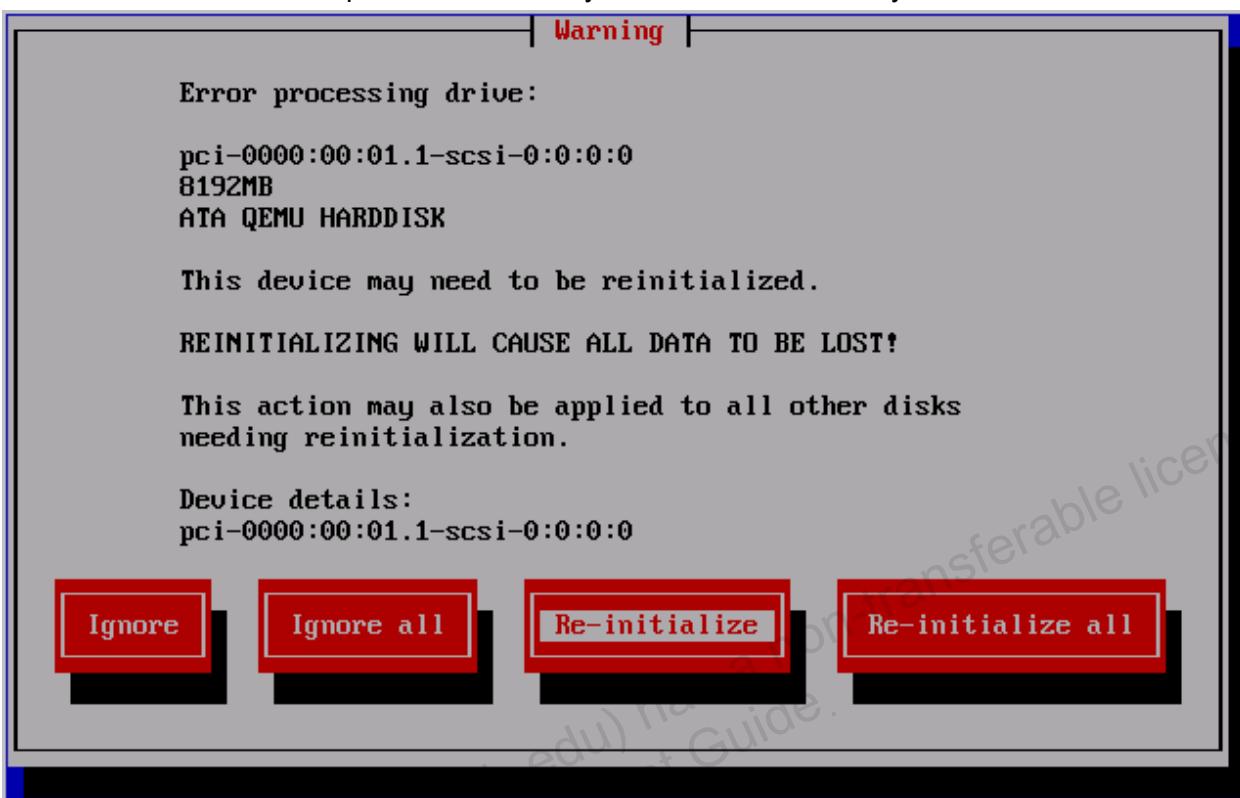
- d. On the next screen, select the keyboard model. For example, accept the default of us, press the Tab key to select OK, and then press the Enter key to continue.



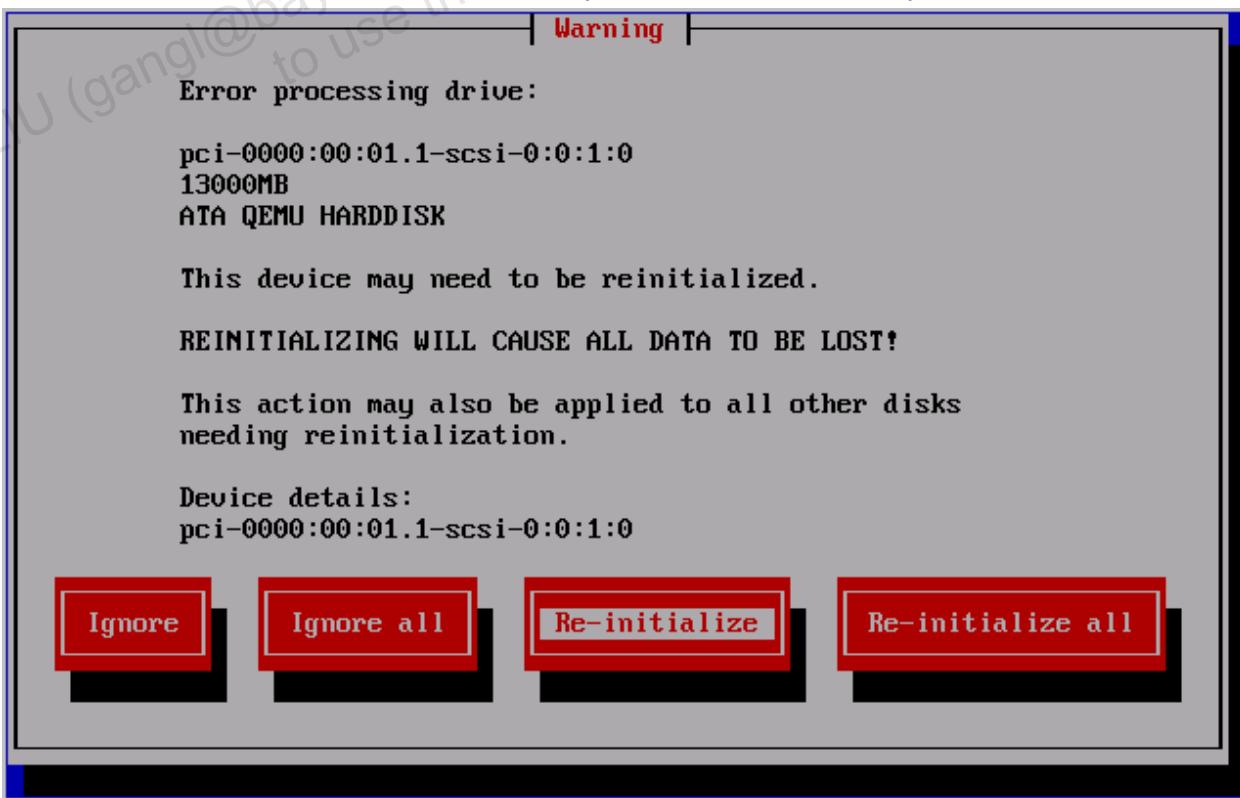
- e. On the next screen (as shown in the following screenshot), accept the terms of the end-user license agreement (EULA) by pressing the Tab key to select Accept, and then press the Enter key to continue:



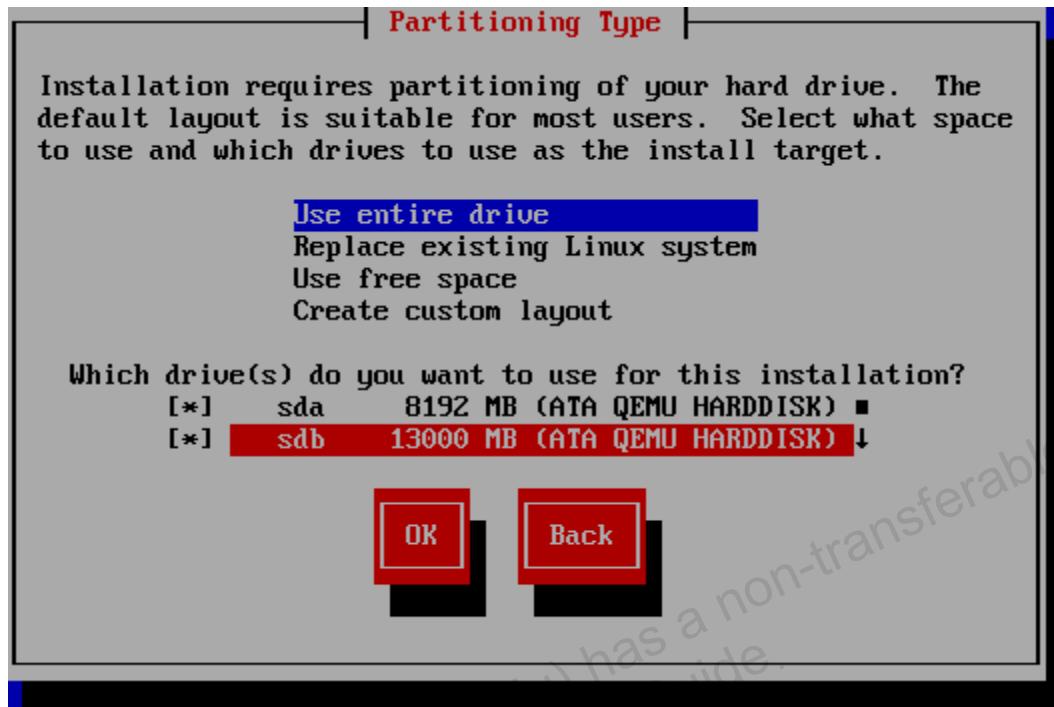
- f. On the next screen (as shown in the following screenshot), press the Tab key to select Re-initialize, and then press the Enter key to initialize the 8 GB system disk:



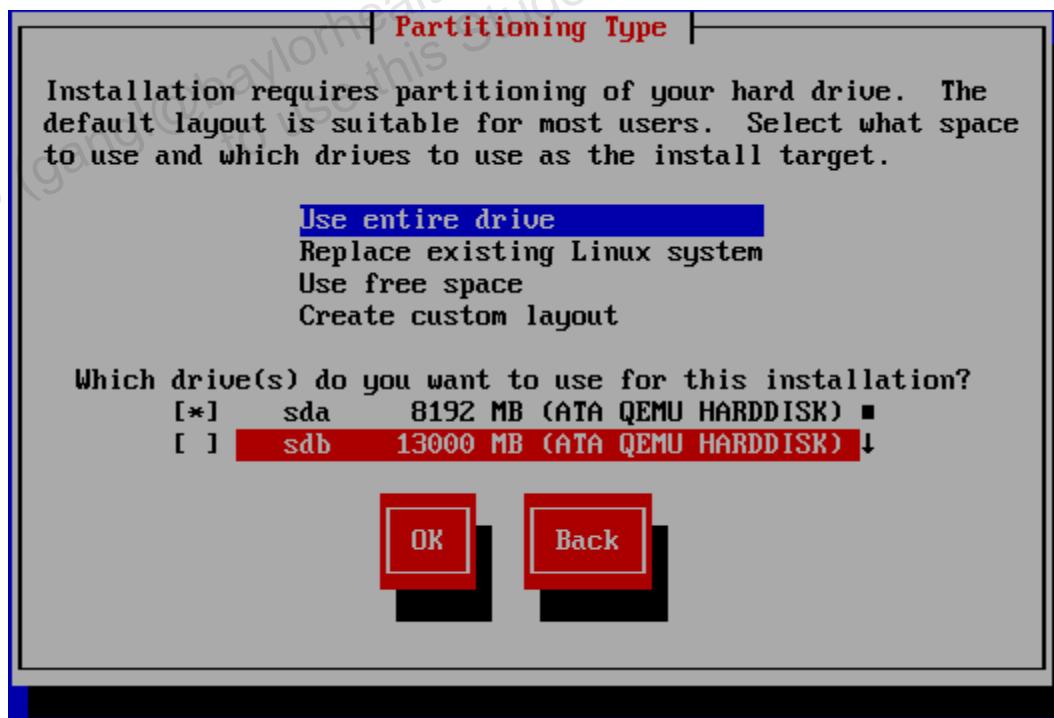
- g. On the next screen (as shown in the following screenshot), press the Tab key to select Re-initialize, and then press the Enter key to initialize the 13 GB system disk:



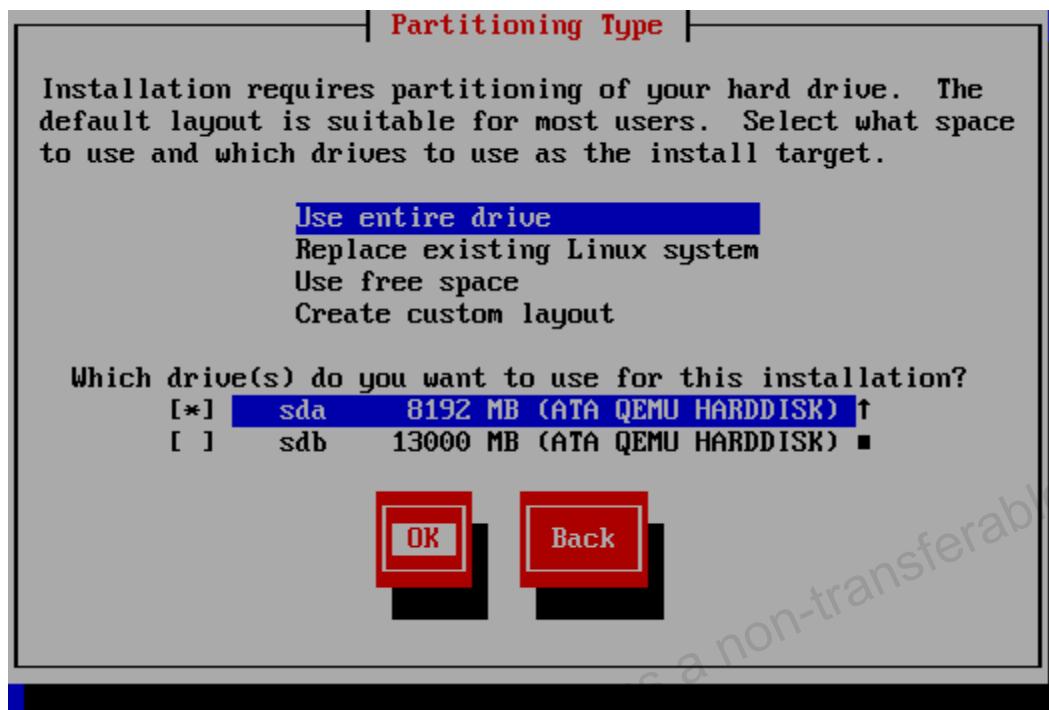
- h. On the next screen, press the Tab key and select “Use entire drive” for installation. Use the Tab key to move to the next selection, then press the down-arrow key to highlight sdb.



Press the Space bar to deselect sdb.

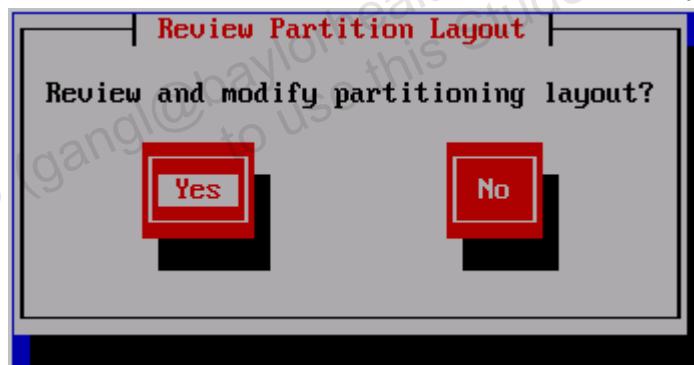


Use the up-arrow key to highlight sda, then press the Tab key to accept sda as the drive for the installation.

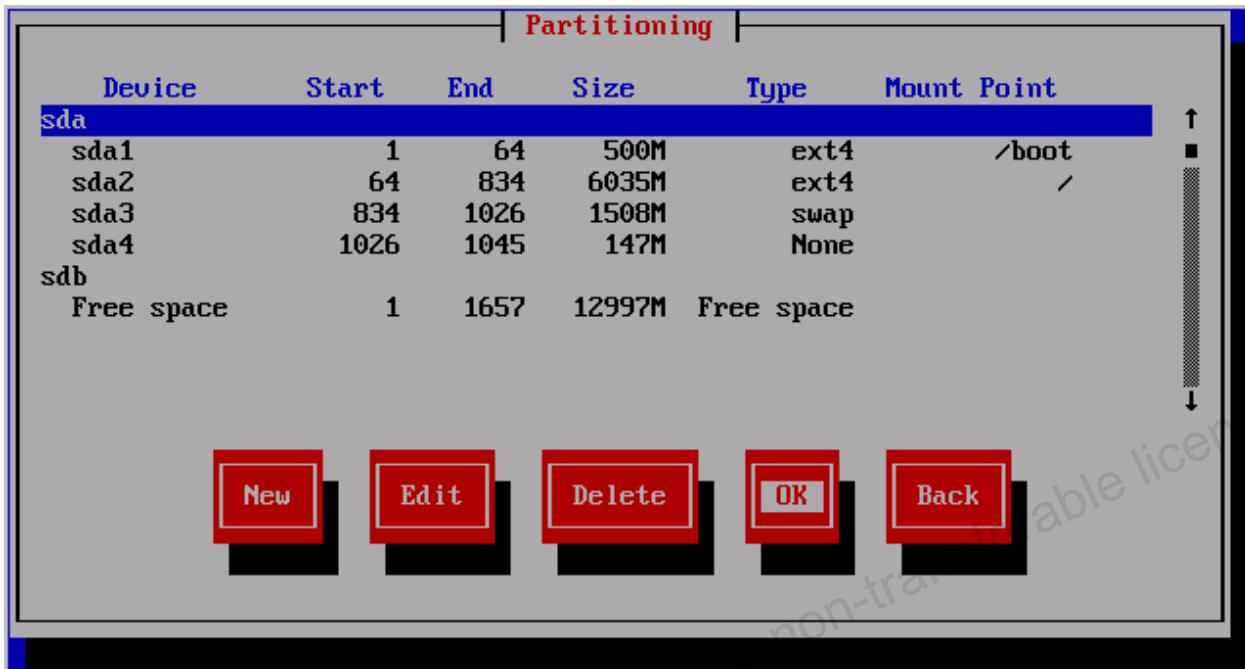


Ensure sdb is not selected before you press the Enter key to continue.

- i. On the next screen, select "Yes" to review and modify partitioning layout.



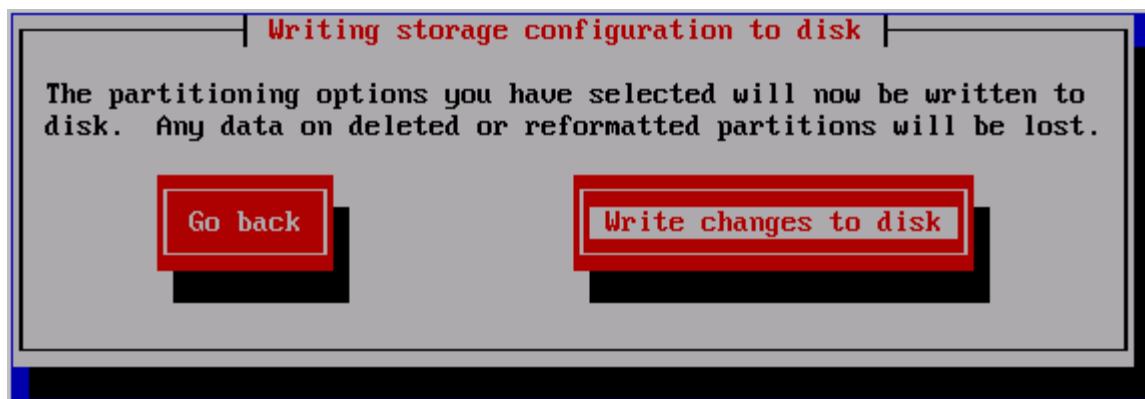
- j. On the next screen, accept the default partitioning.
Press the Tab key to select OK, and then press the Enter key to continue.



- k. On the next screen, select "Yes", and then press the Enter key to continue.

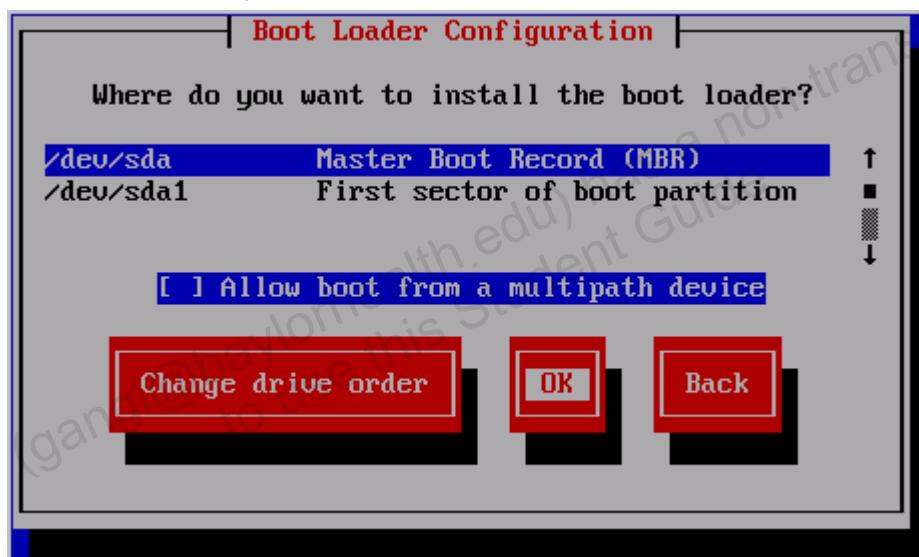


- I. On the next screen, press the Tab key to select “Write changes to disk”. Press the Enter key to continue.



The installation proceeds by creating the partitions.

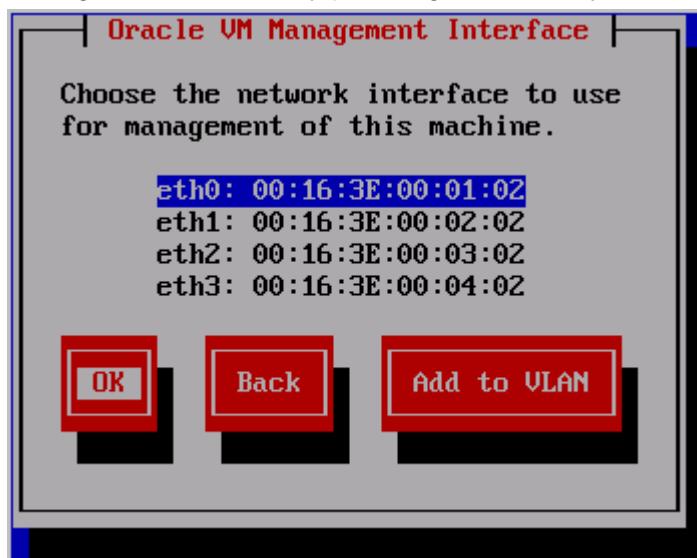
- II. On the Boot Loader Configuration screen, press the Tab key until OK is selected. Press the Enter key to install the boot loader on the /dev/sda device.



- III. On the next screen, select "No" to enable kdump, and then press the Enter key to continue.



- o. On the next screen, accept eth0 as the network interface to use as the Oracle VM management network by pressing the Tab key to select OK. Then press the Enter key.

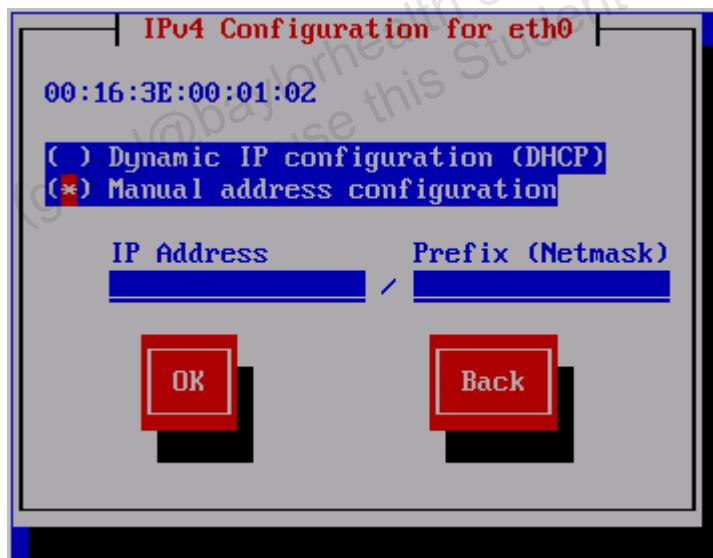


- p. On the next screen, perform the IP configuration for eth0.

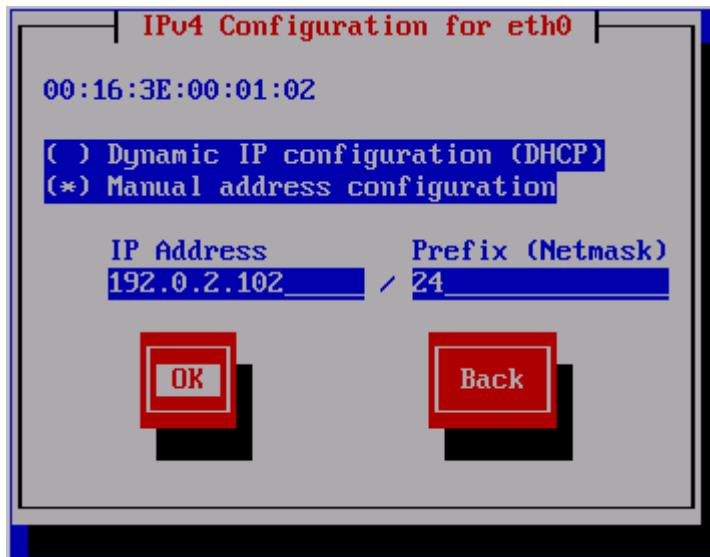
The default is "Dynamic IP configuration."

Press the down arrow key and press the Spacebar to select "Manual address configuration."

The IP Address and Prefix fields become active.



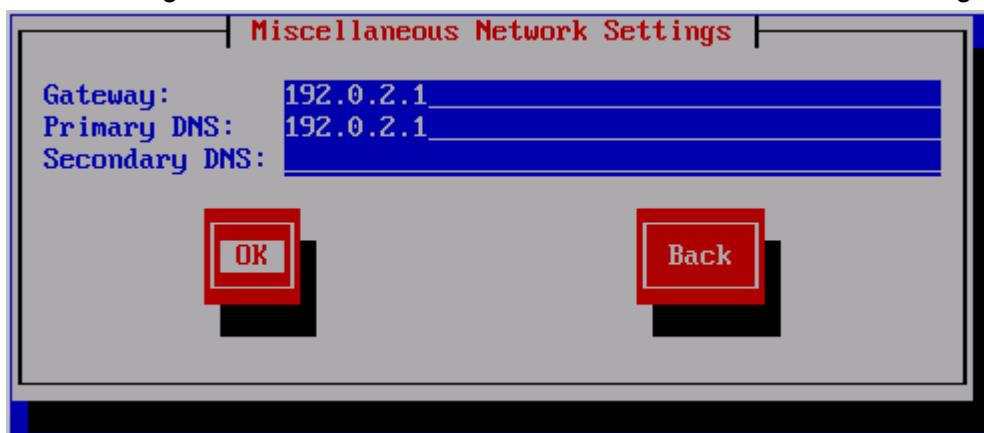
- q. Press the Tab key to enter the IP address for this server: 192.0.2.102. Tab to the “Prefix (Netmask)” field and enter 24, as shown in the following screenshot:
Press the Tab key to select OK, and then press the Enter key to continue.



- r. The next screen prompts you for gateway and DNS information.
Use the information in the following table to fill this screen:

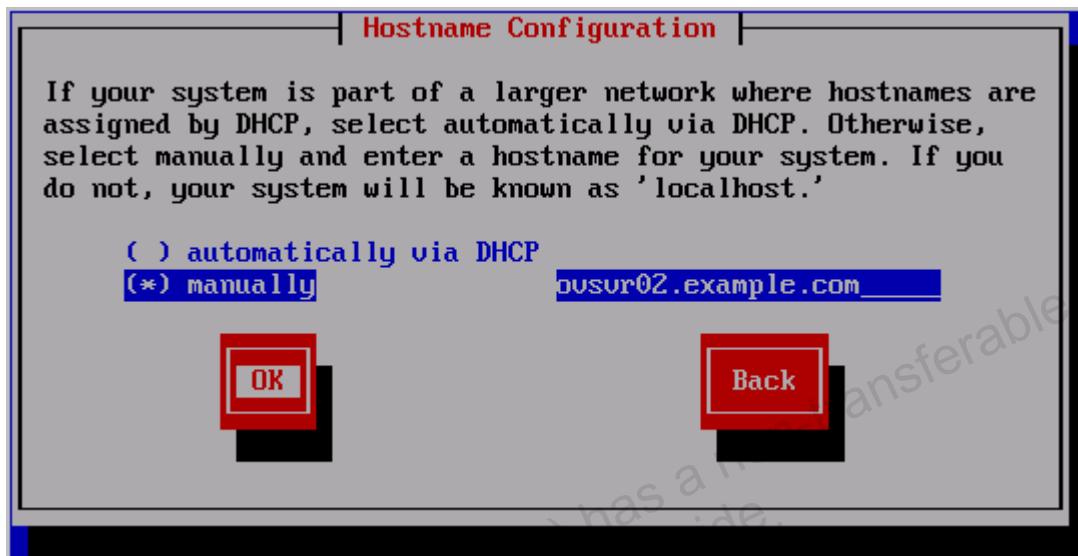
Field	Value
Gateway	192.0.2.1 (your lab machine's IP address on the 192.0.2.0 subnet)
Primary DNS	192.0.2.1 (your lab machine's IP address on the 192.0.2.0 subnet)
Secondary DNS	Leave blank.

After entering information from the table, the screen looks like the following screenshot:

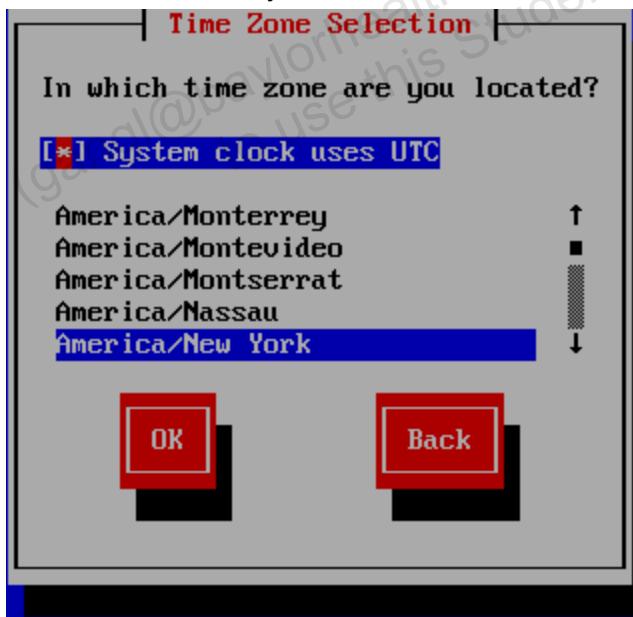


Press the Tab key to select OK and press the Enter key to continue.

- s. The next screen configures the host name for the new Oracle VM server. In your environment, if it is not already selected, select the manual address configuration by moving the cursor to the parentheses next to “manually” and press the space bar to select this option. This selection prompts you for the host name to assign to your Oracle VM server. Enter ovsvr02.example.com and press the Tab key to select OK. Then press the Enter key to continue as shown in the following screenshot:

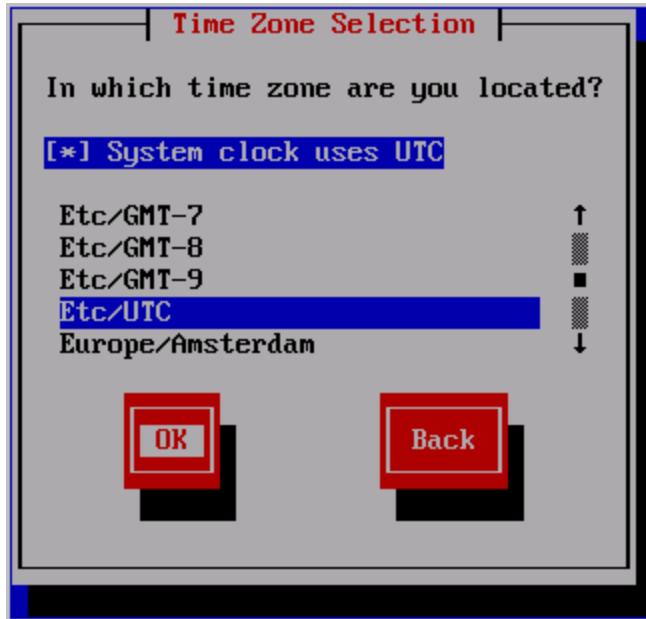


- t. On the next screen, you select the time zone.



- Press the Tab key to move the cursor to the time zone list.
- To avoid scrolling down the list, enter the letter “e.” The “Etc/GMT” selection is now at the top of the list.

- Using the down arrow, find the “Etc/UTC” selection.



After finding “Etc/UTC,” press the Tab key to move the cursor to OK and press the Enter key to continue.

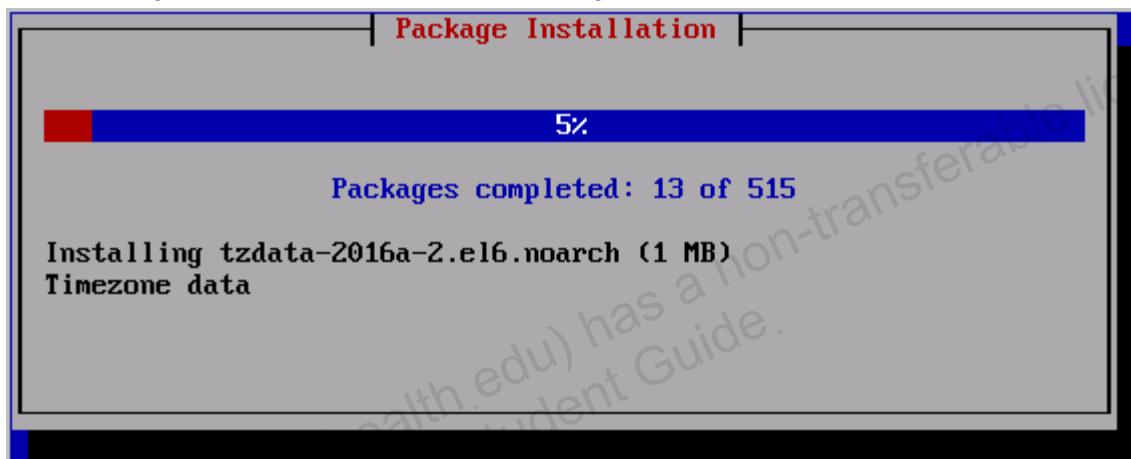
- u. On this screen, select the Oracle VM Agent password. This password must be the same for all Oracle VM servers in your environment.
Use ovsagent as the password. Re-enter the password to confirm. Press the Tab key to select OK and press the Enter key to continue.
- v. On this screen, select the root password for this new Oracle VM server. Use oracle as the password. Re-enter the password to confirm.
Press the Tab key to select OK and press the Enter key to continue, as shown in the following screenshot:



- w. On the Weak Password screen, press the Tab key to Use Anyway and press Enter:



- x. After making some checks, the installation begins.



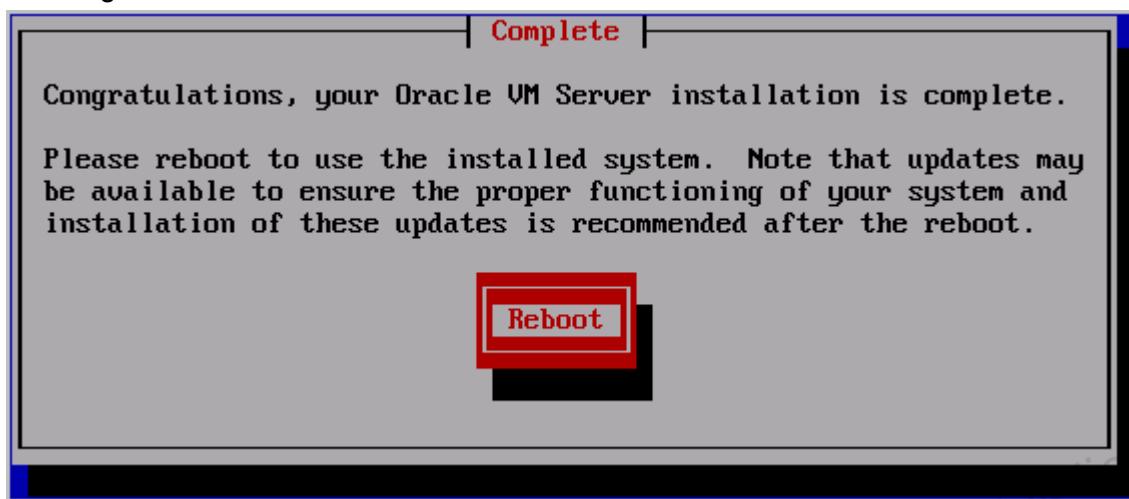
The packages are installed, and the progress of the installation is displayed on the screen.

There is a 20-minute pause after the last package is installed.

Note: Jump to Practice 2-3 but continue to monitor the installation. When the Oracle VM Server for x86 installation completes, you are prompted to reboot the installed system, as shown in the following step, which is labeled step y.

After the last package is installed, the installation process performs additional configuration. This stage takes 8 to 10 minutes to complete.

- y. When the installation is complete, you are prompted to reboot, as shown in the following screenshot:



Press the Enter key to reboot.

The console window closes automatically.

The reboot takes a few minutes to complete.

3. Log on to ovsrv02.example.com.

- a. From a terminal window on your lab machine, as user root, access the new Oracle VM server by using the ssh command. The server's root password is oracle.

Note: If you attempt to access ovsrv02.example.com before the boot process is completed, you get a "No route to host" message.

If the server is not responding after a few minutes, verify that it is running by using the xm list command. The virtual machine named ovsrv02 must appear in the list of active running virtual machines. If it is not running, start it manually by following the steps in Appendix A, "List, start, and stop virtual machines with the xm command," at the end of the practices for Lesson 1, "Introduction."

```
[root@<your lab machine>]# ssh ovsrv02.example.com
The authenticity of host 'ovsrv02.example.com (192.0.2.102)' 
can't be established.
RSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ovsrv02.example.com,192.0.2.102' 
(RSA) to the list of known hosts.
root@ovsrv02.example.com's password: oracle
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.

[root@ovsrv02 ~] #
```

Observe the warning about making manual modifications from the command line of the new Oracle VM server.

- b. Exit your session on ovsrv02.example.com.

```
[root@ovsvr02 ~] # exit  
Connection to ovsrv02 closed.  
[root@<your lab machine>] #
```

- c. If you started performing the tasks in Practice 2-3, resume those tasks.

Practice 2-3: Examine the Host Where the Oracle VM Manager Is Installed

Overview

In this practice, you access the host where the Oracle VM Manager will be installed. You verify that the basic requirements for the installation of the Oracle VM Manager have been met.

The following table summarizes the minimum requirements that must be met on the host where you want to install the Oracle VM Manager:

Item	(Minimum) Value
Memory	8 GB
Swap Space	2.1 GB
Hard Disk Space	5.5 GB in /u01 2 GB in /tmp 500 MB in /var 500 MB in /usr
Userid/Group	oracle, group is dba
Package(s)	unzip
Security limits in /etc/security/limits.conf file	oracle soft nofile 8192 oracle hard nofile 65536 oracle soft nproc 2048 oracle hard nproc 16384 oracle soft core unlimited oracle hard core unlimited

Note: The Oracle VM Manager installation process installs MySQL Enterprise Edition and MySQL Enterprise Backup.

Refer to the *Oracle VM Installation and Upgrade Guide* for a complete list of requirements for the host running the Oracle VM Manager.

To satisfy the preceding requirements, you can manually perform the changes to your Oracle VM Manager host. Alternatively, you can run the `createOracle.sh` script, which implements some of the changes, and also notifies you if some of the requirements are not met. In your lab environment, the `createOracle.sh` script has already been executed.

The `createOracle.sh` script is located in the Oracle VM Manager installation media, in the top-level directory.

Assumptions

This practice makes the following assumptions:

- The host where the Oracle VM Manager is to be installed is up and running.
- The `createOracle.sh` script has been run successfully.
- The Simple installation option is selected during installation. This option installs MySQL as the data repository for the Oracle VM Manager.

Tasks

1. Start a terminal window in your lab machine.
2. Change user to root.
3. In the terminal window, log in to ovmmgr01.example.com (the virtual machine where the Oracle VM Manager is installed).

```
[root@<your lab machine>]# ssh ovmmgr01.example.com
The authenticity of host 'ovmmgr01.example.com (192.0.2.121)' can't be established.
RSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ovmmgr01.example.com,192.0.2.121' (RSA) to the list of known hosts.
root@ovmmgr01.example.com's password: oracle
Last login: ...
[root@ovmmgr01 ~]#
```

4. Display the memory size on ovmmgr01.example.com.

```
[root@ovmmgr01 ~]# more /proc/meminfo
MemTotal:       7144324 kB
MemFree:        6515064 kB
... output omitted for brevity
[root@ovmmgr01 ~]#
```

Note: Your Oracle VM Manager host might have 8 GB or less of memory. In this example, the memory is set at 7 GB. The requirement is 8 GB; however, in a test environment, you can use less if necessary. If your Oracle VM Manager host's memory does not meet the minimum memory requirement, the installation of the Oracle VM Manager software fails. You can install it again by disabling the prerequisites check, with the no-prereqs parameter.

5. Verify that the oracle user ID exists.

```
[root@ovmmgr01 ~]# grep oracle /etc/passwd
oracle:x:54321:54322::/home/oracle:/bin/bash
[root@ovmmgr ~]# grep dba /etc/group
dba:x:54322:
[root@ovmmgr01 ~]#
```

6. Verify that the /u01 directory exists and list its size.

```
[root@ovmmgr01 ~]# ls -ld /u01
drwxr-xr-x. 3 root root 4096 <date_time> /u01
[root@ovmmgr01 ~]# df -h /u01
Filesystem      Size  Used Avail Use% Mounted on
/dev/xvde1     9.1G   37M  8.6G   1% /u01
[root@ovmmgr01 ~] #
```

7. Verify that the `unzip` package is installed.

```
[root@ovmmgr01 ~]# rpm -qa | grep unzip  
unzip-6.0-13.el7.x86_64  
[root@ovmmgr01 ~]#
```

8. Terminate your session on `ovmmgr01.example.com`.

```
[root@ovmmgr01 ~]# exit
```

Practice 2-4: Install the Oracle VM Manager on ovmmgr01.example.com

Overview

In this practice, you install the Oracle VM Manager on the ovmmgr01 virtual host.

Assumptions

This practice assumes that the Oracle VM Manager software is available in the /stage directory on ovmmgr01.example.com, the host where the Oracle VM Manager is to be installed.

You install the Oracle VM Manager software and, as part of the installation, you assign an existing UUID to the Oracle VM Manager. You do this because a repository is already created on an NFS share, and you rediscover this repository in the practice titled “Discover the Generic NFS File Server from the Oracle VM Manager or the Oracle VM CLI.” The UUID in the metadata of this repository must match the Oracle VM Manager’s UUID for the “rediscover repository” operation to succeed.

Tasks

1. Access ovmmgr01.example.com, the host machine where you install the Oracle VM Manager.

```
[root@<your lab machine>] # ssh ovmmgr01.example.com
root@ovmmgr01.example.com's password: oracle
Last login: ...
[root@ovmmgr01 ~] #
```

2. Mount the ISO file in preparation for the installation of the Oracle VM Manager.

- a. Change to the /stage directory.

```
[root@ovmmgr01 ~] # cd /stage
```

- b. List the contents of the directory to locate the Oracle VM Manager installation ISO file.

```
[root@ovmmgr01 stage]# ls -l
total 2361332
drwx----- 2 root root      16384 ... lost+found
-rw-r--r-- 1 root root     113396 ... osc-oracle-s7k-1.0.3-
96.el6.noarch.rpm
-rw-r--r-- 1 root root     200060 ... ovmcore-console-1.0-
46.el6.noarch.rpm
-rw-r--r-- 1 root root 2816419840 ... ovmm-3.4.1-installer-
OracleLinux-b1350.iso
lrwxrwxrwx. 1 root root          42 ... ovmm-3.4.1-installer-
OracleLinux.iso -> ovmm-3.4.1-installer-OracleLinux-b1350.iso
[root@ovmmgr01 stage]#
```

A symbolic link to the actual ISO file is ovmm-3.4.1-installer-OracleLinux.iso.

- c. Mount the ISO file on the /mnt directory as a read-only loop device.

```
[root@ovmmgr01 stage]# mount -o loop,ro ovmm-3.4.1-installer-OracleLinux.iso /mnt
```

- d. Verify that it is mounted properly.

```
[root@ovmmgr01 stage]# df -h
Filesystem           Size  Used Avail Use% Mounted on
...
/dev/loop0            2.7G  2.7G     0 100% /mnt
[root@ovmmgr01 stage]#
```

3. Start the installation by invoking the runInstaller.sh program in /mnt.

- a. Change to the /mnt directory.

```
[root@ovmmgr01 stage]# cd /mnt
```

- b. List the contents of the /mnt directory and locate the installation program.

```
[root@ovmmgr01 mnt]# ls
components          LICENSE                  OvmSDK_3.4.1.1350.zip
createOracle.sh    oracle-validated.params  runInstaller.sh
EULA                ovmm-installer.bsx      sample.yml
[root@ovmmgr01 mnt]#
```

- c. Start the installation by executing the runInstaller.sh program by using the UUID parameter 0004fb00000100002390716cb97d53cf, and respond to the prompts.

Note: If you want to copy and paste the UUID from your environment to avoid entering the wrong UUID, perform the following steps:

- From your lab machine (not ovmmgr01), display the mounted file systems with the df -h command.

```
[root@<your lab machine>]# df -h
Filesystem           Size  Used Avail Use% Mounted on
...
/OVS/sharedDisk/nfsrepos1.img
        20G   3.8G   15G  21% /nfsrepos1
...
[root@<your lab machine>]#
```

- Change directory to the mounted NFS share at /nfsrepos1 and list the files in the directory, including hidden files.

```
[root@<your lab machine>]# cd /nfsrepos1
[root@<your lab machine>]# ls -la
total 52
drwxr-xr-x  8 root root  4096 <date_time> .
drwxr-xr-x 31 root root  4096 <date_time> ..
drwx----- 2 root root  4096 <date_time> Assemblies
-rw-----  1 root root    36 <date_time>.generic_fs_stamp
drwx----- 2 root root  4096 <date_time> ISOs
drwx----- 2 root root 16384 <date_time> lost+found
-rw-----  1 root root   144 <date_time>.ovsrepo
```

```
drwx----- 2 root root 4096 <date_time> Templates
drwx----- 2 root root 4096 <date_time> VirtualDisks
drwx----- 2 root root 4096 <date_time> VirtualMachines
root@<your lab machine> #
```

- Display the contents of the .ovsrepo file by using the cat command.

```
[root@<your lab machine>]# cat .ovsrepo
OVS_REPO_UUID=0004fb000003000d87b5dd02a6c4141
OVS_REPO_VERSION=3.0
OVS_REPO_MGR_UUID=0004fb00000100002390716cb97d53cf
OVS_REPO_ALIAS=nfs_repos
[root@<your lab machine>]#
```

- Use the grep command to extract the UUID from the file by using MGR as the string for the grep command.

```
[root@<your lab machine>]# grep MGR .ovsrepo
OVS_REPO_MGR_UUID=0004fb00000100002390716cb97d53cf
[root@<your lab machine>]#
```

You can now copy and paste the UUID to use with the runInstaller.sh installation script.

The prompts to the installation program are summarized in the following table:

Prompt	Value
Installation Type	Install (option 1)
Password to use for all users	MyOracle1
Continue/Abort	Continue (option 1)

Execute the runInstaller.sh script.

Note

- There are no spaces or newline between --uuid= and the uuid itself.
- If you use a cut-and-paste operation to obtain the command, make sure that the command is copied correctly with the correct UUID specification. If the UUID is not specified correctly, you end up with a new UUID, which is different than the UUID stored in the existing NFS repository. Note that you can cut-and-paste the UUID from the OVMM_UUID_forInstall.txt file located in the /stage directory into the following command.
- The installation takes 25 minutes from the point where you reply to the last prompt.

```
[root@ovmmgr01 mnt]# ./runInstaller.sh --
uuid=0004fb00000100002390716cb97d53cf

Oracle VM Manager Release 3.4.1 Installer

Oracle VM Manager Installer log file:
/var/log/ovmm/ovm-manager-3-install-<....>.log

Please select an installation type:
```

```
1: Install
2: Upgrade
3: Uninstall
4: Help

Select Number (1-4): 1 <====

Starting production with local database installation ...

Verifying installation prerequisites ...
*** WARNING: Recommended memory for the Oracle VM Manager server
installation using Local MySQL DB is 7680 MB RAM

Starting production with local database installation ...

One password is used for all users created and used during the
installation.
Enter a password for all logins used during the installation:
MyOracle1 <====

Enter a password for all logins used during the installation
(confirm) : MyOracle1 <====

Please enter your fully qualified domain name, e.g.
ovs123.us.oracle.com, (or IP address) of your management
server for SSL certification generation 192.0.2.121
[ovmmgr01.example.com]: Press the Enter key to accept default
<====

Verifying configuration ...

Start installing Oracle VM Manager:
1: Continue
2: Abort

Select Number (1-2): 1 <====

Step 1 of 7 : Database Software...
Installing Database Software...
Retrieving MySQL Database 5.6 ...
Unzipping MySQL RPM File ...
Installing MySQL 5.6 RPM package ...
Configuring MySQL Database 5.6 ...
Installing MySQL backup RPM package ...
```

```
Step 2 of 7 : Java ...
Installing Java ...

Step 3 of 7 : WebLogic and ADF...
Retrieving Oracle WebLogic Server 12c and ADF ...
Installing Oracle WebLogic Server 12c and ADF ...
Applying patches to Weblogic ...
Applying patches to ADF ...

Step 4 of 7 : Oracle VM ...
Installing Oracle VM Manager Core ...
Retrieving Oracle VM Manager Application ...
Extracting Oracle VM Manager Application ...

Retrieving Oracle VM Manager Upgrade tool ...
Extracting Oracle VM Manager Upgrade tool ...
Installing Oracle VM Manager Upgrade tool ...

Retrieving Oracle VM Manager CLI tool ...
Extracting Oracle VM Manager CLI tool...
Installing Oracle VM Manager CLI tool ...
Installing Oracle VM Manager WLST Scripts ...

Step 5 of 7 : Domain creation ...
Creating domain ...

Step 6 of 7 : Oracle VM Tools ...

Retrieving Oracle VM Manager Shell & API ...
Extracting Oracle VM Manager Shell & API ...
Installing Oracle VM Manager Shell & API ...

Retrieving Oracle VM Manager Wsh tool ...
Extracting Oracle VM Manager Wsh tool ...
Installing Oracle VM Manager Wsh tool ...

Retrieving Oracle VM Manager Tools ...
Extracting Oracle VM Manager Tools ...
Installing Oracle VM Manager Tools ...

Retrieving ovmcore-console ...
Installing ovmcore-console RPM package ...
```

```
Copying Oracle VM Manager shell to '/usr/bin/ovm_shell.sh' ...
Installing ovm_admin.sh in '/u01/app/oracle/ovm-manager-3/bin'
...
Installing ovm_upgrade.sh in '/u01/app/oracle/ovm-manager-3/bin'
...

Step 7 of 7 : Start OVM Manager ...
Enabling Oracle VM Manager service ...
Shutting down Oracle VM Manager instance ...
Starting Oracle VM Manager instance ...

Please wait while WebLogic configures the applications...
Trying to connect to core via ovmwsh (attempt 1 of 20) ...
Trying to connect to core via ovmwsh (attempt 2 of 20) ...
Trying to connect to core via ovm_shell (attempt 1 of 5) ...
Oracle VM Manager installed.

Installation Summary
-----
Database configuration:
  Database type           : MySQL
  Database host name     : localhost
  Database name          : ovs
  Database listener port : 49500
  Database user          : ovs

Weblogic Server configuration:
  Administration username : weblogic

Oracle VM Manager configuration:
  Username                : admin
  Core management port    : 54321
  UUID                    : 0004fb00000100002390716cb97d53cf

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

Oracle VM Manager UI:
  https://ovmmgr01.example.com:7002/ovm/console
```

Log in with the user 'admin', and the password you set during the installation.

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

Oracle VM Manager installation complete.

Please remove configuration file /tmp/ovm_configCskdC5.
[root@ovmmgr01 mnt]#

4. Examine the configuration file, which is listed near the end of the installation message.

In the installation example, in task 3, the configuration file is named
/tmp/ovm_configCskdC5.

- a. Use the cat command to display the contents of the configuration file that was created during the installation process. Your configuration file name is different in your environment.

```
[root@ovmmgr01 mnt]# cat /tmp/ovm_configCskdC5
Certificate: {FQN: ovmmgr01.example.com}
OVMCli: {home: /u01/app/oracle/ovm-manager-3, install: true}
OVMConsole: {install: true}
OVMCore: {fromUrl: 'http://127.0.0.1/ovm-
bits/weblogic_3.0.1.1124.zip', home: /u01/app/oracle/ovm-
manager-3/,
install: true, user: admin}
OVMCoreConsole: {fromUrl: 'http://127.0.0.1/ovm-bits/ovmcore-
console-1.0-42.el6.noarch.rpm'}
OVMShell: {home: /u01/app/oracle/ovm-manager-3, install: true}
OVMTTools: {home: /u01/app/oracle/ovm-manager-3, install: true}
OVMUpgrade: {home: /u01/app/oracle/ovm-manager-3/ovm_upgrade,
install: true}
OVMWlst: {home: /u01/app/oracle/ovm-manager-3, install: true}
OVMWsh: {home: /u01/app/oracle/ovm-manager-3, install: true}
db: {database: ovs, fromUrl: 'http://127.0.0.1/ovm-bits/oracle-
xe-11.2.0.0-0.3.x86_64.rpm',
host: localhost, install: true, mgmt_port: 8080,
type: MySQL, user: ovs}
java: {home: /u01/app/oracle/java, install: true}
onFailure: {cleanup: false}
webLogic: {fromUrl: 'http://127.0.0.1/ovm-
bits/wls1034_generic.jar', home: /u01/app/oracle/Middleware/,
install: true, options: '-Xms512m -Xmx1024m -
XX:MaxPermSize=256m',
user: weblogic}
[root@ovmmgr01 mnt]#
```

You can use the information in the configuration file to create a new configuration file for an unattended installation of the Oracle VM Manager. See the notes section for the slide titled “Other Installation Options for the Oracle VM Manager” in the lesson titled “Planning and Installation” for information about building a configuration file.

- b. As directed in an installation message, remove this configuration file by using the `rm` command after copying its contents elsewhere for future usage.
5. Terminate your session on `ovmmgr01.example.com`.

```
[root@ovmmgr01 mnt]# exit
```

You are returned to the terminal session on your lab machine.

Practice 2-5: Perform Post-Installation Verification

Overview

In this practice, you look at the installation log, note the UUID assigned to the Oracle VM Manager, and check the status of the `ovmm` service.

Assumptions

This practice assumes that the installation of the Oracle VM Manager completed successfully.

Tasks

- From a terminal window on your lab machine, log in to `ovmmgr.example.com` by using the `ssh -X` command.

Note: The `-X` (capital letter) parameter for `ssh` enables X11 forwarding. With this parameter, you can run the `gedit` command from `ovmmgr01.example.com`.

- From your lab machine's desktop, open a new terminal window and switch to user `root`, but do not specify the `"-"` option.

```
bash-3.2$ su
Password: oracle
[root@<your lab machine> vncuser] #
```

Because you did not specify the `"-"` option with the `su` command, you retain the `DISPLAY` information when you execute the next step.

- Execute the `ssh` command with the `-X` parameter to log in to `ovmmgr01.example.com` as `root`:

```
[root@<your lab machine>] # ssh -X root@ovmmgr01.example.com
root@ovmmgr01.example.com's password: oracle
Last login: ...
[root@ovmmgr01 ~] #
```

- Find and examine the installation log in the `/var/log/ovmm` directory.

- Change directory to `/var/log/ovmm`.

```
[root@ovmmgr01 ~] # cd /var/log/ovmm
```

- List the files in the `/var/log/ovmm` directory.

```
[root@ovmmgr01 ovmm] # ls -l
total 3124
-rw-r--r-- 1 root root ... ovm-manager-3-install-<...>.log
[root@ovmmgr01 ovmm] #
```

- Review the installation log file that was created as `ovm-manager-3-install-<...>.log` by using the `view` or the `gedit` command.

Note: The `view` command is the read-only version of the `vi` command. `gedit` is a simple GUI text editor for the GNOME Desktop.

With the `view` or `gedit` command, use the log file name as it appeared in the output of step b. The log file name is also displayed at the beginning of the installation process. You can review the installation messages in task 3c to locate the log file name.

In the example in this practice, the log file name is `ovm-manager-3-install-2016-03-24-201544.log`. Your log file name would be different.

```
[root@ovmmgr01 ovmm] # gedit ovm-manager-3-install-2016-03-24-201544.log
```

In the installation log file, find the following elements:

- Check for memory size.
- Check for the oracle user and group.
- Check for hardnofiles and softnofiles for oracle.
- Check for /u01.
- Questions area (Prompts and their responses do not appear in the log file.)
- Check whether a service is running on ports 49500, 54321, 7002.
- The ping command to localhost
- Installation of components
- Configuration of applications
- The ovmm daemon process started via systemctl
- The ovmcli daemon process started via systemctl

Note that the UUID of your Oracle VM Manager is listed in the log file.

The installation log file is quite large. Use the gedit search facility to locate important messages in the log file:

- Click Search in the menu bar of the gedit window.
- Select Find from the drop-down list.
- In the Find dialog window, enter keywords to locate important information. For example, enter hardnofiles or ping.

To exit the view command, press the Esc key and enter “:q!“.

To exit the gedit command, select Quit from the File menu.

- d. Execute the grep command against the log file by using the UUID string to display the UUID that was used during installation. Your log file will have a different name from the name used in the following example:

```
[root@ovmmgr ovmm] # grep UUID ovm-manager-3-install-2016-03-24-201544.log
GMT ... ovm.installer DEBUG      Manager UUID argument set to :
'0004fb00000100002390716cb97d53cf'
UUID=0004fb00000100002390716cb97d53cf
GMT ... ovm.installer INFO      UUID
0004fb00000100002390716cb97d53cf
[root@ovmmgr01 ovmm] #
```

The UUID matches the UUID that you specified as a parameter to the installation program.

- e. Check the status of the ovmm and ovmcli services by using the service command.

```
[root@ovmmgr01 ovmm] # service ovmm status
Oracle VM Manager is running...
[root@ovmmgr01 ovmm] # service ovmcli status
```

```
Oracle VM Manager CLI is running...
[root@ovmmgr01 ovmm] #
```

The Oracle VM Manager `ovmm` and `ovmcli` services must be in the running state.

Note: You can start, stop, restart, and request the status of the `ovmm` and `ovmcli` services. Start the services if necessary.

```
[root@ovmmgr01 ovmm] # service ovmm
Usage: /etc/init.d/ovmm {start|stop|status|restart}
[root@ovmmgr01 ovmm] # service ovmcli
Usage: /etc/init.d/ovmcli {start|stop|status|restart}
[root@ovmmgr01 ovmm] #
```

- f. Exit your SSH session on `ovmmgr.example.com`.

```
[root@ovmmgr01 ovmm ~]# exit
```

Note: If your SSH session does not end cleanly, enter the `Ctrl+c` key sequence.

Practice 2-6: Verify Access to the Oracle VM CLI and Set Up Public Key-Based SSH Authentication to Connect to the CLI

Overview

In this practice, you perform the following tasks:

- Verify that you can access the Oracle VM CLI from your lab machine.
To access the Oracle VM CLI from your lab machine (or any other client machine), verify that:
 - Port 10000, which is the default port for connecting to the Oracle VM CLI, is open in the firewall for the host where the Oracle VM Manager runs
 - You know the password for the `admin` user ID on the Oracle VM Manager host. You assigned this password during the installation of the Oracle VM Manager.
- Access the Oracle VM CLI and display the version number for the Oracle VM CLI.
- Configure key-based SSH authentication from your lab machine to the Oracle VM Manager host.

With public key-based SSH authentication, you can connect to the Oracle VM CLI without having to provide a password. With this configuration in place, you can create scripts that connect to the Oracle VM CLI without having to provide a password, or without having to hardcode the password in your scripts.

Tasks

1. Verify that you can access the Oracle VM CLI from your lab machine.
 - a. From a terminal window on your lab machine, logged in as the `root` user, run the `ssh` command to connect to the Oracle VM Manager host. The `root` password on `ovmmgr.example.com` is `oracle`.

```
[root@<your lab machine>]# ssh ovmmgr01
root@ovmmgr01's password: oracle
Last login: ...
[root@ovmmgr01 ~]#
```

- b. Verify that port 10000 is open in the firewall of the Oracle VM Manager host.

```
[root@ovmmgr01 ~]# grep 10000 /etc/sysconfig/iptables
-A INPUT -p tcp -m state --state NEW -m tcp --dport 10000 -j
ACCEPT
[root@ovmmgr01 ~]#
```

The `grep` command must return information about port 10000. The change to the Oracle VM Manager firewall configuration was performed for you as part of your lab environment setup.

- c. Exit your session on the `ovmmgr01` host.

```
[root@ovmmgr01 ~]# exit
logout
Connection to ovmmgr01 closed.
[root@<your lab machine>]#
```

2. Access the Oracle VM CLI.

- a. From your lab machine, run the `ssh` command to the `ovmmgr01` host by using port 10000 and the `admin` user ID.

```
[root@<your lab machine>]# ssh -l admin ovmmgr01.example.com -p 10000
WARNING: RSA key found for host ovmmgr01.example.com
in /root/.ssh/known_hosts:3
RSA key fingerprint ...
The authenticity of host 'ovmmgr01.example.com (192.0.2.121)' can't be established
but keys of different type are already known for this host.
DSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ovmmgr01.example.com,192.0.2.121' (DSA) to the list of known hosts.
admin@ovmmgr01.example.com's password: MyOracle1
OVM>
```

Note: On first access, the prompt takes 20 or more seconds to appear.

- b. Enter “?” to display the available commands.

```
OVM> ?
add
create
delete
edit
embeddedcreate
embeddeddelete
embeddededit
exit
help
list
remove
set
show
showallcustomcmds
showcustomcmds
showobjtypes
showversion
OVM>
```

Note: You can also use the `help` command for information about available commands.

- c. At this point, you have not created any object in your Oracle VM environment. The only useful command is the `showversion`, which displays the version for the CLI, which is also the version for the Oracle VM Manager.

```
OVM> showversion  
3.4.1.1350  
OVM>
```

- d. The CLI list command is very useful. To find out what objects you can list, enter the list command with “?”.

```
OVM> list ?  
AccessGroup  
AntiAffinityGroup  
Assembly  
AssemblyVirtualDisk  
AssemblyVm  
BondPort  
ControlDomain  
Cpu  
CpuCompatibilityGroup  
FileServer  
FileServerPlugin  
FileSystem  
Job  
Manager  
Network  
PeriodicTask  
PhysicalDisk  
Port  
Repository  
RepositoryExport  
Server  
ServerController  
ServerPool  
ServerPoolNetworkPolicy  
ServerUpdateGroup  
ServerUpdateRepository  
StorageArray  
StorageArrayPlugin  
StorageInitiator  
Tag  
VirtualCdrom  
VirtualDisk  
VlanInterface  
Vm  
VmCloneCustomizer  
VmCloneNetworkMapping
```

```
VmCloneStorageMapping  
VmDiskMapping  
Vnic  
VolumeGroup  
OVM>
```

- e. Exit the Oracle VM Manager CLI by using the `exit` command.

```
OVM> exit  
OVM> Connection to ovmmgr01.example.com closed.  
[root@<your lab machine>] #
```

You are returned to your lab machine.

3. On your lab machine, generate a public and private RSA key. The keys are generated in the `.ssh` directory in `root`'s home directory.
- a. On your lab machine, check to see whether an RSA key already exists.

```
[root@<your lab machine>] # cd      ← To access home directory  
[root@<your lab machine>] # cd .ssh  
[root@<your lab machine>] # ls -la  
total 20  
drwx----- 2 root root ... .  
drwxr-x--- 19 root root ... ..  
-rw------- 1 root root ... id_rsa  
-rw-r--r-- 1 root root ... id_rsa.pub  
-rw-r--r-- 1 root root ... known_hosts  
[root@<your lab machine> .ssh] #
```

In this example, the key already exists. In the next step, you re-create this key.

In a production environment, follow the security guidelines for your site.

- b. If there is no RSA key or to regenerate the public and private RSA key in the `.ssh` directory in `root`'s home directory, execute the `ssh-keygen -t rsa` command.

```
[root@<your lab machine>] # ssh-keygen -t rsa  
Generating public/private rsa key pair.  
Enter file in which to save the key (/root/.ssh/id_rsa) :  
← Press Enter  
/root/.ssh/id_rsa already exists.  
Overwrite (y/n)? y ← OK to overwrite in your lab environment  
Enter passphrase (empty for no passphrase) : ← Press Enter  
Enter same passphrase again: ← Press Enter  
Your identification has been saved in /root/.ssh/id_rsa.  
Your public key has been saved in /root/.ssh/id_rsa.pub.  
The key fingerprint is:  
... root@<your lab machine>  
[root@<your lab machine>] #
```

- c. From your lab machine, copy the public key to the Oracle VM Manager host by using the `scp` command and the `oracle` user ID on the Oracle VM Manager host. Ensure that you include the final slash in the `scp` command to indicate that `.ssh` is a directory.

```
[root@<your lab machine>]# scp /root/.ssh/id_rsa.pub
oracle@ovmmgr01:/home/oracle/.ssh/
oracle@ovmmgr01's password: oracle
id_rsa.pub                                100%   395      0.4KB/s   00:00
[root@<your lab machine>]#
```

The `scp` command connects to the Oracle VM Manager host as the `oracle` user ID.

- d. Log in to the Oracle VM Manager host by using the `ssh` command.

```
[root@<your lab machine>]# ssh ovmmgr01
root@ovmmgr01's password: oracle
Last login: ...
[root@ovmmgr01 ~]#
```

- e. Use the `mv` command to move the content of the `id_rsa.pub` file to the `ovmcli_authorized_keys` file in the `/home/oracle/.ssh` directory.

```
[root@ovmmgr01 ~]# cd /home/oracle/.ssh
[root@ovmmgr01 .ssh]# ls -l
total 4
-rw-r--r-- 1 oracle dba ... id_rsa.pub
-rw----- 1 oracle dba ... ovmcli_authorized_keys
[root@ovmmgr01 .ssh]# mv id_rsa.pub ovmcli_authorized_keys
mv: overwrite `ovmcli_authorized_keys'? y
[root@ovmmgr01 .ssh]#
```

Note: If the `ovmcli_authorized_keys` file does not exist, it is created when the `mv` command is run. The `ovmcli_authorized_keys` file is normally created during the installation of the Oracle VM Manager.

- f. Verify that the ownership of the `ovmcli_authorized_keys` file is set to `oracle:dba` by examining the user and group information in the output of the `ls -l` command in the preceding step.

If it is not set to `oracle:dba`, set the ownership by using the `chown` command as shown as follows:

```
[root@ovmmgr01 .ssh]# chown oracle:dba ovmcli_authorized_keys
[root@ovmmgr01 .ssh]#
```

- g. Exit your `ssh` session on the Oracle VM Manager host.

```
[root@ovmmgr01 .ssh]# exit
Connection to ovmmgr01 closed.
[root@<your lab machine>]#
```

- h. Verify that you can now connect to the Oracle VM CLI from your lab machine, without having to supply a password.

From your lab machine, run the `ssh` command as shown in the following example:

```
root@<your lab machine>]# ssh -l admin ovmmgr01.example.com -p  
10000  
OVM>
```

The OVM> prompt appears after a few seconds.

Note

- The password for `admin` in your lab environment is set to `MyOracle1`, as selected during installation.
- If you have never logged in to the Oracle VM CLI, you are always prompted for the `admin` password, even if you have followed the procedure that was previously described. In this situation, exit the CLI and log in again. If you are prompted for a password a second time, verify that you have correctly followed the steps for the procedure described in this task.
- If you restart the Oracle VM Manager, or if you exceed the timeout period for a public key authentication connection channel (currently set to 10080 minutes or 1 week), and you attempt to access the Oracle VM CLI, you are prompted for the `admin` password.

- i. Exit the Oracle VM CLI session.

```
OVM> exit  
OVM> Connection to ovmmgr01.example.com closed.  
[root@<your lab machine>]#
```

You are returned to your lab machine.

Note: In your own environment, follow your site security procedures when enabling key-based authentication. This might include the use of a strong passphrase, a specific file name for the private/public key pair rather than accepting the default name, and the use of an `ssh` configuration file.

In later practices, you are given the choice to use the Oracle VM CLI or the Oracle VM Manager UI to perform some configuration tasks in your Oracle VM environment.

Unauthorized reproduction or distribution prohibited. Copyright© 2019, Oracle and/or its affiliates.

GANG LIU (gangli@baylorhealth.edu) has a non-transferable license
to use this Student Guide.

Practices for Lesson 3: Managing Servers and Networks

Chapter 3

Practices for Lesson 3: Overview

Practices Overview

In these practices, you perform the following:

- Discover Oracle VM servers from the Oracle VM Manager UI and the Oracle VM CLI.
- Create the Virtual Machine network from the Oracle VM Manager UI.
- Create a Cluster Heartbeat network from the Oracle VM Manager UI.
- Check bonds and bridges on the Oracle VM servers.
- Create a network with VLAN support from the Oracle VM Manager UI.

Appendix A, which is located at the end of the practices for this lesson, provides tips on using the Oracle VM CLI.

Practice 3-1: Discover Oracle VM Servers from the Oracle VM Manager UI and the Oracle VM CLI

Overview

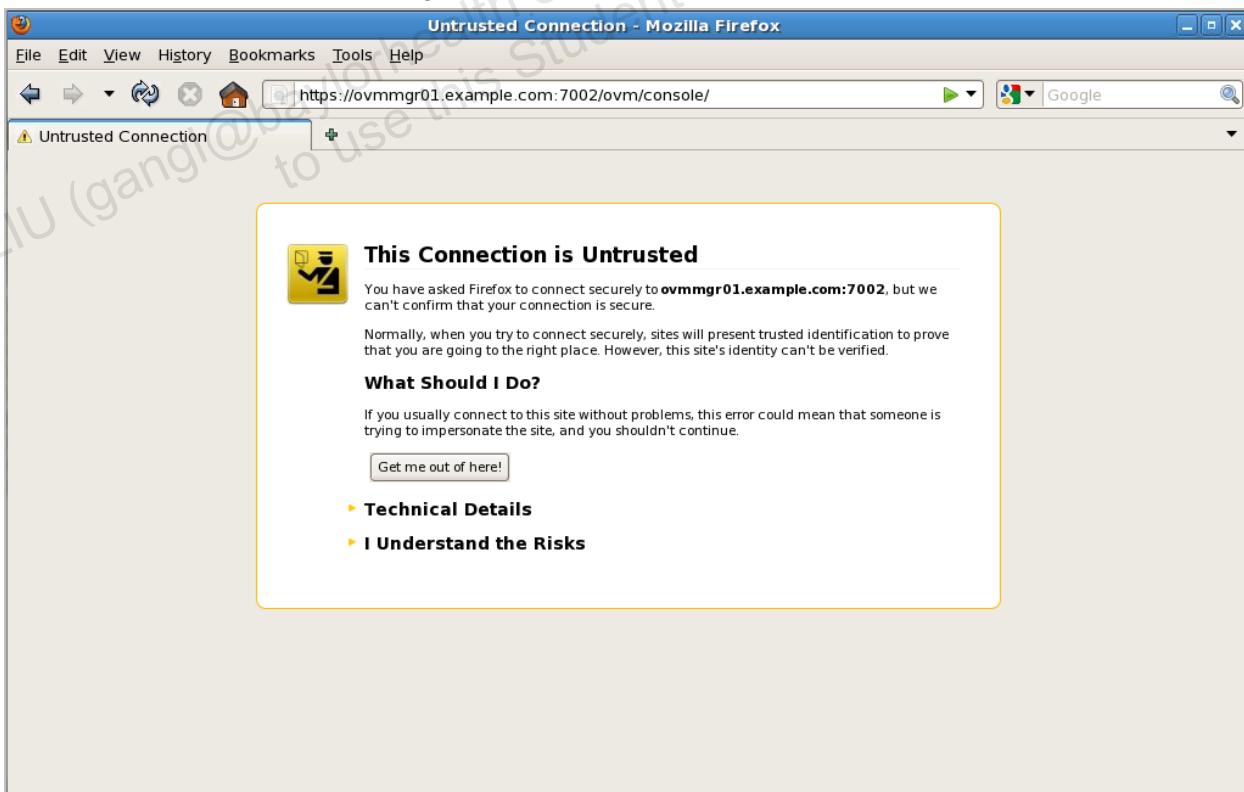
In this practice, you discover the two Oracle VM servers in your environment by using the Oracle VM Manager UI and the Oracle VM CLI. After discovering the Oracle VM servers, you use Oracle VM Manager to examine their properties.

Assumptions

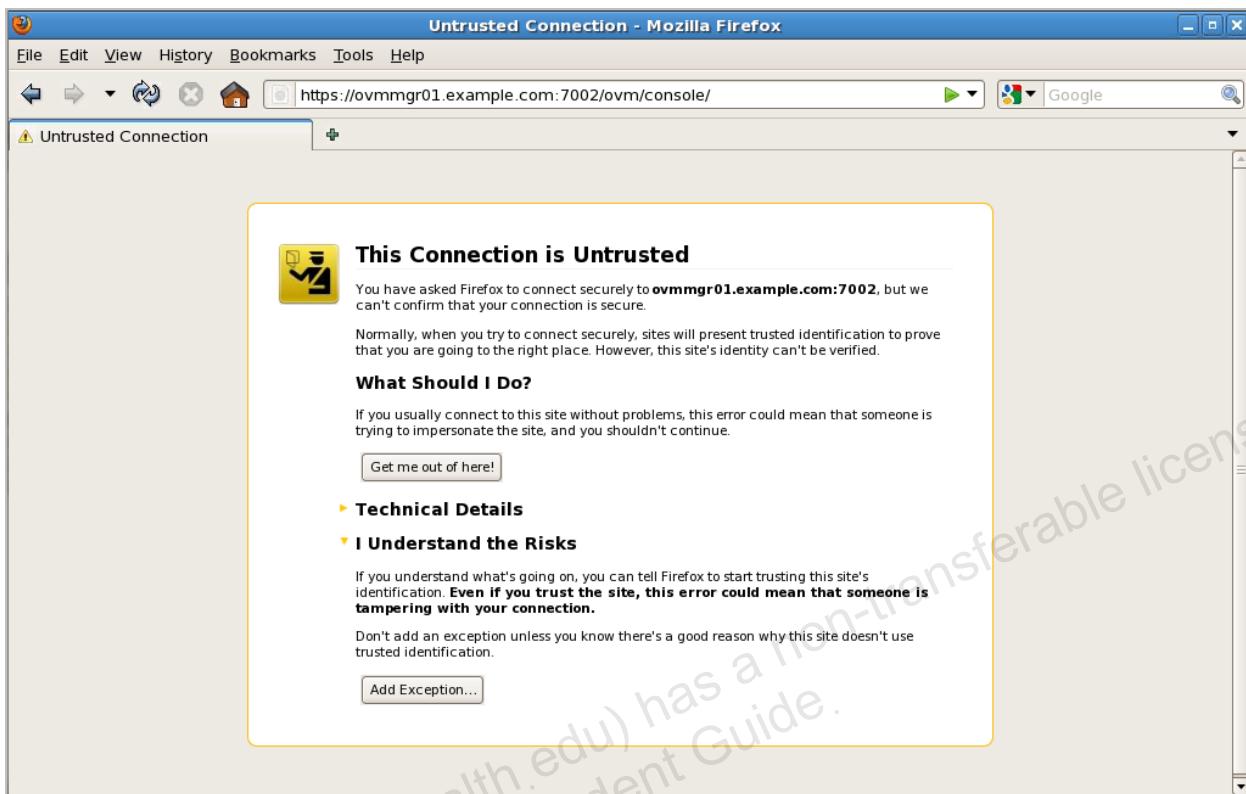
This practice assumes that you have two Oracle VM servers that are up and running, and that these Oracle VM servers are not known to the Oracle VM Manager.

Tasks

1. Start the Oracle VM Manager.
 - a. Start the Firefox Web Browser from your lab machine:
Double-click the Firefox Web Browser icon on your desktop.
Or
Click Applications on the menu bar. Select Internet > Firefox Web Browser.
 - b. Enter the following URL in the URL field:
<https://ovmmgr01.example.com:7002/ovm/console>
 - c. When the “Untrusted Connection” window appears, click the “I Understand the Risks” link as shown in the following screenshot:



- d. Click the Add Exception button in the lower part of the Secure Connection Failed window.

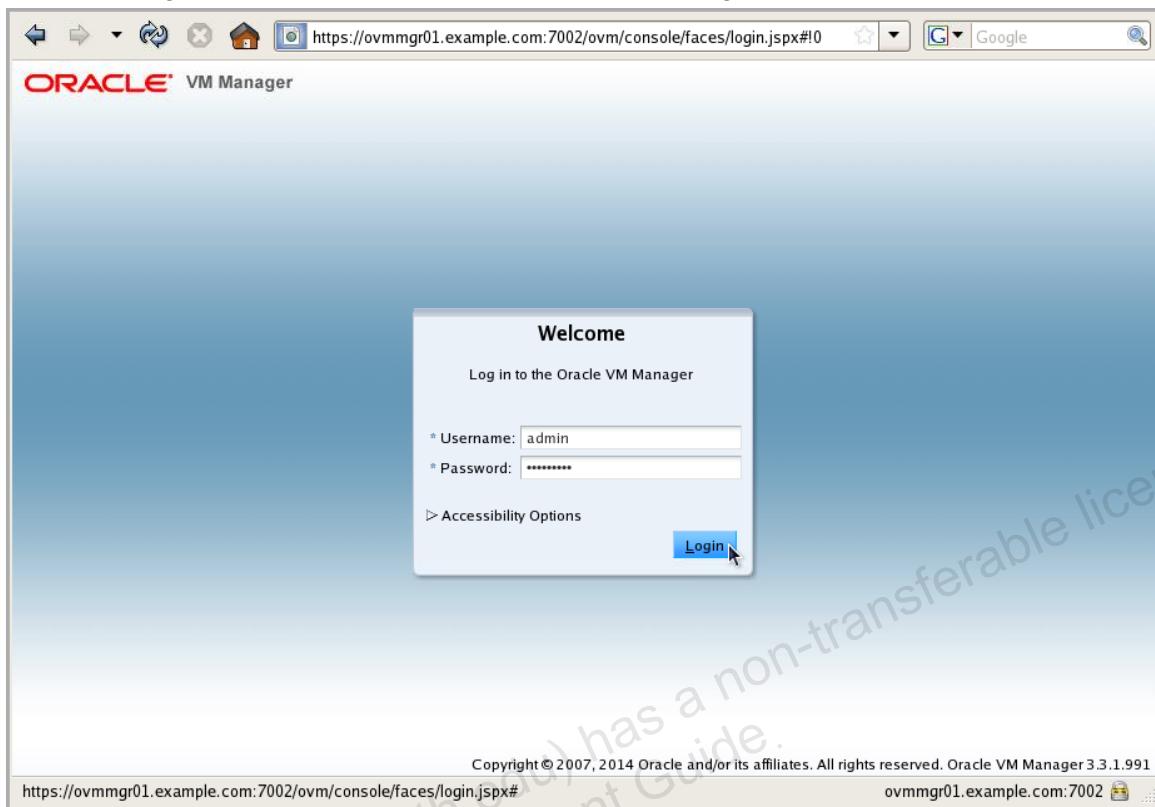


- e. Click Confirm Security Exception when the button becomes active. If the button does not activate promptly, press the Enter key.



- f. In the Welcome window, enter the administrator username and password as specified during installation. The username is admin and the password is MyOracle1.

- g. After entering the username and password, click the Login button.



The Oracle VM Manager's main window appears, showing the information on the Servers and VMs tab. In your environment, the main window might show a different tab after the login operation completes.

The screenshot shows the Oracle VM Manager main interface. The top navigation bar includes tabs for Health, Servers and VMs (which is currently selected), Repositories, and Networking. On the right side of the top bar, it says "Logged in as: admin" with links for Logout, Settings, and Help. The main content area is divided into several panes. The leftmost pane shows a tree view with "Server Pools" (selected), Unassigned Servers, and Unassigned Virtual Machines. The middle pane displays a table with a single row: "Name" and "No Server Pools found". To the right of these panes is a "Getting Started" sidebar titled "Oracle® VM Manager Getting Started" with sections for "Table of Contents", "Discover Oracle VM Servers", "Discover Storage", and "Create a Virtual Machine Network". At the bottom of the interface is a "Job Summary" table with the following data:

Job Summary:		0 Total Jobs	0 Pending	0 In Progress	0 Failed	0 Aborted	0 Complete
Description	Status	Progress	Message	Timestamp	Duration		
No data to display							

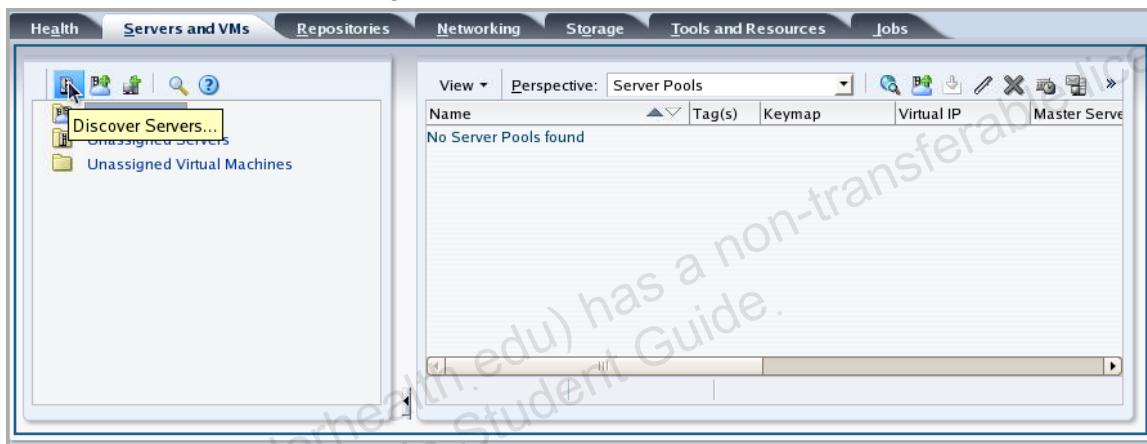
The main window is divided into tabs. From these tabs, you configure your Oracle VM environment.

- h. The Getting Started pane appears to the right of the tabs area. To regain this area, click the Collapse button to the left of the Getting Started pane.
2. Discover your first Oracle VM server, from the Oracle VM Manager UI.

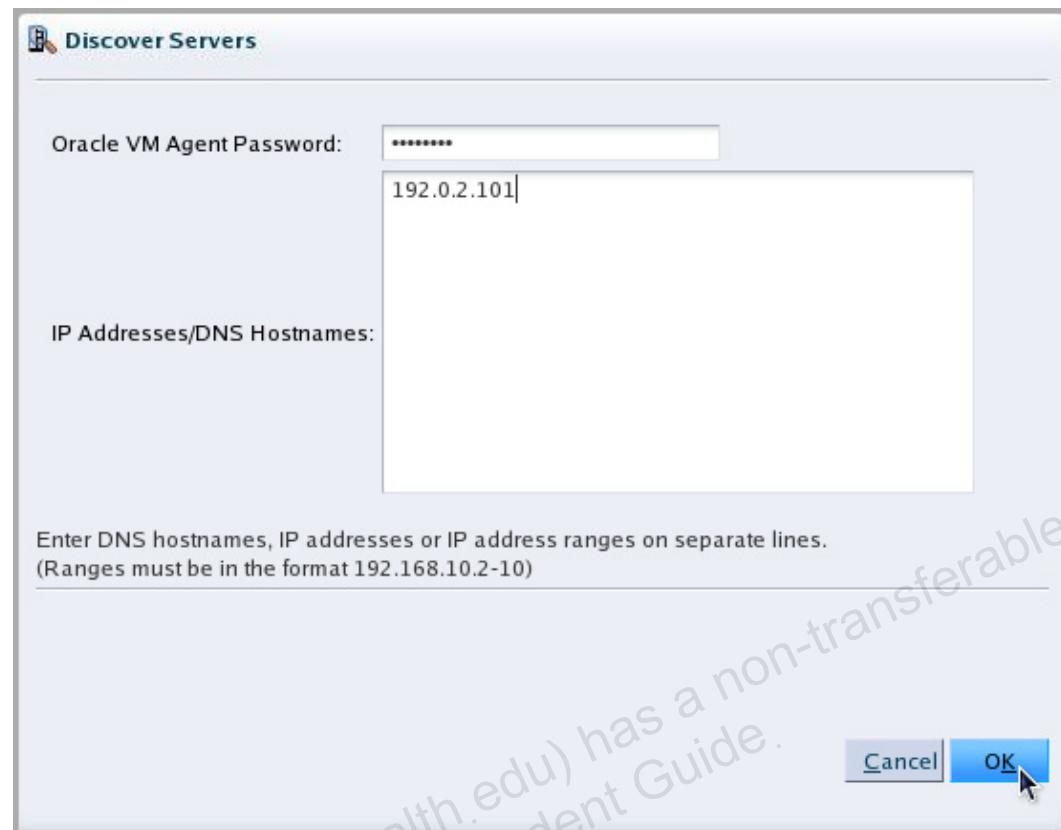
Use the information in the following table for this task:

Field	Value
Oracle VM Server ovsrv01.example.com	IP Address: 192.0.2.101
Oracle VM Agent Password	ovsagent

- a. On the Servers and VMs tab of the Oracle VM Manager UI, click the Discover Servers icon on the toolbar of the navigation pane.

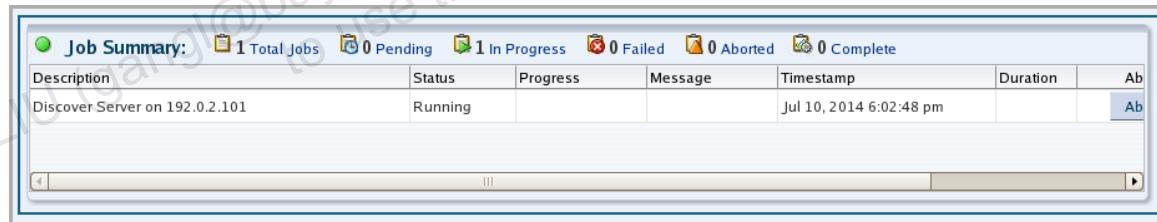


- b. In the Discover Servers window, enter information for the first server.

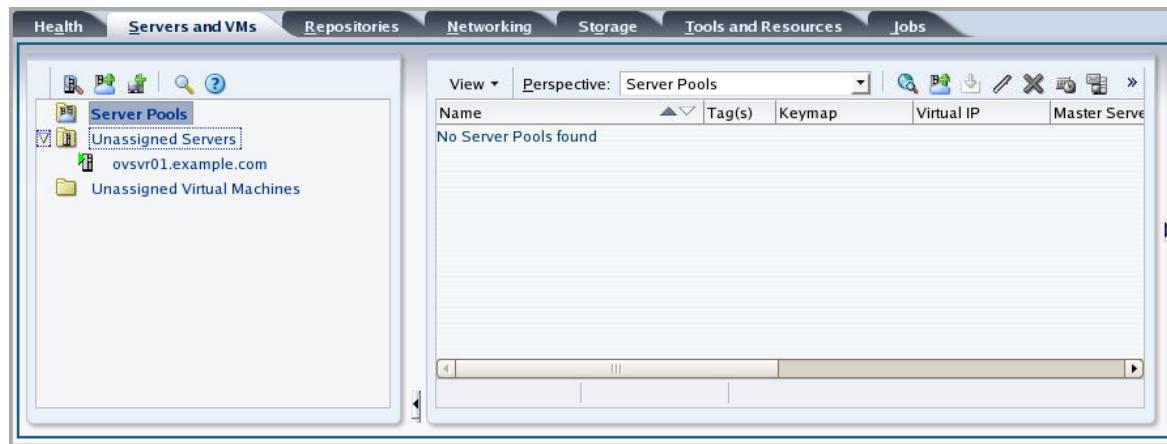


Click OK to trigger the discovery operation.

The discovery operation launches a job, which is visible in the Job Summary pane.



- c. When the job completes, click the Expand button next to the Unassigned Servers folder in the navigation pane, to show the newly discovered Oracle VM server.



- d. Highlight the newly discovered server in the navigation pane and select the Info perspective in the management pane.

The screenshot shows the Oracle VM Management interface. The top navigation bar includes tabs for Health, Servers and VMs (which is selected), Repositories, Networking, Storage, Reports and Resources, and Jobs. On the left, a navigation pane displays Server Pools, Unassigned Servers (with 'ovsvr01.example.com' highlighted in blue), and Unassigned Virtual Machines. The main content area is titled 'Perspective: Info' and shows detailed information for the server 'ovsvr01.example.com'. The data is presented in a grid format:

Server Name: ovsrv01.example.com			
Host Name:	ovsvr01.example.com	IP Address:	192.0.2.101
Status:	Running	Processor Speed (GHz):	2.99
Processors:	1	Memory (GiB):	3.5
Ethernet Ports:	4	Bond Port Count:	1
Maintenance Mode:	Off	CPU Compatibility Group:	Default_Intel_F6_M23
Inbound Migration Locked:	No		[Default_Intel_F6_M23]
Ownership:	Owned by You	Processor Type:	x86-64b
Server Pool:		Hypervisor Type:	XEN
Roles:	Utility, Vm	Up To Date:	Yes
NTP Servers:	192.0.2.121	Version:	3.4.1-1351
Description:			

Examine the information for ovsrv01.example.com.

- Note that ovsrv01.example.com was automatically added to a new processor compatibility group called Default_Intel_F6_M23. Your processor compatibility group would have a slightly different name.
- Examine the Roles information: The newly discovered server is flagged as a virtual machine and utility server.

Expand the Advanced and Server Abilities section by clicking the Expand button.

The server has four Ethernet ports. You use these ports later in these practices to create networks, in addition to the management network that is automatically created when the first Oracle VM server is discovered.

- e. Click the Networking tab to display information about the management network, which is automatically created when the first Oracle VM server is discovered.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		√	√	√			

Note that this network is automatically assigned the Server Management, the Cluster Heartbeat, and the Live Migrate roles.

3. Discover your second Oracle VM server by using the Oracle VM CLI.

Note: See Appendix A at the end of the practices for this lesson for tips on using the Oracle VM CLI.

- Start a terminal window session on your lab machine by double-clicking the Terminal icon on your desktop.
- Switch to the root user by entering the `su -` command.

```
bash-3.2$ su -
Password: oracle
[root@<your lab machine> ~]#
```

Note: You do not have to be root to access the Oracle VM CLI. You switch to the root user to make sure that the output from your commands is very similar to the output shown in these practices.

- Access the Oracle VM CLI.

```
[root@<your lab machine> ~]# ssh -l admin ovmmgr01.example.com
-p 10000
OVM>
```

- List the Oracle VM server that is already discovered.

```
OVM> list server
Command: list server
Status: Success
Time: ...
Data:
```

```

id:b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
name:ovsvr01.example.com
OVM>

```

The UUID for your Oracle VM server, shown in the `id` field, might be different.

- Discover the second Oracle VM server by using the `discoverServer` command and by using the following syntax:

```
discoverServer ipAddress=value password=value takeOwnership= {  
  Yes | No }
```

Use the information in the following table for this task:

Field	Value
Oracle VM Server ovsvr02.example.com	IP Address: 192.0.2.102
Oracle VM Agent Password	ovsagent

```
OVM> discoverServer ipAddress=192.0.2.102 password=ovsagent  
takeOwnership=yes  
Command: discoverServer ipAddress=192.0.2.102 password=*****  
takeOwnership=yes  
Status: Success  
Time: ...  
JobId: ...  
OVM>
```

Note: When you enter the password, it is replaced with asterisks.

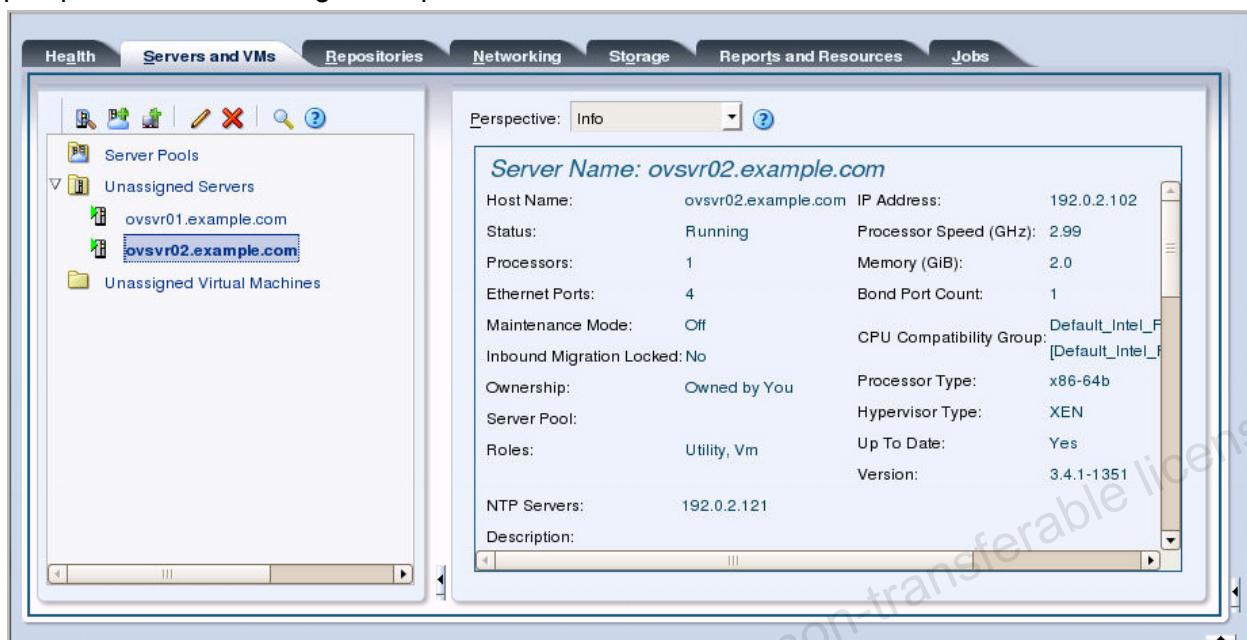
In the Oracle VM Manager UI window, you can see the job to discover the second Oracle VM server running.

- Verify that you now have two available Oracle VM servers.

```
OVM> list server  
Command: list server  
Status: Success  
Time: ...  
Data:  
  id:b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86  
  name:ovsvr01.example.com  
  id:39:7e:44:79:65:0b:5b:d7:ec:60:d1:ed:b0:d3:e2:99  
  name:ovsvr02.example.com  
OVM>
```

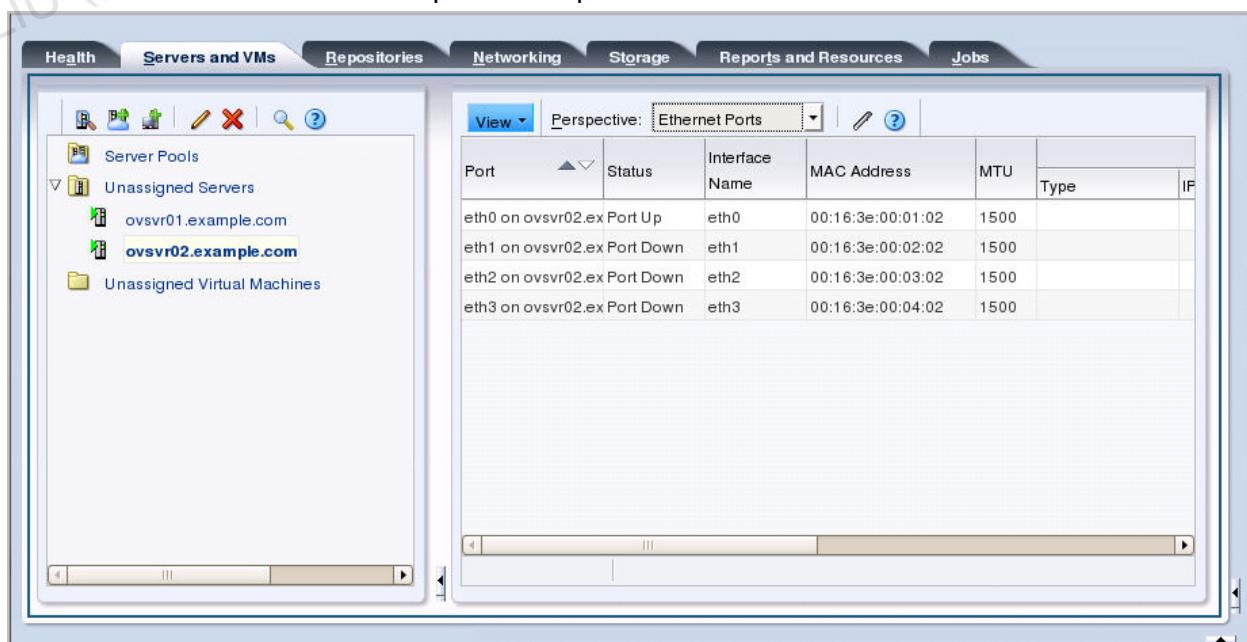
- If you do not have an active session to the Oracle VM Manager, start a new Oracle VM Manager UI session, log in as `admin` with the password `MyOracle1`, and click the Servers and VMs tab from the main window.
- Verify that the two discovered Oracle VM servers are visible by examining the servers list under the Unassigned Servers folder, in the navigation pane on the Servers and VMs tab.

The following screenshot shows information for `ovs02.example.com` by using the Info perspective in the management pane:



Note that `ovs02.example.com` is also part of the `Default_Intel_F6_Mxx` processor compatibility group.

- i. To view more information about your newly discovered Oracle VM server, collapse the Job Summary pane by using the Collapse Pane button.
- j. Examine the Advanced and Server Abilities sections by clicking the Expand button. Click the Restore Pane button at the bottom-right of the window to restore the Job Summary pane.
- k. With the `ovs02.example.com` entry still highlighted in the navigation pane, select Ethernet Ports from the Perspective drop-down list.



The Oracle VM servers, ovsrv01.example.com and ovsrv02.example.com, have identical Ethernet configuration, but different MAC addresses.

You can also display network information for your servers from the CLI.

- I. If you have exited your Oracle VM CLI session, restart it from your lab machine.

```
[root@<your lab machine> ~]# ssh -l admin ovmmgr.example.com \
-p 10000
OVM>
```

- m. Use the list port and list bondPort commands to display the Ethernet ports and the bonded ports on your servers.

Note: You can also use list Port and list bondport.

```
OVM> list Port
Command: list Port
Status: Success
Time: ...
Data:
    id:0004fb000020000084bf0c1484c1acdf  name:eth3 on
ovsvr01.example.com
    id:0004fb0000200000ebe10cd07bc9501e  name:eth1 on
ovsvr01.example.com
    id:0004fb0000200000585a07e0decdda15  name:eth2 on
ovsvr01.example.com
    id:0004fb00002000003f29ba9b4748eb09  name:eth0 on
ovsvr01.example.com
    id:0004fb0000200000eafca8f2a055b1fb  name:eth3 on
ovsvr02.example.com
    id:0004fb000020000076e8f59c4ac8d76e  name:eth2 on
ovsvr02.example.com
    id:0004fb00002000006195fb374ee12ecb  name:eth1 on
ovsvr02.example.com
    id:0004fb0000200000db1f34037c590339  name:eth0 on
ovsvr02.example.com
OVM> list bondport
Command: list bondport
Status: Success
Time: ...
Data:
    id:0004fb00002000003be515a49ff93e3d  name:bond0 on
ovsvr01.example.com
    id:0004fb000020000011bcb59732e21f75  name:bond0 on
ovsvr02.example.com
OVM>
```

Note: You can leave your Oracle VM CLI session open, but it times out after being inactive for 15 minutes.

Practice 3-2: Create the Virtual Machine Network

Overview

In this practice, you create a network for virtual machine traffic. This network has access to a DHCP server that is running on your lab machine. The DHCP server assigns IP addresses for the virtual machines deployed on this network. This network is dedicated to virtual machine traffic, and, therefore, you specify only the Virtual Machine function when creating the network.

Assumptions

This practice assumes that the Oracle VM servers have `eth1` available. The `eth0` network interface was used for the server management network, which was created automatically when you discovered your first Oracle VM server on the `192.0.2.0/24` network.

Tasks

- From the main window of your Oracle VM Manager UI, click the Networking tab. The Networks view appears.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓	✓	✓			

- Create a new network by using `eth1` for each Oracle VM server.
 - Click the Create New Network icon on the toolbar to launch the wizard.

- b. On the Create Network screen, select “Create a network with Ports/Bonds/Vlan Interfaces.”



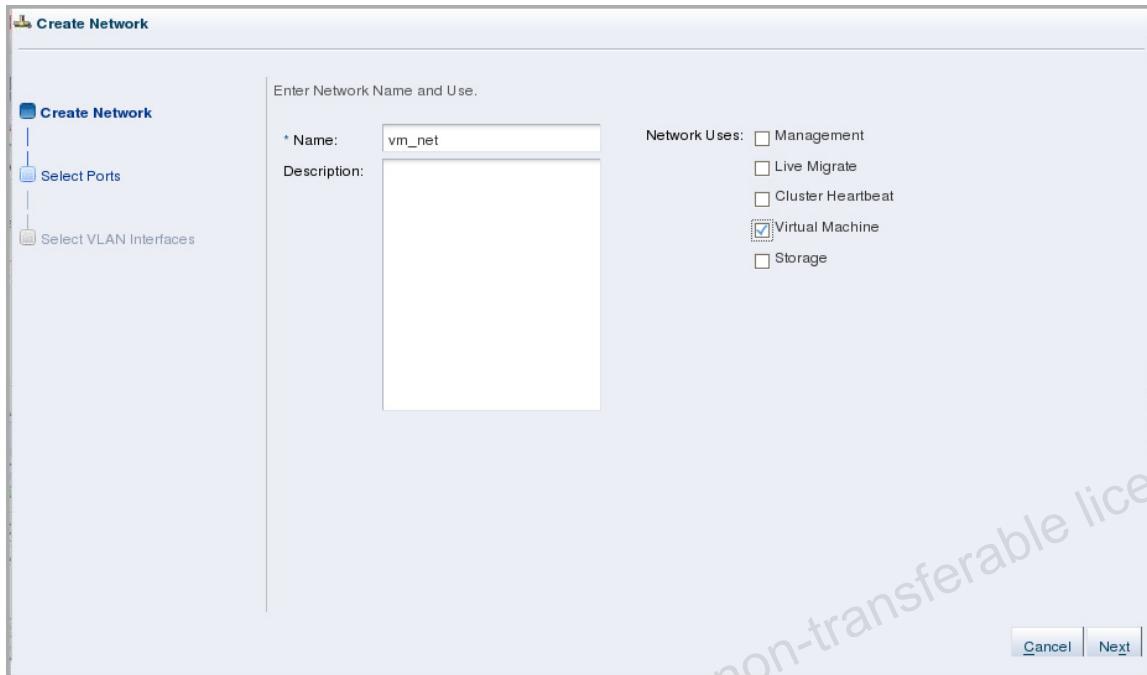
With this selection, you specify a port for each Oracle VM server that is participating in the new network. You can also specify a VLAN interface when creating a new network. This option is exercised in Practice 3-5.

Click Next to continue.

- c. On the next screen, specify a name and a function for your new network.

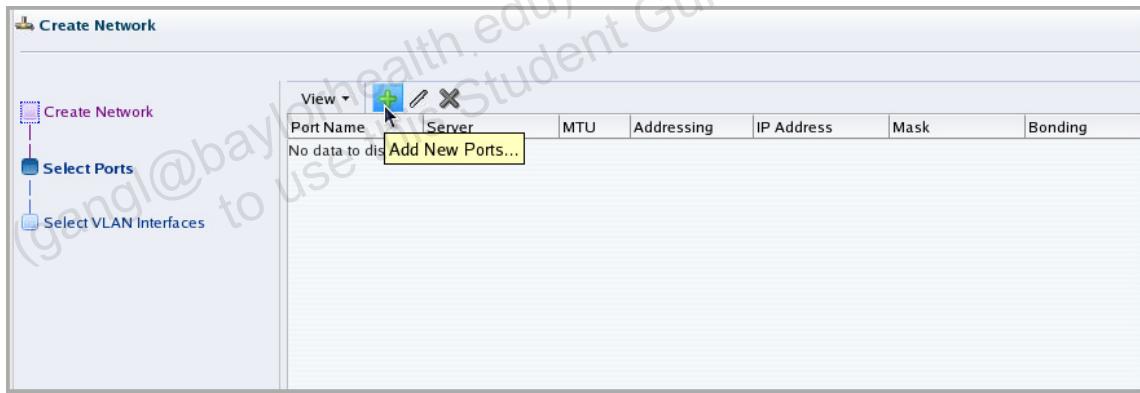
Field	Value
Network Name	vm_net
Network Use	Select the “Virtual Machine” check box.

The selections are shown in the following screenshot:

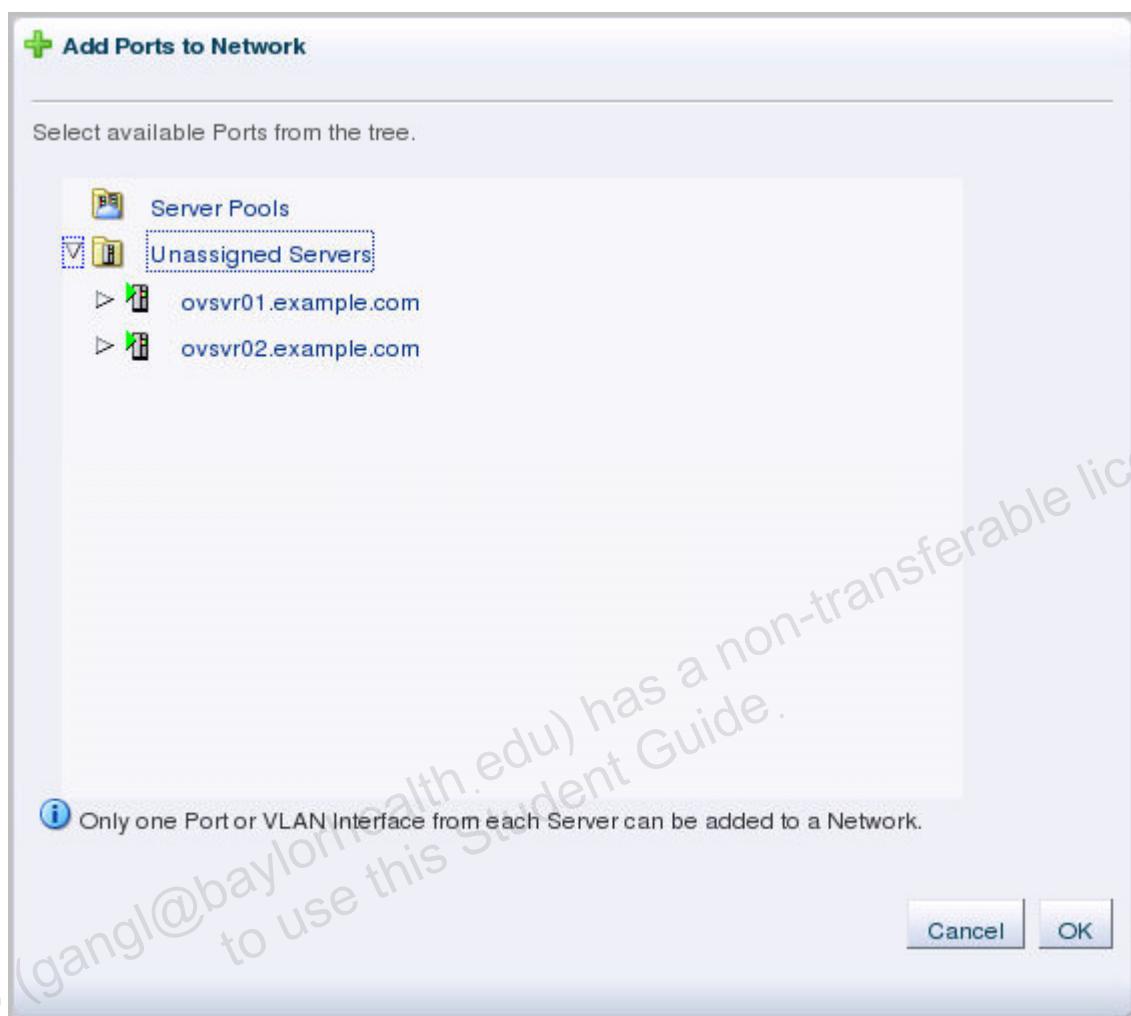


Click Next to continue.

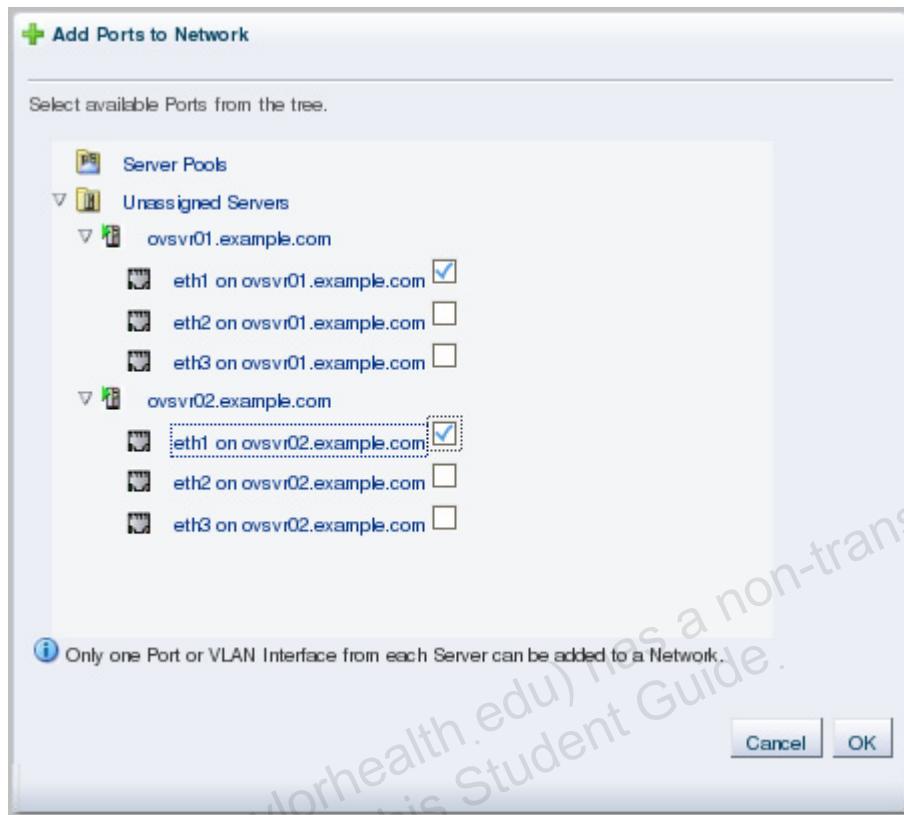
- d. On the Select Ports screen, click the Add New Ports icon.



- e. On the Add Ports to Network screen, click the Expand button next to the Unassigned Servers folder.



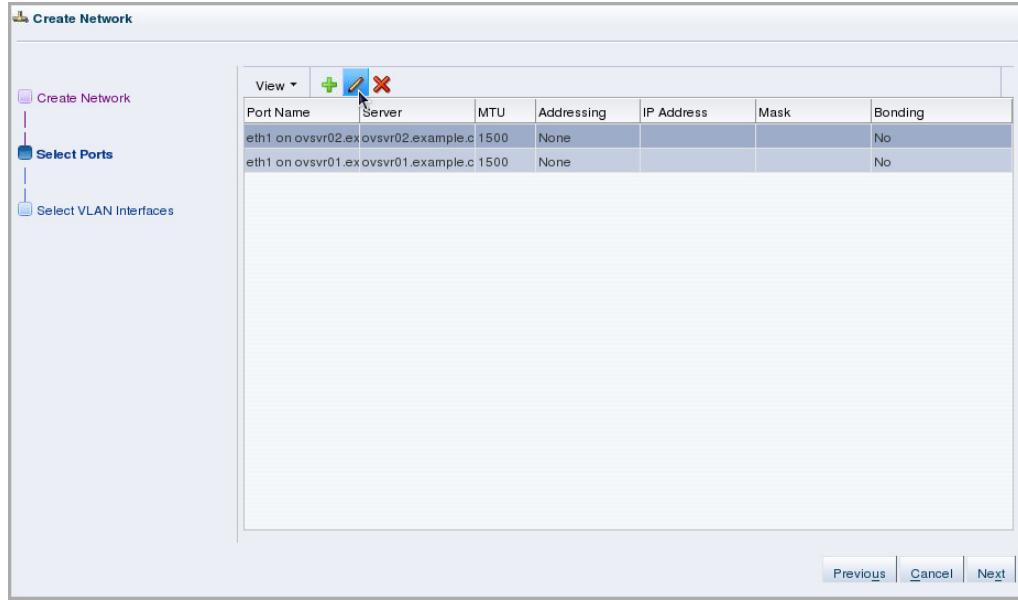
- f. Click the Expand button next to each Oracle VM server to display the available ports for the servers.
Select eth1 for each Oracle VM server.



Click OK to return to the previous screen.

Back on the Select Ports screen, you configure the selected ports by assigning an addressing mode (static), and IP address and netmask.

- g. Highlight both Oracle VM servers and click the Edit Port(s) icon.



- h. Configure the networking information for the ports.

Use the information in the following table to fill in the fields on this screen:

Field	Value
MTU	Leave the MTU at its default value of 1500.
Addressing	Select Static from the drop-down list.
IP Address	192.168.1.101 for ovsrv01.example.com
	192.168.1.102 for ovsrv02.example.com
Mask	255.255.255.0

Note: Because the Oracle VM servers must be able to access to an httpd server located on the 192.168.1.0 subnet (for a later practice), you assign an IP address to each Oracle VM server port, to allow the Oracle VM servers to be addressable on this network.

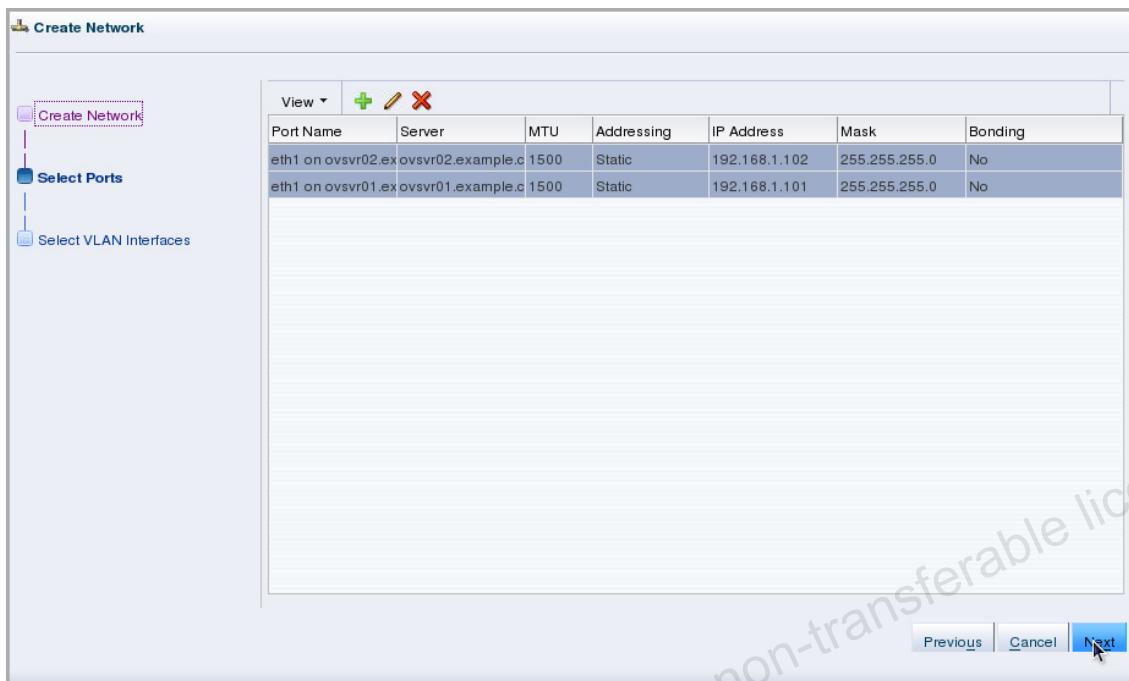
Warning: Make sure that you assign a proper IP address to each Oracle VM server. The servers might show up in any order.

Edit Port(s)

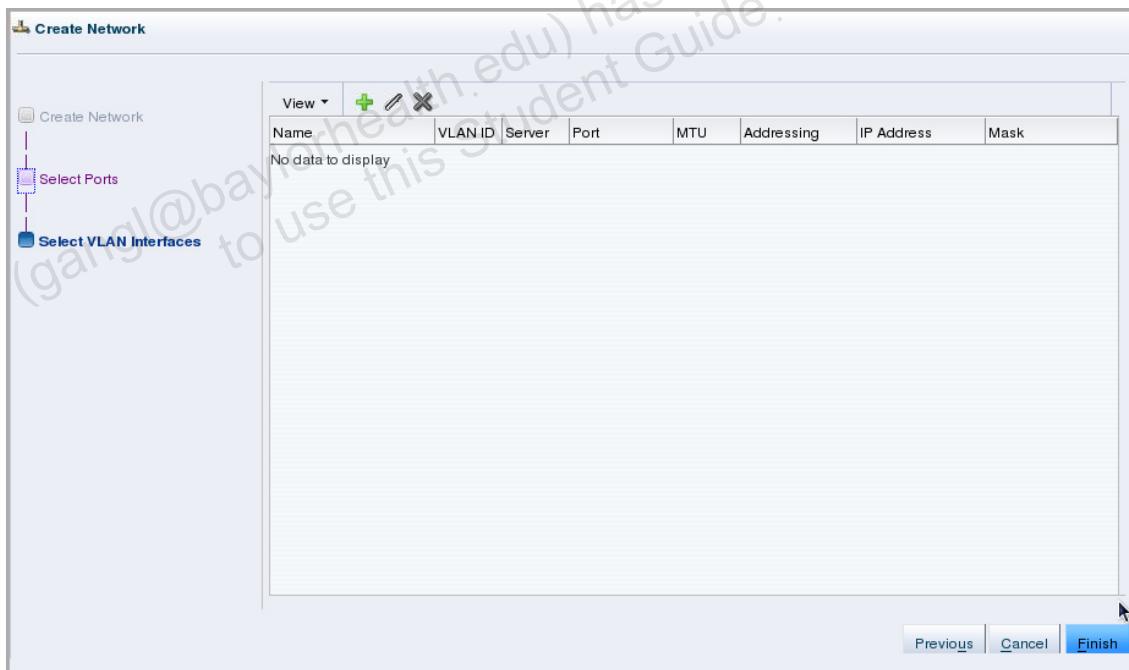
Port Name	Server	MTU	Addressing	IP Address	Mask	Bonding
eth1 on ovsrv02.exovsvr02.examp		1500	Static ▾	192.168.1.102	255.255.255.0	No
eth1 on ovsrv01.exovsvr01.examp		1500	Static ▾	192.168.1.101	255.255.255.0	No

Click OK to return to the previous screen.

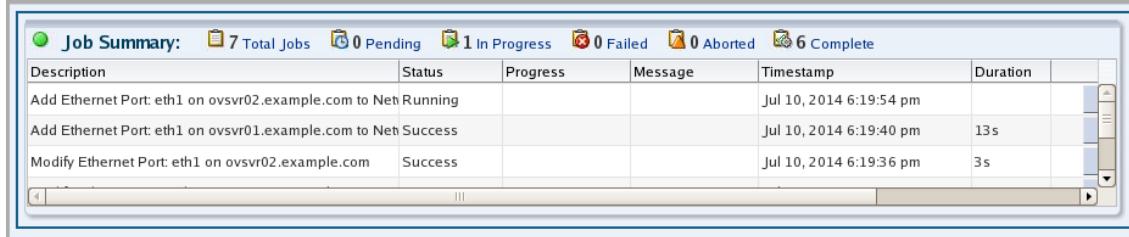
- i. On the Select Ports screen, click Next to continue.



- j. On the Select VLAN Interfaces screen, click Finish.



When you click the Finish button, several jobs are launched as part of the network creation process.



Copyright © 2016, Oracle and/or its affiliates. All rights reserved.

After the jobs complete, examine your new network from the Networking tab. The new network must appear in the list of networks, as shown in the following screenshot:

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		√	√	√			
vm_net	10d2be49e8						√	

Note: Your network ID is different.

- Examine the new network's ports and their IP addressing.
 - Click the Servers and VMs tab.
 - In the navigation pane, expand the Unassigned Servers folder if necessary.
 - Select an Oracle VM server (for example, ovsrv02.example.com), and in the management pane, select the Ethernet Ports perspective.
 - Examine the Addressing area for port eth1 on ovsrv02.example.com.

Port	Status	Interface Name	MAC Address	MTU	Addressing			Bond Name
					Type	IP Address	Netmask	
eth0 on ovsrv02.ex	Port Up	eth0	00:16:3e:00:01:02	1500				bond0 on ovsrv02.e
eth1 on ovsrv02.ex	Port Up	eth1	00:16:3e:00:02:02	1500	Static	192.168.1.102	255.255.255.0	
eth2 on ovsrv02.ex	Port Down	eth2	00:16:3e:00:03:02	1500				
eth3 on ovsrv02.ex	Port Down	eth3	00:16:3e:00:04:02	1500				

Note that there is no IP addressing for eth0, because this port is part of a bonded interface.

- I. Use the scrollbar at the bottom of the management pane and scroll to the right to view information for the port that is part of a bonded interface.

The screenshot shows the Oracle VM Server interface with the 'Networking' tab selected. In the center, there is a table titled 'Addressing' displaying network interface configurations. The table has columns for Interface Name, MAC Address, MTU, Type, IP Address, Netmask, Bond Name, and Network. Four rows are listed: eth0, eth1, eth2, and eth3. The last two rows (eth2 and eth3) are grouped under a 'vn' header. The 'IP Address' column for eth1 contains '192.168.1.102'. The 'Network' column for eth1 contains 'vm_net'. The 'Bond Name' column for eth2 and eth3 contains 'bond0 on ovsrv02.example.com'. At the bottom of the table, a horizontal scrollbar is visible, with a red arrow pointing to its right side.

Interface Name	MAC Address	MTU	Addressing			Bond Name	Network
			Type	IP Address	Netmask		
eth0	00:16:3e:00:01:02	1500				bond0 on ovsrv02.example.com	
eth1	00:16:3e:00:02:02	1500	Static	192.168.1.102	255.255.255.0		vm_net
vn	eth2	00:16:3e:00:03:02	1500				
vn	eth3	00:16:3e:00:04:02	1500				

You can also use the Collapse Pane button for the navigation pane to extend the viewing area for the management pane. You regain access to the navigation pane by clicking the Restore Pane button.

Note: If you need to make a change to the configuration of an Ethernet port, select the port and click the Edit Selected Port icon on the toolbar from the Ethernet Ports perspective. Similarly, you can make changes to your bond ports by selecting the Bond Ports perspective.

Practice 3-3: Create a Cluster Heartbeat Network

Overview

In this practice, you create a separate Cluster Heartbeat network. The cluster heartbeat function is currently part of the management network, as you can see in the screenshot in Practice 3-2, task 1. Before you create a separate network for the cluster heartbeat, you remove the cluster heartbeat function from the management network.

Note: If you intend to create a separate network for the heartbeat network, it is advisable to create this network before creating your Oracle VM server pools.

Assumptions

This practice assumes that there is a free network interface card on each Oracle VM server to create the heartbeat network. In your lab environment, use the third port, eth2, on each Oracle VM server, to create the new network with the heartbeat function.

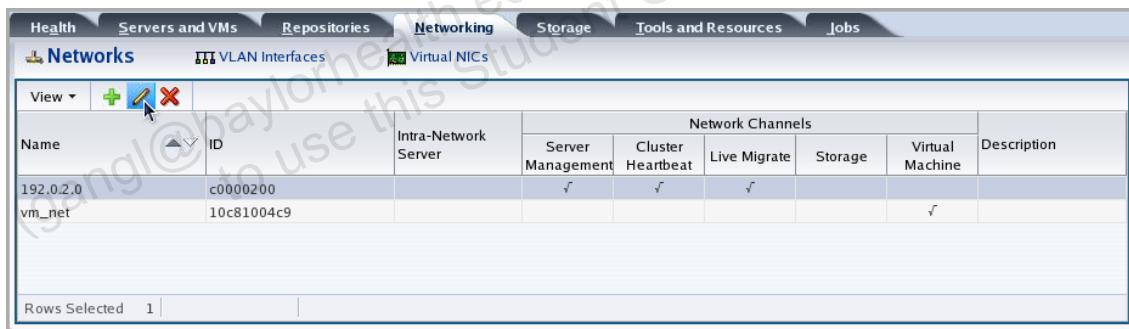
Tasks

1. Remove the Cluster Heartbeat network channel from the management network.

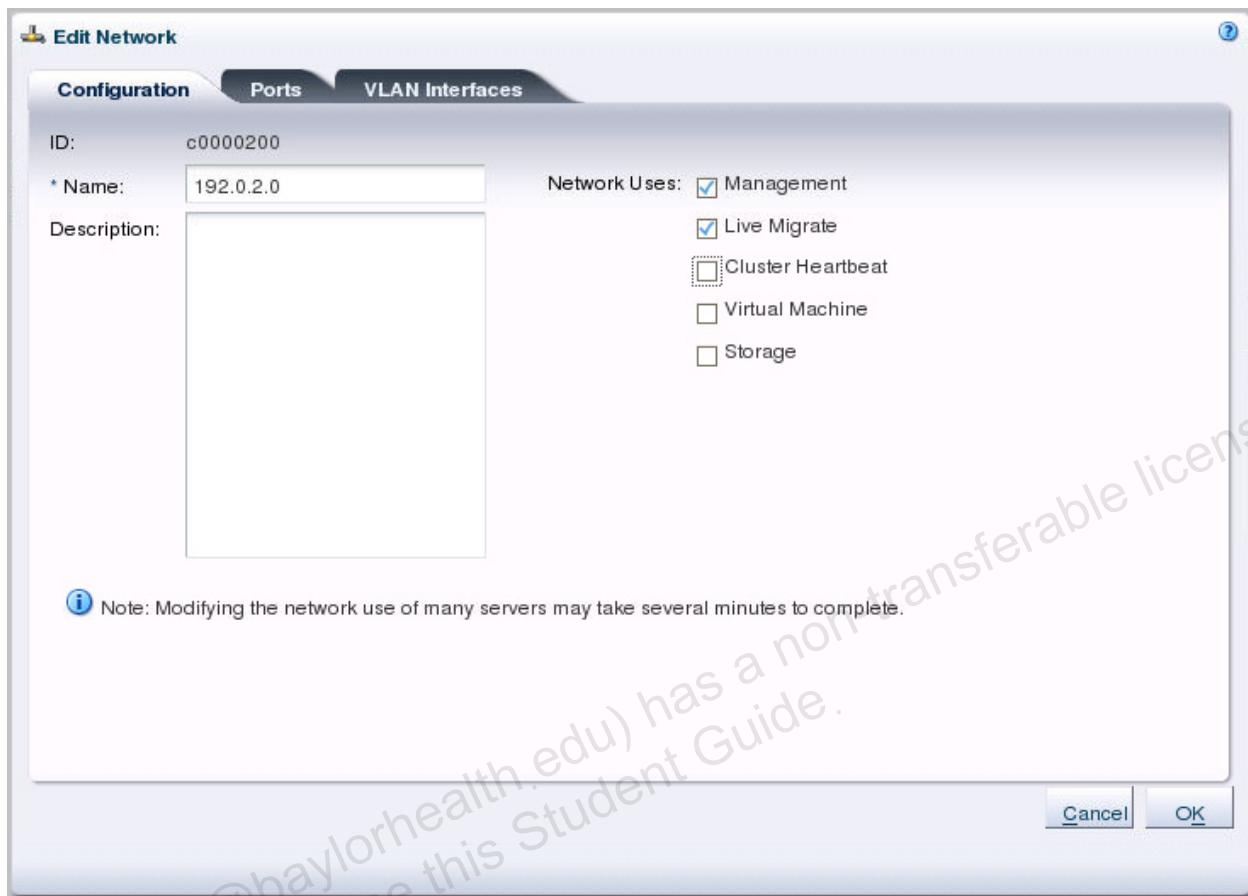
Use the Oracle VM CLI to perform this task or use the Oracle VM Manager UI.

Using the UI:

- a. Navigate to the Networking tab from the Oracle VM Manager UI main window.
- b. On the Networking tab, select the management network (192.0.2.0) and click the “Edit Selected Network” icon to launch the edit operation.



- c. On the Configuration tab, deselect the Cluster Heartbeat check box in the Network Uses section.



Click OK to complete the edit operation.

- d. After removing the Cluster Heartbeat network channel from the management network, verify your work by displaying the current networks on the Networking tab in your Oracle VM Manager UI session.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓	✓				
vm_net	10d2be49e8					✓		

The Cluster Heartbeat network channel is no longer specified for the 192.0.2.0 management network.

Using the CLI:

- a. If necessary, restart your Oracle VM CLI session on your lab machine.

```
[root@<your lab machine> ~]# ssh -l admin ovmmgr01.example.com -p 10000
OVM>
```

- b. List the available networks.

```
OVM> list network
Command: list network
Status: Success
Time: ...
Data:
    id:10c81004c9  name:vm_net
    id:c0000200  name:192.0.2.0
OVM>
```

- c. Show details for the management network named 192.0.2.0.

```
OVM> show network name=192.0.2.0
Command: show network name=192.0.2.0
Status: Success
Time: ...
Data:
    Server Local = false
```

```
MTU = 0
Role 1 = Management
Role 2 = Live Migrate
Role 3 = Cluster Heartbeat
Port 1 = 0004fb00002000003be515a49ff93e3d [bond0 on
ovsvr01.example.com]
Port 2 = 0004fb000020000011bcb59732e21f75 [bond0 on
ovsvr02.example.com]
Id = c0000200 [192.0.2.0]
Name = 192.0.2.0
Locked = false
OVM>
```

- d. Modify the management network, removing the Cluster Heartbeat function.

```
OVM> edit network name=192.0.2.0 roles='MANAGEMENT,LIVE_MIGRATE'
Command: edit network name=192.0.2.0
roles='MANAGEMENT,LIVE_MIGRATE'
Status: Success
Time: ...
JobId: 1405016914477
OVM>
```

Note: The JobID that is shown as part of the CLI command is the same job ID that you can see on the Jobs tab or the Job Summary pane in the Oracle VM Manager UI. If you click the job details for the Modify Network job in the Job Summary pane, you can view the job ID.

- e. Verify the change.

```
OVM> show network name=192.0.2.0
Command: show network name=192.0.2.0
Status: Success
Time: ...
Data:
    Server Local = false
    MTU = 0
    Role 1 = Management
    Role 2 = Live Migrate
    Port 1 = 0004fb00002000003be515a49ff93e3d [bond0 on
ovsvr01.example.com]
    Port 2 = 0004fb000020000011bcb59732e21f75 [bond0 on
ovsvr02.example.com]
    Id = c0000200 [192.0.2.0]
    Name = 192.0.2.0
    Locked = false
OVM>
```

2. Create the heartbeat network.
 - a. On the Networking tab, click the Create New Network icon on the toolbar to launch the wizard.

Name	ID	Intra-Network Server	Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	Description
192.0.2.0	c0000200		✓		✓			
vm_net	10c81004c9						✓	

- b. On the first screen, select the “Create a Network with Ports/Bond Ports/VLAN Interfaces” radio button.

Select a Network Configuration

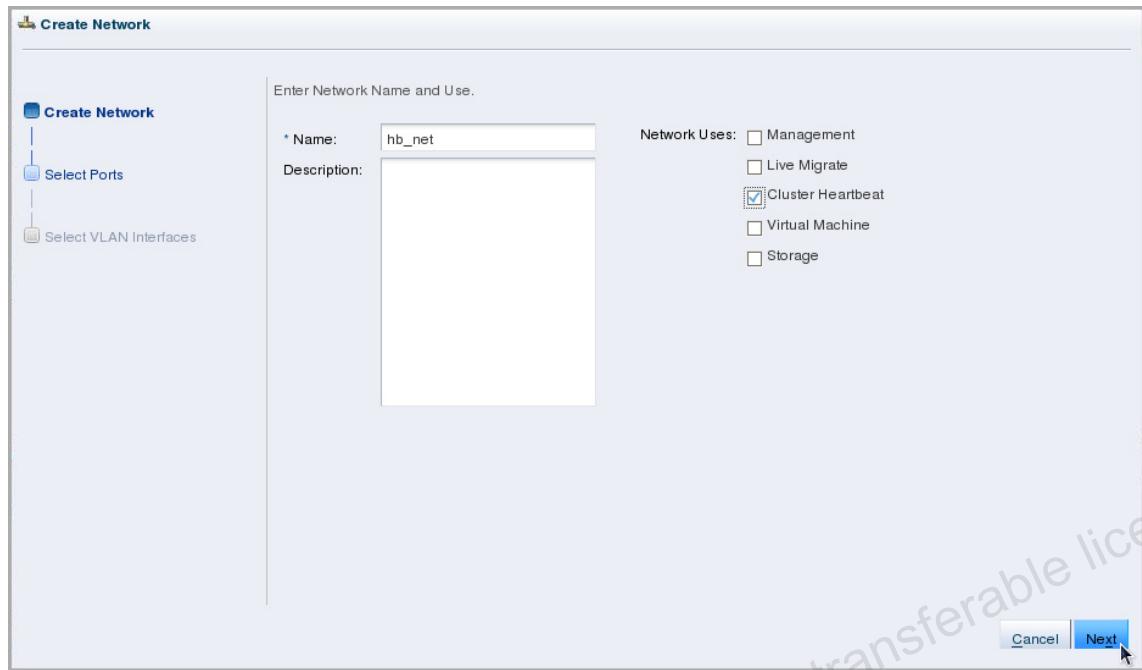
Create a Network with Ports/Bond Ports/VLAN Interfaces
 Create a Local Network on a single server

Cancel **Next >**

Click Next to continue.

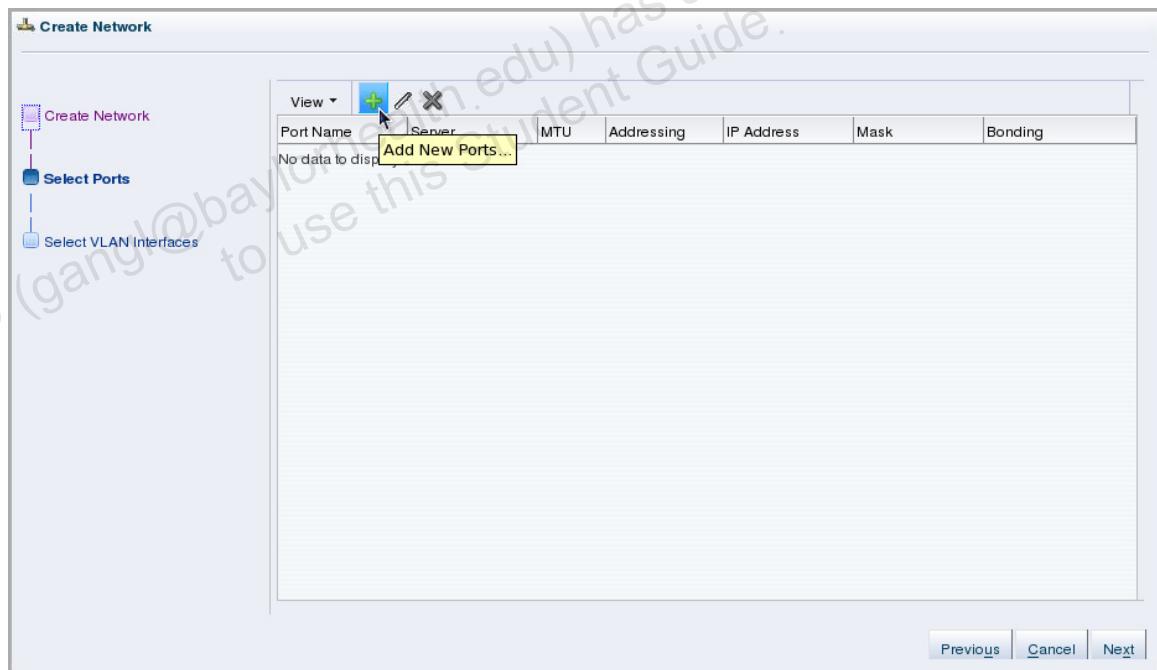
- c. On the Create Network screen, specify a name and a function for your new network by using the information in the following table:

Field	Value
Network Name	hb_net
Network Channel	Select the “Cluster Heartbeat” check box.

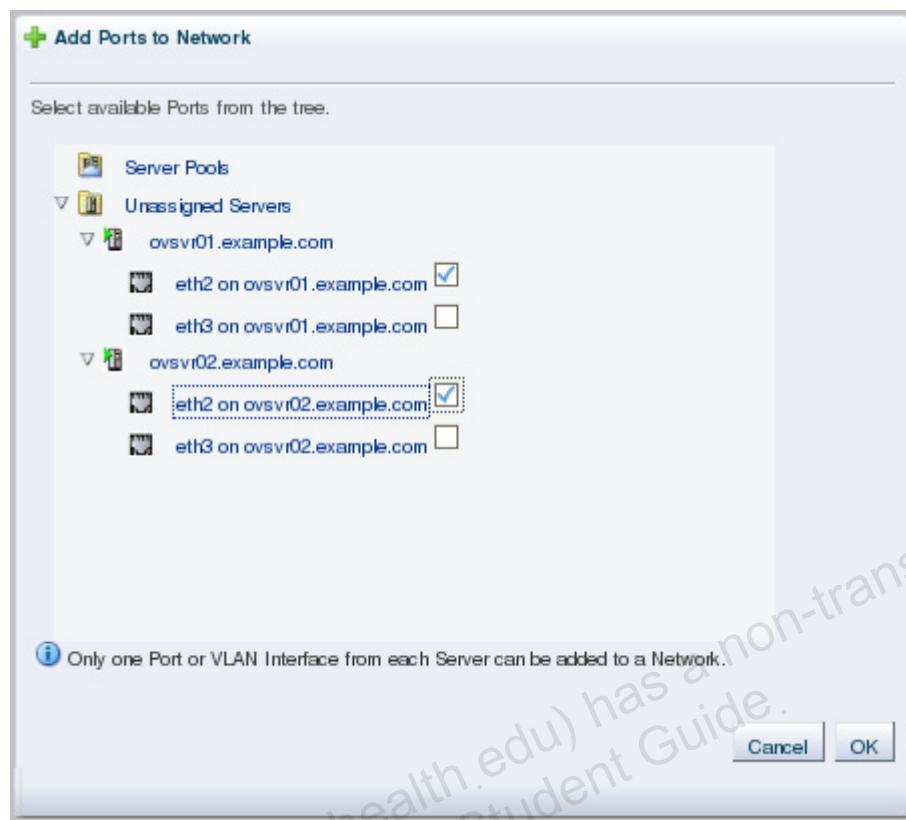


Click Next to continue.

- d. On the Select Ports screen, click the Add New Ports icon.

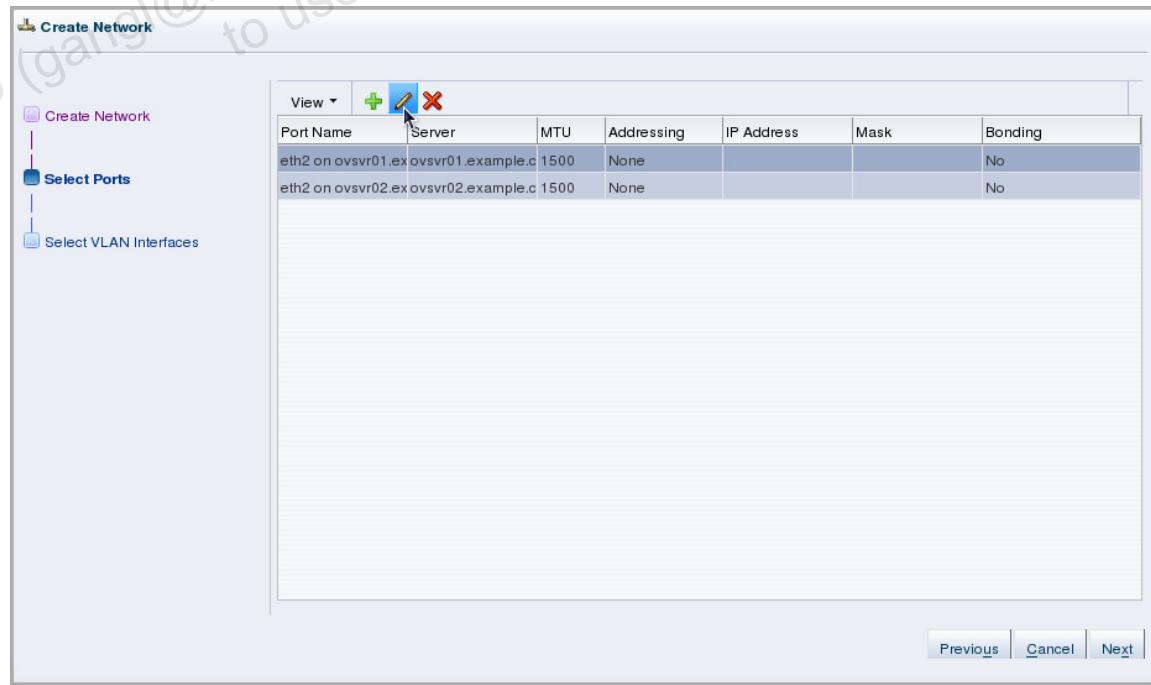


- e. On the Add Ports to Network screen, select the eth2 check box for both Oracle VM servers.



Click OK to return to the previous screen.

- f. Highlight both Oracle VM servers and click the Edit Port(s) icon.

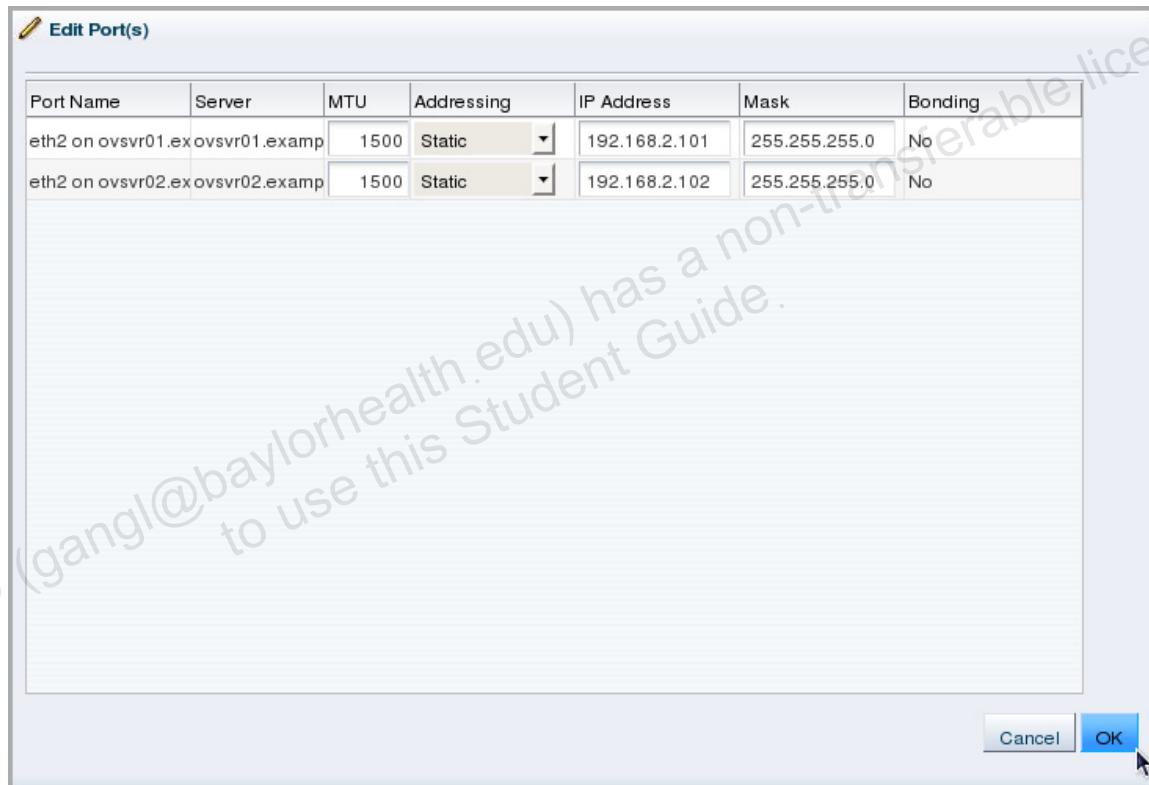


- g. On the Edit Port(s) screen, configure networking information for the ports.

Use the information in the following table to fill this screen:

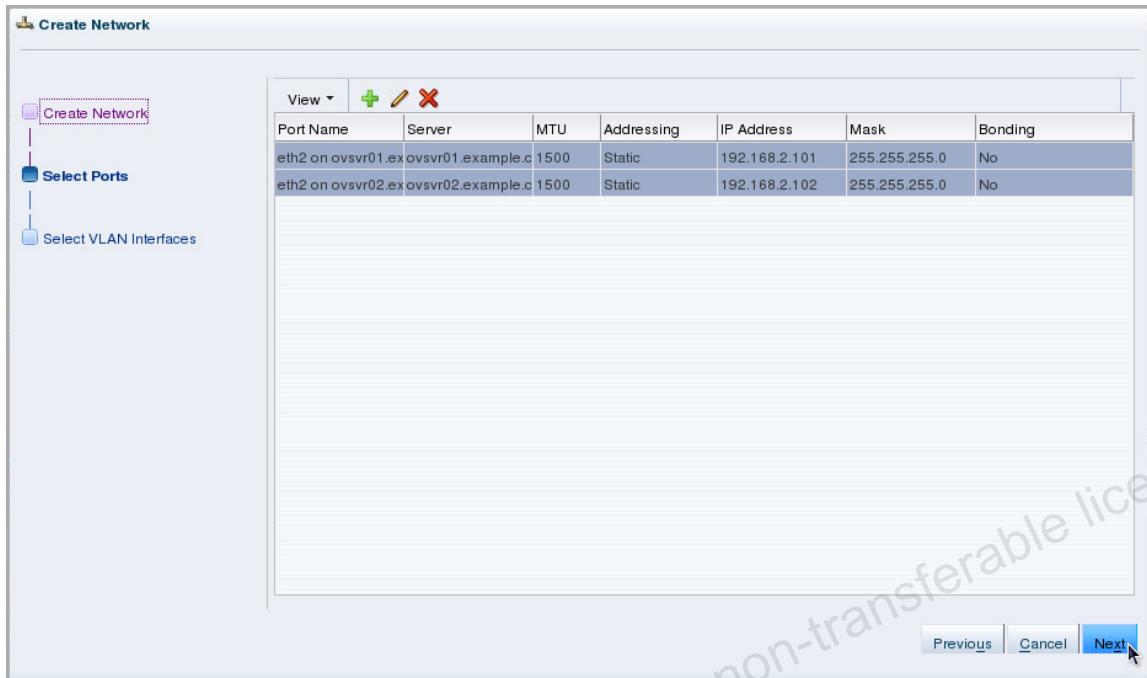
Field	Value
MTU	Leave the MTU at its default value of 1500.
Addressing	Select Static from the drop-down list.
IP Address	192.168.2.101 for ovsrv01.example.com 192.168.2.102 for ovsrv02.example.com
Mask	255.255.255.0

Warning: Make sure that you assign a proper IP address to each Oracle VM server. The servers might show up in any order.

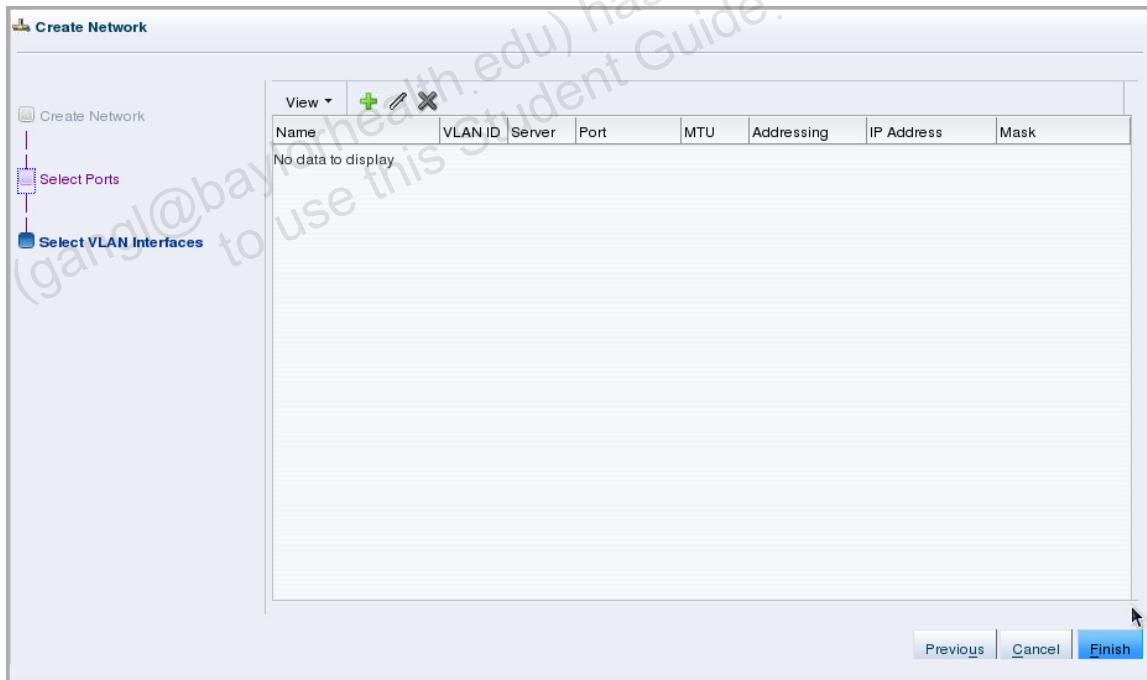


Click OK to return to the previous screen.

- h. On the Select Ports screen, click Next to continue.



- i. On the Select VLAN Interfaces screen, click Finish.



After the jobs to create the network complete, examine your new network from the Networking tab. The new network must appear in the list of networks, as shown in the following screenshot:

The screenshot shows the Networking tab in the Oracle VM Manager interface. The table displays the following data:

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓		✓			
hb_net	101183c7ed			✓				
vm_net	10d2be49e8						✓	

Practice 3-4: Check Bonds and Bridges on the Oracle VM Servers

Overview

In this practice, you examine the network devices created on your Oracle VM servers.

Assumptions

This practice assumes that the networks have been configured successfully, as described in the previous practices of this lesson.

Tasks

1. Log in to `ovsvr01.example.com` as root.
 - a. Open a terminal window from your lab machine.
 - b. Change user to root.
 - c. Use the `ssh` command to log in to your Oracle VM server.

```
[root@<your lab machine> ~]# ssh ovsvr01
The authenticity of host 'ovsvr01 (192.0.2.101)' can't be
established.

RSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ovsvr01' (RSA) to the list of known
hosts.

root@ovsvr01's password: oracle
Last login: Thu Jul 10 15:33:47 2014 from 192.0.2.1
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.

[root@ovsvr01 ~]#
```

2. Execute commands to display network device and bridge information.
 - a. Execute the `ifconfig -a` command.

```
[root@ovsvr01 ~]# ifconfig -a
10c81004c9 Link encap:Ethernet HWaddr 00:16:3E:00:02:01
          inet addr:192.168.1.101 Bcast:192.168.1.255
                                         Mask:255.255.255.0
                                         UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                                         RX packets:535 errors:0 dropped:0 overruns:0 frame:0
                                         TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
                                         collisions:0 txqueuelen:0
                                         RX bytes:24610 (24.0 KiB) TX bytes:0 (0.0 b)

bond0      Link encap:Ethernet HWaddr 00:16:3E:00:01:01
          inet addr:192.0.2.101 Bcast:192.0.2.255 Mask:255.255.255.0
          UP BROADCAST RUNNING MASTER MULTICAST MTU:1500 Metric:1
          RX packets:2513 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2337 errors:0 dropped:0 overruns:0 carrier:0
```

```
        collisions:0 txqueuelen:0
        RX bytes:467676 (456.7 KiB) TX bytes:649359 (634.1 KiB)

eth0      Link encap:Ethernet HWaddr 00:16:3E:00:01:01
          UP BROADCAST RUNNING SLAVE MULTICAST MTU:1500 Metric:1
          RX packets:2515 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2339 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:467780 (456.8 KiB) TX bytes:649971 (634.7 KiB)

eth1      Link encap:Ethernet HWaddr 00:16:3E:00:02:01
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:537 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:24702 (24.1 KiB) TX bytes:84 (84.0 b)

eth2      Link encap:Ethernet HWaddr 00:16:3E:00:03:01
          inet addr:192.168.2.101 Bcast:192.168.2.255
                           Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:2 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:92 (92.0 b) TX bytes:84 (84.0 b)

eth3      Link encap:Ethernet HWaddr 00:16:3E:00:04:01
          BROADCAST MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          UP LOOPBACK RUNNING MTU:65536 Metric:1
          RX packets:256 errors:0 dropped:0 overruns:0 frame:0
          TX packets:256 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:73341 (71.6 KiB) TX bytes:73341 (71.6 KiB)
[root@ovs01 ~] #
```

b. Examine:

- The **eth0** and **bond0** network interfaces

Notice that the **eth0** network interface is a SLAVE device to **bond0**, which is the master. **eth0** and **bond0** have the same MAC address.

- The **106ea679b9** bridge, which is also a network device

Your bridge has a different name.

The bridge entry can appear at the beginning or at the end of the listing.

This is the bridge created when you configured the virtual machine network, **vm_net**.

The bridge, in this example **10c81004c9**, and **eth1** have the same MAC address.

The bridge, however, has the IP address assigned (192.168.1.101).

c. Execute the **brctl show** command to display bridge information.

```
[root@ovsvr01 ~]# brctl show
bridge name      bridge id          STP enabled      interfaces
10c81004c9        8000.00163e000201    no            eth1
[root@ovsvr01 ~]#
```

The output of the **brctl** command shows that there is one bridge configured for **eth1**, which is the port specified for the Oracle VM servers when you created the virtual machine network, **vm_net**.

d. Exit your session on **ovsvr01.example.com** by using the **exit** command.

```
[root@ovsvr01 ~]# exit
Connection to ovsvr01 closed.
[root@<your lab machine> ~]#
```

Practice 3-5: Create a Network with VLAN Support

Overview

In this practice, you create a network with VLAN support. First, you create VLAN interfaces and assign a VLAN segment or ID to each VLAN interface. You then assign the VLAN interfaces that you have defined to a network in the same way that you assigned ports or bonds to networks in the previous practices.

With VLAN support in Oracle VM, you can direct traffic from several VLAN segments onto a single port or bond on your Oracle VM servers. When traffic is routed through the VLAN interface, the packets are automatically tagged with the VLAN ID that is configured for that VLAN interface, and the packets are then routed through the actual port or bond to which the VLAN interface is attached.

Note: You must configure the VLAN infrastructure that is needed to support your VLAN design before you can create any network with VLAN interfaces. You usually perform these preparatory tasks on external Ethernet switches, by using switch trunking.

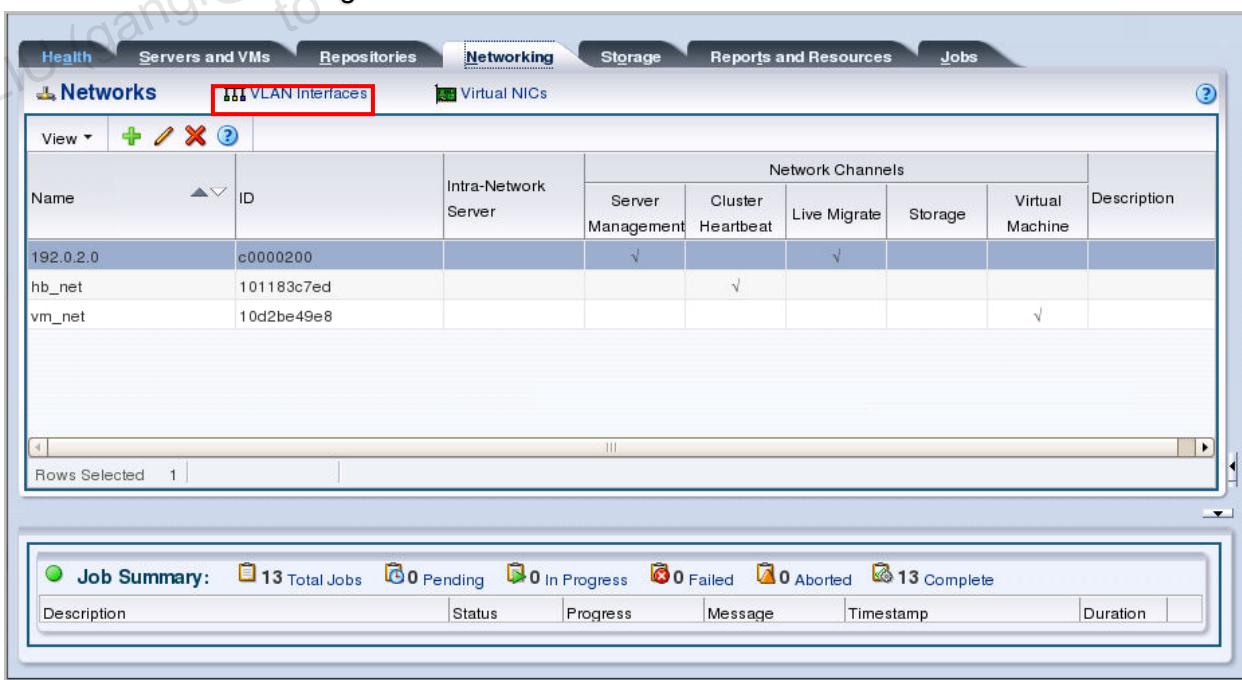
Assumptions

Your lab environment does not support VLAN tagging. However, you can create networks with VLAN support, but you cannot use them. When you create the network with VLAN support, it remains unused for the remaining lab practices.

This practice uses the Oracle VM Manager UI only.

Tasks

1. Create the VLAN interfaces to direct traffic from the two VLANs onto a single port on each of your Oracle VM servers.
 - a. Start the Oracle VM Manager UI.
 - b. Access the Networking tab.



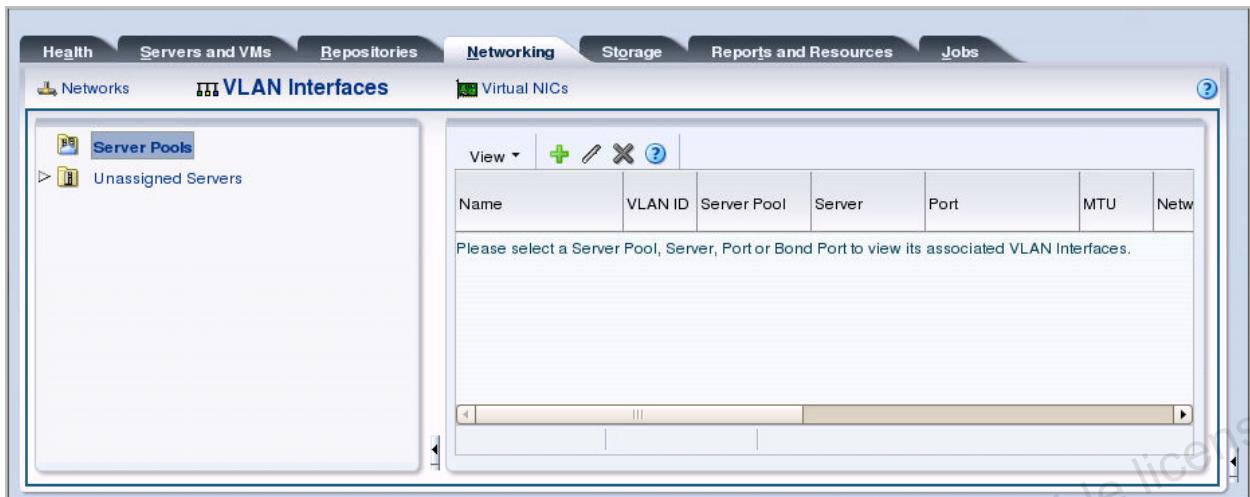
The screenshot shows the Oracle VM Manager UI with the Networking tab selected. In the top navigation bar, the Networking tab is highlighted. Below it, the 'VLAN Interfaces' link is also highlighted with a red box. The main content area displays a table of VLAN interfaces. The columns are: Name, ID, Intra-Network Server, and Network Channels (Server Management, Cluster Heartbeat, Live Migrate, Storage, Virtual Machine). The table contains three rows:

Name	ID	Intra-Network Server	Network Channels
192.0.2.0	c0000200		✓ ✓
hb_net	101183c7ed		✓
vm_net	10d2be49e8		

At the bottom of the table, there is a status bar showing 'Rows Selected 1'. Below the table, a 'Job Summary' box displays 13 total jobs, 0 pending, 0 in progress, 0 failed, 0 aborted, and 13 complete. There is also a table with columns: Description, Status, Progress, Message, Timestamp, and Duration.

- c. Click the VLAN Interfaces link.

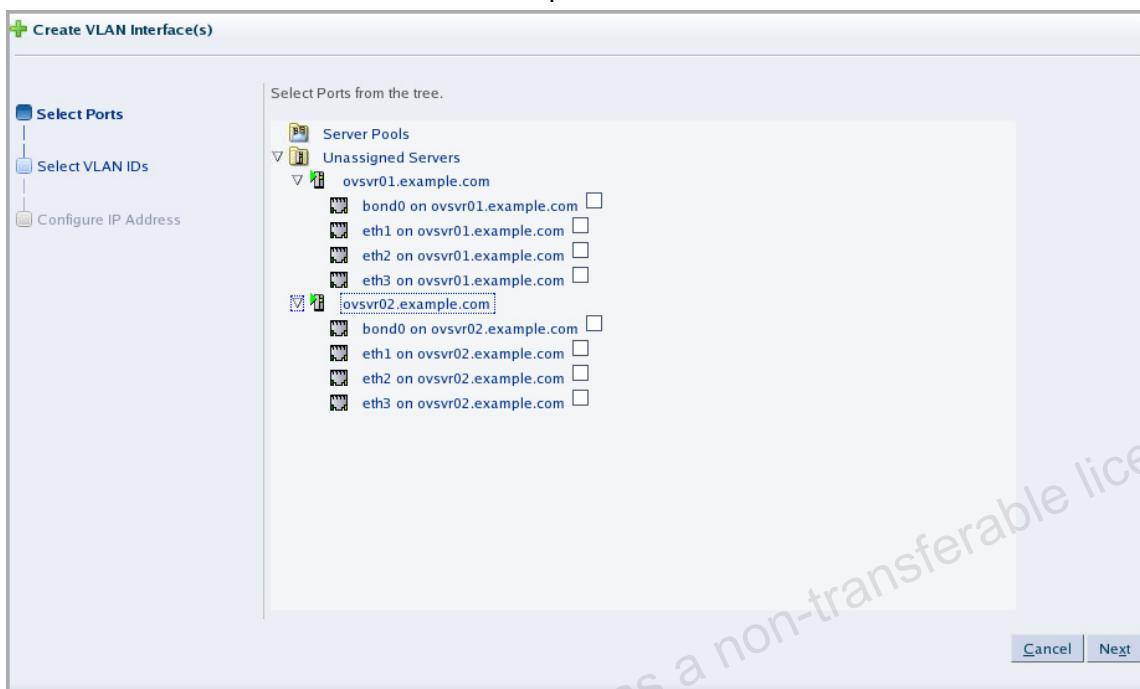
The VLAN Interfaces pane appears. There are no VLAN interfaces defined in your lab environment.



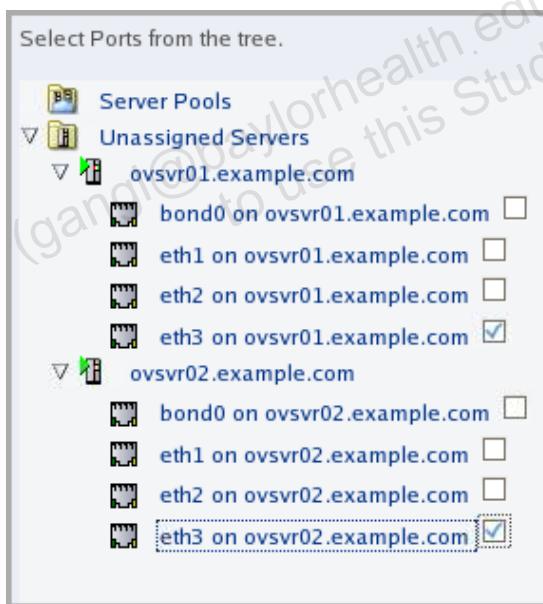
- d. Click the Create VLAN Interface icon in the management pane.



- e. On the first screen of the wizard, called Select Ports, click the Expand button to expose the Oracle VM servers and their available ports or bonds.



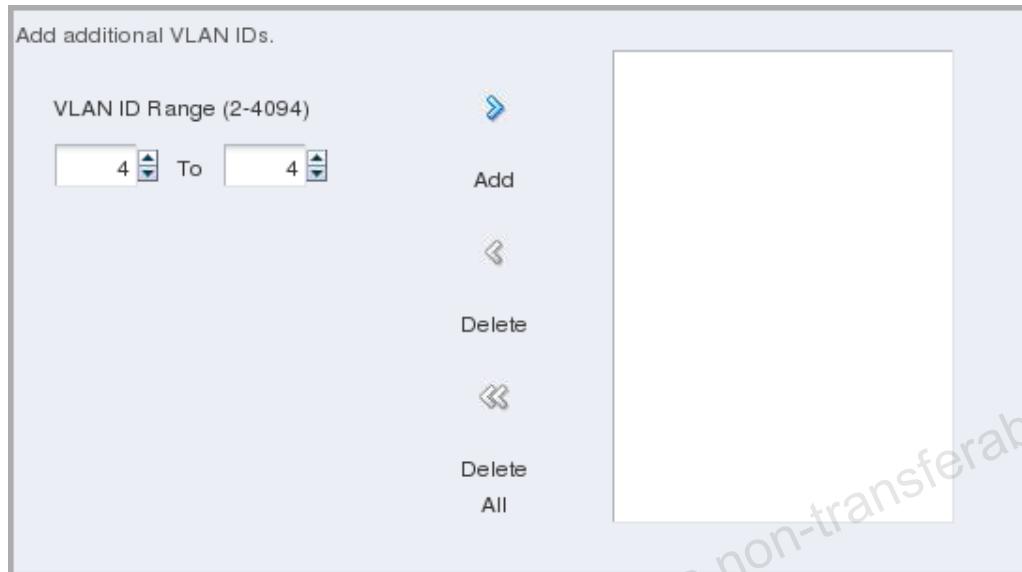
- f. Select port eth3 for both Oracle VM servers.



Note: Ports or bonds that are already part of networks are shown on this screen. Make sure that you select ports that support VLANs.

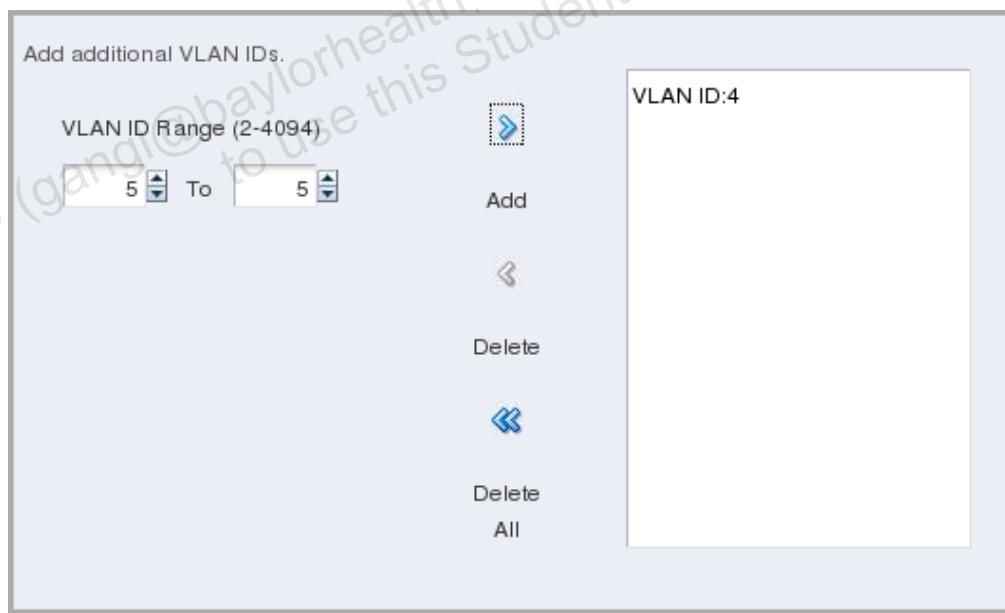
Click Next to move to the next step.

- g. On the Select VLAN IDs screen, add the VLAN IDs that will determine the VLAN traffic on the selected ports.
- Under the “VLAN ID Range (2-4094)” heading, click the arrow at the top of the left field, which is the Increment button of the VLAN ID field, to select VLAN ID 4.

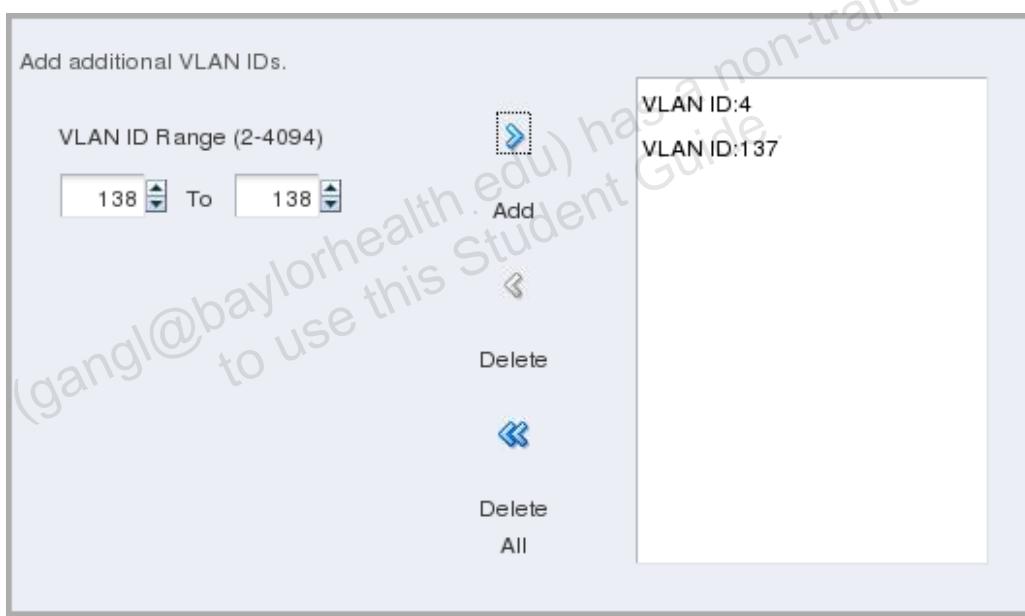
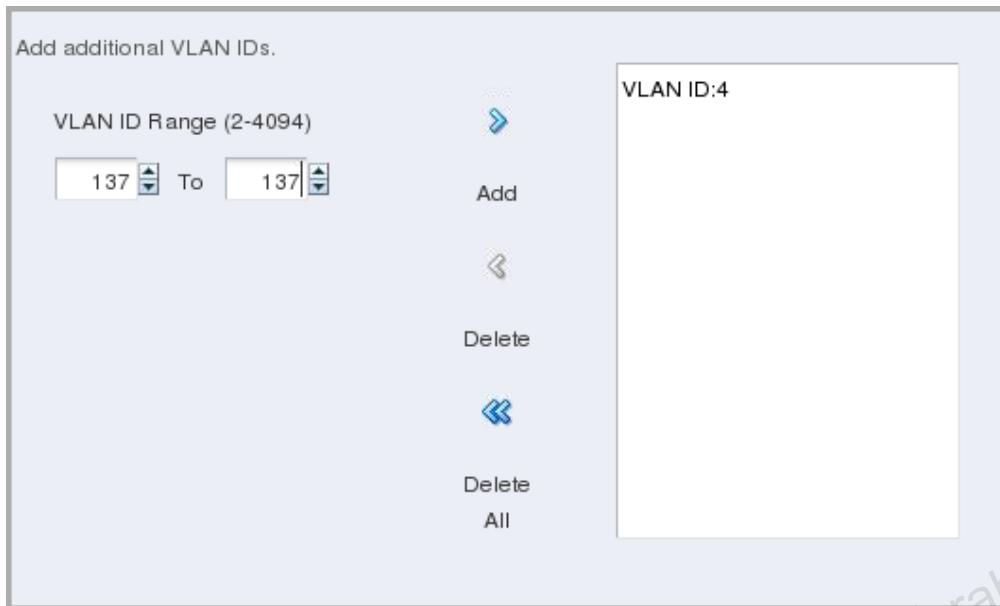


The right field automatically adjusts to the same value.

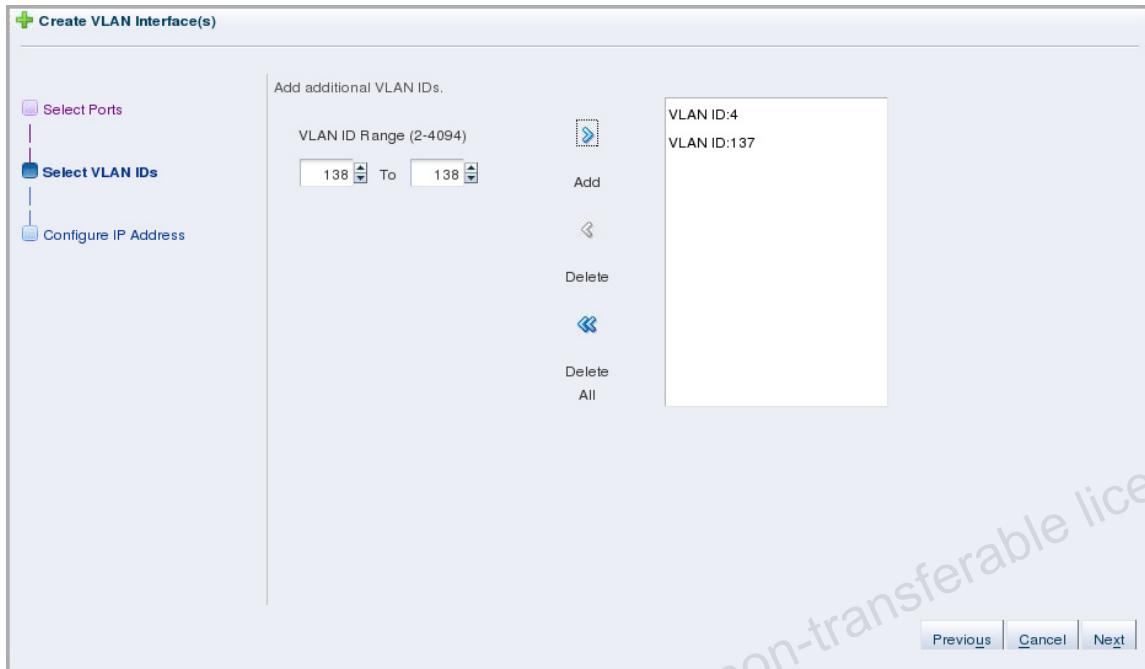
- Click Add (the single right-arrow button) to add your selection to the list of VLAN IDs.



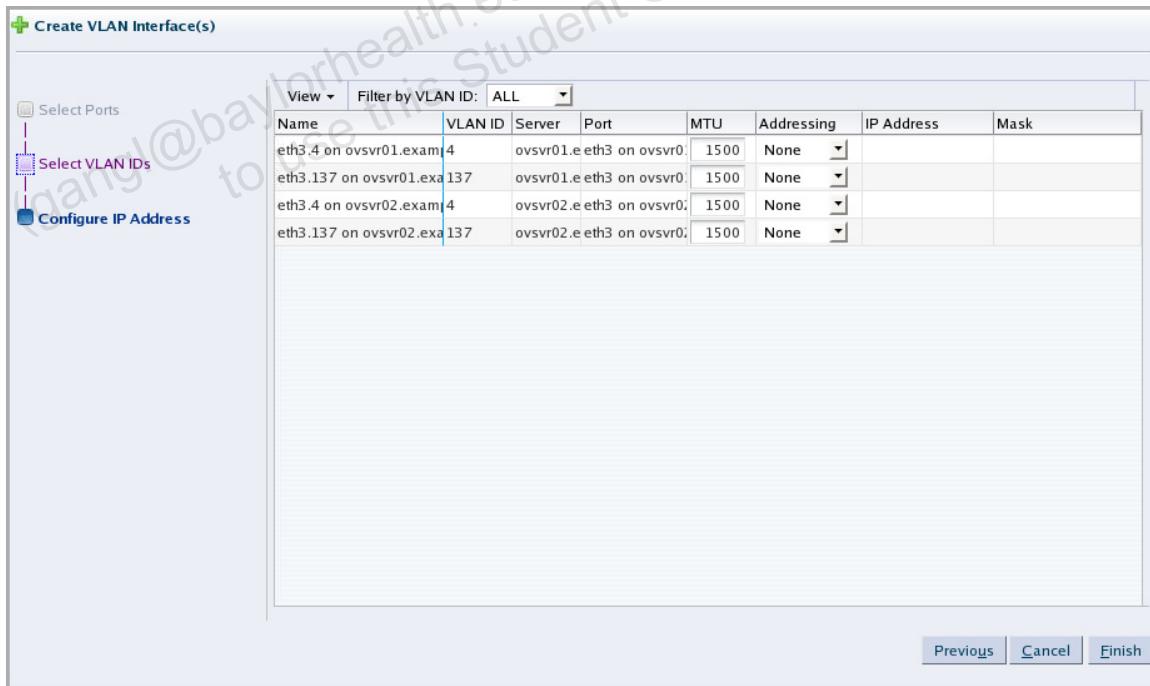
- Repeat for VLAN ID 137, by entering 137 in the VLAN ID field. Tab to the next field, and 137 appears in the second field.



After selecting VLAN ID 4 and 137, your screen looks like the following:



- Click Next to move to the next step.
- h. On the Configure IP Addresses screen, configure IP information if you want the VLAN interfaces to acquire an IP address when they are created.



If your future network is used for virtual machine traffic, you do not need to assign an IP address for the VLAN interfaces for that network.

For example:

- The network to be created with VLAN Segment 4 has the Storage function.
- The network to be created with VLAN Segment 137 has the Virtual Machine function only.

In the preceding examples, you assign IP addresses to the VLAN interfaces for VLAN ID 4, but no IP addresses for the VLAN interfaces for VLAN ID 137.

Use the information in the following table as input to this screen:

VLAN ID	Server/Port	Addressing Type	IP Address	Netmask
137	ovsvr01.example.com Port (3)	None	N/A	N/A
137	ovsvr02.example.com Port (3)	None	N/A	N/A
4	ovsvr01.example.com Port (3)	Static	192.168.3.101	255.255.255.0
4	ovsvr02.example.com Port (3)	Static	192.168.3.102	255.255.255.0

When you enter the data in the Addressing, IP Address, and Mask columns, the screen matches the following:

Name	VLAN ID	Server	Port	MTU	Addressing	IP Address	Mask
eth3.4 on ovsrv01.example.com	4	ovsvr01.e	eth3 on ovsrv01	1500	Static	192.168.3.101	255.255.255.0
eth3.137 on ovsrv01.example.com	137	ovsvr01.e	eth3 on ovsrv01	1500	None		
eth3.4 on ovsrv02.example.com	4	ovsvr02.e	eth3 on ovsrv02	1500	Static	192.168.3.102	255.255.255.0
eth3.137 on ovsrv02.example.com	137	ovsvr02.e	eth3 on ovsrv02	1500	None		

Note: The server ports can appear in any order. Make sure that you assign the IP addresses to the appropriate port.

Click Finish to trigger the creation of the VLAN interfaces on the two Oracle VM servers.

Several jobs are triggered when you click the Finish button. Each job creates a new VLAN interface in the associated Oracle VM server.

Job Summary:						
Description	Status	Progress	Message	Timestamp	Duration	Ab
Create VLAN Interface: eth3.137 on ovsrv02.example.cc	Success			Jul 10, 2014 7:52:48 pm	2s	Ab
Create VLAN Interface: eth3.4 on ovsrv02.example.com	Success			Jul 10, 2014 7:52:42 pm	5s	Ab
Create VLAN Interface: eth3.137 on ovsrv01.example.cc	Success			Jul 10, 2014 7:52:38 pm	3s	Ab
Create VLAN Interface: eth3.4 on ovsrv01.example.com	Success			Jul 10, 2014 7:52:28 pm	8s	Ab

- i. When the jobs complete, highlight each Oracle VM server in the Unassigned Servers folder in the left pane of the VLAN Interfaces view.

Name	VLAN ID	Server Pool	Server	Port	MTU	Netw
eth3.4 on ovsrv01.example.com	4		ovsrv01.example.com	eth3	1500	
eth3.137 on ovsrv01.example.com	137		ovsrv01.example.com	eth3	1500	

- j. Use the scrollbar to view the Addressing information of the VLAN interfaces for your selected Oracle VM server.

Network	Addressing			Description
	Type	IP Address	Netmask	
eth3.4	Static	192.168.3.101	255.255.255.0	

In this example:

- The Oracle VM server ovsrv01.example.com is highlighted
- The VLAN interfaces for this selected server are eth3.137 and eth3.4
- Only VLAN interface eth3.4 has an IP address assigned: 192.168.3.101

In a later task, you create a new network by using VLAN ID 4.

In the following task, you examine the VLAN interfaces on ovsrv01.example.com.

- Display the network devices created on Oracle VM server ovsrv01.example.com when you created the new VLAN interfaces.
 - From your lab machine, log in to ovsrv01.example.com as root by using ssh.

```
[root@<your lab machine> ~]# ssh ovsrv01.example.com
root@ovsrv01.example.com's password: oracle
Last login: ...
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.
[root@ovsrv01 ~]#
```

- Execute the ifconfig -a | more command to display the network devices that are available on the ovsrv01.example.com server.

```
[root@ovsrv01 ~]# ifconfig -a
```

Near the end of the output for the ifconfig command, examine the two new network devices that were created when you configured the VLAN interfaces for VLAN ID 4 and 137 by using the Oracle VM Manager UI.

```
eth3.4      Link encap:Ethernet  HWaddr 00:16:3E:00:04:01
```

```

inet addr:192.168.3.101 Bcast:192.168.3.255
                                                Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)   TX bytes:168 (168.0 b)

```

The eth3.4 network device has an IP address assigned to it, and is associated with VLAN segment 4.

```

eth3.137 Link encap:Ethernet HWaddr 00:16:3E:00:04:01
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)   TX bytes:0 (0.0 b)

```

The eth3.137 network device does not have an IP address assigned to it, and is associated with VLAN segment 137.

- Exit your session on ovsrv01.example.com by using the `exit` command.

```

[root@ovs01 ~]# exit
Connection to ovsrv01.example.com closed.
[root@<your lab machine> ~]#

```

- Examine the VLAN interface information by using the Oracle VM CLI.
 - From your lab machine, restart your Oracle VM CLI session if it has expired.
 - Use the `list vlanInterface` command at the OVM> prompt.

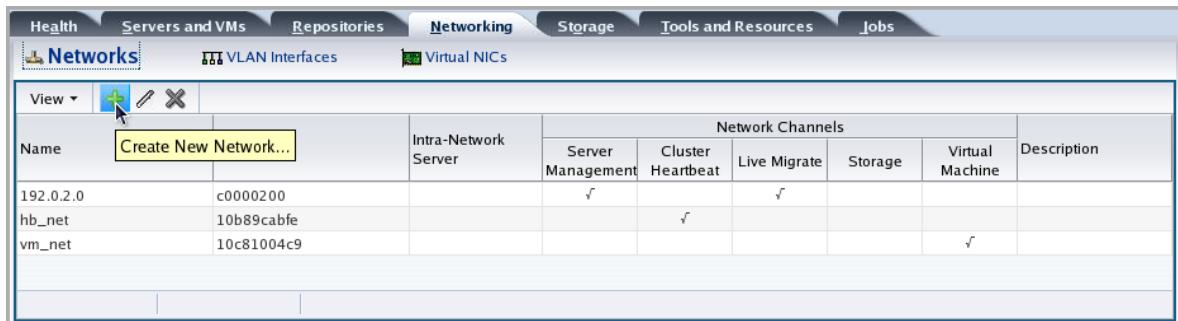
```

OVM> list vlanInterface
Command: list vlanInterface
Status: Success
Time: ...
Data:
        id:0004fb0000240000ce3fc1c7b5248be2    name:eth3.4 on
                                                ovsrv01.example.com
        id:0004fb0000240000d260264872c85823    name:eth3.137 on
                                                ovsrv01.example.com
        id:0004fb0000240000732418c9ed7705cf    name:eth3.4 on
                                                ovsrv02.example.com
        id:0004fb00002400002c5053a58c493d74    name:eth3.137 on
                                                ovsrv02.example.com
OVM>

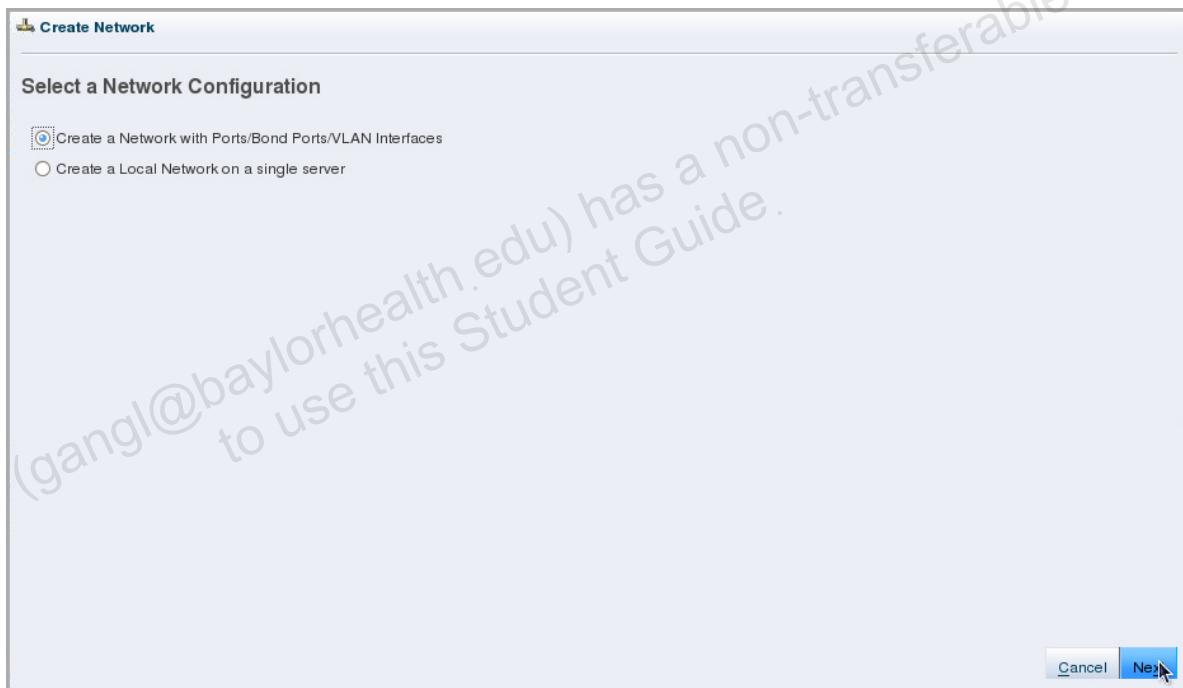
```

- Exit your CLI session by using the `exit` command.

4. Create a network to allow traffic tagged with VLAN ID 4.
 - a. From the Oracle VM Manager's UI, navigate to the Networking tab.
 - b. Click the Networks link, which is located on the top-left corner of the Networking pane.
 - c. Click the Create New Network icon to launch the wizard.



- d. On the Select a Network Configuration screen, select “Create a Network with Ports/Bond Ports/VLAN Interfaces.”



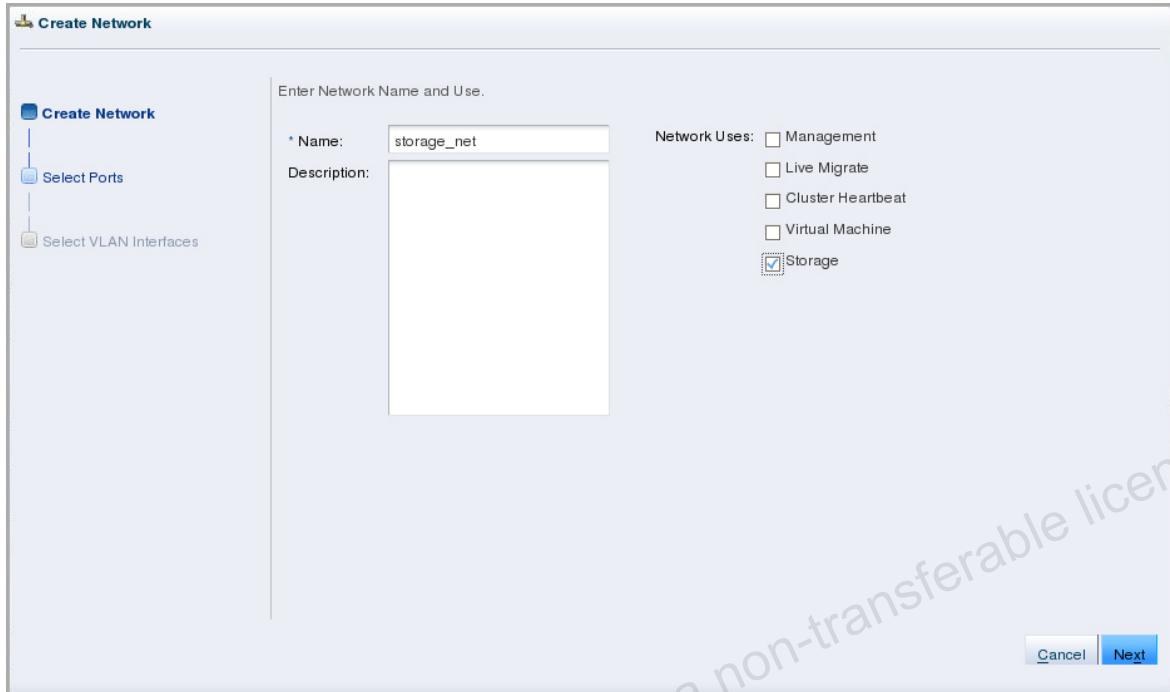
Click Next to continue.

- e. On the Create Network screen, provide a name and a network channel for this new network.

Use the values listed in the following table:

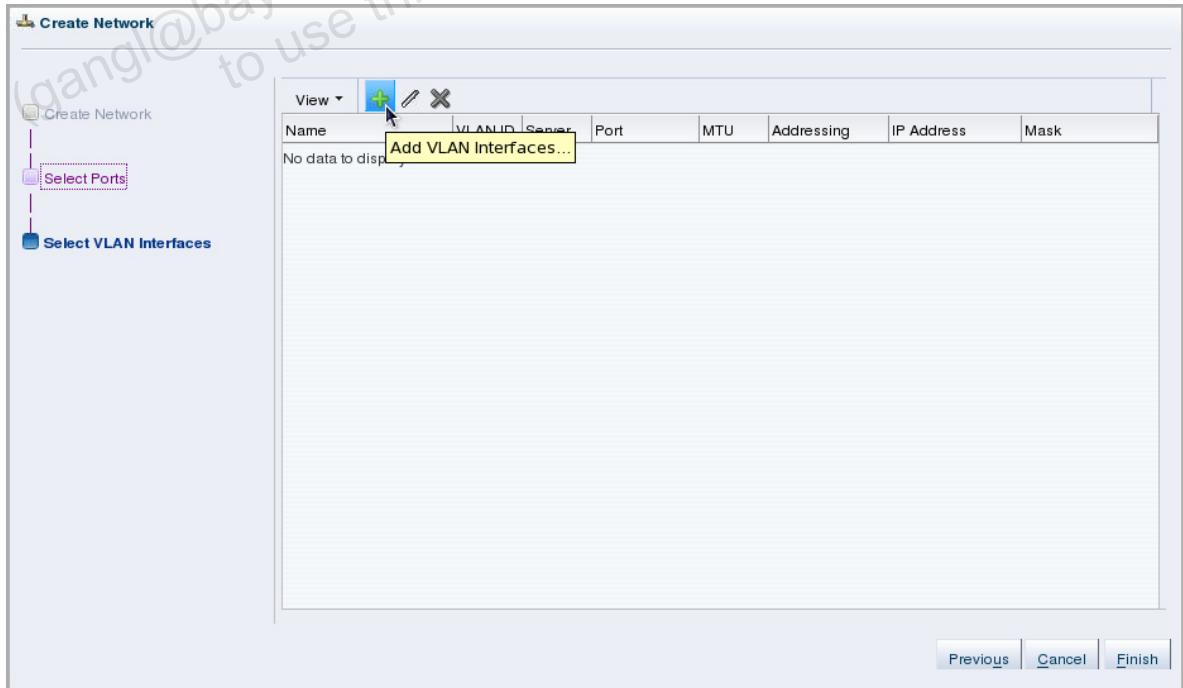
Field	Value
Network Name	storage_net
Network Channel	Select the Storage check box.

The screen looks like the following:



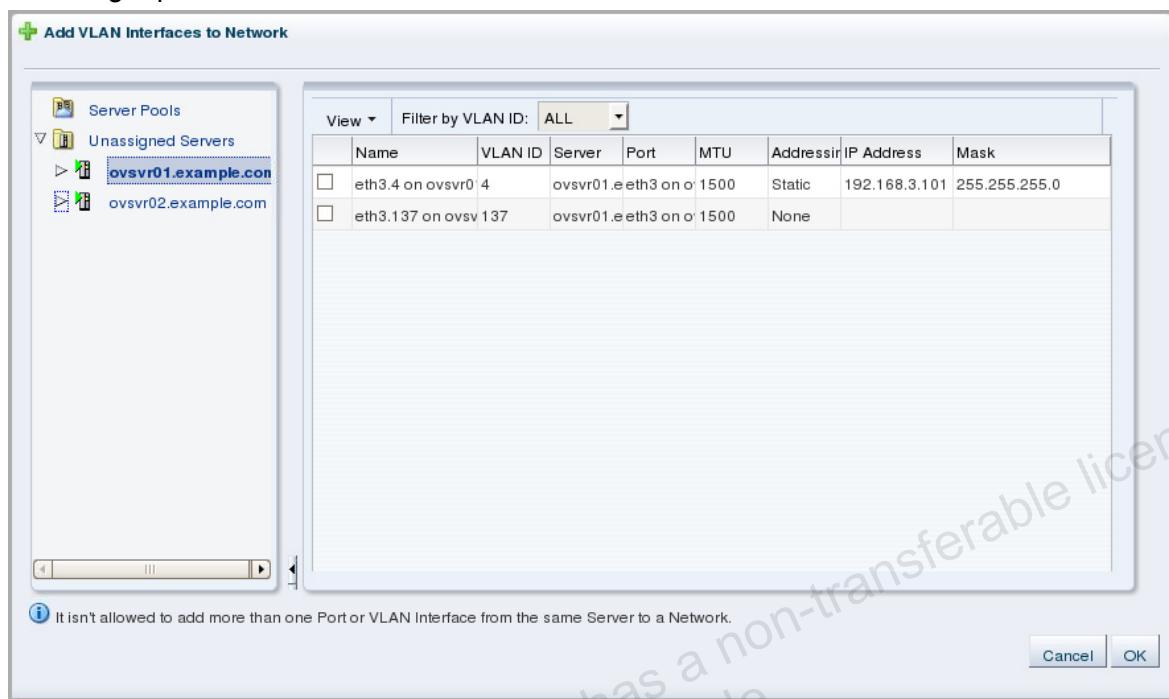
Click Next to continue.

- f. On the Select Ports screen, click Next to move to the next screen.
- g. On the Select VLAN Interfaces screen, you add the VLAN interfaces that were already created on your Oracle VM servers.
 - Click the Add VLAN Interfaces icon.



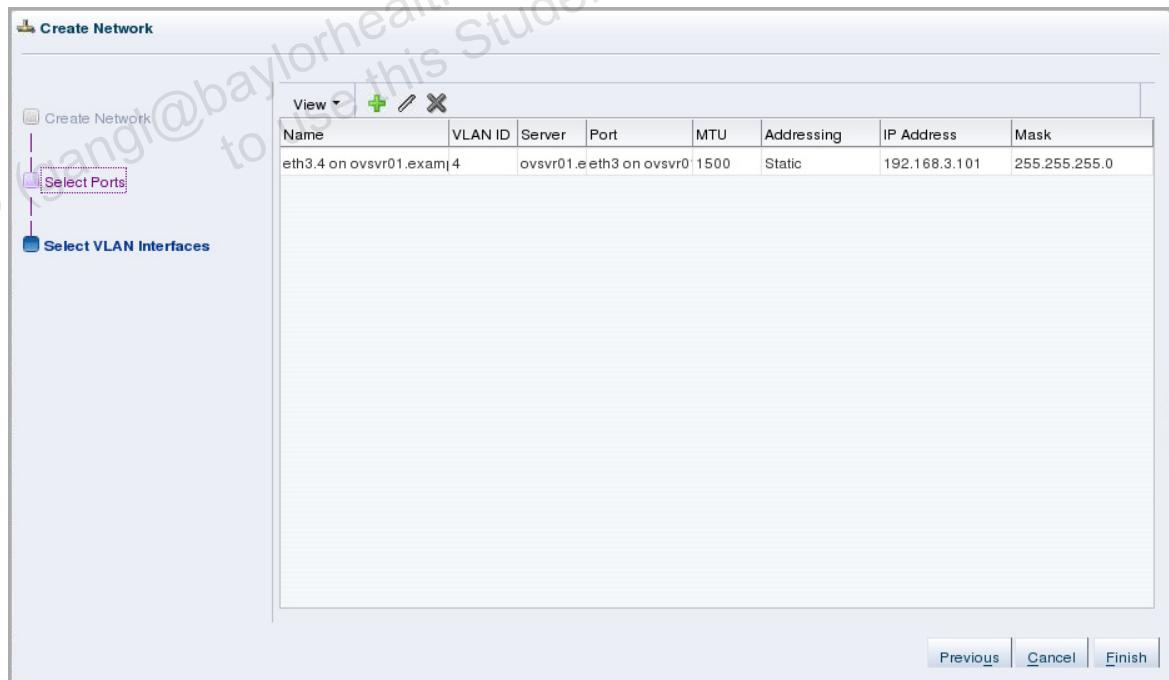
- On the “Add VLAN Interfaces to Network” screen, click the Expand button in the left pane to expose your Oracle VM servers.

- Highlight `ovsvr01.example.com` in the left pane. Its VLAN interfaces appear in the right pane.

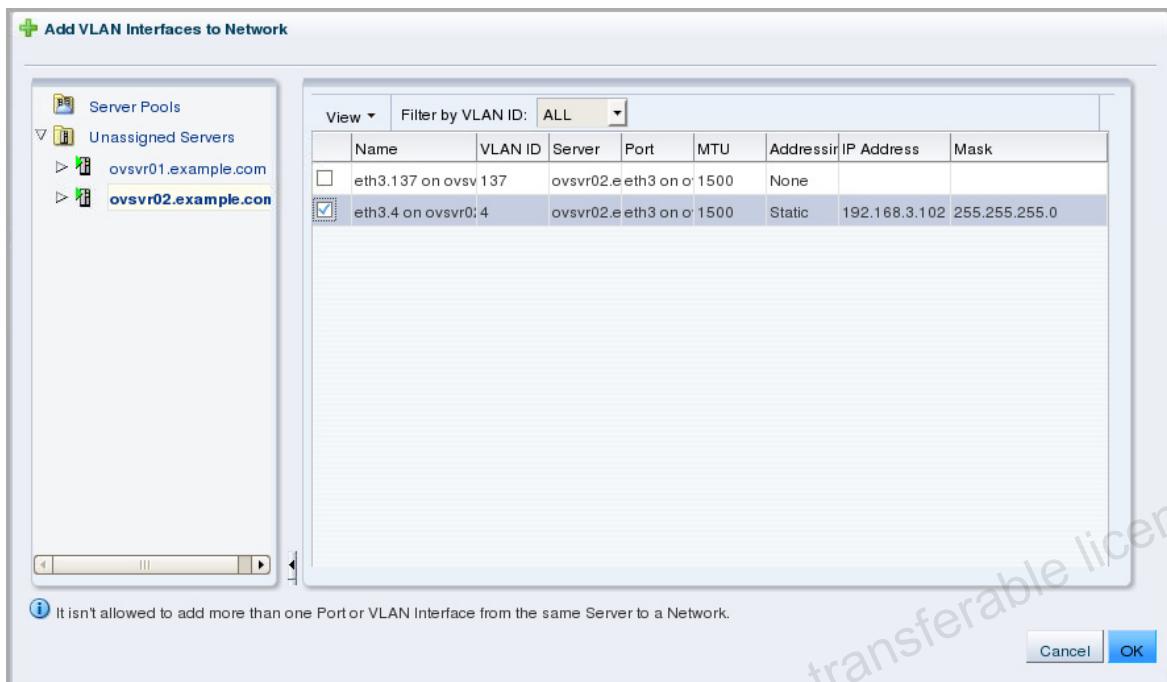


- Select `eth3.4` and click OK.

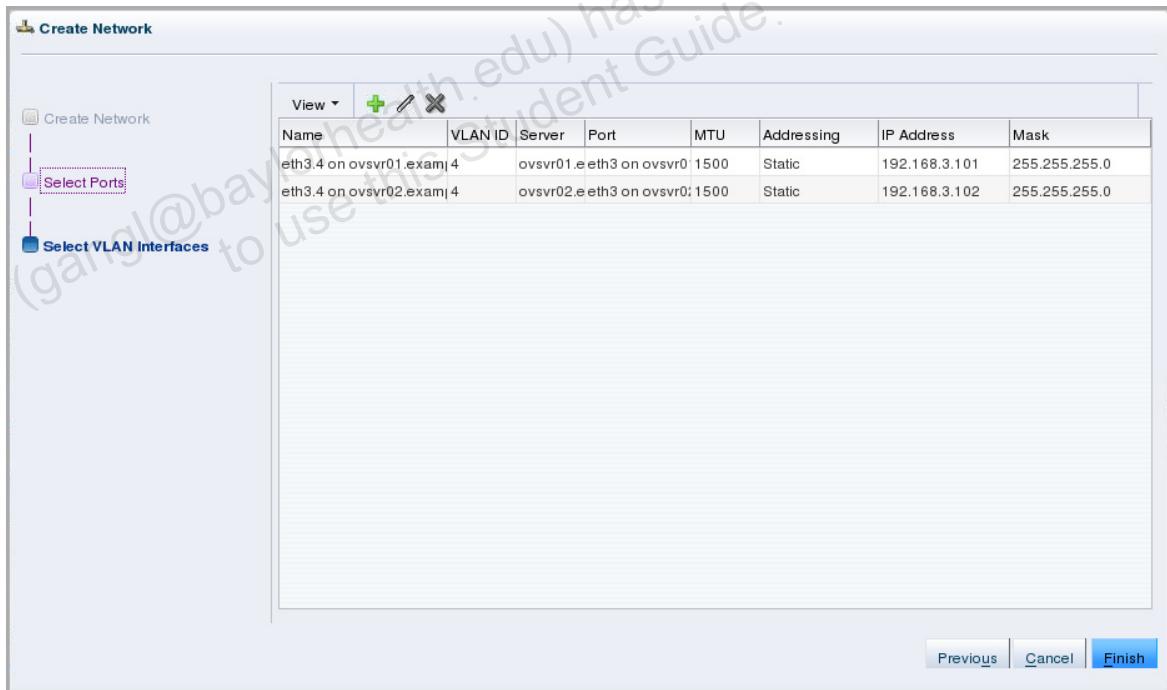
The selected VLAN interface now appears in the list of VLAN interfaces.



- Click the Add VLAN Interfaces icon again and repeat the previous steps to add the `eth3.4` VLAN interface for the second Oracle VM server, `ovsvr02.example.com`.



After adding the VLAN interfaces for VLAN ID 4 for both Oracle VM servers, the “Select VLAN Interfaces” screen looks like the following screenshot:



- Click the Finish button to trigger the creation of the `storage_net` network.

Your new network, called `storage_net`, appears in the list of networks on the Networking tab.

The screenshot shows the Oracle VM Server interface with the Networking tab selected. The main window displays a table of networks. The columns are: Name, ID, Intra-Network Server, and Network Channels (Server Management, Cluster Heartbeat, Live Migrate, Storage, Virtual Machine). The Description column is also present. The rows show five networks: 192.0.2.0, hb_net, storage_net (selected), and vm_net. The storage_net row has a highlighted ID value of 10cd3eee96.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓		✓			
hb_net	101183c7ed			✓				
storage_net	10cd3eee96					✓		
vm_net	10d2be49e8						✓	

Note: You do not use this new network, `storage_net`, in the rest of the lab practices. You created this network to learn about VLAN interfaces and how VLAN interfaces are used to create networks with VLAN support. In your lab environment, the storage traffic (NFS and iSCSI) uses the management network.

Appendix A: Tips on Using the Oracle VM CLI

Overview

In this appendix, you learn tips for using the Oracle VM CLI.

You can find the complete list of CLI commands, with explanation and examples, in the *Oracle VM Command Line Interface User's Guide*, Part Number E50252-01 or later.

Tips

- From your lab machine, start an Oracle VM CLI session.

```
[root@<your lab machine> ~]# ssh -l admin ovmmgr01.example.com \
-p 10000
OVM>
```

- To list Oracle VM objects, use the `list <object>` command.

Example:

```
OVM> list server
Command: list server
Status: Success
Time: ...
Data:
    id:b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
        name:ovsvr01.example.com
    id:39:7e:44:79:65:0b:5b:d7:ec:60:d1:ed:b0:d3:e2:99
        name:ovsvr02.example.com
OVM>
```

The `list` command lists all instances for an object. To find out more about a particular instance, use the `show` command, which is discussed next.

- To display information for a particular instance of an object, use the `show` command.

Example:

```
OVM> show server name=ovsvr01.example.com
Command: show server name=ovsvr01.example.com
Status: Success
Time: ...
Data:
    Status = Running
    Role 1 = Utility
    Role 2 = Vm
    Ip Address = 192.0.2.101
    Maintenance Mode = Off
    Inbound Migration Locked = No
    Agent Login = oracle
    ...
    Host Name = ovsvr01.example.com
    Manager UUID = 0004fb00000100002390716cb97d53cf
```

```

Server Ability - Cluster = Yes
Server Ability - Nfs = Yes
Server Ability - iSCSI = Yes
...
Server Ability - PowerOn WOL = Yes
Server Ability - Repo On SharedDisk = Yes
Server Ability - Repo On LocalDisk = Yes
Server Ability - ClusterFs On PhysicalDisk = Yes
Server Ability - VmEmptyCdrom = Yes
Manufacturer = Xen
Product Name = HVM domU
Serial Number = b88b9fea-a86e-da0f-6d74-51a942867186
Up To Date = Yes
Control Domain 1 = 0004fb0000210000d7ceab47db959e68
                           [Control Domain]
Cpu 1 = Processor (1) in
           b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
Hypervisor Type = XEN
Cpu Compatibility Group = Default_Intel_F6_M23_NoNx
                           [Default_Intel_Family:6_Model:23_NoNx]
Ethernet Port 1 = 0004fb00002000003f29ba9b4748eb09 [eth0 on
                           ovsrv01.example.com]
Ethernet Port 2 = 0004fb0000200000ebe10cd07bc9501e [eth1 on
                           ovsrv01.example.com]
Ethernet Port 3 = 0004fb0000200000585a07e0decdda15 [eth2 on
                           ovsrv01.example.com]
Ethernet Port 4 = 0004fb000020000084bf0c1484c1acdf [eth3 on
                           ovsrv01.example.com]
Bond Port 1 = 0004fb00002000003be515a49ff93e3d [bond0 on
                           ovsrv01.example.com]
...
Physical Disk 1 = 0004fb000018000010b015d225f0c9c2
                           [1ATA_QEMU_HARDDISK_QM00002]
Id = b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
                           [ovsrv01.example.com]
Name = ovsrv01.example.com
Locked = false
OVM>

```

The `show` command displays information for a single instance of an object. You must specify the instance by using its UUID or name, as stored in the Oracle VM Manager database.

Note: The previous example has been reformatted and sections of the output have been removed to make it easier to read.

4. To find out all object types, use the `list ?` command.

Example:

```
OVM> list ?
AccessGroup
AntiAffinityGroup
Assembly
AssemblyVirtualDisk
AssemblyVm
BondPort
ControlDomain
Cpu
CpuCompatibilityGroup
FileServer
FileServerPlugin
FileSystem
Job
Manager
Network
PeriodicTask
PhysicalDisk
Port
Repository
RepositoryExport
Server
ServerController
ServerPool
ServerPoolNetworkPolicy
ServerUpdateGroup
ServerUpdateRepository
StorageArray
StorageArrayPlugin
StorageInitiator
Tag
VirtualCdrom
VirtualDisk
VlanInterface
Vm
VmCloneCustomizer
VmCloneNetworkMapping
VmCloneStorageMapping
VmDiskMapping
Vnic
```

```
VolumeGroup
```

```
OVM>
```

- For general help about command syntax, use the `help` command.

Example:

```
OVM> help
For Most Object Types:
  list <objectType>
  show <objectType> <instance>
  create <objectType> [(attribute1)="value1"] ... [on
<objectType> <instance>]
  edit <objectType> <instance> (attribute1)="value1" ...
  delete <objectType> <instance>
For Most Object Types with Children:
  add <objectType> <instance> to <objectType> <instance>
  remove <objectType> <instance> from <objectType> <instance>
Client Session Commands:
  set outputMode=[Verbose, XML, Sparse]
  set endLineChars=[CRLF, CR, LF]
  showobjtypes
  showallcustomcmds
  showcusomcmds <objectType>
  showversion
  exit
OVM>
```

The `help` command does not show all available commands. For example, the `migrate` or `refresh` commands are not shown. Use the `help` command to display general command syntax.

- For more complex commands, use the context-sensitive help, with the `?` character, to discover options for a particular command.

- Example with the `discoverServer` command:

Start with the `discoverServer` command itself, add the `?` character, and press Enter to display the required parameters.

```
OVM> discoverServer ?
          *ipAddress
          *password
          *takeOwnership
OVM>
```

The command returns with the list of required parameters.

- b. Example with the `create network` command:

```
OVM> create network ?
      *name
      description
      roles
      on

OVM>
```

7. Oracle VM CLI commands are not case-sensitive.

- a. Commands are not case-sensitive. For example, you can use the following commands to list servers.

```
OVM> list server
```

or

```
OVM> List Server
```

- b. Data values for objects are case-sensitive. You must use the data value as specified when the object was created. For example, if you created a virtual machine named `MyVM`, you must use this name when referring to this virtual machine in a command.

```
OVM> show vm name=MyVM
```

8. Use the up or down arrow keys to step through the list of commands entered in the current session, to retrieve a previously entered command.

9. The Oracle VM CLI supports tab completion. Press the Tab key to auto-complete a command.

Example with the `discoverServer` command:

```
OVM> disc ← Press Tab key
```

The rest of the command appears:

```
OVM> discoverServer
```

Unauthorized reproduction or distribution prohibited. Copyright© 2019, Oracle and/or its affiliates.

GANG LIU (gangli@baylorhealth.edu) has a non-transferable license
to use this Student Guide.

Practices for Lesson 4: Managing Storage

Chapter 4

Practices for Lesson 4: Overview

Practices Overview

In these practices, you manage the storage needed in your Oracle VM environment to:

- a. Create a clustered server pool
- b. Create repositories
- c. Provide physical disks to your virtual machines

To configure the storage needed for your lab environment, you perform the following tasks:

1. Verify the NFS storage on your lab machine.
2. Discover the generic NFS file server from the Oracle VM Manager UI or the Oracle VM Manager CLI.
3. Verify the presence of iSCSI targets and LUNs on your lab machine.
4. Discover the iSCSI generic storage array.
5. Explore available operations on the physical disks.
6. Install the Oracle ZFS Storage Appliance plug-in.

Practice 4-1: Verify the NFS Storage on Your Lab Machine

Overview

In this practice, you verify that the NFS share is available to your two Oracle VM servers.

Tasks

1. Log in to your lab machine and display the exported shares by using the `exportfs` command.
 - a. Start a terminal window from your lab machine.
 - b. Change user to `root`.

```
bash-3.2$ su -
Password: oracle
[root@<your lab machine> ~]#
```

- c. Execute the `exportfs` command.

```
[root@<your Lab Machine> ~]# exportfs
/nfsrepos1      192.168.1.0/255.255.255.0
/nfsrepos1      192.0.2.0/255.255.255.0
```

The NFS share can be accessed from the 192.168.1.0 and 192.0.2.0 subnets.

- d. Display the `/etc/exports` file.

```
[root@<your Lab Machine> ~]# cat /etc/exports
/nfsrepos1
192.168.1.0/255.255.255.0 (rw,sync,no_root_squash,no_subtree_check)
192.0.2.0/255.255.255.0 (rw,sync,no_root_squash,no_subtree_check)
[root@<your lab machine> ~]#
```

The `no_root_squash` parameter allows `root` on the Oracle VM servers to access this network share on your lab machine.

2. Use the `df -h` command to ensure that the NFS file system is mounted.

```
[root@<Your Lab Machine> ~]# df -h
Filesystem           Size   Used  Avail Use% Mounted on
...
/OVS/sharedDisk/nfsrepos1.img
        20G   3.8G   15G  21% /nfsrepos1
...
```

The mounted NFS share is highlighted in bold in the output of the `df -h` command.

Note: The NFS share that will become a repository is 21% full. The share already contains a repository and will be rediscovered by using the Oracle VM Manager UI. For the rediscover operation to succeed, the current Oracle VM Manager was installed by using the same UUID that was assigned to the Oracle VM Manager instance that created and populated the NFS repository.

Practice 4-2: Discover the Generic NFS File Server from the Oracle VM Manager or the Oracle VM CLI

Overview

In this practice, you discover the NFS file server to use the share exported from your lab machine.

You perform this task by using the Oracle VM Oracle VM Manager UI. Instructions for performing the same task using the Oracle VM Manager CLI are provided as a reference.

Assumptions

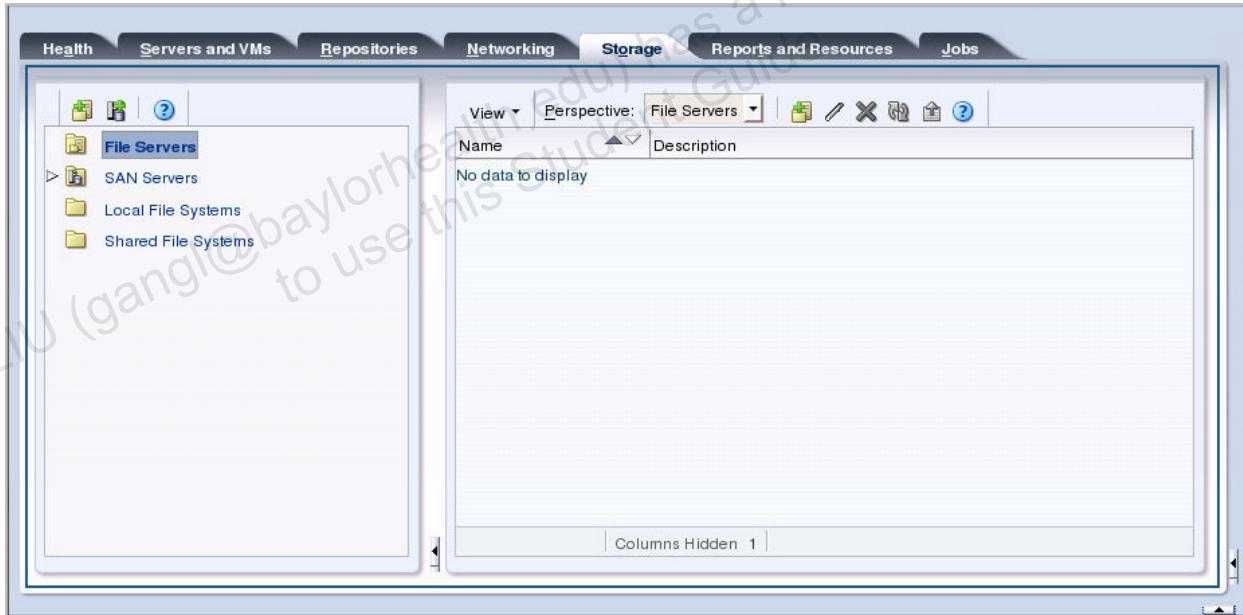
This practice assumes that the verification steps in Practice 4-1 were successful.

Tasks

Using the Oracle VM Manager UI

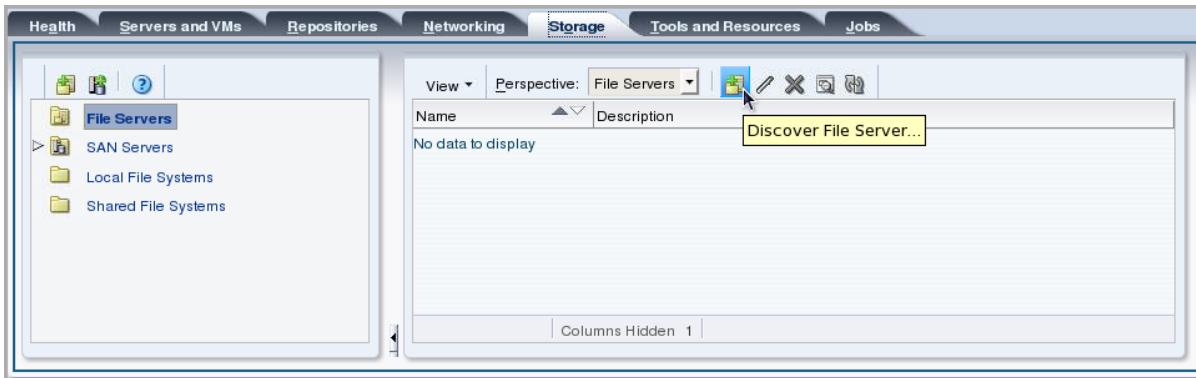
Complete the following steps to discover the generic NFS file server:

1. If your Oracle VM Manager UI session has expired, log in again.
2. Access the Storage directory tree.
 - a. Click the Storage tab.

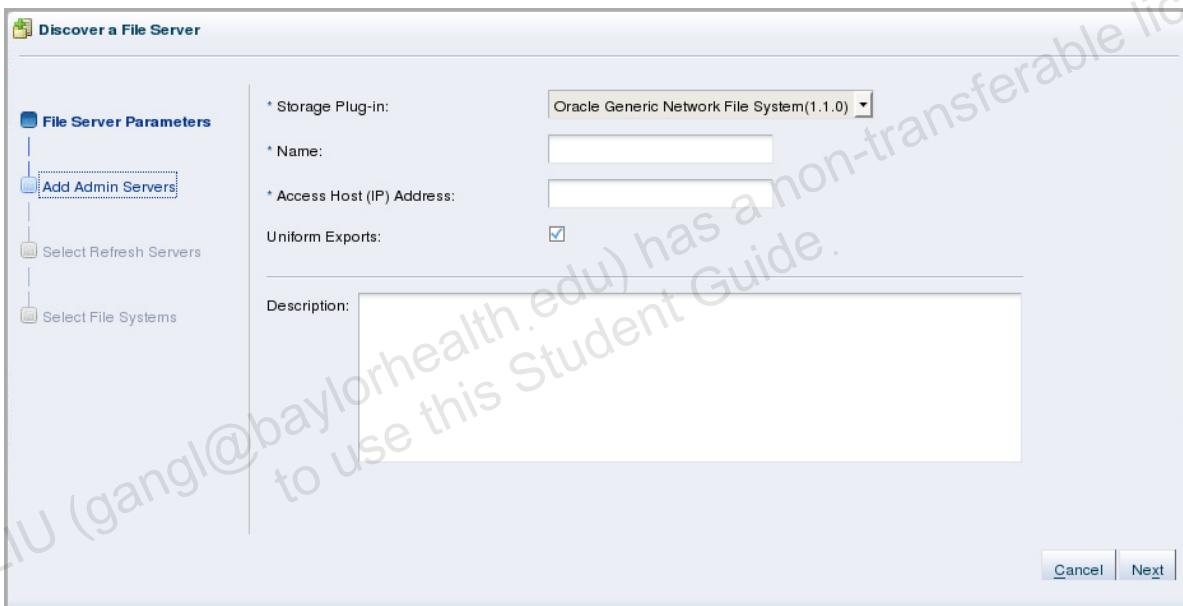


- b. In the navigation tree, if it is not already highlighted, click File Servers. There is no file server configured in your Oracle VM environment.

3. To launch the Discover File Server Wizard, click the Discover File Server icon on the toolbar in the navigation pane or the management pane. The following screenshot shows how to launch the wizard from the management pane:



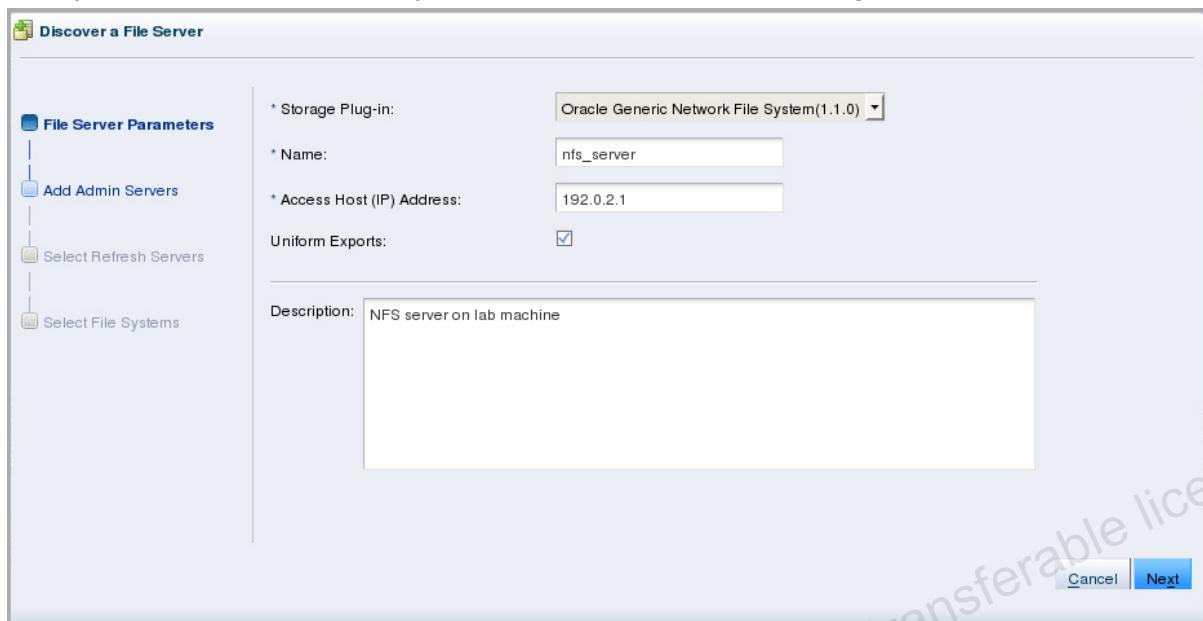
The wizard is launched.



4. Enter the values in the following table in the File Server Parameters screen:

Field	Value
Storage Plug-in	Select Oracle Generic Network File System from the drop-down list.
Name	nfs_server
Access Host (IP) Address	192.0.2.1
Uniform Exports	Leave the check box selected.
Description	NFS server on lab machine

After you enter the information, your screen looks like the following screenshot:



Click Next to continue.

5. On the Add Admin Servers screen, select the two available Oracle VM servers and click the double right-arrow button to move them to the Selected Admin Server(s) list, as shown in the following screenshot:



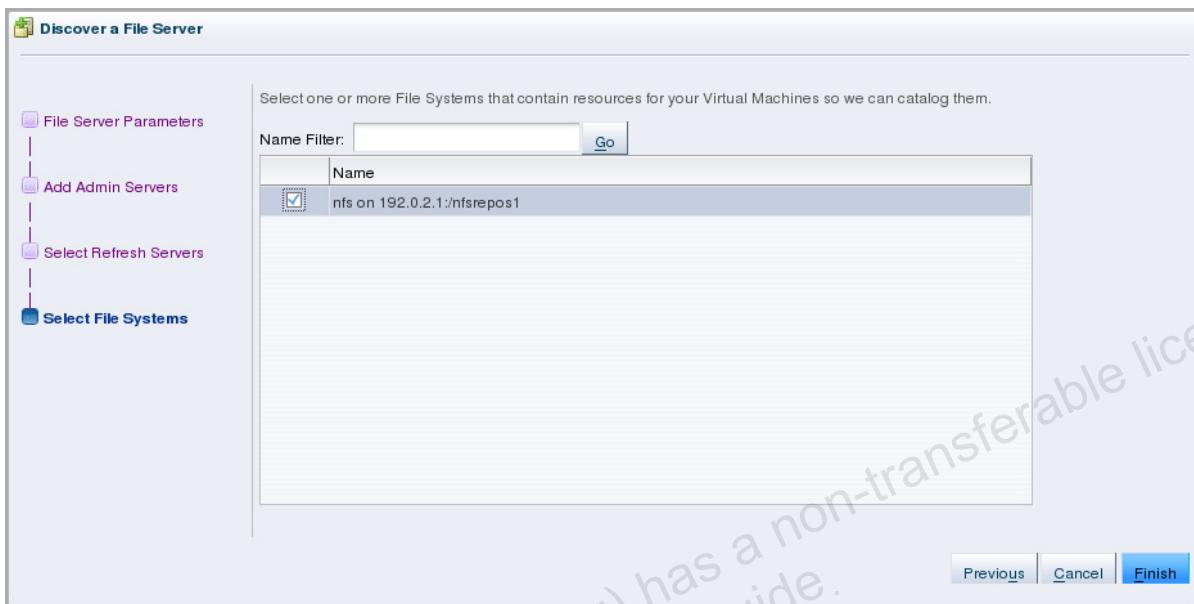
Click Next to continue.

The Oracle VM Manager discovers the NFS server and its shares.

6. The next screen shows the discovered NFS shares.

Select the check box for nfs on 192.0.2.1:/nfsrepos1 to indicate that this share already has a repository on it and that this repository is to be automatically discovered as part of the file server discovery process.

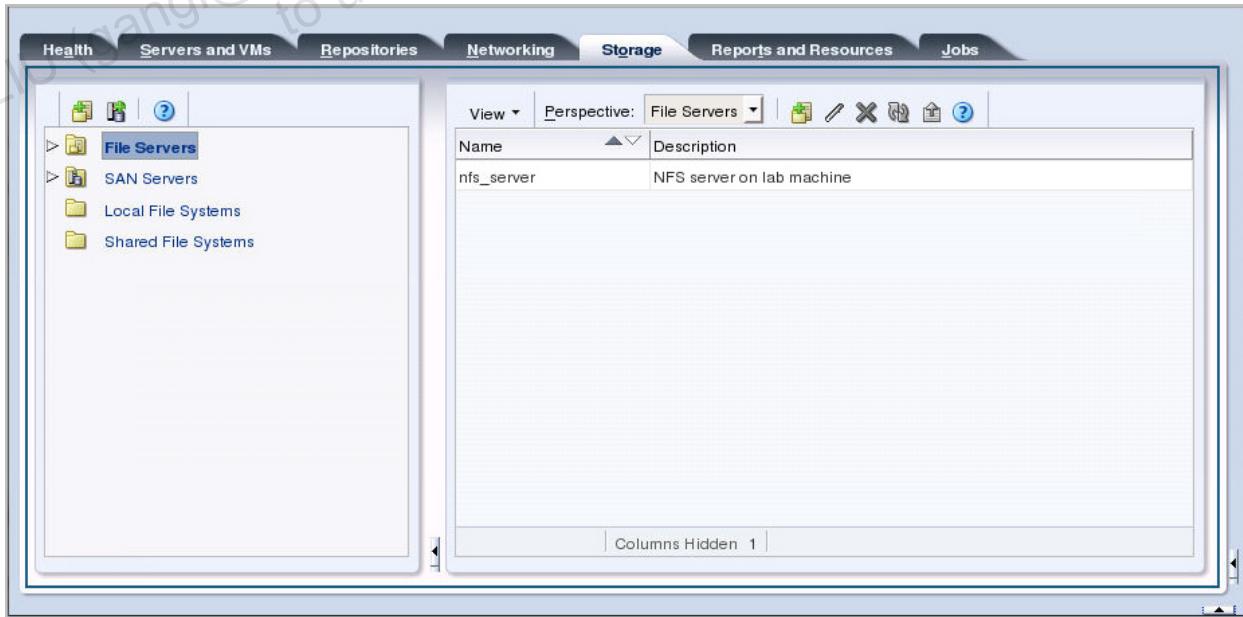
Leave the Name Filter field blank.



Note: If you do not select the check box next to the share with the existing repository, you can rediscover the repository on that share at a later time.

Click Finish to complete the operation.

7. When the operation completes, a new file server appears in the File Servers folder in the navigation tree. Click the Expand button to see the newly discovered file server.



8. Highlight the `nfs_server` file server in the navigation tree and select File Systems from the Perspective drop-down list.

The screenshot shows the Storage perspective in a management interface. The left pane displays a navigation tree with categories like File Servers, SAN Servers, Local File Systems, and Shared File Systems. Under File Servers, the `nfs_server` node is selected. The right pane shows a table titled "File Systems" with one entry: "nfs on 192.0.2.1:/nfsrepos". The table includes columns for Name, Event Severity, Refreshed, Free, Used, Total, and Use. The "Free" column shows 15.90 GiB.

Name	Event Severity	Refreshed	Free	Used	Total	Use
nfs on 192.0.2.1:/nfsrepos	Yes		15.90	3.79	19.69	Rep

Examine the space usage and note that this file system already contains a repository.

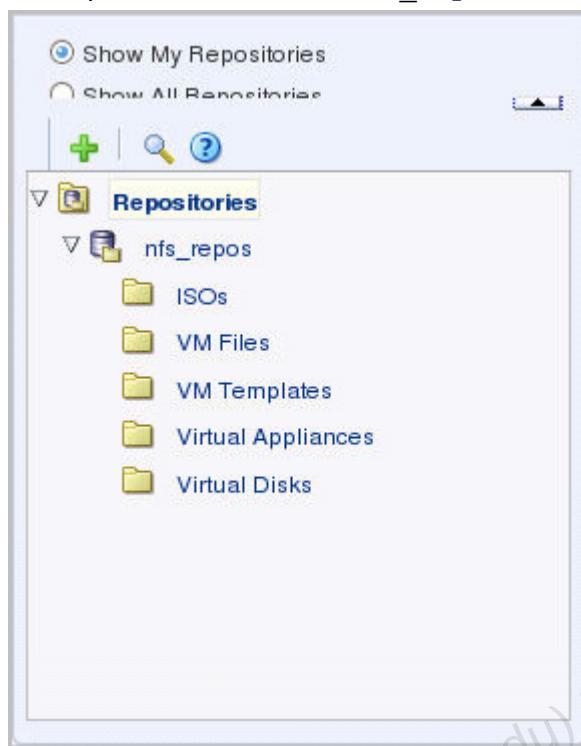
9. Display information about the repository in the `192.0.2.1:/nfsrepos1` share.
a. Click the Repositories tab.

The screenshot shows the Storage perspective with the Repositories tab selected. The left pane displays a list of repositories under the "Repositories" category. The right pane shows a table titled "Repositories" with one entry: "nfs_repos". The table includes columns for Name and File System. The "File System" column shows the UUID of the NFS share.

Name	File System
nfs_repos	613ada9c-cece-4ce0-8300-46991a59319c [nfs on 192.0.2.1:/nfsrepos]

The repository named `nfs_repos` has been discovered as part of the file server discovery process.

- b. Click the Expand button next to the Repositories folder in the navigation tree and click the Expand button next to `nfs_repos`, to expose the folders in the repository.



If you click each folder, you see that the folders are empty. In a practice for the lesson titled “Server Pools and Repositories,” you perform the steps to discover the contents of the `nfs_repos` repository.

10. Refresh the NFS share.

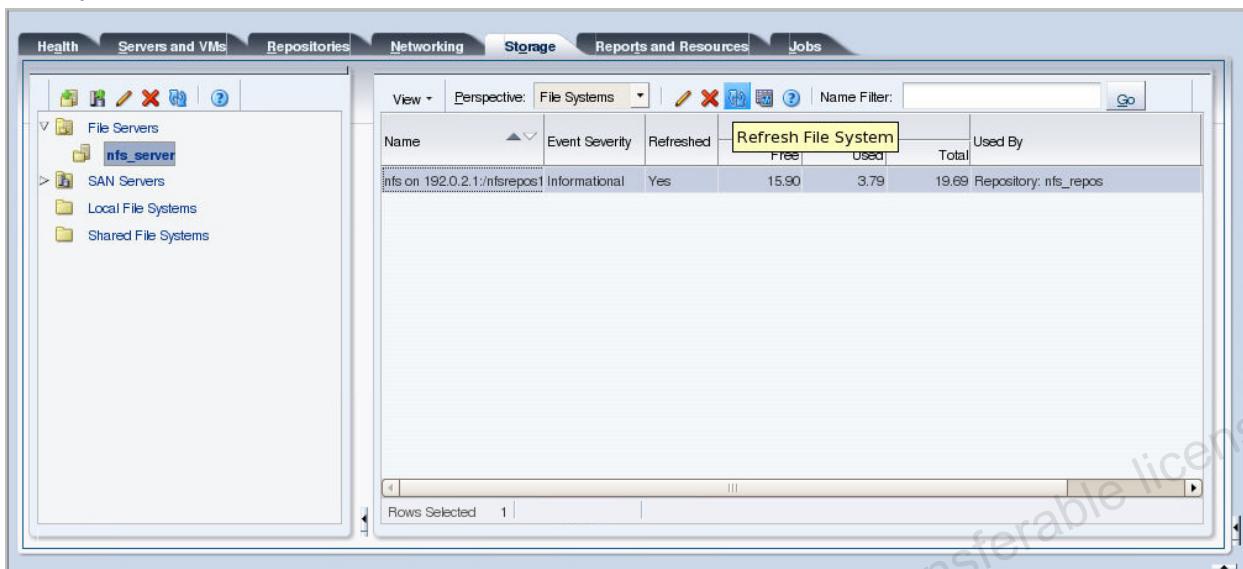
The discovery process of the NFS file server contains several steps:

- Discover the file server.
- Add refresh Oracle VM servers.
- Refresh the file server.
- Refresh the file systems.

You can, however, perform a manual refresh of the NFS share.

- a. Click the Storage tab.
- b. In the navigation pane, highlight the file server, `nfs_server`.
- c. In the management pane, select the File Systems perspective.

- d. Highlight the nfs on 192.0.2.1:/nfsrepos file system and click the Refresh File System icon.



The job completes, as shown in the Jobs pane:

Job Summary: 28 Total Jobs 0 Pending 0 In Progress 0 Failed 0 Aborted 28 Complete							
Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Refresh File System: nfs on 192.0.2.1:/nfsrepos1	Success			Mar 31, 2016 2:04:38 am	4s	Abort	Details
Refresh File System: nfs on 192.0.2.1:/nfsrepos1	Success			Mar 31, 2016 2:00:35 am	4s	Abort	Details

The NFS share is now ready for use.

Using the Oracle VM CLI - For Reference Only

You cannot use the Oracle VM CLI to do the same task. The instructions here provide you the command syntax needed to discover a generic NFS file server. Continue with the next practice titled “Verify the Presence of iSCSI Targets and LUNs on Your Lab Machine.”

1. Restart the Oracle VM CLI session on your lab machine.

```
[root@<your Lab Machine> ~]# ssh -l admin ovmmgr01.example.com -
p 10000
OVM>
```

2. Use the `create FileServer` CLI command to discover the file server.

- To list the syntax for the command, enter “`create fileserver`” and press the space bar.

```
OVM> create fileserver
```

If the command does not return, it indicates that you must supply additional parameters for the command.

- b. Enter ? to list the parameters that are required for this operation.

```
OVM> create fileServer ?
      *accessHost
      *adminServers
      *name
      *plugin
      description
      refreshServers
      uniformedExports

OVM>
```

Parameters with an asterisk are required.

To construct the `create fileServer` command, use the information in the following table. Use the additional CLI commands in the table to discover information about the `adminServers` and `plugin` parameters that you must supply to the `create fileServer` command:

Parameter	Value	CLI Command
AccessHost	192.0.2.1 (your lab machine)	
adminServers	All Oracle VM servers available	<code>list server</code>
name	nfs_server	
plugin	The plug-in for the generic file server	<code>list FileServerPlugin</code>
description	NFS server on lab machine	
All other parameters	A default value	

- c. Find the list of potential admin servers by using the `list server` command.

The two Oracle VM servers that you added to your Oracle VM environment can be used as admin servers, which means that either server can be selected by the Oracle VM Manager to perform admin functions on the file server that you are creating.

```
OVM> list server
Command: list server
Status: Success
Time: ...
Data:
      id:b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
              name:ovsvr01.example.com
      id:39:7e:44:79:65:0b:5b:d7:ec:60:d1:ed:b0:d3:e2:99
              name:ovsvr02.example.com

OVM>
```

- d. Find the name of the plug-in that is associated with a generic file server.

```
OVM> list FileServerPlugin
Command: list FileServerPlugin
Status: Success
Time: ...
Data:
  id:oracle.ocfs2.OCFS2.OCFS2Plugin (0.1.0-47)  name:Oracle
  OCFS2 File system
  id:oracle.generic.NFSPlugin.GenericNFSPlugin (1.1.0)
  name:Oracle Generic Network File System
OVM>
```

You use the Oracle Generic Network File System plug-in.

- e. You now have all the information to construct the `create fileServer` command.

```
OVM> create FileServer accessHost=192.0.2.1
adminServers="ovsvr01.example.com,ovsvr02.example.com"
plugin="Oracle Generic Network File System" name=nfs_server
description="NFS file server on lab machine"
Command: create FileServer accessHost=192.0.2.1
adminServers="ovsvr01.example.com,ovsvr02.example.com"
plugin="Oracle Generic Network File System" name=nfs_server
description="NFS file server on lab machine"
Status: Success
Time: ...
JobId: ...
Data:
  id:0004fb00009000051d4e32a485e5466  name:nfs_server
OVM>
```

The new file server appears on the Storage tab of your Oracle VM Manager UI session.

3. Display information about your new file server to make sure that all the parameters were properly set.

```
OVM> show fileServer name=nfs_server
Command: show fileServer name=nfs_server
Status: Success
Time: ...
Data:
  FileServer Type = Network
  Storage Plug-in = oracle.generic.NFSPlugin.GenericNFSPlugin (1.1.0)
  [Oracle Generic Network File System]
  Access Host = 192.0.2.1
  Admin Server 1 = b8:8b:9f:ea:a8:6e:da:0f:6d:74:51:a9:42:86:71:86
  [ovsvr01.example.com]
  Admin Server 2 = 39:7e:44:79:65:0b:5b:d7:ec:60:d1:ed:b0:d3:e2:99
  [ovsvr02.example.com]
  UniformExports = Yes
```

```

Id = 0004fb000009000051d4e32a485e5466 [nfs_server]
Name = nfs_server
Description = NFS file server on lab machine
Locked = false
OVM>

```

Note that the UniformExports parameter defaulted to Yes but that there are no refresh servers associated with the new file server.

- Add refresh servers to your newly created file server. The refresh servers are Oracle VM servers that are used to refresh the file systems that are available from the file server. You must assign at least one refresh server to a file server with uniform exports.

Use an iterative process to find the parameters required by this command.

- Enter the addRefreshServer command with ?.

```

OVM> addRefreshServer ?
FileServer
OVM>

```

- Add FileServer to your command and use ? again.

```

OVM> addRefreshServer FileServer ?
id=<object identifier> OR
name=<object name>
OVM>

```

- Add the name of your file server, nfs_server, press the space bar, and enter ?.

```

OVM> addRefreshServer FileServer name=nfs_server ?
*server
OVM>

```

- Provide the name of the Oracle VM server that will act as the refresh server.

```

OVM> addRefreshServer FileServer name=nfs_server
server=ovsvr01.example.com
Command: addRefreshServer FileServer name=nfs_server
server=ovsvr01.example.com
Status: Success
Time: ...
JobId: ...
OVM>

```

- Optionally, add the second Oracle VM server as a refresh server.

```

OVM> addRefreshServer FileServer name=nfs_server
server=ovsvr02.example.com
Command: addRefreshServer FileServer name=nfs_server
server=ovsvr02.example.com
Status: Success
Time: ...
JobId: ...
OVM>

```

5. As the final step in creating the file server, execute the command to refresh the file server.
 - a. Use the `refresh` command and find out the objects that can be refreshed.

```
OVM> refresh ?  
AccessGroup  
Assembly  
FileServer  
FileSystem  
PhysicalDisk  
Repository  
Server  
StorageArray  
OVM>
```

Because you are trying to refresh a file server, the object is `FileServer`.

- b. Find the next parameter.

```
OVM> refresh FileServer ?  
id=<object identifier> OR  
name=<object name>  
OVM>
```

- c. Provide the file server name in the form of `name=<object name>` and press the space bar. When you press the space bar, the command executes.

```
OVM> refresh FileServer name=nfs_server  
Command: refresh FileServer name=nfs_server  
Status: Success  
Time: ...  
JobId: ...  
OVM>
```

6. When you use the Oracle VM Manager UI to discover a file server, the wizard gives you a list of file systems that were discovered on the file server. If you select any of the file systems for the file server, the discovery process refreshes that file system. If a repository already exists on that file system, it is discovered.

The steps in this task accomplish the same operation by using the Oracle VM CLI.

- a. Use the `refresh filesystem` command and find the parameters needed for the command.

```
OVM> refresh filesystem ?  
id=<object identifier> OR  
name=<object name>  
OVM>
```

- b. To find the list of file systems available in your environment, use the `list filesystem` command.

```
OVM> list filesystem
Command: list filesystem
Status: Success
Time: ...
Data:
    id:613ada9c-cece-4ce0-8300-46991a59319c  name:nfs on
                                                192.0.2.1:/nfsrepos1
OVM>
```

The name of the only file system is shown in bold in this example.

- c. Construct the `refresh filesystem` command by using the file system name information from the previous command and press the space bar.

```
OVM> refresh filesystem name="nfs on 192.0.2.1:/nfsrepos1"
Command: refresh filesystem name="nfs on 192.0.2.1:/nfsrepos1"
Status: Failure
Time: ...
Error Msg: Couldn't find a FileSystem object with the identifier
of nfs on 192.0.2.1:nfsrepos1.
OVM>
```

The command failed.

Problem: Name not recognized

Solution: If the object name contains slashes, you must escape them by using an additional slash.

- d. Re-issue the command and provide an additional slash (/) in front of `nfsrepos1`.

```
OVM> refresh filesystem name="nfs on 192.0.2.1://nfsrepos1"
Command: refresh filesystem name="nfs on 192.0.2.1:// nfsrepos1"
Status: Success
Time: ...
JobId: ...
OVM>
```

- e. Did the `refresh filesystem` action discover the repository on the target file system? Use `list repository` to find out.

```
OVM> list repository
Command: list repository
Status: Success
Time: ...
Data:
  id:0004fb0000030000d87b5dd02a6c4141  name:nfs_repos
OVM>
```

There is now one repository in your environment, called `nfs_repos`. You can also verify the result of your work from your Oracle VM Manager UI session.

The NFS share is now ready for use.

Practice 4-3: Verify the Presence of iSCSI Targets and LUNs on Your Lab Machine

Overview

In this practice, you verify the presence of iSCSI targets and LUNs on your lab machine. The LUNs are used to create repositories and physical disks.

Tasks

1. If you are not already logged in, log in to your lab machine, open a terminal window, and change user to root.

```
bash-3.2$ su -  
Password: oracle  
[root@<your lab machine> ~]#
```

2. Issue the `tgt-admin --show` command to display the iSCSI targets and the associated LUNs.

```
[root@<your lab machine> ~]# tgt-admin --show  
Target 1: iqn.2011-12.com.example.mypc:tgt1  
    System information:  
        Driver: iscsi  
        State: ready  
    I_T nexus information:  
    LUN information:  
        LUN: 0  
            Type: controller  
            SCSI ID: IET      00010000  
            SCSI SN: beaf10  
            Size: 0 MB, Block size: 1  
            Online: Yes  
            Removable media: No  
            Readonly: No  
            Backing store type: null  
            Backing store path: None  
            Backing store flags:  
        LUN: 1  
            Type: disk  
            SCSI ID: IET      00010001  
            SCSI SN: beaf11  
            Size: 13631 MB, Block size: 512  
            Online: Yes  
            Removable media: No  
            Readonly: No  
            Backing store type: rdwr
```

```
Backing store path:  
    /OVS/sharedDisk/iscsiPoolfs1.img  
Backing store flags:  
LUN: 2  
    Type: disk  
    SCSI ID: IET      00010002  
    SCSI SN: beaf12  
    Size: 60130 MB, Block size: 512  
    Online: Yes  
    Removable media: No  
    Readonly: No  
    Backing store type: rdwr  
    Backing store path:  
        /OVS/sharedDisk/iscsiRepos1.img  
    Backing store flags:  
LUN: 3  
    Type: disk  
    SCSI ID: IET      00010003  
    SCSI SN: beaf13  
    Size: 10737 MB, Block size: 512  
    Online: Yes  
    Removable media: No  
    Readonly: No  
    Backing store type: rdwr  
    Backing store path: /OVS/sharedDisk/physDisk1.img  
    Backing store flags:  
LUN: 4  
    Type: disk  
    SCSI ID: IET      00010004  
    SCSI SN: beaf14  
    Size: 10737 MB, Block size: 512  
    Online: Yes  
    Removable media: No  
    Readonly: No  
    Backing store type: rdwr  
    Backing store path: /OVS/sharedDisk/physDisk3.img  
    Backing store flags:  
Account information:  
ACL information:  
    192.0.2.101  
    192.0.2.102  
Target 2: iqn.2011-12.com.example.mypc:tgt2  
System information:
```

```
Driver: iscsi
State: ready
I_T nexus information:
LUN information:
    LUN: 0
        Type: controller
        SCSI ID: IET      00020000
        SCSI SN: beaf20
        Size: 0 MB, Block size: 1
        Online: Yes
        Removable media: No
        Readonly: No
        Backing store type: null
        Backing store path: None
        Backing store flags:
    LUN: 1
        Type: disk
        SCSI ID: IET      00020001
        SCSI SN: beaf21
        Size: 10737 MB, Block size: 512
        Online: Yes
        Removable media: No
        Readonly: No
        Backing store type: rdwr
        Backing store path: /OVS/sharedDisk/physDisk2.img
        Backing store flags:
    LUN: 2
        Type: disk
        SCSI ID: IET      00020002
        SCSI SN: beaf22
        Size: 10737 MB, Block size: 512
        Online: Yes
        Removable media: No
        Readonly: No
        Backing store type: rdwr
        Backing store path: /OVS/sharedDisk/physDisk4.img
        Backing store flags:
Account information:
ACL information:
    192.0.2.101
    192.0.2.102
[root@<your lab machine> ~]#
```

Note: There is no information in the I_T nexus information section in the output of the tgt-admin --show command, because no initiator-to-target connections are established yet.

The available targets and LUNs are summarized in the following table:

Target	LUN - Size
1	0 - Size 0 MB (controller)
	1 - Size 13631 MB
	2 - Size 60130 MB
	3 - Size 10737 MB
2	4 - Size 10737 MB
	0 - Size 0 MB (controller)
	1 - Size 10737 MB
	2 - Size 10737 MB

You use these LUNs in several practices throughout this course. LUN usage is described in the next practice.

Practice 4-4: Discover the iSCSI Generic Storage Array

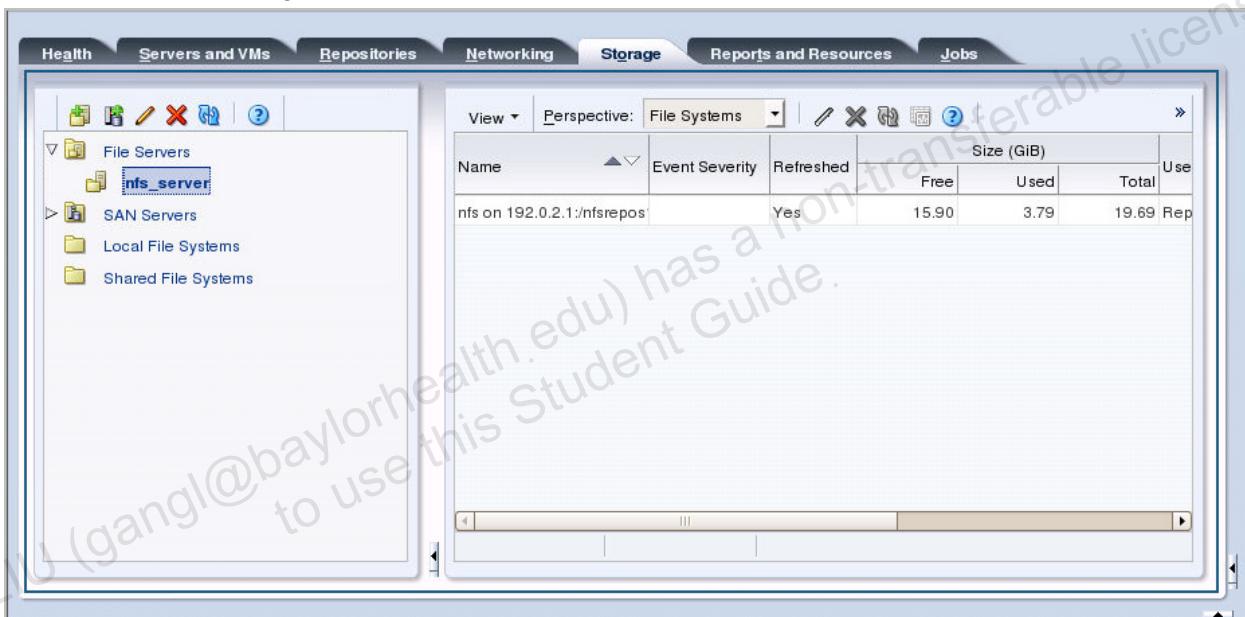
Overview

In this practice, you discover your lab machine as an iSCSI storage array. The iSCSI storage array on your lab machine is considered a generic storage array because it does not use a Storage Connect vendor plug-in. It uses the standard generic SCSI plug-in, which is already available in each installed Oracle VM server.

You perform this practice by using the Oracle VM Manager UI only.

Tasks

1. Prepare to discover the iSCSI storage array as a SAN Server.
 - a. Access and log in to the Oracle VM Manager UI.
 - b. Access the Storage tab from the main window.



- c. Click the Expand button next to the SAN Servers folder in the navigation tree.



- d. Click the Expand button next to Unmanaged FibreChannel Storage Array and Unmanaged iSCSI Storage Array. Click all the Expand buttons to display the entire tree structure for these default storage arrays.



LUNs that might appear under these unmanaged storage arrays are seen by the Oracle VM servers, but no other information is available to the Oracle VM Manager. In your lab environment, there are no LUNs appearing in either of the two unmanaged storage arrays.

2. Launch the discovery of your iSCSI storage array by clicking the Discover SAN Server icon on the toolbar.



3. On the screens presented by the Discover SAN Server Wizard, enter information about your storage array.

This information is summarized in the following table:

Field/Check Box	Screen Name	Value
Name	Discover SAN Server	iscsi_server
Description	Discover SAN Server	iSCSI server on lab machine
Storage Type	Discover SAN Server	Select iSCSI Storage Server from the drop-down list.
Storage Plug-in	Discover SAN Server	Select Oracle Generic SCSI Plugin from the drop-down list.
Use Chap	Access Information	Do not select the check box.
Access Host	Create Access Host	192.0.2.1
Access Port	Create Access Host	3260

- a. On the first screen of the wizard:
 - Enter a name and description for the storage array
 - Select iSCSI Storage Server from the Storage Type drop-down list, as shown in the following screenshot:

Discover SAN Server

Discover SAN Server

Access Information (if required)

Set Storage Name (if required)

Add Admin Servers

Manage Access Group (if required)

* Name:	iscsi_server
Description:	iSCSI server on lab machine
Storage Type:	iSCSI Storage Server
* Storage Plug-in:	iSCSI Storage Server FibreChannel
Plug-in Private Data:	[Empty]
* Admin Host:	[Empty]
* Admin Username:	[Empty]
* Admin Password:	[Empty]

Cancel **Next**

- Select Oracle Generic SCSI Plugin from the Storage Plug-in drop-down list.

Discover SAN Server

Discover SAN Server

Access Information (if required)

Set Storage Name (if required)

Add Admin Servers

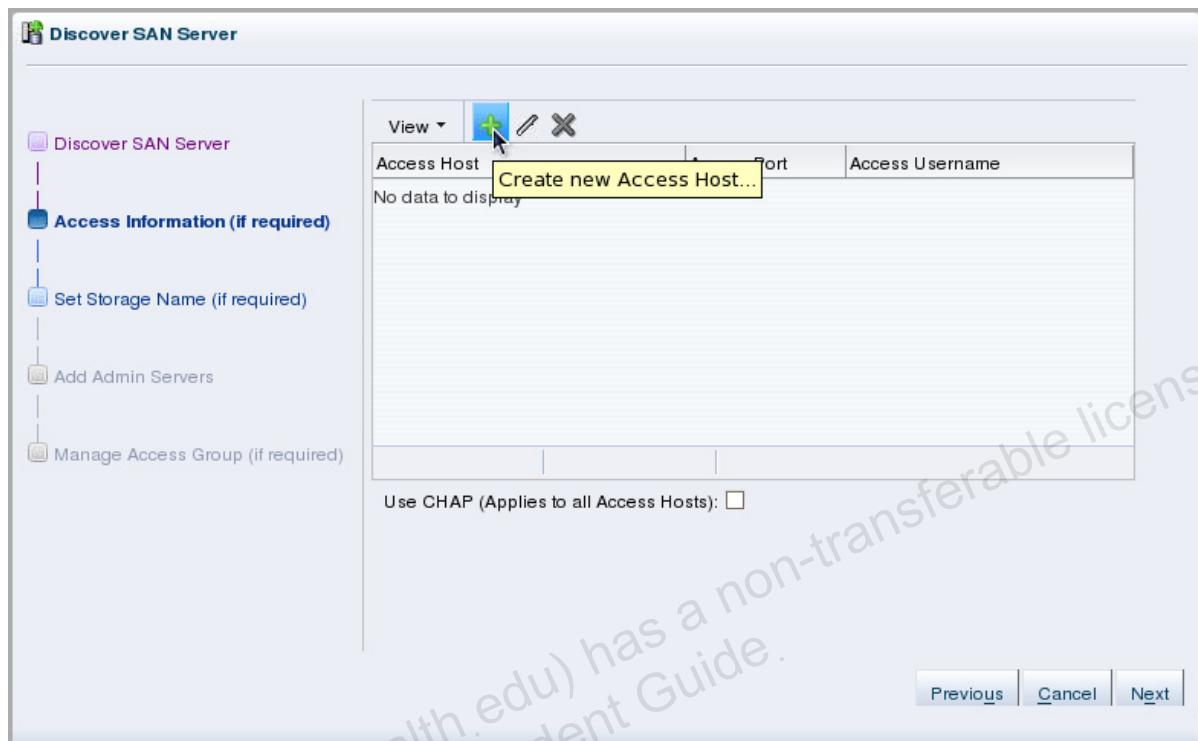
Manage Access Group (if required)

* Name:	iscsi_server
Description:	iSCSI server on lab machine
Storage Type:	iSCSI Storage Server
* Storage Plug-in:	Oracle Generic SCSI Plugin
Plug-in Private Data:	[Empty]
* Admin Host:	[Empty]
* Admin Username:	[Empty]
* Admin Password:	[Empty]

Cancel **Next**

Click Next to continue.

- b. The Access Information screen appears.
- Do not select the Use CHAP check box.
 - Click the Create New Access Host icon on the toolbar.



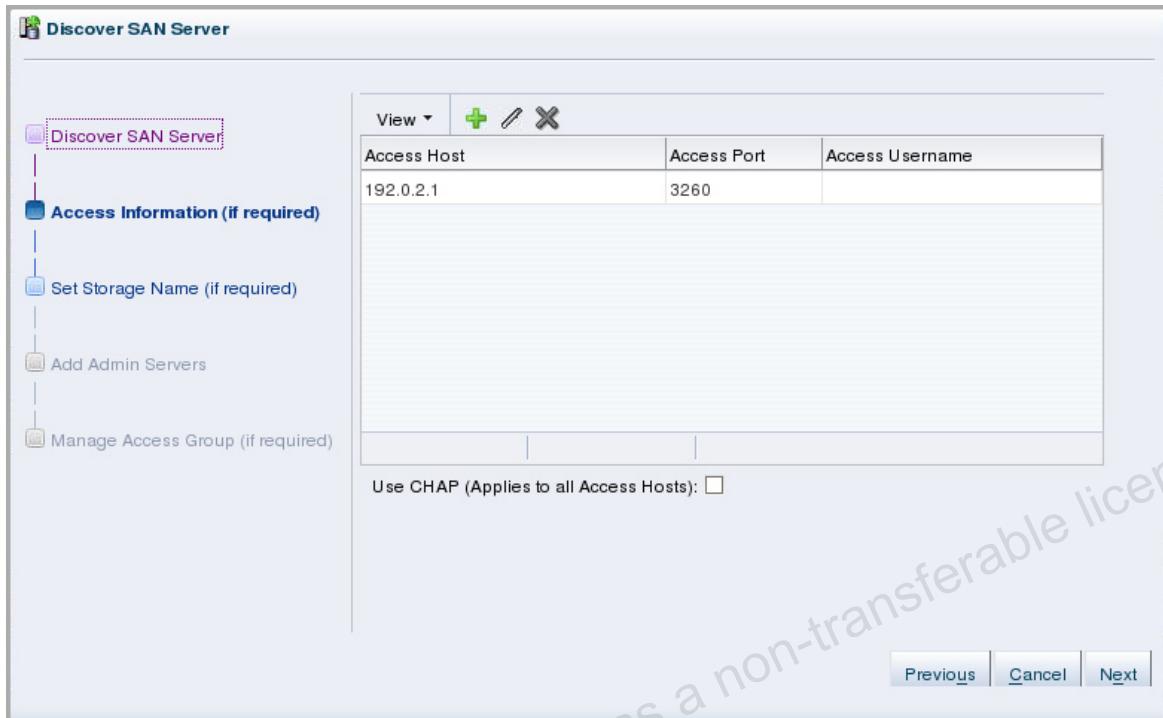
- c. On the Create Access Host screen, enter 192.0.2.1 as the Access Host and 3260 as the Access Port (the default port used by the iSCSI protocol).



The Access Username and Access Password fields are disabled because you did not elect, on the previous screen, to use CHAP.

Click OK to add the access host for your new iSCSI storage array.

- d. The new access host appears on the Access Information screen.



Click Next to continue.

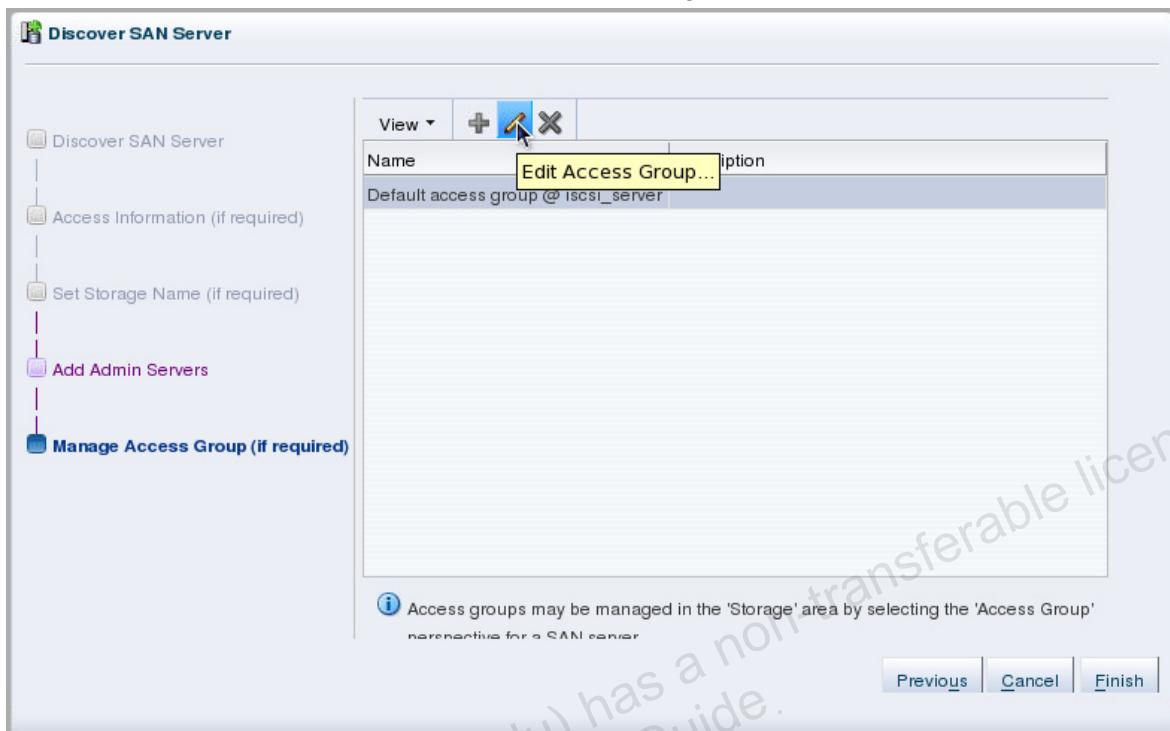
- e. On the Add Admin Servers screen, you select the Oracle VM servers that can connect to this iSCSI storage server.

Click the double right-arrow button to move both Oracle VM servers to the Selected Server(s) pane.

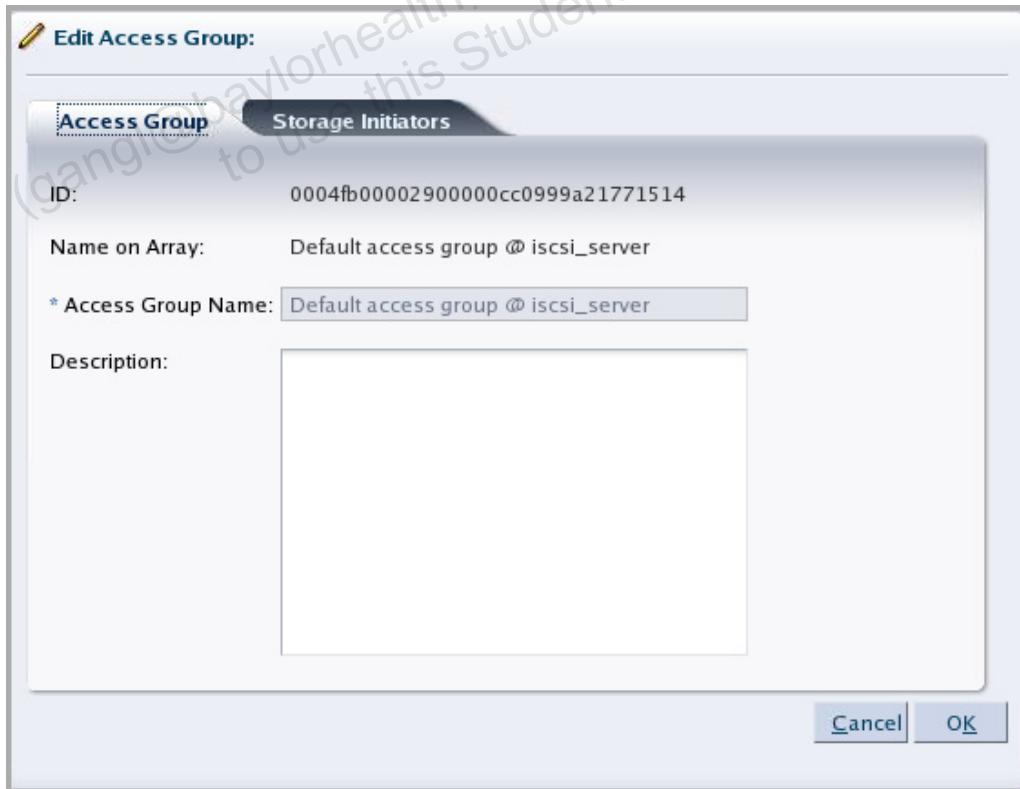


Click Next to continue.

- f. The Manage Access Group screen appears. Select the default access group and click the Edit Access Group icon, as shown in the following screenshot:

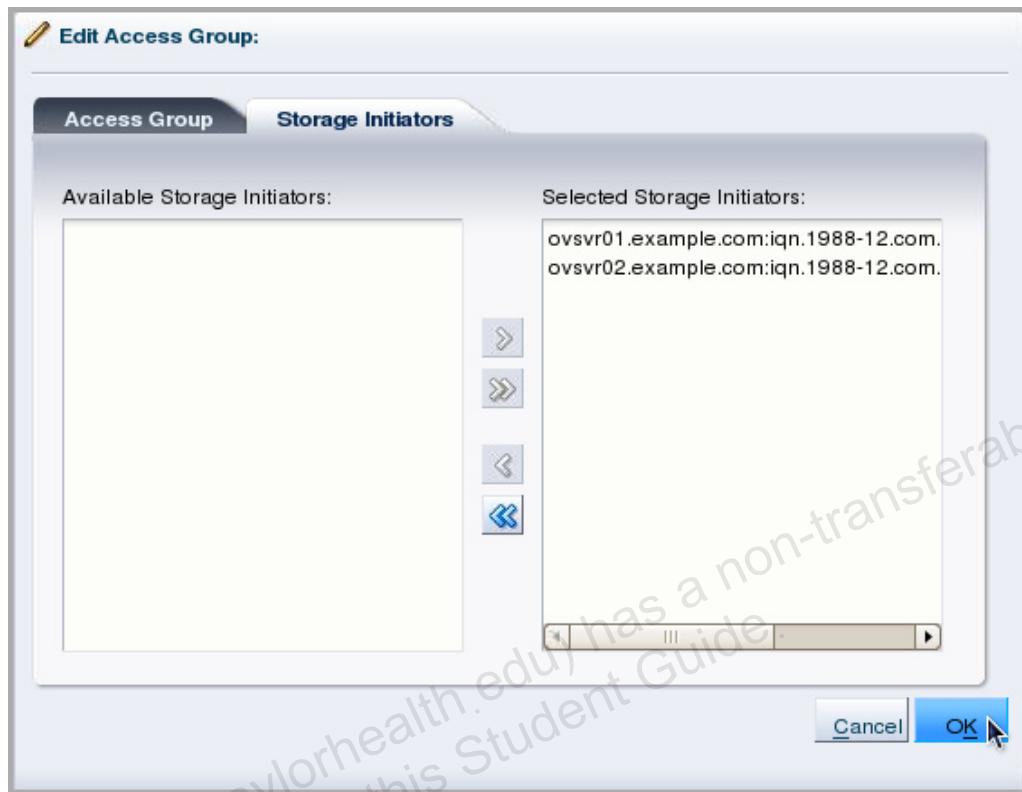


The Edit Access Group screen appears. This screen has two tabs.



On the Access Group tab, you can provide a description for the default access group.

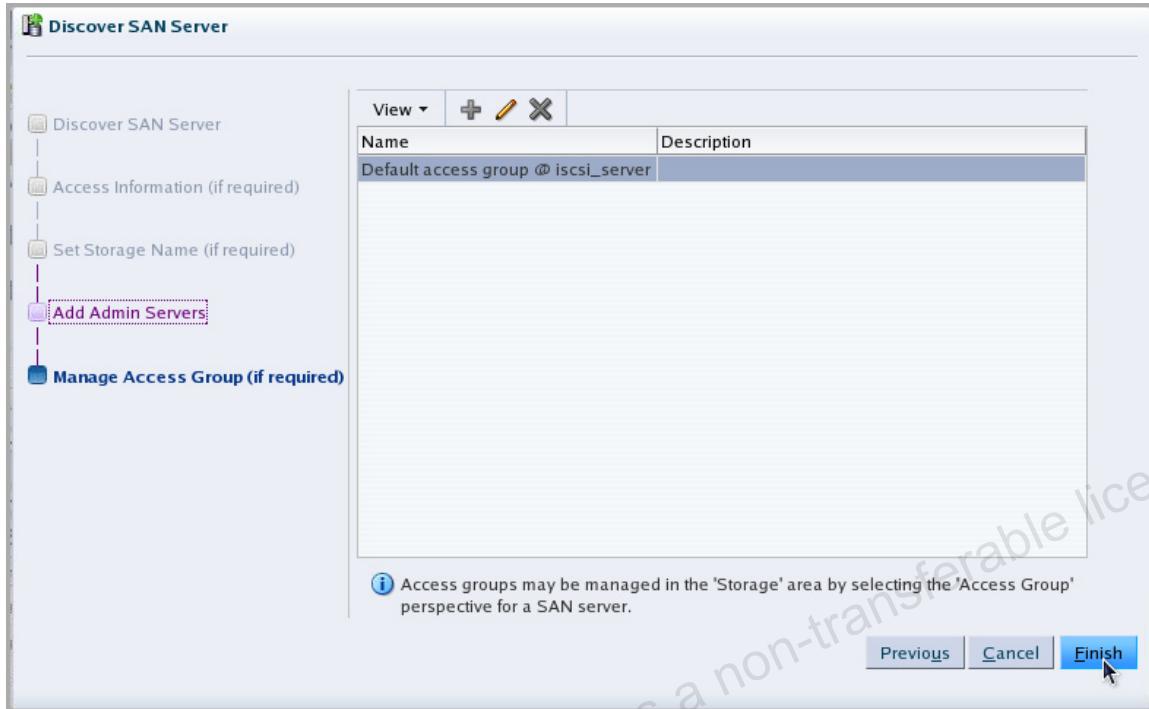
- g. Click the Storage Initiators tab.
- h. On the Storage Initiators tab, click the double right-arrow button to move the two available Oracle VM servers to the Selected Storage Initiators pane, as shown in the following screenshot:



Note: Each initiator, one for each Oracle VM server, acts as an iSCSI client to access resources from the iSCSI server on your lab machine.

- i. Click OK to complete the edit operation.
You are returned to the Manage Access Group screen.

- j. Click Finish to complete the discovery process for your iSCSI storage array.



The discovery process triggers several jobs that you can examine in the Job Summary pane.

- k. When the last storage initiator is added to the access group, highlight SAN Servers in the navigation tree to display the new storage array in the list of SAN Servers in the management pane.

Name	Status	Size (GiB)			Total
		Allocated	Free	Used	
Unmanaged FibreChanne		0.00	0.00	0.00	0
Unmanaged iSCSI Storag		0.00	0.00	0.00	0
iscsi_server	offline	0.00	0.00	0.00	0

Note: There might be a lock on the new SAN server if the last refresh operation has not yet completed.

4. View the physical disks that are available in your newly discovered storage array.
- Select the new storage array, `iscsi_server`, in the navigation pane. The list of physical disks that are available for use is displayed in the management pane.

The screenshot shows the Storage Management interface. The navigation pane on the left lists categories like File Servers, SAN Servers, Local File Systems, and Shared File Systems. Under SAN Servers, there are Unmanaged FibreChannel Storage Array, Unmanaged iSCSI Storage Array, and `iscsi_server`. The `iscsi_server` node is expanded, showing a sub-node for Generic_ISCSI_Volume_Group. The management pane on the right displays a table titled "Physical Disks". The table has columns for Name, Event Severity, Size (GiB), Server, Status, and Share. Six entries are listed, all named IET (1) through IET (6), with sizes ranging from 10.0 to 56.0 GiB, all listed as "Informational" severity, "ovsvr01.example.c" server, and "online" status.

Name	Event Severity	Size (GiB)	Server	Status
IET (1)	Informational	12.7	ovsvr01.example.c	online
IET (2)	Informational	56.0	ovsvr01.example.c	online
IET (3)	Informational	10.0	ovsvr01.example.c	online
IET (4)	Informational	10.0	ovsvr01.example.c	online
IET (5)	Informational	10.0	ovsvr01.example.c	online
IET (6)	Informational	10.0	ovsvr01.example.c	online

Note: If the perspective shown in the management pane is not Physical Disks, select Physical Disks from the Perspective drop-down list.

- If the perspective shown in the management pane is Physical Disks, but no physical disks appear in the management pane, right-click `iscsi_server` in the navigation pane and select Refresh from the shortcut menu. The refresh operation triggers a discovery of the LUNs that are available on the iSCSI server:

Note: You are prompted to confirm the refresh operation. Click OK.

This screenshot is similar to the previous one, showing the Storage Management interface. The navigation pane now shows the `iscsi_server` node selected, and a context menu is open over it. The menu options include Edit, Delete, Refresh (which is highlighted in blue), Generate Report, and Help. The management pane to the right shows the same table of physical disks as before.

5. Examine usage for the available physical disks.

The physical disks that are made available by the new iSCSI storage array on your lab machine are used for several upcoming lab exercises.

The disk usage is summarized in the following table:

Physical Disk or LUN	Usage
IET (1)	Server pool file system
IET (2)	Repository
IET (3)	Unused
IET (4)	Disk cloning
IET (5)	Resource for future virtual machine (pvm1)
IET (6)	Delete disk operation, disk cloning

Practice 4-5: Explore the Available Operations on Physical Disks

Overview

In this practice, you explore the operations that you can perform on the new physical disks exposed by the iSCSI server on your lab machine. However, the operations are limited because you do not have server pools or repositories configured yet.

Tasks

1. Rename one physical disk by using the Oracle VM Manager UI.
 - a. Access the list of physical disks available from your iSCSI server.
 - If your Oracle VM Manager UI session has expired, log in again as the `admin` user, with the password `MyOracle1`.
 - From the Storage tab view, expand the SAN Servers folder in the navigation tree.
 - Highlight `iscsi_server` in the navigation tree and select Physical Disks from the Perspective drop-down list in the management pane.

The list of physical disks appears, as shown in the following screenshot:

The screenshot shows a software interface titled "Physical Disks". At the top, there's a toolbar with icons for creating, deleting, filtering, and help. Below the toolbar is a table with columns: Name, Event Severity, Size (GiB), Server, Status, and Share. The table lists six entries, all named "IET" followed by a number (1 through 6). Each entry has an informational severity level, a size of 10.0 or 12.7 GiB, is associated with the server "ovsvr01.example.c", and is in an "online" status. The "Share" column is partially visible. At the bottom of the table is a scroll bar.

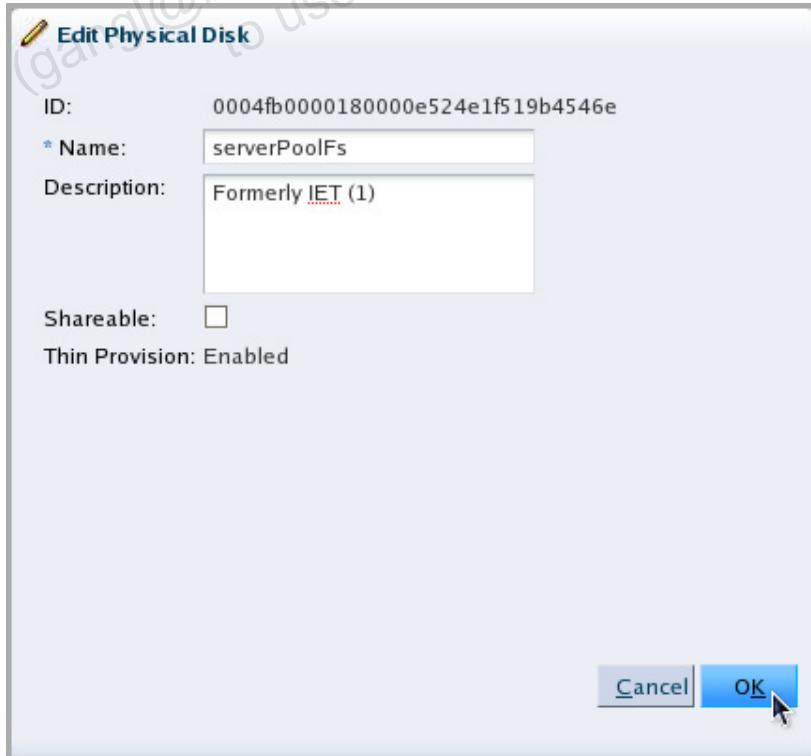
Name	Event Severity	Size (GiB)	Server	Status	Share
IET (1)	Informational	12.7	ovsvr01.example.c	online	
IET (2)	Informational	56.0	ovsvr01.example.c	online	
IET (3)	Informational	10.0	ovsvr01.example.c	online	
IET (4)	Informational	10.0	ovsvr01.example.c	online	
IET (5)	Informational	10.0	ovsvr01.example.c	online	
IET (6)	Informational	10.0	ovsvr01.example.c	online	

- b. Select physical disk IET (1) and click the Edit Physical Disk icon on the toolbar.

Name	Event Severity	Size (GiB)	Status	Shareable
IET (1)	Informational	12.7	ovsvr01.example.c online	 Edit Physical Disk...
IET (2)	Informational	56.0	ovsvr01.example.c online	
IET (3)	Informational	10.0	ovsvr01.example.c online	
IET (4)	Informational	10.0	ovsvr01.example.c online	
IET (5)	Informational	10.0	ovsvr01.example.c online	
IET (6)	Informational	10.0	ovsvr01.example.c online	

- c. In the Edit Physical Disk window, change the name from IET (1) to serverPoolFs and add a comment in the Description field.

Do not share this physical disk by selecting the Shareable check box, because this disk will be used as a server pool file system. Share only the physical disks that are used by the virtual machines, if the guest OS of the virtual machines supports it.



Note: Your physical ID is different.

- Click OK to complete the edit operation.

The new name is displayed in the Physical Disks perspective.

Name	Event Severity	Size (GiB)	Server	Status	Sh
serverPoolFs	Informational	12.7	ovsvr01.example.c	online	
IET (2)	Informational	56.0	ovsvr01.example.c	online	
IET (3)	Informational	10.0	ovsvr01.example.c	online	
IET (4)	Informational	10.0	ovsvr01.example.c	online	
IET (5)	Informational	10.0	ovsvr01.example.c	online	
IET (6)	Informational	10.0	ovsvr01.example.c	online	

- Rename a second physical disk by using the Oracle VM CLI.

- Access the Oracle VM CLI.

```
[root@<your Lab Machine> ~]# ssh -l admin ovmmgr01.example.com -p 10000
OVM>
```

- List the physical disks that are available in your environment.

```
OVM> list physicaldisk
Status: Success
Time: ...
Data:
    id:0004fb0000180000e524e1f519b4546e    name:serverPoolFs
    id:0004fb0000180000972c92081aa5c2dd
name:1ATA_QEMU_HARDDISK_QM00004
    id:0004fb000018000032702e9aad98aa85    name:IET (2)
    id:0004fb000018000010b015d225f0c9c2
name:1ATA_QEMU_HARDDISK_QM00002
    id:0004fb0000180000fef0cd10a4dc410e    name:IET (6)
    id:0004fb000018000042ffb38776a9622c    name:IET (4)
    id:0004fb0000180000997e0a5749837cb8    name:IET (5)
    id:0004fb000018000039a587a982031333    name:IET (3)
OVM>
```

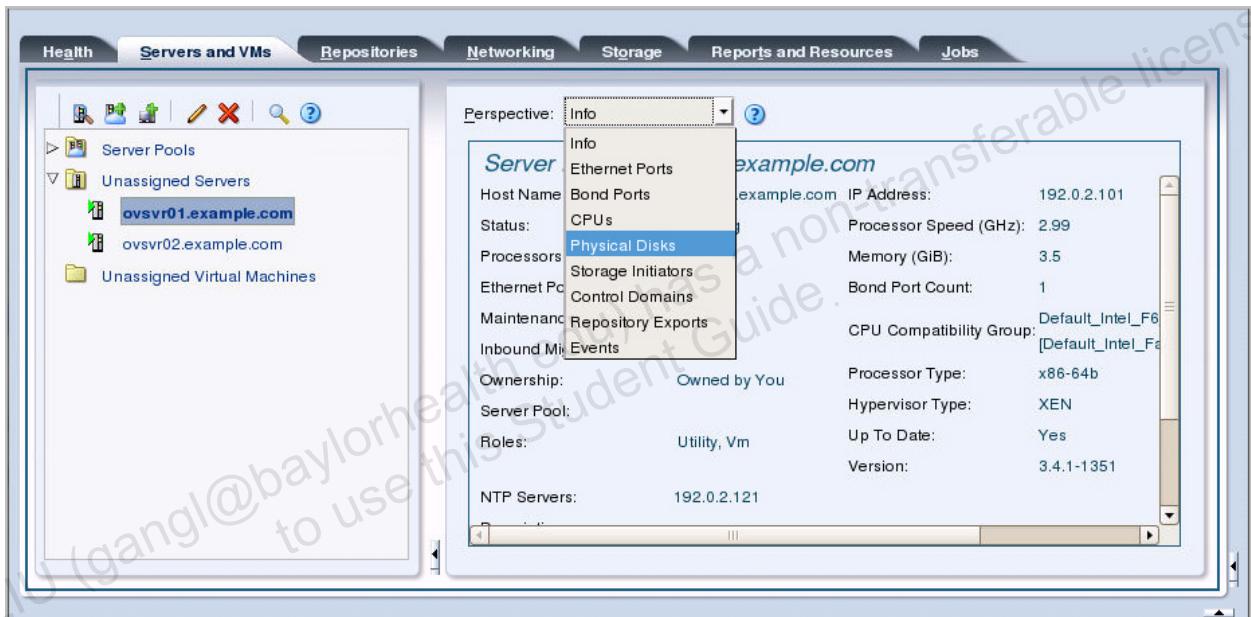
The order in which the physical disks are listed might be different in your lab environment.

You obtain the same list as seen from the Oracle VM Manager UI, plus two additional disks: 1ATA_QEMU_HARDDISK_QM00002 and 1ATA_QEMU_HARDDISK_QM00004. Where are these physical disks?

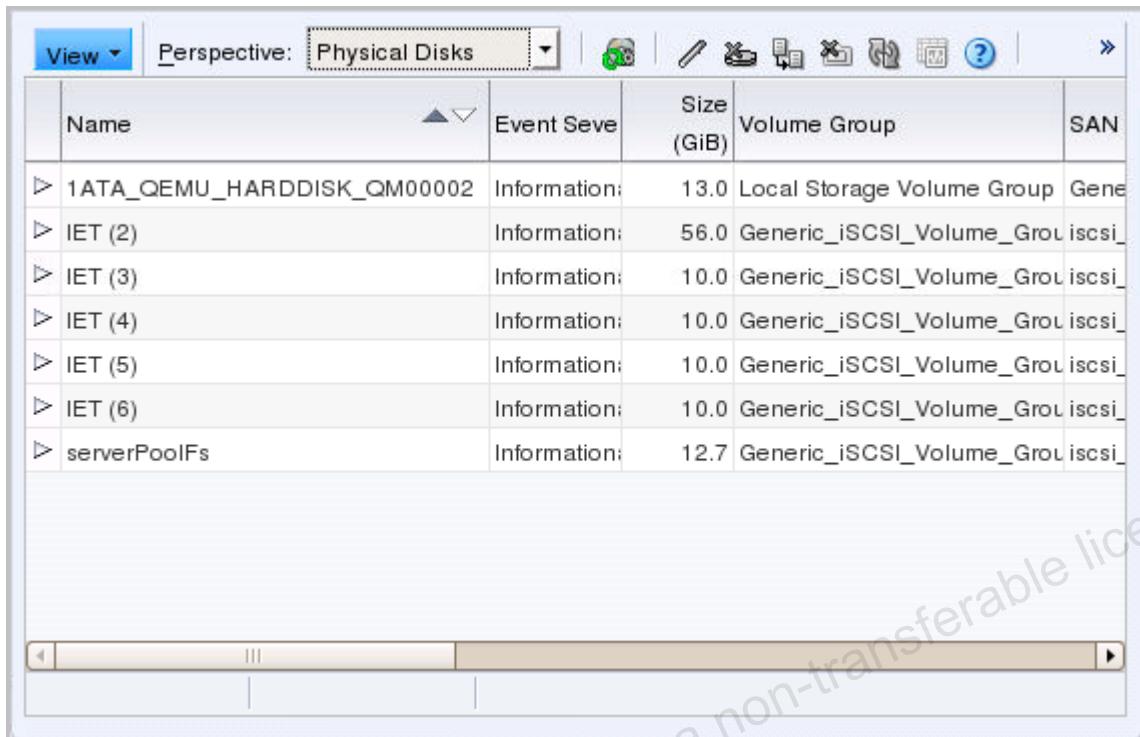
- c. To find the owner of the disk, list the physical disks that are available to your two Oracle VM servers.

From your Oracle VM Manager UI session, perform the following:

- Click the Servers and VMs tab.
- Expand the Unassigned Servers folder in the navigation tree.
- Highlight the first Oracle VM server, ovsrv01.example.com.
- In the management pane, select Physical Disks from the Perspective drop-down list.



The physical disks that are accessible to ovsrv01.example.com are listed in the management pane.



The screenshot shows the Oracle VM Server interface with the 'Physical Disks' perspective selected. The main window displays a table of physical disks with columns: Name, Event Seve, Size (GiB), Volume Group, and SAN. The table contains the following data:

Name	Event Seve	Size (GiB)	Volume Group	SAN
1ATA_QEMU_HARDDISK_QM00002	Information	13.0	Local Storage Volume Group	Gene
IET (2)	Information	56.0	Generic_iSCSI_Volume_Group	iscsi_
IET (3)	Information	10.0	Generic_iSCSI_Volume_Group	iscsi_
IET (4)	Information	10.0	Generic_iSCSI_Volume_Group	iscsi_
IET (5)	Information	10.0	Generic_iSCSI_Volume_Group	iscsi_
IET (6)	Information	10.0	Generic_iSCSI_Volume_Group	iscsi_
serverPoolFs	Information	12.7	Generic_iSCSI_Volume_Group	iscsi_

The 1ATA_QEMU_HARDDISK_QM00002 physical disk is local storage on ovsrv01.example.com. It is the second internal disk for the server. You use this second disk in a later practice to create a local repository for the server.

Note: During installation of the Oracle VM Server for x86 software on a physical host, the leftover space on the physical disk that is selected for the installation might appear in this list as local storage. This is not the case in your environment because the installation disk is small and all the space is used by the installation process.

- d. Highlight the second Oracle VM server, ovsrv02.example.com. With the Physical Disks Perspective selected, the 1ATA_QEMU_HARDDISK_QM00004 physical disk is listed as shown on the following screen.

The 1ATA_QEMU_HARDDISK_QM00004 physical disk is local storage on ovsrv02.example.com. It is the second internal disk for the server.

Name	Event Seve	Size (GiB)	Volume Group	SAN
1ATA_QEMU_HARDDISK_QM00004		12.7	Local Storage Volume Group	Gen
IET (2)	Loading...	56.0	Generic_iSCSI_Volume_Group	iscsi
IET (3)	Loading...	10.0	Generic_iSCSI_Volume_Group	iscsi
IET (4)	Loading...	10.0	Generic_iSCSI_Volume_Group	iscsi
IET (5)	Loading...	10.0	Generic_iSCSI_Volume_Group	iscsi
IET (6)		10.0	Generic_iSCSI_Volume_Group	iscsi
serverPoolFs	Loading...	12.7	Generic_iSCSI_Volume_Group	iscsi

- e. From your Oracle VM CLI session, find the syntax of the `edit physicaldisk` command to rename IET (2) to repositoryLun.
- Enter `edit physicaldisk` and press the space bar. Because the command does not return automatically, enter `?` to display parameters for the command.

```
OVM> edit physicaldisk ?
      id=<object identifier> OR
      name=<object name>
OVM>
```

- f. Add the name of the physical disk to the `edit physicaldisk` command and find more parameters for the command.

```
OVM> edit physicaldisk name="IET (2)" ?
      *name
      *shareable
      description
      extraInfo
OVM>
```

Note: Use double quotation marks around the physical disk's name because the name contains a space.

- g. Use the `name` parameter to rename the disk.

```
OVM> edit physicaldisk name="IET (2)" name=repositoryLun
Command: edit physicaldisk name="IET (2)" name=repositoryLun
Status: Success
Time: ...
```

```
JobId: ...
OVM>
```

- h. List the physical disks.

```
OVM> list physicaldisk
Command: list physicaldisk
Status: Success
Time: ...
Data:
  id:0004fb0000180000e524e1f519b4546e  name:serverPoolFs
  id:0004fb0000180000972c92081aa5c2dd
name:1ATA_QEMU_HARDDISK_QM00004
  id:0004fb000018000032702e9aad98aa85  name:repositoryLun
  id:0004fb000018000010b015d225f0c9c2
name:1ATA_QEMU_HARDDISK_QM00002
  id:0004fb0000180000fef0cd10a4dc410e  name:IET (6)
  id:0004fb000018000042ffb38776a9622c  name:IET (4)
  id:0004fb0000180000997e0a5749837cb8  name:IET (5)
  id:0004fb000018000039a587a982031333  name:IET (3)
OVM>
```

You can also see the result of the renaming operation from your Oracle VM Manager UI session.

3. From the Oracle VM Manager UI, examine the other operations that are allowed on the physical disks.
 - a. Access the list of physical disks exposed by your iSCSI server.
 - If your Oracle VM Manager UI session has expired, log in again as the `admin` user.
 - From the Storage tab view, expand the SAN Servers folder in the navigation tree.
 - Highlight `iscsi_server` in the navigation tree and select Physical Disks from the Perspective drop-down list in the management pane.

The list of physical disks offered by the iSCSI server on your lab machine appears in the management pane.

The order of physical disks in your pane might be different.

- b. Highlight one of the physical disks. The icons that represent the operations that are allowed on the physical disk become active on the toolbar.

Name	Event Severity	Size (GiB)	Server	Status	Shareable
serverPoolFs	Informational	12.7	ovsvr01.example.com	online	
repositoryLun	Informational	56.0	ovsvr01.example.com	online	
IET (3)	Informational	10.0	ovsvr01.example.com	online	
IET (4)	Informational	10.0	ovsvr01.example.com	online	
IET (5)	Informational	10.0	ovsvr01.example.com	online	
IET (6)	Informational	10.0	ovsvr01.example.com	online	

- Edit Physical Disk: Use the to change the name, description, and shareable flag for the physical disk.
- Delete Physical Disk: Use this function to remove the disk from the list of available physical disks.

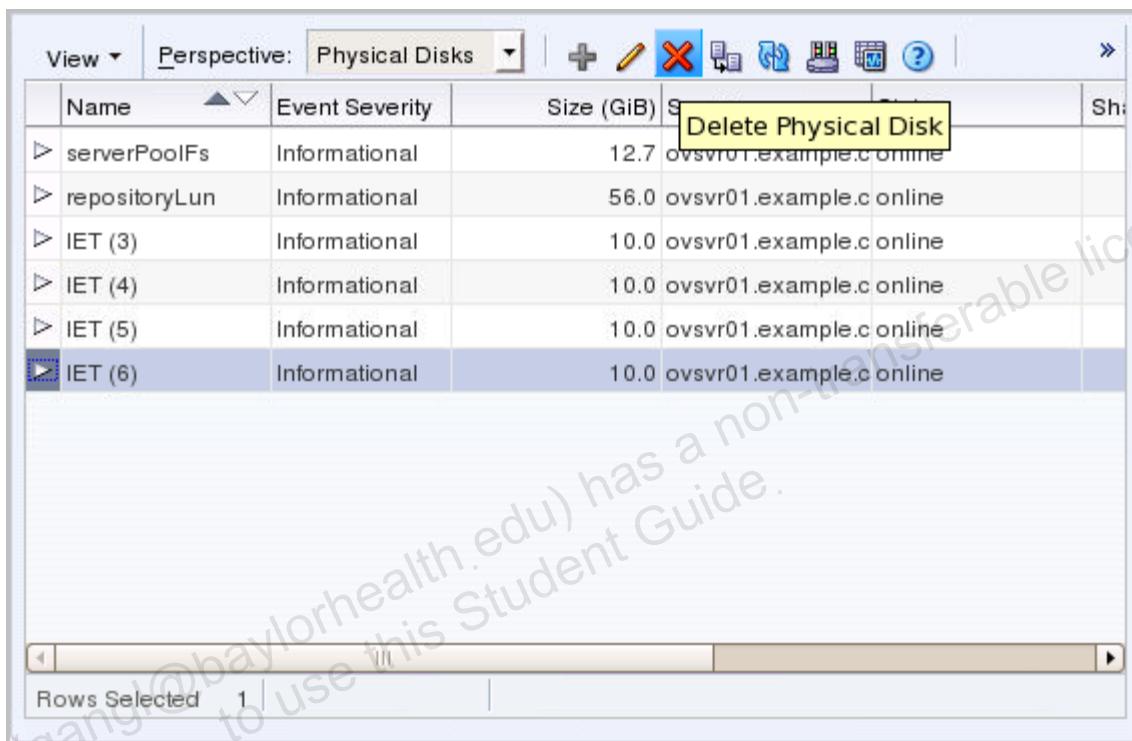
Note: For a generic storage array, you usually delete a physical disk from the Oracle VM Manager before removing the disk by using the utilities on the iSCSI server. The delete function from the Oracle VM Manager does not actually destroy the disk, because you do not have management capabilities on the storage when working with a generic storage array.

If you delete a physical disk from a storage array that is managed with a Storage Connect vendor plug-in, the disk is deleted from the Oracle VM Manager and from the storage array, depending on the functionality of the plug-in. The functionality of each vendor plug-in is described in the vendor documentation.

- Clone Physical Disk: Use this function to copy the physical disk to another physical disk that is of the same size or bigger, or to copy the physical disk to a virtual disk in an accessible repository.
- Refresh Physical Disk: If you make a modification on the physical disk from the iSCSI server, use this function to force the Oracle VM Manager to register the change for each Oracle VM server with access to this physical disk in the storage array.
- Display Servers using Physical Disk: This is a useful action that tells you which Oracle VM servers have access to the physical disk.
- Display Selected Physical Disk Events: This action displays a list of events for the physical disk, such as creation or deletion.

Note that the Create Physical Disk icon is not active. You cannot create a physical disk for a generic storage array by using the Oracle VM Manager or the Oracle VM CLI. If you create a new physical disk on your storage array by using the administrative tools that are available with the storage array, you can make the new physical disk visible by refreshing the storage array.

4. Delete a physical disk from your generic storage array.
 - a. From the Physical Disks perspective on the Storage tab of your Oracle VM Manager UI session, select IET (6) and click the Delete Physical Disk icon.



- b. Click OK in the Delete Confirmation dialog box.



After the delete operation completes, the physical disk no longer appears in the list of physical disks for the generic storage array.

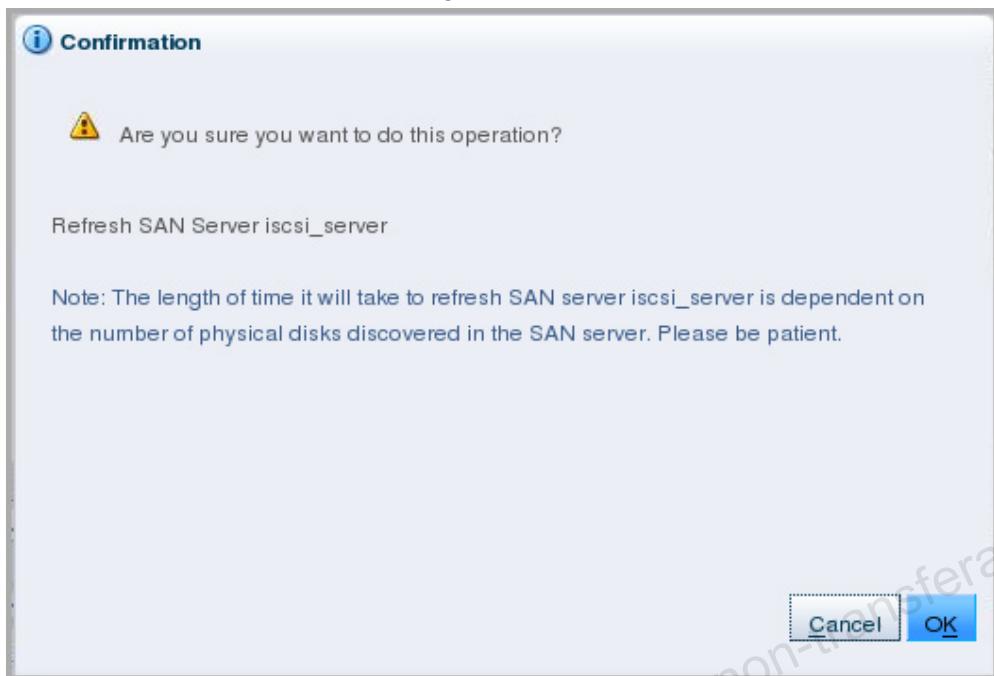
The screenshot shows the Storage perspective in a management interface. The top navigation bar includes 'View', 'Perspective' set to 'Physical Disks', and various toolbar icons. A table lists five physical disks:

Name	Event Severity	Size (GiB)	Server	Status	Sh
serverPoolFs	Informational	12.7	ovsvr01.example.c	online	
repositoryLun	Informational	56.0	ovsvr01.example.c	online	
IET (3)	Informational	10.0	ovsvr01.example.c	online	
IET (4)	Informational	10.0	ovsvr01.example.c	online	
IET (5)	Informational	10.0	ovsvr01.example.c	online	

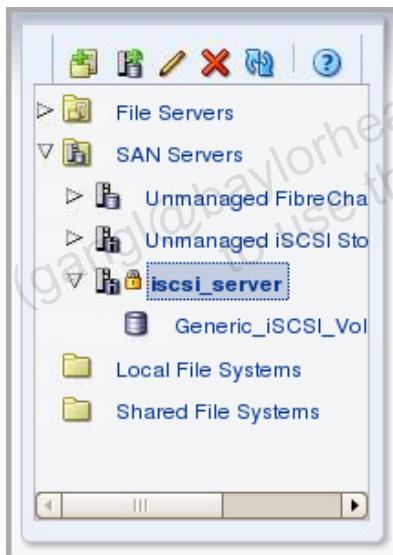
- c. Refresh the generic storage array by right-clicking `iscsi_server` in the navigation pane and selecting Refresh from the shortcut menu.

The screenshot shows the Storage perspective with a context menu open over the 'iscsi' entry in the navigation pane. The menu options include 'Edit', 'Delete', 'Refresh' (which is highlighted with a blue selection bar), 'Generate Report', and 'Help'. The main pane displays the same list of physical disks as the previous screenshot.

- d. Click OK in the Confirmation dialog box.



The SAN Server is locked during the refresh operation.



- e. Check the results of the refresh action.

Wait until the `iscsi_server` storage array is no longer locked.

The physical disk reappears, as shown in the following screenshot:

Name	Event Severity	Size (GiB)	Server	Status	Sh:
IET (1)	Informational	10.0	ovsvr01.example.c	online	
serverPoolFs	Informational	12.7	ovsvr01.example.c	online	
repositoryLun	Informational	56.0	ovsvr01.example.c	online	
IET (3)	Informational	10.0	ovsvr01.example.c	online	
IET (4)	Informational	10.0	ovsvr01.example.c	online	
IET (5)	Informational	10.0	ovsvr01.example.c	online	

The physical disk is now named IET (1).

Note

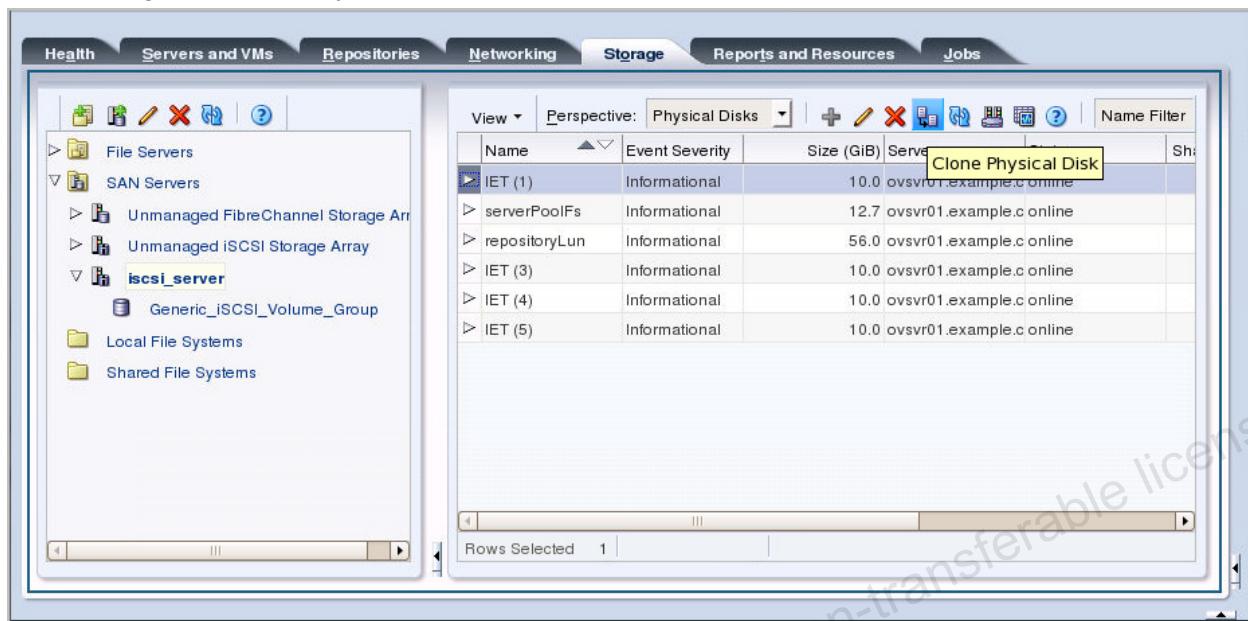
The physical disk re-appeared because the previous delete operation did not destroy the physical disk on the storage array. It just removed it from the Oracle VM list of accessible physical disks on the generic iSCSI storage array. The refresh operation on the generic iSCSI storage array restored access to the physical disk.

This situation does not occur when you are dealing with a storage array that is managed by a vendor plug-in, because a vendor plug-in provides management access to the storage array. When you use a vendor plug-in, the delete operation results in the removal of the physical disk.

5. Clone a physical disk.

Note: All the physical disks are empty and although cloning is already allowed at this point, a cloning operation simply copies an empty physical disk to another physical disk.

- a. Launch the cloning operation by selecting IET (1) [formerly known as IET (6)] and clicking the Clone Physical Disk icon.

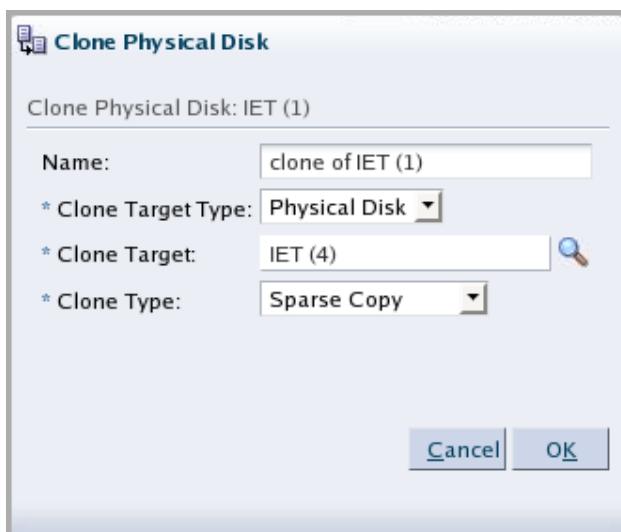


- b. The Clone Physical Disk window appears.

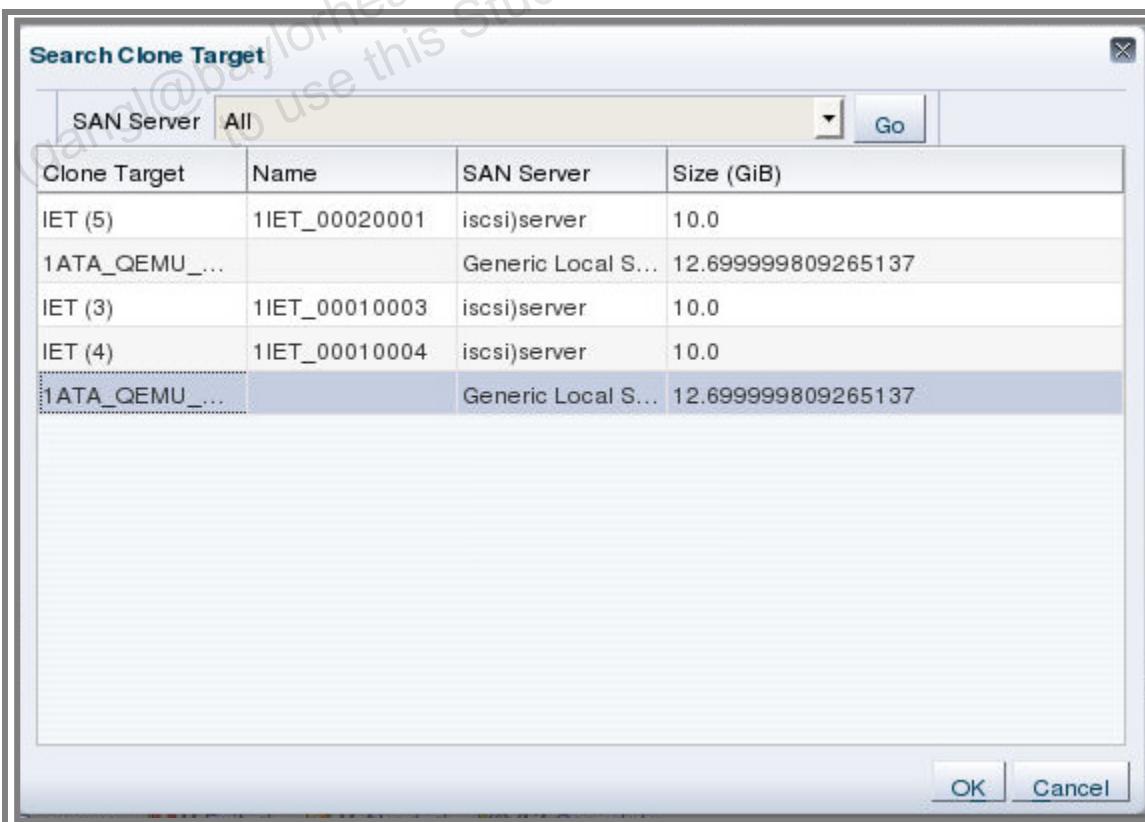


Click the Clone Target Type drop-down list to view available selections. You can clone the physical disk to another physical disk or to a repository.

- c. In the Clone Physical Disk window, enter a name for the clone. In this example, the clone name is **clone of IET (1)**, as shown in the following screenshot:

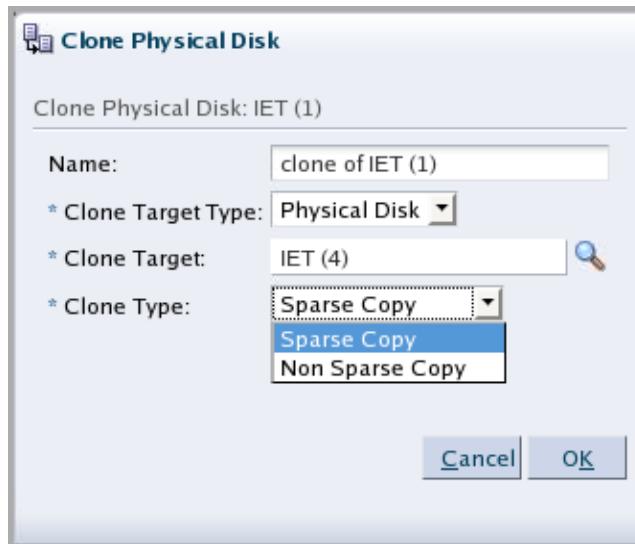


- d. Retain Physical Disk as the Clone Target Type.
e. To clone a physical disk in a generic storage array to “Physical Disk,” you must select an existing physical disk as the target for the cloning operation. There is a search function that allows you to select a physical disk within the same storage array, or a physical disk from another storage array.
 - Click the Search icon for the Clone Target field.
 - In the Search Clone Target window, find **IET (4)** and select it.



Click OK to exit the Search Clone Target window and return to the Clone Physical Disk window.

- f. View the available Clone Types from the drop-down list.



Notice that Thin Clone is not available for generic storage arrays.

- g. Click the Cancel button to cancel the operation, because the cloning takes too long in your lab environment.

Note: Thin cloning is not supported for physical disks in generic iSCSI storage arrays. In a practice for the lesson titled “Server Pools and Repositories,” you clone a virtual disk by using thin cloning and the operation is near instantaneous.

Practice 4-6: Install the Oracle ZFS Storage Appliance Plug-In

Overview

In this practice, you install the vendor plug-in for the Oracle ZFS Storage Appliance. You perform this operation to demonstrate the differences when discovering a generic storage array versus a storage array managed with a vendor plug-in. Because there is no Oracle ZFS Storage Appliance in the lab environment, you cancel the discovery process after examining the changes introduced by installing the Oracle ZFS Storage Appliance plug-in in your Oracle VM environment.

Tasks

- SFTP the plug-in from the Oracle VM Manager host to each Oracle VM server.

Note: The Oracle VM Manager software does not include plug-ins. The Oracle ZFS Appliance Storage Connect plug-in has been stored in the /stage directory in your Oracle VM Manager for your convenience. You can obtain the latest Oracle ZFS Storage Appliance plug-in from <http://www.oracle.com/technetwork/server-storage/sun-unified-storage/downloads/zfssa-plugins-1489830.html>.

- Open a terminal window on your lab machine.
- Change user to `root`.
- Use the `ssh` command to access the first Oracle VM server, `ovsvr01.example.com`.

```
[root@<your lab machine> ~]# ssh ovsvr01.example.com
root@ovsvr01.example.com's password: oracle
Last login: ...
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.
[root@ovsvr01 ~]#
```

- Start the `sftp` command to access your Oracle VM Manager, where the Oracle ZFS Storage Appliance plug-in is located.

```
[root@ovsvr01 ~]# sftp ovmmgr01.example.com
Connecting to ovmmgr01.example.com...
The authenticity of host 'ovmmgr01.example.com (192.0.2.121)' 
can't be established.
RSA key fingerprint is ...
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ovmmgr01.example.com,192.0.2.121' 
(RSA) to the list of known hosts.
root@ovmmgr01.example.com's password: oracle
sftp>
```

- Change directory to `/stage`, list the files, and transfer the plug-in package.

```
sftp> cd /stage
sftp> ls
lost+found
osc-oracle-s7k-1.0.3-96.el6.noarch.rpm
```

```
ovmcore-console-1.0-46.el6.noarch.rpm
ovmm-3.4.1-installer-OracleLinux-b1350.iso
ovmm-3.4.1-installer-OracleLinux.iso
sftp> get osc-oracle-s7k-1.0.3-96.el6.noarch.rpm
Fetching /stage/osc-oracle-s7k-1.0.3-96.el6.noarch.rpm to osc-
oracle-s7k-1.0.3-96.el6.noarch.rpm
/stage/osc-oracle-s7k-1.0.3-96.el6.noarch.rpm 100% 111KB
110.7KB/s 00:00
sftp>
```

- f. Exit the sftp program.

```
sftp> quit
[root@ovsvr01 ~] #
```

2. Install the Oracle ZFS Storage Appliance plug-in on ovsvr01.example.com.

- a. Check whether a previous plug-in is already installed.

```
[root@ovsvr01 ~] # rpm -qa | grep -i s7k
[root@ovsvr01 ~] #
```

The rpm command does not return any data. There is no Oracle ZFS Storage Appliance plug-in already installed. If you are upgrading the plug-in, remove the previous package before installing the newer package.

- b. Install the package by using the rpm command.

```
[root@ovsvr01 ~] # ls
anaconda-ks.cfg install.log.syslog
install.log osc-oracle-s7k-1.0.3-96.el6.noarch.rpm
[root@ovsvr01 ~] # rpm -ivh osc-oracle-s7k-1.0.3-
96.el6.noarch.rpm
warning: osc-oracle-s7k-1.0.3-96.el6.noarch.rpm: Header V3
RSA/SHA256 Signature, key ID ec551f03: NOKEY
Preparing... ##### [100%]
1:osc-oracle-s7k ##### [100%]
[root@ovsvr01 ~] #
```

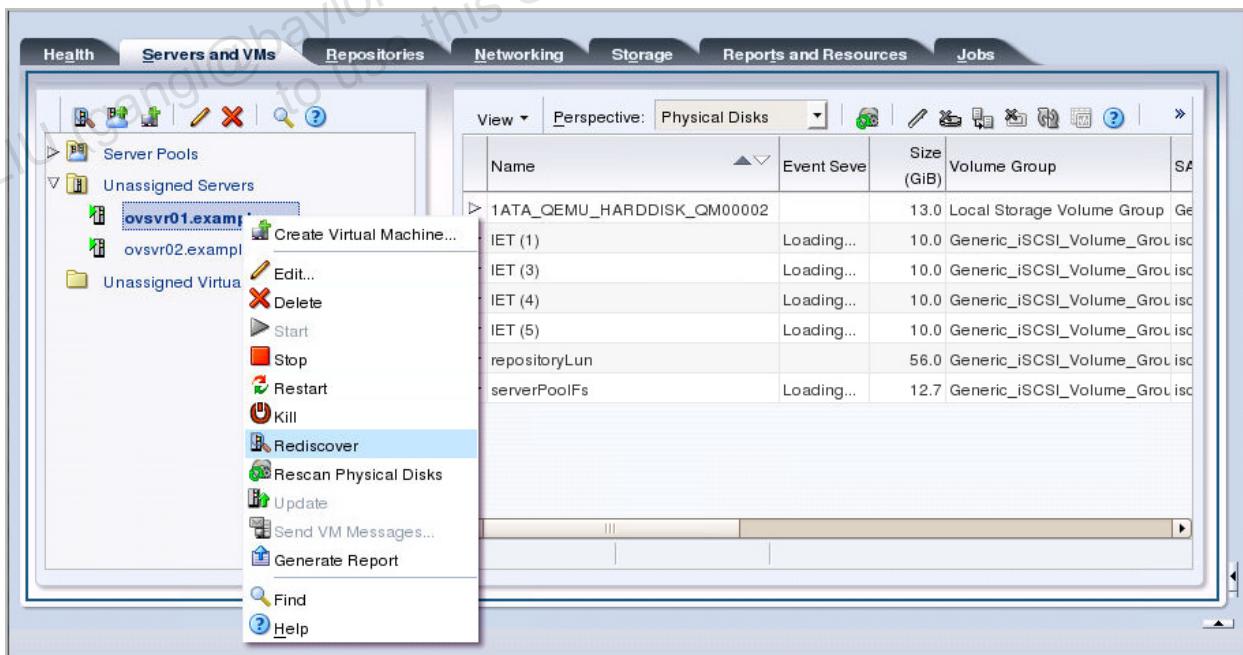
3. Repeat this process on the second Oracle VM server, ovsvr02.example.com.

- a. Exit ovsvr01.example.com by using the exit command.
- b. Access ovsvr02.example.com by using the ssh command.
- c. SFTP the plug-in from ovmmgr01.example.com by using the sftp command.
- d. Install the plug-in on ovsvr02.example.com.
- e. Exit ovsvr02.example.com by using the exit command.

4. From the Oracle VM Manager UI, rediscover one Oracle VM server. This operation refreshes the list of plug-ins available on the Oracle VM server.
 - a. If the Oracle VM Manager UI session is not active, restart the UI from your lab machine by using the `https://ovmmgr01.example.com:7002/ovm/console` URL in your browser.
 - b. Access the view on the Servers and VMs tab.
 - c. In the navigation tree, find and highlight the first Oracle VM server that is located in the Unassigned Servers folder.



- d. Right-click `ovsvr01.example.com` and select Rediscover.



The job launches immediately. The Oracle VM server is locked during this operation.

Job Summary:					
Description	Status	Progress	Message	Timestamp	Duration
Refresh Server: ovsvr01.example.com	Running			Mar 29, 2016 11:42:54 pm	
Refresh Storage Array: iscsi_server	Success			Mar 29, 2016 11:15:47 pm	12s

5. Use the Oracle VM CLI and repeat the rediscover operation for ovsvr02.example.com.
- Restart your Oracle VM CLI session if it has expired.

```
[root@<your lab machine> ~]# ssh -l admin ovmmgr01.example.com -p 10000
OVM>
```

- Use the `refresh Server` command to rediscover ovsvr02.example.com, which is the second Oracle VM server. Find what parameters are needed with the `refresh` command.

```
OVM> refresh ?
AccessGroup
Assembly
FileServer
FileSystem
PhysicalDisk
Repository
Server
StorageArray
OVM> refresh server ?
          id=<object identifier> OR
          name=<object name>
```

- Provide the single parameter for the `refresh server` command.

```
OVM> refresh server name=ovsvr02.example.com
Command: refresh server name=ovsvr02.example.com
Status: Success
Time: ...
JobId: ...
OVM>
```

6. Attempt to discover a new storage array, which uses the plug-in that you installed in your Oracle VM servers.
- Click the Storage tab from your Oracle VM Manager UI session.

- b. Click the Discover SAN Server icon on the toolbar of the navigation pane.



The Discover SAN Server screen appears.

A screenshot of the 'Discover SAN Server' configuration dialog. On the left is a sidebar with a tree view:

- Discover SAN Server (selected)
- Access Information (if required) (highlighted with a dashed blue border)
- Set Storage Name (if required)
- Add Admin Servers
- Manage Access Group (if required)

On the right are several input fields:

- * Name: [empty text box]
- Description: [empty text area]
- Storage Type: iSCSI Storage Server [dropdown menu]
- * Storage Plug-in: Oracle Generic SCSI Plugin [dropdown menu]
- Plug-in Private Data: [empty text box]
- * Admin Host: [empty text box]
- * Admin Username: [empty text box]
- * Admin Password: [empty text box]

At the bottom right are 'Cancel' and 'Next' buttons.

- c. Select iSCSI Storage Server from the Storage Type drop-down list.

The screenshot shows a configuration form with the following fields:

- * Name: [Text input field]
- Description: [Text area]
- Storage Type: A dropdown menu with three options: "iSCSI Storage Server" (selected), "iSCSI Storage Server", and "FibreChannel".
- * Storage Plug-in: A dropdown menu with three options: "iSCSI Storage Server" (selected), "iSCSI Storage Server", and "FibreChannel".
- Plug-in Private Data: [Text input field]
- * Admin Host: [Text input field]
- * Admin Username: [Text input field]
- * Admin Password: [Text input field]

- d. Select Sun ZFS Storage Appliance SCSI from the Storage Plug-In drop-down list.

The screenshot shows the "Discover SAN Server" interface with the following navigation path on the left:

- Discover SAN Server
- Access Information (if required)
- Set Storage Name (if required)
- Add Admin Servers
- Manage Access Group (if required)

The main configuration form on the right has the following fields:

- * Name: [Text input field]
- Description: [Text area]
- Storage Type: iSCSI Storage Server
- * Storage Plug-in: A dropdown menu with three options: "Oracle Generic SCSI Plugin" (selected), "Oracle Generic SCSI Plugin(1.1.0)", and "Sun ZFS Storage Appliance iSCSI/FC1.0.3-01(1.0.3-01)".
- Plug-in Private Data: [Text input field]
- * Admin Host: [Text input field]
- * Admin Username: [Text input field]
- * Admin Password: [Text input field]

At the bottom right are "Cancel" and "Next" buttons.

Notice what happens when the Sun ZFS Storage Appliance plug-in is selected.

Discover SAN Server

Discover SAN Server

Access Information (if required)

Set Storage Name (if required)

Add Admin Servers

Manage Access Group (if required)

* Name:

Description:

Storage Type: iSCSI Storage Server

* Storage Plug-in: Sun ZFS Storage Appliance

Plug-in Private Data:

* Admin Host:

* Admin Username:

* Admin Password:

- The Admin information section is active. In this section, specify the information to configure access to the control path of the storage array.
- The Access Information section in the next window (not shown here), is also active. In this section, specify the information to configure the data path to the storage array.
- The Plugin Private Data field is active. In this field, you enter information that makes sense to the storage array. In the case of the Oracle ZFS Storage Appliance, you supply the target group and target name that you configured on the ZFS Storage Appliance, for use by your Oracle VM environment.

- e. Click anywhere in the Plug-in Private Data field to display the associated hint.



In this example, the target group is called OVM-iSCSI and the target is called OVM-iSCSI-Target.

You must configure the target and the target group on the Oracle ZFS Storage Appliance before you attempt to discover the Oracle ZFS Storage Appliance as a SAN server from the Oracle VM Manager.

- f. Exit the discovery wizard by clicking the Cancel button.

Practices for Lesson 5: Server Pools and Repositories

Chapter 5

Practices for Lesson 5: Overview

Practices Overview

In these practices, you create an Oracle VM server pool and repositories by using the Oracle VM Manager.

The following points summarize the rules for creating repositories:

- You can create or rediscover NFS repositories even if you have not yet created a server pool.
- To create repositories on an iSCSI or Fibre Channel physical disk (LUN), you need an existing clustered server pool.
- Repositories can also be created on local storage. Unused internal disks or leftover disk space on the installation disk in the Oracle VM server are available as local storage.
- You can create repositories on local storage for clustered or unclustered server pools.

The practices follow this sequence:

1. Refresh the rediscovered NFS repository.
2. Create a clustered server pool.
3. Create an iSCSI repository.
4. Import resources into the repository.
5. Move a template between repositories.
6. Perform disk and cloning operations for resources in the repositories.
7. Create a repository on local storage on both servers.
8. (Optional) Configure a repository export to allow backup of the contents of the repository.

Practice 5-1: Refresh the Rediscovered NFS Repository

Overview

In this practice, you refresh the NFS repository that you rediscovered in the practices for the lesson titled “Managing Storage.”

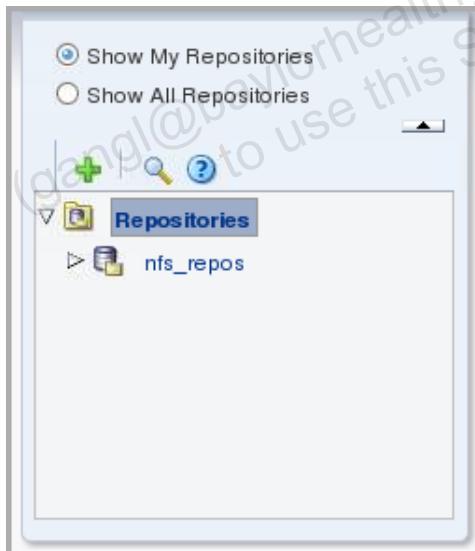
Assumptions

This practice assumes that the NFS share has an existing repository on it. Recall that the NFS share was configured as part of the discovery process for the NFS file server on your lab machine, and that, as part of the discovery process, you rediscovered the existing repository on the NFS share.

The existing repository contains metadata that includes the UUID of the Oracle VM Manager that was used to create it. This is why you used a specific UUID with the UUID parameter when you installed the Oracle VM Manager in the practices for the lesson titled “Planning and Installation.” The UUID in the repository metadata on the NFS share must match the UUID of your current Oracle VM Manager, or you cannot reclaim this repository.

Tasks

1. Find the NFS repository that you discovered in a practice for the lesson titled “Managing Storage.”
 - a. If your Oracle VM Manager UI session has expired, log in again.
 - b. Click the Repositories tab.
 - c. Click the Expand button next to the Repositories folder in the navigation tree.

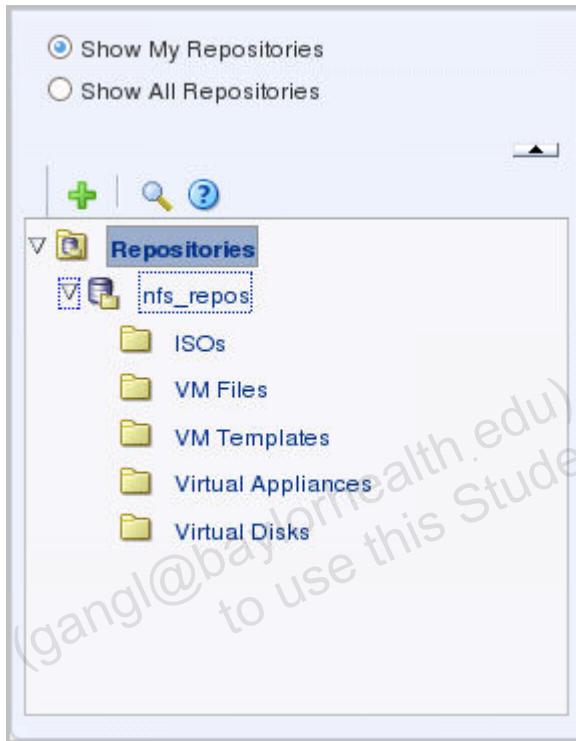


The Oracle VM Manager has already discovered the repository.

- d. If the `nfs_repos` repository does not appear in the list of existing repositories, it is because you did not complete Practice 4-2, for the lesson titled “Managing Storage.”
If the `nfs_repos` repository does appear in the list of existing repositories, continue with step e.

Discover the NFS repository now by performing the following steps:

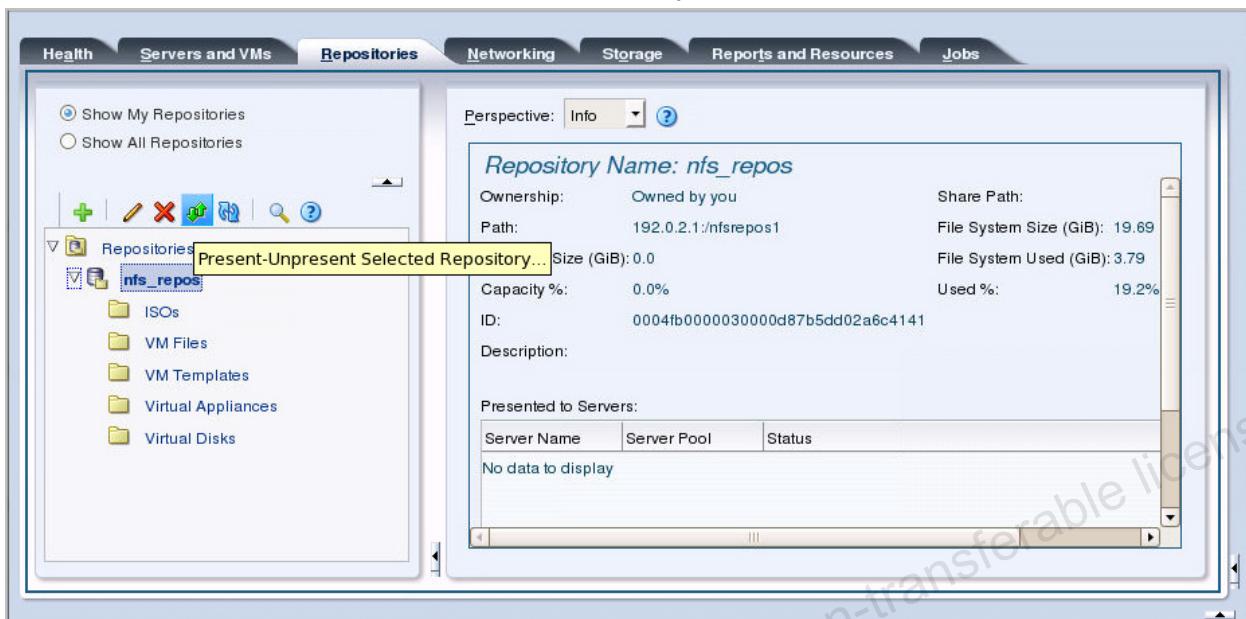
- i. On the Storage tab, click the Expand button next to the File Servers folder in the navigation pane.
 - ii. Highlight `nfs_server` in the navigation tree and select File Systems from the Perspective drop-down list in the management pane.
 - iii. Select `nfs on 192.0.2.1:/nfsrepos1` in the management pane and click the Refresh File System icon on the toolbar.
 - iv. After the refresh operation completes, click the Repositories tab.
- The repository now appears on the Repositories tab.
- e. Click the Expand button next to the `nfs_repos` repository.



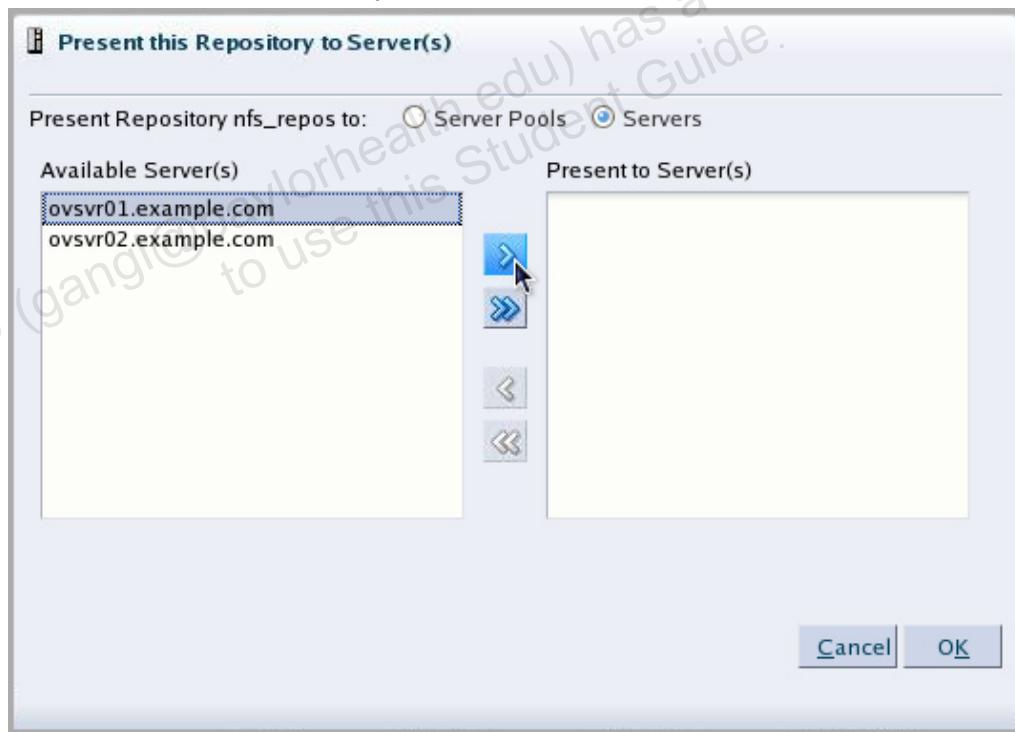
If you click each folder that is present in the `nfs_repos` repository, you see that the folders are empty, because no object appears in the management pane. In the next steps, you perform operations to discover the contents of the repository.

2. Present the repository to an Oracle VM server by using the Oracle VM Manager UI.
- To perform any operation on a repository, you must have presented it to at least one Oracle VM server that has access to the repository. In this step, you present the NFS repository to the `ovs01.example.com` Oracle VM server.

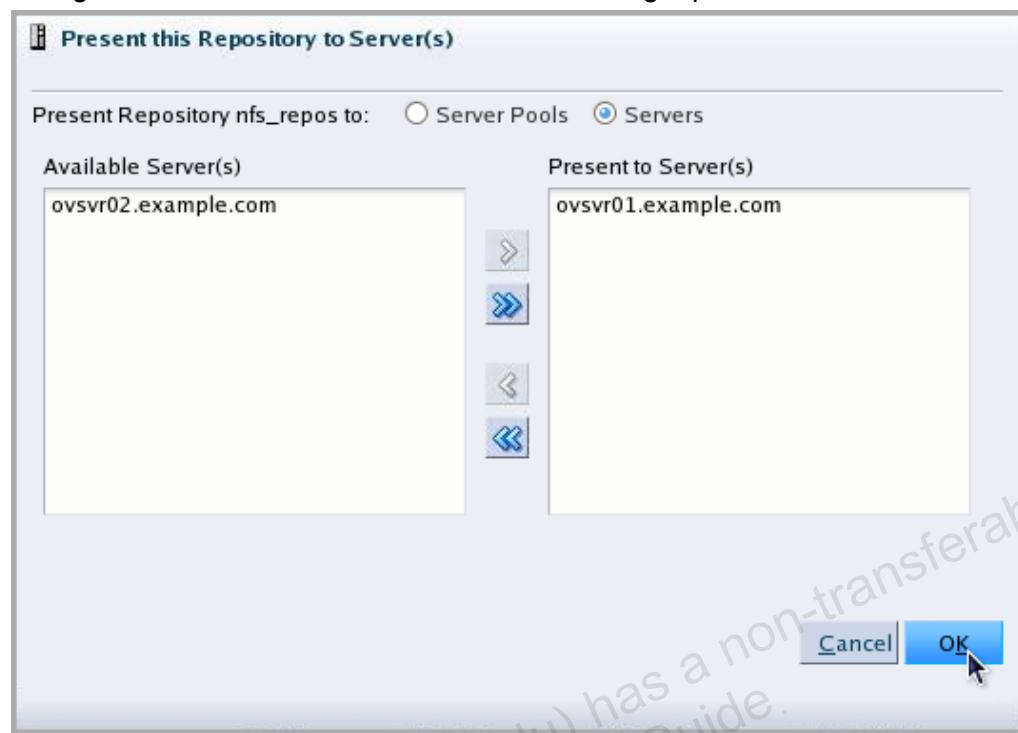
- a. On the Repositories tab, select the `nfs_repos` repository in the navigation tree and click the Present-Unpresent Selected Repository icon on the toolbar.



- b. In the Present this Repository to Server(s) window, select the Servers radio button.

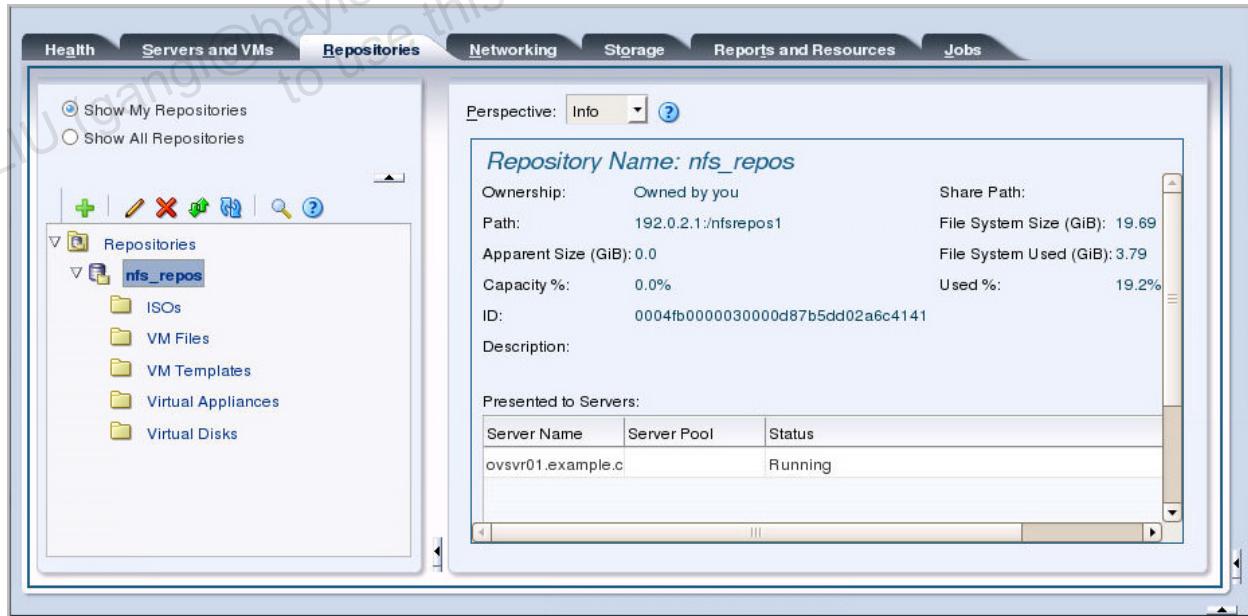


- c. Select the ovsrv01.example.com server in the Available Server(s) pane and click the right-arrow button to move the server to the right pane.



- d. Click the OK button to trigger the present operation.

The Info perspective for nfs_repos shows that the repository is now presented to one server.



3. Present the repository to the second Oracle VM server by using the Oracle VM CLI.
 - a. From a terminal window on your lab machine, restart your Oracle VM CLI session if it has expired.

```
bash-3.2$ su -  
Password: oracle  
[root@<your lab machine> ~]# ssh -l admin ovmmgr01.example.com -p 10000  
OVM>
```

- b. Use the add server command to present the second Oracle VM server to your NFS repository.

```
OVM> add server ?  
      id=<object identifier> OR  
      name=<object name>  
OVM>
```

- c. Use the up arrow to recall your last command, add the Oracle VM server name to the command, and find the next parameter to specify for the add server command.

```
OVM> add server name=ovsvr02.example.com ?  
                                to  
OVM>
```

- d. Add to to the command and find the next parameter to specify.

```
OVM> add server name=ovsvr02.example.com to ?  
                                ServerPool  
                                CpuCompatibilityGroup  
                                Repository  
                                AccessGroup  
OVM>
```

- e. Add repository to the command and find the next parameter to specify.

```
OVM> add server name=ovsvr02.example.com to Repository ?  
                                id=<parent object identifier> OR  
                                name=<parent object name>  
OVM>
```

- f. Add name=nfs_repos to the command and find the next parameter to specify.

```
OVM> add server name=ovsvr02.example.com to Repository  
      name=nfs_repos  
Status: Success  
Time: ...  
JobId: ...  
OVM>
```

The command executes after adding the last parameter, which is the repository name.

- g. In your Oracle VM Manager UI, on the Repositories tab, select nfs_repos in the navigation tree, and the Info perspective in the management pane.

The screenshot shows the Oracle VM Manager interface. At the top, there's a toolbar with a 'Perspective' dropdown set to 'Info' and a help icon. Below the toolbar, the title 'Repository Name: nfs_repos' is displayed. The main area contains several details about the repository:

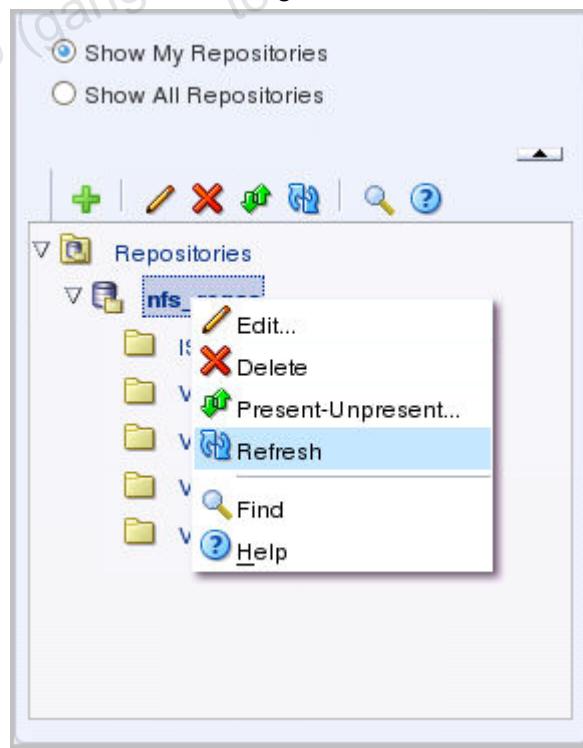
Ownership:	Owned by you	Share Path:	
Path:	192.0.2.1:/nfsrepos1	File System Size (GiB):	19.69
Apparent Size (GiB):	0.0	File System Used (GiB):	3.79
Capacity %:	0.0%	Used %:	19.2%
ID:	0004fb0000030000d87b5dd02a6c4141		

Below these details is a 'Description:' field which is empty. Underneath, a section titled 'Presented to Servers:' lists two servers:

Server Name	Server Pool	Status
ovs01.example.com		Running
ovs02.example.com		Running

Both Oracle VM servers appear in the list of servers presented to the repository.

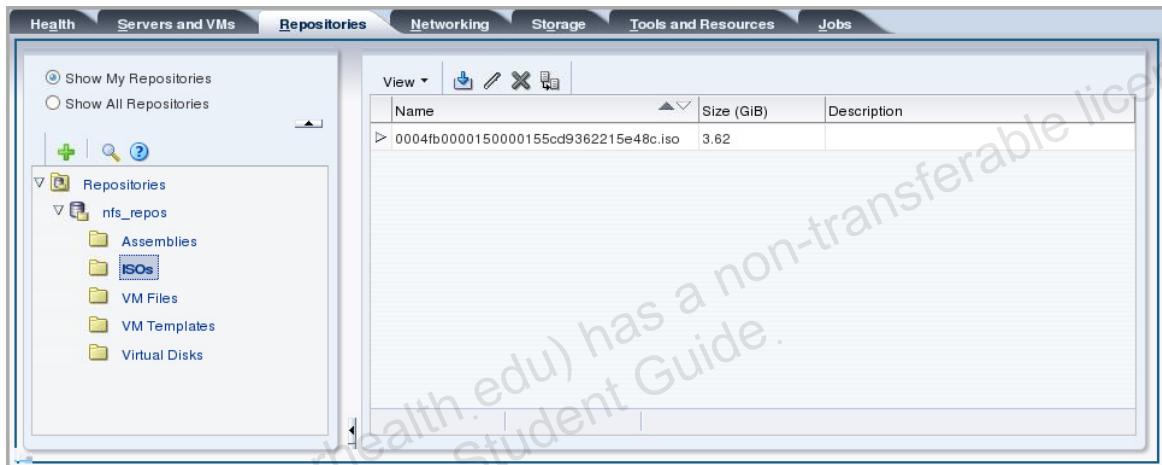
4. Refresh the contents of the NFS repository from the Oracle VM Manager UI.
- On the Repositories tab, select the nfs_repos repository and click the Refresh Selected Repository icon on the toolbar or use Refresh from the shortcut menu as shown in the following screenshot:



The refresh repository job triggers two jobs that complete successfully as seen in the Job Summary pane.

Job Summary:					
Description	Status	Progress	Message	Timestamp	Duration
Refresh File System: nfs on 192.0.2.1:/nfsrepos1	Success			Mar 30, 2016 12:28:54 am	4s
Refresh Repository: nfs_repos	Success			Mar 30, 2016 12:28:50 am	1s

- b. Select the `nfs_repos` repository in the navigation tree and click each of its folders to examine the content. Note that the ISOs folder has an object in it, as seen in the following screenshot:



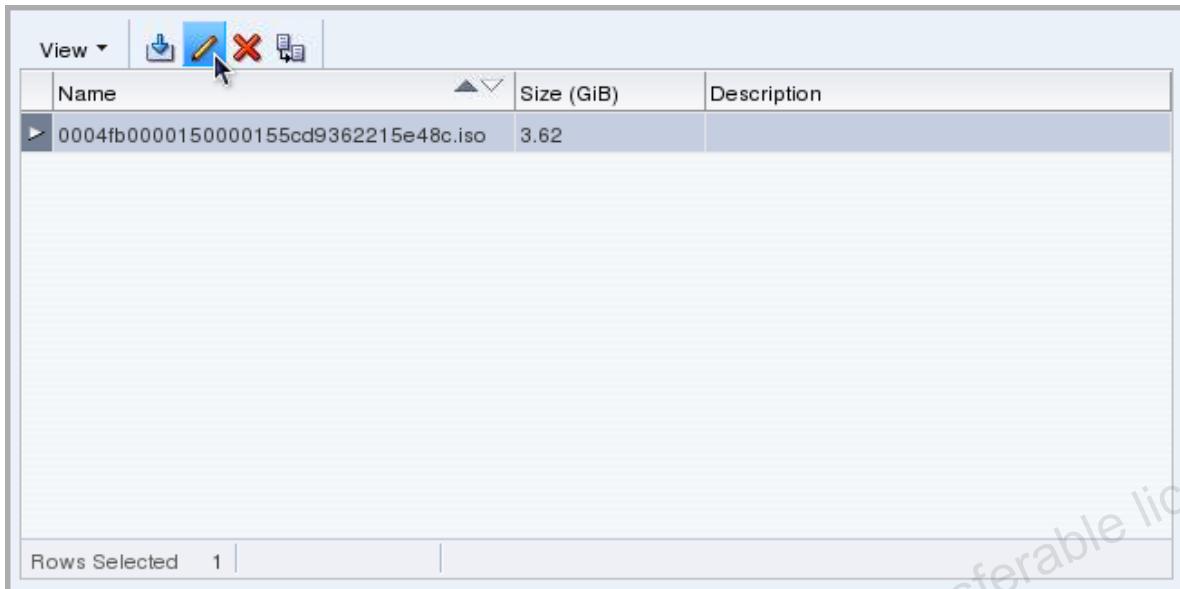
In the next step, you rename the ISO file.

5. Rename the ISO file in the `nfs_repos` repository.

Recall that you did not create the NFS repository, but you discovered the repository by using the Oracle VM Manager.

The name for the ISO file shows up as a series of hexadecimal digits, forming a unique identifier (UUID). The original, friendly name that was stored initially in the database of a previous Oracle VM Manager installation was lost when you did a fresh installation of the Oracle VM Manager.

- a. Select the ISO file and click the Edit icon.



- b. In the Edit ISO window, replace the ISO name with OracleLinux-R6-U5-Server-x86_64-dvd.iso, as shown in the following screenshot:



Click OK to trigger the Edit operation.

The ISO file now appears with its restored friendly name in the ISOs folder.

Name	Size (GiB)	Description
OracleLinux-R6-U5-Server-x86_64-dvd.iso	3.62	

Rows Selected 1

6. Use the Oracle VM CLI to display the list of repository objects. The output shows the UUID and the matching name for each object displayed.

In your Oracle VM environment, it is a good practice to track the objects in your repositories by their names and UUID. If you must rediscover one or more repositories during a re-installation, you are able to give the objects in your rediscovered repositories their previous friendly name, based on their UUID. This also applies to the physical disks in your Oracle VM environment. You can use the Oracle VM CLI `edit` command to perform the renaming task.

In this task, you display the ISO file in your repository, as well as the physical disks that are available in your lab environment, by using the Oracle VM CLI.

- Restart your Oracle VM CLI session if it has expired.
- List the ISO file in your environment by using the `list VirtualCdrom` command.

```
OVM> list virtualCdrom
Command: list virtualCdrom
Status: Success
Time: ...
Data:
    id:EMPTY_CDROM  name:Empty CDROM
    id:0004fb0000150000155cd9362215e48c.iso  name:OracleLinux-R6-
U5-Server-x86_64-dvd.iso
OVM>
```

Both the friendly name (`name`) and UUID (`id`) are listed for the ISO object.

- List the physical disks in your environment by using the `list physicalDisk` command.

```
OVM> list physicalDisk
Status: Success
Time: ...
Data:
    id:0004fb0000180000e524e1f519b4546e  name:serverPoolFs
```

```
id:0004fb0000180000972c92081aa5c2dd
name:1ATA_QEMU_HARDDISK_QM0004
    id:0004fb000018000032702e9aad98aa85 name:repositoryLun
    id:0004fb0000180000fef0cd10a4dc410e name:IET (1)
    id:0004fb000018000010b015d225f0c9c2
name:1ATA_QEMU_HARDDISK_QM0002
    id:0004fb000018000042ffb38776a9622c name:IET (4)
    id:0004fb0000180000997e0a5749837cb8 name:IET (5)
    id:0004fb000018000039a587a982031333 name:IET (3)
OVM>
```

Practice 5-2: Create a Clustered Server Pool

Overview

In this practice, you create a clustered server pool and add the two Oracle VM servers to this server pool.

Creating the server pool as a clustered server pool offers the following benefits:

- High availability for the virtual machines running on the servers in the clustered server pool
- Ability to create repositories and physical disks for the virtual machines on the storage shared by the Oracle VM servers that are members of the server pool

All server pools, whether they are clustered or unclustered, also offer the following benefits:

- Anti-affinity feature
- Live migration
- Dynamic Resource Scheduler (DRS) and Dynamic Power Management (DPM)

The live migration, anti-affinity, and high availability features are covered in the practices for the lesson titled “Managing Virtual Machines.”

Assumptions

This practice assumes that there is a physical disk, which is at least 12 GB in size, to act as a server pool file system.

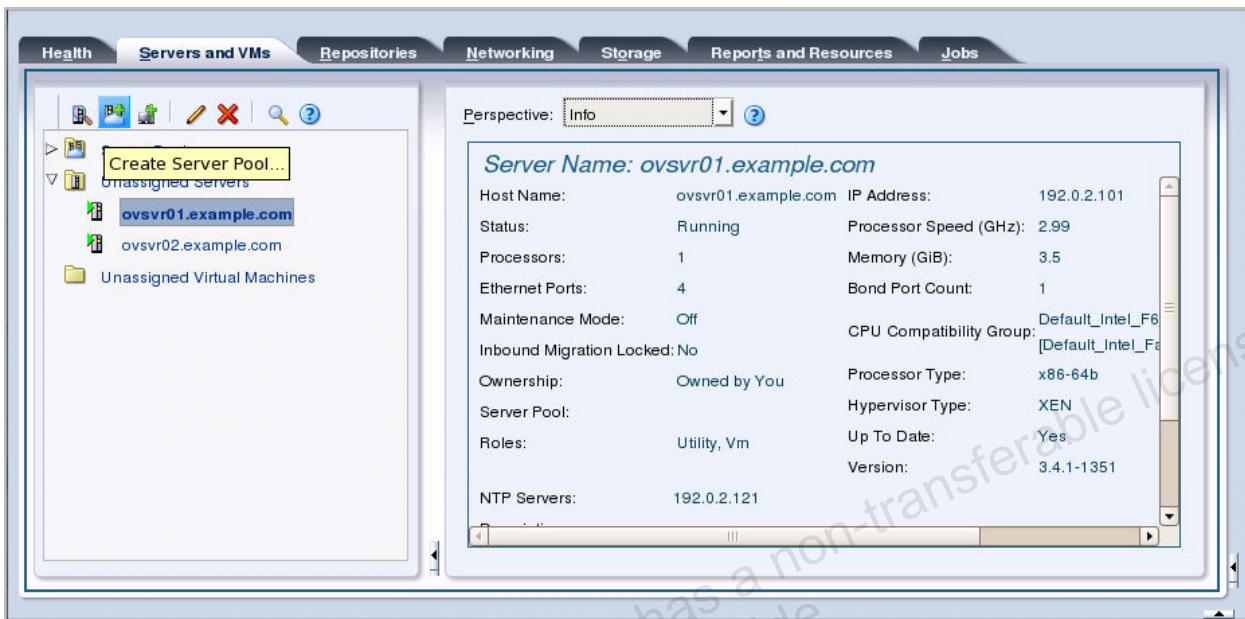
- The iSCSI storage array that you configured in a practice for the lesson titled “Managing Storage,” presented a LUN of 12.7 GiB. You renamed this LUN `serverPoolFs` to declare its intended usage.

You also need an available IP address for the clustered server pool. This IP address must be on the management network.

You perform this practice by using the Oracle VM Manager UI.

Tasks

1. Create the clustered server pool.
 - a. From the Servers and VMs tab, click the Create Server Pool icon on the toolbar of the navigation pane.

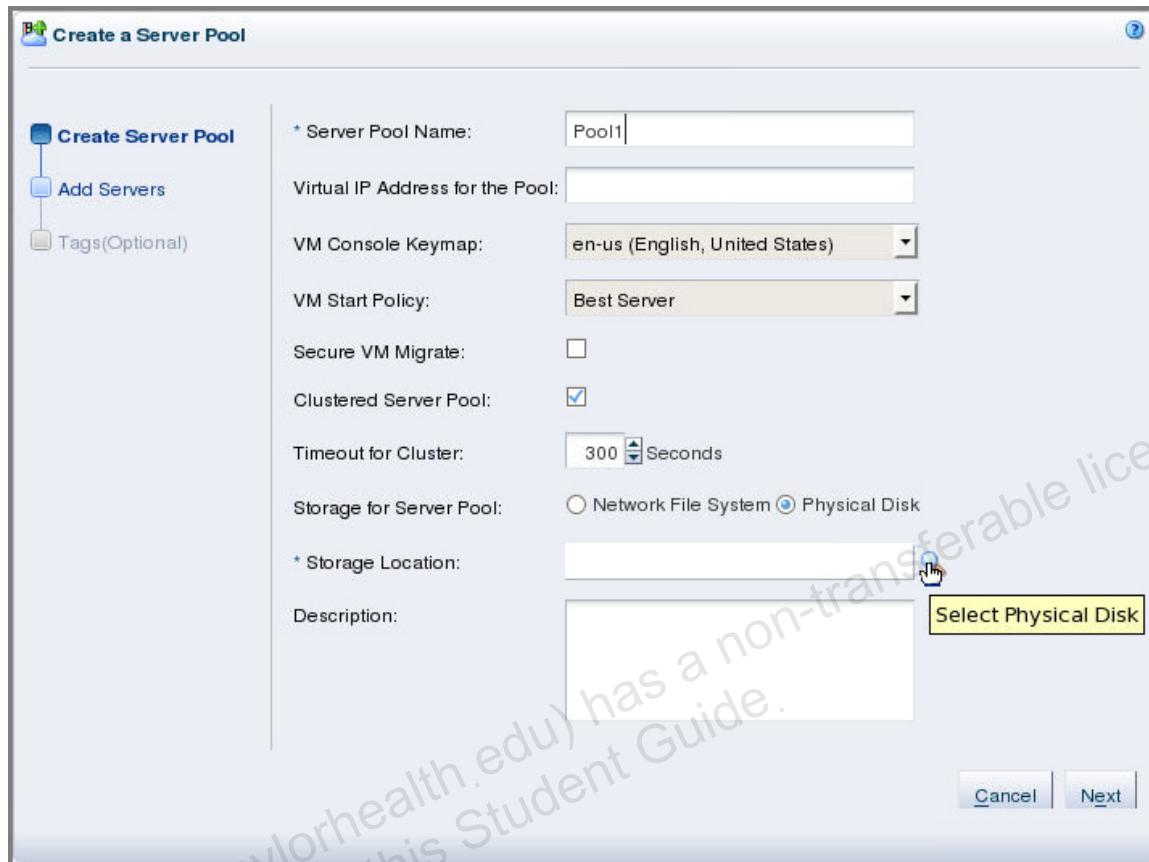


The Create Server Pool screen appears.

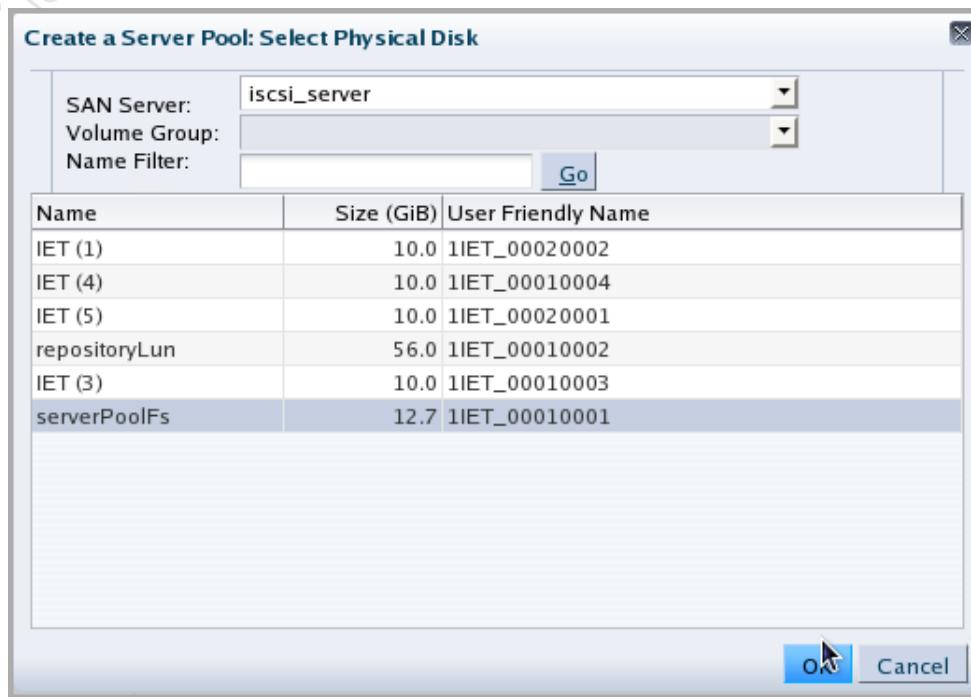
- b. On the Create Server Pool screen, provide information for the new server pool. This information is summarized in the following table:

Field	Value
Server Pool Name	Pool1
Virtual IP Address for the Pool	Leave empty. For Oracle VM version 3.4, a VIP address is not required for clustered server pools. In earlier versions of Oracle VM, you require a VIP for server pool management. The relevant field is still active in the Oracle VM Manager 3.4 UI.
VM Console Keymap	English, United States, or a keymap to match your keyboard requirement
VM Start Policy	Best Server
Secure VM Migrate	Leave deselected.
Clustered Server Pool	Select this check box.
Timeout for Cluster	Set the timeout to 300 seconds.
Storage for Server Pool	Select the Physical Disk option.
Storage Location	Using the search function, find serverPoolFs.
Description	server pool for ovsvr01 and ovsvr02

After entering these values in the top part of the screen, it looks like the following screenshot:



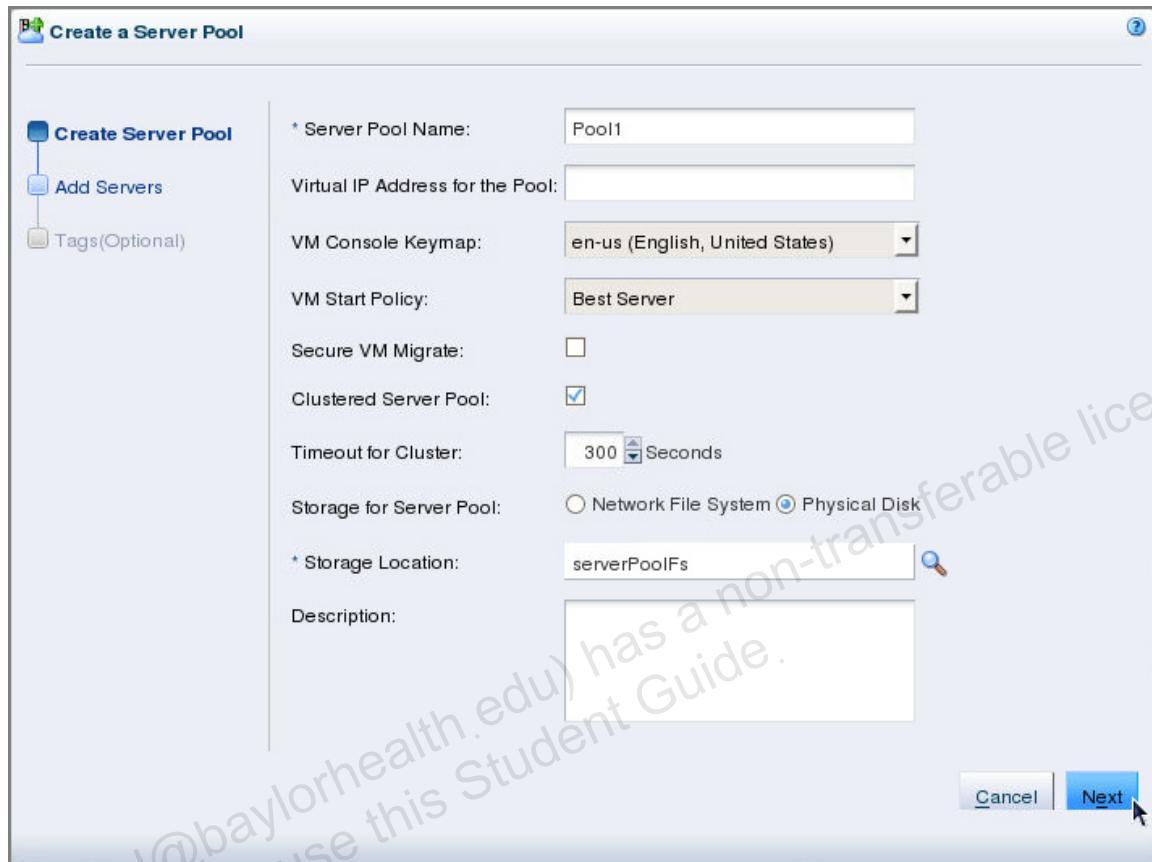
- Click the Search button to find the physical disk to use for the server pool file system.
- On the Select Physical Disk screen, select `iscsi_server` from the SAN Server dropdown list, and then select `serverPoolFs`, as shown in the following screenshot:



- e. Click OK to continue.

You are returned to the Create Server Pool screen.

- f. Enter a description and examine your selections.



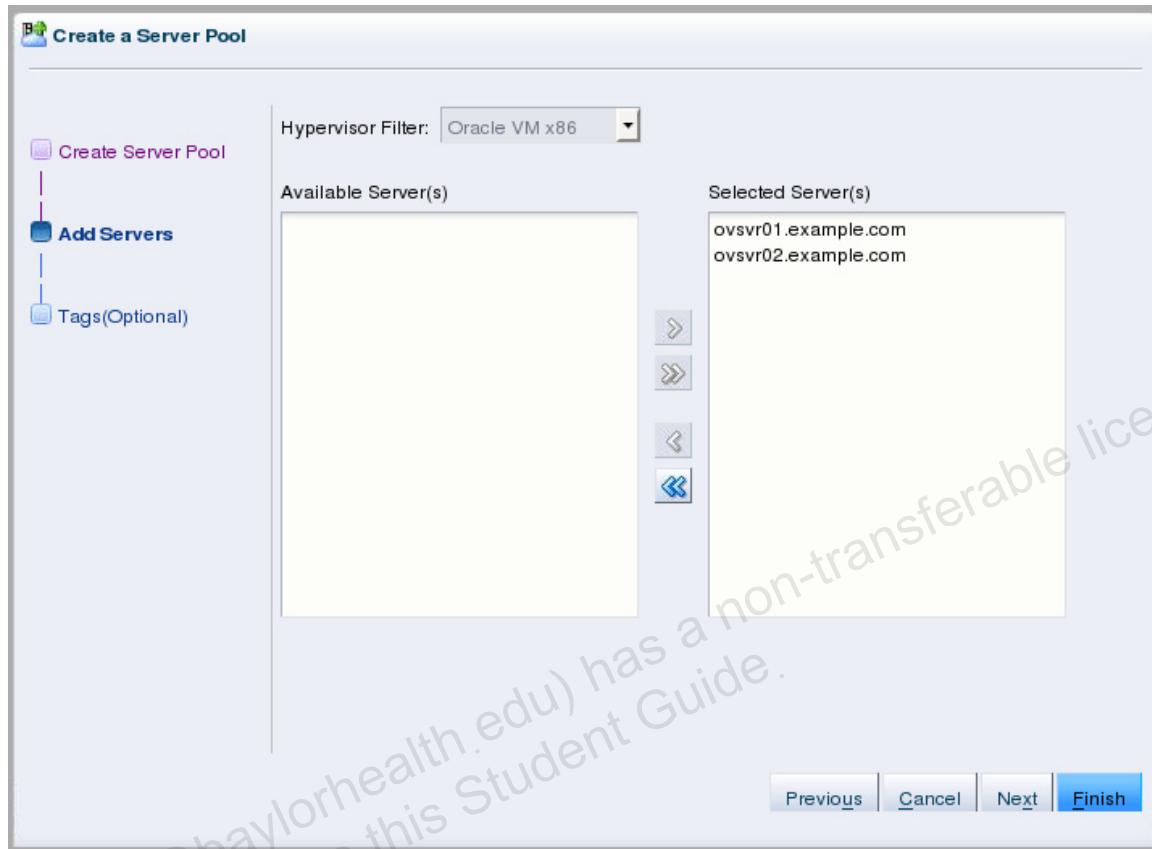
- g. Click Next to continue.

The Oracle VM Manager is selecting an Oracle VM server to create the server pool.



When the server pool is created, the Add Servers screen appears.

- h. On the Add Servers screen, click the double right-arrow button to move the two available Oracle VM servers to the list of selected servers, as shown in the following screenshot:



Click Finish to complete the creation of the server pool, bypassing the optional Tags window.

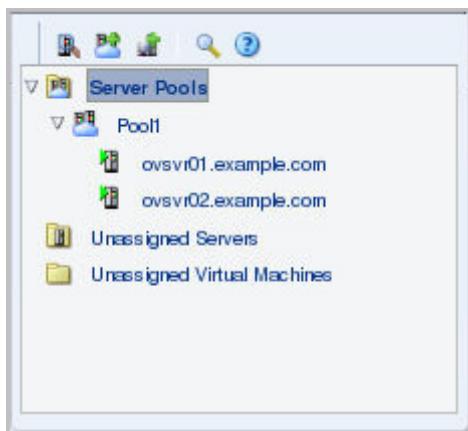
Notice that creating a new server pool triggered several jobs, as seen in the Jobs pane in the following screenshot:

Job Summary: 12 Total Jobs 0 Pending 1 In Progress 6 Failed 0 Aborted 5 Complete						
Description	Status	Progress	Message	Timestamp	Duration	Abort
Add Server: ovsvr02.example.com to Server Pool: Pool1	Running	Updating cluster info		Mar 30, 2016 3:18:54 am		<button>Abort</button> <button>Details</button>
Add Server: ovsvr01.example.com to Server Pool: Pool1	Success			Mar 30, 2016 3:18:30 am	23s	<button>Abort</button> <button>Details</button>
Create Cluster Heartbeat Device on Cluster: eeabd78365	Success			Mar 30, 2016 3:17:14 am	53s	<button>Abort</button> <button>Details</button>
Create Cluster on Server Pool: Pool1	Success			Mar 30, 2016 3:17:13 am	40ms	<button>Abort</button> <button>Details</button>
Create Server Pool: Pool1	Success			Mar 30, 2016 3:17:13 am	82ms	<button>Abort</button> <button>Details</button>

All jobs must complete successfully.

Note: In your lab environment, the server pool creation jobs take several minutes to complete.

In the navigation pane, click the Expand button for the Server Pools folder, and then the Expand button for Pool1.



- Select Pool1 in the navigation pane and select Info from the Perspective drop-down list in the management pane to view information about your newly created server pool.

Server Pool Name: Pool1	
Server Count:	2
Clustered:	Yes
Timeout for Cluster:	300 Seconds
Master Server:	N/A
Virtual IP:	N/A
ID:	0004fb0000020000a0267c7393e91c6e
Description:	
Pool File System:	Server Pool File System
Pool File System Type:	Storage Element
Pool File System Storage Device:	serverPoolFs
NFS/NAS File System:	

Notice the following items:

- Server Count: 2 (`ovsvr01.example.com` and `ovsvr02.example.com`)
 - Clustered: Yes
 - Pool File System Storage Device: `serverPoolFs`
- Also examine the information from the Servers perspective and other available perspectives in the management pane.

Server Pool Notes

- When you have created the server pool, you cannot change the timeout value selected for the server pool.
- You can, however, make the following changes to your server pool:
 - Change the server pool name.
 - Change the server pool description.
 - Change the master server, if managing a server pool with Oracle VM servers running 3.3 or earlier.
 - Change the virtual machine console keymap, which determines the key mapping when connecting to a virtual machine's console.

- Change the virtual machine start policy (Start on best server, Start on current server).
- Specify whether to enable the Secure VM Migrate feature.
- Specify whether to override the Global Server Update Group.

Practice 5-3: Create an iSCSI Repository

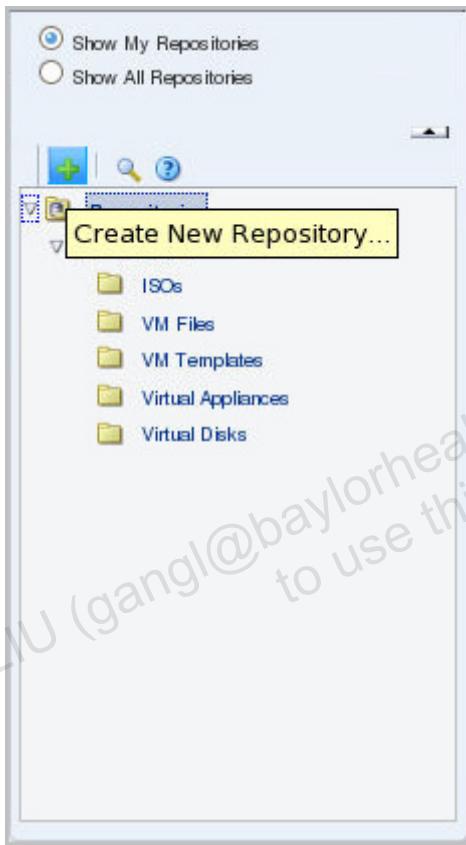
Overview

In a previous practice, you renamed the 56 GiB iSCSI physical disk to repositoryLun. In this practice, you create a repository by using this iSCSI physical disk (LUN).

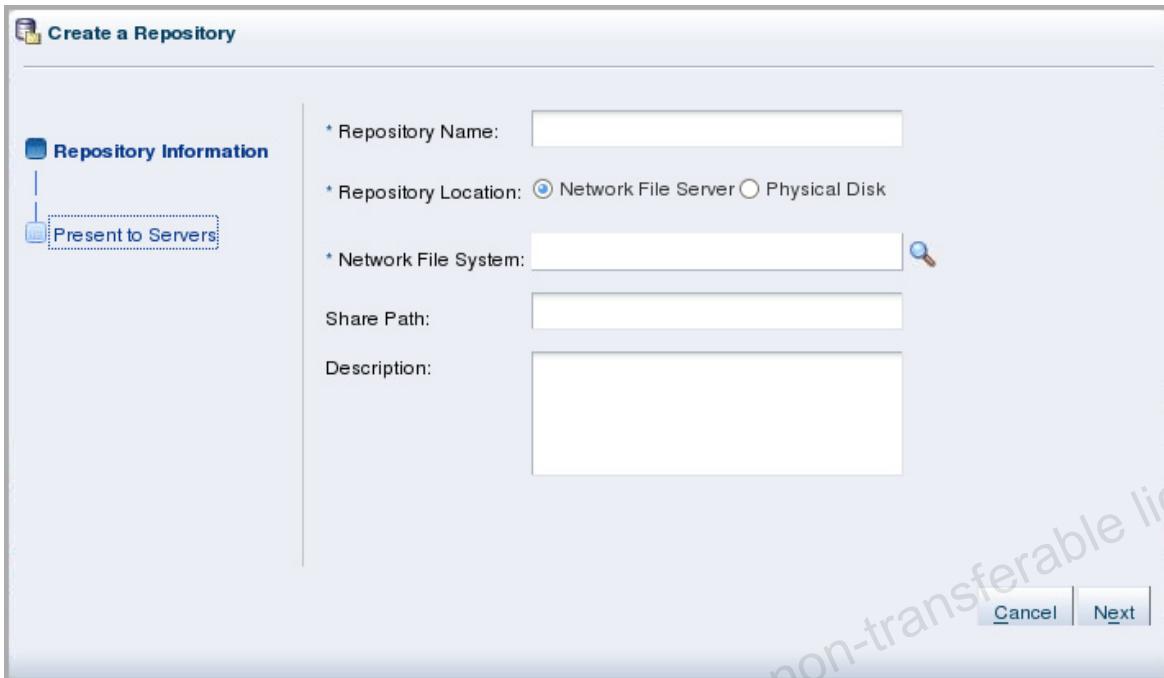
You use the Oracle VM Manager UI for this practice and you watch the progress of the job from the ovsrv01.example.com Oracle VM server.

Tasks

1. In the Oracle VM Manager UI, click the Repositories tab.
2. Click the Create New Repository icon on the toolbar of the navigation pane.



The Repository Information window appears.



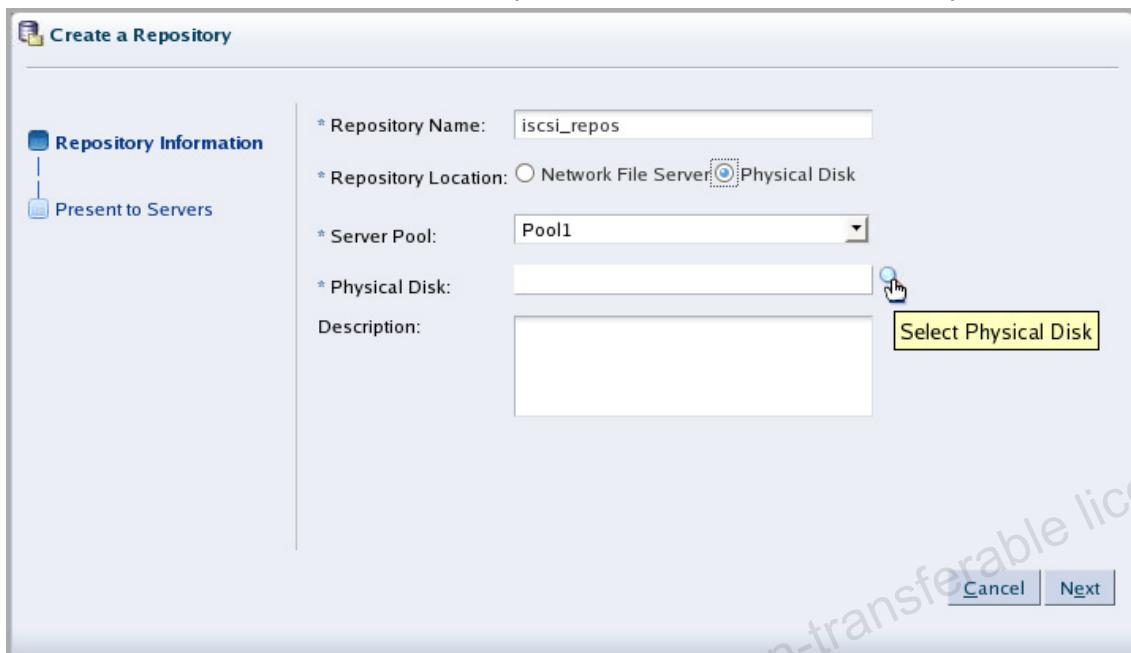
3. Create the new repository.

Use the information in the following table to create your new repository:

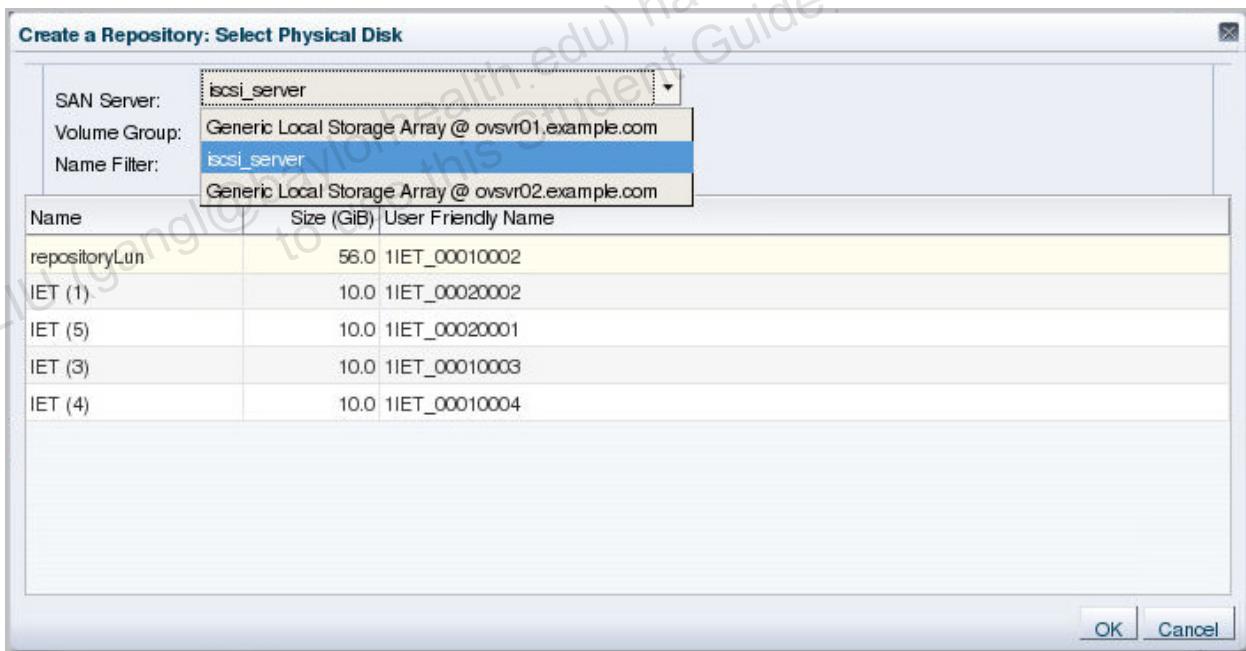
Field	Value
Repository Name	iscsi_repos
Repository Location	Select the Physical Disk option.
Server Pool	Select Pool1 from the drop-down list.
Physical Disk	Using the search function, find repositoryLun.
Description	56 GiB repository on repositoryLun

- In the Repository information window, provide the repository name.
- Select the Physical Disk option button for Repository Location.
- Select Pool1 (the only possible selection) for Server Pool.

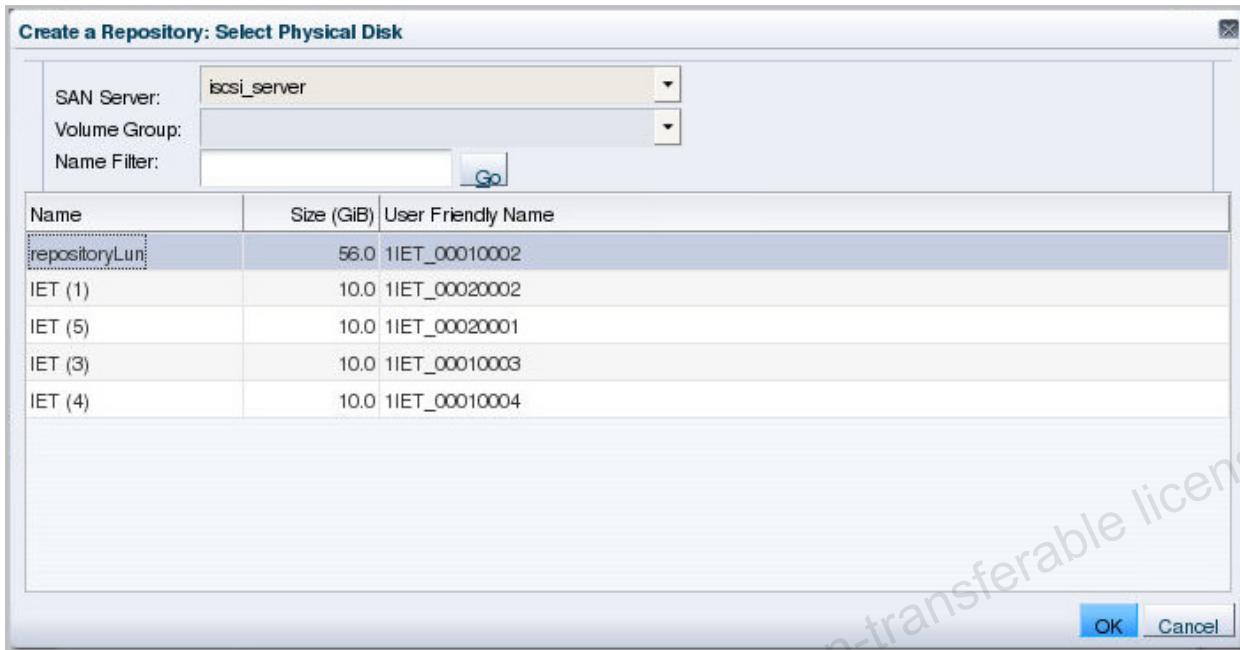
- d. Click the Search button to locate the physical disk to use for the repository.



- e. In the Select Physical Disk pop-up window, select `iscsi_server` from the SAN Server drop-down list.



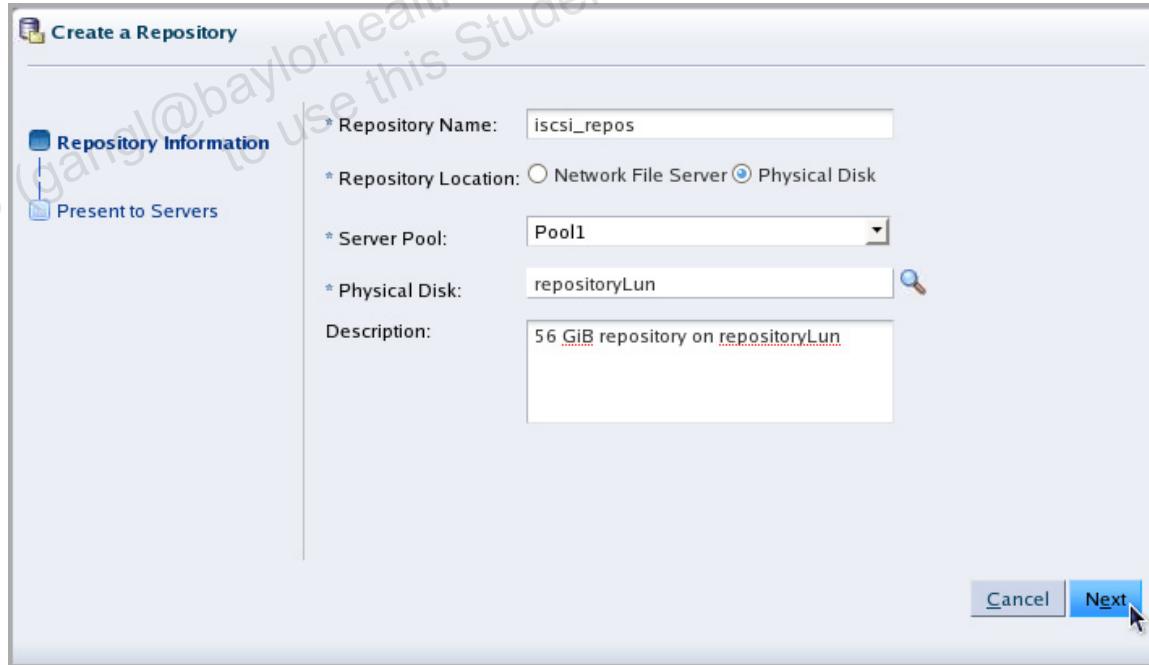
- f. Select repositoryLun from the list of physical disks available from iscsi_server.



Notice that the physical disk named serverPoolFS does not appear in the list, because it is now in use as a server pool file system.

Click OK to continue.

- g. Optionally, enter a description for the new repository.



Click Next to create the new directory.

The Oracle VM Manager dispatches an Oracle VM server to create the new repository.

Message

 Creating a Repository, please wait ...

This action can take 11–15 minutes or more in your lab environment. Use the information in the next step to monitor your job.

- h. Log in to ovsrv01.example.com as root.

```
[root@<your lab machine> ~]# ssh ovsrv01
root@ovsrv01's password: oracle
Last login: Thu Jul 10 21:40:32 2014 from 192.0.2.1
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.

[root@ovsrv01 ~]#
```

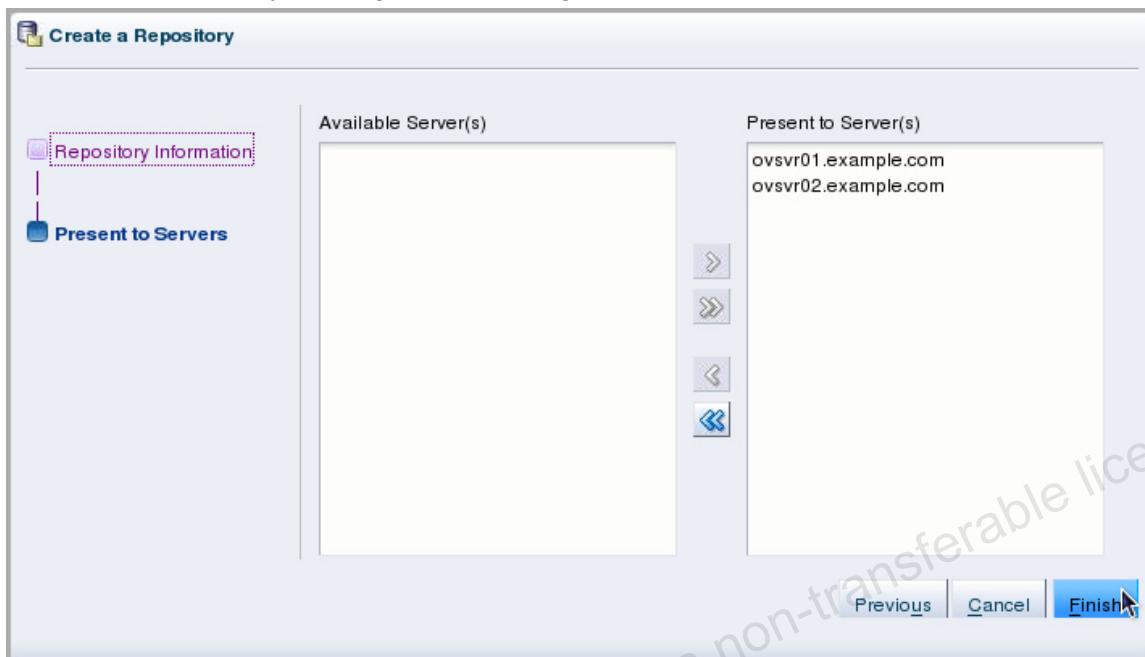
- i. Use the ps command to locate the mkfs.ocfs2 process.

```
[root@ovsrv01 ~]# ps -eaf | grep mkfs
root      13872 13848  0 22:26 ?        00:00:00 /sbin/mkfs.ocfs2
-J block64 -b 4096 -L OVS713d0c2783a8c -U
0004fb0000050000021713d0c2783a8c -T vmstore -N 32
/dev/mapper/1IET_00010002
root      13928 13892  7 22:26 pts/0      00:00:00 grep mkfs
[root@ovsrv01 ~]#
```

Note: If mkfs.ocfs2 is not running on ovsrv01, it is running on the other Oracle VM server, ovsrv02. If this is the case, log in to ovsrv02 to view the mkfs.ocfs2 process.

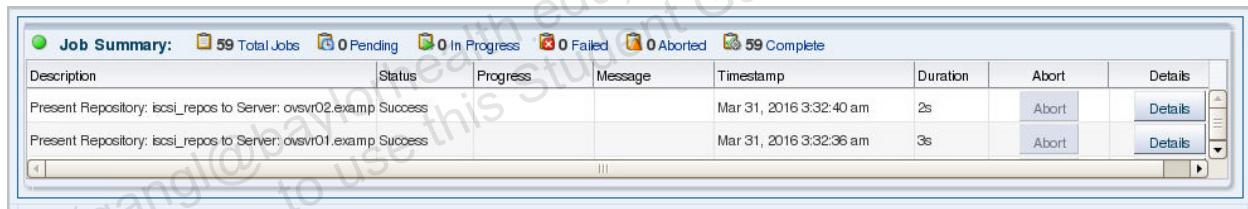
When the mkfs.ocfs2 process to create the repository completes, the Present to Servers window appears as shown in the next step.

- j. In the Present to Servers window, move the two Oracle VM servers to the “Present to cp Server(s)” pane by clicking the double right-arrow button.

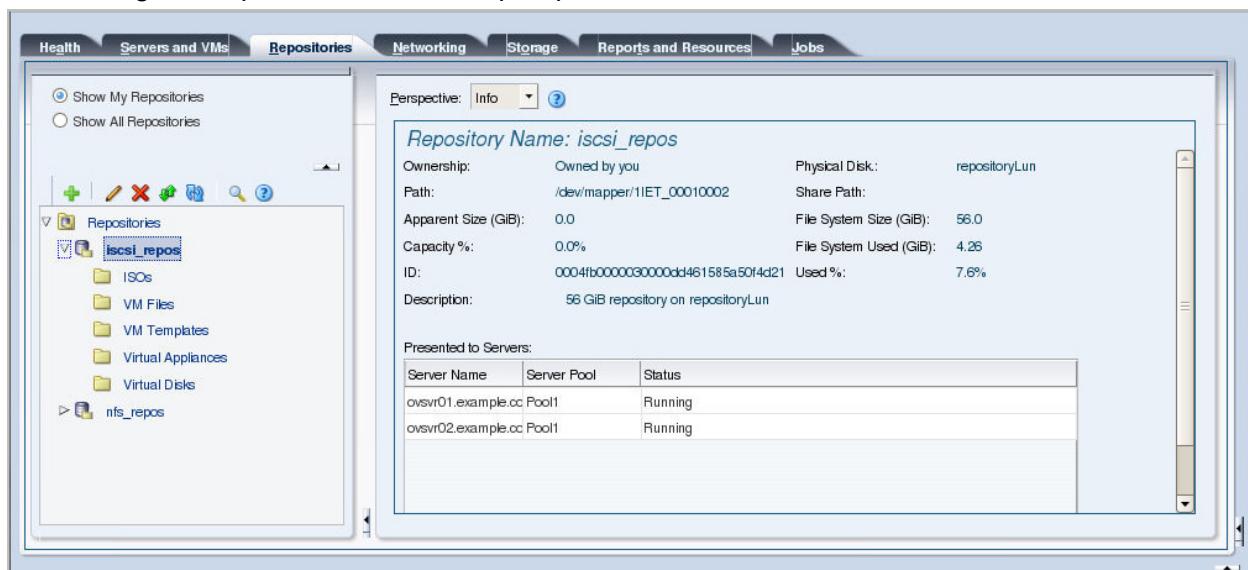


- k. Click Finish to trigger the operation.

Two jobs are created to present the repository to the two Oracle VM servers.



- l. To view information about your new iSCSI repository, expand the Repositories folder in the navigation tree and click **iscsi_repos**. The following screenshot shows the management pane when the Info perspective is selected:



Use the scrollbar in the management pane to expose the list of Oracle VM servers to which the repository has been presented.

Your new repository is now ready to use.

Practice 5-4: Import Resources into the Repository

Overview

In this practice, you import a template into the new NFS repository. The template contains the files for a virtual machine that was built by selecting a minimal installation of *Oracle* Linux Release 6 Update 5.

The template is built with the minimum set of packages for a functional operating system. You then customize the template by adding the packages and services needed to run a particular application.

The template also contains the Oracle VM Guest Additions packages and has been configured for first boot interview. When you boot a virtual machine that is cloned from this template, it prompts you for information that is used to configure networking for the virtual machine.

Note: You accelerate the deployment of virtual, multitier applications by using Oracle Virtual Assembly Builder to create customized templates and assemblies. More information about Oracle Virtual Assembly Builder is available at www.oracle.com/us/products/middleware/exalogic/virtual-assembly-builder/overview.

Assumptions

You can use the FTP, HTTP, or HTTPS protocol to import ISO files, templates, assemblies, virtual disk images, and virtual machines into any repository. In your lab environment, you use the HTTP protocol for the import operation.

The tasks in this practice assume that a web server is accessible from your Oracle VM servers. In your lab environment, your lab machine acts as the web server.

Tasks

1. Copy the template into the web server default directory on your lab machine.
 - a. Open a terminal window on your lab machine.
 - b. Change user to `root`.

```
bash-3.2$ su -
Password: oracle
[root@<your lab machine> ~]#
```

- c. Check whether the `httpd` service is running.

```
[root@<your lab machine> ~]# service httpd status
httpd (pid ...) is running...
[root@<your lab machine> ~]#
```

If the service is not running, start it.

```
[root@<your lab machine> ~]# service httpd start
```

- d. Change directory to `/OVS/seed_pool` and execute the `ls` command.

```
[root@<your lab machine> ~]# cd /OVS/seed_pool
[root@<your lab machine> seed_pool]# ls
env_refresh.sh                                physDisk1.tgz
iscsiPoolfs1.tgz                               physDisk2.tgz
iscsiRepos1.tgz                                physDisk3.tgz
local_ovsdrv01.tgz                            physDisk4.tgz
```

```

local_ovsvr02.tgz
nfsrepo1.tgz
OracleLinux-R7-U1-Server-x86_64-dvd.iso
osc-oracle-s7k-1.0.3-96.el6.noarch.rpm
ovmcore-console-1.0-36.el6.noarch.rpm
ovmm-3.4.1-installer-OracleLinux-b1350.iso
OVS-3.4.1-1351.iso
ovs_restore.sh
[root@<your lab machine> seed_pool]#

```

Note: Your output differs.

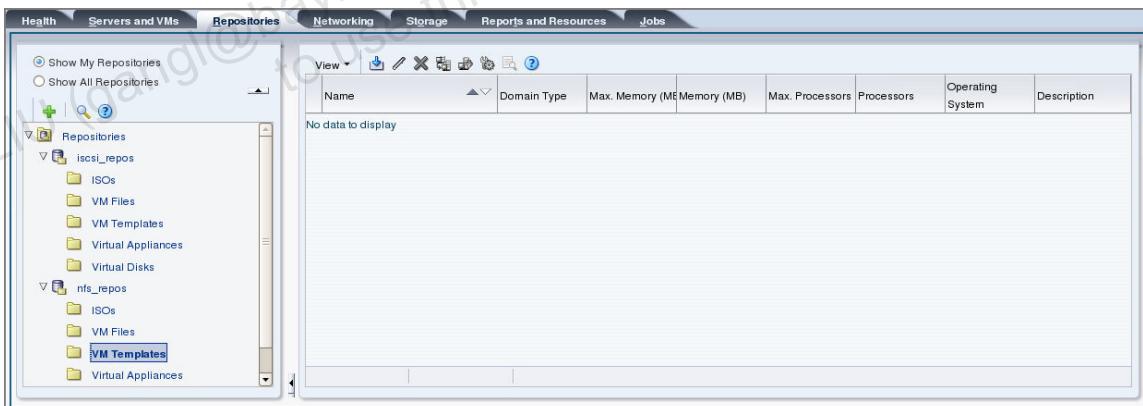
- Copy the `pvm_template.tgz` template to the `/var/www/html` directory, which is the default directory for `httpd`.

```

[root@<your lab machine> seed_pool]# cp pvm_template.tgz
/var/www/html/
[root@<your lab machine> seed_pool]#

```

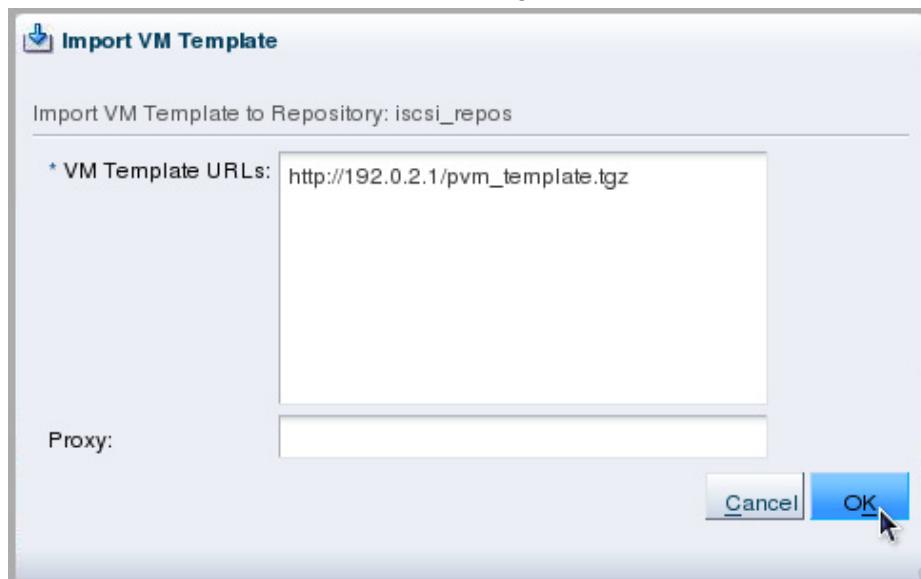
- Using the Oracle VM Manager UI, import the template into the iSCSI repository.
 - On the Repositories tab, select `nfs_repos` in the navigation pane. If `nfs_repos` is not visible, click the Expand button next to the `Repositories` folder.
 - Expand the folders under `nfs_repos` to expose the directory structure for the repository.
 - Click the `VM Templates` folder.
 - In the management pane, click the Import Template icon, which is located on the toolbar.



- In the Import Template window, enter the information summarized in the following table:

Field	Value
Template URLs	<code>http://192.0.2.1/pvm_template.tgz</code>
Proxy	Leave blank

Your filled screen looks like the following screenshot:



Click OK to trigger the import operation.

The import operation goes through a downloading stage, followed by an unpacking stage.

A screenshot of a 'Job Summary' page. At the top, it shows 'Job Summary: 22 Total Jobs, 0 Pending, 1 In Progress, 1 Failed, 0 Aborted, 20 Complete'. Below this is a table with columns 'Description', 'Status', 'Progress', and 'Message'. One row in the table shows the status 'Running' for an import operation to 'nfs_repos' from 'http://192.0.1.100/pvm_template.tgz'.

During the Import Operation

You can follow the progress of the unpacking step, which occurs after the downloading step, of the import operation by searching for the `gtar xzf` process on your environment's Oracle VM servers. You might have to search for this process on different servers before you can follow its progress. In the example below, the import operation is on `ovs02.example.com`. By reading through the section below you see where the directory structure was created during the unpacking operation.

The `gtar` command to unpack the template is as follows:

```
[root@ovs02 ~]# ps -eaf | grep gtar
root      15233 15134  2 22:41 ?          00:00:00 gtar xzf
/OVS.Repositories/0004fb000003000016baf5a586dc7047/Templates/000
4fb0000140000bac794224bd73749/tmp/pvm_template.tgz --no-same-
owner -C
/OVS.Repositories/0004fb000003000016baf5a586dc7047/Templates/000
4fb0000140000bac794224bd73749/tmp
root      15275 15196  3 22:41 pts/0      00:00:00 grep gtar
[root@ovs02 ~]#
```

You can also see the compressed template and its components in a temporary directory in the target repository.

Note: The NFS-based repository is mounted to both Oracle VM servers.

- From either Oracle VM server, display the mounted file systems by using the `df -h` command. This example uses `ovsvr02.example.com`.

```
[root@ovsvr02 ~]# df -h
Filesystem           Size  Used Avail Use% Mounted on
/dev/sda2            3.6G  1.1G  2.3G  33% /
tmpfs                361M     0  361M   0% /dev/shm
/dev/sda1            477M   47M  401M  11% /boot
none                361M   40K  361M   1%
/var/lib/xenstored
192.0.2.1:/nfsrepos1      20G  3.8G  15G  21%
/OVS/Repositories/0004fb0000030000d87b5dd02a6c4141 ←This is the
                                         iSCSI repository.
/dev/mapper/1IET_00010001    13G  369M  13G   3%
/poolfsmnt/0004fb0000050000715242fc656c4807
/dev/mapper/1IET_00010002    56G  5.8G  51G  11%
/OVS/Repositories/0004fb000003000016baf5a586dc7047
root@ovsvr02 ~]#
```

You can recognize the NFS-based repository by its size: 20 GiB

- Change directory to the repository's file system by using the `cd` command and display the top-level contents of the repository by using the `ls` command.

```
[root@ovsvr02 ~]# [root@ovsvr02 ~]# cd
/OVS/Repositories/0004fb0000030000d87b5dd02a6c4141
[root@ovsvr02 0004fb000014000019b43afddd537ea0]# ls
Assemblies  ISOs  lost+found  Templates  VirtualDisks
VirtualMachines
[root@ovsvr02 0004fb0000030000d87b5dd02a6c4141]#
```

- Change directory to the `Templates` directory by using the `cd` command and display the contents of the `Templates` directory by using the `ls` command.

```
[root@ovsvr02 0004fb0000030000d87b5dd02a6c4141]# cd Templates
[root@ovsvr02 Templates]# ls
0004fb000014000019b43afddd537ea0
[root@ovsvr02 Templates]#
```

There is only one template in the repository, which is the template that you are currently importing. Your template directory name matches the UUID assigned to your template and differs from the UUID in this example.

- Change directory to the existing template directory and display its content.

```
[root@ovsvr02 Templates]# cd 0004fb000014000019b43afddd537ea0
[root@ovsvr02 0004fb0000140000bac794224bd73749]# ls
tmp-974477ceb9c7402da5154a5ae798a7c4
```

The `tmp-` directory exists only for the duration of the import operation.

- Change directory to the `tmp` directory and display the content by using the `ls -l` command.

```
[root@ovs02 0004fb000014000bac794224bd73749]# cd
tmp-167856a67dc545e0961ce2c2ecb67bab
[root@ovs02 tmp]# ls -l
total 2621440
-rw-r--r-- 1 root root ... pvm_template.tgz
-rw----- 1 root root ... system.img
-rw----- 1 root root ... vm.cfg
[root@ovs02 tmp]#
```

The uncompressed components of the template are `system.img` and `vm.cfg`. These two components are relocated at the completion of the import operation and the `tmp` directory is removed.

- Exit the `tmp` directory by executing the `cd` command.

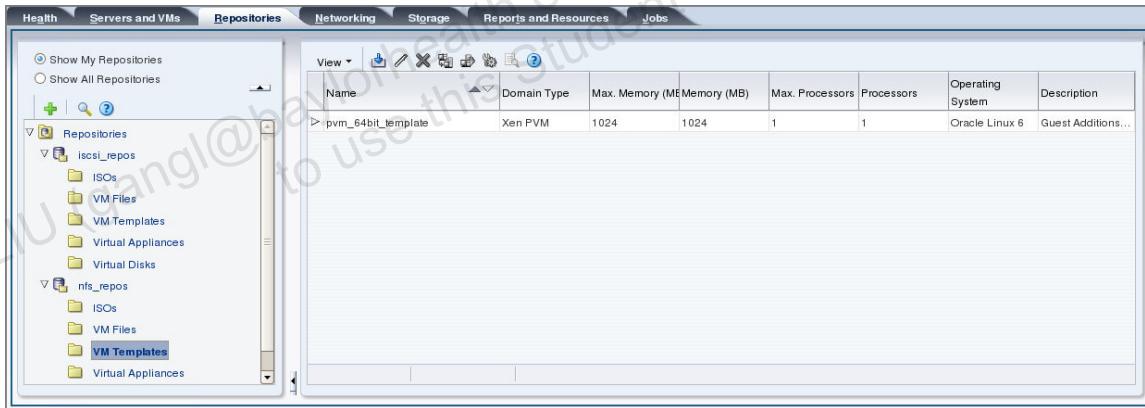
```
[root@ovs02 tmp]# cd
[root@ovs02 ~]#
```

- Terminate your session to `ovs02` by executing the `exit` command.

```
[root@ovs02 ~]# exit
```

Note: The import operation takes about 13 minutes to complete.

After the import operation completes, the new template appears on the Templates tab.



3. Display your new template information by using the Oracle VM CLI.
 - If necessary, restart your Oracle VM CLI session.
 - Use the `list vm` command to display the list of virtual machines, which also includes templates.

```
OVM> list vm
Command: list vm
Status: Success
Time: ...
Data:
    id:0004fb000014000bac794224bd73749    name:pvm_64bit_template
OVM>
```

Oracle VM treats virtual machines and templates similarly.

Note: The single `vm` in the above listing is your newly imported template. The template name and the name of the compressed file that you used for the import operation do not necessarily match.

- c. Use the `show vm` command to display further information about a particular virtual machine or template.

```
OVM> show vm ?
      id=<object identifier> OR
      name=<object name>
OVM> show vm id=0004fb0000140000bac794224bd73749
Command: show vm id=0004fb0000140000bac794224bd73749
Status: Success
Time: ...
Data:
  Status = Template
  Memory (MB) = 1024
  Max. Memory (MB) = 1024
  Processors = 1
  Max. Processors = 1
  Priority = 50
  Processor Cap = 100
  High Availability = No
  Operating System = Oracle Linux 6
  Mouse Type = USB TABLET
  Domain Type = Xen PVM
  Keymap = en-us
  Start Policy = Current Server
  Origin = [http://192.0.2.1/pvm_template.tgz]
  Disk Limit = 104
  Huge Pages Enabled = No
  Config File Absolute Path =
/dev/mapper/1IET_00010002/Templates/.../vm.cfg
  Config File Mounted Path =
/OVS.Repositories/...//Templates/.../vm.cfg
  Repository = 0004fb000003000016baf5a586dc7047 [nfs_repos]
  Vnic 1 = 0004fb0000070000dbdb975a4c2c75f5 [Template Vnic]
  VmDiskMapping 1 = 0004fb000013000028c38caa566b3901 [Mapping
    for disk Id (8643ec16ed9b415b9ab13182ea6490cc.img)]
  Restart Action On Crash = Restart
  Id = 0004fb0000140000bac794224bd73749 [pvm_64bit_template]
  Name = pvm_64bit_template
  Description = Guest Additions installed and configured for
    first boot interview.
  Locked = false
```

```
DeprecatedAttrs = [Huge Pages Enabled (Deprecated for PV guest)]
OVM>
```

Note: The `id` for the template is different in your environment.

From the information displayed for the template, note the following:

- The template name is `pvm_64bit_template`. This name is assigned from the information in the configuration file of the template.
 - The template is assigned 1024 MB of memory (also the maximum memory).
 - The domain type is `Xen PVM`.
 - The template's configuration file resides in the `nfs_repos` directory.
 - The template has one VNIC defined, but it is not associated with any network.
 - The single virtual disk information is provided as `vmDiskMapping 1`.
- d. Find out more about `vmDiskMapping`, which is displayed in the preceding step.

Use the disk mapping `id` from the preceding step. The `id` is unique to your environment.

```
OVM> show vmdiskmapping id=0004fb000013000028c38caa566b3901
Command: show vmdiskmapping id=0004fb000013000028c38caa566b3901
Status: Success
Time: ...
Data:
  Slot = 0
  Emulated Block Device = No
  Virtual Disk = 8643ec16ed9b415b9ab13182ea6490cc.img
  [system.img]
  Vm = 0004fb0000140000bac794224bd73749  [pvm_64bit_template]
  Id = 0004fb000013000028c38caa566b3901  [Mapping for disk Id
    (8643ec16ed9b415b9ab13182ea6490cc.img)]
  Name = Mapping for disk Id
    (8643ec16ed9b415b9ab13182ea6490cc.img)
  Locked = false
OVM>
```

The disk mapping corresponds to a virtual disk. The `name` and `id` of the virtual disk are listed, as well as the virtual machine or template (shown as `Vm`) to which the virtual disk is associated.

- e. Continue drilling down into the virtual disk of the disk mapping to find the location of the virtual disk for the template.

Use the `id` of the virtual disk, as listed in the preceding step.

```
OVM> show virtualdisk id=8643ec16ed9b415b9ab13182ea6490cc.img
Command: show virtualdisk
id=8643ec16ed9b415b9ab13182ea6490cc.img
Status: Success
Time: ...
Data:
```

```
Absolute Path =
/dev/mapper/1IET_00010002/VirtualDisks/8643ec16ed9b415b9ab13182ea6490cc.img
Mounted Path =
/OVS/Repositories/.../VirtualDisks/8643ec16ed9b415b9ab13182ea6490cc.img
VmDiskMapping 1 = 0004fb000013000028c38caa566b3901 [Mapping
for disk Id
(8643ec16ed9b415b9ab13182ea6490cc.img)]
Max (GiB) = 3.0
Used (GiB) = 3.0
Shareable = No
Repository Id = 0004fb000003000016baf5a586dc7047 [n_repos]
Import Filename = system.img
Id = 8643ec16ed9b415b9ab13182ea6490cc.img [system.img]
Name = system.img
Locked = false
DeprecatedAttrs = [Assembly Virtual Disk]
OVM>
```

The virtual disk for the template is located in the nfs_repos repository. You can also see this virtual disk's friendly name (system.img) and size.

The template imported in this practice is used in the practices for the lesson titled “Managing Virtual Machines.”

Practice 5-5: Move pvm_64bit_template to iscsi_repos Repository

Overview

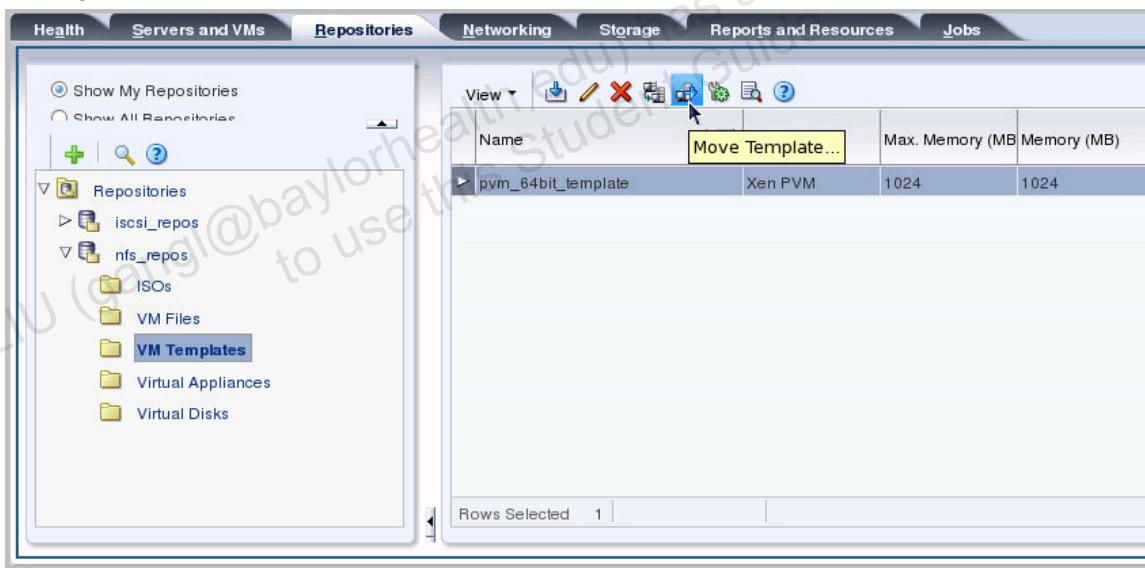
One of the operations you can perform is to move a virtual machine template's resources to a different storage repository. In this practice, you move the `pvm_64bit_template`, and its resources, to the `iscsi_repos` repository using the Oracle VM Manager UI. This operation uses a clone customizer to change the location of the virtual disk and virtual machine configuration file. In the practice titled "Practice 6-6: Create a Clone Customizer and Use it for Cloning Operations" you use the Advanced Clone technique to create a clone customizer for the `pvm_64bit_template` template.

Assumptions

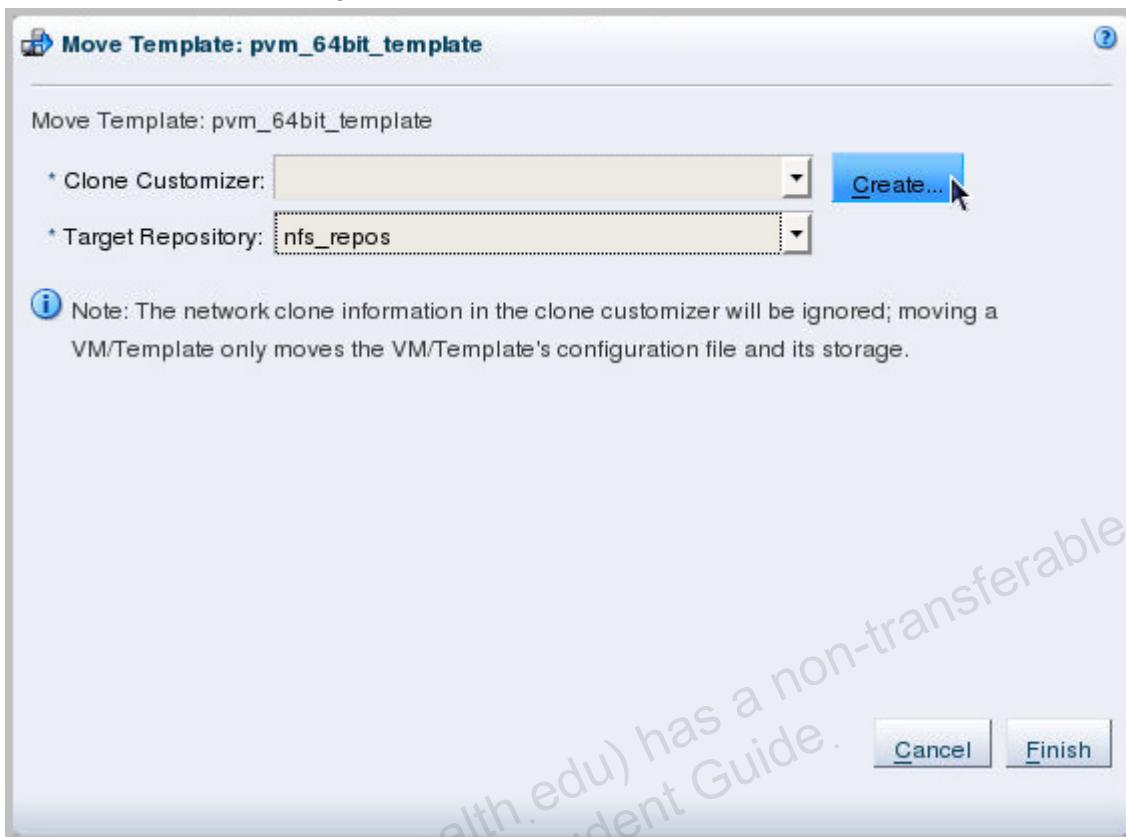
This practice assumes the successful import of the `pvm_64bit_template` into the NFS repository.

Tasks

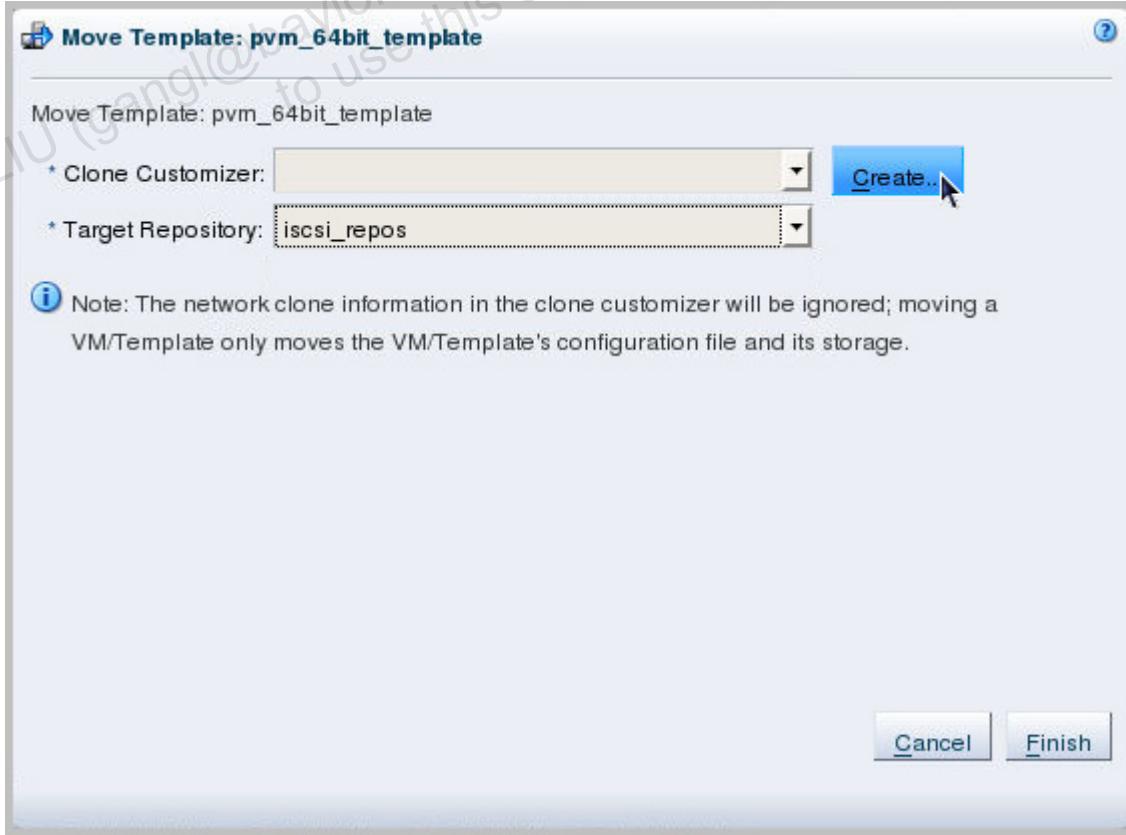
1. In the Oracle VM Manager UI, click the Repositories tab.
2. Click the expand button next to the `nfs_repos` repository to expand the repository folders.
3. Highlight the VM Templates folder in the navigation pane, select the `pvm` template in the management pane, and the click the Move Template icon from the tool bar.



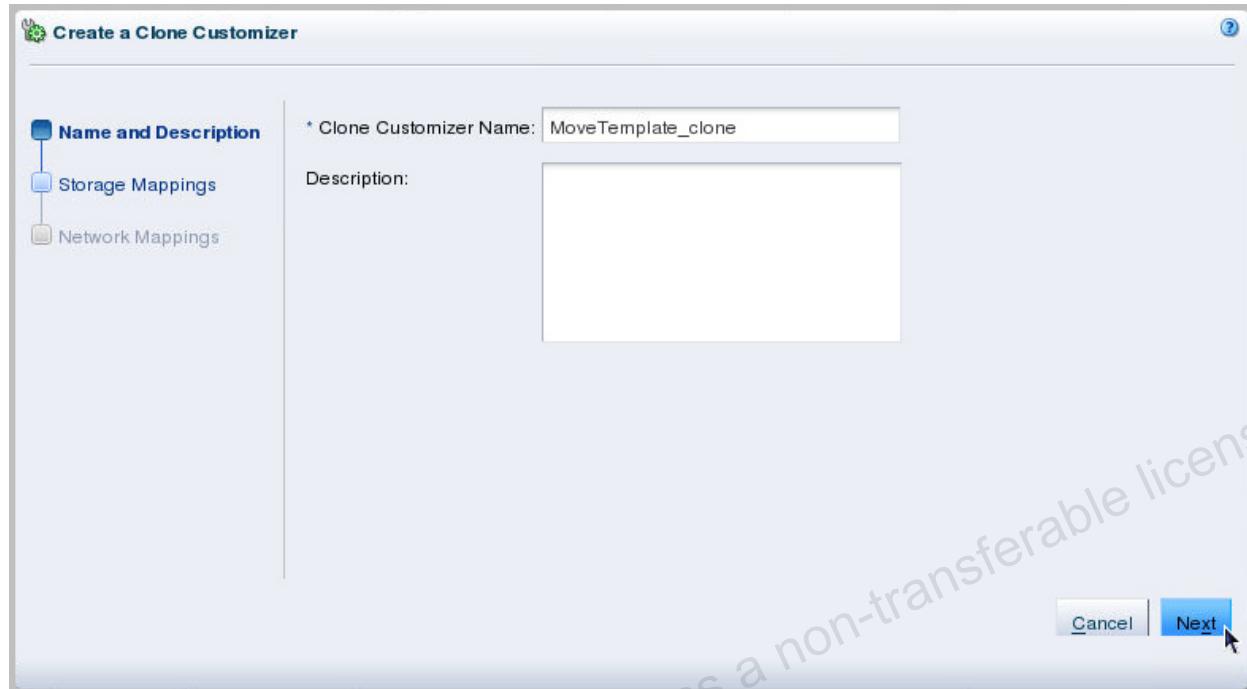
The Move Template dialog appears.



4. Click Create to launch the Clone Customizer wizard.



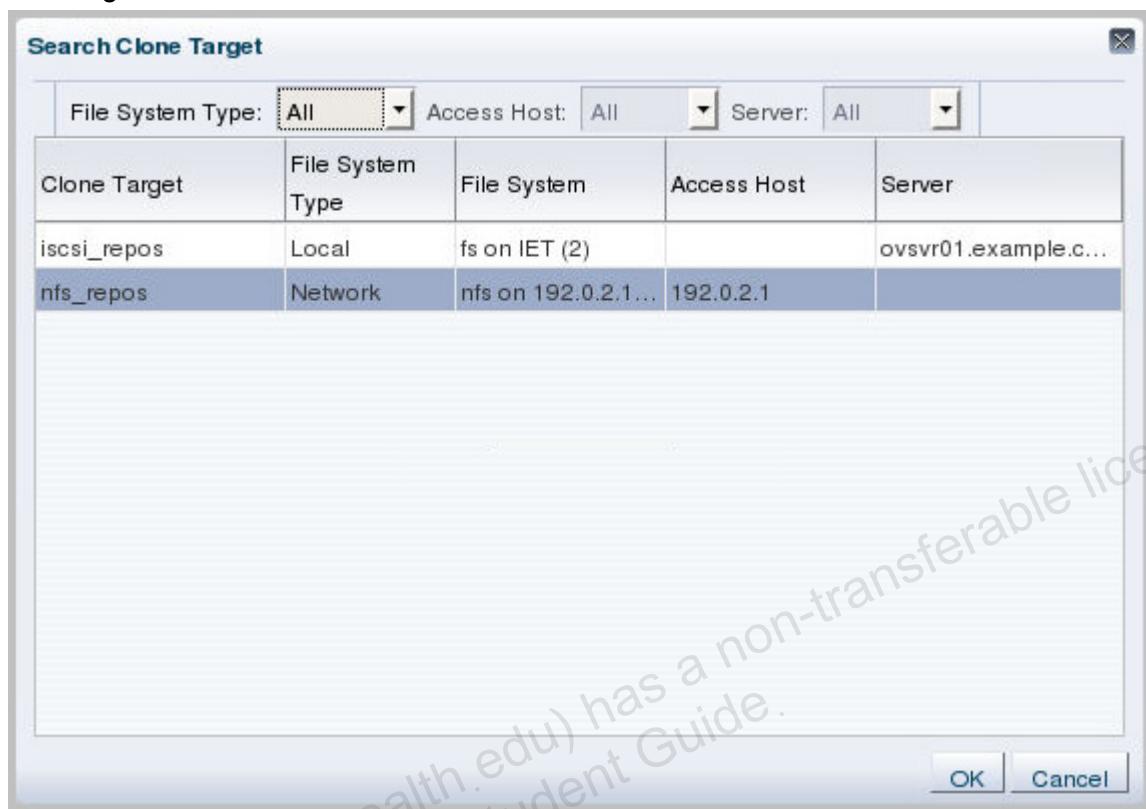
5. On the first screen of the wizard, enter “MoveTemplate_clone” as the name of the Clone Customizer.



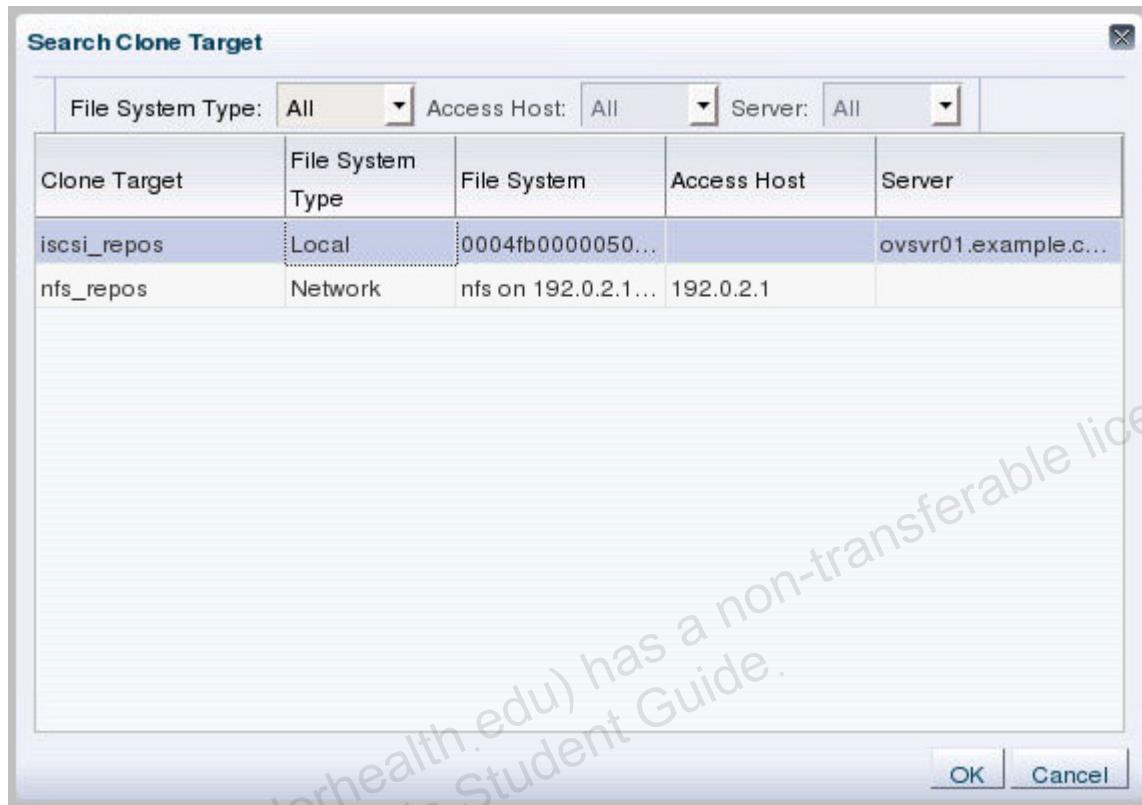
Click Next to configure the Storage Mappings.

6. The only virtual disk in the source template is already selected. The Clone Target Type can be either a Repository or a Physical Disk. The Clone Target is the location where the disk is to be created.
 - a. If not already select, change the Clone Target Type to Repository.

- b. Click the Search icon. The Search Clone Target screen appears, as shown in the following screen shot.

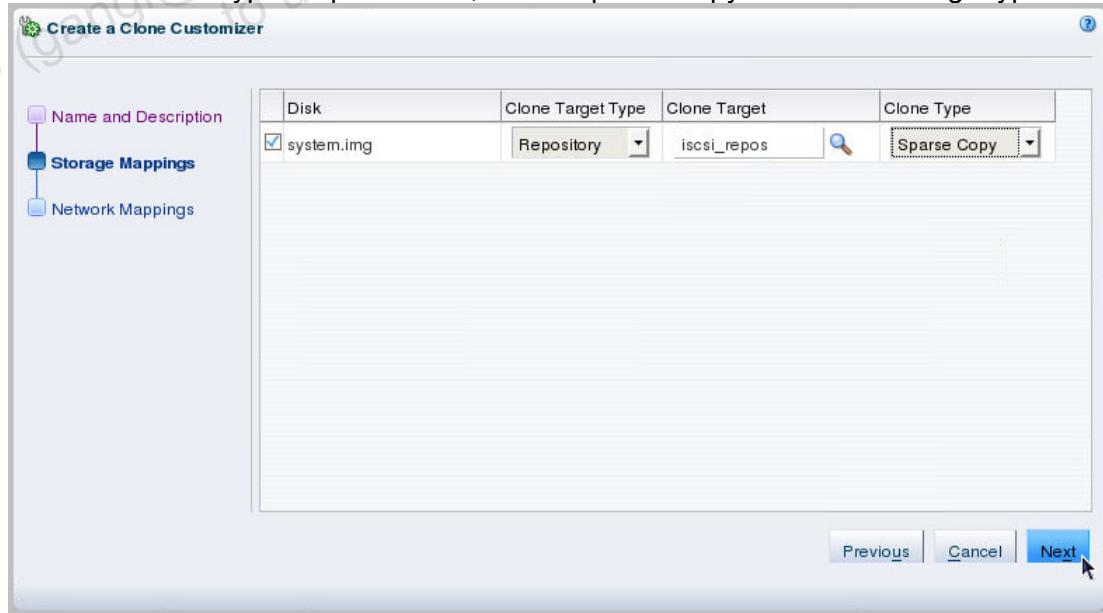


- c. Select `iscsi_repos` as the Clone Target. You can specify a search filter by choosing a File System Type from the drop-down list. The following screen shot displays both the Network and Local file system types.



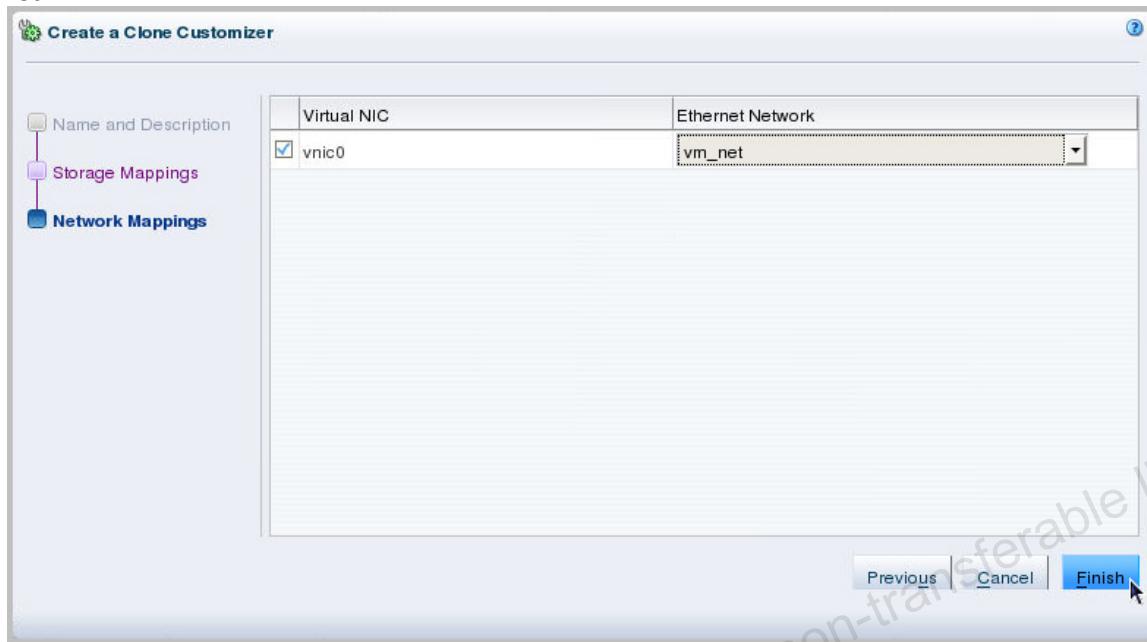
Click OK to return to the Storage Mappings screen.

- d. From the Clone Type drop-down list, select Sparse Copy for the disk image type.

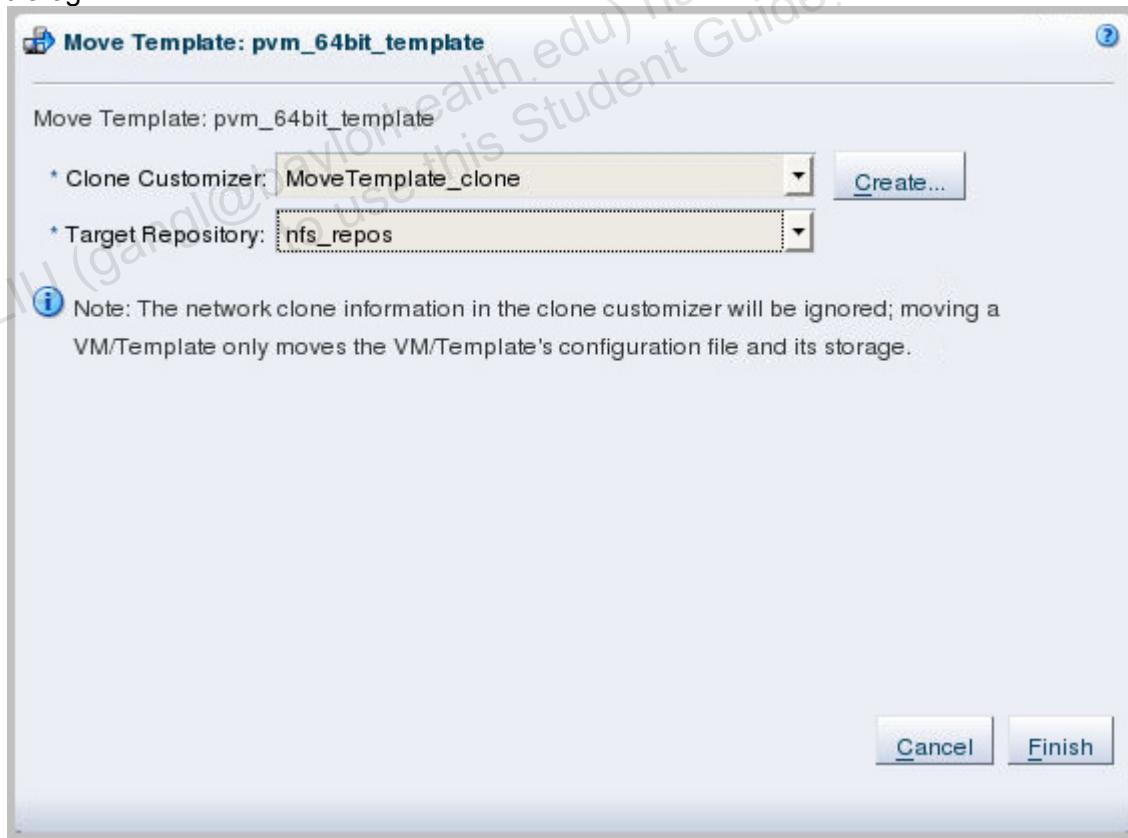


Click Next to display the Network Mappings screen

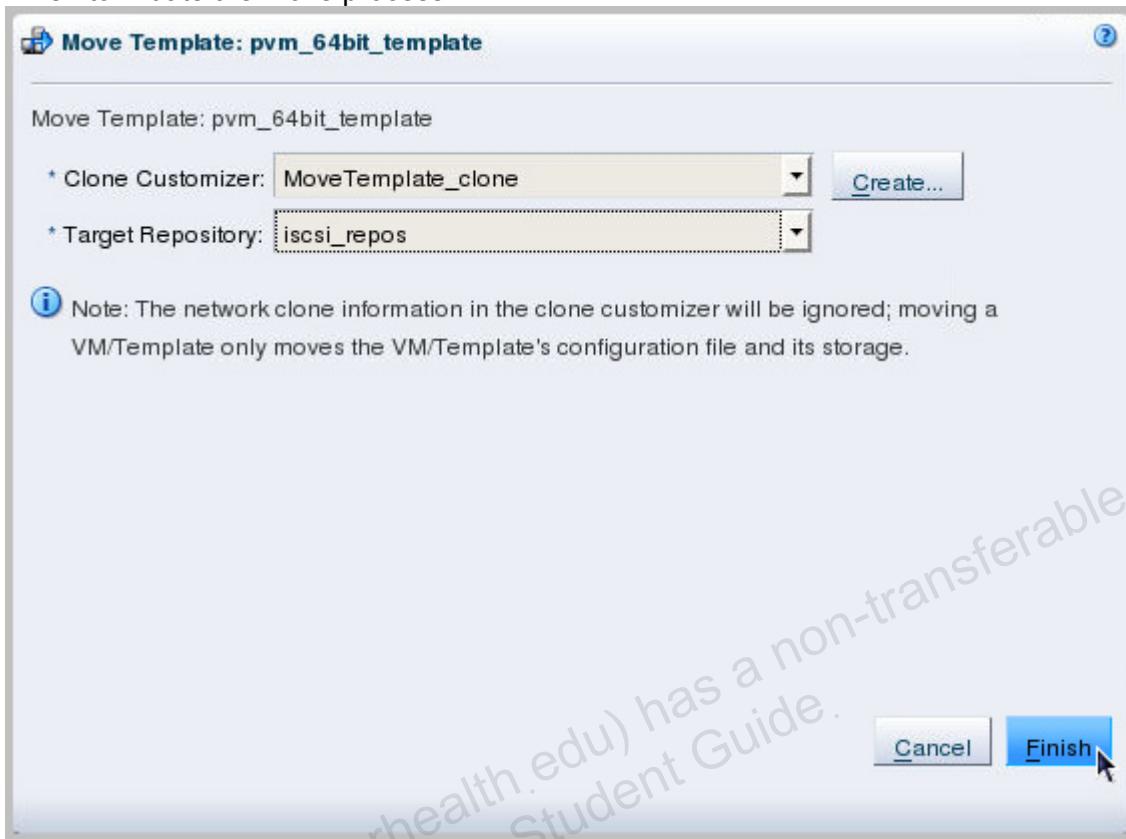
7. On the Network Mappings screen, select “vm_net” from the Ethernet Network drop-down list.



Click Finish to complete the Clone Customizer wizard and return to the Move Template dialog.



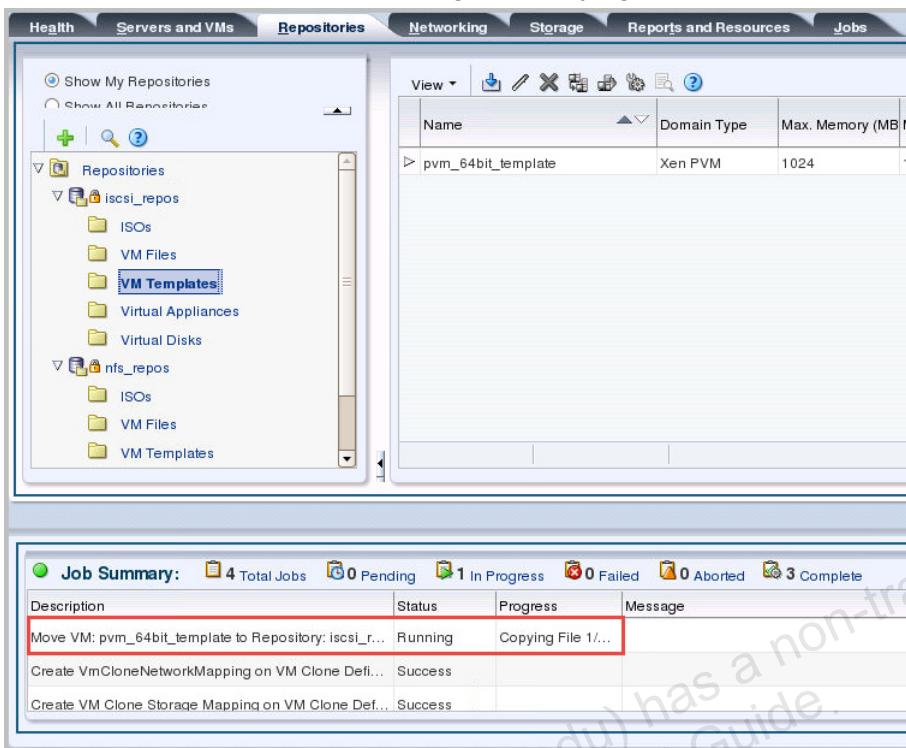
- From the Target Repository drop-down list, select the `iscsi_repos` repository and click Finish to initiate the move process.



During the move process; both repositories are locked, as shown



During this time, the template appears in the VM Templates folder of the iSCSI repository, but the move process is still running and copying files.



You can follow the move process in the Job Summary pane. The process takes approximately 13 minutes.

Practice 5-6: Perform Disk and Cloning Operations for Resources in the Repositories

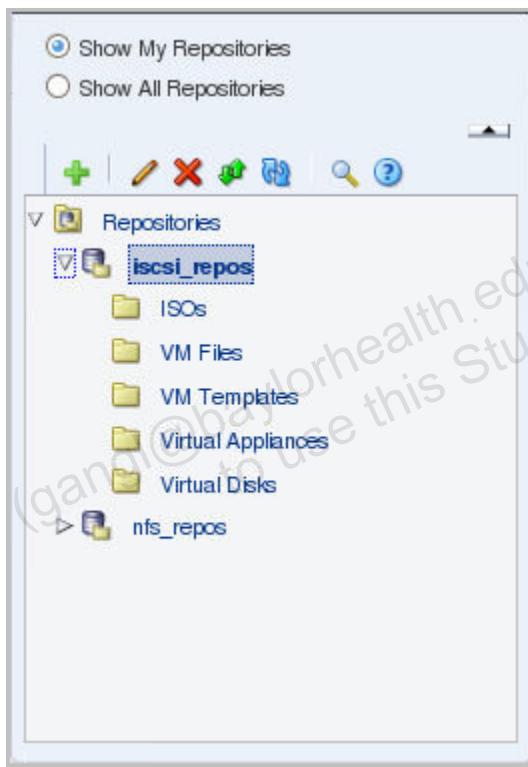
Overview

In this practice, you create two virtual disks in your iSCSI repository. These two virtual disks are needed by the future pvm1 virtual machine, which you create in the practices for the lesson titled “Managing Virtual Machines.” You also clone one of these virtual disks by using thin cloning.

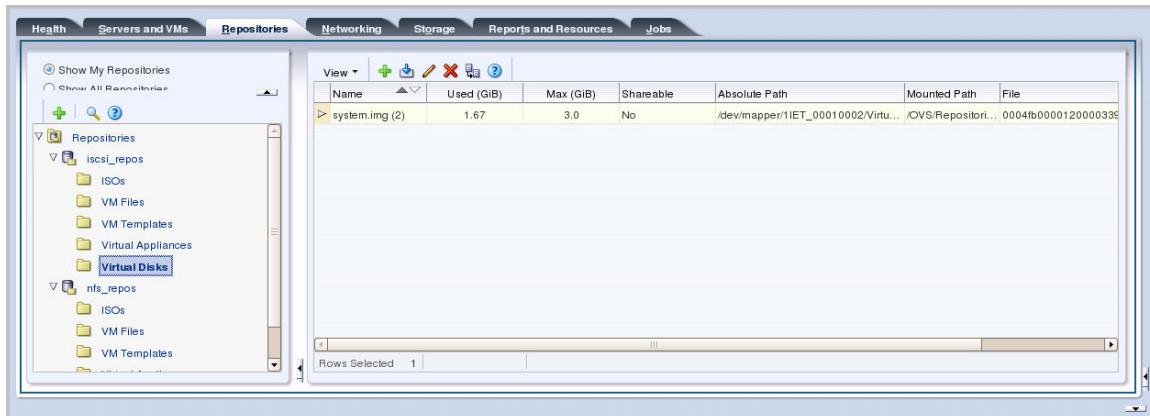
You perform these tasks by using the Oracle VM Manager UI.

Tasks

1. Create two virtual disks.
 - a. From the Repositories tab, select the `iscsi_repos` repository in the navigation tree, and then expand the folders for this repository.

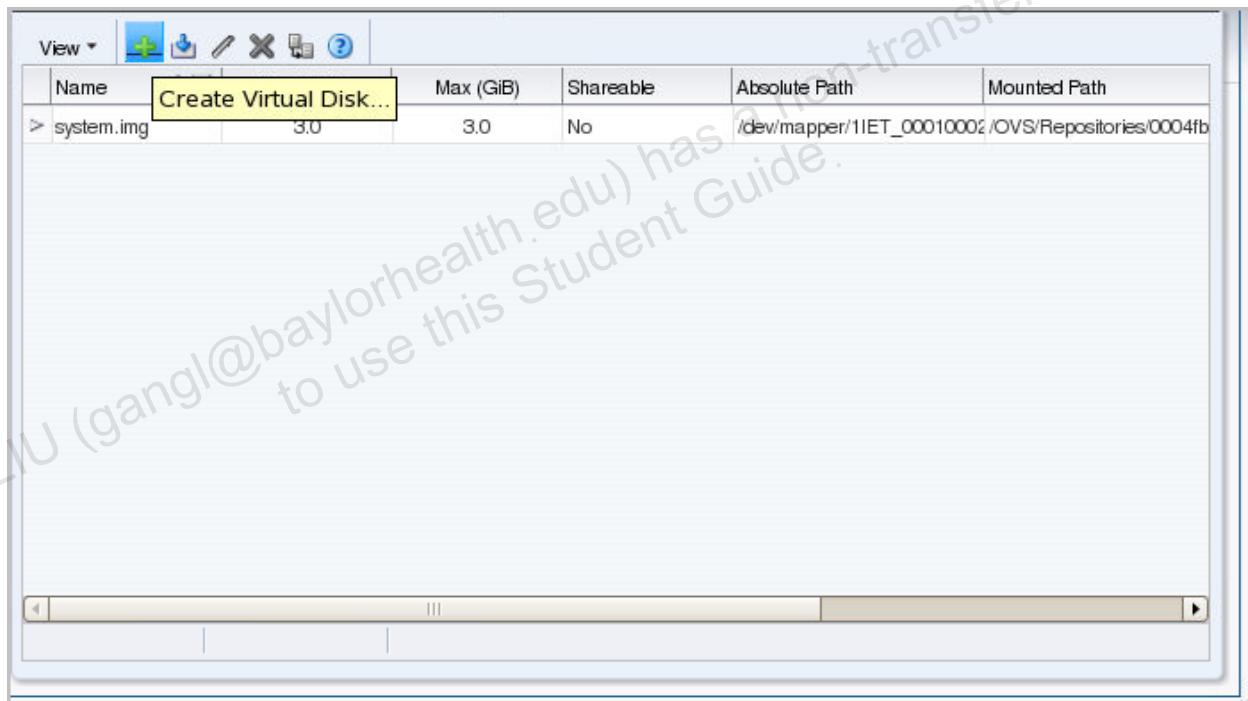


- b. Highlight Virtual Disks in the navigation tree.



There is one virtual disk in this repository and the virtual disk is named `system.img (2)`. It was created when you moved the `pvm_template.tgz` in the previous practice.

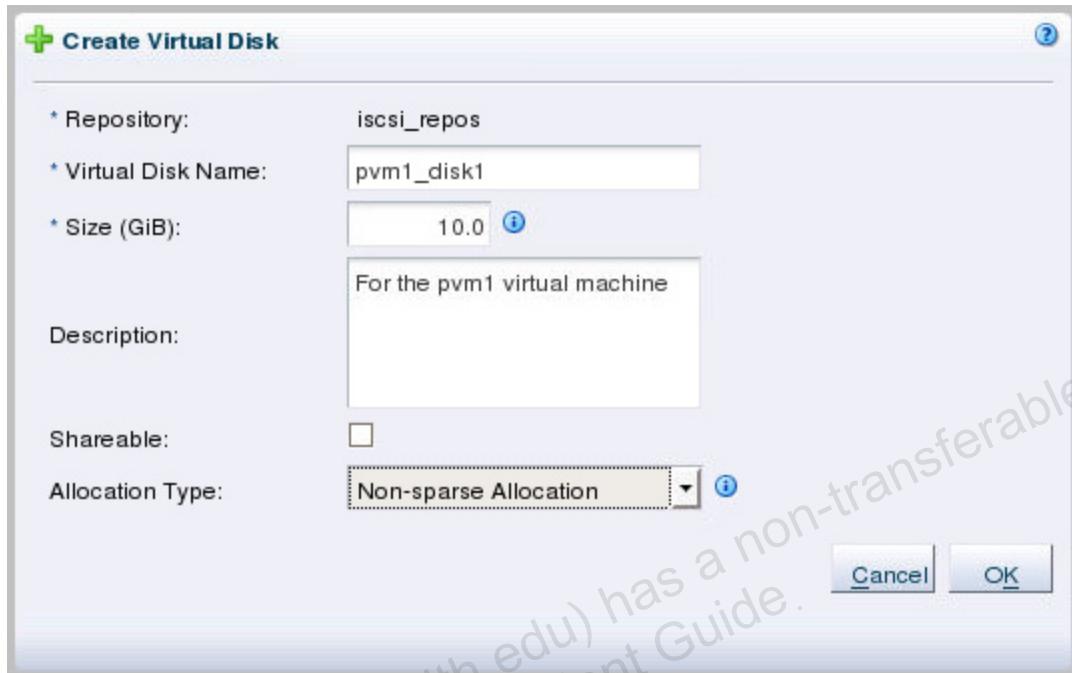
- c. In the management pane, click the Create Virtual Disk icon on the toolbar.



- d. In the Create Virtual Disk window, enter information to create the virtual disk. This information is summarized in the following table:

Field	Value
Name	<code>pvm1_disk1</code>
Size in GiB	10
Description	For the <code>pvm1</code> virtual machine
Shareable	Leave the check box deselected.
Allocation Type	Select “Non-sparse Allocation” from the drop-down menu.

Note: In these steps, you select “Non-sparse Allocation,” which means that when the disk is created, all space is allocated. With a sparse allocation, space is not allocated until a write is issued for that area of the disk. This information is not persistent and is not stored within Oracle VM Manager, so you cannot determine what allocation type was used to create a virtual disk after it has been created.



Click OK after you have made all your selections.

The job takes a few seconds. If the job status is still “In Progress” after 30 seconds, click the Jobs tab to display the status of your Create Virtual Disk operation.

You can find out how long a job and its associated child processes took to complete by examining the information on the Jobs tab. This information is displayed in the job duration column.

- e. Create a second virtual disk by using the information in the following table:

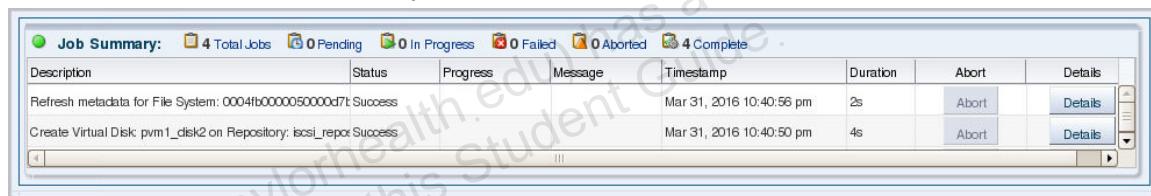
Field	Value
Name	pvm1_disk2
Size in GB	8
Description	For the pvm1 virtual machine
Shareable	Leave the check box deselected.
Allocation Type	Select “Non-sparse Allocation” from the drop-down list.

Your window looks like the following screenshot:

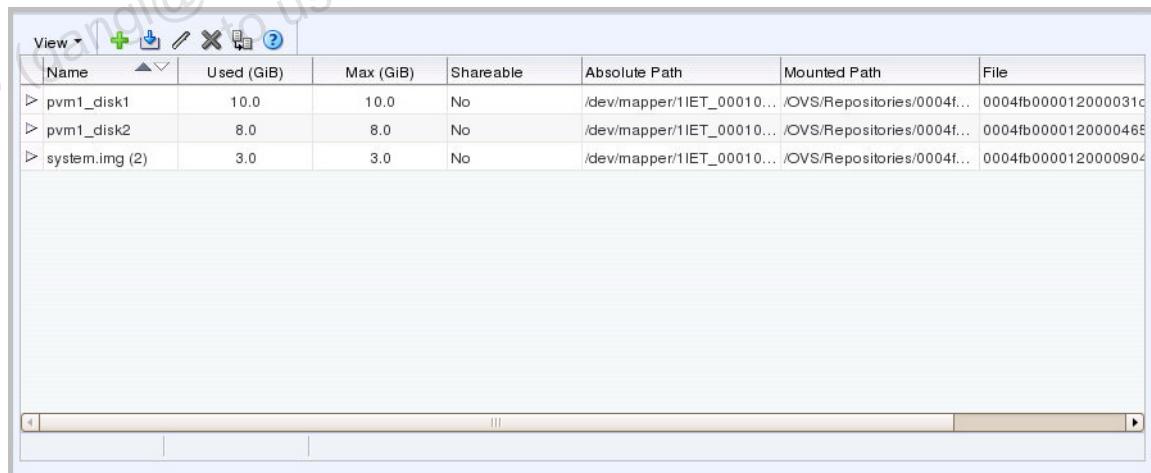


Click OK to trigger the operation.

The operation completes quickly.



Your two new virtual disks appear in the management pane.



2. Clone the `pvm1_disk1` virtual disk.
 - a. On the Repositories tab, select `iscsi_repos` from the list of repositories in the navigation tree and select the Virtual Disks folder.

- b. In the management pane, select pvm1_disk1 and click the Clone Virtual Disk icon.

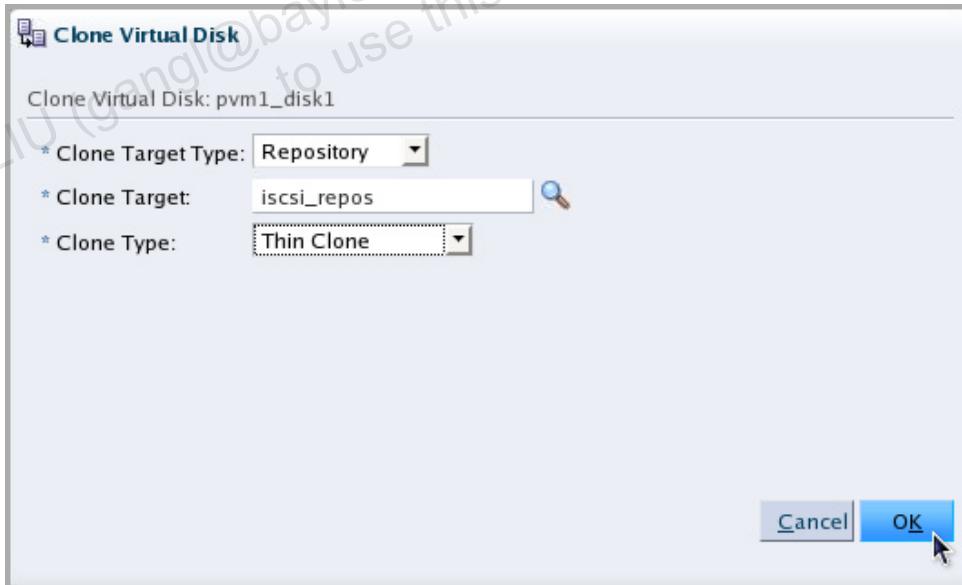
Name	Used	Clone Virtual Disk	Shareable	Absolute Path	Mounted Path	File
pvm1_disk1	10.0	10.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb000012000031c
pvm1_disk2	8.0	8.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000465
system.img (2)	3.0	3.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000904

- c. In the Clone Virtual Disk window, provide the information for the cloning operation. Use the information in the following table:

Field	Value
Clone Target Type	Select “Repository” from the drop-down list.
Clone Target	Select <code>iscsi_repos</code> .
Clone Type	Select “Thin Clone” from the drop-down list.

Note: Thin cloning in OCFS2-based repositories uses the reflink feature of OCFS2. This feature is also referred to as fast copy.

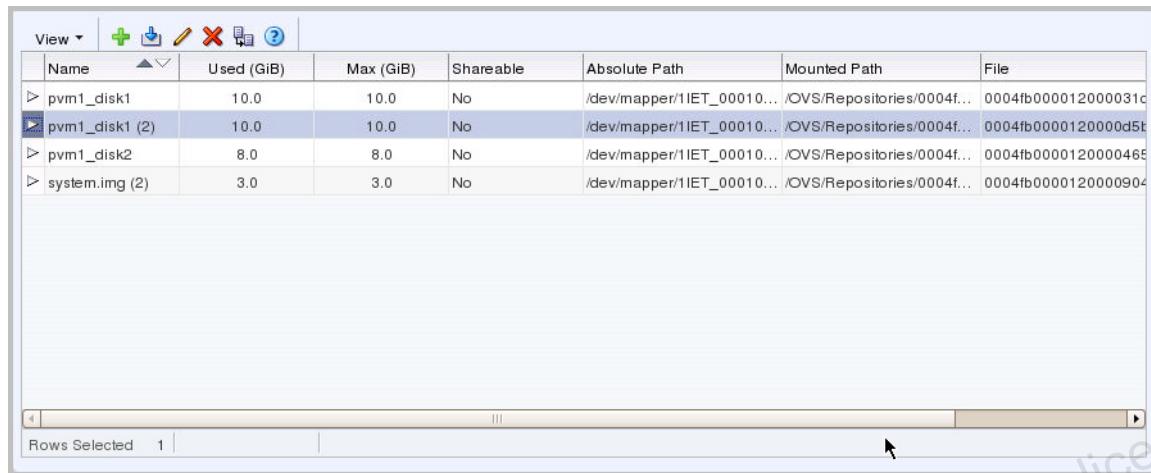
Your window looks like the following screenshot:



Click OK to trigger the cloning operation.

The cloning operation takes less than 10 seconds to complete.

After it completes, the clone appears as a new virtual disk on the Virtual Disks subtab, as shown in the following screenshot:

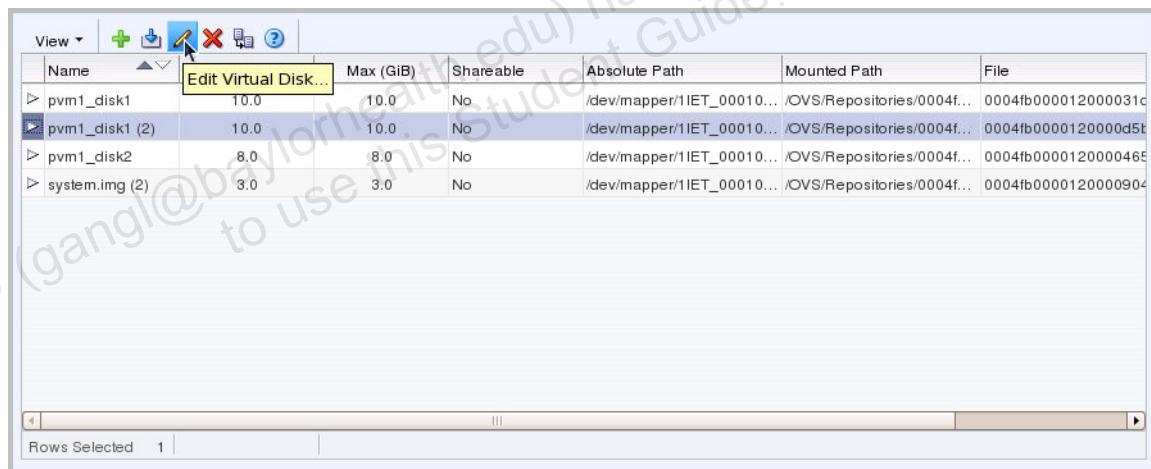


Name	Used (GiB)	Max (GiB)	Shareable	Absolute Path	Mounted Path	File
pvm1_disk1	10.0	10.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb000012000031c
pvm1_disk1 (2)	10.0	10.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000d5t
pvm1_disk2	8.0	8.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000465
system.img (2)	3.0	3.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000904

3. Rename the new clone.

Give the virtual and physical disks a meaningful name. Several operations have a search capability for disks in repositories or storage arrays, and only the names are provided here. Using meaningful names for your disks decreases the chance of selecting the wrong disk.

- a. From the list of virtual disks, select the new clone named pvm1_disk1 (2) and click the Edit icon.

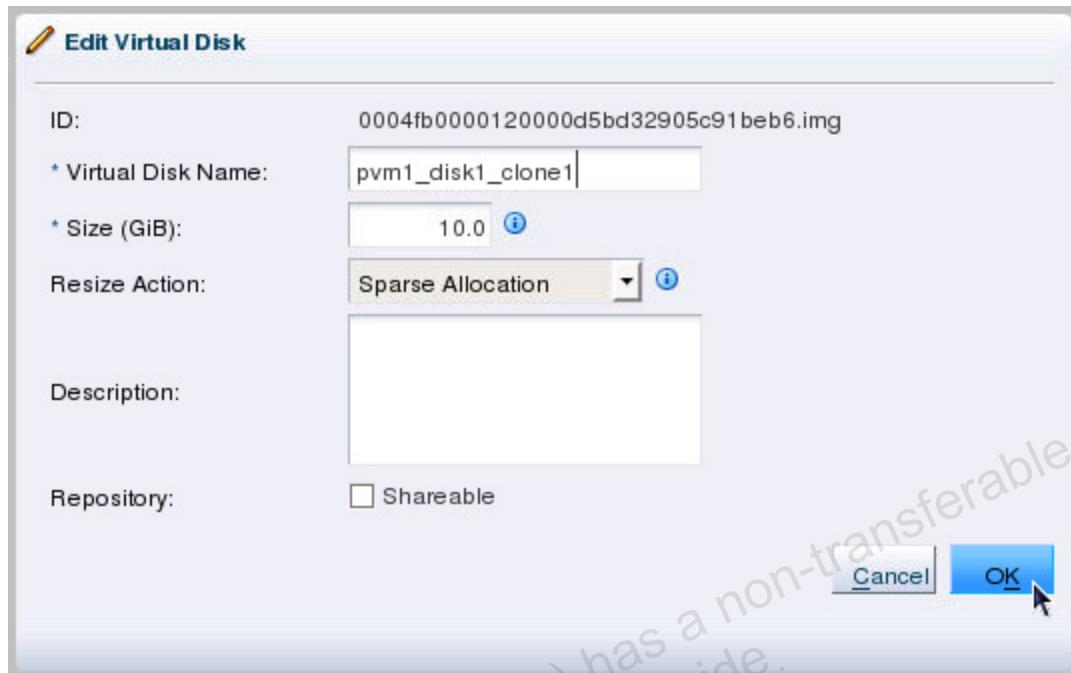


Name	Used (GiB)	Max (GiB)	Shareable	Absolute Path	Mounted Path	File
pvm1_disk1	10.0	10.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb000012000031c
pvm1_disk1 (2)	10.0	10.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000d5t
pvm1_disk2	8.0	8.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000465
system.img (2)	3.0	3.0	No	/dev/mapper/1IET_00010...	/OVS/Repositories/0004f...	0004fb0000120000904

- b. In the Edit Virtual Disk window, enter a new name for your clone.

- c. Select Non-Sparse Allocation as the Resize Action type.

Note: This drop-down selector does not default to the allocation type that was used when the disk was created, as this information is not stored within Oracle VM Manager.



- d. Click OK to complete the edit operation.

The newly renamed clone appears in the list of virtual disks for the `iscsi_repos` repository.

Name	Used (GiB)	Max (GiB)	Shareable	Absolute Path	Mounted Path
pvm1_disk1	0.0	10.0	No	/dev/mapper/1IET_00010002/OVS/Repositories/0004fb	
pvm1_disk1_clone1	0.0	10.0	No	/dev/mapper/1IET_00010002/OVS/Repositories/0004fb	
pvm1_disk2	8.0	8.0	No	/dev/mapper/1IET_00010002/OVS/Repositories/0004fb	
system.img	3.0	3.0	No	/dev/mapper/1IET_00010002/OVS/Repositories/0004fb	

Note: When you clone a physical or virtual disk, the cloned disk is independent of the source disk. You can use these cloned disks to create new virtual machines.

Practice 5-7: Create a Repository on Local Storage

Overview

In this practice, you create a new repository on the second disk for each Oracle VM server: ovsrv01.example.com and ovsrv02.example.com.

The second disk on both servers is treated as local storage.

Note: During the installation of Oracle VM Server for x86 on a physical host, the installation uses a portion of the installation disk. The rest of the installation disk is then seen as available storage. In your lab environment, the installation disk for your Oracle VM servers is small and there is no remaining space available on the installation disk that can be used as local storage.

Local Storage

You can create a repository on local storage, but the resources you add to this repository, such as templates and ISOs, cannot be shared with the other Oracle VM servers in the server pool. The benefits of repositories on local storage are limited, except in the case of a server pool with a single Oracle VM server. In this case, you can create the server pool as unclustered. An unclustered pool does not require a server pool file system. During the creation of the unclustered server pool, you add the Oracle VM server to the server pool and you can use a free disk on the server to create a repository. The disk you select must not have any partitions defined on it.

When you create a storage repository on a local disk, an OCFS2 file system is created. The local disk must not contain any data or meta-data. If it does, the operation fails, and it is necessary to clean the disk manually, using the dd command, before attempting to create the storage repository a second time. The Oracle VM Manager software uses features built into the OCFS2 file system that enable you to perform live migrations of running virtual machines that have virtual disks on local storage.

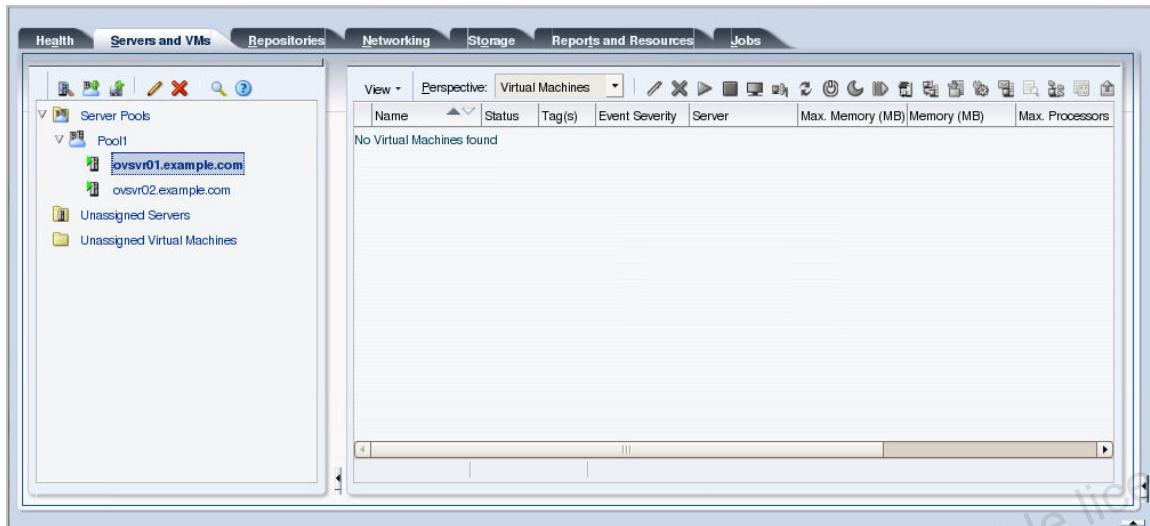
Assumptions

This practice assumes that there is a second disk available for ovsrv01.example.com and ovsrv02.example.com.

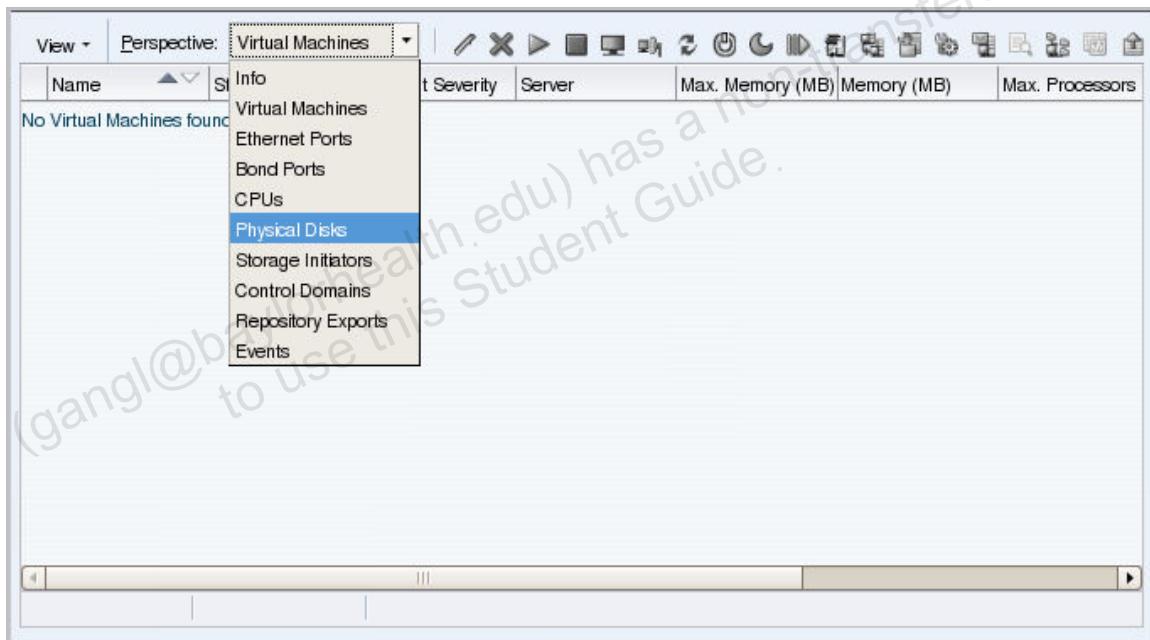
Tasks

1. Verify the presence of the second disk on ovsrv01.example.com by using the Oracle VM Manager UI.
 - a. On the Servers and VMs tab, click the Expand button for the Server Pools folder in the navigation tree.
 - b. Click the Expand button for Pool1.

- c. Highlight ovsrv01.example.com.



- d. Select Physical Disks from the Perspective drop-down list in the management pane.



The list of physical disks that can be accessed by `ovsvr01.example.com` appears in the management pane.

Name	Event Severity	Size (GiB)	Volume Group	SAN Server	Type
1ATA_QEMU_HARDD...	Informational	12.7	Local Storage Volume Group	Generic Local Storage Array @ ov...	LUN
IET (3)	Informational	10.0	Generic_iSCSI_Volume_G...	iscsi_server	LUN
IET (4)	Informational	10.0	Generic_iSCSI_Volume_G...	iscsi_server	LUN
IET (5)	Informational	10.0	Generic_iSCSI_Volume_G...	iscsi_server	LUN
IET (6)	Informational	10.0	Generic_iSCSI_Volume_G...	iscsi_server	LUN
repositoryLun	Informational	56.0	Generic_iSCSI_Volume_G...	iscsi_server	LUN
serverPoliffs	Informational	12.7	Generic_iSCSI_Volume_G...	iscsi_server	LUN

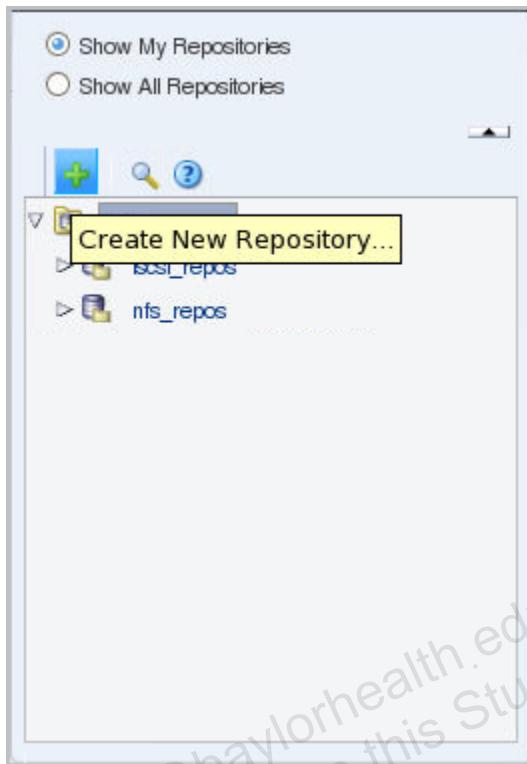
The local storage is identified by “Local Storage Volume Group” in the Volume Group column.

- e. Click the Expand button next to the local disk and examine the information provided.
- Note:** To display more information for the physical disk in the management pane, click the Collapse button for the Job Summary pane.

Name:	1ATA_QEMU_HARDDISK_QM00002	Reserved by Server(s):
User Friendly Name:		Storage Targets:
Status:		Server Pool:
Shareable:	No	Repository:
Thin Provision:	No	VM(s):
ID:	0004fb00001800004f694da3e431087a	
Page83 ID:	1ATA_QEMU_HARDDISK_QM00002	
Access Groups:		
Extra Information:		
Absolute Path:	/dev/mapper/1ATA_QEMU_HARDDISK_QM00002	

In your lab environment, the second internal disk for `ovsvr01.example.com` is a virtual disk, because your Oracle VM server is a virtual machine. In your production environment, this information reflects the type and vendor for the disk. For example, the string `MAY2073RCSUN72G` might appear for an internal disk in an Oracle Sun Fire server.

2. Create a repository on the second disk of the `ovsvr01.example.com` Oracle VM server by using the Oracle VM Manager UI.
 - a. Access the repositories information on the Repositories tab.
 - b. Click the Create New Repository icon on the toolbar of the navigation pane to launch the wizard.



- c. In the Repository Information window, enter information to create the repository on the local disk for `ovsvr01.example.com`.

This information is summarized in the following table:

Field	Value
Repository Name	<code>local_repos_ovsvr01</code>
Repository Location	Select the Physical Disk option.
Server Pool	Select <code>Pool1</code> , which is the only selectable choice from the drop-down list.
Physical Disk	Use the Search function to find the second disk for <code>ovsvr01.example.com</code> .
Description	Local repository for <code>ovsvr01.example.com</code>

- Enter the name of the repository and its location.
- Select the server pool.
- Click the Search icon to find the local disk for `ovsvr01.example.com`.

Create a Repository

Repository Information

* Repository Name: local_repository_ovsvr01

* Repository Location: Network File Server Physical Disk

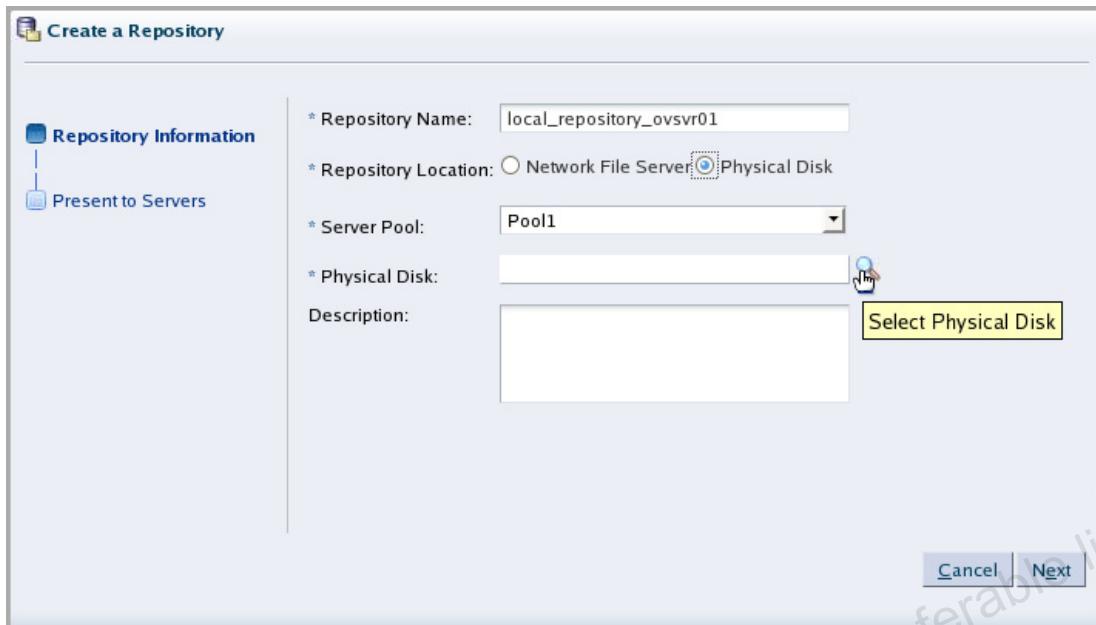
* Server Pool: Pool1

* Physical Disk:

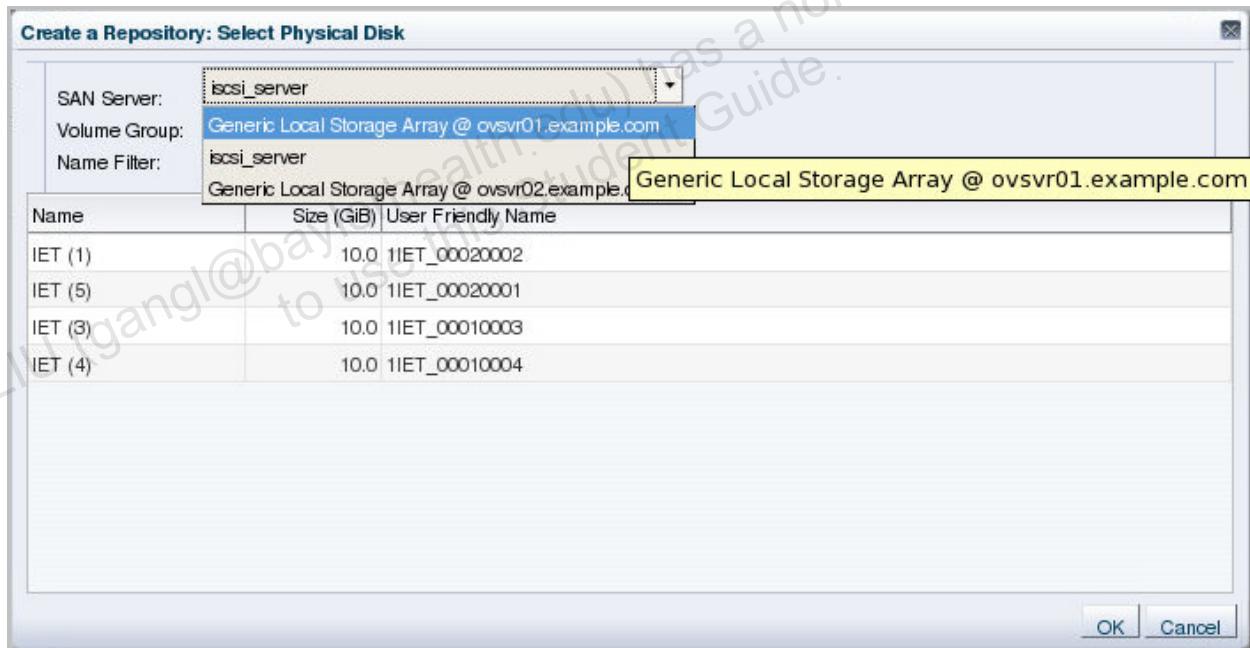
Description:

Select Physical Disk

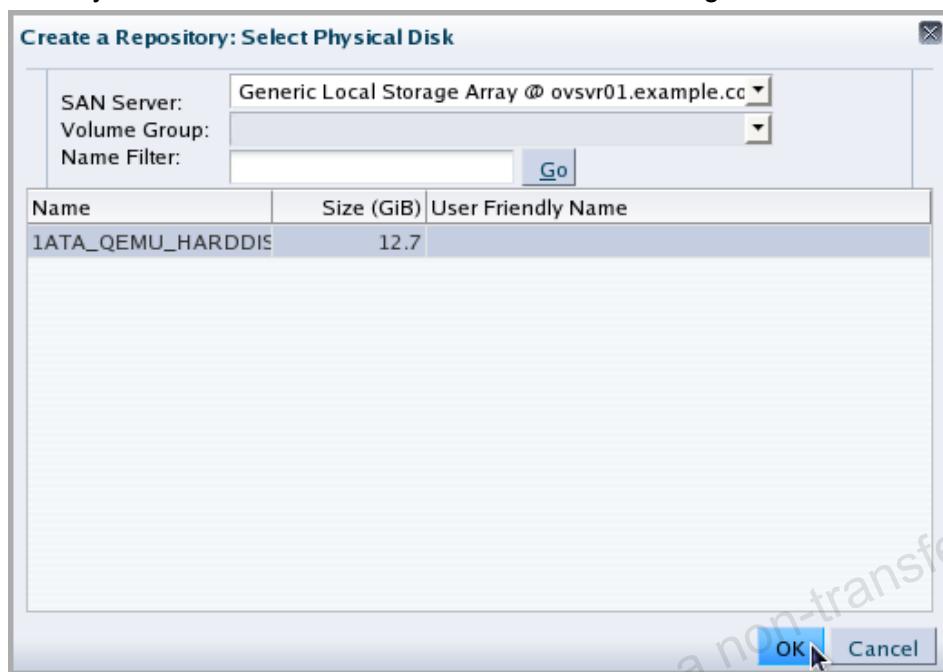
Cancel **Next**



- d. In the Select Physical Disk pop-up window, select “Generic Local Storage Array @ ovsvr01.example.com” from the drop-down list.

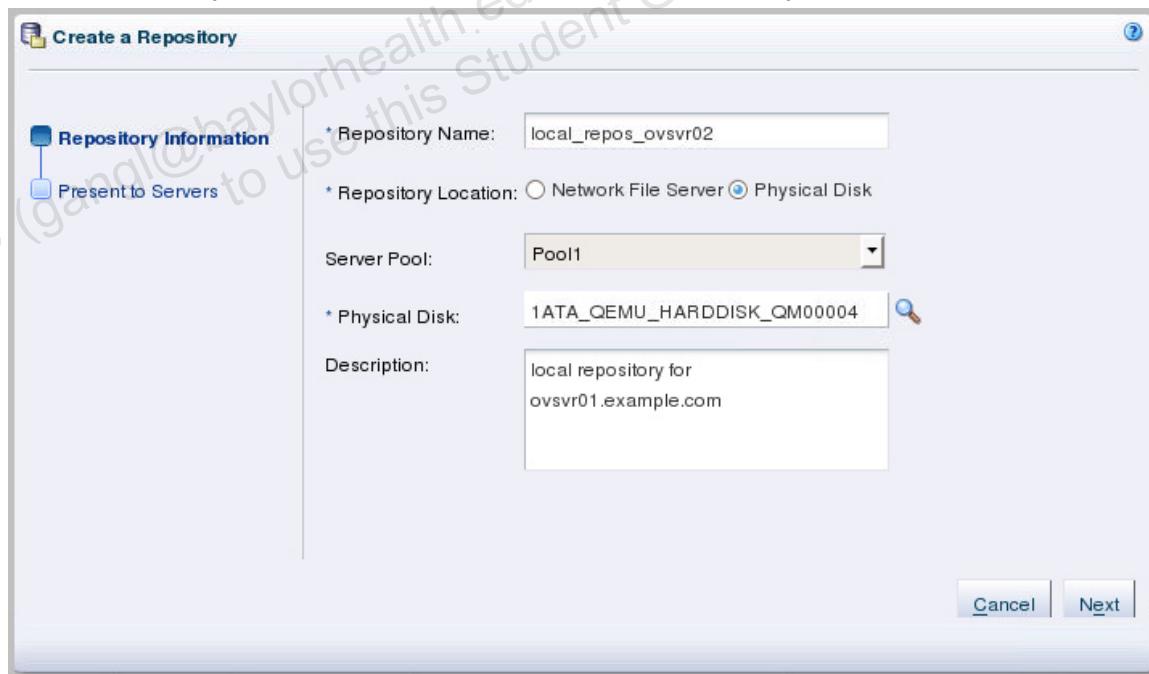


- e. From the “Generic Local Storage Array @ ovsrv01.example.com” storage array, select the only disk that is available, as shown in the following screenshot:



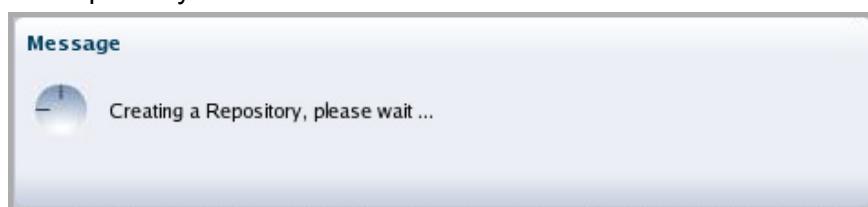
Click OK to return to the Repository Information window.

- f. In the Repository Information window, enter a description of your choice.



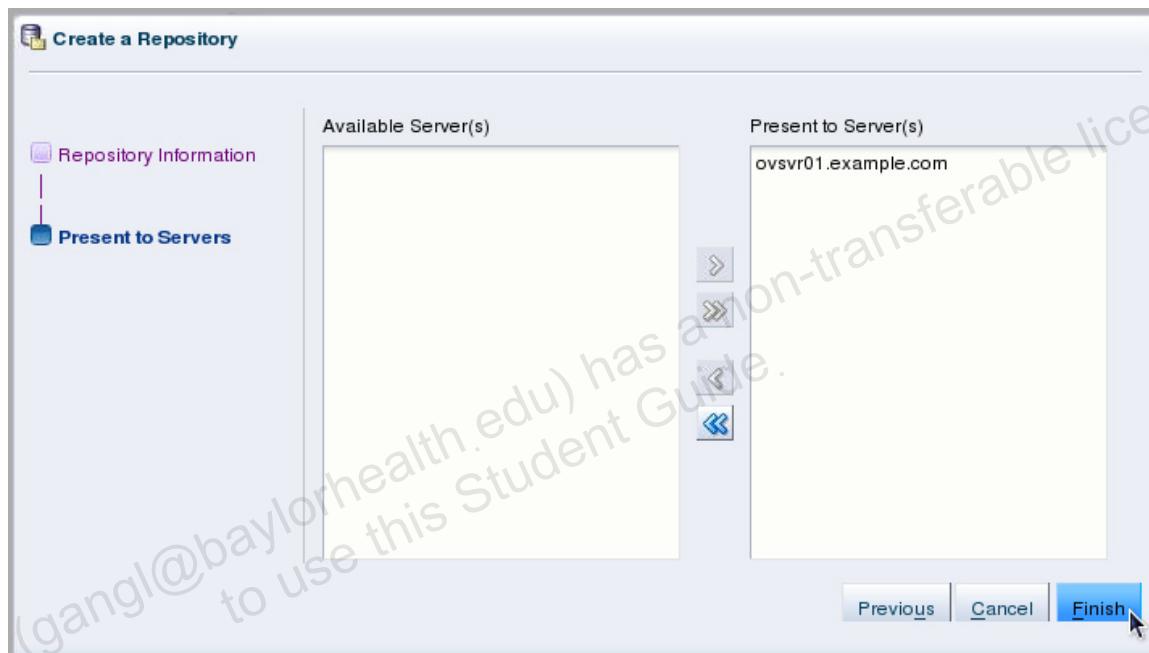
- g. Click Next to create the repository.

The repository is created.



This operation takes six to eight minutes to complete.

- h. In the "Present to Servers" window, move `ovsvr01.example.com` to the "Present to Server(s)" pane clicking the single right-arrow button.



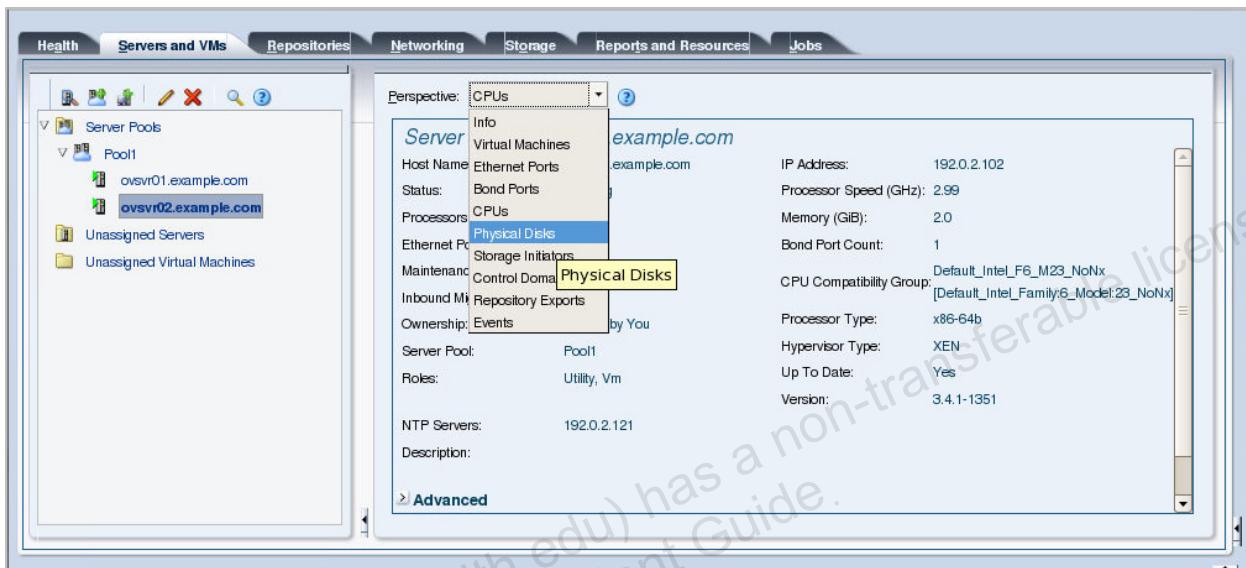
Note that `ovsvr0.example.com` is not listed among the available servers, because the Oracle VM Manager knows that the local disk on `ovsvr01` is not accessible by `ovsvr02`.

- i. Click Finish to complete the operation.

The new repository is displayed on the Repositories tab.

Name	File System	File System Size (GiB)				
		Free	Used	Total	Apparent	Capacity (%)
iscsi_repos	0004fb0000050000a8a3cdbd0439faac	30.66	25.34	56.0	31.0	55.4
local_repos_ovsvr01	0004fb0000050000e6lef30d6b9f7cf2	8.56	4.13	12.7	0.0	0.0
nfs_repos	613ada9c-cece-4ce0-8300-46991a59319c [nfs on 1...]	12.89	6.79	19.69	6.62	33.6

3. Verify the presence of the second disk on ovsrv02.example.com by using the Oracle VM Manager UI.
 - a. On the Servers and VMs tab, click the Expand button for the Server Pools folder in the navigation tree.
 - b. Click the Expand button for Pool1.
 - c. Highlight ovsrv02.example.com.
 - d. Select Physical Disks from the Perspective drop-down list in the management pane.



The list of physical disks that can be accessed by ovsrv02.example.com appears in the management pane.

Name	Event Severity	Size (GiB)	Volume Group	SAN Server	Type	File
1ATA_QEMU_HARDD	Informational	12.7	Local Storage Volume Group	Generic Local Storage Array @ ovsrv02.example.com	LUN	
IET (1)	Informational	10.0	Generic_iSCSI_Volume_Group	iscsi_server	LUN	
IET (3)	Informational	10.0	Generic_iSCSI_Volume_Group	iscsi_server	LUN	
IET (4)	Informational	10.0	Generic_iSCSI_Volume_Group	iscsi_server	LUN	
IET (5)	Informational	10.0	Generic_iSCSI_Volume_Group	iscsi_server	LUN	
repositoryLun	Informational	56.0	Generic_iSCSI_Volume_Group	iscsi_server	LUN	00000000000000000000000000000000
serverPoolFs	Informational	12.7	Generic_iSCSI_Volume_Group	iscsi_server	LUN	Se

The local storage is identified by “Local Storage Volume Group” in the Volume Group column.

- e. Click the Expand button next to the local disk and examine the information provided.
- Note:** To display more information for the physical disk in the management pane, click the Collapse button for the Job Summary pane.

Name	Event Severity	Size (GiB)	Volume Group	SAN Server	Type
1ATA_QEMU_HARDD	Informational	12.7	Local Storage Volume Group	Generic Local Storage Array @ ovs LUN	

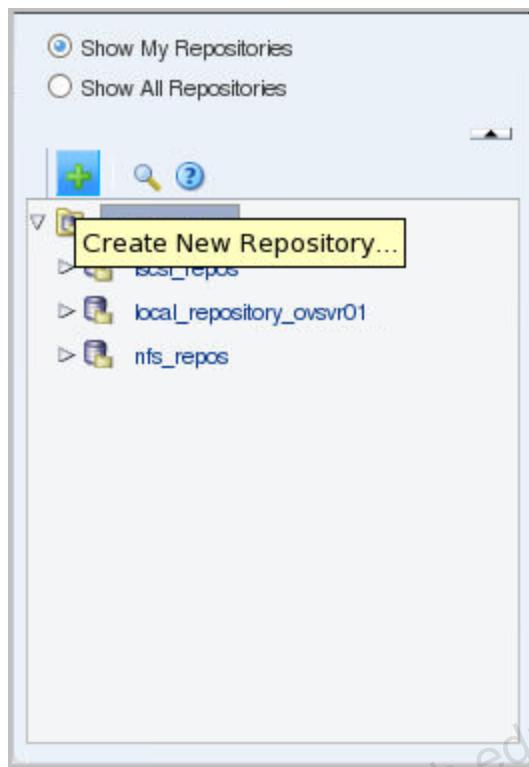
Detailed View (for selected disk):

- Name:** 1ATA_QEMU_HARDDISK_QM00004 **Reserved by Server(s):**
- User Friendly Name:** **Storage Targets:**
- Status:** **Server Pool:**
- Shareable:** No **Repository:**
- Thin Provision:** No **VM(s):**
- ID:** 0004fb000018000013cd46c90f6e23d8
- Page83 ID:** 1ATA_QEMU_HARDDISK_QM00004
- Access Groups:**
- Extra Information:**
- Absolute Path:** /dev/mapper/1ATA_QEMU_HARDDISK_QM00004

In your lab environment, the second internal disk for ovsrvr02.example.com is a virtual disk, because your Oracle VM server is a virtual machine. In your production environment, this information reflects the type and vendor for the disk. For example, the string MAY2073RCSUN72G might appear for an internal disk in an Oracle Sun Fire server.

- Create a repository on the second disk of the ovsrvr02.example.com Oracle VM server by using the Oracle VM Manager UI.
 - Access the repositories information on the Repositories tab.

- b. Click the Create New Repository icon on the toolbar of the navigation pane to launch the wizard.



- c. In the Repository Information window, enter information to create the repository on the local disk for ovsvr02.example.com.

This information is summarized in the following table:

Field	Value
Repository Name	local_repos_ovsvr02
Repository Location	Select the Physical Disk option.
Server Pool	Select Pool1, which is the only selectable choice from the drop-down list.
Physical Disk	Use the Search function to find the second disk for ovsvr02.example.com.
Description	Local repository for ovsvr02.example.com

- Enter the name of the repository and its location.
- Select the server pool.
- Click the Search icon to find the local disk for ovsvr02.example.com.

Create a Repository

Repository Information

* Repository Name: local_repository_ovsvr02

* Repository Location: Network File Server Physical Disk

Server Pool: Pool1

* Physical Disk:

Description:

Present to Servers

Cancel Next

This screenshot shows the 'Create a Repository' dialog box. In the 'Repository Information' section, the repository name is set to 'local_repository_ovsvr02' and the location is selected as 'Physical Disk'. A 'Server Pool' dropdown menu is open, showing 'Pool1' as the selected option. Below this, there is a search bar for selecting a physical disk, with a 'Select Physical Disk' button next to it. The 'Present to Servers' section is also visible. At the bottom right, there are 'Cancel' and 'Next' buttons.

- d. In the Select Physical Disk pop-up window, select “Generic Local Storage Array @ ovsvr02.example.com” from the drop-down list.

Create a Repository: Select Physical Disk

SAN Server: iscsi_server

Volume Group: iscsi_server

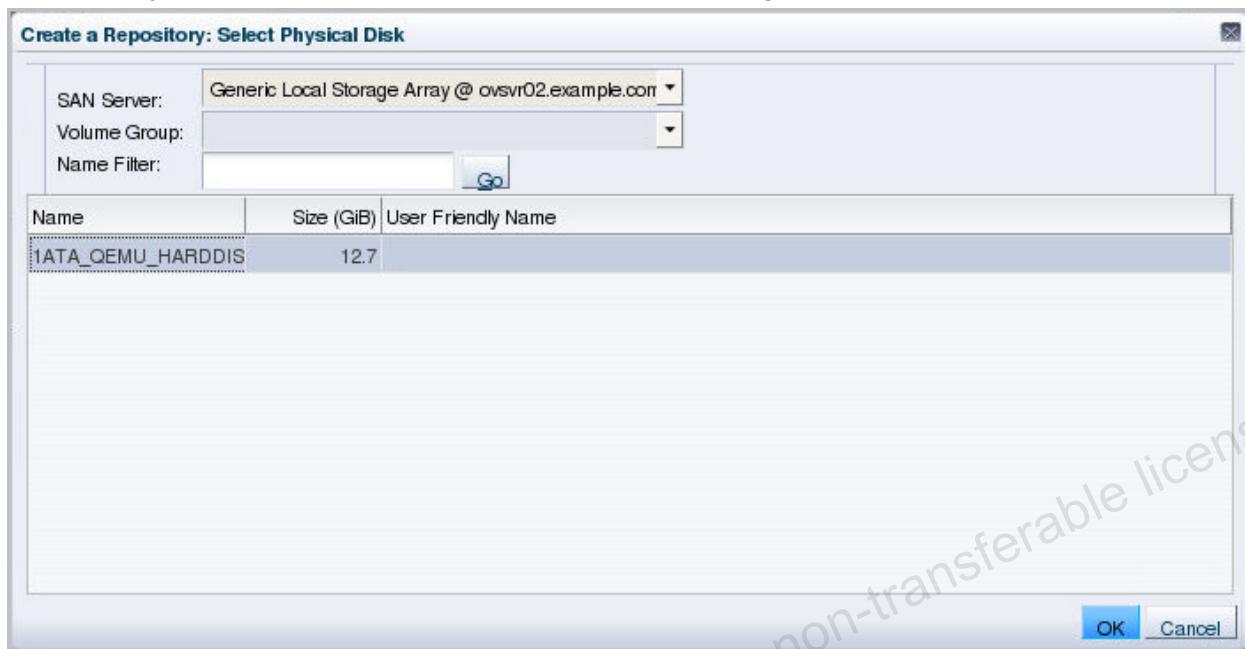
Name Filter: Generic Local Storage Array @ ovsvr02.example.com

Name	Size (GiB)	User Friendly Name
IET (1)	10.0	1IET_00020002
IET (5)	10.0	1IET_00020001
IET (3)	10.0	1IET_00010003
IET (4)	10.0	1IET_00010004

OK Cancel

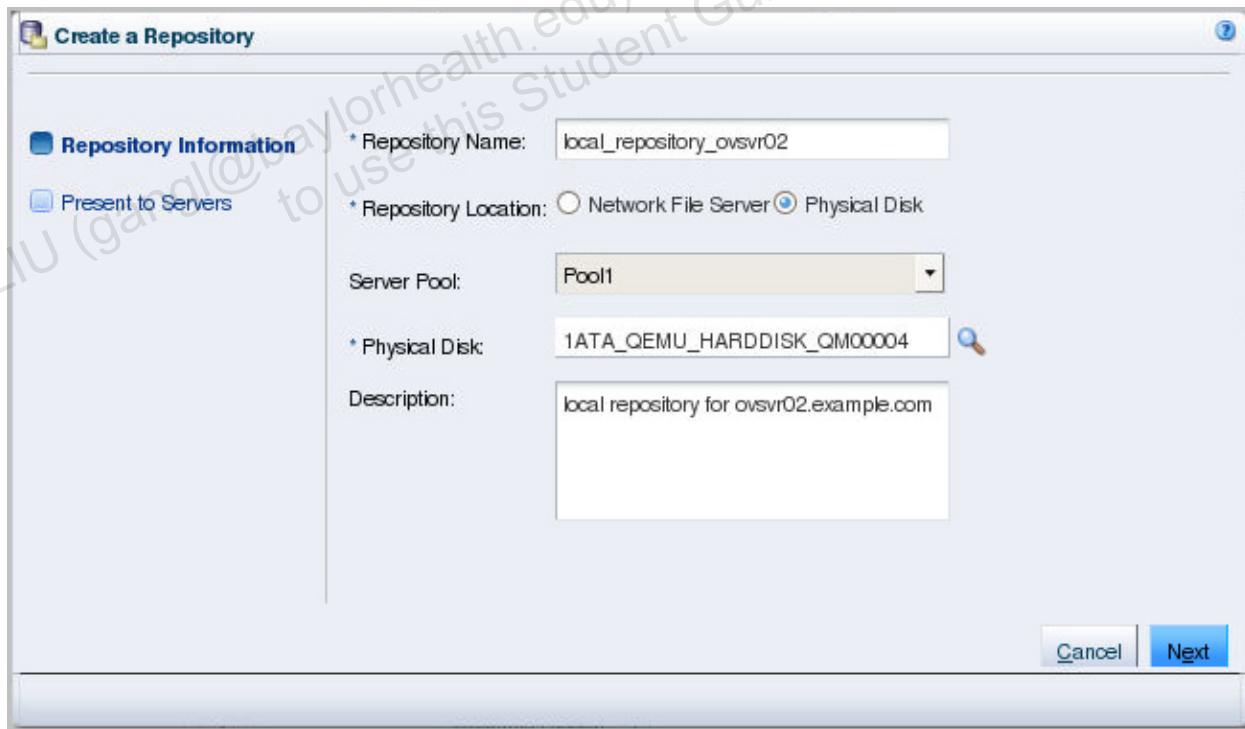
This screenshot shows the 'Select Physical Disk' dialog box. It displays a list of storage arrays under 'SAN Server' and 'Volume Group'. A filter is applied to show 'Generic Local Storage Array @ ovsvr02.example.com'. The main table lists four volumes (IET (1) through IET (4)) with their sizes and user-friendly names. At the bottom right are 'OK' and 'Cancel' buttons.

- e. From the “Generic Local Storage Array @ ovsrv02.example.com” storage array, select the only disk that is available, as shown in the following screenshot:



Click OK to return to the Repository Information window.

- f. In the Repository Information window, enter the description.



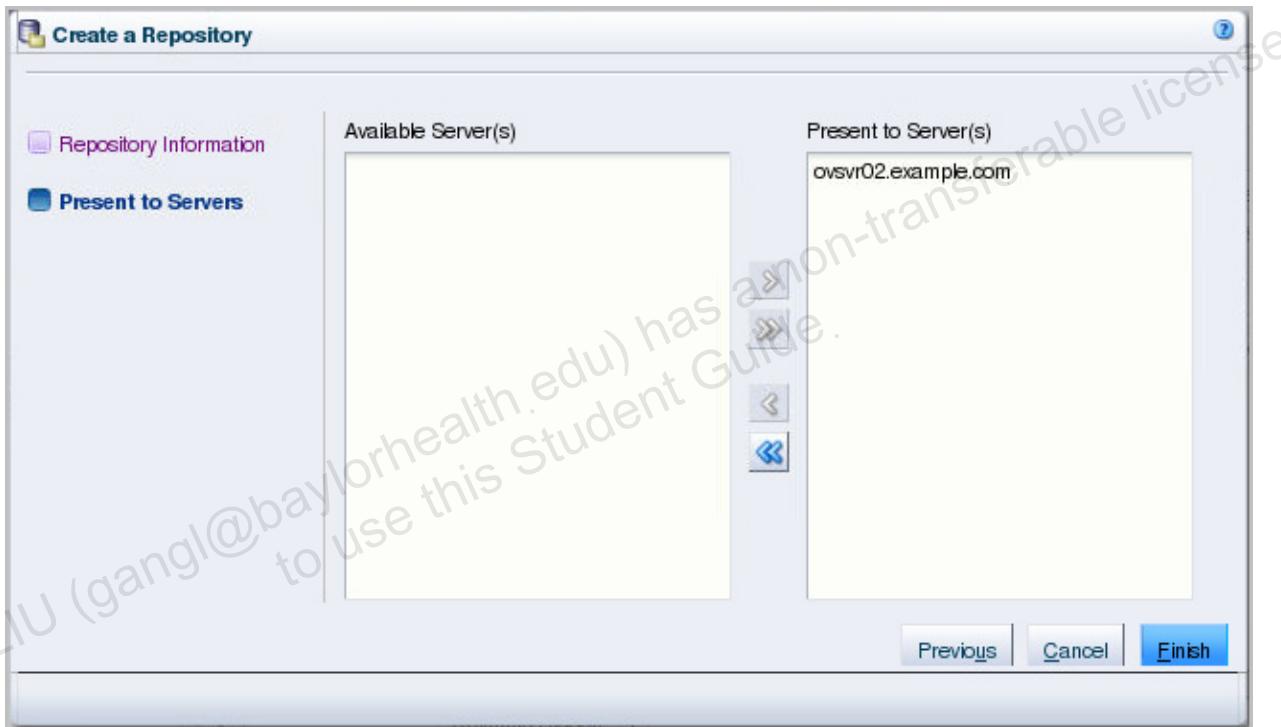
- g. Click Next to create the repository.

The repository is created.



This operation takes six to eight minutes to complete.

- h. In the "Present to Servers" window, move `ovsvr02.example.com` to the "Present to Server(s)" pane by selecting `ovsvr02.example.com` and clicking the single right-arrow button.



Note that `ovsvr01.example.com` is not listed among the available servers, because the Oracle VM Manager knows that the local disk on `ovsvr02` is not accessible by `ovsvr01`.

- Click Finish to complete the operation.

The new repository is displayed on the Repositories tab.

Name	File System	File System Size (GiB)			
		Free	Used	Total	Apparent
iscsi_repos	0004fb0000050000d7b632438ecfa4c8	40.49	15.51	56.0	21.0
local_repository_ovsvr01	0004fb00000500007bb4b7c5ed7866ef	8.56	4.13	12.7	0.0
local_repository_ovsvr02	0004fb00000500005b40a0ac5f55d1e1	8.56	4.13	12.7	0.0
nfs_repos	613ada9c-cece-4ce0-8300-46991a59319c [nfs on 192.0.2.14]	15.9	3.79	19.69	0.0

- Create a virtual disk in the new repository on ovsvr01.example.com by using the Oracle VM CLI.

- Restart your Oracle VM CLI session if it has expired.

```
[root@ <your lab machine> ~]# ssh -l admin ovmmgr01.example.com
-p 10000
OVM>
```

- List the available repositories.

```
OVM> list repository
Command: list repository
Status: Success
Time: ...
Data:
  id:0004fb0000030000d87b5dd02a6c4141  name:nfs_repos
  id:0004fb000003000074ce62fd309a61d4  name:iscsi_repos
  id:0004fb0000030000cbd019c98969baad  name:local_repos_ovsvr02
  id:0004fb0000030000419a64d5f9e0c7e9  name:local_repos_ovsvr01
OVM>
```

- Find the syntax for the create VirtualDisk command.

```
OVM> create virtualdisk ?
      *name
      *size
      *sparse
      description
```

```
shareable
*on
OVM>
```

- d. Construct the `create virtualDisk` command, up to the `sparse` parameter. Use the question mark to find options for the `sparse` parameter.

```
OVM> create virtualdisk name=vd1_ovsvr01 size=6 sparse=?
Yes, No
OVM>
```

- e. Add the `description` and `shareable` parameters, and find the syntax following the `on` parameter.

```
OVM> create virtualdisk name=vd1_ovsvr01 size=6 sparse=Yes
description="First virtual disk for ovsvr01 local repository"
shareable=no on ?
```

Repository

```
OVM> create virtualdisk name=vd1_ovsvr01 size=6 sparse=Yes
description="First virtual disk for ovsvr01 local repository"
shareable=no on Repository ?
```

id=<parent object identifier> OR

name=<parent object name>

```
OVM>
```

- f. You now have all the parameters to build the complete `create virtualdisk` command.

```
OVM> create virtualdisk name=vd1_ovsvr01 size=6 sparse=Yes
description="First virtual disk for ovsvr01 local repository"
shareable=no on Repository name=local_repos_ovsvr01
Command: create virtualdisk name=vd1_ovsvr01 size=6 sparse=Yes
description="First virtual disk for ovsvr01 local repository"
shareable=no on Repository name=local_repos_ovsvr01
Status: Success
Time: ...
JobId: ...
Data:
    id:0004fb000012000024cbb4e87d13a938.img  name:vd1_ovsvr01
OVM>
```

- g. List the virtual disks that are available in your Oracle VM environment.

```
OVM> list virtualdisk
Command: list virtualdisk
Status: Success
Time: ...
Data:
```

```

id:0004fb00001200009040903c91e814a7.img  name:system.img (2)
id:0004fb0000120000465d5e404c1ad875.img  name:pvm1_disk2
id:0004fb0000120000d5bd32905c91beb6.img
name:pvm1_disk1_clone1
id:0004fb0000120000c2f74e3a1883edf1.img  name:vd1_ovsvr01
id:0004fb000012000031c34ccdb09f9cc4.img  name:pvm1_disk1
OVM>

```

Your newly created virtual disk, vd1_ovsvr01, appears in the list.

- Show the available information for the new virtual disk.

```

OVM> show virtualdisk name=vd1_ovsvr01
Command: show virtualdisk name=vd1_ovsvr01
Status: Success
Time: ...
Data:
Absolute Path =
/dev/mapper/1ATA_QEMU_HARDDISK_QM0002/virtualDisks/0004fb000012
0000c2f74e3a1883edf1.img
Mounted Path =
/OVS.Repositories/0004fb0000030000419a64d5f9e0c7e9/VirtualDisks/
0004fb0000120000c2f74e3a1883edf1.img
Max (GiB) = 6.0
Used (GiB) = 0.0
Shareable = No
Repository Id = 0004fb0000030000419a64d5f9e0c7e9
[local_repos_ovsvr01]
Id = 0004fb0000120000c2f74e3a1883edf1.img [vd1_ovsvr01]
Name = vd1_ovsvr01
Description = First virtual disk for ovsvr01 local repository
Locked = false
DeprecatedAttrs = [Assembly Virtual Disk]
OVM>

```

Note that the size for the new disk is specified in GiB, not GB.

- To view the new virtual disk in the Oracle VM Manager UI, perform the following steps:
 - Click the Repositories tab.
 - Expose the list of repositories by clicking the Expand button for the Repositories folder in the navigation tree.
 - Expose the list of directories for local_repos_ovsvr01 by clicking its Expand button.
 - Highlight the Virtual Disks folder in the navigation tree.

The new virtual disk appears in the management pane.

The screenshot shows the Oracle VM Server interface with the 'Repositories' tab selected. On the left, there's a sidebar with options like 'Show My Repositories' and 'Show All Repositories'. Below that is a tree view of repositories:

- Repositories
 - iscsi_repos
 - local_repository_ovsvr01
 - ISOs
 - VM Files
 - VM Templates
 - Virtual Appliances
 - Virtual Disks** (this folder is selected)
 - local_repository_ovsvr02
 - nfs_repos

The main pane shows a table of virtual disks:

Name	Used (GiB)	Max (GiB)	Shareable	Absolute Path	Mounted Path
vd1_ovsvr01	0.0	6.0	No	/dev/mapper/1ATA_QEMU_L_OVS/Repositories/0004fb	

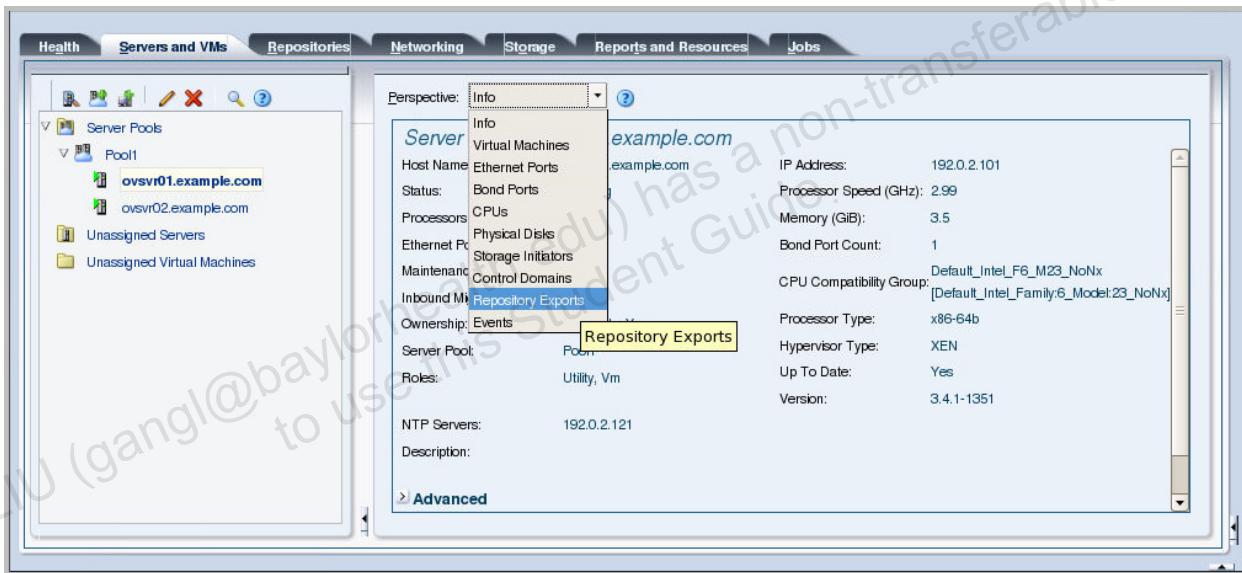
Practice 5-8: (Optional) Configure a Repository Export to Allow Backup of the Contents of the Repository

Overview

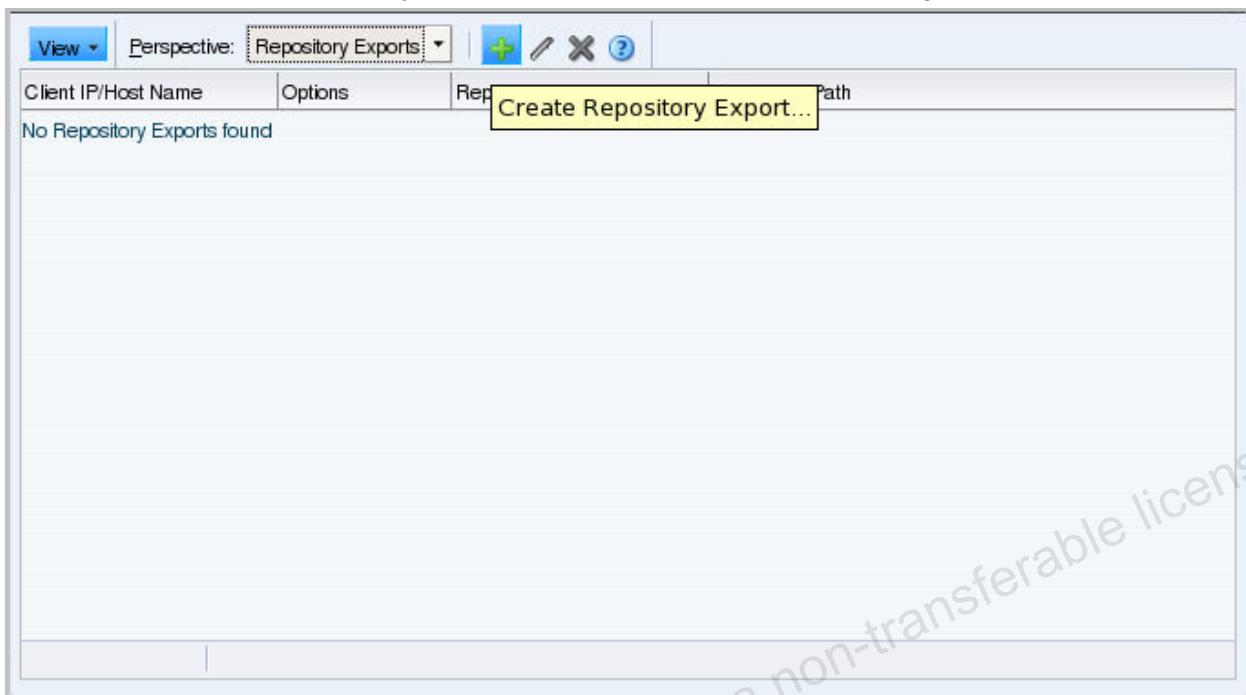
In this practice, you create a repository export. When the repository export is in place, you can back up the contents of the repository from the NFS client machine that you specified as part of the repository export information. At the end of this practice, you remove the repository export from your environment.

Tasks

1. Configure the repository export from the Oracle VM Manager UI.
 - a. Click the Servers and VMs tab.
 - b. In the navigation tree, expand the contents of Pool1 by clicking the Expand button.
 - c. Highlight ovsrv01.example.com and select the Repository Exports perspective in the management pane.



- d. Click the Create Repository Export icon on the toolbar in the management pane.



- e. In the Create Repository Export window, enter information to create the repository export for ovsvr01.example.com.

Use the information in the following table:

Field	Value
Client IP/Host Name	192.0.2.1 (your lab machine)
Repository	iscsi_repos
Options	async,no_root_squash

A screenshot of the 'Create Repository Export' dialog box. It has a title bar with a green plus icon and the text 'Create Repository Export'. Below the title are three input fields: 'Client IP/Host Name' with the value '192.0.2.1', 'Repository' with the value 'iscsi_repos' selected from a dropdown, and 'Options' with the value 'async,no_root_squash'. At the bottom right of the dialog are two buttons: 'Cancel' and 'OK', with a cursor pointing over the 'OK' button.

- f. Click OK to trigger the operation.

The new repository export appears in the management pane.

Client IP/Host Name	Options	Repository	Repository Path
192.0.2.1	async,no_root...	0004fb000003000074ce...	/OVS.Repositories/0004fb000003000074ce62fd309a61d4/

2. Verify that you can access the repository export from your lab machine.

- a. Start a terminal window on your lab machine.
- b. Switch to the root user.

```
bash-3.2$ su -
Password: oracle
[root@ <your lab machine> ~]#
```

- c. List the exports that are offered by ovsvr01.example.com.

```
[root@ <your lab machine> ~]# showmount -e ovsvr01.example.com
Export list for ovsvr01.example.com:
/OVS.Repositories/0004fb000003000074ce62fd309a61d4 192.0.2.1
[root@ <your lab machine> ~]#
```

- d. Create the directory for the NFS mount.

```
[root@ <your lab machine> ~]# mkdir /mnt_repos
```

- e. Mount the repository from your lab machine by using the repository UUID as listed in the output of step 2c. Your repository UUID is unique to your environment.

```
[root@ <your lab machine> ~]# mount -t nfs ovsvr01.example.com:
/OVS.Repositories/0004fb000003000074ce62fd309a61d4 /mnt_repos
[root@ <your lab machine> ~]#
```

- f. Verify that you can access the contents of the iscsi_repos repository from your lab machine by using the following commands:

- df -h command to view the mounted NFS share
- cd /mnt/repos to access the NFS share
- ls and ls -lR to view the contents of the NFS share

```
[root@ <your lab machine> ~]# df -h
Filesystem           Size   Used  Avail Use% Mounted on
...
ovsvr01.example.com:/OVS.Repositories/0004fb000003000074ce62fd309a61d4
                     56G   16G   41G  28% /mnt_repos
```

Copyright © 2016, Oracle and/or its affiliates. All rights reserved.

```
[root@ <your lab machine> ~]# cd /mnt_repos
[root@ <your lab machine> ~]# ls
Assemblies  ISOs  lost+found  Templates  VirtualDisks
VirtualMachines
[root@ <your lab machine> ~]# ls -lR
...
drwx----- 2 root root ... Assemblies
drwx----- 2 root root ... ISOs
drwxr-xr-x 2 root root ... lost+found
drwx----- 3 root root ... Templates
drwx----- 2 root root ... VirtualDisks
drwx----- 2 root root ... VirtualMachines

./Assemblies:
total 0

./ISOs:
total 0

./lost+found:
total 0

./Templates:
total 4
drwxr-xr-x 2 root root ... 0004fb0000140000bac794224bd73749

./Templates/0004fb0000140000bac794224bd73749:
total 1
-rw-r--r-- 1 root root ... vm.cfg

./VirtualDisks:
...
-rw----- 1 root root 8589934592 ...
0004fb000012000025a0bbc0767ada65.img
-rw----- 1 root root 10737418240 ...
0004fb000012000044b705828033aa21.img
-rw----- 1 root root 10737418240 ...
0004fb00001200008f228c0115f6079b.img
-rw----- 1 root root 3221225472 ...
8643ec16ed9b415b9ab13182ea6490cc.img

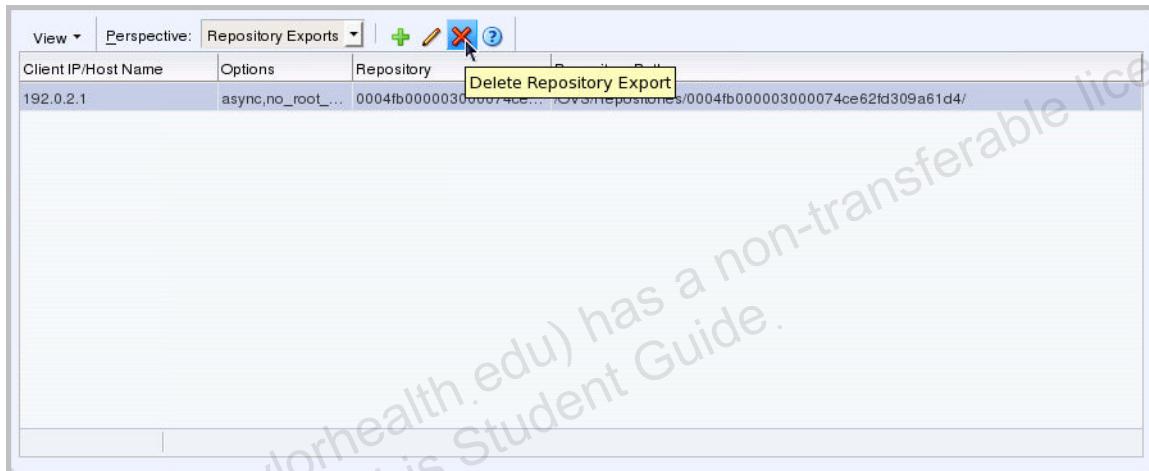
./VirtualMachines:
total 0
[root@ <your lab machine> ~]#
```

You can now access and back up the contents of the `iscsi_repos` repository.

3. Remove the repository export.
 - a. On your lab machine, unmount the NFS share to remove access to the contents of the `iscsi_repos` directory.

```
[root@ <your lab machine> mnt_repos]# cd  
[root@ <your lab machine> ~]# umount /mnt_repos  
[root@ <your lab machine> ~]#
```

- b. In the Oracle VM Manager UI, click the Servers and VMs tab.
 - c. Expand `Pool1` in the navigation tree and select `ovsvr01.example.com`.
 - d. Select Repository Exports from the Perspective drop-down list in the management pane.
 - e. Highlight the repository export and click the Delete icon.



- f. In the Confirmation dialog box, click OK to complete the delete operation.



- g. Verify that the NFS share is no longer accessible from `ovsvr01.example.com`.

```
[root@ <your lab machine> ~]# showmount -e ovsvr01.example.com  
mount clntudp_create: RPC: Program not registered  
[root@ <your lab machine> ~]#
```

The share is no longer accessible.

Unauthorized reproduction or distribution prohibited. Copyright© 2019, Oracle and/or its affiliates.

GANG LIU (gangli@baylorhealth.edu) has a non-transferable license
to use this Student Guide.

Practices for Lesson 6: Managing Virtual Machines

Chapter 6

Practices for Lesson 6: Overview

Practices Overview

In these practices, you create and manage virtual machines.

First, you prepare your environment for creating virtual machines.

Next, you create the `pvm1` virtual machine and install Oracle Linux as a guest OS. Recall that you created two virtual disks called `pvm1_disk1` and `pvm1_disk2` in Practice 5-5 titled “Perform Disk and Cloning Operations for Resources in the Repositories.” You use these two disks to create `pvm1`.

The second technique for creating virtual machines is to use a template. Recall that you imported the `pvm_template.tgz` template in a practice for the lesson titled “Server Pools and Repositories.” You use this template to create several new virtual machines, either by using simple cloning or by using cloning with a clone customizer.

Finally, you explore several features of Oracle VM: Maintenance mode for Oracle VM servers, live migration, high availability (HA), and anti-affinity.

In this practice, you:

1. Reserve MAC addresses for the VNICs of your future virtual machines
2. Prepare your web server for installing a guest OS in a virtual machine
3. Create `pvm1`, which is a paravirtualized virtual machine
4. Start and access the console of your new virtual machine
5. Install Oracle Linux as the guest OS in the virtual machine
6. Clone an existing template into a new virtual machine
7. Create a clone customizer and use it for cloning operations
8. Migrate running virtual machines
9. Use the high availability (HA) feature
10. Use the anti-affinity feature
11. View VNIC usage from the Oracle VM Manager

Practice 6-1: Reserve MAC Addresses for the VNICs of Your Future Virtual Machines

Overview

In this practice, you reserve 20 MAC addresses to assign to the VNICs of your future virtual machines.

You use the Virtual NICs tool of the Oracle VM Manager UI to reserve a range of MAC addresses, which are then assigned dynamically to the VNICs configured to your virtual machines.

Tasks

1. Access the Virtual NICs tool from the Oracle VM Manager UI.
 - a. If your Oracle VM Manager UI session has expired, log in again as the `admin` user, with `MyOracle1` as the password.
 - b. Click the Networking tab.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓		✓			
hb_net	10b89cabfe			✓				
storage_net	10afcd34b9				✓			
vm_net	10c81004c9					✓		

- c. From the Networking tab view, click the Virtual NICs button located on the tab toolbar. The Virtual NICs window is separated into two areas:
 - The Dynamic MAC Address Range area
 - The area displaying the VNICs that were already created. This area is empty.

Dynamic MAC Address Range

Range: : : : : : To:

No data to display

MAC addresses must be unique or collisions may occur if you are running multiple OVM Manager Server applications.

- Define a MAC address range for the VNICs that you assign when you create virtual machines.

A VNIC is a virtual network interface card. Each virtual machine can have zero or more VNICs.

How Are MAC Addresses Assigned to VNICs?

- You can select to have a MAC address assigned dynamically to a VNIC that you configure as part of a virtual machine. The dynamic assignment uses one of the MAC addresses in the reserved MAC address range.
 - You can manually specify a MAC address to a VNIC in your virtual machine.
- In this task, you customize the range of MAC addresses that can be assigned to VNICs when they are created for the virtual machines in your Oracle VM environment.
- By default, the initial MAC address in the Range field is composed of the Oracle-assigned 00:21:f6, followed by zeros: 00:21:f6:00:00:00.



The default initial MAC address in the range is therefore set to 00:21:f6:FF:FF:FF.

- In the last three octets of the To area, enter 00:00:13. The hexadecimal value 13 corresponds to the decimal value 19. This selection reserves a range of 20 MAC addresses, from 00:21:f6:00:00:00 to 00:21:f6:00:00:13.



Click Apply Range to set the range.

Note: If you have more than one Oracle VM environment, make sure that the MAC addresses for all VNICs in all Oracle VM environments do not overlap. By specifying a different MAC address range for each environment from the Virtual NICs tool or from the Oracle VM CLI, you can create unique MAC address ranges for your entire enterprise.

- Verify the setting for your MAC address range by using the Oracle VM CLI.

- Restart your Oracle VM CLI session if it has expired.

```
[root@ <your lab machine> ~]# ssh -l admin \
ovmmgr01.example.com -p 10000
OVM>
```

- List the range of MAC addresses that are available to VNICs by using the getVnicMacAddrRange command.

Note: After entering a few letters of the command, press the Tab key to make use of the tab auto-completion feature.

```
OVM> getVnicMacAddrRange
Command: getVnicMacAddrRange
Status: Success
Time: ...
```

```
Data:  
oui = 00:21:f6:  
start = 00:00:00  
end = 00:00:13  
OVM>
```

The output must match the range that you set previously from the Oracle VM Manager UI.

Note: The first three fields (octets) represent the Organizationally Unique Identifier (OUI), which has been assigned to Oracle. Do not change these fields. Changing these fields can cause network conflicts and ultimately result in network failure.

Practice 6-2: Prepare Your Web Server for Installing a Guest OS in a Virtual Machine

Overview

In this practice, you ensure that you can access the web server that is needed to install a guest OS in your virtual machine.

Assumptions

This practice assumes that your lab virtual machine is running the `httpd` service, and that the required ISO file is available in the `/OVS/seed_pool` directory on your lab machine.

Tasks

1. From a terminal window on your lab machine, change user to `root`.
2. Display the status of the `httpd` service.

```
[root@<your lab machine> ~]# service httpd status
httpd (pid ...) is running...
[root@<your lab machine> ~]#
```

3. Change directory to `/OVS/seed_pool`.

```
[root@<your lab machine> ~]# cd /OVS/seed_pool
[root@<your lab machine> seed_pool]#
```

4. Display the content of the `/OVS/seed_pool` directory.

```
[root@<your lab machine> seed_pool]# ls
env_refresh.sh                                     physDisk1.tgz
iscsiPoolfs1.tgz                                  physDisk2.tgz
iscsiRepos1.tgz                                  physDisk3.tgz
local_ovs01.tgz                                    physDisk4.tgz
local_ovs02.tgz                                  pvm_template.tgz
nfsrepos1.tgz                                    stage_ovmmgr01.tgz
OracleLinux-R6-U5-Server-x86_64-dvd.iso          swap_ovmmgr01.tgz
osc-oracle-s7k-1.0.3-96.el6.noarch.rpm           system_ovmmgr01.tgz
ovmcore-console-1.0-36.el6.noarch.rpm            system_ovs01.tgz
ovmm-3.4.1-installer-OracleLinux-b1350.iso      system_ovs02.tgz
OVS-3.4.1-1351.iso                                u01_ovmmgr01.tgz
ovs_restore.sh                                     vmpscan-1.0.0.tar.gz
[root@<your lab machine> ~]#
```

The listing for your directory might be different, but the ISO `OracleLinux-R6-U5-Server-x86_64-dvd.iso` file must appear in the listing.

5. Copy the required ISO file from /OVS/seed_pool to the default document directory for the HTTP server.

```
[root@<your lab machine> seed_pool]# cp OracleLinux-R6-U5-
Server-x86_64-dvd.iso /var/www/html/
[root@<your lab machine> seed_pool]#
```

The copy operation takes two to three minutes to complete.

6. Verify access to the ISO file from one of your Oracle VM servers.

- a. From a terminal window, use the ssh command to access ovsrv01.example.com.

```
[root@<your lab machine> html]# ssh ovsrv01.example.com
root@ovsrv01's password: oracle
Last login: ...
Warning: making manual modifications in the management domain
might cause inconsistencies between Oracle VM Manager and the
server.

[root@ovsrv01 ~]#
```

- b. Issue the wget command with the --spider option to verify that the target ISO file is accessible from your Oracle VM server.

Warning: Do not retrieve the ISO file, because this could cause the root (/) file system to fill up on your Oracle VM server.

```
[root@ovsrv01 ~]# wget --spider http://192.0.2.1/OracleLinux-R6-
U5-Server-x86_64-dvd.iso
Spider mode enabled. Check if remote file exists.
----- http://192.0.2.1/OracleLinux-R6-U5-Server-x86_64-
dvd.iso
Connecting to 192.0.2.1:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 3885117440 (3.6G) [application/octet-stream]
Remote file exists.

[root@ovsrv01 ~]#
```

- c. Terminate your session on ovsrv01.example.com by using the exit command.

7. From your lab machine, mount the ISO file as an exploded file. This exploded file is used in a subsequent practice to install the guest OS in a virtual machine.

Note: An exploded ISO file means that the files and directories in the ISO file are directly accessible.

- a. In a terminal session on your lab machine, change user to root.
- b. Create the iso directory in the HTTP server default directory, /var/www/html. This directory is used in the next step to mount the ISO file.

```
[root@<your lab machine>~]# cd /var/www/html
[root@<your lab machine> html]# pwd
/var/www/html
[root@<your lab machine> html]# mkdir iso
```

```
[root@<your lab machine> html]# ls  
iso  OracleLinux-R6-U5-Server-x86_64-dvd.iso  pvm_template.tgz  
[root@<your lab machine>~]#
```

- c. Mount the ISO file on the `iso` directory.

```
[root@<your lab machine> html]# mount -o loop,ro OracleLinux-R6-  
U5-Server-x86_64-dvd.iso /var/www/html/iso  
[root@<your lab machine> html]#
```

Note: Mounting the ISO file as a loop device enables you to access the contents of the ISO file.

- d. Verify that the `mount` command succeeded.

```
[root@<your lab machine> html]# df -h  
Filesystem           Size   Used Avail Use% Mounted on  
...  
/var/www/html/OracleLinux-R6-U5-Server-x86_64-dvd.iso  
      3.7G  3.7G     0 100% /var/www/html/iso  
[root@edudr26p0 html]#
```

The ISO file is mounted on `/var/www/html/iso` and is available from the `httpd` (web) server on your lab machine.

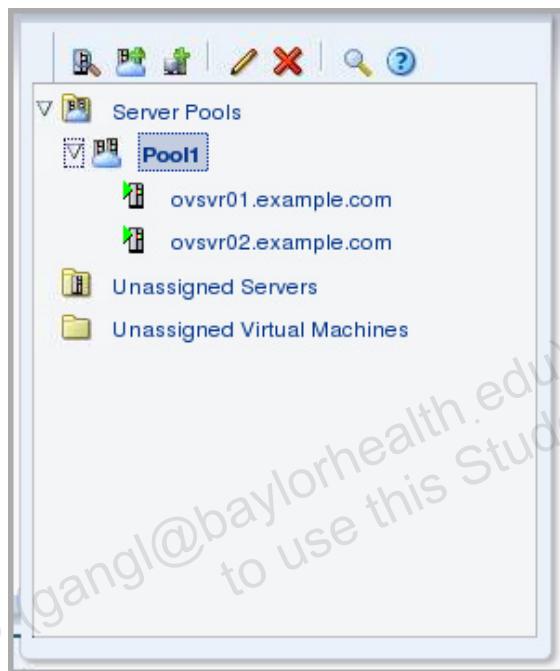
Practice 6-3: Create pvm1, a Paravirtualized Virtual Machine

Overview

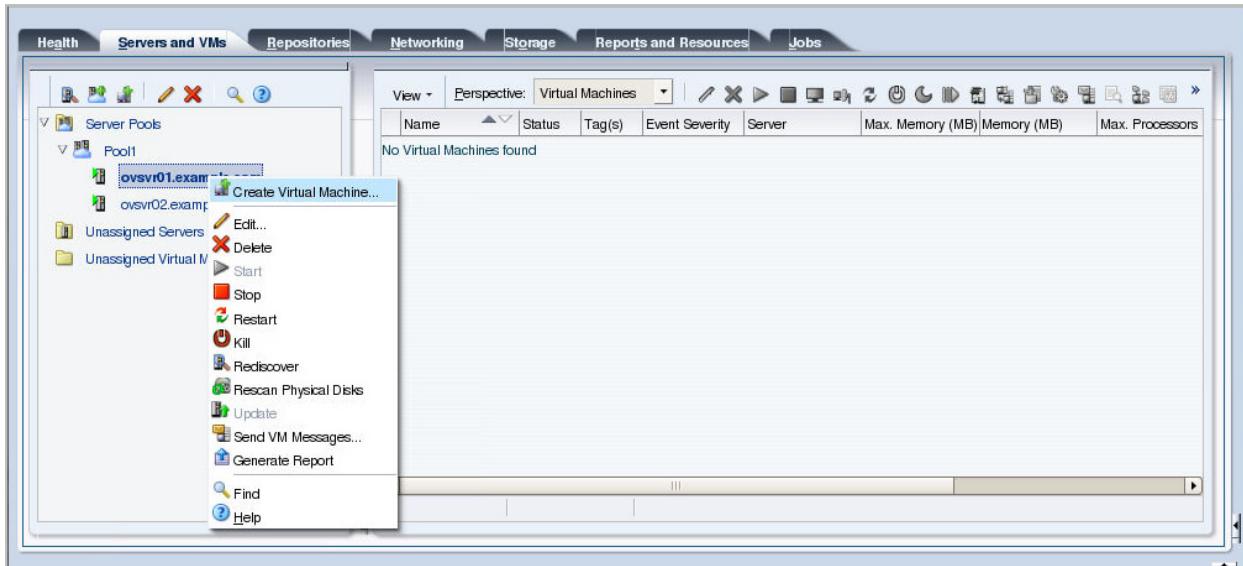
In this practice, you create, start and access your first virtual machine by using the Oracle VM Manager UI.

Tasks

1. Launch the Create Virtual Machine Wizard.
 - a. In the Oracle VM Manager UI, click the Servers and VMs tab.
 - b. In the navigation tree, click the Expand button for the Server Pools folder.
 - c. Click the Expand button for Pool1.



- d. Right-click `ovsvr01.example.com` and select Create Virtual Machine from the shortcut menu or click the Create Virtual Machine icon on the toolbar.



- e. On the next screen, accept the “Create a new VM” option and click Next to continue.



Note: The second option creates a virtual machine through a cloning process. Cloning is performed in subsequent practices for this lesson.

The Create Virtual Machine Wizard is launched.

Note: You can launch the Create Virtual Machine Wizard in the following ways:

- From the Server Pools folder (with a right-click) in the navigation pane
- From a particular server pool in the navigation pane
- From an Oracle VM server within a pool in the navigation pane
- From the toolbar in the navigation pane
- From the Servers perspective in the management pane (when a server pool is selected in the navigation pane) by clicking the icon on the toolbar (with or without a server selected in the list of servers)

Depending on how you launch the wizard and what object is selected when you launch it, the Server Pool is either already filled in, or you must select the server pool from the Server Pool drop-down list.

The same is true for the Oracle VM server: If you launch the Create Virtual Machine Wizard from a highlighted server pool, you must make a selection for the Server field: Any or an Oracle VM server listed in the Server drop-down list.

To create a virtual machine, the wizard walks you through five screens:

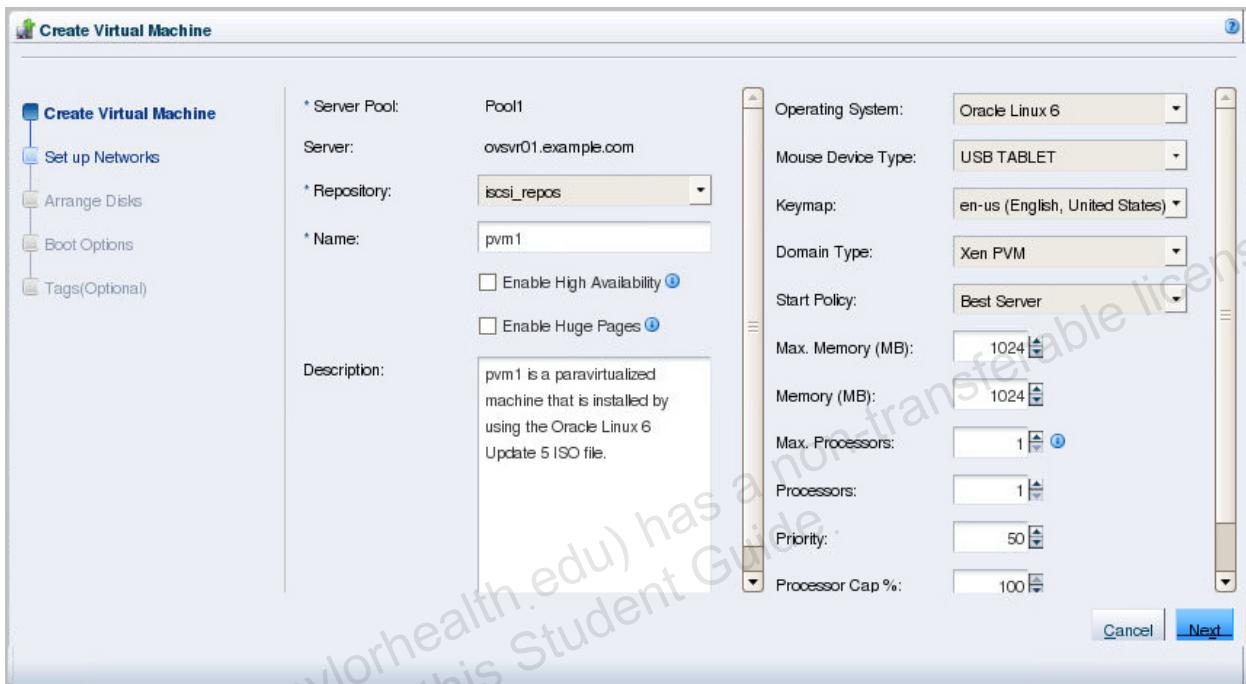
- Create Virtual Machine: On this screen, specify parameters for your virtual machine. This information includes a name, server pool, repository, domain type, memory, and number of virtual processors.
- Set up Networks: On this screen, assign vnics and their associated networks.
- Arrange Disks: Specify the order in which the virtual or physical disks are presented to the OS or installation program in your virtual machine. This determines the letter associated with the disks (for example, /dev/xvda and /dev/xvdb). Use the virtual and physical disks that you previously created or discovered. Also create a new virtual disk for your virtual machine.

- Boot Options: On this screen, specify the boot device. If you specify CDROM, booting your virtual machine triggers an installation from an ISO file (HVM virtual machines only). If you specify Disk, the virtual machine attempts to boot from its first virtual or physical disk. If you specify Network, your virtual machine attempts to install from an exploded ISO file that is available over the network (PVM virtual machines only).
 - Tags (Optional): From this screen, you can associate already created tags with your new virtual machine. In this practice, you do not use tags.
2. Create the virtual machine as a PVM (paravirtualized machine).
- a. On the Create Virtual Machine screen of the wizard, specify parameters for your new virtual machine. Use the information in the following table to enter values on the screen:

Field	Value
Server Pool	It is already filled in if you started the wizard from an Oracle VM server.
Server	It is already selected as ovsvr01.example.com.
Repository	Select iscsi_repos from the drop-down list.
Name	pvm1
Enable High Availability	Leave deselected.
Enable Huge Pages	Leave deselected. If the field is disabled, it becomes selectable when you set the Domain Type to XEN_PVM.
Description	pvm1 is a paravirtualized machine that is installed by using the Oracle Linux 6 Update 5 ISO file.
Operating System	Select Oracle Linux 6 from the drop-down list.
Mouse Device Type	Select USB TABLET for best mouse synchronization. Other selections are: OS Default PS2 Mouse USB Mouse
Keymap	Select “en-us (English, United States)” or the keymap specified by your instructor.
Domain Type	Select “Xen PVM” from the drop-down list.
Start Policy	Leave as “Best Server.”
Maximum Memory	1024
Memory	1024
Maximum Processors	1
Processors	1

Field	Value
Priority	50
Processor Cap (%)	100
Restart Action On Crash	Restart

After entering all the information, your screen looks like the following:



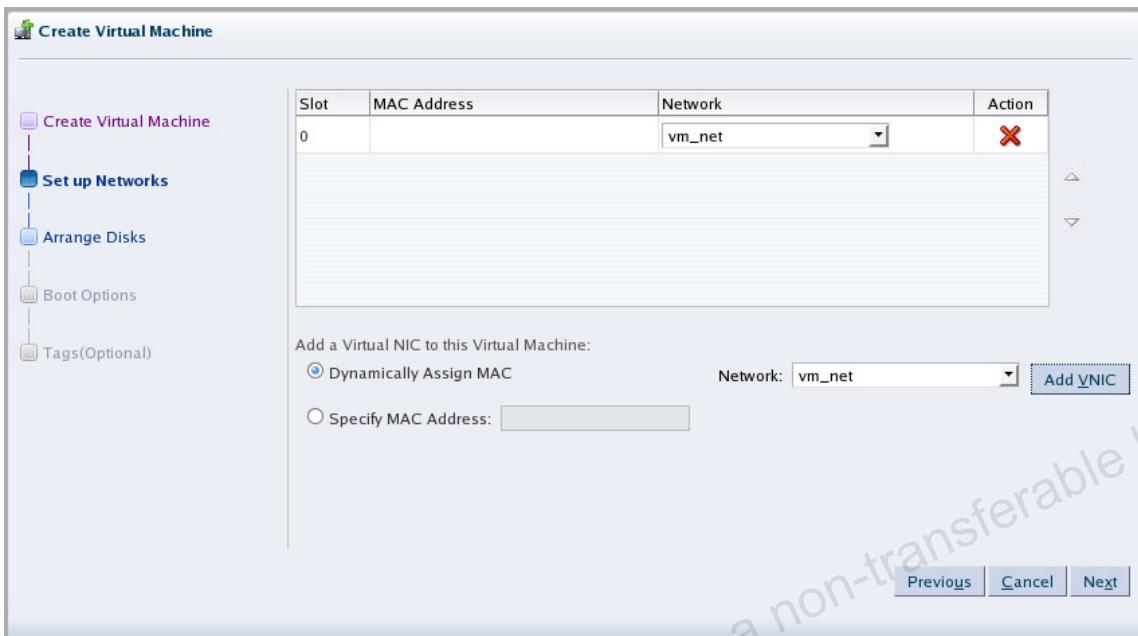
Click Next to advance to the next screen.

- b. On the “Set up Networks” screen, you assign one or more VNICs by creating pairs of MAC addresses and networks. If the MAC address is to be assigned dynamically, the assignment is not completed until the virtual machine is created.

In your lab environment, create a single VNIC by selecting `vm_net`, the virtual machine network that you created in a practice for the lesson titled “Managing Servers and Networks,” and by selecting a MAC address in the list of reserved MAC addresses.

- Leave the Dynamically Assign MAC radio button selected.
- Select `vm_net` from the Network drop-down list next to the Add VNIC button.
- Click the Add VNIC button.

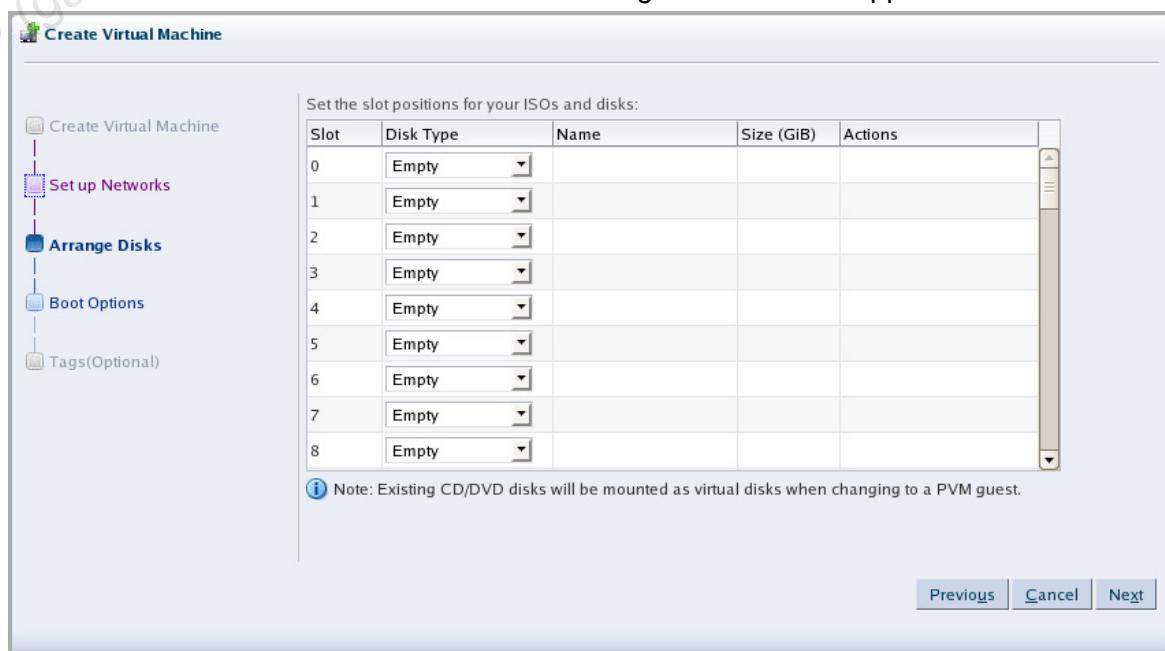
Your new VNIC pair appears in the top pane. Because you used a dynamically assigned MAC address, the MAC Address field is empty for now as shown in the following screenshot:



Note: If you did not previously define a range of MAC addresses for your VNICs, or you run out of available MAC addresses, the VNIC assignment fails.

Note: The Network field in the list of MAC Address/Network pairs has a drop-down option that allows you to change the network for the VNIC. Only networks that are created with the Virtual Machine function are available in the drop-down list. You can also change the network selection after the virtual machine has been created, by using the Edit Virtual Machine Wizard.

Click Next to move to the next screen. The Arrange Disks screen appears.



- c. On the Arrange Disks screen, select `pvm1_disk1` and `pvm1_disk2` in slots 0 and 1. For this step, you add `pvm1_disk1` and `pvm1_disk2`, the two virtual disks that you created in the practices for the lesson titled “Server Pools and Repositories.” You do not add any ISO file, because the ISO file that you are using to install Oracle Linux 6 Update 5 into your virtual machine is offered over the network, and, therefore, is not needed in your virtual machine’s disk configuration. You can choose to add the ISO file if you want to install additional packages at a later time.

To make your virtual disk selections, perform these steps:

- Select Virtual Disk from the drop-down list under Disk Type for slot 0.

Set the slot positions for your ISOs and disks:

Slot	Disk Type	Name	Size (GiB)	Actions
0	Virtual Disk	Empty	N/A	
1	Empty			
2	Virtual Disk			
3	Physical Disk CD/DVD			
4	Empty			
5	Empty			
6	Empty			
7	Empty			
8	Empty			

Note: Existing CD/DVD disks will be mounted as virtual disks when changing to a PVM guest.

- Click the search icon on the Actions toolbar.

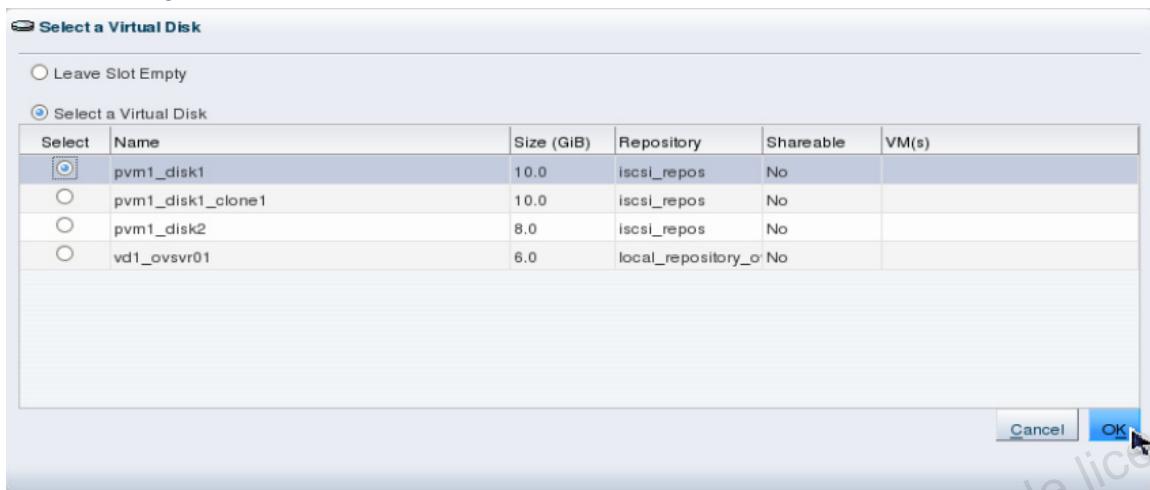
Set the slot positions for your ISOs and disks:

Slot	Disk Type	Name	Size (GiB)	Actions
0	Virtual Disk	Empty	N/A	
1	Empty			
2	Empty			
3	Empty			
4	Empty			
5	Empty			
6	Empty			
7	Empty			
8	Empty			

Note: Existing CD/DVD disks will be mounted as virtual disks when changing to a PVM guest.

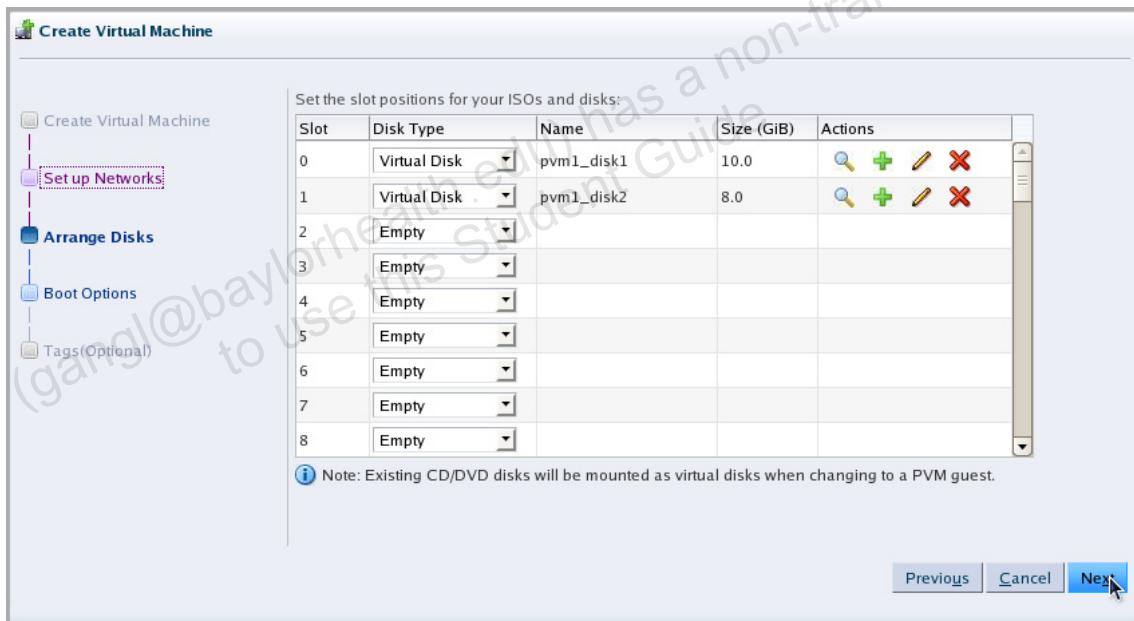
Select a Virtual Machine Disk

- Select pvm1_disk1 from the list of available virtual disks and click OK to return to the Arrange Disks screen.



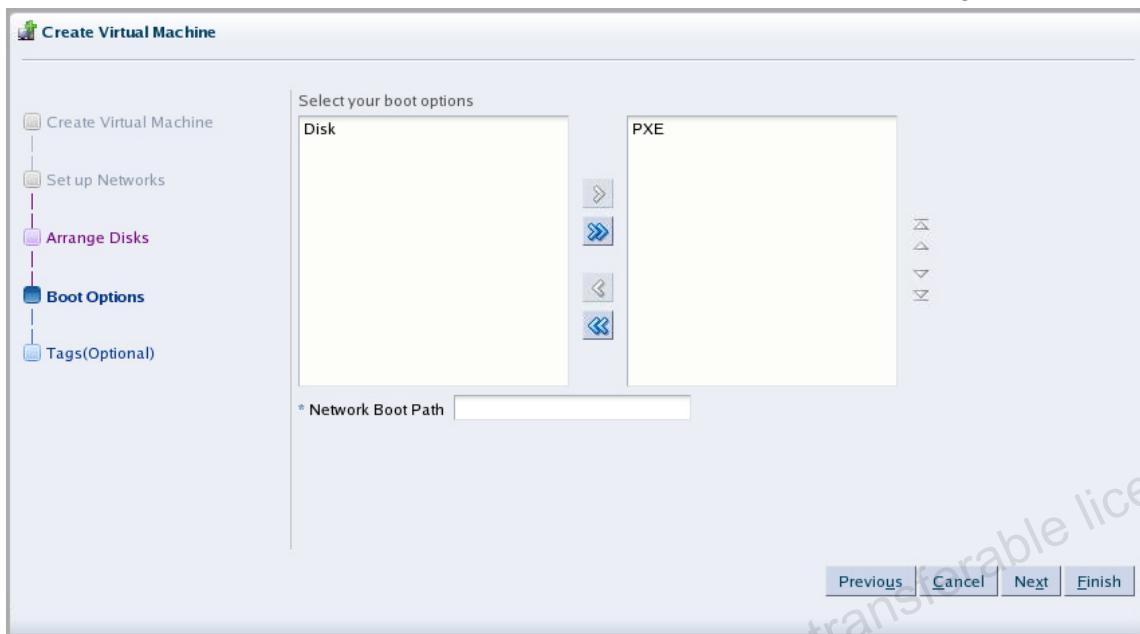
- Repeat these steps to select pvm1_disk2 for slot 1.

Your slot selections must look like the following screenshot:

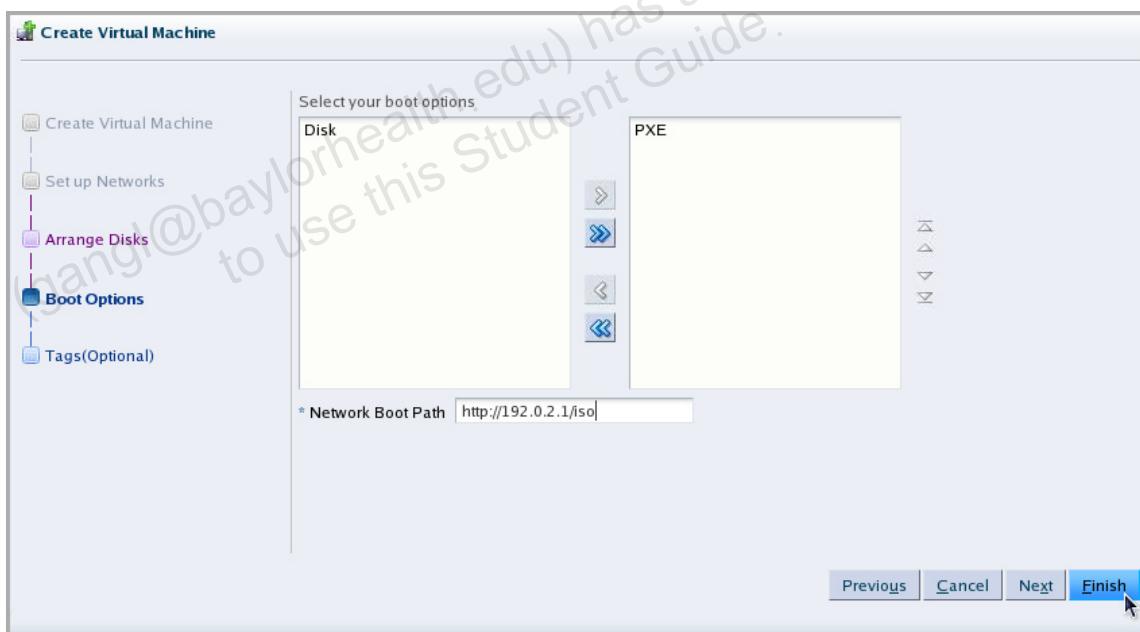


- Click Next to continue.
- On the Boot Options screen, select PXE in the left pane and click the single right-arrow button to move this selection to the right pane.

This action activates the Network Boot Path field, as shown in the following screenshot:

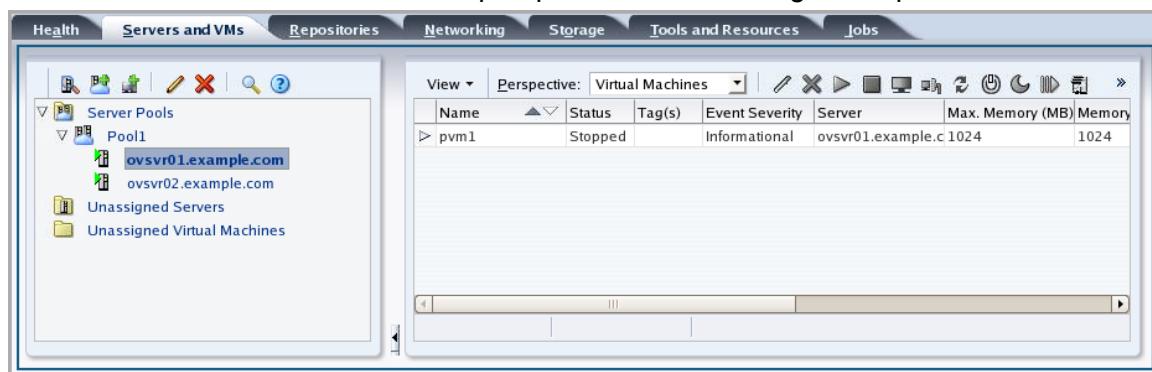


- f. Enter `http://192.0.2.1/iso` in the Network Boot Path field, which is a required field.

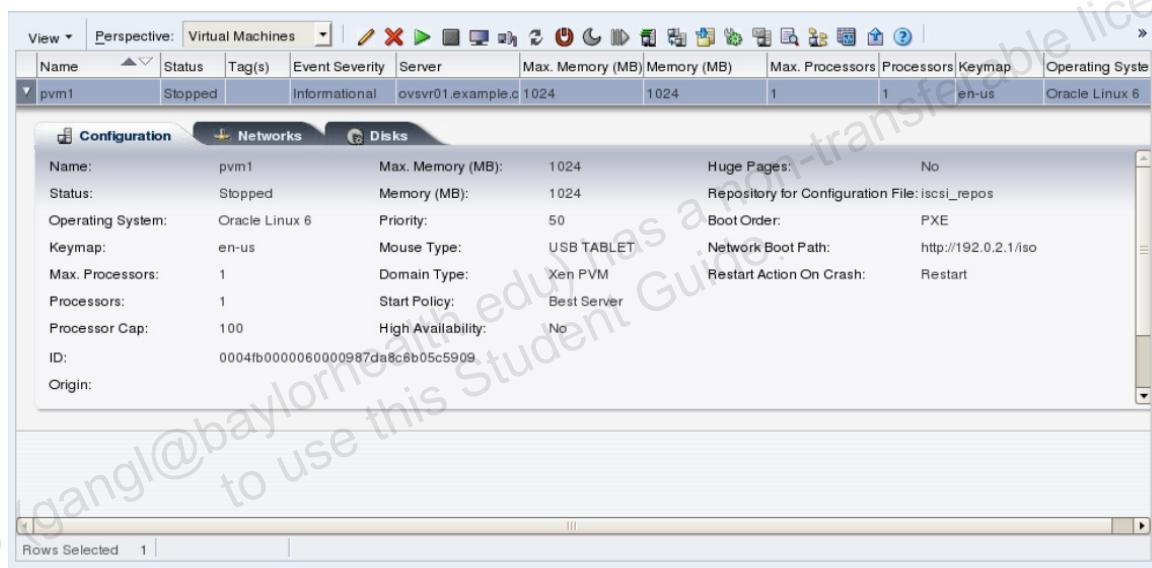


Note: You can also access the exploded ISO file by using the HTTPS or NFS protocol. Click Finish to trigger the creation of your virtual machine.

- g. To view your new virtual machine, select `ovsvr01.example.com` in the navigation tree and select the Virtual Machines perspective in the management pane.



- h. Click the Expand button next to `pvm1`, to display configuration information about this virtual machine.

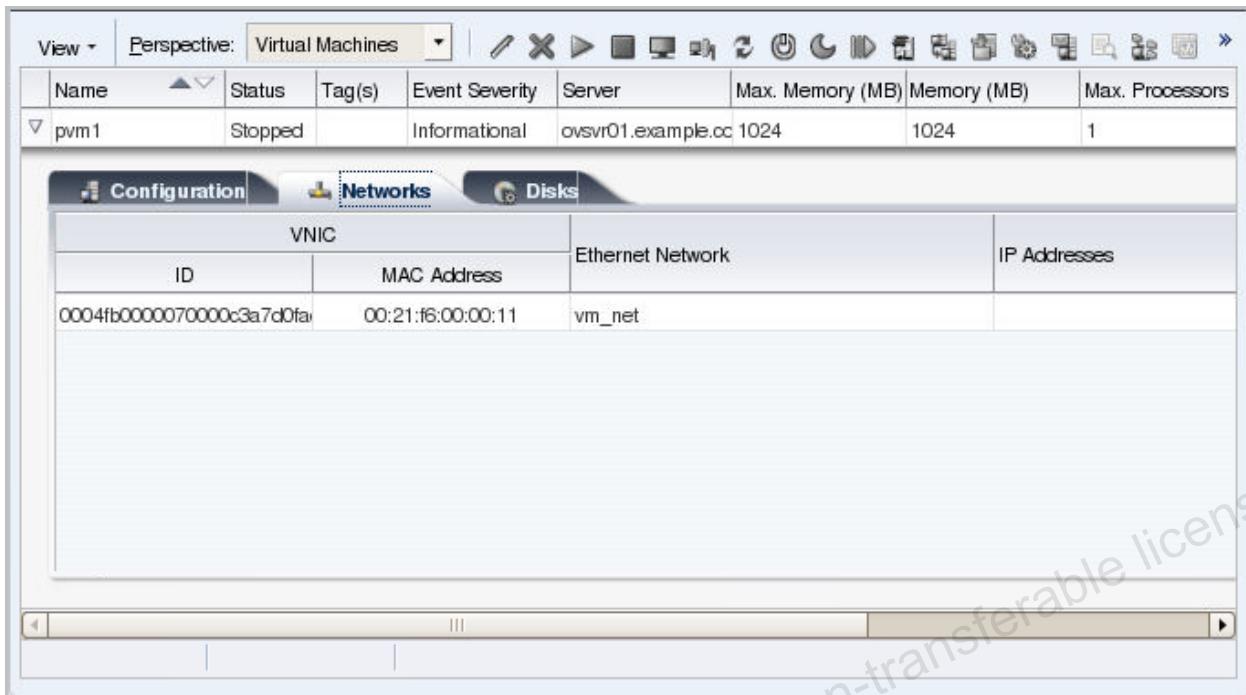


Note that `pvm1` is in the stopped state.

- i. There are three tabs for the `pvm1` virtual machine:
- Configuration
 - Networks
 - Storage

Click each tab to display configuration information for `pvm1`.

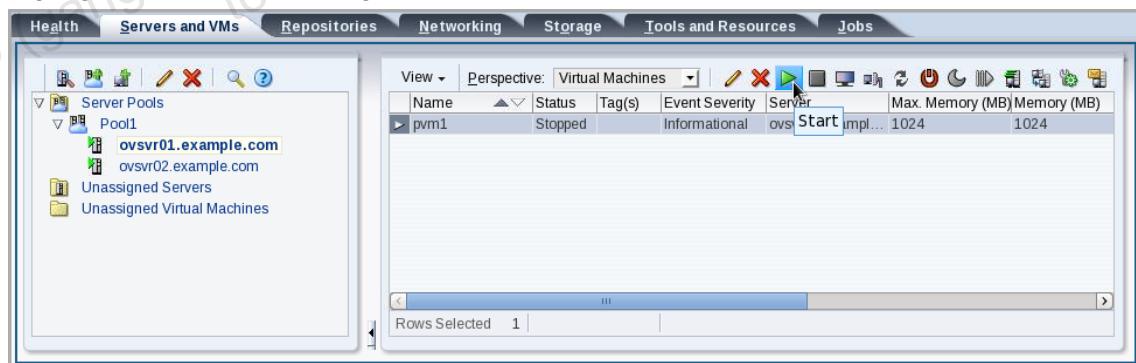
Observe that the MAC address for the VNIC has been assigned as part of the creation of the virtual machine.



Note: The MAC address displayed for your pvm1 virtual machine might not be the same as the value shown on the Networks tab.

Your new virtual machine is ready to use.

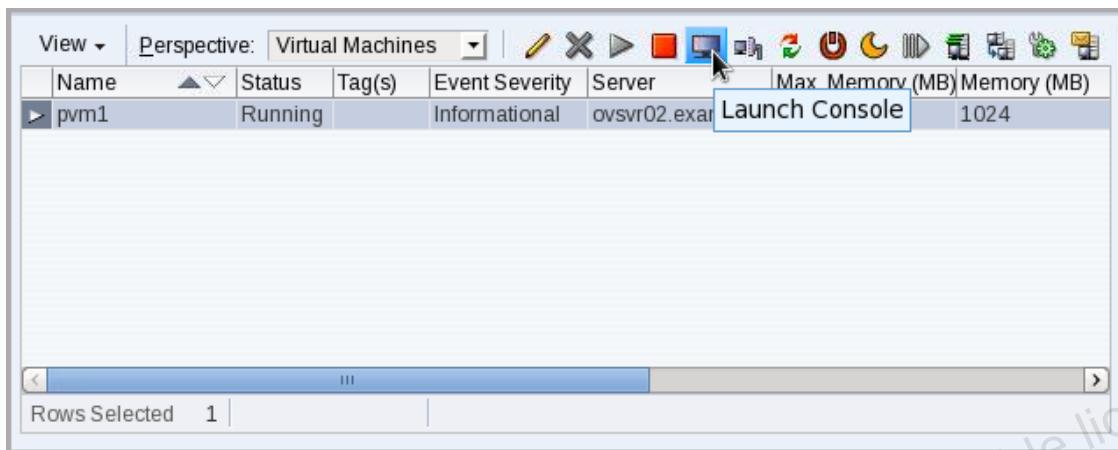
3. Start and access your new virtual machine by launching the VNC Console. You use the VNC Console to connect to a running virtual machine.
 - a. On the Servers and VMs tab, select ovsrv01.example.com in the navigation tree and select the Virtual Machines perspective in the management pane.
 - b. Highlight pvm1 in the management pane and click the Start icon on the toolbar.



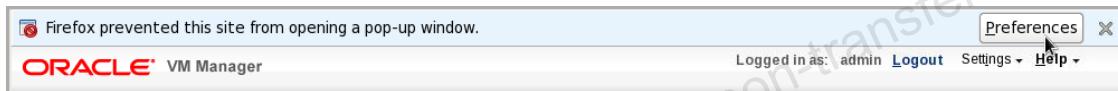
The start operation triggers a job.

Note: Your virtual machine starts on either ovsrv01.example.com or ovsrv02.example.com. If the virtual machine disappears from the list of virtual machines for ovsrv01.example.com, highlight ovsrv02.example.com in the navigation pane to display the virtual machines for ovsrv02.example.com.

4. Start the VNC console for pvm1.
 - a. In the management pane, highlight pvm1 and click the Launch Console icon on the toolbar.



- b. If Firefox does not allow the pop-up window, click Preferences.

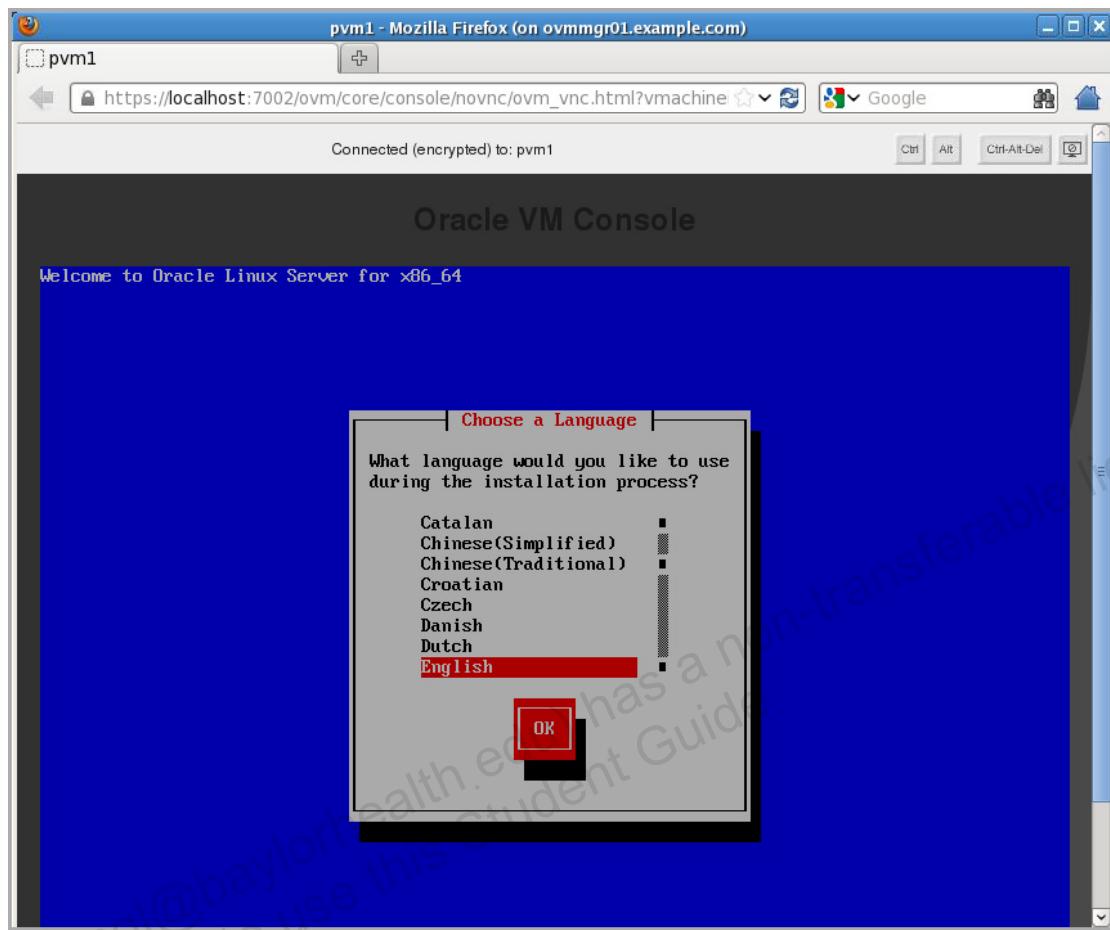


- c. Select ‘Allow pop-ups for localhost.’



- d. If the session has timed out, restart the console.

- e. The Oracle VM Console window appears and the “Choose a Language” screen appears.



Continue with the next practice to install Oracle Linux 6 Update 5 in your virtual machine.

Practice 6-4: Install Oracle Linux as the Guest OS in the Virtual Machine

Overview

In this practice, you start the installation of Oracle Linux 6 Update 5 in your virtual machine. This installation is slow in your virtual lab environment. Therefore, after responding to prompts of the installation program, and ensuring that the installation is proceeding normally, you perform a few operations against your running virtual machine, and then cancel the installation if it is not completed. In the subsequent practices for this lesson, you create virtual machines by using a faster method with templates and cloning.

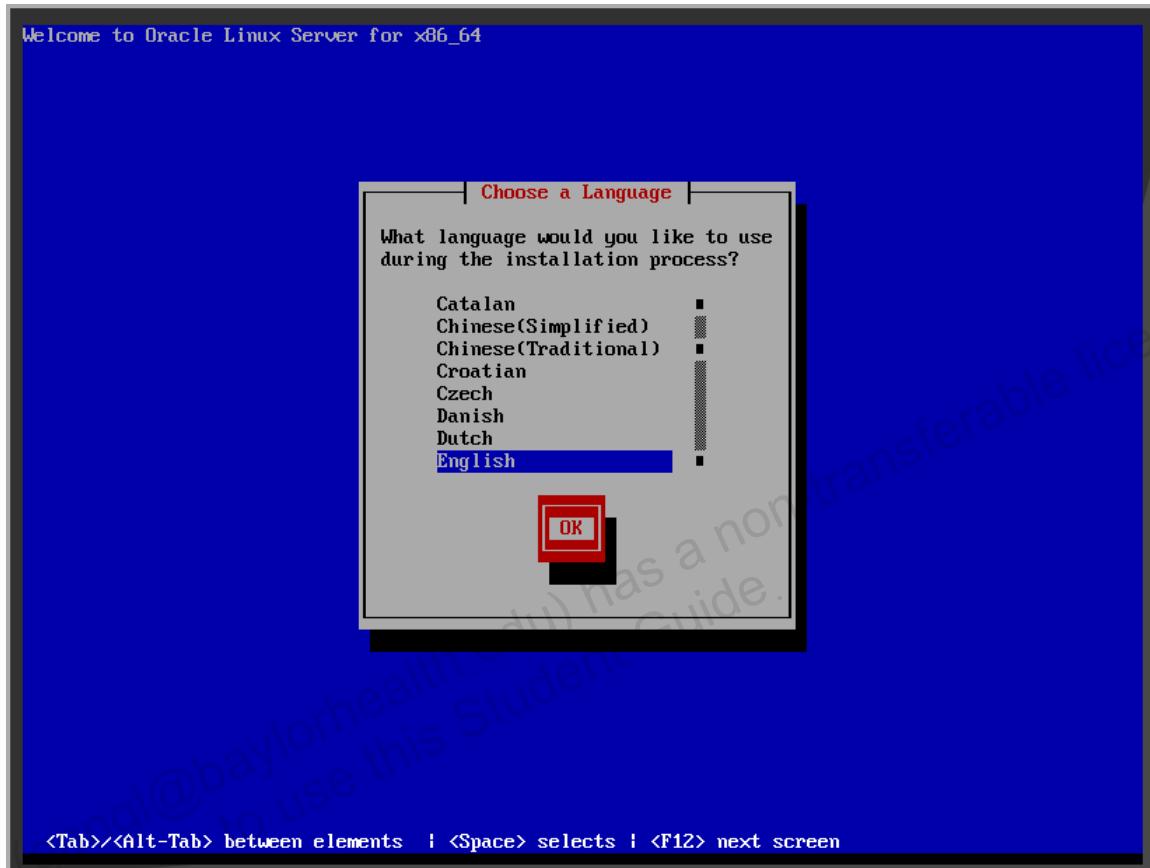
The first part of the installation is driven by the Oracle VM server where the virtual machine is running. The network boot program prompts for information about the location of the exploded ISO file on the network.

The second part of the installation is the installation itself, and takes place over the virtual machine network that is specified in the virtual machine configuration.

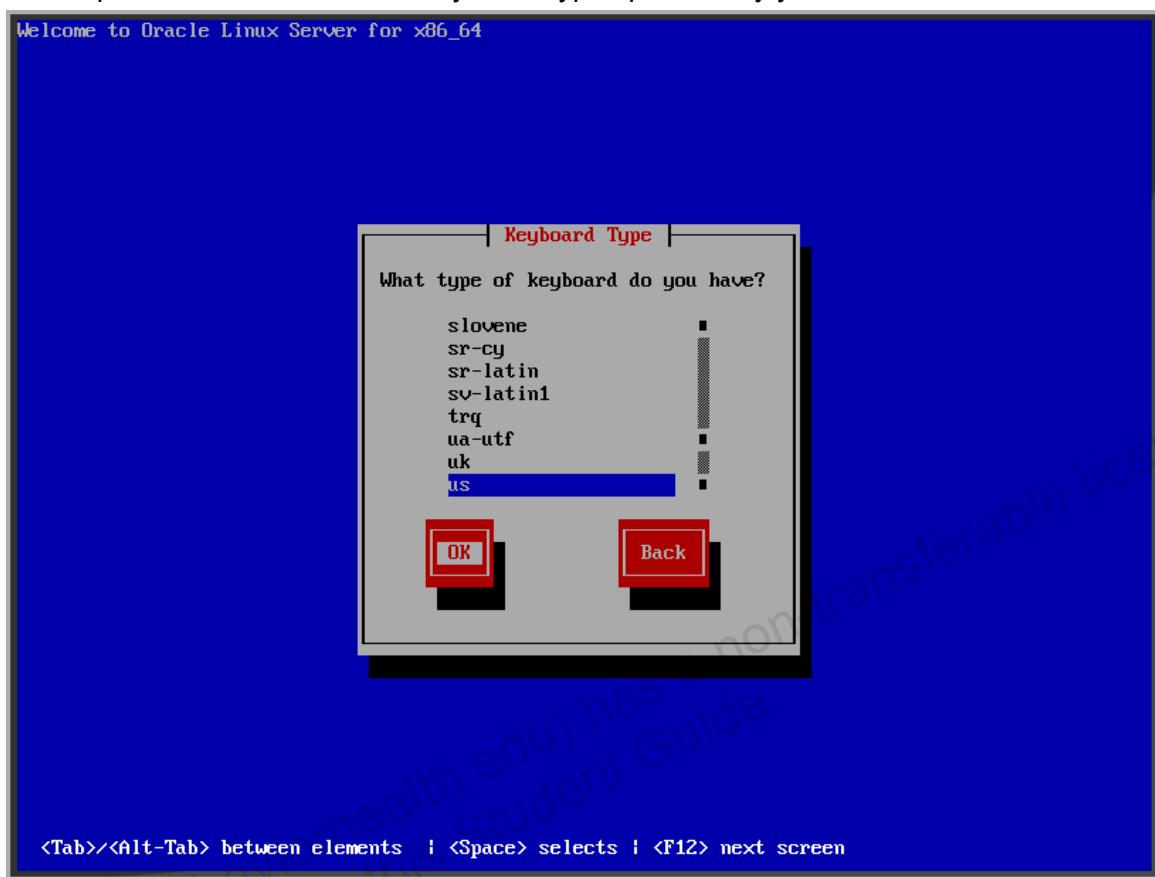
Note: The responses to the various prompts issued during the installation process have been chosen to fit your lab environment and to minimize configuration. The responses suitable for a production environment might differ from those used in this practice.

Tasks

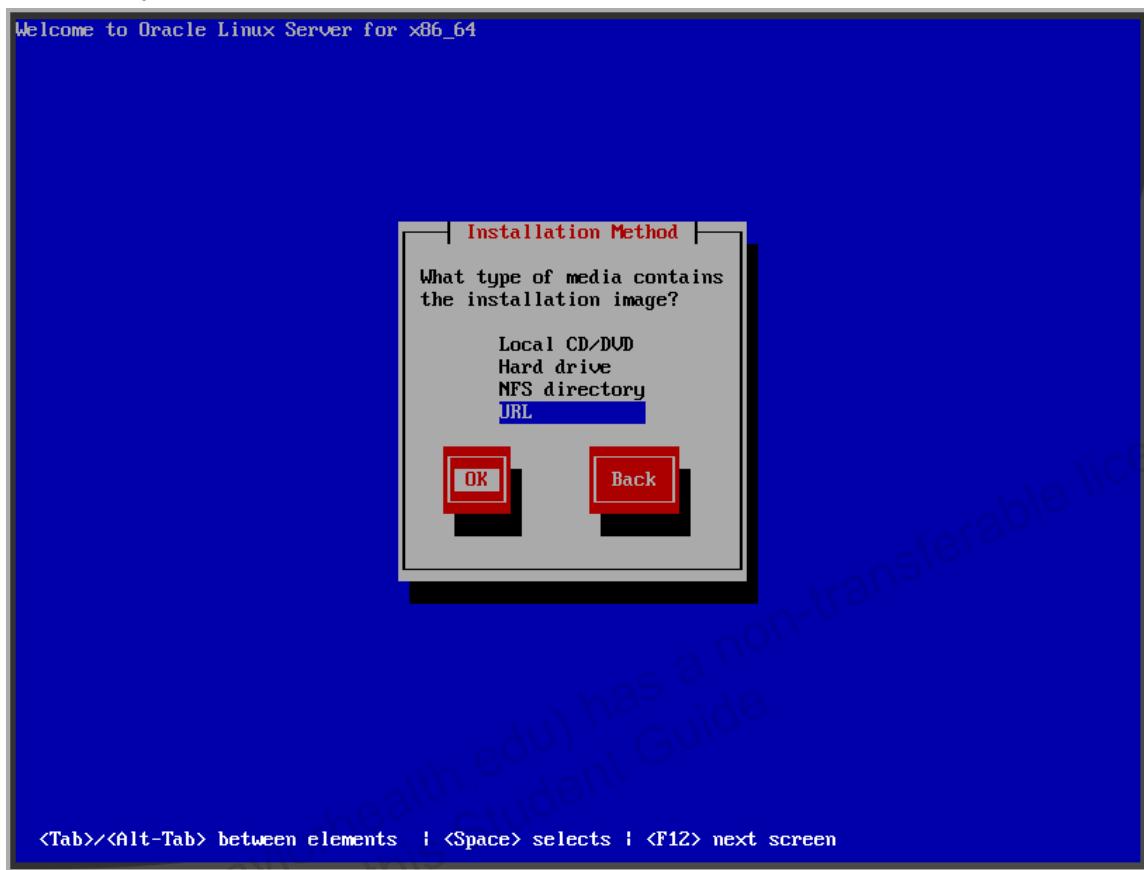
1. Respond to prompts for locating the exploded ISO file and starting the installation.
 - a. On the Choose a Language screen, press the Tab key to select OK and press the Enter key to accept the default.



- b. On the Keyboard Type screen, press the Tab key to select OK and press the Enter key to accept the default, or use the keyboard type specified by your instructor.

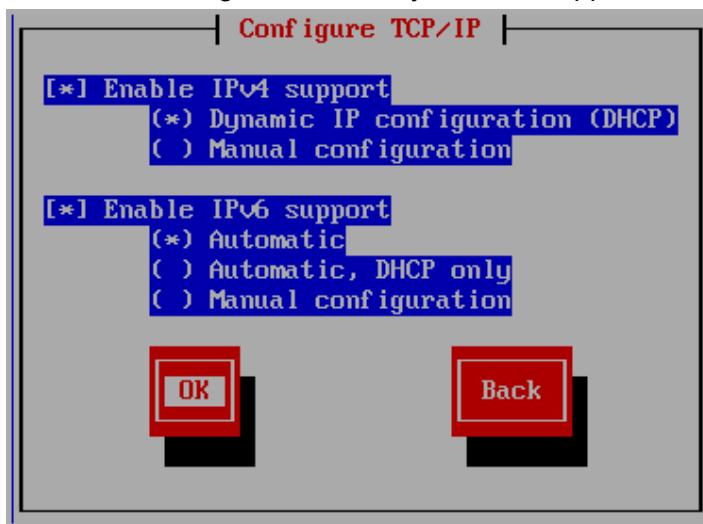


- c. On the Installation Method screen, use the down-arrow key to select URL and press the Tab key to select OK.



Press the Enter key to continue.

- d. On the Configure TCP/IP screen, press the Tab key several times to select OK and accept the defaults.
- Dynamic IP configuration for IPv4 support
 - Automatic neighbor discovery for IPv6 support



Press the Enter key to continue.

The installation program attempts to configure eth0 to facilitate access to the exploded ISO file.

Waiting for NetworkManager to configure eth0.

Warning

If the installation program fails to configure eth0, the failure indicates a problem with the DHCP server that is running on your lab machine.

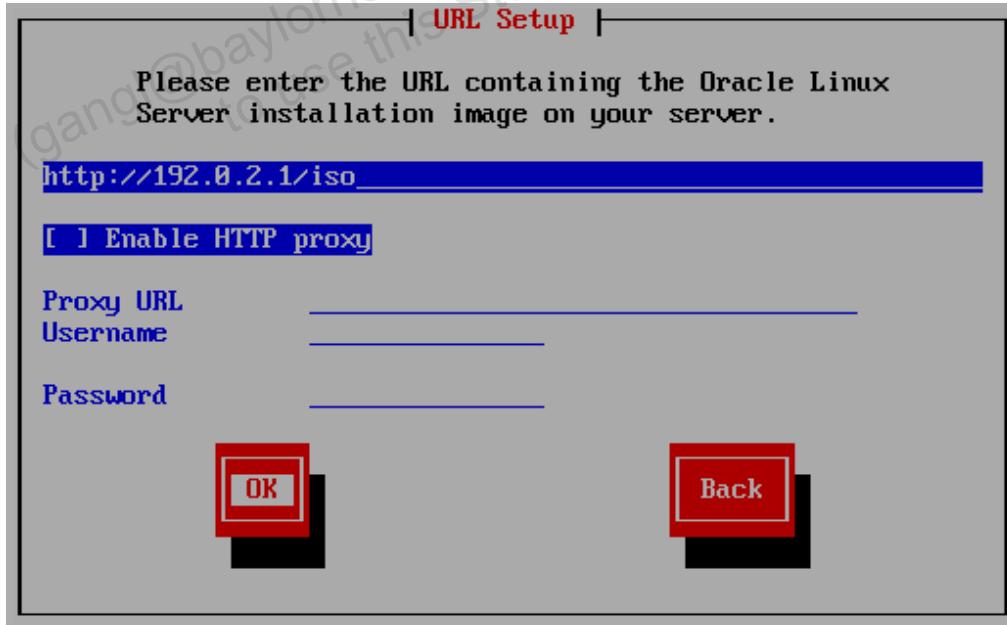
- Click the Retry button to return to the Configure TCP/IP screen.
- From a terminal session on your lab machine (not in the ovmmgr01.example.com host), restart the dhcpcd service.

```
[root@<your lab machine> ~]# service dhcpcd restart
Shutting down dhcpcd:                                [  OK  ]
Starting dhcpcd:                                     [  OK  ]
[root@<your lab machine> ~]#
```

- On the Configure TCP/IP installation screen, press the Tab key several times to select OK and press the Enter key to continue.

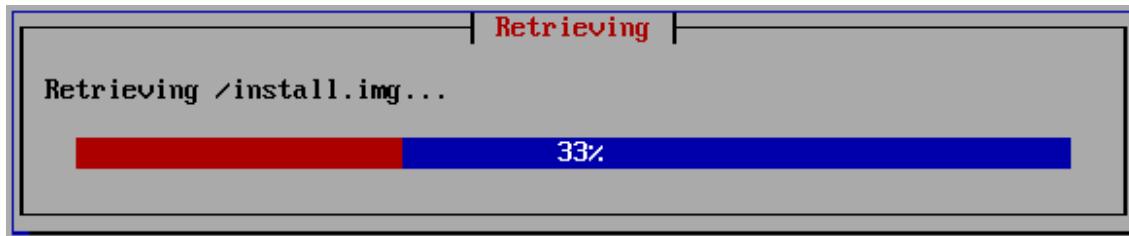
The TCP/IP configuration proceeds.

- On the URL Setup screen, provide information for locating the web server (192.0.2.1), and the directory where the exploded ISO is mounted (iso), if it is not mounted to the root directory of the web server.

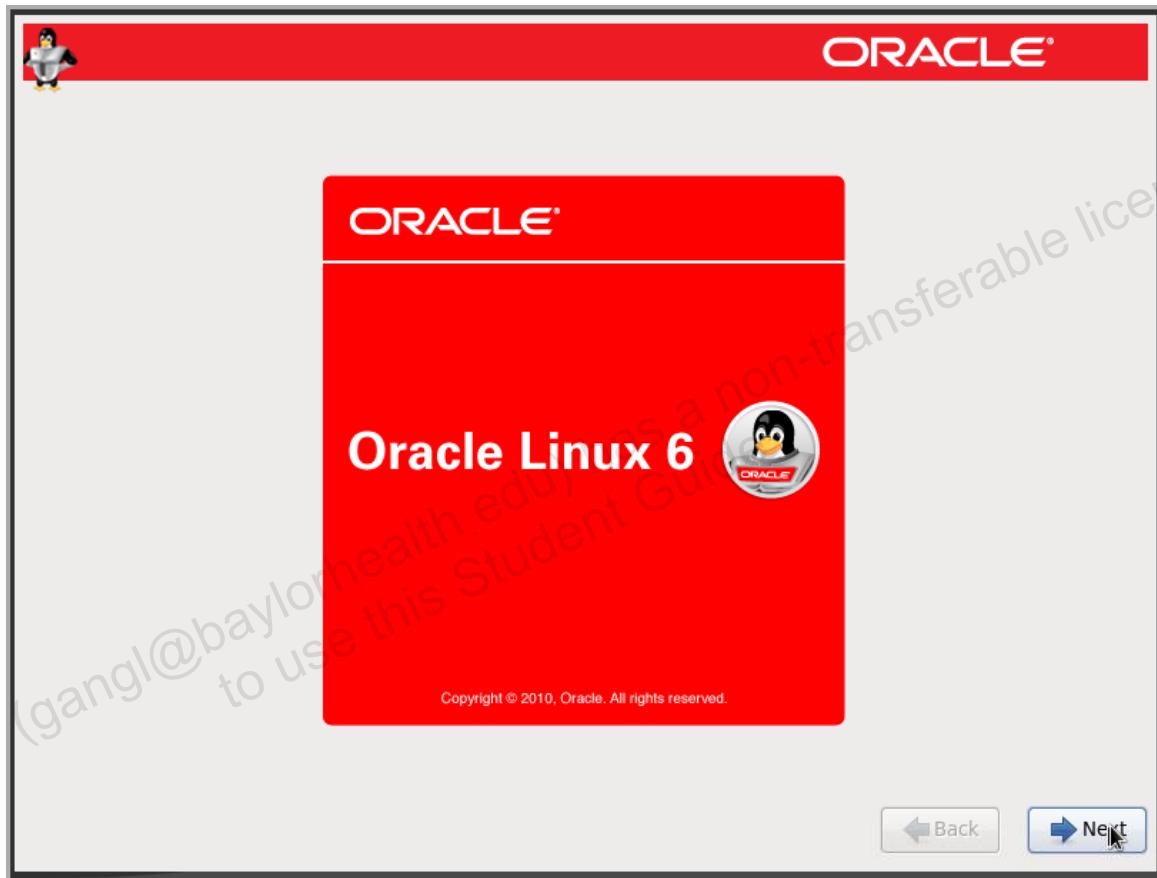


After entering the information, press the Tab key to select OK and press the Enter key to continue.

The network boot program retrieves the boot files for the installation.

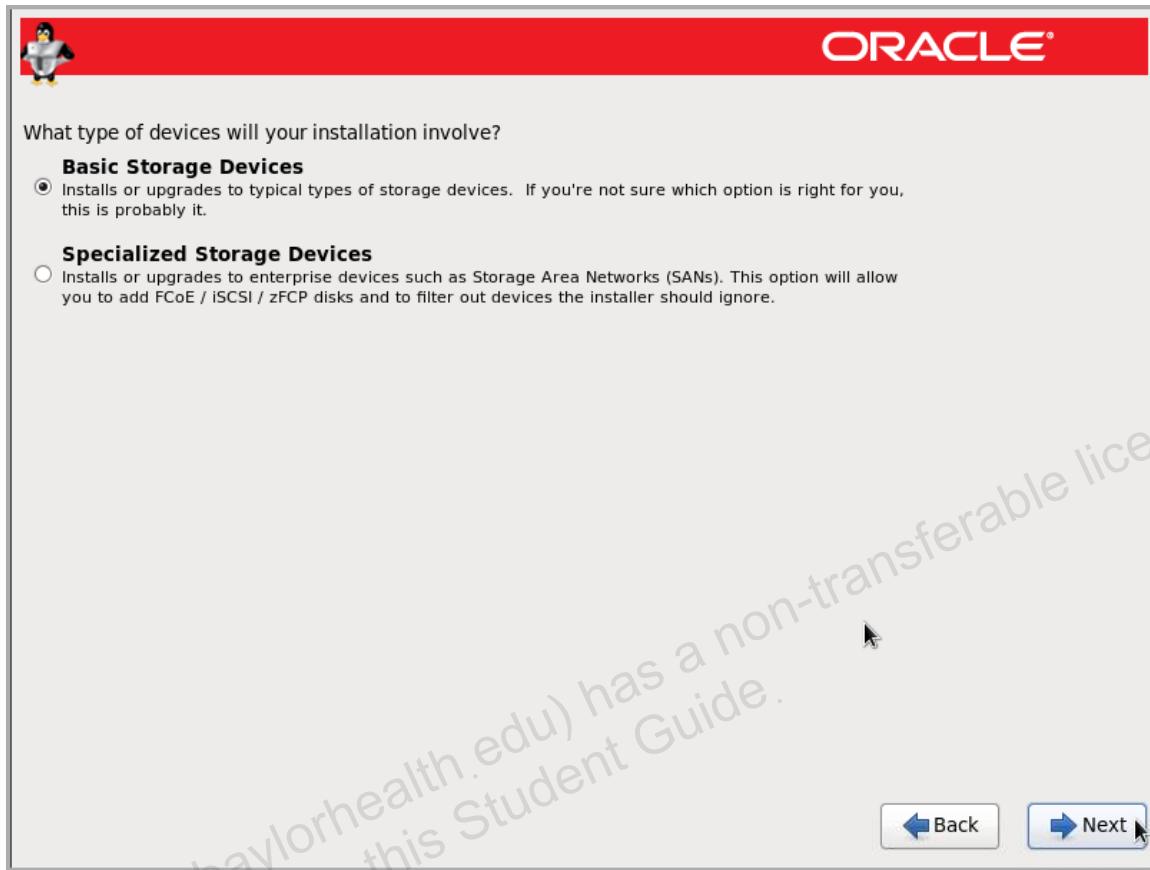


The installation begins.



- f. Click Next to start the installation.

2. Proceed with the installation of Oracle Linux 6 Update 5 in your virtual machine.
 - a. In the first window for the installation, select the Basic Storage Devices option button.



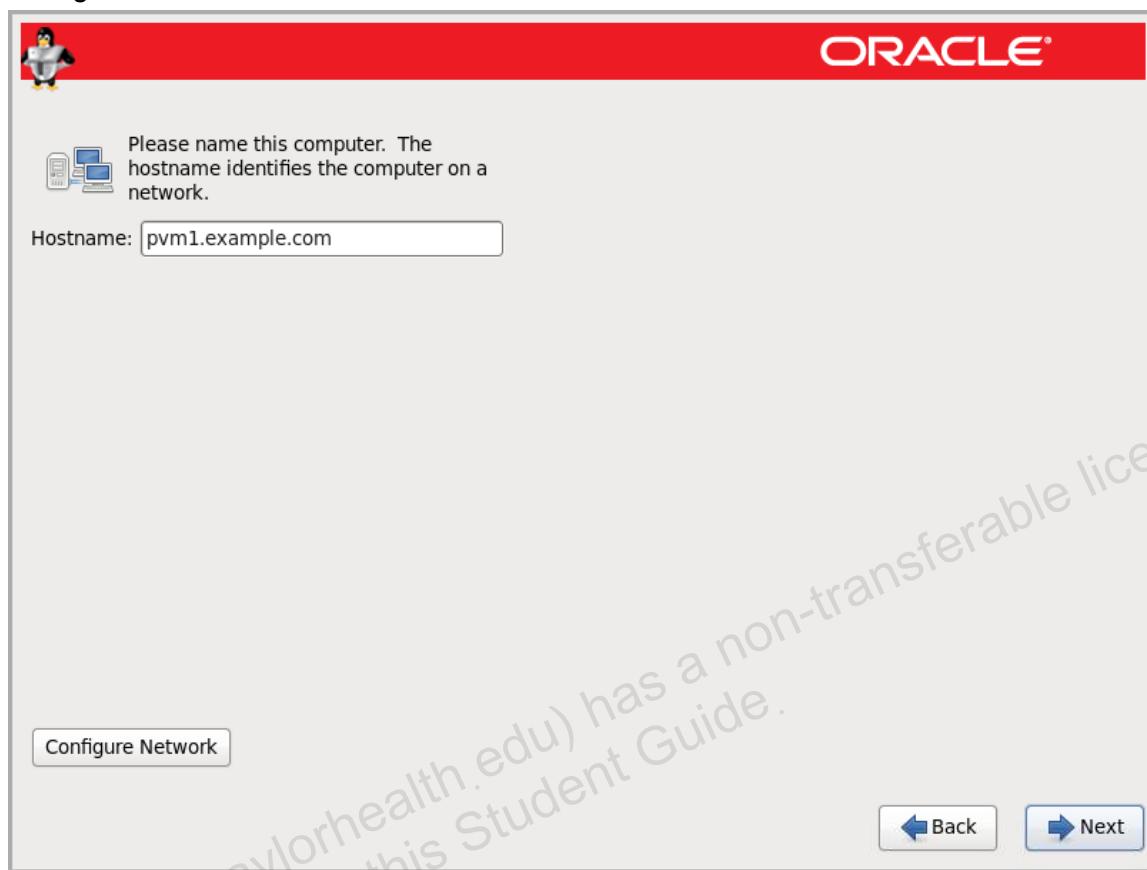
Click Next to continue.

- b. In the Warning dialog box about storage devices that might contain data, click the “Yes, discard any data” button to initialize the drives.



Click Next to continue.

- c. In the next window, name your computer as pvm1.example.com and click the Configure Network button.

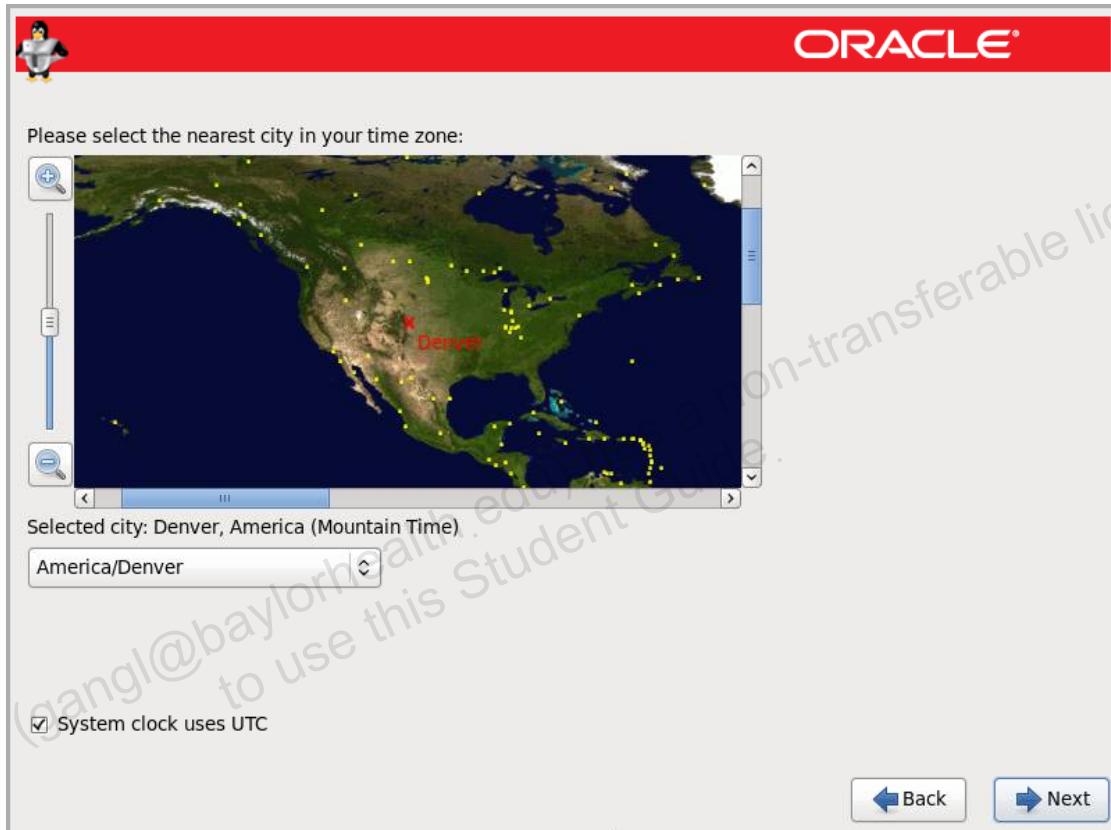


- d. In the Network Connections window, highlight eth0 and click Edit.



- Verify that the “Connect automatically” check box is selected.
- Note that the MAC address is part of the range of MAC addresses that you reserved earlier.

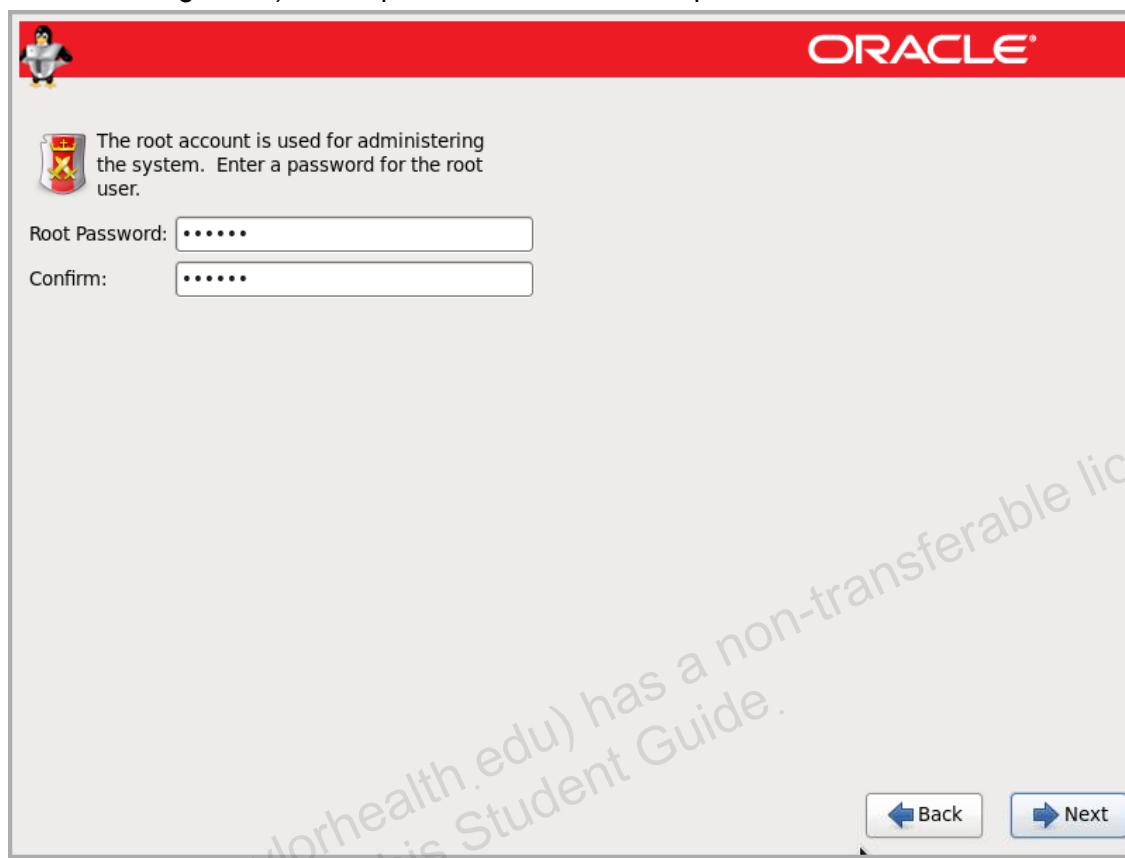
- Click the IPv4 Settings tab.
 - Verify that the Method field is set to Automatic (DHCP).
 - Click the Apply button.
- e. Back in the Network Connections window, click the Close button.
- f. Click Next to continue.
- g. In the time zone selection window, select a time zone by clicking a location on the map or select the time zone from the drop-down list. In the following example, America/Denver is selected on the map:



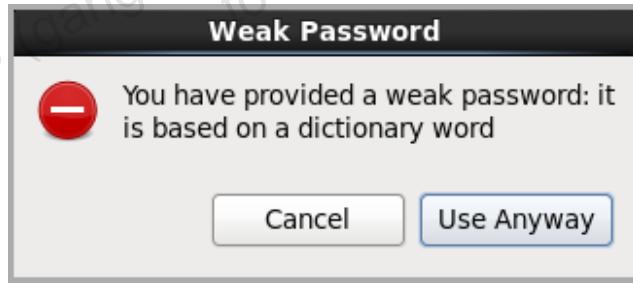
Make sure that the “System clock uses UTC” check box is selected.

Click Next to continue.

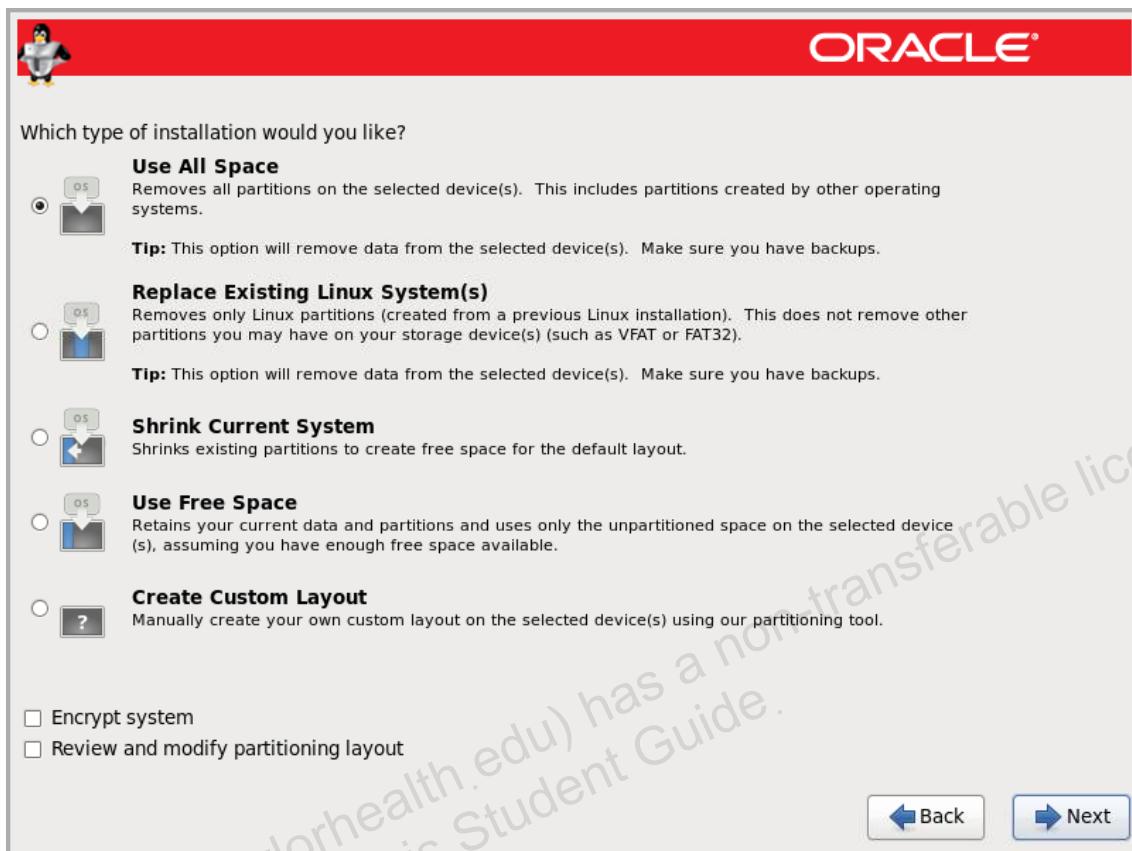
- h. In the window to set the password for the root user, enter 0racle (where the first letter is the digit zero) as the password. Re-enter the password and click Next.



- i. Click the Use Anyway button in the Weak Password dialog box to accept the password.

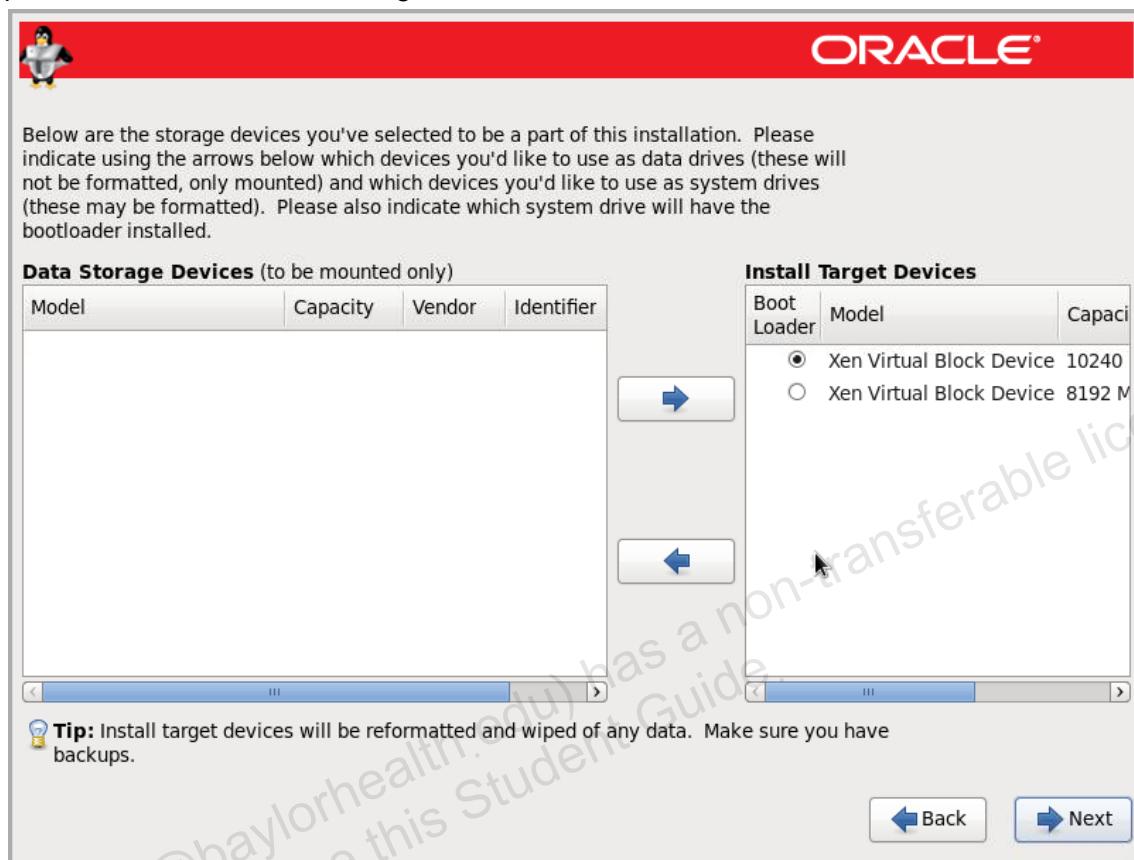


- j. In the next window, select the type of installation to use by clicking the Use All Space option button.



Click Next to continue.

- k. In the next window, select both virtual disks to be used as target devices during the installation. Select each device and click the right arrow to move the device to the right pane, as shown in the following screenshot:



The first device, the 10 GiB virtual disk, is automatically selected as the device where the boot loader is installed. Click Next to continue.

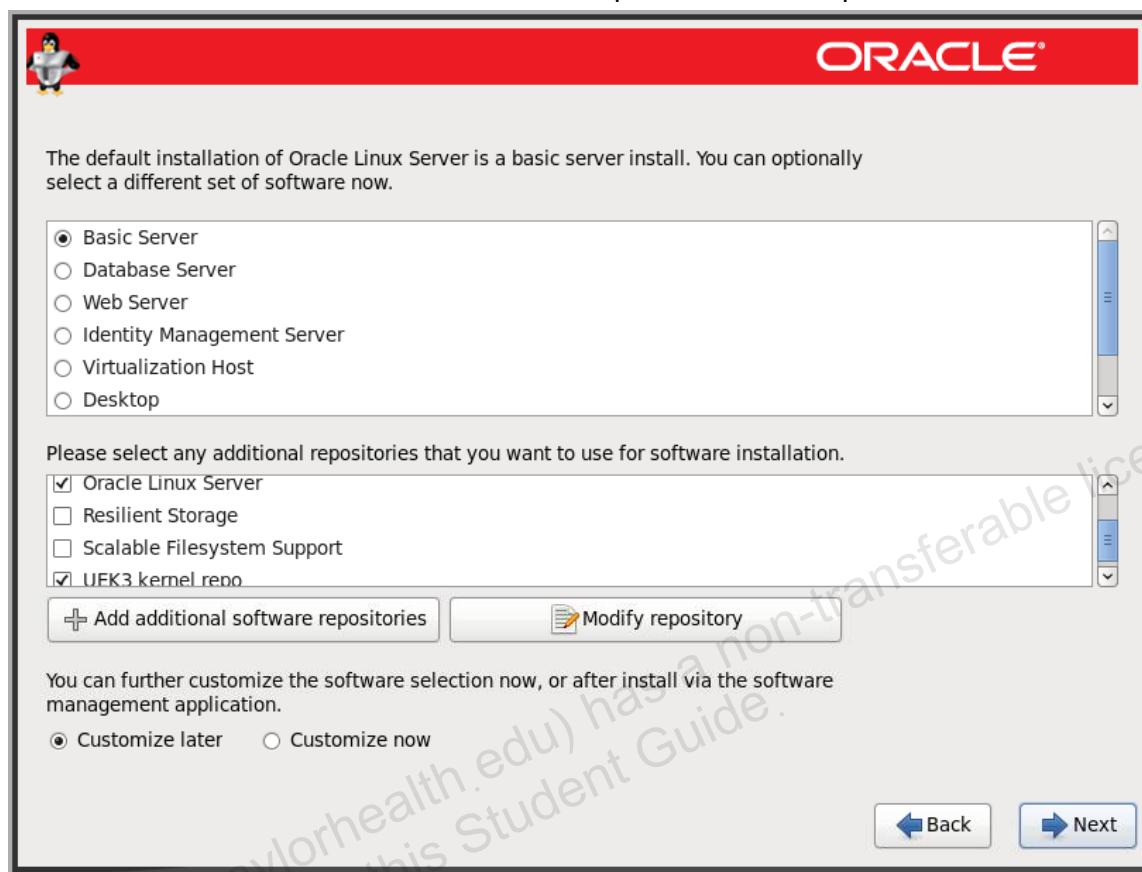
- l. In the “Writing storage configuration to disk” dialog box, click “Write changes to disk” to allow the partitioning layout to be written to disk.



The installation formats the devices to be used during the installation.



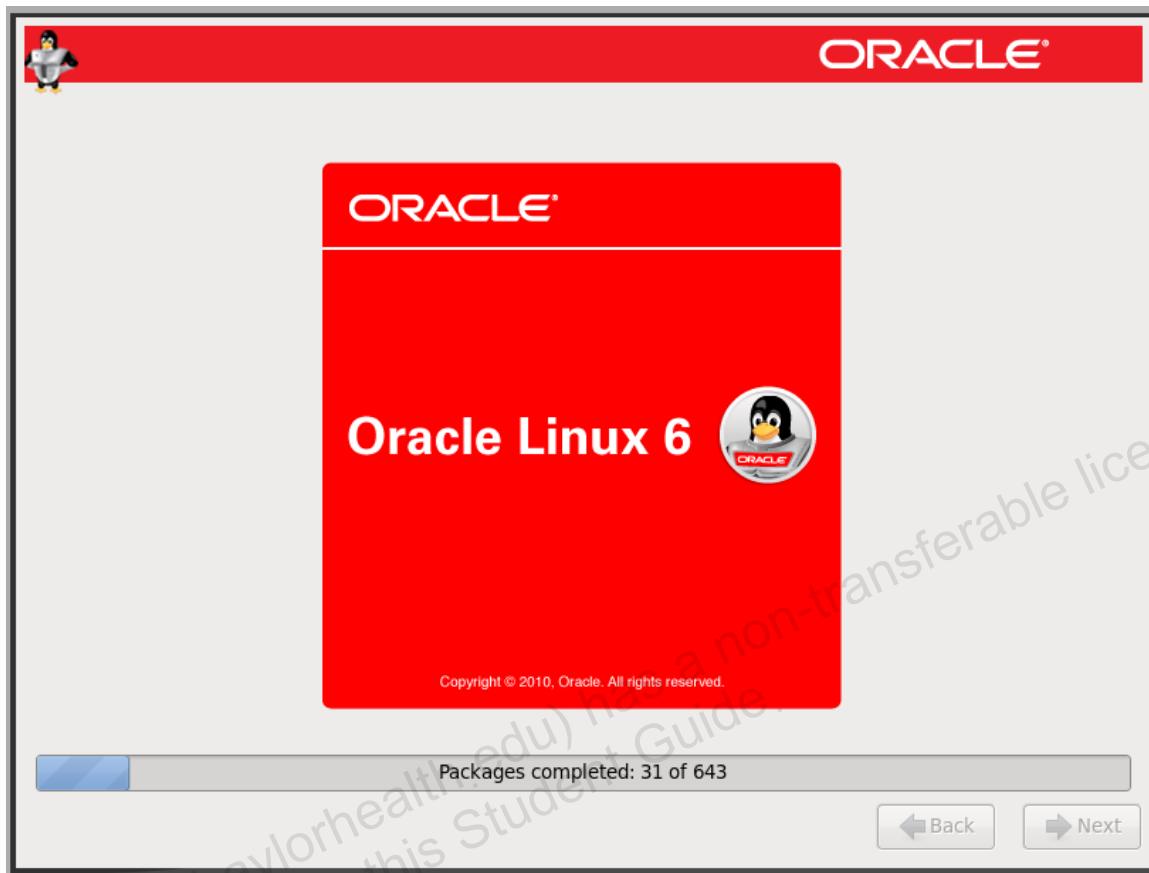
- m. In the software selection window, accept the selection of Basic Server in the top pane, and “Oracle Linux Server” and “UEK3 kernel repo” in the bottom pane.



Leave the “Customize later” option button selected.

Click Next to continue.

The installation program checks for dependencies in the packages that are selected for this installation and the installation proceeds.



Note

- The package installation takes a long time to complete. You are not expected to complete this installation.
- Read the information in the following section “When the Installation Completes,” and then proceed with task 3.

When the Installation Completes

After the last package is installed, there is a long pause, which can last up to 20 minutes, before the final screen appears. The entire installation takes over one hour.

At the end of the installation process, the program prompts for a reboot.



You perform the following steps to prepare the virtual machine for reboot:

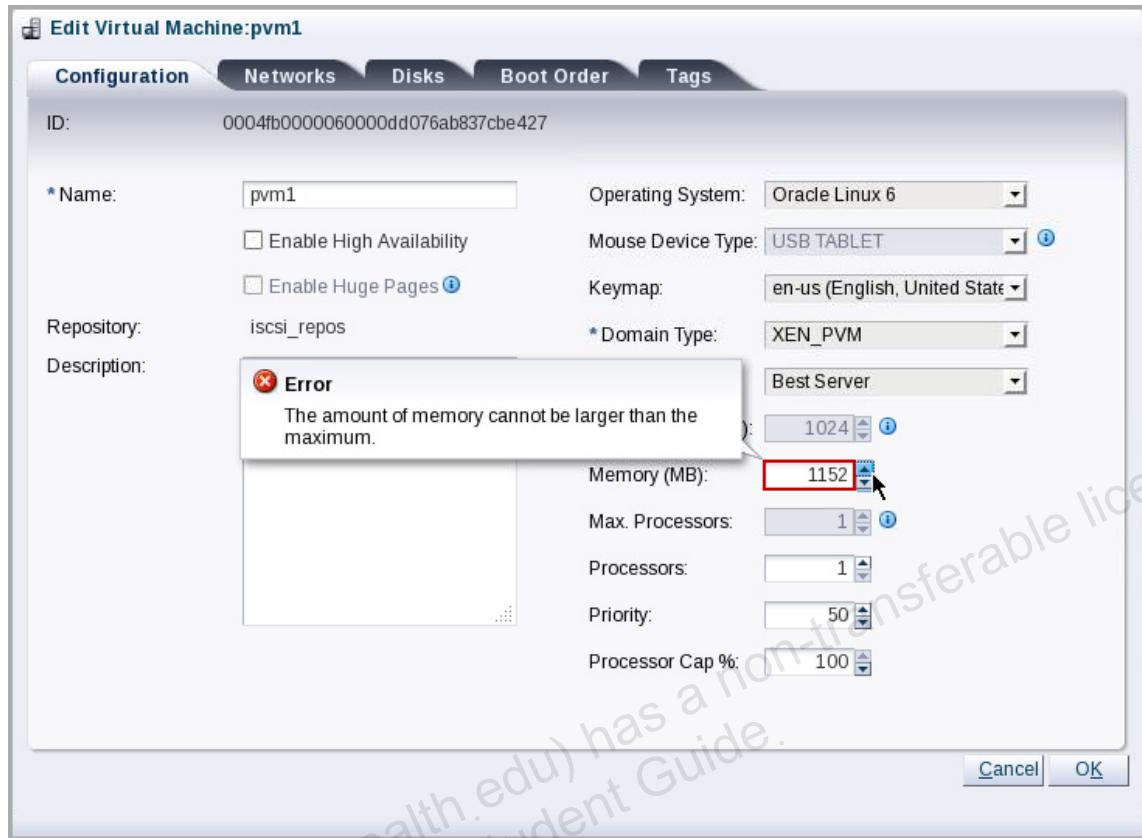
- Stop the virtual machine from the Oracle VM Manager UI.
- Edit the virtual machine and change the boot option from PXE to Disk.
- Restart the virtual machine.

The virtual machine boots from its boot disk and you can log in to your newly installed OS.

Note: Just rebooting the virtual machine does not change the boot device to disk (from PXE). You must stop the virtual machine to use the newly updated boot device in the virtual machine configuration.

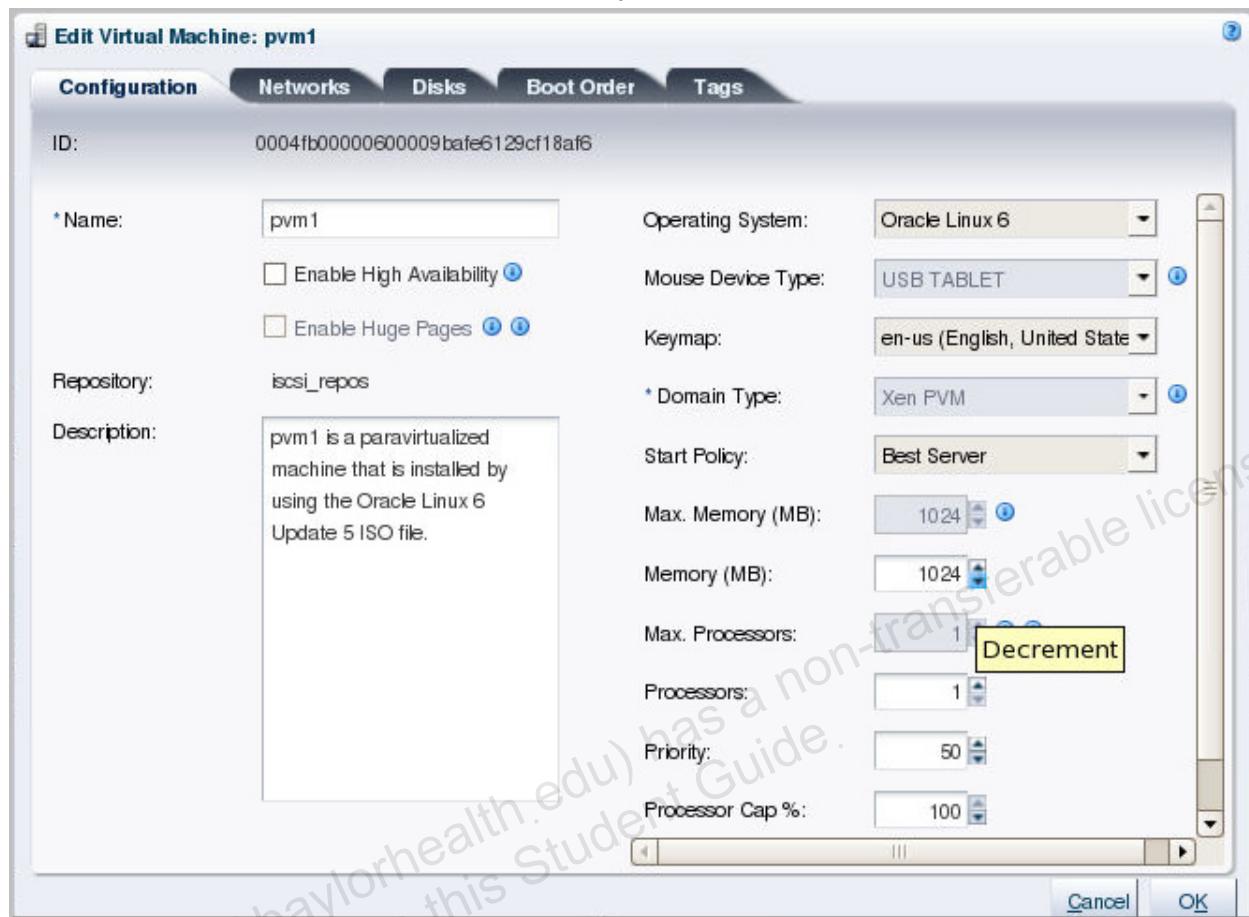
3. At this point, the installation process is still running in your pvm1 virtual machine. In this task, you attempt several types of modifications to your running virtual machine.
 - a. In the Oracle VM Manager UI, from the Virtual Machines perspective, locate the pvm1 virtual machine in the management pane, select it, and click the Edit Virtual Machine icon.

- b. On the Configuration tab, use the Memory increment button to increase the memory.

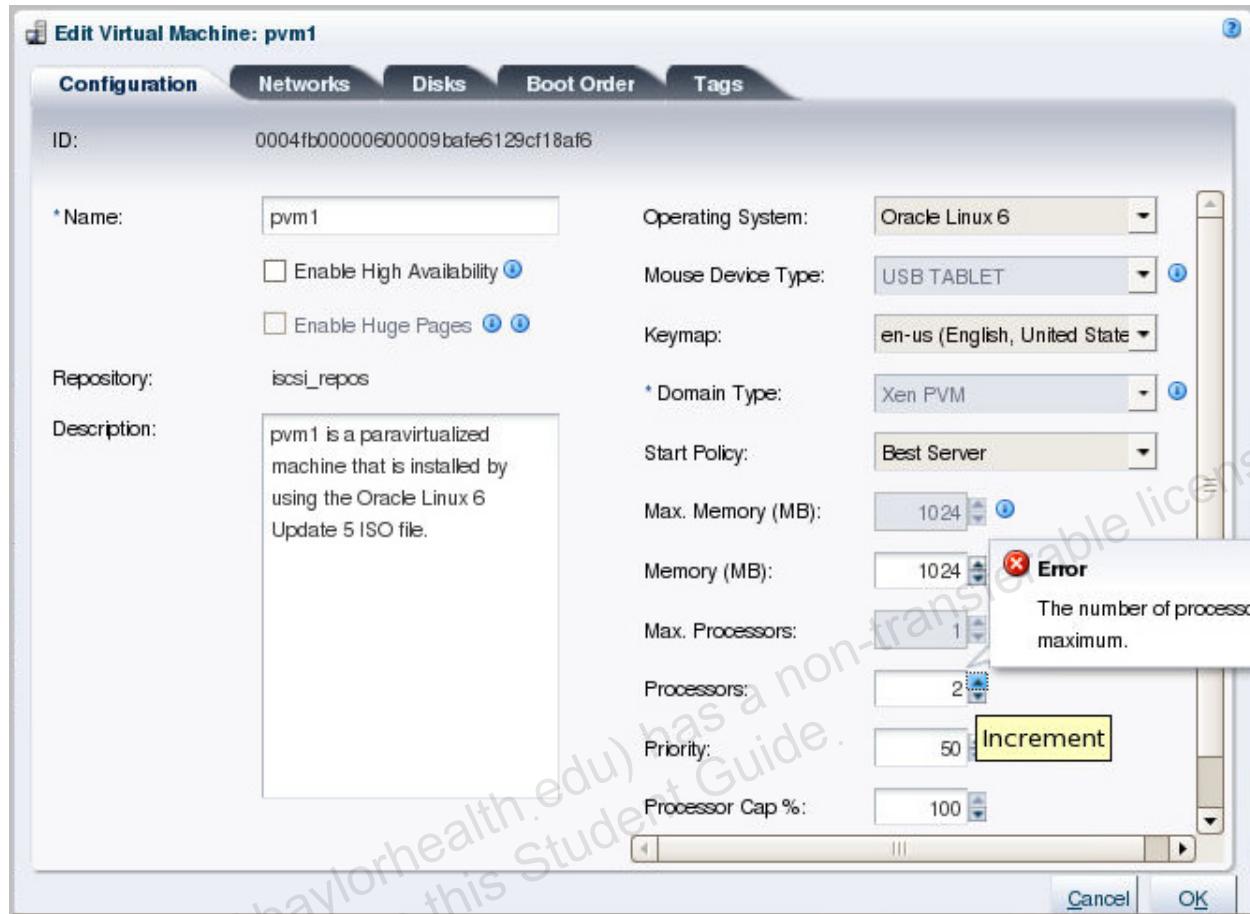


An error message appears: You cannot set memory higher than the set maximum memory.

- c. Click the decrement button to reset memory to 1024.



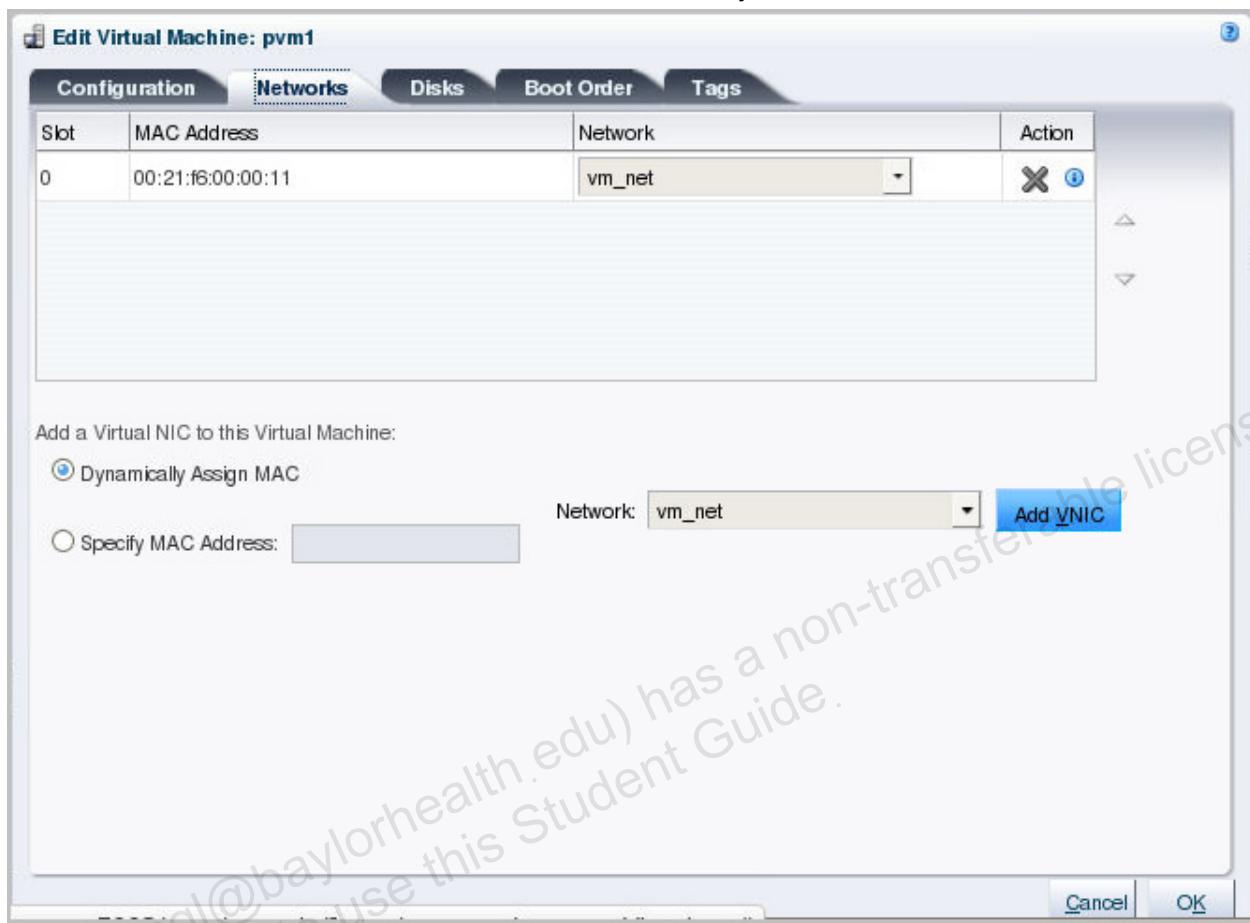
- d. Using the increment button, increase the number of Processors to 2.



An error message appears: The number of processors cannot be larger than the maximum.

Reset the number of processors to 1.

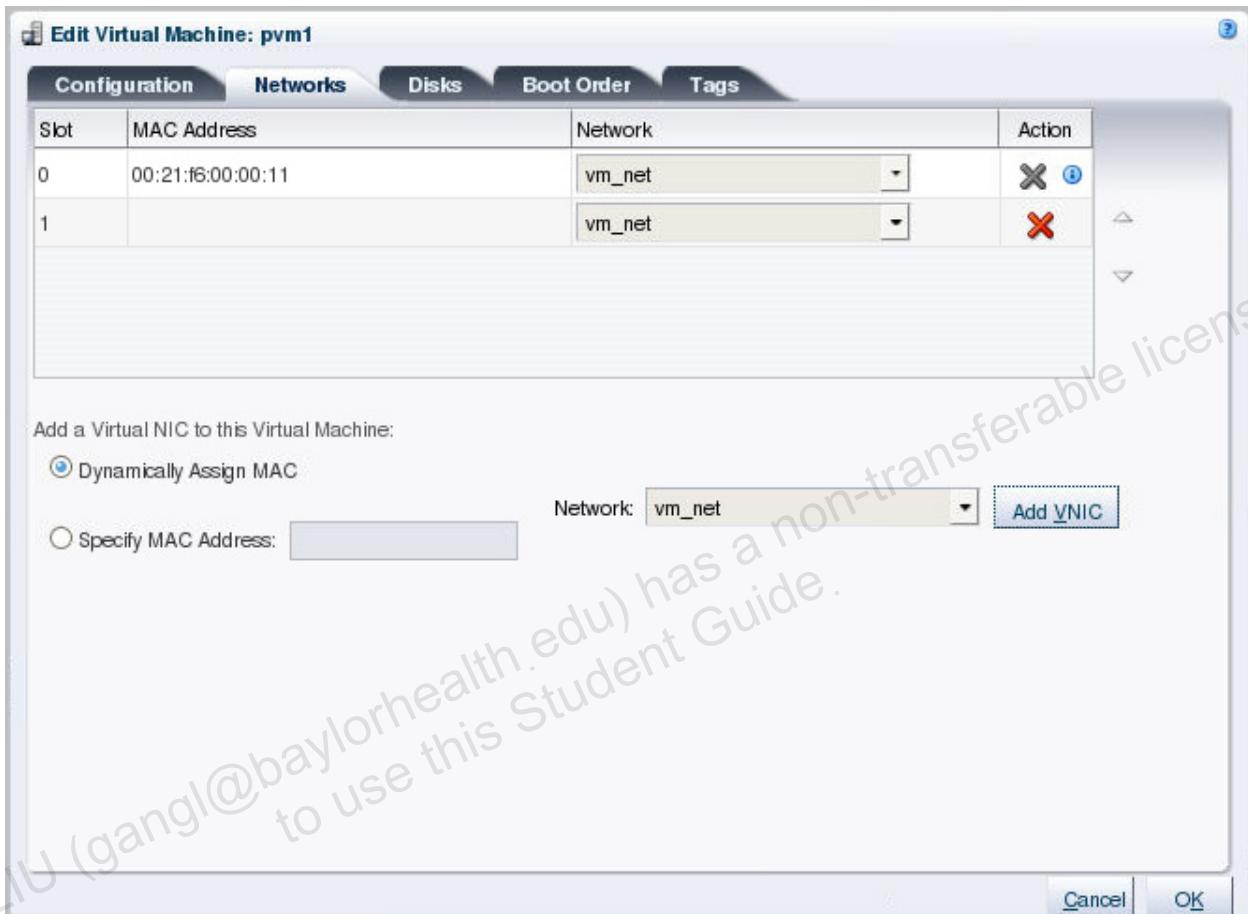
- e. Continue with the edit function by clicking the Networks tab.
Click the Add VNIC button to add a second VNIC to your virtual machine.



The second VNIC appears in the list of VNICs for the virtual machine. Its MAC address has not yet been assigned.

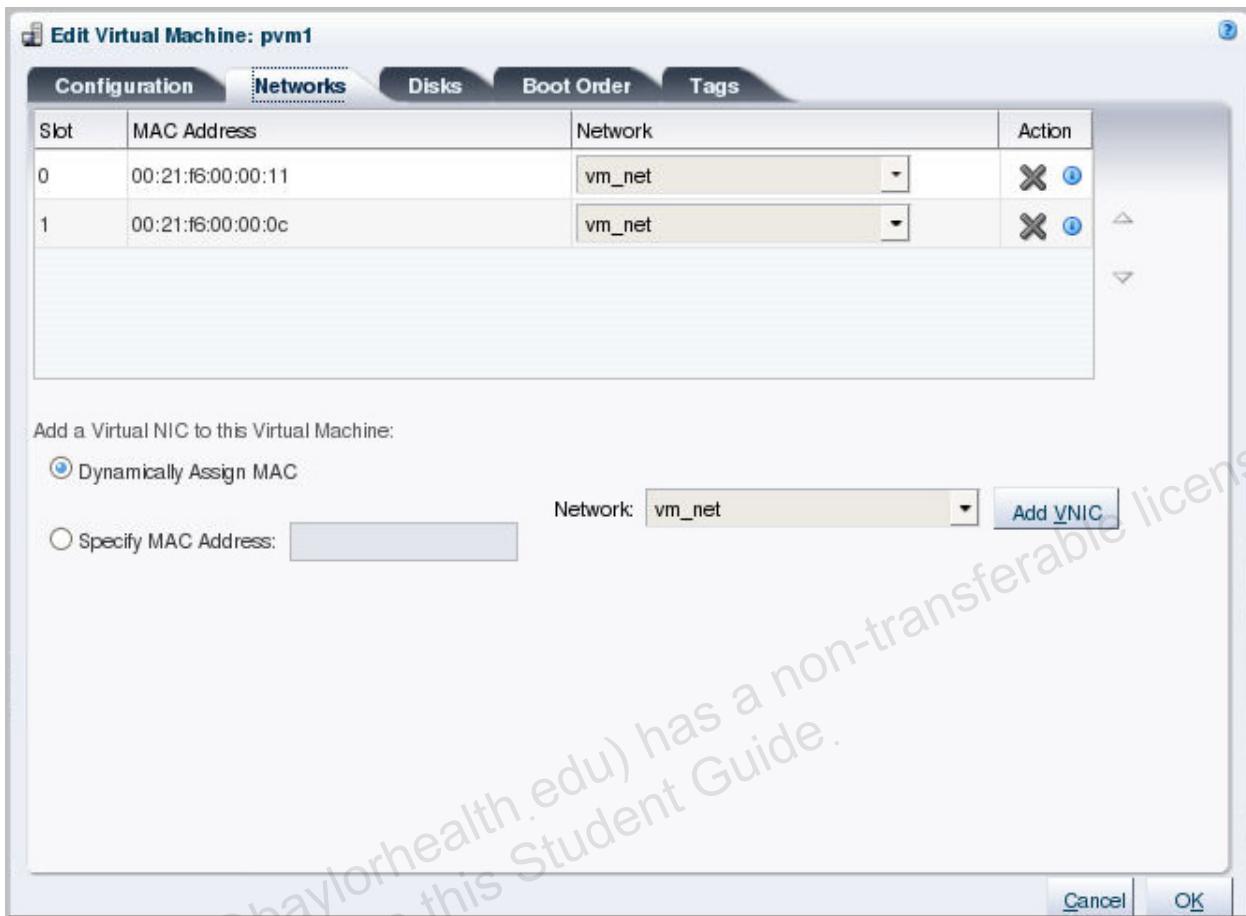
Note that the Delete icon is active for the new VNIC. At this point, you can remove the new VNIC that you just added to your virtual machine configuration.

Do not remove the new VNIC at this time.



Click OK to complete the addition of the new VNIC to your pvm1 virtual machine.

- f. Restart the edit function for the pvm1 virtual machine and click the Networks tab.

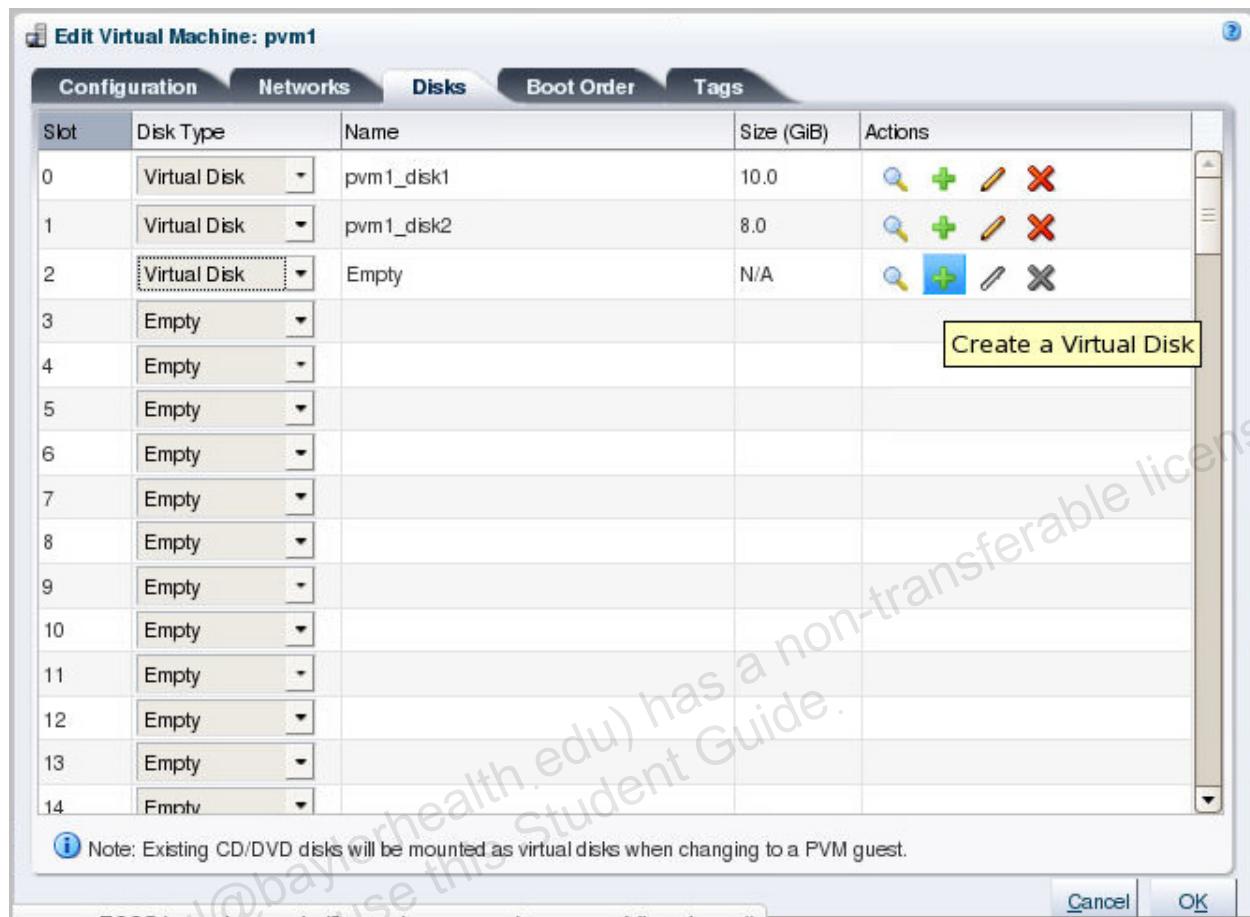


The Delete action for both VNICs is now inactive.

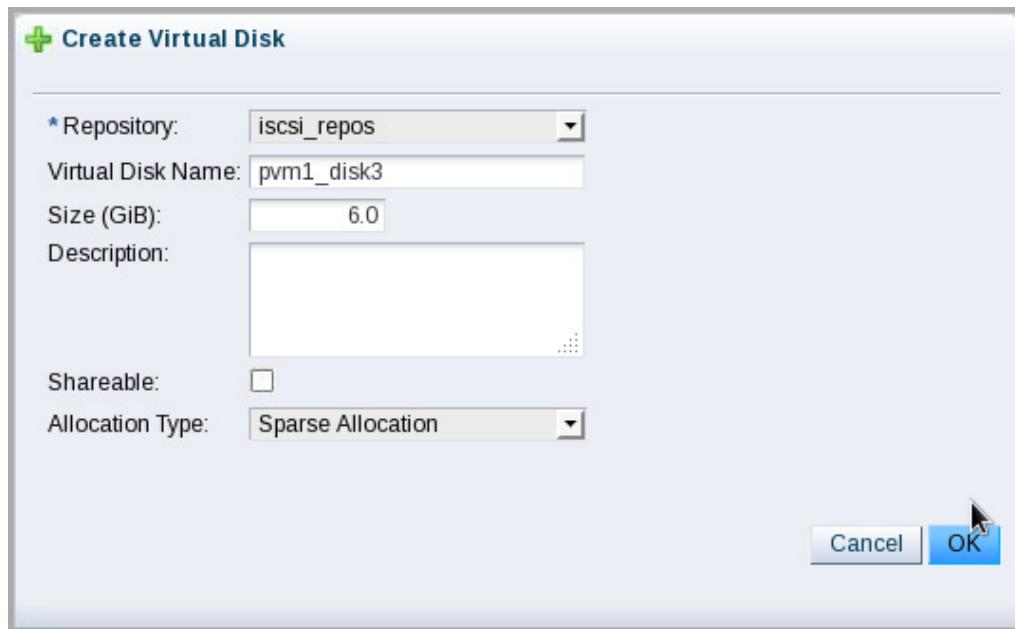
You can hot-add a VNIC to your virtual machine, but you cannot remove an already configured VNIC after it has been committed to the configuration.

- g. Click the Disks tab.

- h. On the Disks tab, select Virtual Disk from the Disk Type drop-down list for slot 2 and click the Create a Virtual Disk icon.

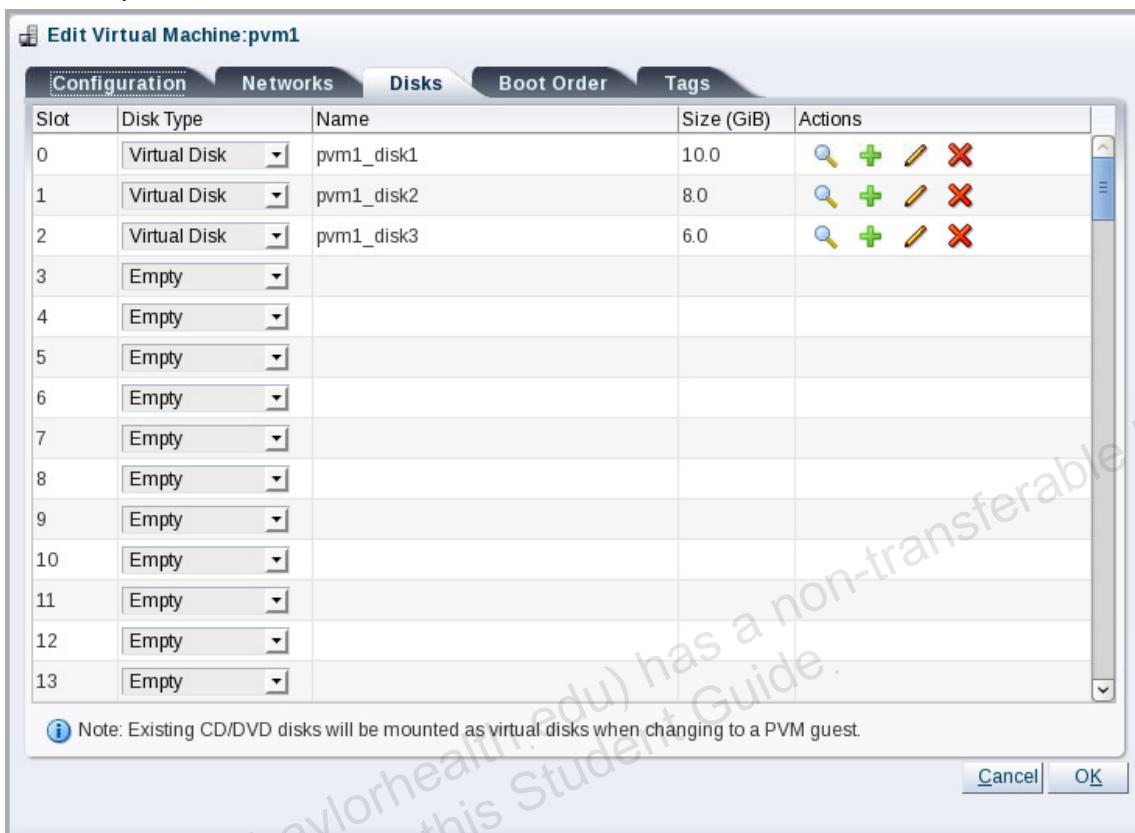


- i. In the Repository window, select `iscsi_repos` from the drop-down list.
j. In the Create Virtual Disk window, enter a name for the new virtual disk (for example, `pvm1_disk3`) and a size of 6 GiB.

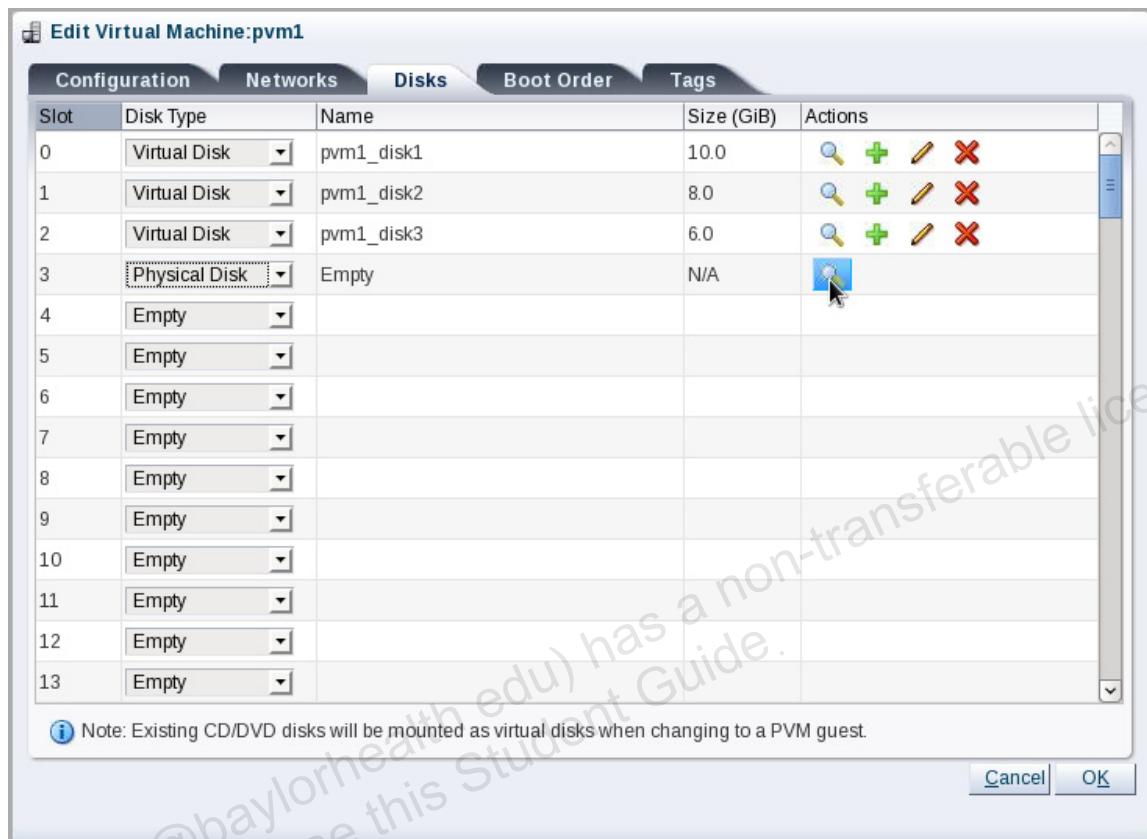


Click OK to create the virtual disk for the running virtual machine pvm1.

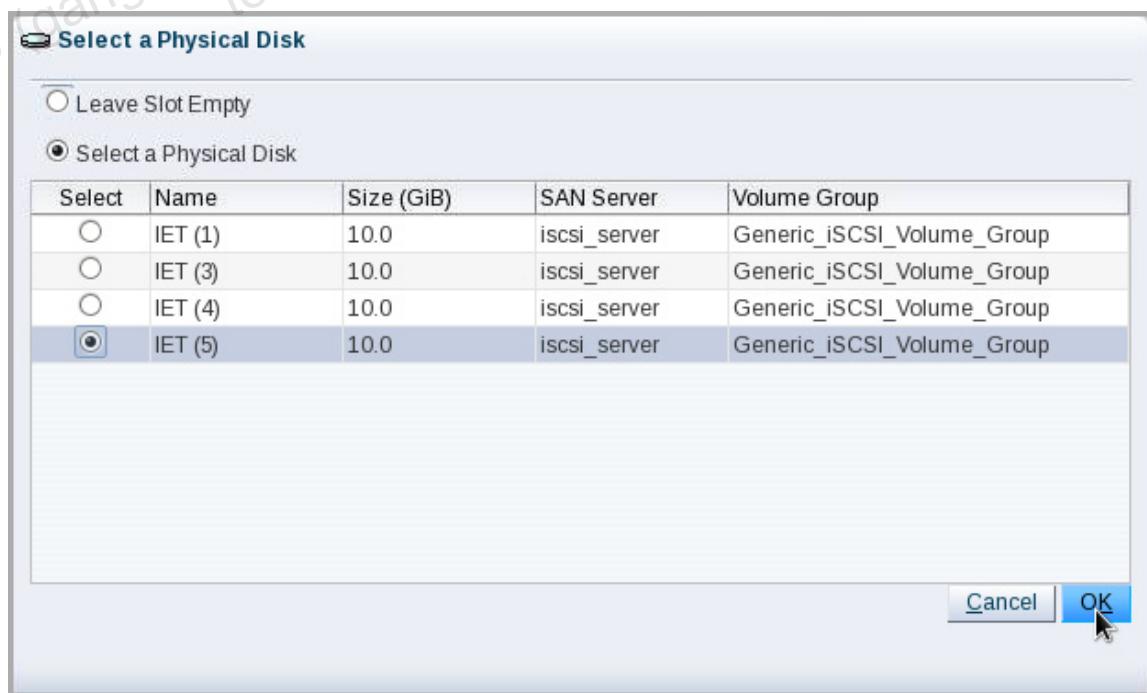
You are returned to the Disks tab in the Edit Virtual Machine Wizard. The new disk occupies slot 2.



- k. Add a physical disk to pvm1:
- Select Physical Disk from the Disk Type drop-down list for slot 3.
 - Click the search icon to locate the physical disk and add it to the configuration of pvm1.



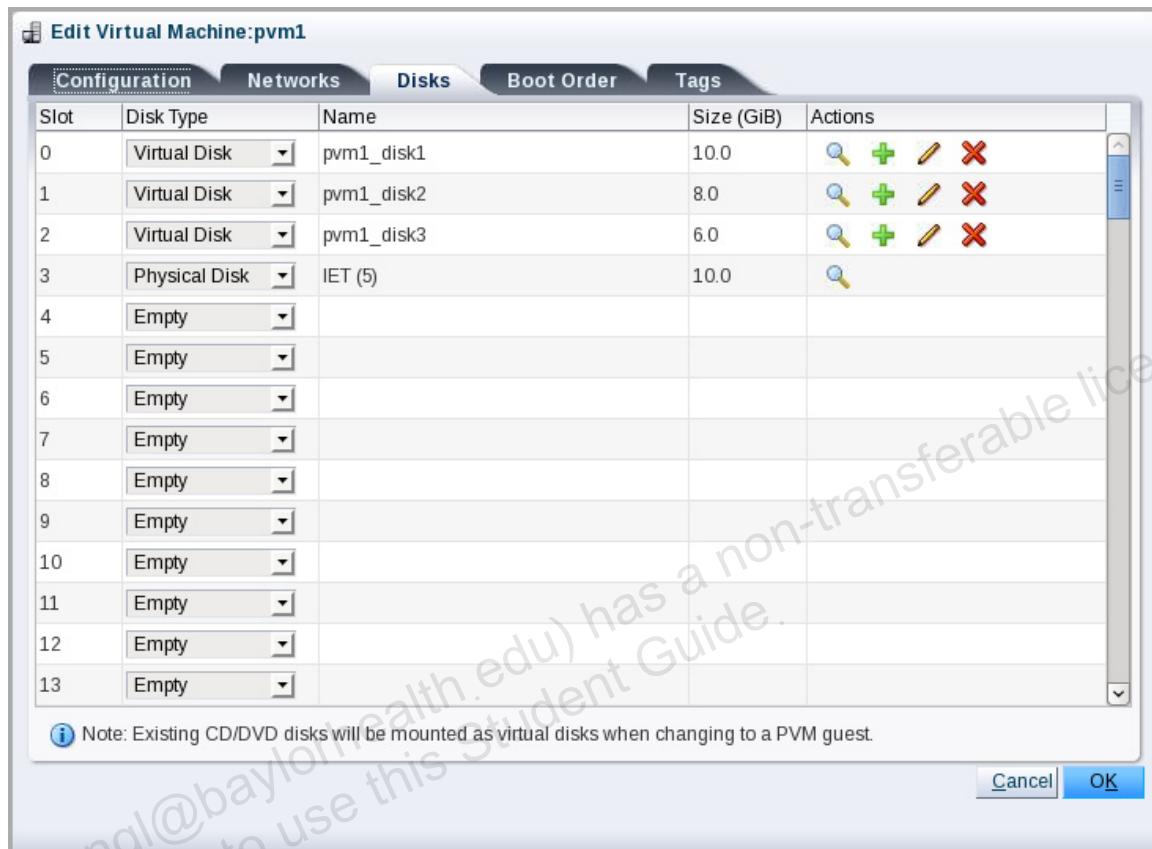
- l. Select IET (5) and click OK.



Recall that IET (5) is one of the six LUNs offered by the iSCSI server on your lab machine.

The new disk is in slot 3.

- Trigger the changes to the disk configuration for pvm1 by clicking the OK button.



Wait until the jobs related to adding the new disks to pvm1 complete successfully.

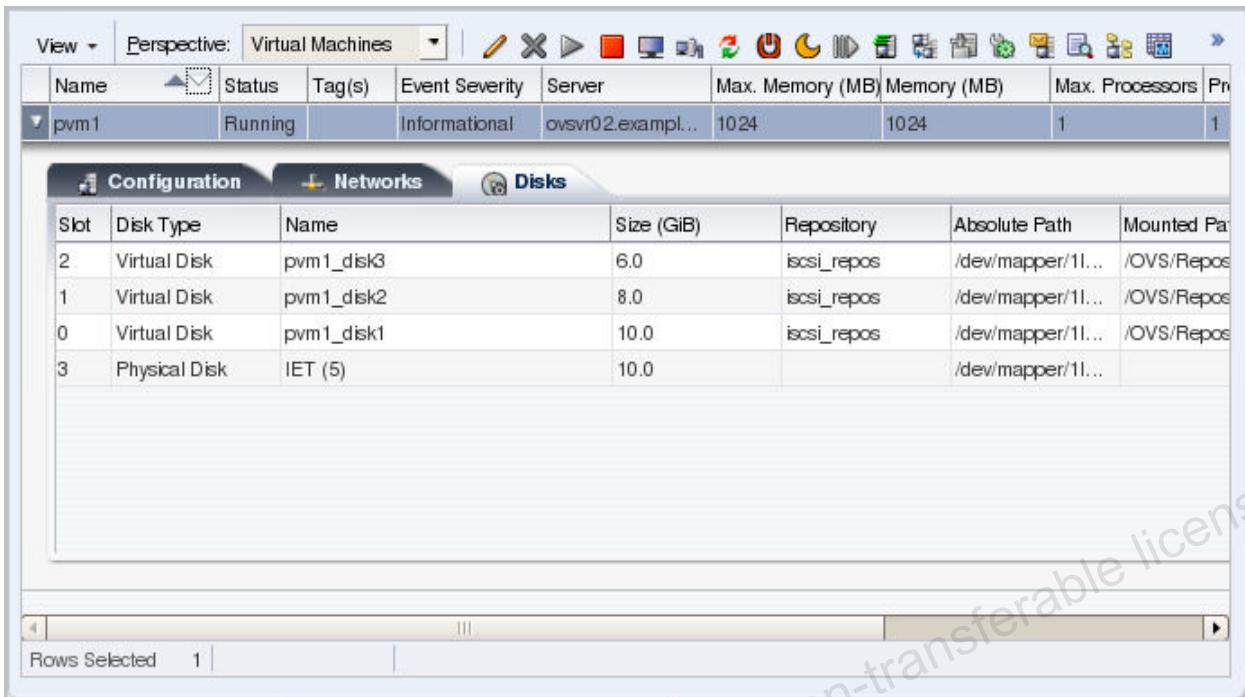
Job Summary:							
Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Create VM Disk Mapping on VM: pvm1	Success			Apr 03, 2016 3:22:57 am	17s	Abort	Details
Create VM Disk Mapping on VM: pvm1	Success			Apr 03, 2016 3:22:30 am	24s	Abort	Details

Note that even if the edit operation fails, the job to create the virtual disk pvm1_disk3 completes independently.

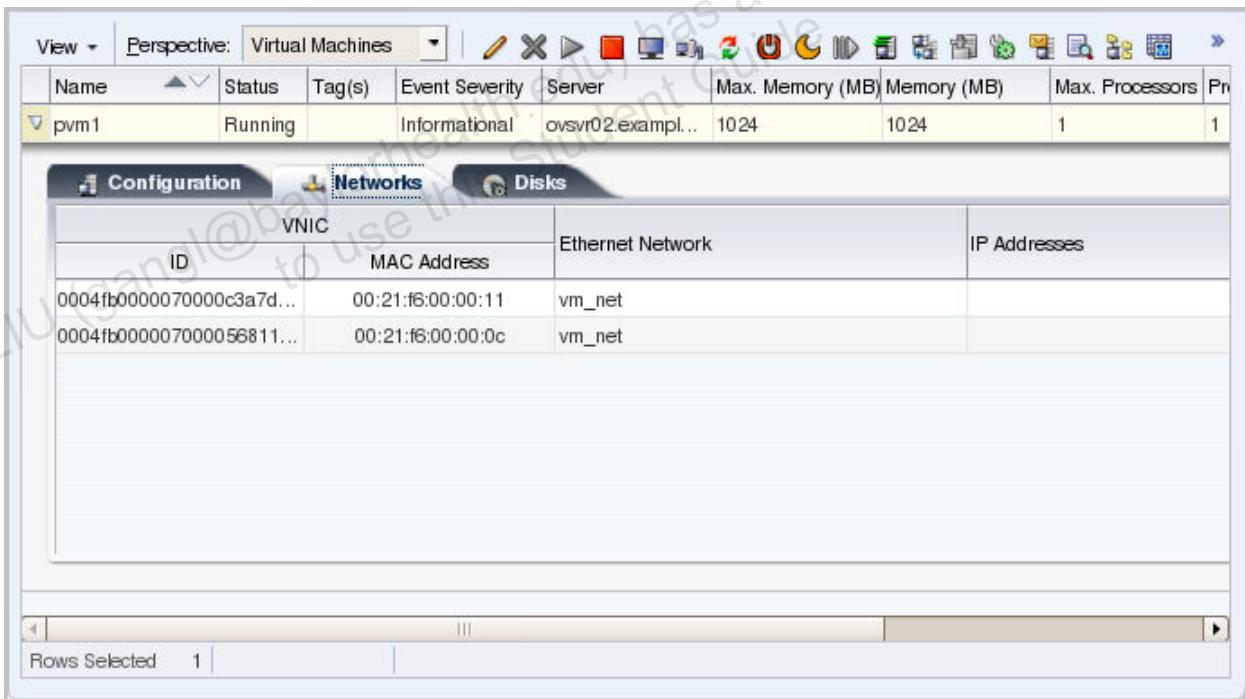
- Check the new network and disk configuration for pvm1.

In the management pane, from the listing of virtual machines, click the Expand button next to pvm1.

- Verify the current disk configuration by clicking the Disks tab.



- Verify the network configuration by clicking the Networks tab.



- o. Start the Edit Virtual Machine function again for `pvm1` and click the Boot Order tab.
 - Remove PXE from the Boot Order by selecting it and clicking the single left-arrow button.
 - Add Disk to the Boot Order pane by selecting it and clicking the single right-arrow button.



- Click OK to complete the edit operation.

The next time the virtual machine is stopped and restarted, it boots from its first disk.

4. Cancel the installation process in the `pvm1` virtual machine.

At this point, the installation program in your `pvm1` virtual machine might still be running.

Note: You do not use this virtual machine for any additional exercises.

Cancel the installation process to regain the resources used by `pvm1` by performing the following steps:

- a. Access the list of all virtual machines by highlighting `Pool1` in the navigation pane and selecting the Virtual Machines perspective in the management pane.
- b. Highlight the `pvm1` virtual machine and click the Stop icon on the toolbar.
- c. Click OK in the Confirmation dialog box.

If the virtual machine cannot be stopped:

- a. Cancel the job to stop the `pvm1` virtual machine in the Job Summary pane by clicking the Abort button
- b. From the list of virtual machines, highlight the `pvm1` virtual machine and click the Kill icon on the toolbar. The Kill icon looks like a power button on a computer.

If you stop your pvm1 virtual machine before you are prompted to reboot, the virtual machine still exists, but the guest operating system associated with it might not boot properly.

5. If the console window is still active, close the window by clicking the Close Window button (x) at the top-right of the console window.

Practice 6-5: Clone the pvm_64bit_template Template into a New Virtual Machine

Overview

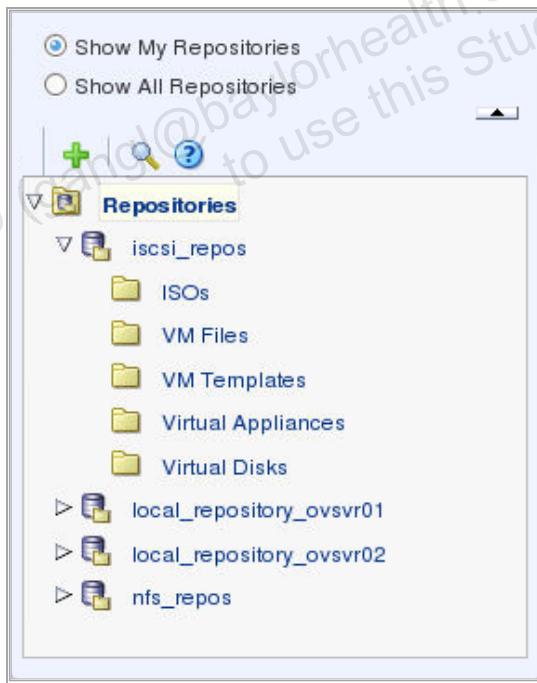
Cloning a virtual machine or template enables you to create multiple virtual machines or templates based on the original. There are two methods of cloning virtual machines:

- A simple clone: Sets up the clone with the same configuration information as the original.
- An advanced clone: Enables you to create and use a clone customizer. With a clone customizer, you can clone a virtual machine (or template) with disk and network mappings that are different than those from the source virtual machine (or template).

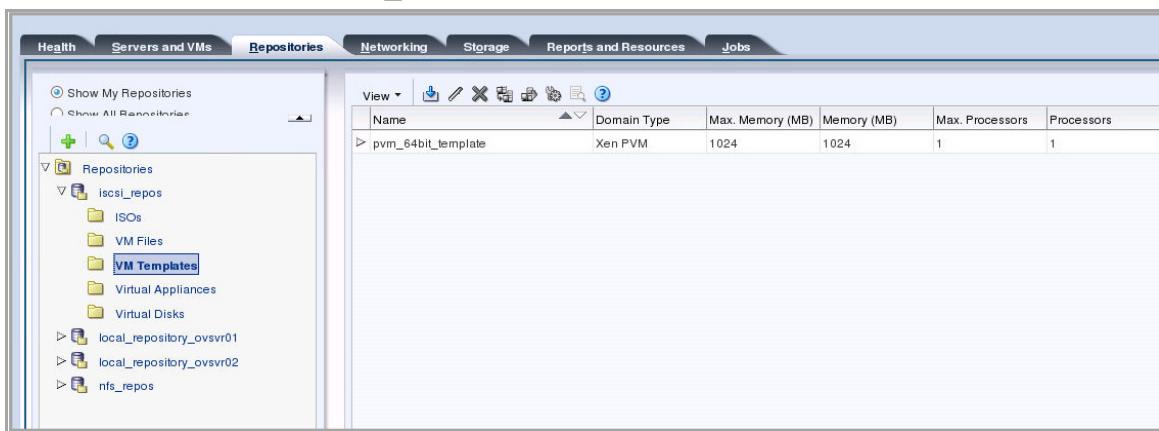
In this practice, you use the `pvm_64bit_template` template, which you imported in a practice for the lesson titled “Server Pools and Repositories,” to clone a new virtual machine by using the simple clone technique.

Tasks

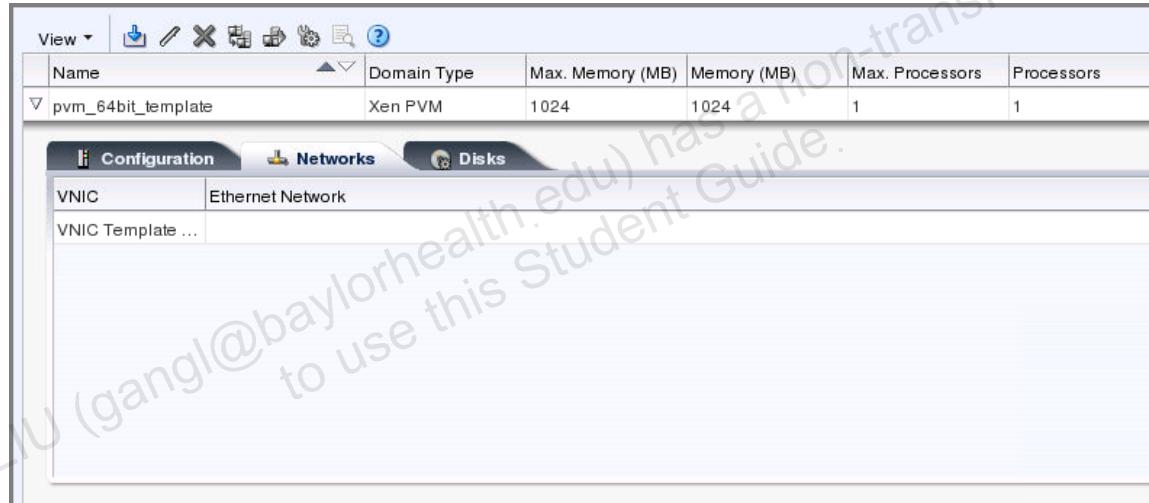
1. If your Oracle VM Manager UI session is no longer active, restart the Oracle VM Manager UI, log in to the Oracle VM Manager UI as the `admin` user, with `MyOracle1` as the password.
2. Examine the `pvm_64bit_template` template.
 - a. On the Repositories tab, expand the `Repositories` folder and expand the `iscsi_repos` repository.



- b. Click the VM Templates folder in the navigation tree to expose the single template that is available in the `iscsi_repos` repository.

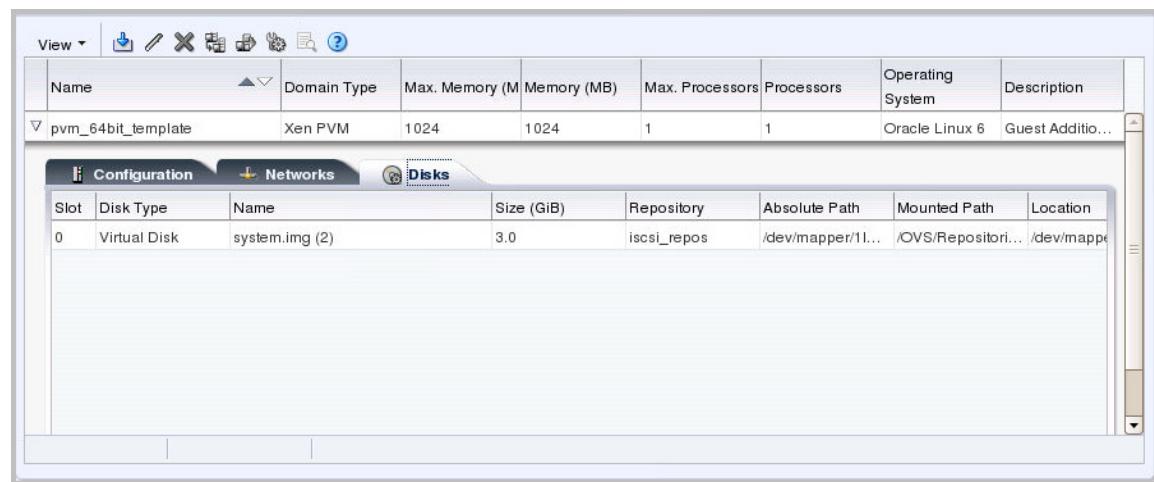


- c. Click the Expand button next to `pvm_64bit_template` to examine the disk and networking configuration for the template.
– On the Networks tab:



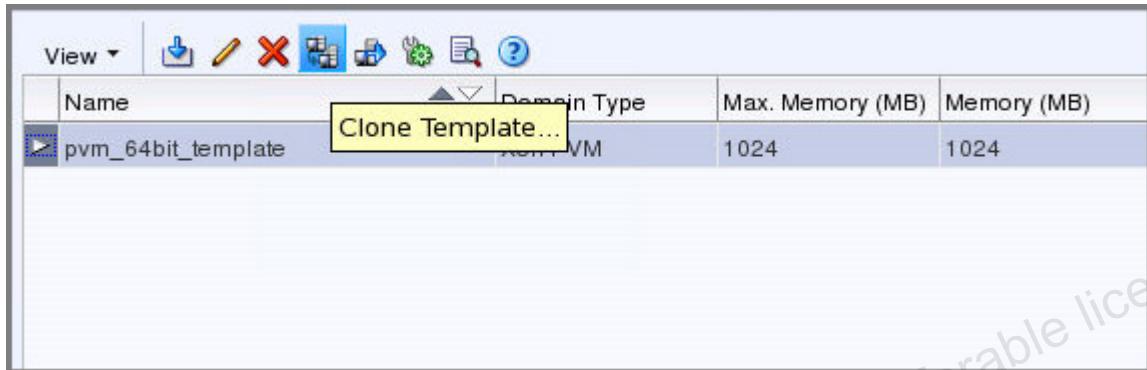
The template has one VNIC configured, but there is no network associated with this VNIC.

- On the Disks tab:

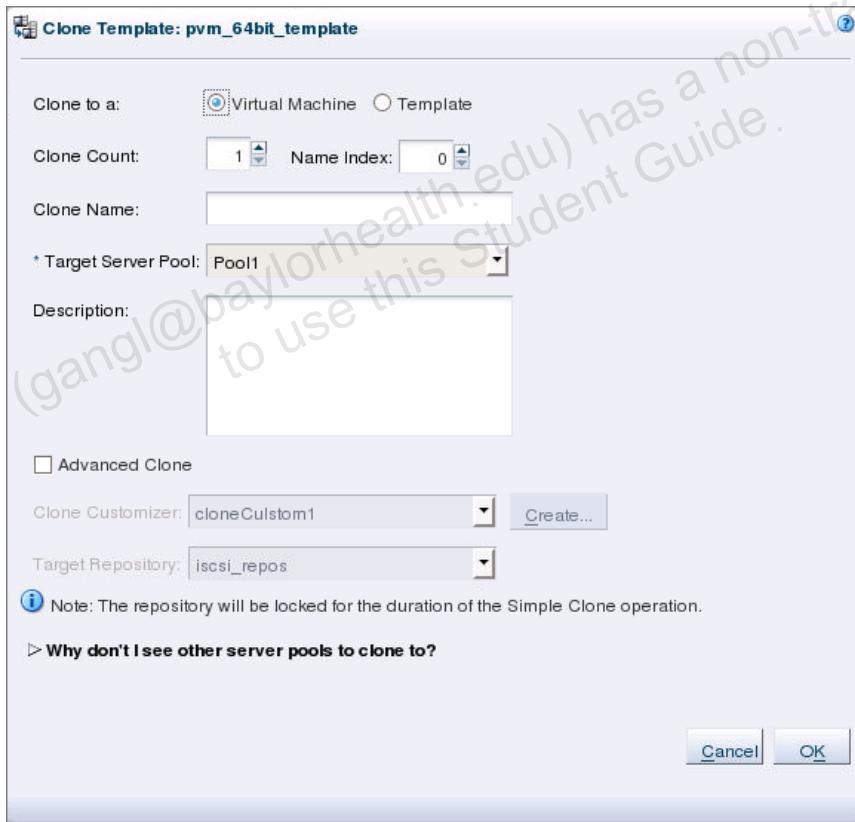


The template contains a single virtual disk called `system.img` (2), which is 3 GiB in size.

- d. Click the Collapse button next to the template name.
2. Launch the cloning operation.
 - a. Select the template in the management pane and click the “Clone Template” icon on the toolbar.



The “Clone Template” window appears.



- Enter the information to clone the template to a virtual machine. Use the simple cloning operation.

The information to use for the cloning operation is summarized in the following table:

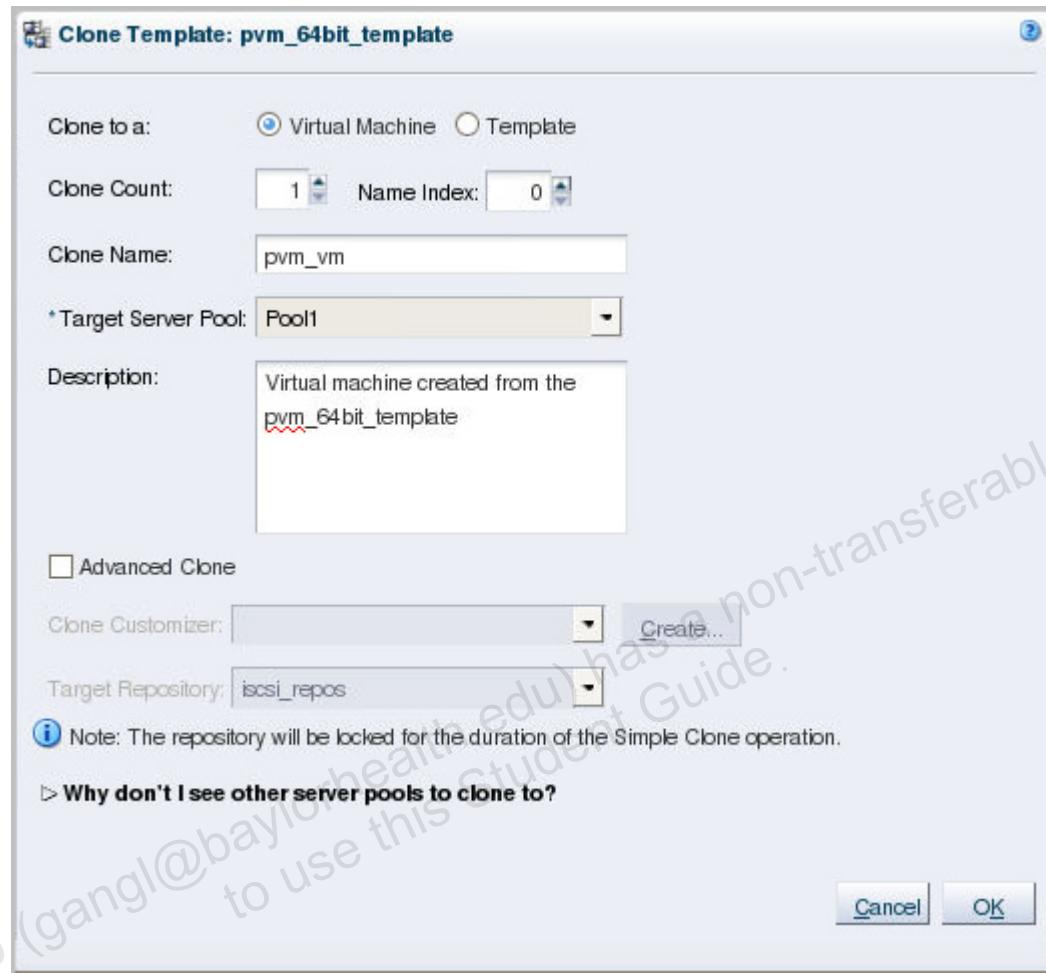
Field	Value
Clone to a (target clone type)	Select the Virtual Machine option button.
Clone Count	Select 1 by using the Increment and Decrement buttons.
Name Index	This is the start number to append to the clone name; the default is 0.
Clone Name	pvm_vm
Target Server Pool	Select Pool1 from the drop-down list.
Description	Virtual machine created from the pvm_64bit_template template
Advanced Clone select box	Leave the Advanced Clone check box deselected to trigger a simple cloning operation.
Clone Customizer	The field is disabled for simple cloning.
Target Repository	The field is disabled for simple cloning.
Why don't I see other server pools to clone to?	A collapsed section that shows the list of server pools that do not meet the requirements for the clone request

Note

- This practice uses simple cloning, where a virtual machine is created directly from the template, without the opportunity to make configuration changes to the resulting virtual machine.
- The next practice uses advanced cloning, where the cloning process creates a virtual machine according to the configuration information contained in a clone customizer.

- In the cloning window, enter values in all the fields by using the information in the previous table.

After entering the information, your window looks like the following screenshot:



Click OK to trigger the cloning operation.

The cloning job completes quickly.

Several jobs are created to perform the simple cloning, as can be seen in the Job Summary pane.

- Click the Jobs tab to display the jobs associated with the simple cloning request.

Timestamp	Status	Pr/Description	Created By	Duration	End Time
Apr 03, 2016 3:41:09 am	Success	Modify VM: pvm_vm.0	admin	188ms	Apr 03, 2016 3:41:09
Apr 03, 2016 3:41:08 am	Success	Modify VM: pvm_vm.0	admin	225ms	Apr 03, 2016 3:41:09
Apr 03, 2016 3:41:07 am	Success	OVMJOB_1050J Delete CloneD... @OvmAdmin	admin	81ms	Apr 03, 2016 3:41:07
Apr 03, 2016 3:40:50 am	Success	Clone VM: pvm_64bit_template ... admin	admin	11s	Apr 03, 2016 3:41:02

- The job to create the clone from the template
 - The job to delete the temporary clone customizer that is used for the cloning operation
 - Two additional modify VM jobs that complete the cloning process
- c. To locate the new virtual machine, click the Servers and VMs tab, select Pool1 in the navigation tree, and select the Virtual Machines perspective in the management pane.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors
pvm1	Stopped		Informational	ovsr02.example.com	1024	1024	1
pvm_vm.0	Stopped		Informational	ovsr01.example.com	1024	1024	1

In this example, the new virtual machine, pvm_vm.0, appears under ovsr01.example.com as seen in the Server column.

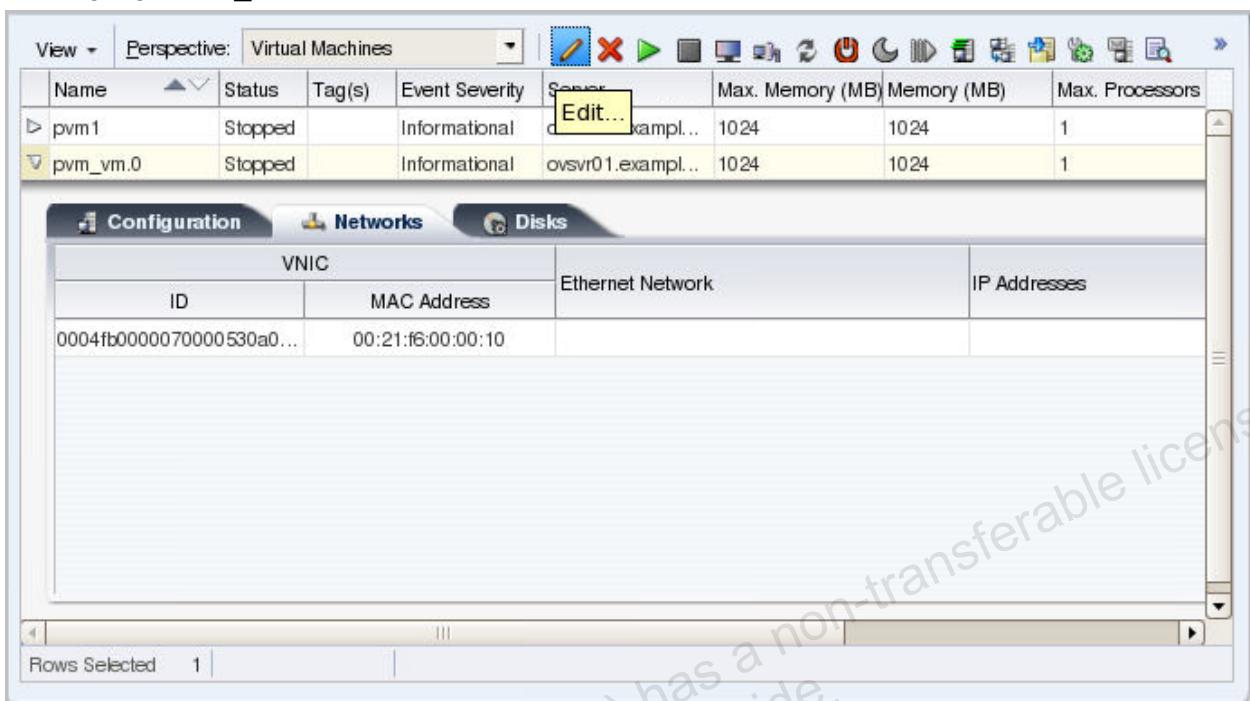
Note: Your new virtual machine might appear under ovsr02.example.com.

- d. Click the Expand button next to the new virtual machine, pvm_vm.0, and click the Networks tab.

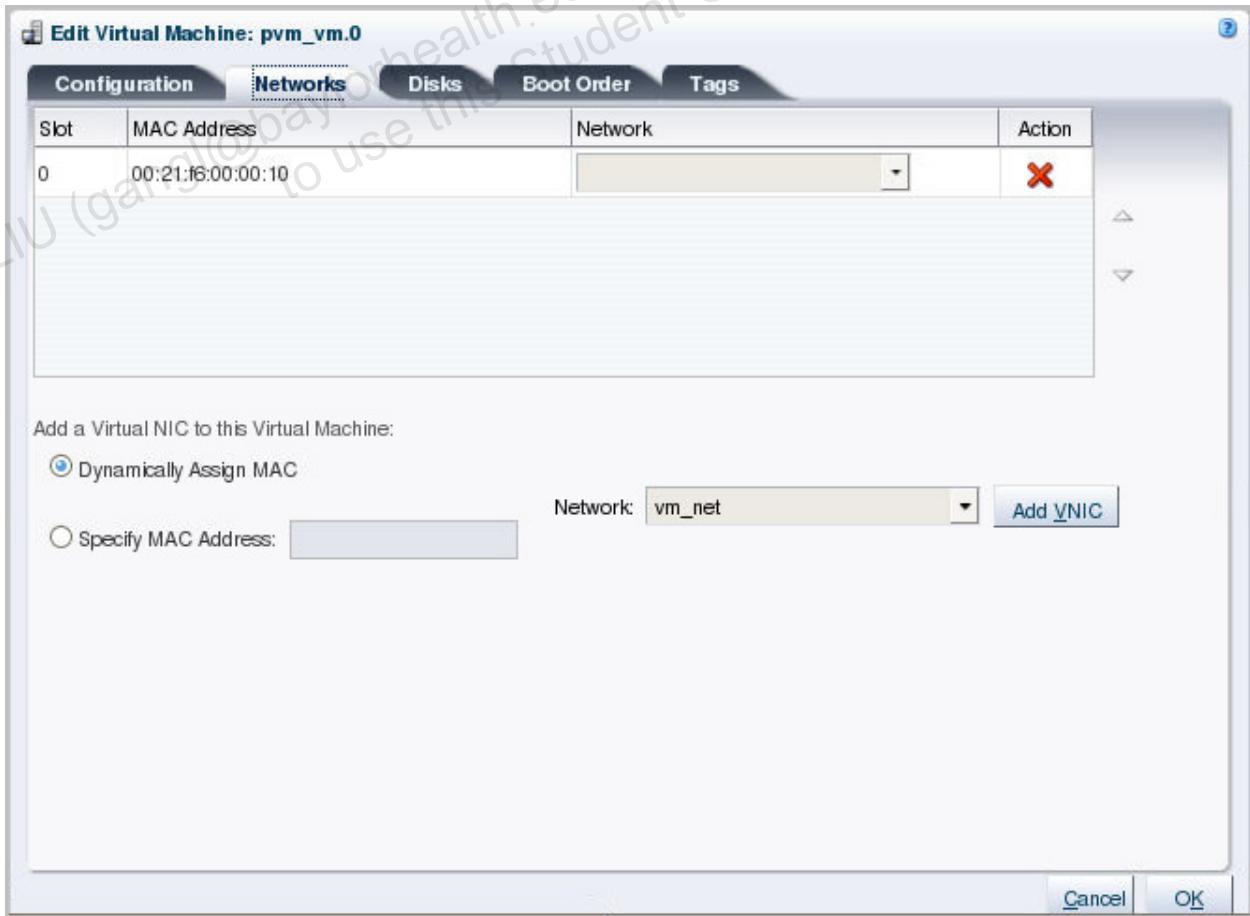
VNIC		Ethernet Network	IP Addresses
ID	MAC Address		
0004fb0000070000530a0...	00:21:f6:00:00:10		

Notice that the cloning process added a VNIC to pvm_vm.0, but there is no network associated with this virtual NIC.

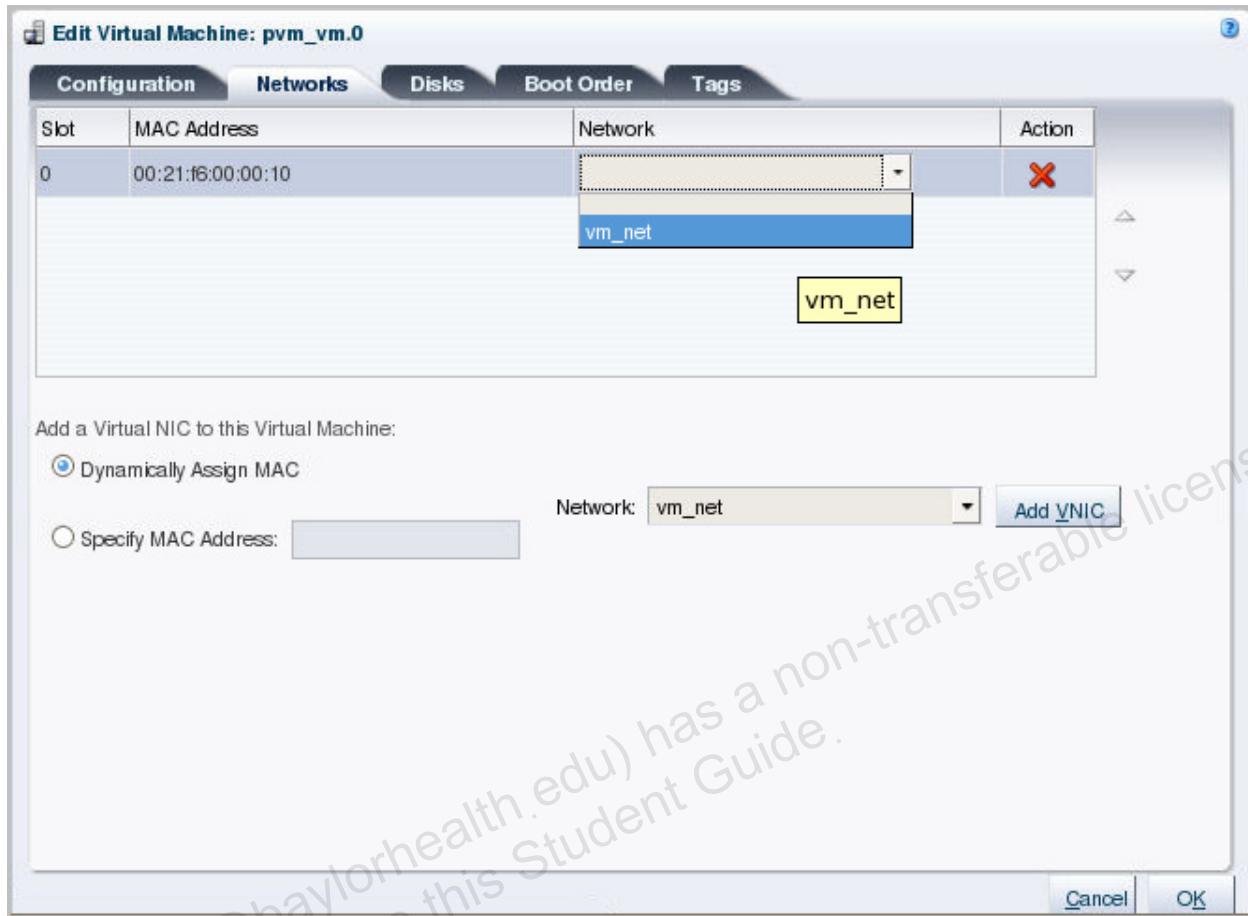
4. Edit the new virtual machine, pvm_vm.0, to associate a network with its VNIC.
- Highlight pvm_vm.0 in the list of virtual machines and click the Edit icon on the toolbar.



- In the “Edit Virtual Machine:pvm_vm.0” window, click the Networks tab.



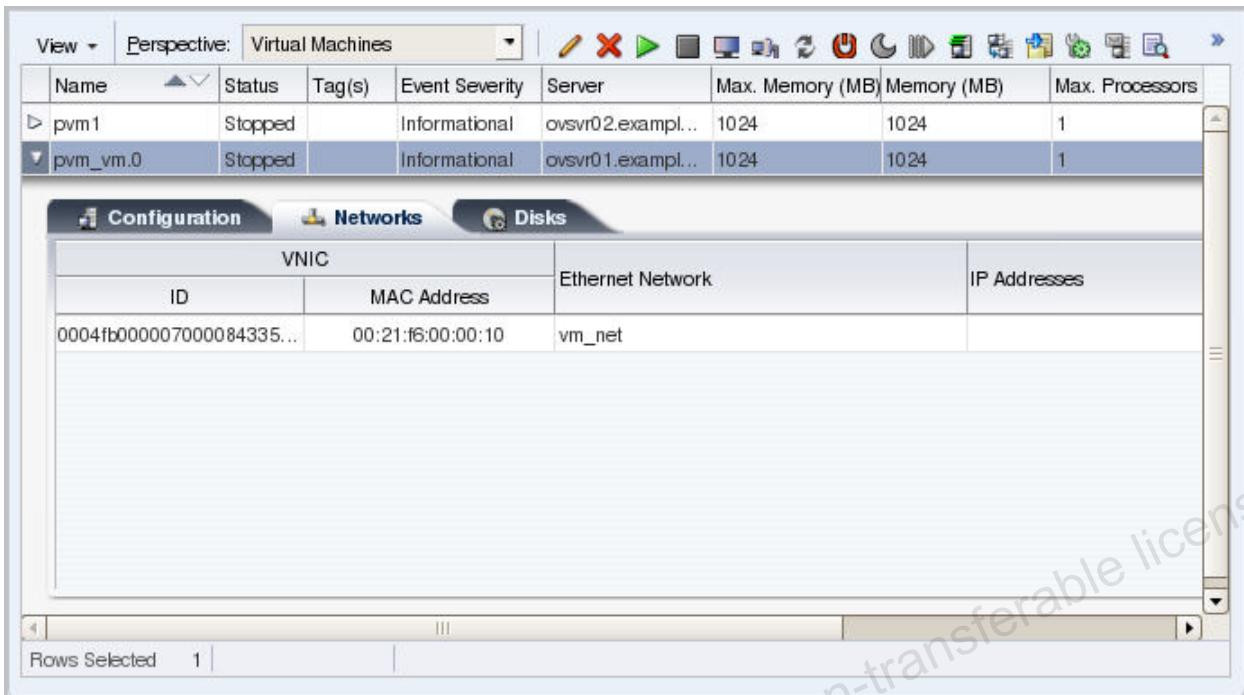
- c. Select `vm_net` from the Network drop-down list for the assigned VNIC.



Click OK to complete the edit operation.

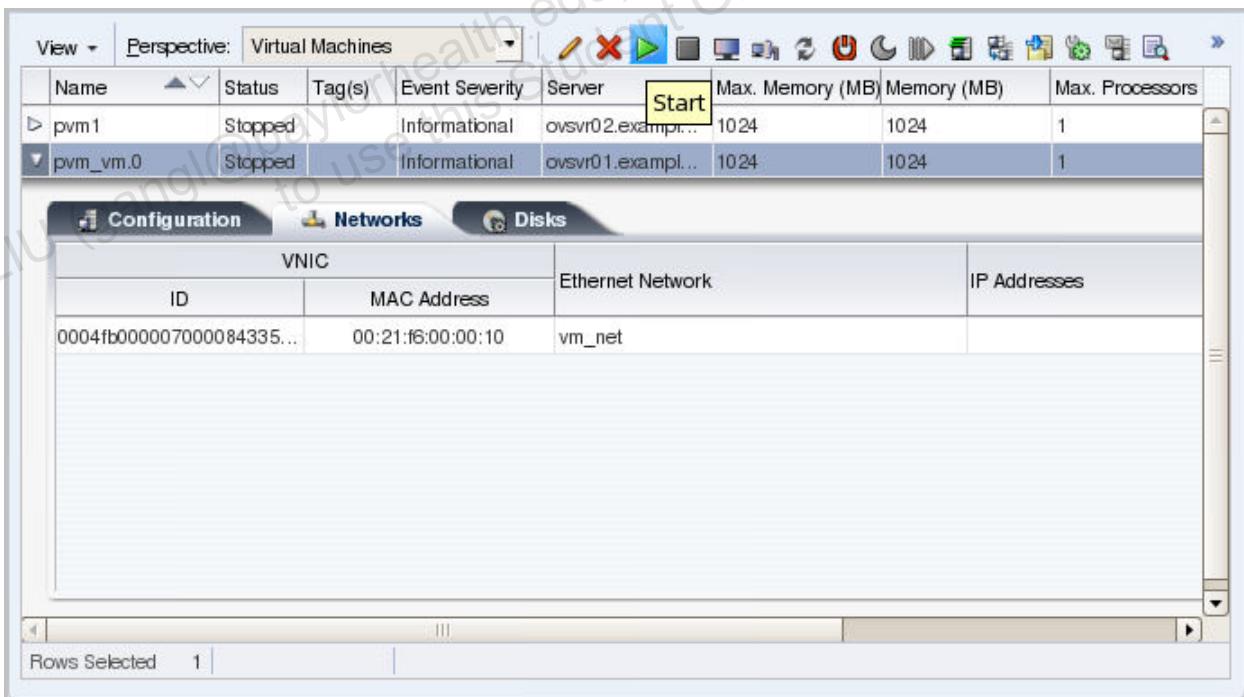
You are returned to the Virtual Machines perspective.

Now you can see the Ethernet Network information for the VNIC. If the information does not appear, click the Collapse button and the Expand button to force a refresh.

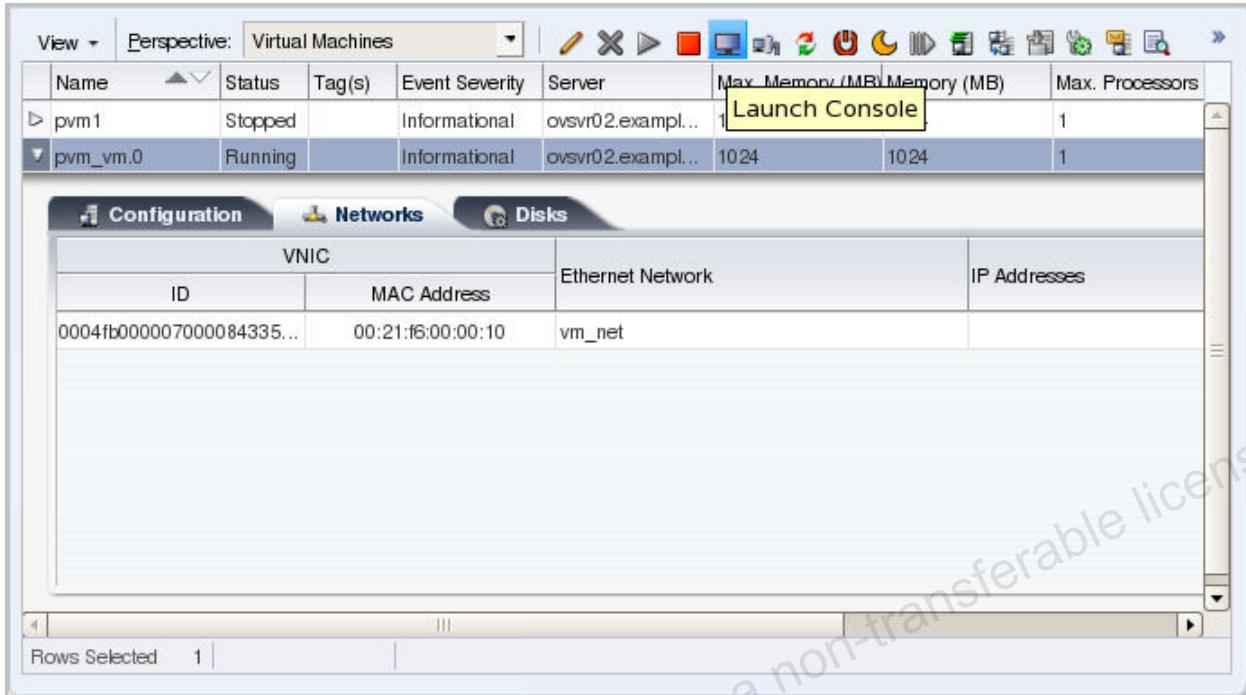


5. Start and access the `pvm_vm.0` virtual machine.

- a. Highlight `pvm_vm.0` in the list of virtual machines and click the Start icon on the toolbar.



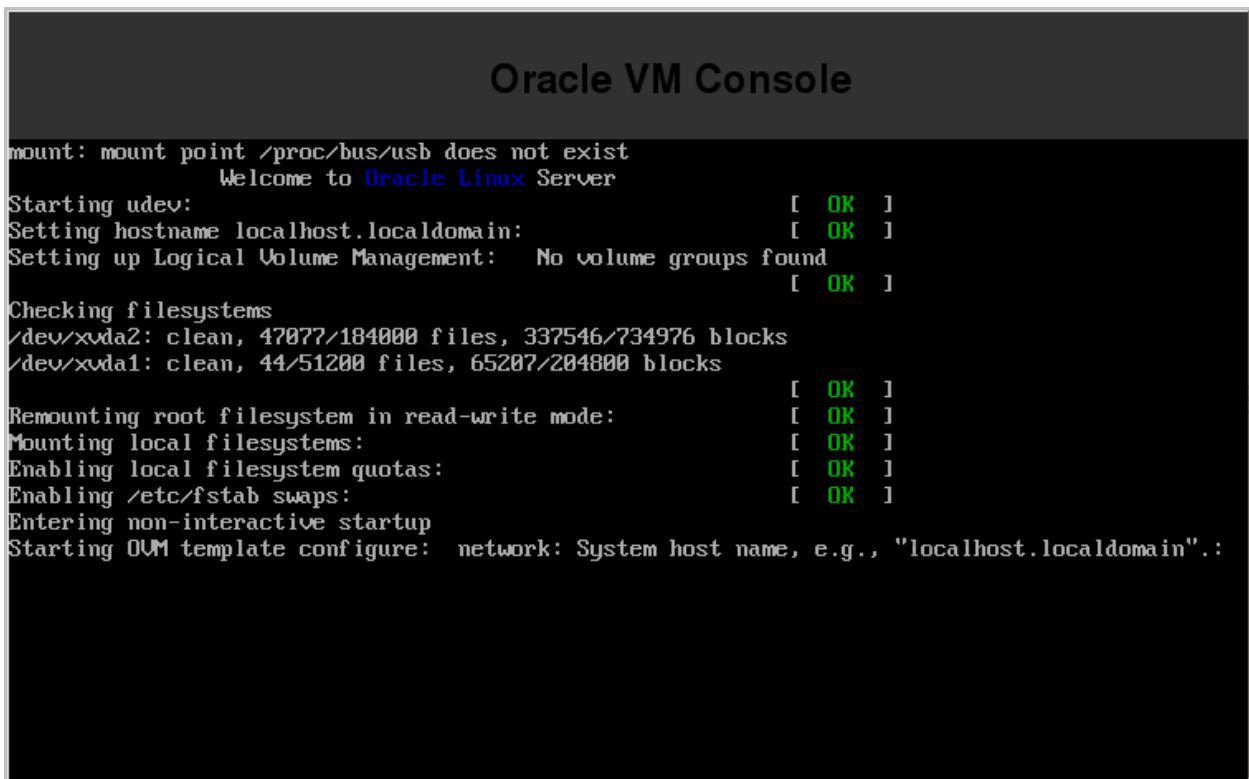
- b. Highlight pvm_vm.0 in the list of virtual machines and click the Launch Console icon.



The virtual machine's console appears and the boot messages are displayed.

Note: During the early stages of the boot process, the Oracle Linux Server 6.5 boot status bar is displayed near the bottom of the screen. If you do not see this bar, use the console window's scrollbar to expose the bottom of the window.

The boot process is then interrupted and the OVM Template configuration process becomes active. You are prompted to enter several configuration values, starting with the System host name, as shown in the following screenshot:



The screenshot shows a terminal window titled "Oracle VM Console". The output of the boot process is displayed, followed by the configuration steps for the OVM template. The configuration steps include setting the system host name, network device, boot protocol, and root password. Each step is followed by an "[OK]" status indicator.

```

mount: mount point /proc/bus/usb does not exist
      Welcome to Oracle Linux Server
Starting udev: [ OK ]
Setting hostname localhost.localdomain: [ OK ]
Setting up Logical Volume Management: No volume groups found [ OK ]
Checking filesystems
/dev/vvda2: clean, 47077/184000 files, 337546/734976 blocks
/dev/vvda1: clean, 44/51200 files, 65207/204800 blocks [ OK ]
Remounting root filesystem in read-write mode: [ OK ]
Mounting local filesystems: [ OK ]
Enabling local filesystem quotas: [ OK ]
Enabling /etc/fstab swaps: [ OK ]
Entering non-interactive startup
Starting OVM template configure: network: System host name, e.g., "localhost.localdomain":
```

- Respond to prompts for the network configuration of your new cloned virtual machine. Use the information in the following table to respond to the prompts.
- Warning:** Do not press the Enter key at the prompts. The examples are not defaults and if you do not enter a value, the configuration process continues with null values.

Prompt	Response
System host name	vm1.example.com
Network device to configure	eth0
Activate interface on system boot	yes
Boot protocol: dhcp or static	dhcp
root password	Cangetin1

After entering the password for the `root` user, the boot proceeds and the login prompt appears.

- d. Log in to the virtual machine as root, with the password Cangetin1.

The screenshot shows a terminal window titled "Oracle VM Console". The output of the terminal shows:

```
Oracle Linux Server release 6.5
Kernel 3.8.13-16.2.1.el6uek.x86_64 on an x86_64

vm1 login: root
Password:
Last login: Mon Mar 10 06:59:35 from 192.168.1.1
[root@vm1 ~]#
```

- e. Display the network information by using the ifconfig -a command.

The screenshot shows a terminal window titled "Oracle VM Console". The output of the terminal shows the results of the ifconfig -a command:

```
Oracle Linux Server release 6.5
Kernel 3.8.13-16.2.1.el6uek.x86_64 on an x86_64

vm1 login: root
Password:
Last login: Mon Mar 10 06:59:35 from 192.168.1.1
[root@vm1 ~]# ifconfig -a
eth0      Link encap:Ethernet HWaddr 00:21:F6:00:00:10
          inet addr:192.168.1.252 Bcast:192.168.1.255 Mask:255.255.255.0
          inet6 addr: fe80::21:f6ff:fe00:10/64 Scope:Link
            UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
            RX packets:15 errors:0 dropped:0 overruns:0 frame:0
            TX packets:18 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:1000
            RX bytes:1470 (1.4 KiB) TX bytes:1864 (1.8 KiB)

lo       Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
            UP LOOPBACK RUNNING MTU:65536 Metric:1
            RX packets:0 errors:0 dropped:0 overruns:0 frame:0
            TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
            collisions:0 txqueuelen:0
            RX bytes:0 (0.0 b) TX bytes:0 (0.0 b)

[root@vm1 ~]#
```

6. Shut down the virtual machine.

From the command line, execute the shutdown -h now command.

The virtual machine shuts down immediately.

The screenshot shows a terminal window titled "Oracle VM Console". The output of the shutdown command is displayed:

```
Stopping abrt daemon:                                          [ OK ]
Stopping sshd:                                                 [ OK ]
Shutting down postfix:                                         [ OK ]
Stopping crond:                                               [ OK ]
Stopping automount:                                           [ OK ]
Stopping HAL daemon:                                           [ OK ]
Shutting down...St[ OK ]ttd:
```

The shutdown process has completed successfully, indicated by the green "OK" status for each service and the final message "Shutting down...".

The pvm_vm_0 virtual machine is now in a stopped state, as shown in the Status column in the management pane of the Oracle VM Manager UI window.

Close the console window by clicking the Close Window button (x) in the upper-right corner of the virtual machine's console.

Practice 6-6: Create a Clone Customizer and Use It for Cloning Operations

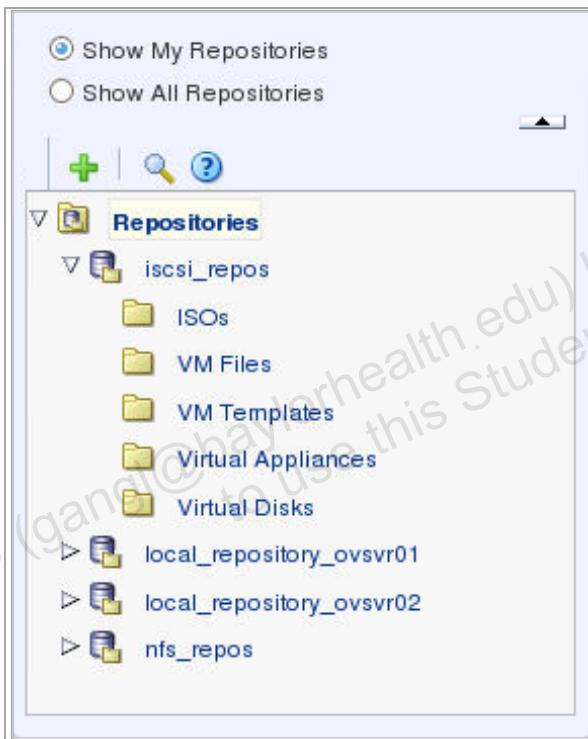
Overview

In this practice, you use the Advanced Clone technique for cloning operations. As part of the Advanced Clone mechanism, you create a clone customizer for the `pvm_64bit_template` template.

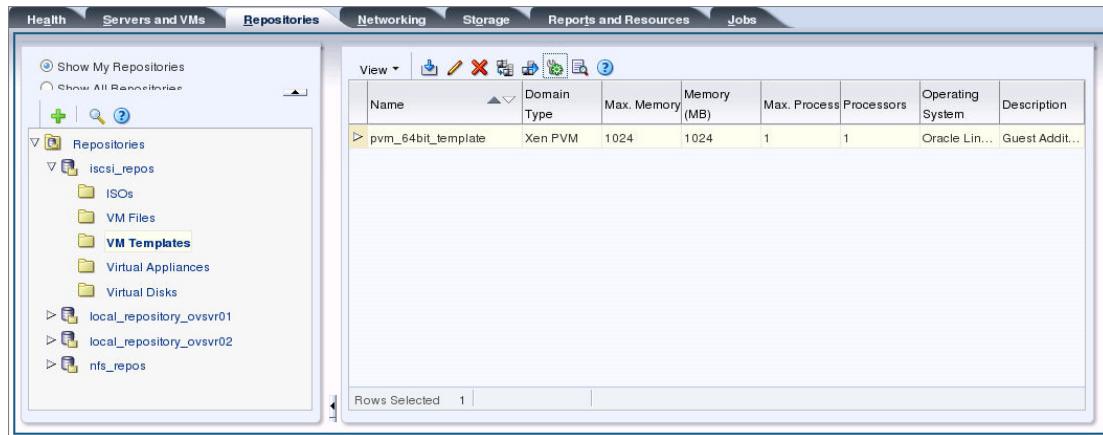
You then create two virtual machines from the `pvm_64bit_template` template by using the configuration information specified in the clone customizer.

Tasks

1. Create a clone customizer for the `pvm_64bit_template` template.
 - a. Click the Repositories tab and expand the `iscsi_repos` folder to expose its structure.

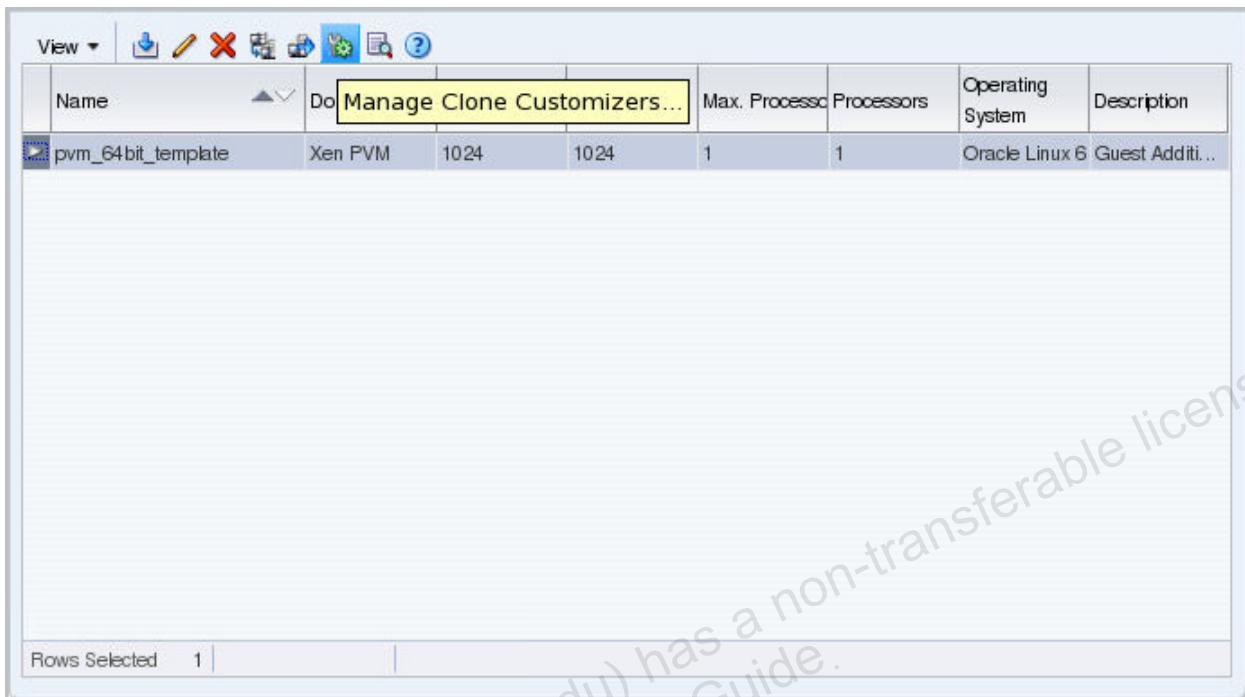


- b. Highlight VM Templates in the navigation tree.

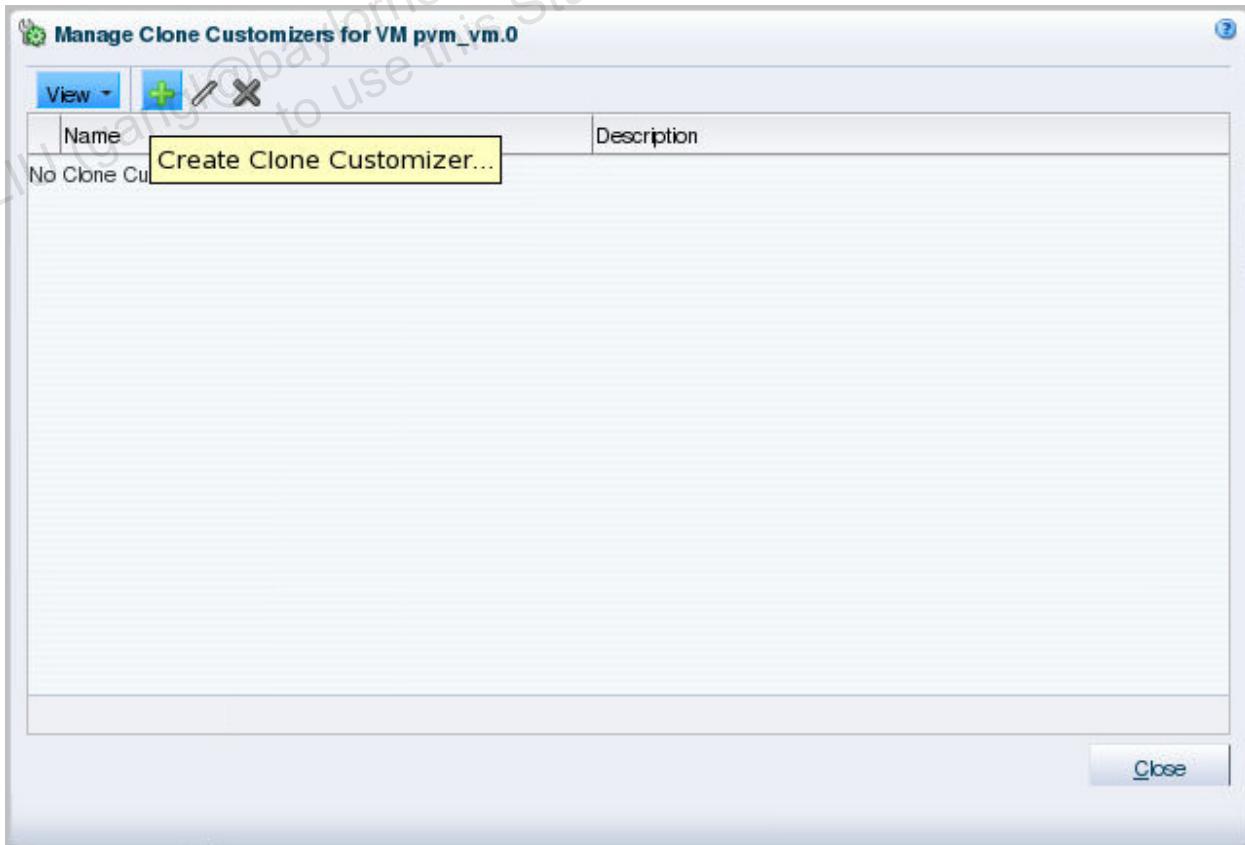


The only template in the `iscsi_repos` repository is listed in the management pane.

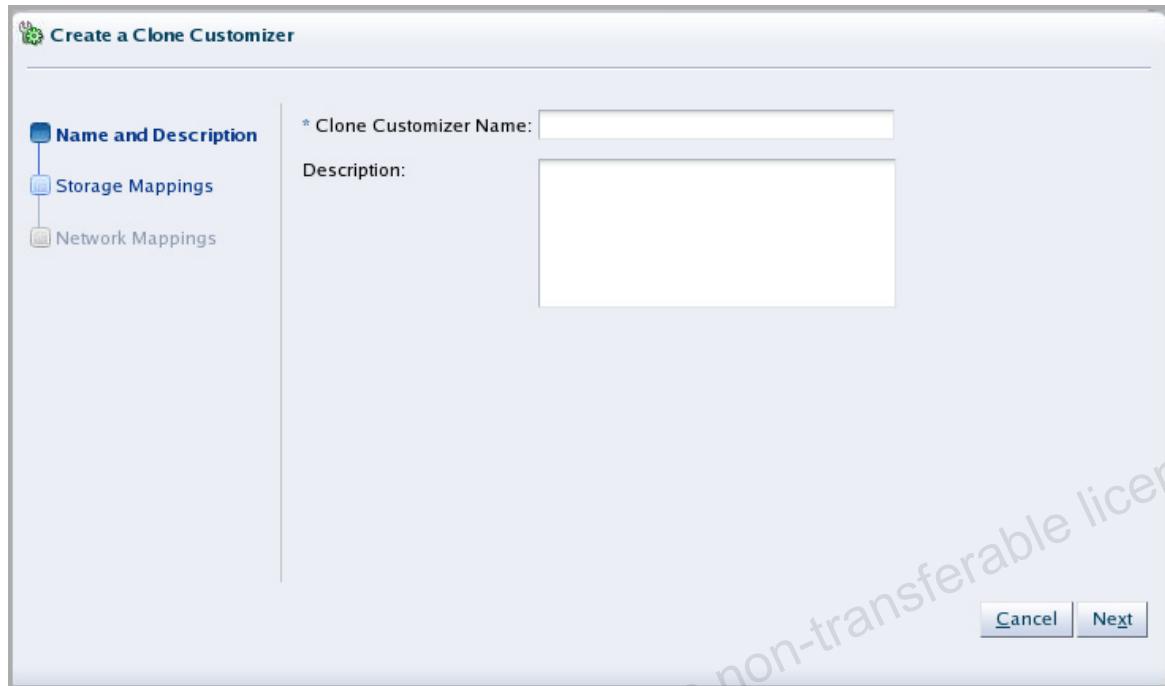
- c. Highlight the template in the management pane and click the Manage Clone Customizer icon on the toolbar.



- d. In the "Manage Clone Customizers for VM" window, click the Create Clone Customizer icon, as shown in the following screenshot:



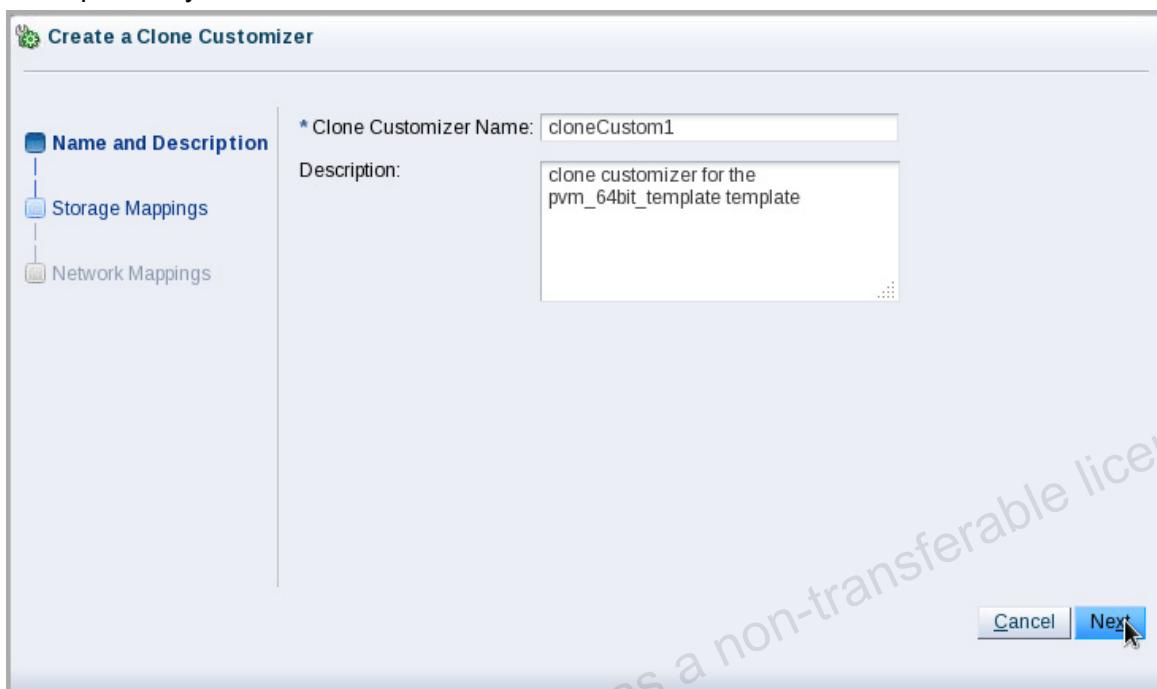
The Create a Clone Customizer Wizard is launched.



This wizard presents three configuration screens:

- **Name and Description:** You provide a name and description for the new clone customizer.
- **Storage Mappings:** For each storage device in the source template, you can map the device to a new target device, or you can choose to skip the mapping for a particular storage device.
- **Network Mappings:** For each network device (VNIC) in the source template, you choose to create a new VNIC during the cloning process, and you can associate each VNIC with any network with the Virtual Machine function. You can also choose to skip the mapping for a particular VNIC in the source template.

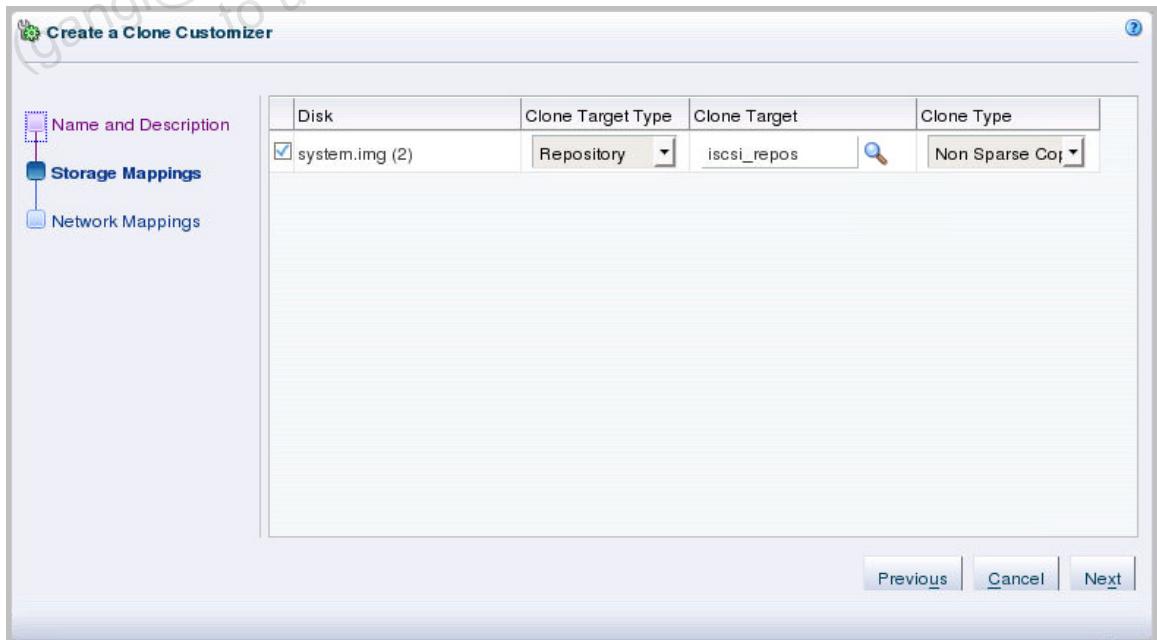
- e. On the first screen of the wizard, enter the name `cloneCustom1` and enter a description of your choice for the new clone customizer.



Note: A clone customizer is always associated with a template or a virtual machine. You cannot create a clone customizer without this association.

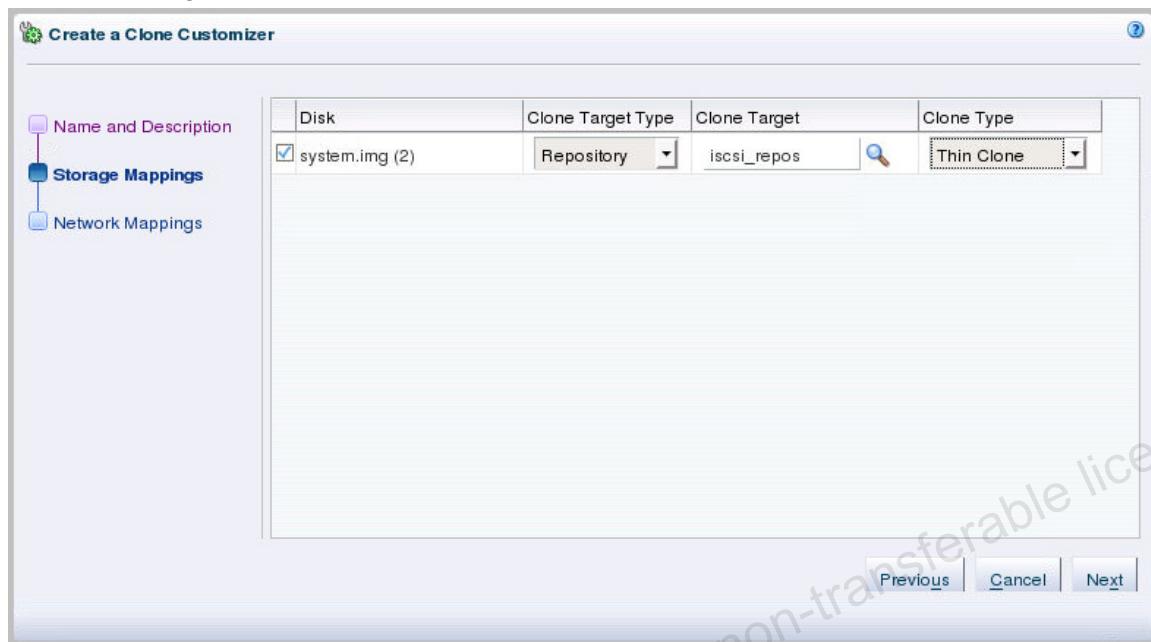
Click Next to proceed to the Storage Mappings screen.

- f. On the second screen of the wizard, the only virtual disk in the source template is already selected, and the default mapping maps the virtual disk for future clones to be created in the `iscsi_repos` repository.



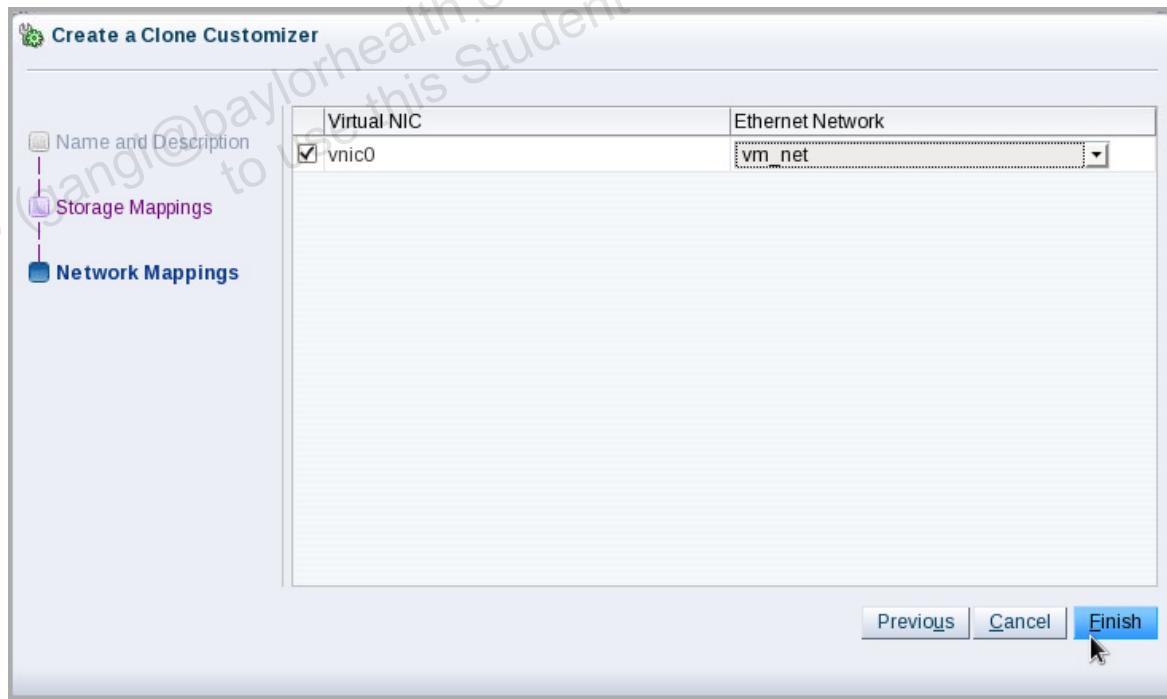
Accept the selections for Clone Target Type and Clone Target.

- g. On the same screen, select Thin Clone from the Clone Type drop-down list, as shown in the following screenshot:



Click Next to proceed to the last screen.

- h. On the last screen of the wizard, the only VNIC in the source template is unassigned. Select the `vm_net` network from the Ethernet Network drop-down list.



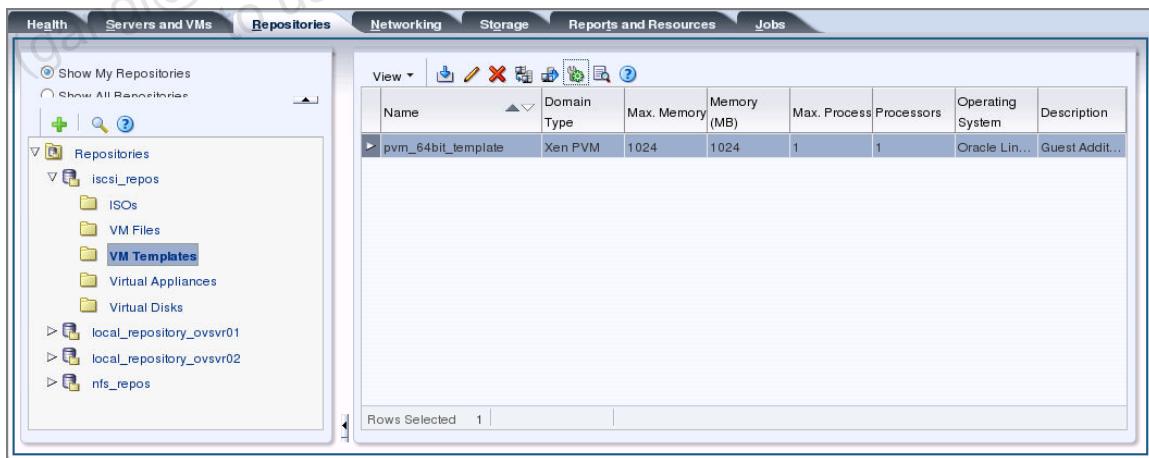
Click Finish to create the clone customizer.

The new clone customizer appears in the "Manage Clone Customizers for VM" window.

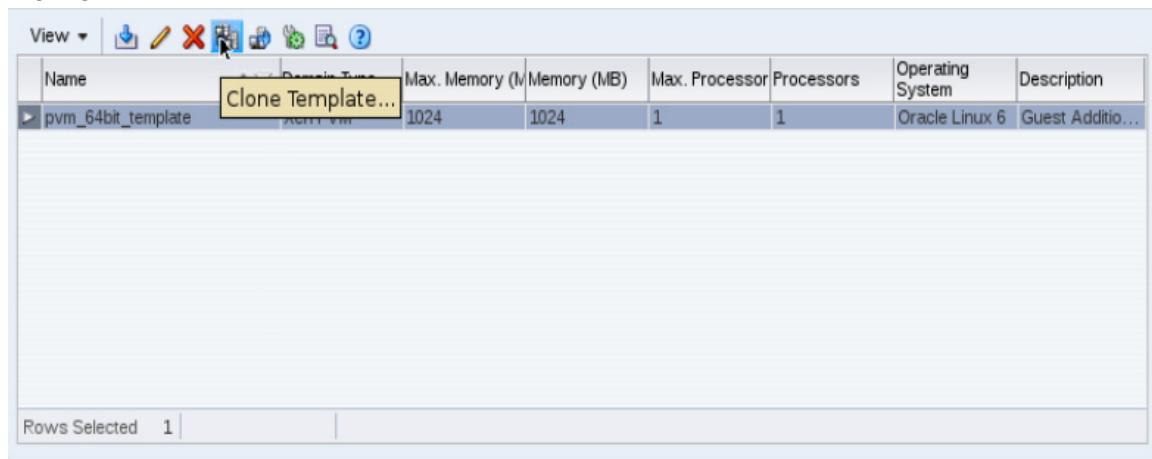
- i. Click the Close button to exit the window.



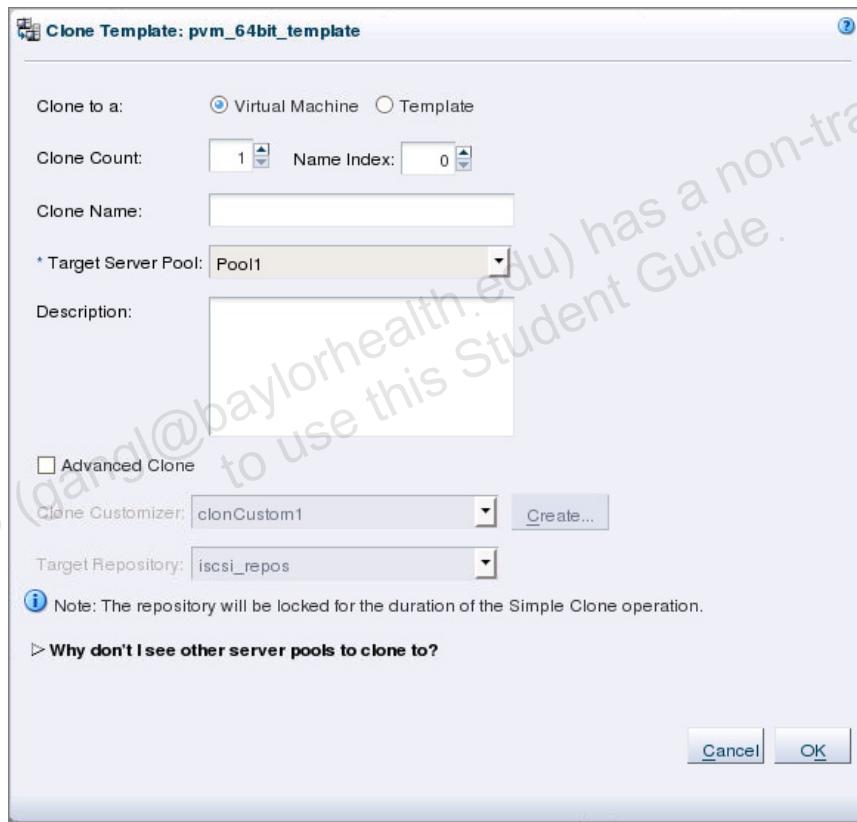
2. Clone the `pvm_64bit_template` template into two new virtual machines by using the clone customizer that was created in the previous step.
 - a. Locate the `pvm_64bit_template` template by selecting the VM Templates folder in the `iscsi_repos` repository structure. The template appears in the management pane.



- b. Highlight the template and click the Clone Template icon on the toolbar.



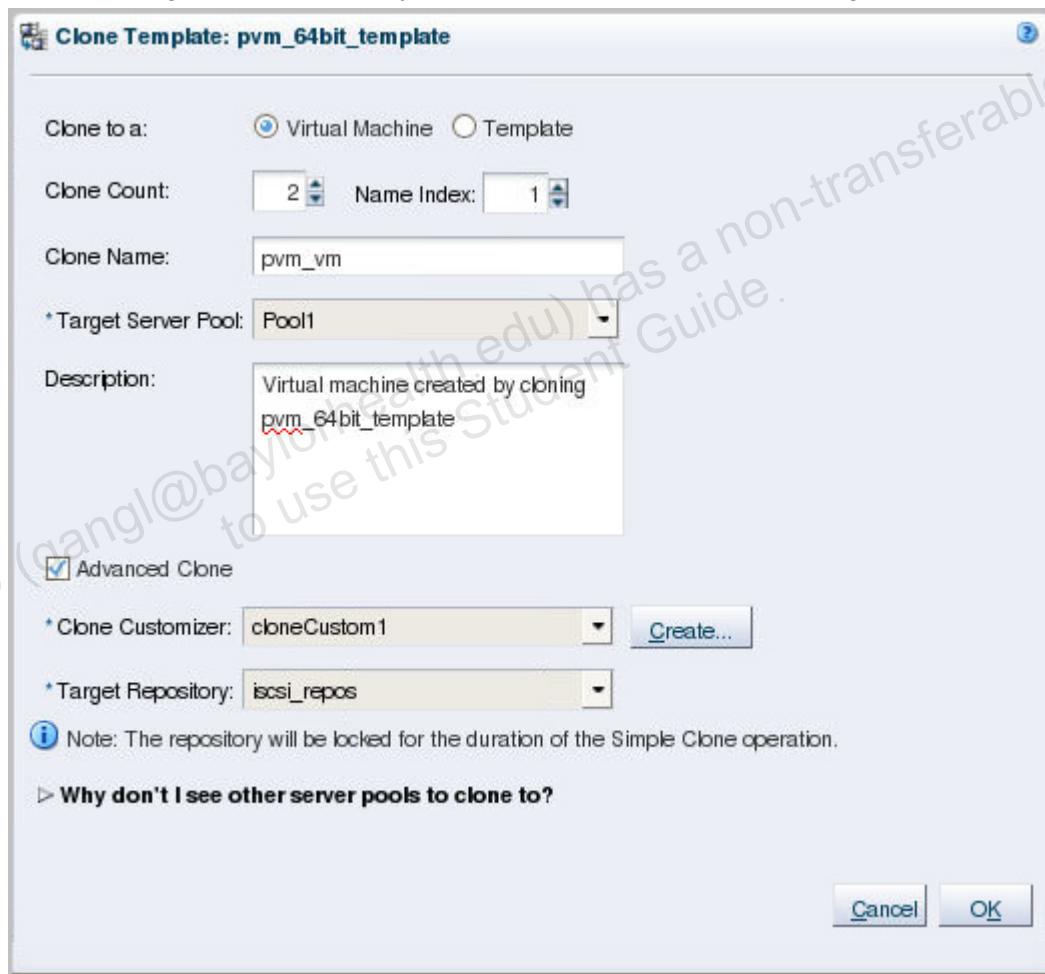
The Clone Template window appears.



- c. In the cloning window, make the following selections:
- Click the Virtual Machine option button to create a virtual machine as the result of the cloning.
 - Set the number of clones to create to 2.
 - Select 1 for the Name Index. The first virtual machine will be named `pvm_vm.1` and the second virtual machine will be named `pvm_vm.2`.
- Note:** Recall that you created `pvm_vm.0` in the previous simple cloning operation. Selecting a Name Index other than 0 allows you to continue the numbering sequence for your clones.

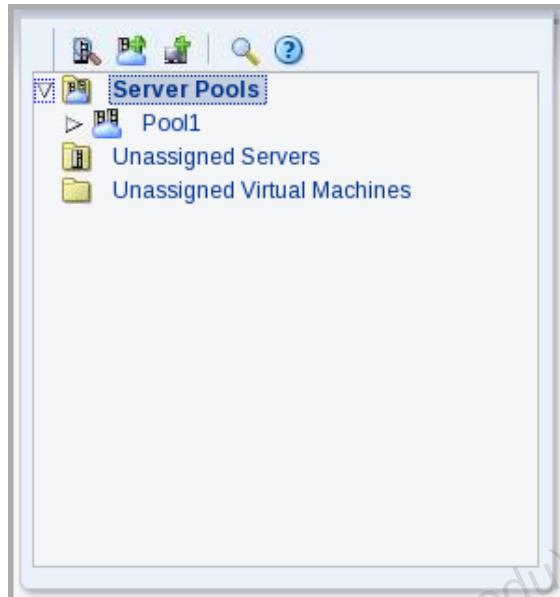
- Enter `pvm_vm` as the clone name for the virtual machines.
- Select `Pool1` as the Target Server Pool, which is the server pool where the new virtual machines are deployed. In your environment, `Pool1` is the only choice.
- Enter a description for the new virtual machines, to indicate that these virtual machines are created by using a cloning operation.
- Select the Advanced Clone check box. The remaining fields become active.
- Select `cloneCustom1` as the clone customizer. You can create a new clone customizer by clicking the Create button. Do not create a new clone customizer at this time.
- Select `iscsi_repos` as the target repository. This selection causes the new virtual machines configuration file (`vm.cfg`) to be created in this repository.

After entering the information, your window looks like the following screenshot:



- Click the Expand button next to the “Why don’t I see other servers pools to clone to?” string for an explanation of why `Pool1` is the only server pool listed in the Target Server Pool drop-down list. All server pools were examined as candidates and all of them passed.
- d. After verifying your selections, click OK to trigger the creation of two new virtual machines that are created as clones of the `pvm_64bit_template` template by using the `cloneCustom1` clone customizer.

- e. Examine the jobs created during the cloning process: For each clone, there are two jobs to create the clone and one job to refresh the file system that contains the `iscsi_repos` repository.
3. Locate the new virtual machines that were created as part of the cloning process.
 - a. Click the Servers and VMs tab and expand the Server Pools folder in the navigation tree.



- b. Highlight `Pool1` in the navigation tree and select the Virtual Machines perspective in the management pane.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pr
pvm1	Stopped		Informational	ovsrr02.example...	1024	1024	1	1
pvm_vm.1	Stopped		Informational	ovsrr02.example...	1024	1024	1	1
pvm_vm.0	Stopped		Informational	ovsrr02.example...	1024	1024	1	1
pvm_vm.2	Stopped		Informational	ovsrr01.example...	1024	1024	1	1

The two new virtual machines, `pvm_vm.1` and `pvm_vm.2`, appear in the list of virtual machines, and each is assigned to an Oracle VM server.

The server assignment of your virtual machines might be different.

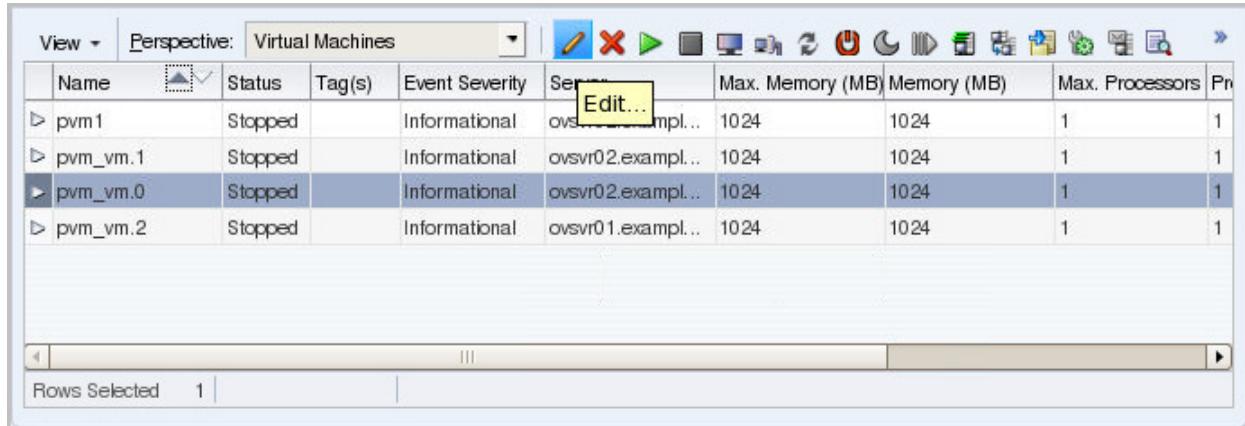
4. Rename the new clones.

In this task, you rename all the clones to simplify their names.

- `pvm_vm.0` -> `pvm_vm1`
- `pvm_vm.1` -> `pvm_vm2`
- `pvm_vm.2` -> `pvm_vm3`

You perform the renaming operation to avoid confusion over the name of the virtual machines when performing the remaining practices for this lesson.

- a. Select the first clone, pvm_vm.0 and click the Edit button.



- b. In the Edit Virtual Machine window, rename the clone to pvm_vm1.



Click OK to complete the renaming operation.

- c. Perform the same operation for `pvm_vm.1` and `pvm_vm.2` and rename them as `pvm_vm2` and `pvm_vm3`.

When the renaming tasks are completed, the list of virtual machines available in the server pool `Pool1` looks like the following screenshot:

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pro
pvm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm2	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsvr01.example.com	1024	1024	1	1

5. Start the `pvm_vm2` virtual machine, access its console, respond to prompts for its network configuration, and leave it running.

- To start the `pvm_vm2` virtual machine, select it, and click the Start button on the toolbar.
 - After it starts successfully, click the Launch Console button on the toolbar. The console appears and shows the boot messages for the virtual machine.
- Note:** As with `pvm_vm1`, you connect to the console at any stage of the boot process.
- When prompted for the System host name, enter `vm2.example.com`.
 - When prompted for the network device to configure, enter `eth0`.
 - When prompted whether to activate the interface on system boot, enter `yes`.
 - When prompted for the network protocol at boot, enter `dhcp`.
 - When prompted for the System root password, enter `Cangetin1`.
 - When the Login prompt appears, log in as `root` with the password `Cangetin1`.
 - Leave the virtual machine running.

Note: Leaving `pvm_vm2` running is important for a later practice.

- Close the console by clicking the Close Window button.

The mix of your virtual machines and Oracle VM servers might be different from the examples shown in the preceding paragraphs.

You now have four virtual machines in your Oracle VM environment. The virtual machines are residing on either `ovsvr01.example.com` or `ovsvr02.example.com`. The virtual machine `pvm_vm2` is running and the other three are in the Stopped state.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pro
pvm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm2	Running		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsvr01.example.com	1024	1024	1	1

Practice 6-7: Migrate Virtual Machines

Overview

In this practice, you perform the following tasks:

- Migrate a running virtual machine from one Oracle VM server to another Oracle VM server within the same server pool.
- Migrate a stopped virtual machine to a different server within the same server pool.

Assumptions

At this point, you have four virtual machines in your environment. In this example, the virtual machine in the Running state is on `ovsvr02.example.com`. The virtual machines in the Stopped state are hosted by either `ovsvr02.example.com` or `ovsvr01.example.com`.

Note: If your environment differs from the examples shown in this practice, make your selections for virtual machines and Oracle VM servers to fit the tasks for your environment.

Tasks

1. Migrate a running virtual machine to a different Oracle VM server within the same server pool and verify that its virtual disks and configuration do not move.
 - a. In your Oracle VM Manager UI session, click the Servers and VMs tab.
 - b. Highlight `Pool1` in the navigation tree and select the Virtual Machines perspective in the management pane.
 - c. In the management pane, from the listing of virtual machines, click the Expand button next to `pvm_vm2`.
 - d. Verify the current disk configuration by clicking the Configuration tab.

Note the ID number of `pvm_vm2` and the location of the configuration file.

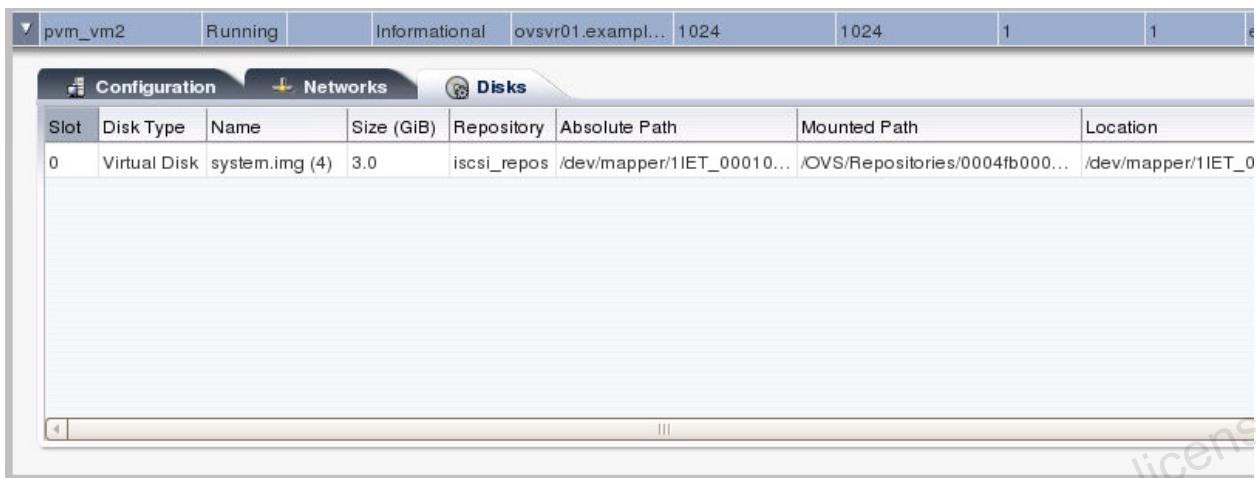
In this example, the ID is `0004fb00000600009f521804752ea999` and the location (Repository) of the configuration file is `iscsi_repos`.



The screenshot shows the Oracle VM Manager interface with the 'Configuration' tab selected for the virtual machine 'pvm_vm2'. The configuration details are as follows:

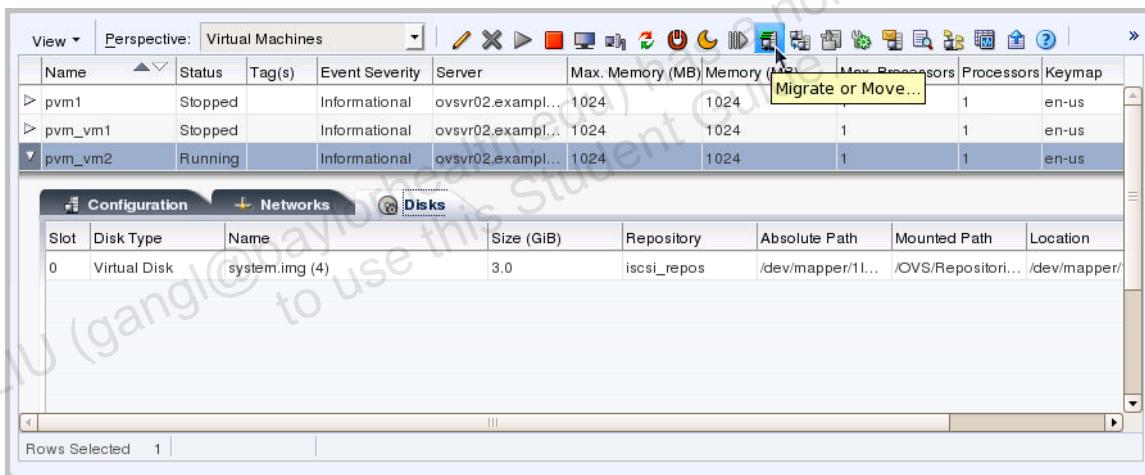
Name:	pvm_vm2	Max. Memory (MB):	1024	Huge Pages:	No
Status:	Running	Memory (MB):	1024	Repository for Configuration File:	iscsi_repos
Operating System:	Oracle Linux 6	Priority:	50	Boot Order:	
Keymap:	en-us	Mouse Type:	USB TABLET	Network Boot Path:	
Max. Processors:	1	Domain Type:	Xen PVM	Restart Action On Crash:	Restart
Processors:	1	Start Policy:	Use Pool Policy		
Processor Cap:	100	High Availability:	No		
ID:	0004fb00000600009f521804752ea999				
Origin:	[http://192.0.2.1/pvm_template.tgz]				

- e. Select the Disks tab to verify the absolute and mounted paths of the pvm_vm2's virtual disks:

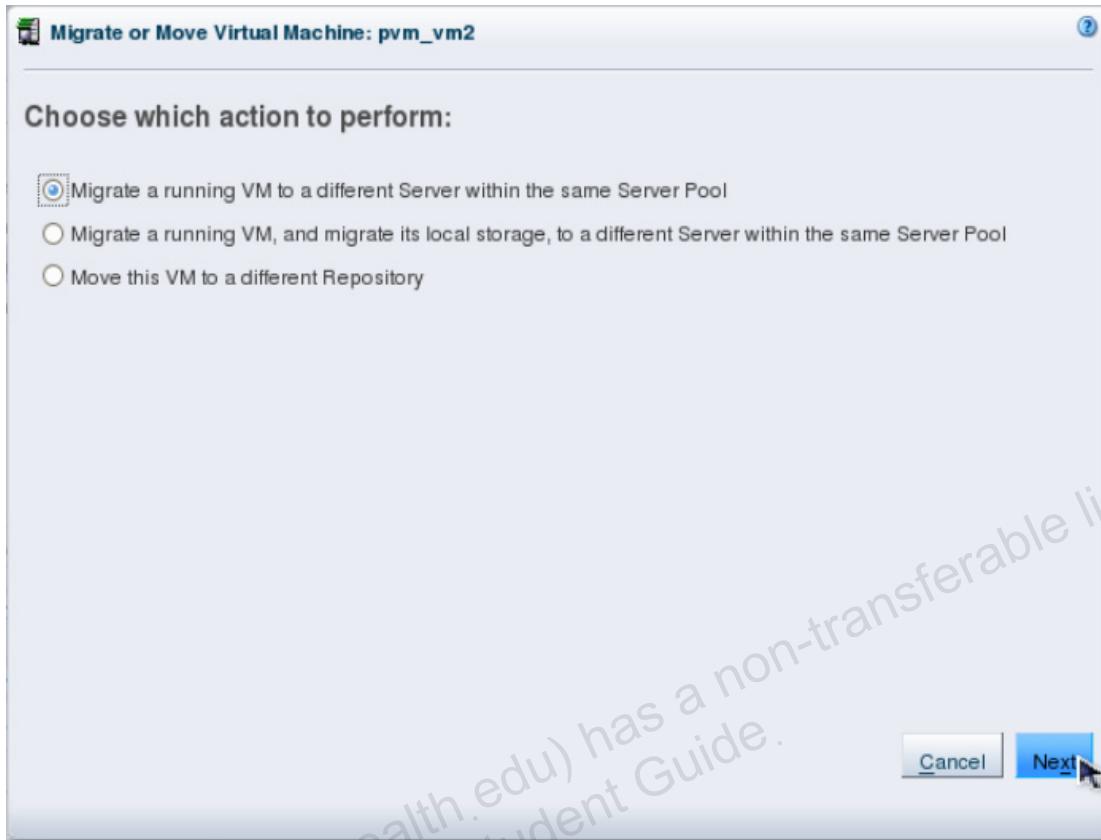


You can resize the columns to view this information. Oracle VM Manager displays disk mapping information on virtual machines.

- f. Highlight the pvm_vm2 virtual machine and click the Migrate or Move icon on the toolbar.



The Migrate or Move Virtual Machine window appears.



Note: You are presented with three options:

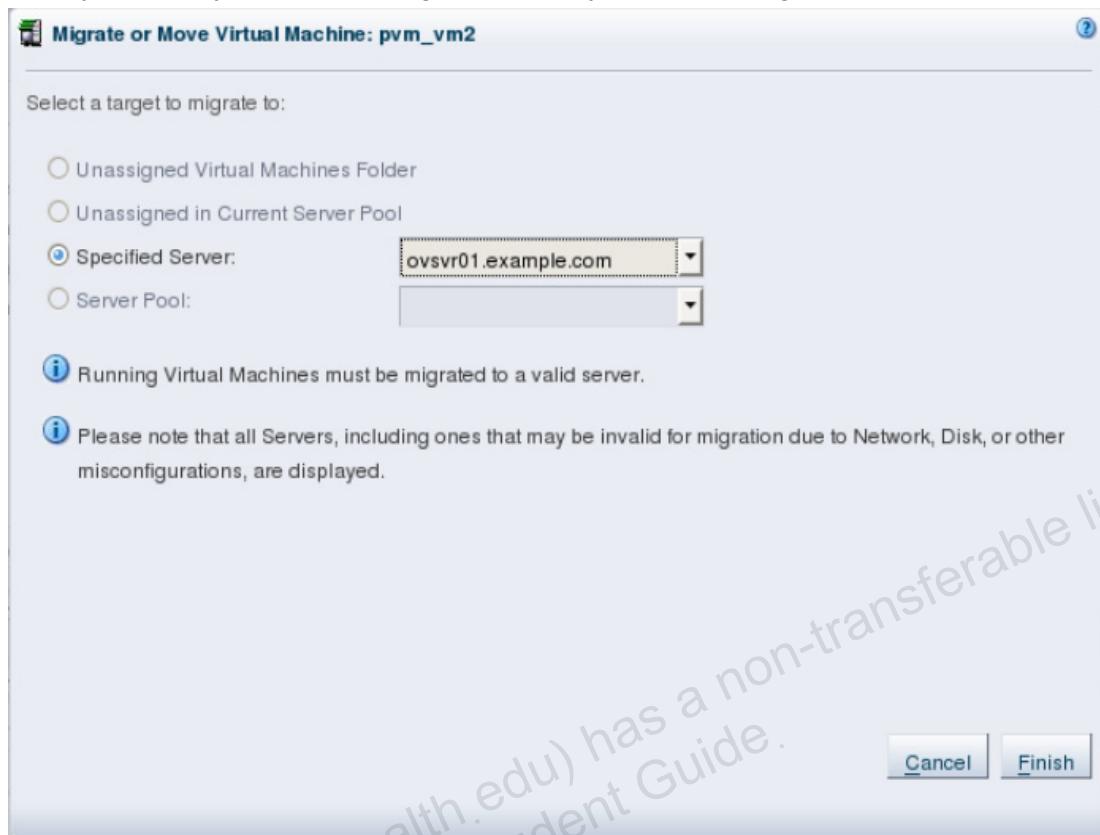
- Migrate a running VM to a different Server within the same Server Pool
- Migrate a running VM, and migrate its local storage, to a different Server within the same Server Pool
- Move this VM to a different Repository

You can read a description of these options by clicking the Help icon.

- g. Select "Migrate a running VM to a different Server within the same Server Pool", and click Next to continue.

Migrating a running virtual machine is a two step process. First, you select the action you want to perform.

Next, you specify a server or target to where you want to migrate the virtual machine.



Note

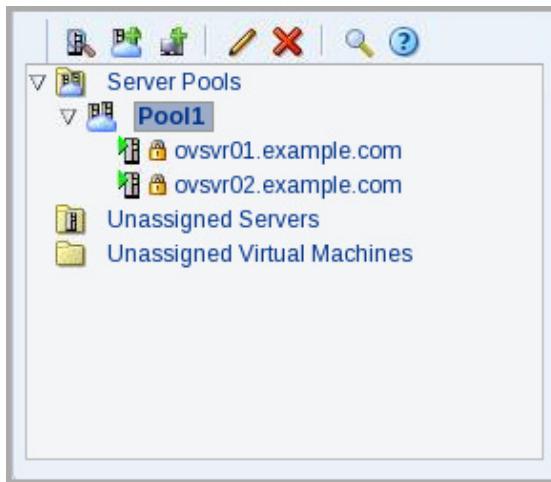
- In this example, the only specified Oracle VM server choice is `ovsvr01.example.com`, because it is the only other server in your environment.
- You cannot migrate the virtual machine to the Unassigned Virtual Machines Folder, because `pvm_vm2` is a running virtual machine, and can be migrated only to another Oracle VM server.
- You cannot live migrate `pvm_vm2` to any other server pool because the option you selected only migrates virtual machines to an Oracle VM server within the same server pool.

Click Finish to start the migration operation.

Note: In a production environment, live migration can be a quick process if the running virtual machine is not busy, or it can take much longer for a busy virtual machine.

In your lab environment, the process takes about three minutes.

During the migration process, the source and the target Oracle VM servers are locked.



Note

- Wait until the live migration job has completed and the Oracle VM servers are unlocked, before continuing with the next task. The virtual machine can already appear on the target server, but the migration process might still be active.
 - If you can no longer see the migrated virtual machine in the list of virtual machines in the management pane, make sure that you have selected **Pool1** in the navigation pane to display all the virtual machines in your environment.
- h. Verify that the virtual machine's virtual disks and configuration did not move by clicking the Expand button next to **pvm_vm2** and note the ID number of **pvm_vm2** and the location of the configuration file. Note that the virtual machine ID and the location of the configuration file did not change.
- i. Shut down **pvm_vm2** by highlighting **pvm_vm2** from the listing of virtual machines in the management pane and clicking the Stop icon from the toolbar. This action frees the system resources.
2. Migrate a non-running virtual machine.

Note: Migrating a non-running virtual machine is called “cold migration.”

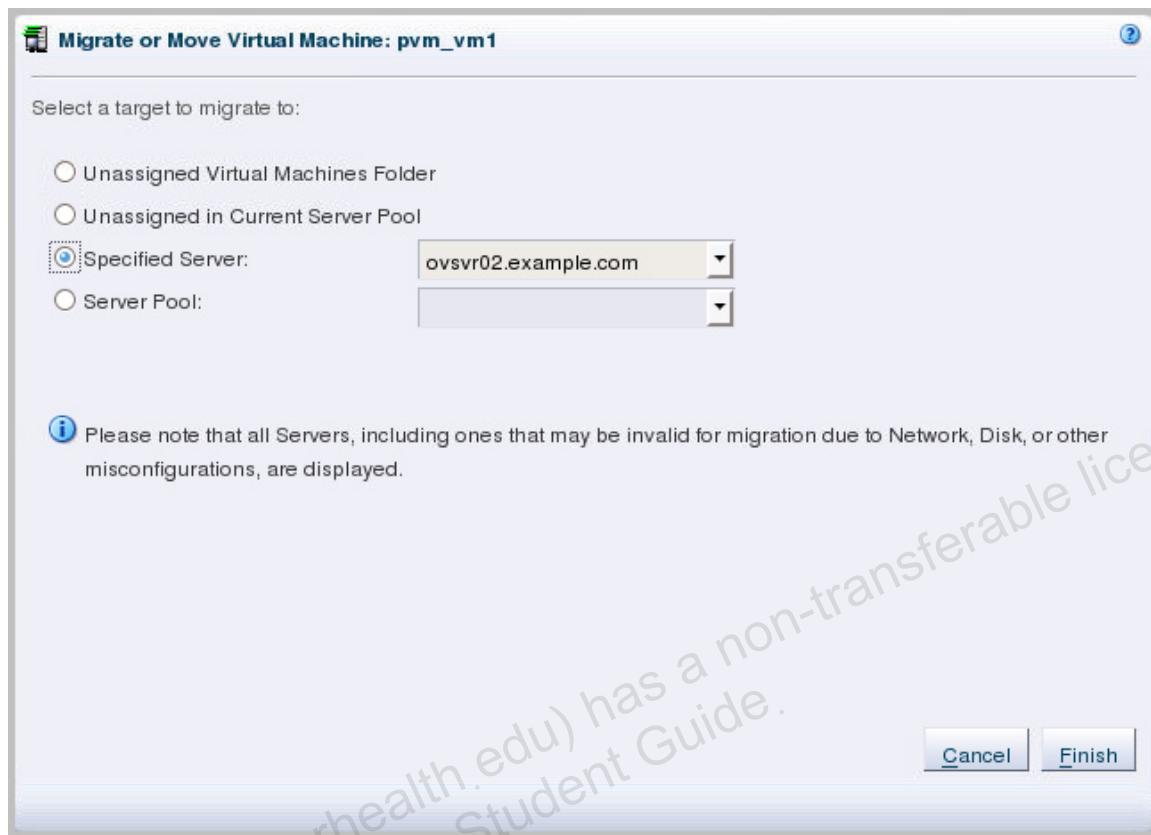
- a. Highlight the non-running virtual machine **pvm_vm1** and click the Migrate icon.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Migratable	Max Processors	Processor
pvm1	Stopped		Informational	ovs02.example.com	1024	1024	<input type="checkbox"/>	1	
pvm_vm1	Stopped		Informational	ovs01.example.com	1024	1024	<input checked="" type="checkbox"/>	1	
pvm_vm2	Stopped		Informational	ovs01.example.com	1024	1024	<input type="checkbox"/>	1	
pvm_vm3	Stopped		Informational	ovs02.example.com	1024	1024	<input type="checkbox"/>	1	

The “Migrate or Move Virtual Machine: pvm_vm1” window appears.



- b. Select the “Migrate a VM to a different Server, Server Pool, or Unassigned State” option button click and click Next to continue.



You can migrate non-running virtual machines:

1. To a specified Oracle VM server in the server pool
 2. To the server pool itself by removing it from its current server
 3. To the Unassigned Virtual Machines folder
 4. To a different server pool
- c. Select the Specified Server option button. In the screenshot above, the only possible selection is `ovsvr01.example.com`, and click Finish to begin the migration operation.

The `pvm_vm1` virtual machine is now associated with the `ovsvr01.example.com` Oracle VM server.

Practice 6-8: Use the High Availability (HA) Feature

Overview

High availability for virtual machines is available at the Oracle VM server and the virtual machine levels.

- If an Oracle VM server is shut down or fails, the virtual machines that are running on that server that have high-availability enabled restart on another available Oracle VM server, or on the same server when it is restarted.
- If a virtual machine fails, it is restarted automatically on the same Oracle VM server or possibly on another server.

Note: If you shut down a virtual machine from its guest OS, the Oracle VM Manager restarts the virtual machine automatically if it is enabled for high availability. If you want to shut down a highly available virtual machine, use the Oracle VM Manager to shut it down by using the Stop action.

In this practice, you perform the following tasks:

- Enable high availability on a running virtual machine.
- Restart the Oracle VM server where the highly available virtual machine is currently running.
You restart the Oracle VM server by stopping and starting the virtual machine in which the Oracle VM server is running to simulate a server outage.
- Observe what happens to the virtual machine when the Oracle VM server on which it is running is restarted.

Assumptions

This practice assumes that you have a running virtual machine on one of your Oracle VM servers.

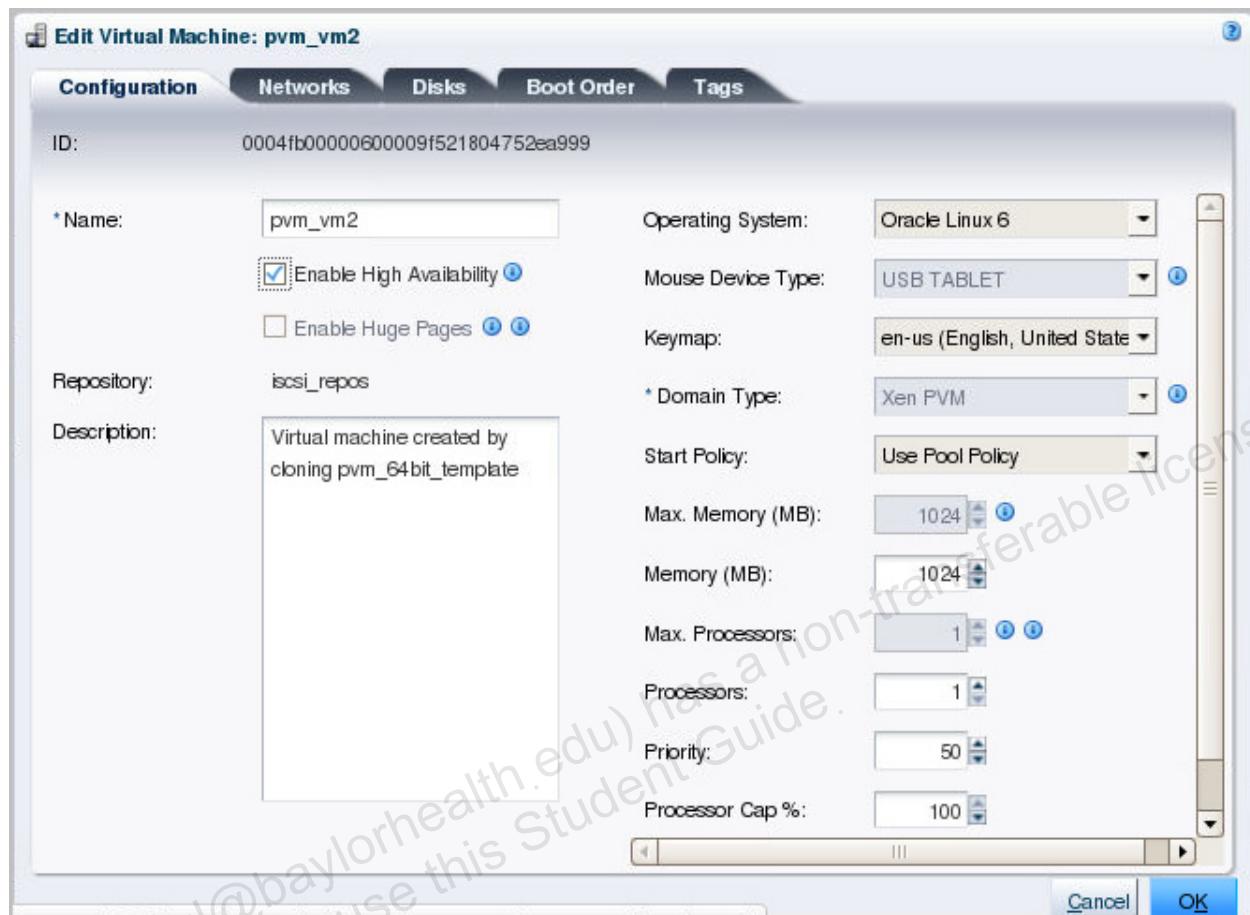
Tasks

1. Enable high availability on the running virtual machine.
 - a. Start `pvm_vm2`.

- b. From the list of virtual machines for server pool Pool1, highlight the running virtual machine and click the Edit icon.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pro
pvm1	Stopped		Informational	ovs...pl...	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsvr02.exampl...	1024	1024	1	1
pvm_vm2	Running		Informational	ovsvr02.exampl...	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsvr01.exampl...	1024	1024	1	1

- c. Select the Enable High Availability check box and click OK to complete the edit operation.



2. Restart the Oracle VM server where the virtual machine is running and observe what happens to the “highly available” running virtual machine.
- Note which Oracle VM server has the running virtual machine.
 - Highlight the Pool1 server pool in the navigation tree and select Servers from the Perspective drop-down list in the management pane.

- c. Highlight the Oracle VM server where the running virtual machine is located and click the Restart icon.

The screenshot shows the Oracle VM Manager application window. The top navigation bar includes Health, Servers and VMs (selected), Repositories, Networking, Storage, Reports and Resources, and Jobs. The left sidebar shows Server Pools (with Pool1 containing ovsrv01.example.com and ovsrv02.example.com) and Unassigned Servers/Virtual Machines. The main pane displays a table of servers:

Name	Status	Tag(s)	Maintenance Mode	IP Address	Mem	Processor	Speed (GHz)
ovsrvr01.example.com	Running		Off	192.0.2.101	3.5	1	2.99
ovsrvr02.example.com	Running		Off	192.0.2.102	2.0	1	2.99

The URL in the address bar is https://ovmmgr01.example.com:7002/ovm/console/faces/resource/resourceView.jspx#.

- d. Click OK in the Confirmation dialog box.



The job fails.

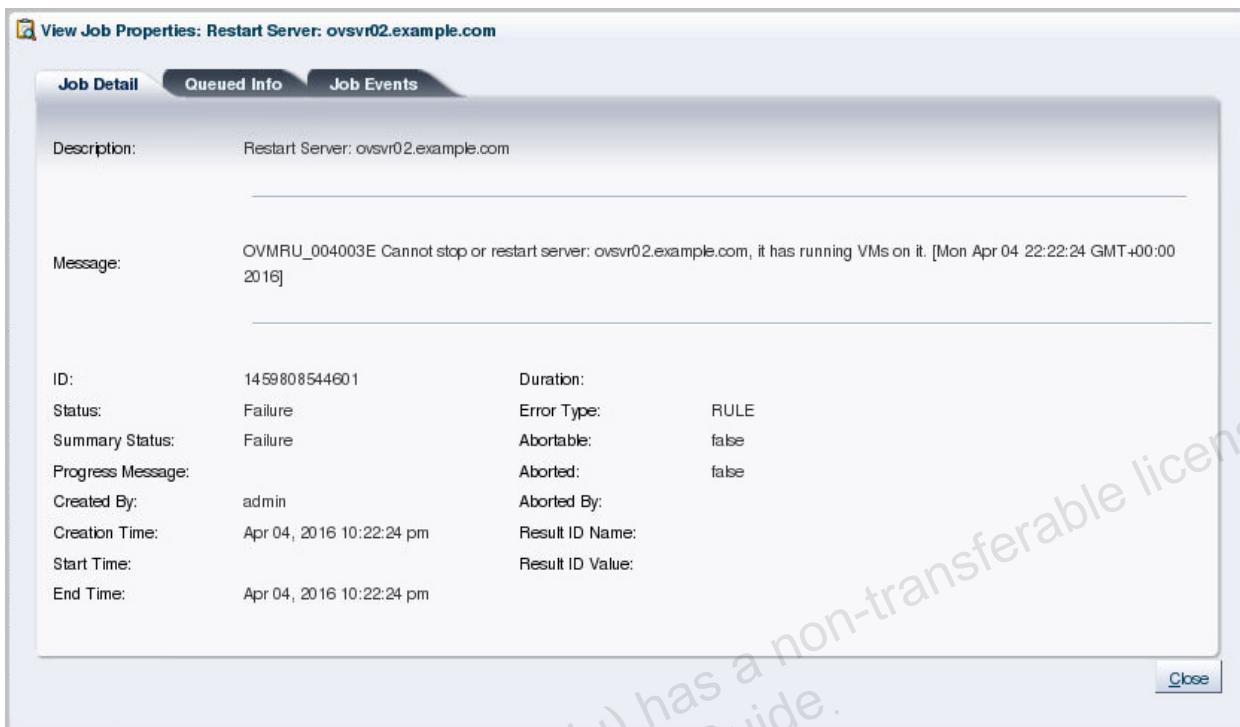
- e. Locate the Restart Server job in the Job Summary pane and click the Details button.

The screenshot shows the Job Summary pane. The header indicates 5 Total Jobs, 0 Pending, 0 In Progress, 1 Failed, 0 Aborted, and 4 Complete. The table lists the jobs:

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Restart Server: ovsrv02.example.com	Failure		OVMRU_00400...	Apr 04, 2016 10:22:24 pm		Abort	Details
Modify VM: pvm_vm2	Success			Apr 04, 2016 10:20:17 pm	1s	Abort	Details

The "View Job Properties: Restart Server" window appears.

The message on the job Detail tab provides the reason you could not stop the Oracle VM server.



You cannot restart an Oracle VM server that has running virtual machines on it.

Note: If you want to stop or restart an Oracle VM server that has running virtual machines on it, you can turn on maintenance mode on the server. The running virtual machines on the Oracle VM server are migrated to other available servers.

- f. Click Close to exit the Details window.
3. As part of this task, you stop the Oracle VM server by killing the virtual machine in which the server is running from your lab machine.

If you log in to your Oracle VM server and issue the `shutdown -h` command, the virtual machine that is running on the server takes a few minutes to restart on the other server, because it is still seen as alive for a while as the server shuts down. For this reason, you will kill the Oracle VM server from your lab machine to simulate a sudden failure.

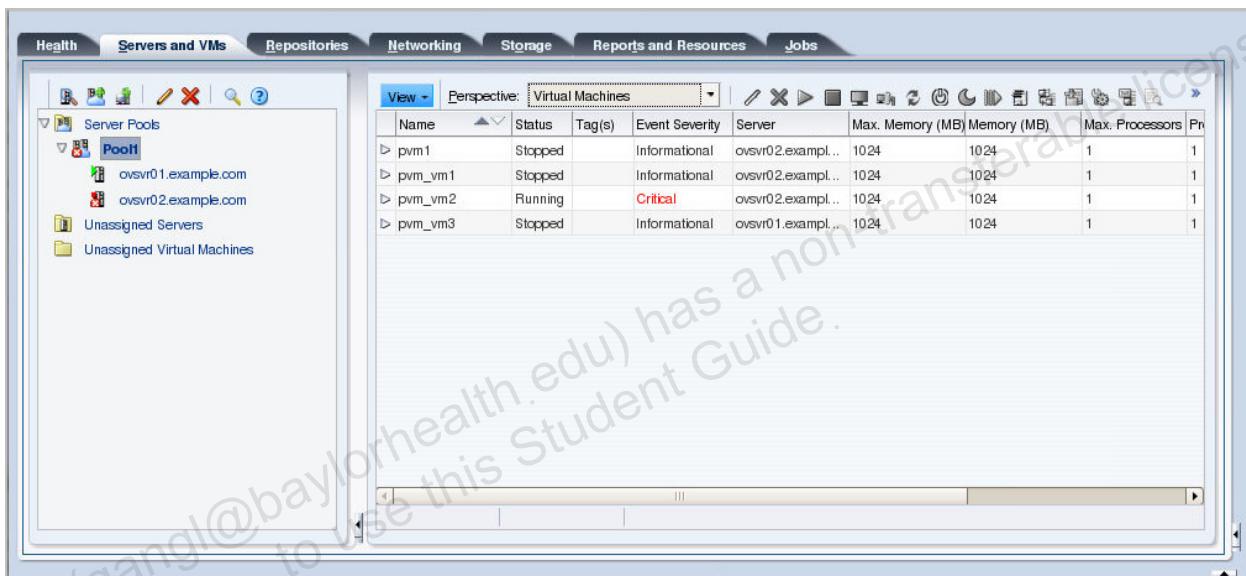
- a. Note which Oracle VM server, `ovsvr01.example.com` or `ovsvr02.example.com`, has the running virtual machine.
- b. On the desktop of your lab machine, open a terminal window and switch to the `root` user.
- c. Display the list of virtual machines running on your lab machine by issuing the `xm list` command:

```
[root@<your lab machine> ~]# xm list
Name          ID  Mem  VCPUs      State   Time(s)
Domain-0       0   2048       2      r-----  6891.2
ovmmgr01      5   7168       2      -b----  7963.3
ovsvr01        2   3584       1      -b----  19815.5
ovsvr02        4   2048       1      -b----  12178.1
[root@<your lab machine> ~]#
```

- d. Issue the `xm destroy ovsrv0x` command, where `x` is either 1 or 2, to terminate the Oracle VM server where the `pvm_vm2` virtual machine is running. In this example, `ovsvr02` is selected:

```
[root@<your lab machine> ~]# xm destroy ovsrv02
[root@<your lab machine> ~]#
```

4. In the Oracle VM Manager UI, monitor the events triggered by terminating the Oracle VM server.
- Examine the changes to the Oracle VM server that is terminated abruptly.
 - Click the Servers and VMs tab.
 - Highlight the `Pool1` server pool in the navigation pane.
 - Select Virtual Machines from the Perspective drop-down list.



The Oracle VM server icon turns red, indicating that it is not running.

The Oracle VM server has an additional red stop icon against it, indicating that it has one or more error events associated with it.

Note: Your screen might differ from the preceding screenshot, depending on which Oracle VM server was terminated.

When there is a red icon on any object, you can examine the events reported for this object.

- Examine the events associated with the terminated Oracle VM server.
 - Click the Servers and VMs tab.
 - Expand the server pool `Pool1` folder to expose its servers in the navigation pane.
 - Highlight the server that is down (for example, `ovsvr02.example.com`) in the navigation pane.
 - Select Events from the Perspective drop-down list in the management pane.

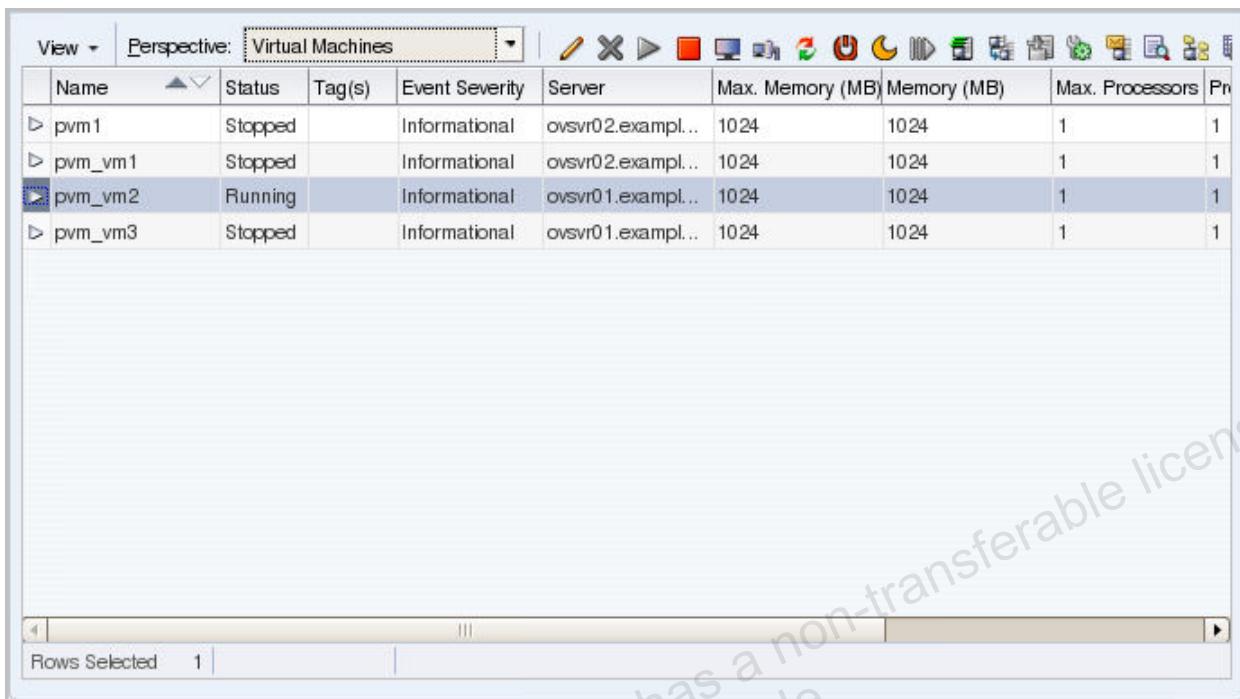
You can follow the sequence of events from the time you issued the `xm destroy` command from your lab machine.

- The server is stopped.
 - There is a connection failure.
 - The server cluster is down.
 - The server is offline.
- c. Click the Health tab to view the status of your Oracle VM environment.

The summary shows one Oracle VM server offline and one virtual machine offline.

- d. Check the status of `pvm_vm2`, the virtual machine that was running on the terminated Oracle VM server.
- Click the Servers and VMs tab.
 - Highlight server pool `Pool1` in the navigation tree.
 - Select Virtual Machines from the Perspective drop-down list.
- The list of virtual machines appears in the management pane.

In your environment, it takes about five minutes for the virtual machine to restart on the remaining online Oracle VM server, which is ovsrv01.example.com in this example.



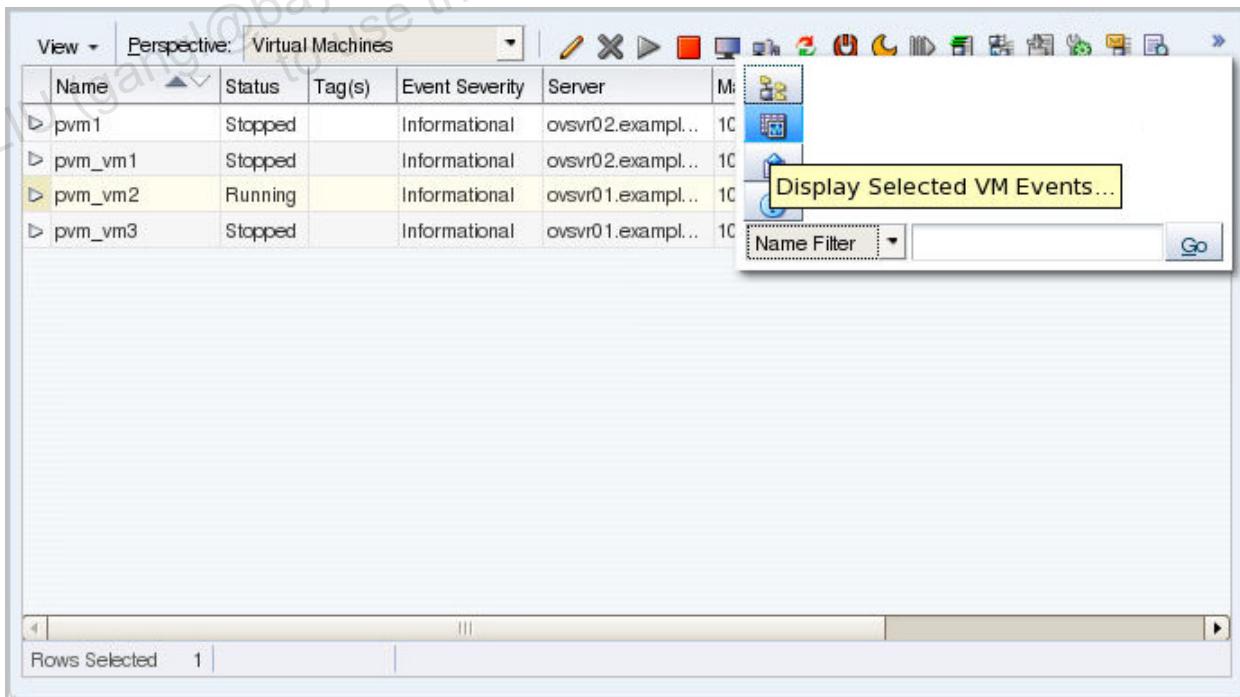
Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pro
pvm1	Stopped		Informational	ovsrv02.example.com	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsrv02.example.com	1024	1024	1	1
pvm_vm2	Running		Informational	ovsrv01.example.com	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsrv01.example.com	1024	1024	1	1

- e. View the events for the pvm_vm2 virtual machine.

Highlight the pvm_vm2 virtual machine in the list of virtual machines.

Find the “Display Selected VM Events” icon on the toolbar in the management pane.

You might have to click the double arrow on the toolbar to expose the hidden icons.



Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Pro
pvm1	Stopped		Informational	ovsrv02.example.com	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsrv02.example.com	1024	1024	1	1
pvm_vm2	Running		Informational	ovsrv01.example.com	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsrv01.example.com	1024	1024	1	1

The Selected VM Events as shown. Note that it can take a few minutes for the events for the pvm_vm2 virtual machine to appear as follows:

Severity	Timestamp	Modify Time	Type	Summary
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.running.	Virtual Machine is Running
Critical	Apr 04, 2016 10...	Apr 04, 2016 10...	vm.error.offline.	Virtual Machine is Offline
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.stopped.	Virtual Machine is Stopped
Critical	Apr 04, 2016 10...	Apr 04, 2016 10...	vm.error.discon...	Virtual Machine Disconne...
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.running.	Virtual Machine is Running
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.starting.	Virtual Machine is Starting
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.stopped.	Virtual Machine is Stopped
Informational	Apr 04, 2016 10...	Apr 04, 2016 10...	runstate.stopping.	Virtual Machine is Stopping
Informational	Apr 04, 2016 9...	Apr 04, 2016 10...	vm.migrating.	Virtual Machine Live Migr...
Informational	Apr 03, 2016 4...	Apr 03, 2016 4...	vm.domain.mis...	Domain Type for VM: "Xe..."

The virtual machine stopped running on the terminated Oracle VM server and restarted on the other Oracle VM server, which is ovsvr01.example.com in this example.

Click Close to close the Events for pvm_vm2 window.

Summary

- Many events against a server (or a virtual machine, repository, or storage object) are acknowledged automatically, when they can be resolved. There are some instances where you must acknowledge a critical event to clear it. To clear critical events, access the events pane for the object and click the Acknowledge or Acknowledge All icon.
- In the case of an Oracle VM server failure, Oracle VM restarts only the virtual machines that have high availability enabled. You can migrate and start the other virtual machines manually.
- When you terminate an Oracle VM server by using the xm destroy command, the highly available virtual machine that is running on that server starts running on the other available server in the server pool. If no other server is available, the virtual machine restarts on the failing server when it is back online.
- Where a virtual machine is started or restarted depends on several factors, including the VM Start policy for the server pool, the anti-affinity groups, the active DRS/DPM server policies, and the “Inbound Migration Locked” setting of the remaining, active Oracle VM servers in the server pool.

Anti-affinity is covered in the next practice.

5. Restart the terminated Oracle VM server.

Note: Wait for the highly available virtual machine to restart on the running Oracle VM server before proceeding with this task.

- On the desktop of your lab machine, open a terminal window and switch to the `root` user.
- Display the list of virtual machines running on your lab machine by issuing the `xm list` command:

```
[root@<your lab machine> ~]# xm list
Name           ID   Mem  VCPUs      State   Time(s)
Domain-0       0    2048     2        r----- 7017.2
ovmmgr01      5    7168     2        r----- 8189.3
ovsvr01       2    3584     1        ----- 20078.0
[root@<your lab machine> ~]#
```

One Oracle VM server, `ovsvr01` or `ovsvr02`, is not showing in the list. Restart this missing Oracle VM server. In this example, `ovsvr02` will be restarted.

- Access the directory for the missing Oracle VM server.

```
[root@<your lab machine> ~]# cd /OVS/running_pool/ovsvr02
[root@edudr26p0 ovsvr02]# ls
local_storage.img  system.img  vm.cfg
[root@<your lab machine> ~]#
```

- Restart the missing Oracle VM server by issuing the `xm create` command.

```
[root@<your lab machine> ~]# xm create vm.cfg
Using config file "./vm.cfg".
Started domain ovsvr02 (id=6)
[root@<your lab machine> ~]#
```

- Display the list of virtual machines to verify that the virtual machine for `ovsvr02` is restarting.

```
[root@<your lab machine> ~]# xm list
Name           ID   Mem  VCPUs      State   Time(s)
Domain-0       0    2048     2        r----- 7031.2
ovmmgr01      5    7168     2        -b---- 8204.1
ovsvr01       2    3584     1        r----- 20095.9
ovsvr02       6    2048     1        -----  8.9
[root@<your lab machine> ~]#
```

The restart takes about four minutes. You can follow the progress of the restart by monitoring the events for the restarting Oracle VM server from the Oracle VM Manager UI.

- f. Before continuing with the next practice, verify that the Oracle VM server is online.

The screenshot shows the Oracle VM Server interface with the 'Events' perspective selected. On the left, there's a tree view of server pools, one of which contains two servers: 'ovsvr01.example.com' and 'ovsvr02.example.com'. Both servers have solid green icons, indicating they are online. The main pane displays a table of events with columns: Severity, Timestamp, Modify Time, Type, and Summary. The table lists various log entries, including server start/stops, cluster state changes, and lifecycle events. A watermark across the screen reads: 'DANG LIU (gangl@baylorhealth.edu) has a non-transferable license to use this Student Guide.'

Severity	Timestamp	Modify Time	Type	Summary
Informational	Apr 04, 2016 10:50:01 pm	Apr 04, 2016 10:50:01 pm	runstate.running.	Server is Running
Informational	Apr 04, 2016 10:49:32 pm	Apr 04, 2016 10:49:42 pm	server.cluster.state.up.	Server Cluster is Up
Informational	Apr 04, 2016 10:49:30 pm	Apr 04, 2016 10:49:30 pm	runstate.starting.	Server is Starting
Informational	Apr 04, 2016 10:49:25 pm	Apr 04, 2016 10:49:25 pm	server.started.	Agent started
Critical	Apr 04, 2016 10:30:27 pm	Apr 04, 2016 10:49:31 pm	server.offline.	Server is Offline
Informational	Apr 04, 2016 10:30:27 pm	Apr 04, 2016 10:49:32 pm	server.cluster.state.down.	Server Cluster is Down
Critical	Apr 04, 2016 10:29:06 pm	Apr 04, 2016 10:30:27 pm	server.disconnected.	Server Connection Failure
Informational	Apr 04, 2016 10:29:06 pm	Apr 04, 2016 10:29:06 pm	runstate.stopped.	Server is Stopped
Informational	Mar 31, 2016 2:59:03 am	Apr 04, 2016 10:30:27 pm	server.cluster.state.up.	Server Cluster is Up
Informational	Mar 31, 2016 2:58:27 am	Mar 31, 2016 2:59:03 am	server.cluster.state.down.	Server Cluster is Down
Informational	Mar 31, 2016 1:37:48 am	Apr 04, 2016 10:50:09 pm	lifecycle.modify.	Object changed
Informational	Mar 31, 2016 1:37:48 am	Mar 31, 2016 1:37:48 am	lifecycle.create.	Object created
Informational	Mar 31, 2016 1:37:25 am	Mar 31, 2016 1:37:25 am	runstate.running.	Server is Running
Informational	Mar 31, 2016 1:37:17 am	Mar 31, 2016 1:37:17 am	runstate.starting.	Server is Starting

The solid green icon on the restarted Oracle VM server indicates that it is online, and is part of the server pool cluster.

Practice 6-9: Use the Anti-Affinity Feature

Overview

Anti-affinity groups specify that certain virtual machines must never run on the same Oracle VM server within a server pool.

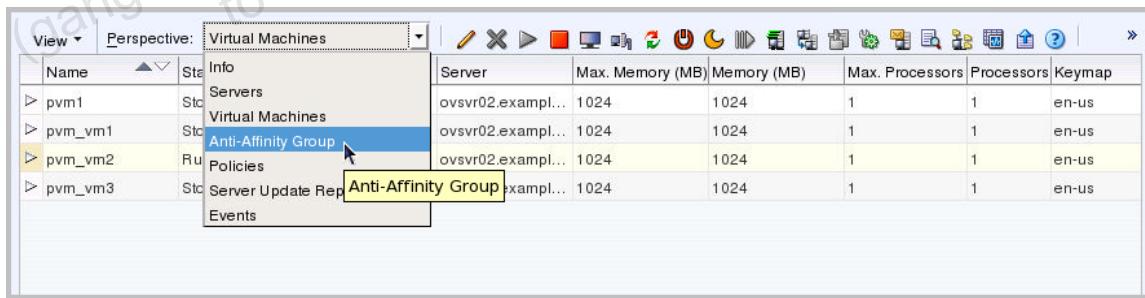
An anti-affinity group applies to all the Oracle VM servers in a server pool.

You set up anti-affinity groups when you want to incorporate redundancy or load balancing of specific applications in your server pool.

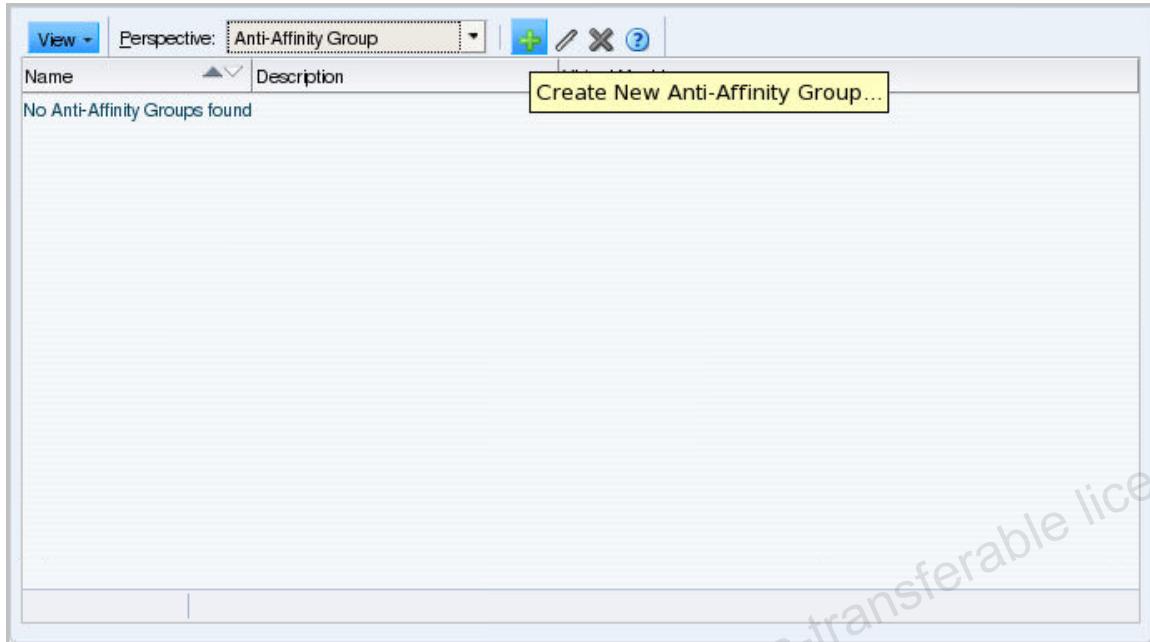
In this practice, you create an anti-affinity group for your server pool and observe the outcome of this action.

Tasks

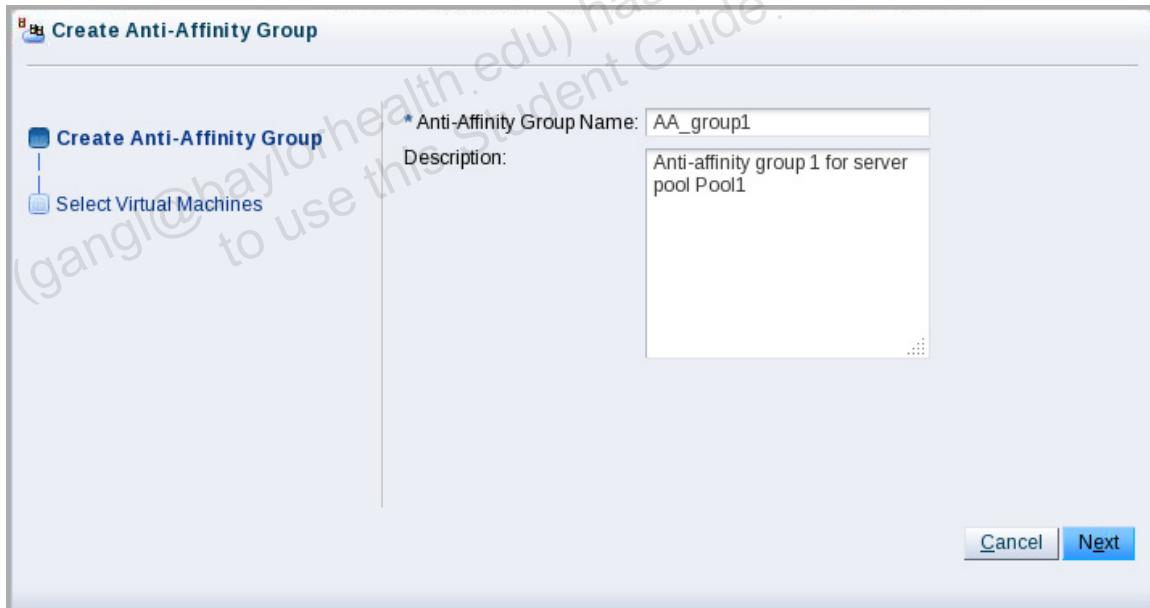
1. Create an anti-affinity group.
 - a. Click the Servers and VMs tab, highlight the server pool in the navigation pane, and select Virtual Machines from the Perspective drop-down list.
 - b. Take note of the following:
 - The name of the only virtual machine that is running
 - The name of the Oracle VM server on which the running virtual machine is located
 - The names of two virtual machines that are located on the same Oracle VM server, including the running virtual machine. In this example, pvm_vm2 and pvm_vm1 are located on ovsrvr01.example.com.
 - c. If you do not have a second virtual machine in addition to the running virtual machine on the same Oracle VM server, (cold) migrate a non-running virtual machine to the Oracle VM server where the running virtual machine is located.
 - d. In the navigation tree, select your server pool, Pool1, and select Anti-Affinity Group from the Perspective drop-down list in the management pane.



- e. Click the Create New Anti-Affinity Group icon.

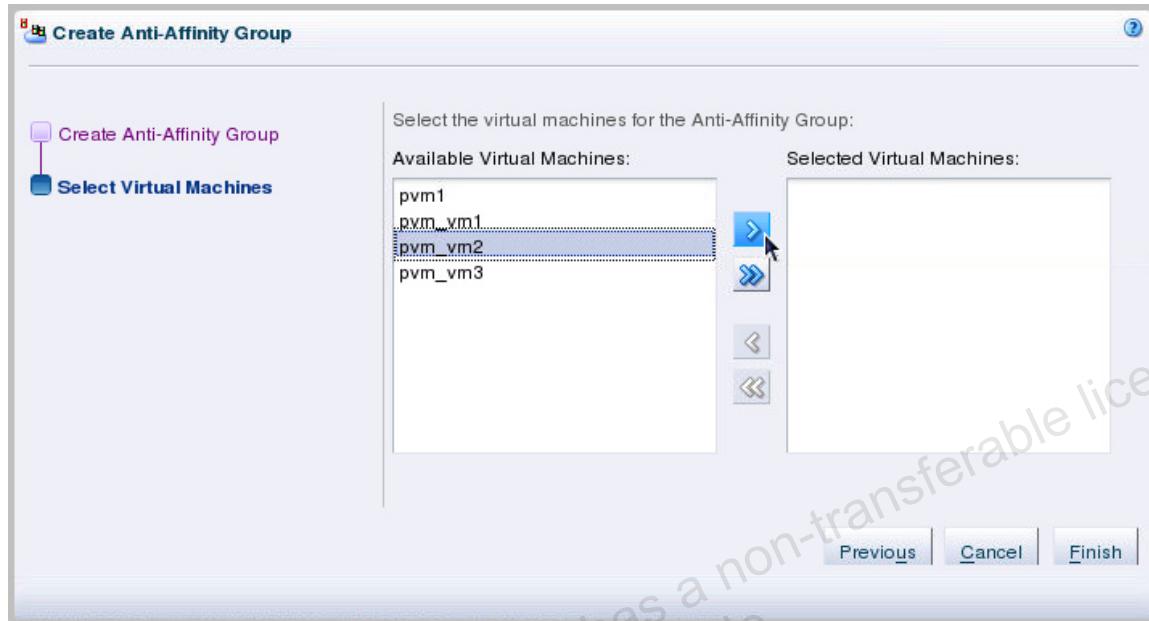


- f. In the Create Anti-Affinity Group window, enter a name and description for your new group.

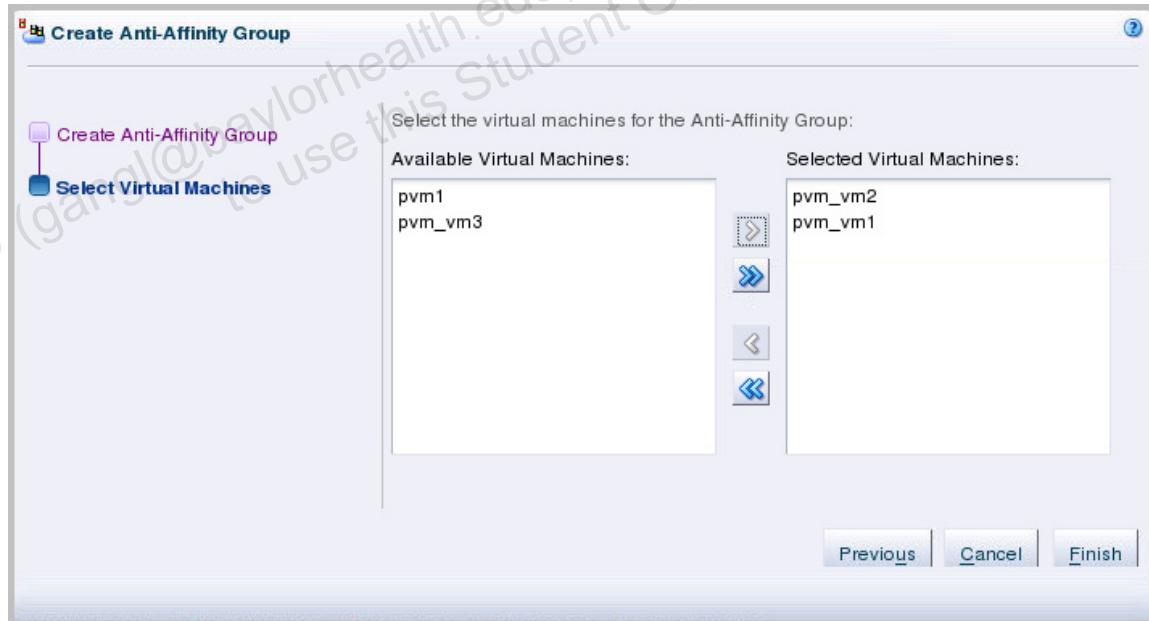


Click Next to move to the second window.

- g. In the Select Virtual Machines window, select the two virtual machines that are currently on the same Oracle VM server. In this example, pvm_vm2 and pvm_vm1 are on the ovsrv02.example.com server. Select the running virtual machine first. as shown:



Repeat the task for pvm_vm1. Your window should look as follows:



Click Finish to complete the operation.

The job partially fails.

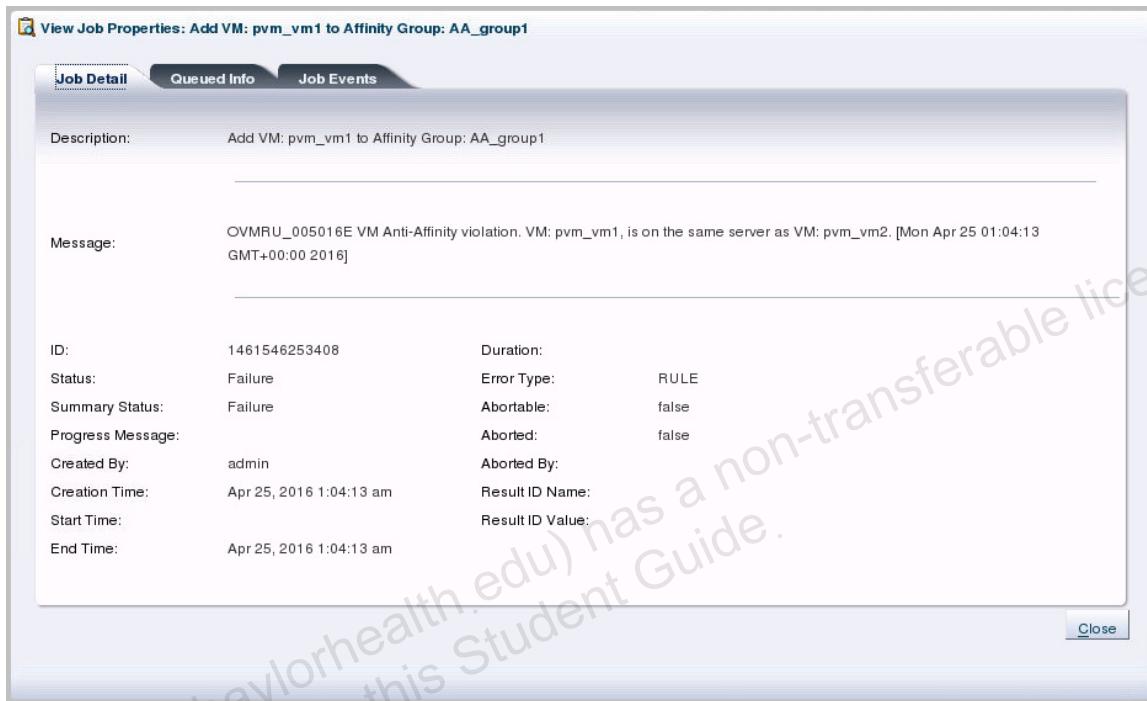
Job Summary: 15 Total Jobs 0 Pending 0 In Progress 3 Failed 0 Aborted 12 Complete								
Description	Status	Progress	Message	Timestamp	Duration	Abort	Details	
Add VM: pvm_vm1 to Affinity Group: AA_group1	Failure		OVMRU_005016E VM Anti-Affinity viol...	Apr 25, 2016 1:04:13 am		Abort	Details	
Add VM: pvm_vm2 to Affinity Group: AA_group1	Success			Apr 25, 2016 1:04:13 am	44ms	Abort	Details	
Create Affinity Group: AA_group1 on Server Pool: Po...	Success			Apr 25, 2016 12:52:16 am	19ms	Abort	Details	

The job to create the anti-affinity group succeeds.

The job to add pvm_vm2 to the anti-affinity group succeeds.

The job to add pvm_vm3 to the anti-affinity group fails.

2. View the error message for the failed job.
 - a. In the Job Summary pane, locate the failed job, which is associated with creating the new anti-affinity group called AA_group1.
 - b. Click the Details button for the failed job.

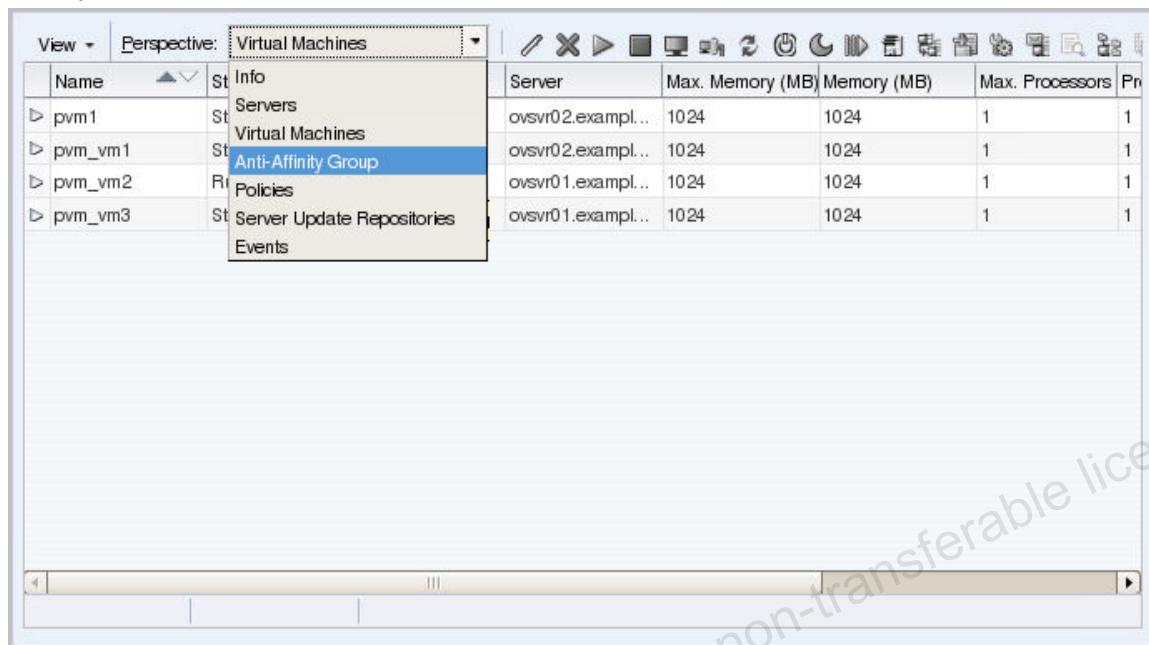


The message “OVMRU_005016E VM Anti-Affinity violation. VM: pvm_vm1 is on the same server as VM: pvm_vm2.” indicates that you cannot add virtual machines to an anti-affinity group if those virtual machines reside on the same Oracle VM server, whether the virtual machines are running or not.

Note: The virtual machines referenced in the message might be different in your lab environment.

- c. Click Close to exit the message window.
3. Add a second virtual machine to the anti-affinity group.
In this example, pvm_vm2 was added successfully to the anti-affinity group AA_group1.
- a. Find and note the name of another virtual machine, running or not, which is not located on the same Oracle VM server as pvm_vm2.
In this example, pvm1 is located on ovsvr02.example.com, and can be added to the anti-affinity group.

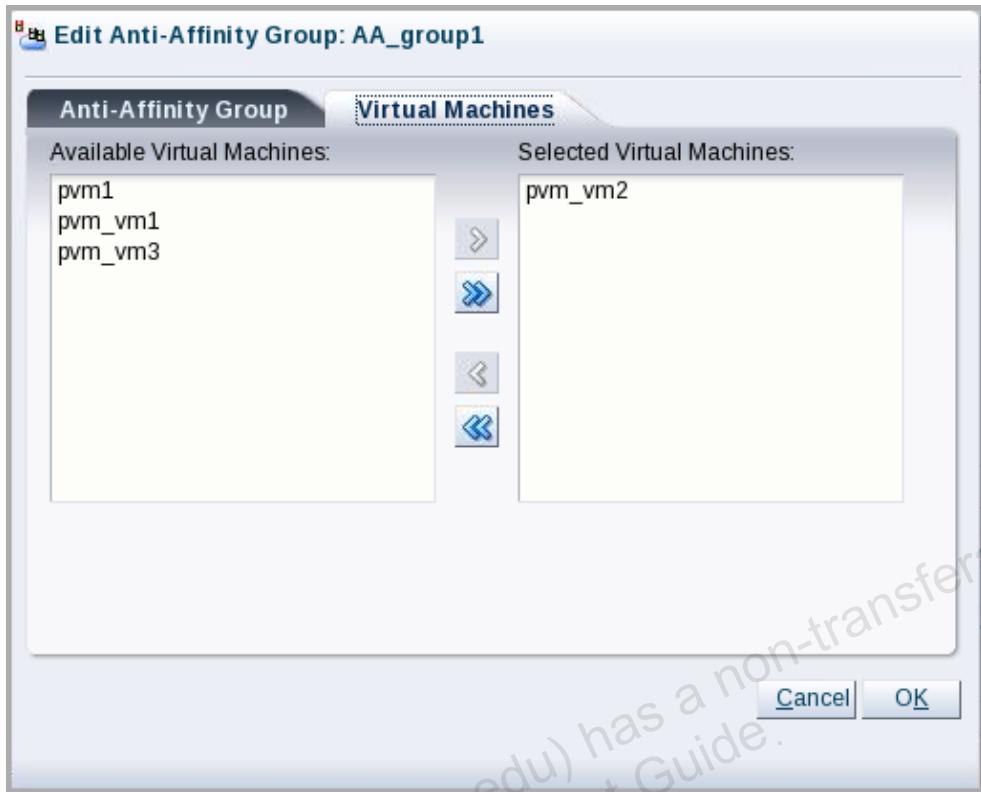
- b. On the Servers and VMs tab, highlight Pool1 in the navigation pane and select Anti-Affinity Group from the Perspective drop-down list.



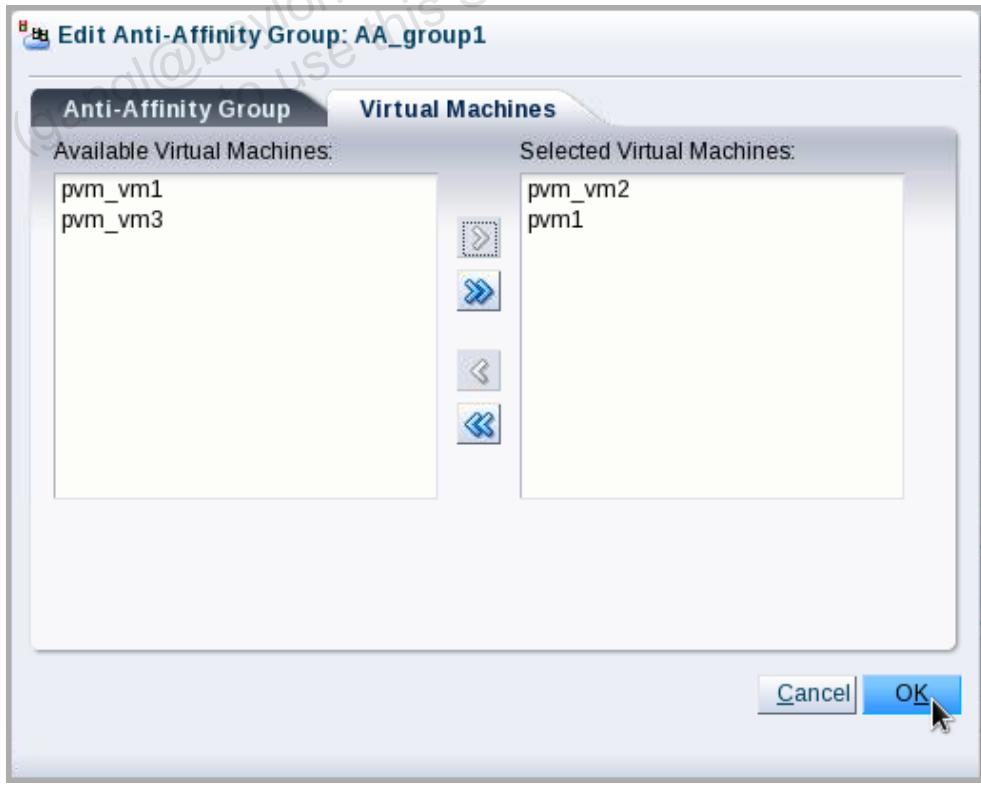
- c. In the management pane, highlight the existing anti-affinity group and click the Edit Anti-Affinity Group icon.



- d. Click the Virtual Machines tab in the Edit Anti-Affinity Group: AA_group1 window.



- e. Move the virtual machine that is not on the same Oracle VM server as you determined in step a. of this task. In this example, the virtual machine is pvm1.



Click OK to complete the edit operation.

The job to add the virtual machine to the anti-affinity group is successful.

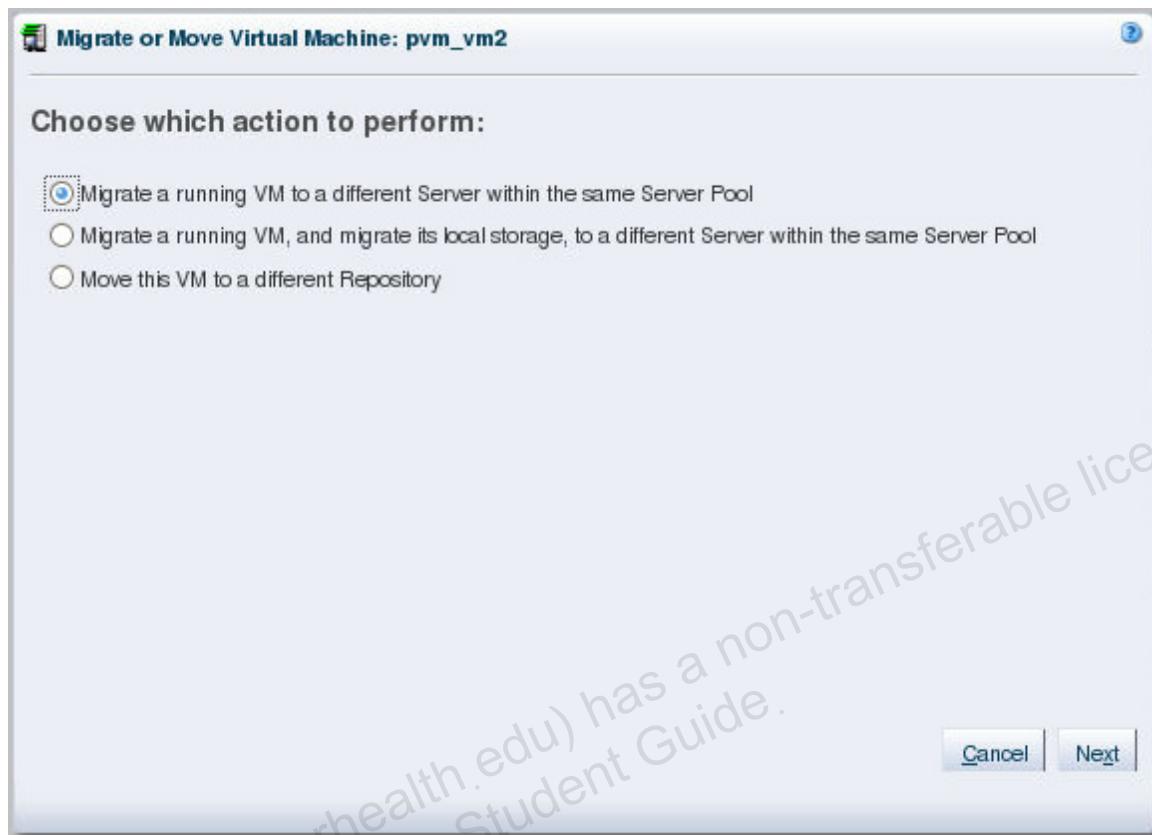
You can view the list of virtual machines in all defined anti-affinity groups from the Anti-Affinity Group perspective.

Name	Description	Virtual Machines
AA_group1	Anti-affinity group 1 for server pool ...	pvm_vm2,pvm1

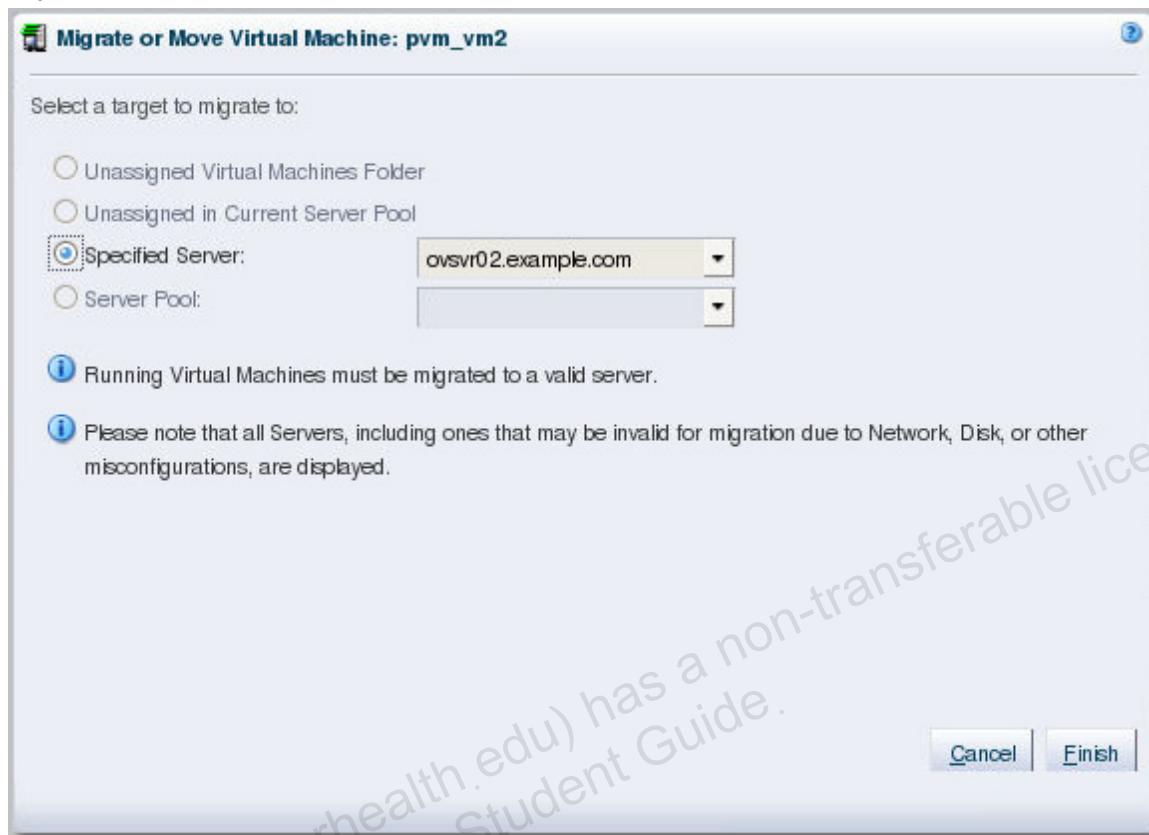
4. Migrate one of the virtual machines in the anti-affinity group. In the following example, the pvm_vm2 virtual machine is used for the migration operation.
 - a. From the Servers and VMs tab, highlight server pool Pool1 in the navigation pane.
 - b. In the management pane, select the Virtual Machines perspective.
 - c. Highlight pvm_vm2, which is one of the virtual machines in the AA_group1 anti-affinity group, and click the Migrate or Move icon.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	M
pvm1	Stopped		Informational	ovsvr02.example...	1024	1024	
pvm_vm1	Stopped		Informational		1024	1024	
pvm_vm2	Running		Informational	ovsvr01.example...	1024	1024	
pvm_vm3	Stopped		Informational	ovsvr01.example...	1024	1024	

- d. Select Migrate a running VM to a different Server within the same Server Pool as shown. Click Next.



- e. In the Migrate or Move Virtual Machine window, examine the choices that are available to you.



The choices are different if the virtual machine selected for migration is running or not.

- If your virtual machine is running, the Unassigned Virtual Machines Folder and “Remove from Server” options are not available.
 - If your virtual machine is not running, you can select the Unassigned Virtual Machines Folder or the “Remove from Server” option.
 - You cannot move the virtual machine to another server pool, because there is only one server pool in your environment.
- f. Click the Cancel button to exit the Migrate or Move Virtual Machine window.
You cancel the migration operation to retain the two virtual machines in the anti-affinity group. If you do not cancel the operation, the next task does not succeed.
5. Put the Oracle VM server with the running virtual machine in maintenance mode.
Recall that for both the Oracle VM servers in your environment, there is a virtual machine residing on each server that is listed in the AA_group1 anti-affinity group. One of these virtual machines is currently running.
In the following example, the Oracle VM server ovsvr01.example.com, which has the running virtual machine, is used for the operation.

- a. Examine the list of virtual machines and their locations.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processor Speed (GHz)
pvm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm1	Stopped		Informational	ovsvr02.example.com	1024	1024	1	1
pvm_vm2	Running		Informational	ovsvr01.example.com	1024	1024	1	1
pvm_vm3	Stopped		Informational	ovsvr01.example.com	1024	1024	1	1

Rows Selected 1

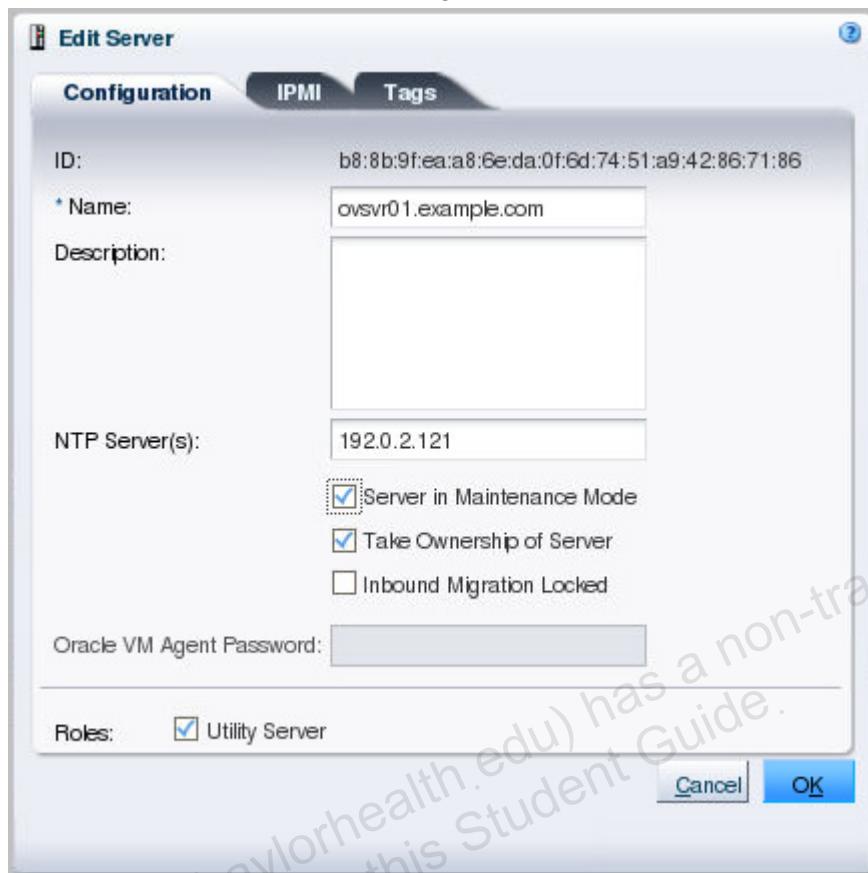
Note the name of the running virtual machine and the Oracle VM server on which it is running. In this example, pvm_vm2 is running and is associated with ovsvr01.example.com.

- b. With Pool1 highlighted in the navigation pane, select Servers from the Perspective drop-down list.
 c. Highlight ovsvr01.example.com and click the Edit icon on the toolbar.

Name	Status	Tag(s)	Maintenance Mode	IP Addr	Edit...	Memory (GiB)	Processors	Speed (GHz)
ovsvr01.example.com	Running		Off	192.0.2.101	3.5	1	2.99	
ovsvr02.example.com	Running		Off	192.0.2.102	2.0	1	2.99	

Rows Selected 1

- d. In the Edit Server window, select the “Server in Maintenance Mode” check box and click OK, as shown in the following screenshot:



The operation to enable maintenance mode completes successfully and the ovs0r01.example.com server is now in maintenance mode.

Notice the event icon on ovs0r01.example.com in the navigation tree.

Name	Status	Tag(s)	Maintenance Mode	IP Address	Memory (GiB)	Processors	Speed (GHz)
ovs0r01.example.com	Running		On	192.0.2.101	3.5	1	2.99
ovs0r02.example.com	Running		Off	192.0.2.102	2.0	1	2.99

Note: The event icon is a yellow triangle, with an exclamation point inside the triangle.

- e. Highlight the Oracle VM server with the event icon in the navigation tree and select Events from the Perspective drop-down list.

Severity	Timestamp	Modify Time	Type	Summary
Warning	Apr 05, 2016 12:36:21 am	Apr 05, 2016 12:38:23 am	server.evacuate.failed.	Maintenance Mode Cannot Evacuate
Informational	Apr 05, 2016 12:36:21 am	Apr 05, 2016 12:36:21 am	server.maintenance.mode.	Maintenance Mode task is In Progress
Informational	Mar 31, 2016 2:57:51 am	Mar 31, 2016 2:57:51 am	server.cluster.state.up.	Server Cluster is Up
Informational	Mar 31, 2016 2:57:18 am	Mar 31, 2016 2:57:51 am	server.cluster.state.down.	Server Cluster is Down
Informational	Mar 31, 2016 1:35:13 am	Apr 05, 2016 12:36:21 am	lifecycle.modify.	Object changed
Informational	Mar 31, 2016 1:35:13 am	Mar 31, 2016 1:35:13 am	lifecycle.create.	Object created
Informational	Mar 31, 2016 1:34:47 am	Mar 31, 2016 1:34:47 am	runstate.running.	Server is Running
Informational	Mar 31, 2016 1:34:34 am	Mar 31, 2016 1:34:34 am	runstate.starting.	Server is Starting
Informational	Mar 31, 2016 1:34:34 am	Mar 31, 2016 1:34:34 am	server.discovery.started.	Discover Server
Informational	Mar 31, 2016 1:34:34 am	Mar 31, 2016 1:34:34 am	runstate.stopped.	Server is Stopped

- f. Click the Expand button next to the failed event to view additional information.

Description: No compatible server found for VM pvm_vm2. Reasons:

- ovsvr01.example.com:
 - VM: pvm_vm2, is already on the destination server: ovsvr01.example.com.
 - Server: ovsvr01.example.com is in maintenance mode
- ovsvr02.example.com:
 - Server: ovsvr02.example.com, has a VM: pvm1, that is in an Anti-Affinity Group of this VM: pvm_vm2.

No compatible server found for VM pvm_vm2. Reasons:

- ovsvr01.example.com:
 - VM: pvm_vm2, is already on the destination server: ovsvr01.example.com.
 - Server: ovsvr01.example.com is in maintenance mode

The virtual machine pvm_vm2 cannot be evacuated from the server in maintenance mode, because migrating it to the other Oracle VM server violates the anti-affinity rule.

6. Clean up.
- Edit ovsvr01.example.com and deselect the Server in Maintenance Mode check box.
 - Delete the AA_group1 anti-affinity group.

Practice 6-10: View VNIC Usage from the Oracle VM Manager

Overview

In this practice, you view the VNIC usage by your virtual machines from the Oracle VM Manager UI.

Tasks

- Click the Networking tab.

Name	ID	Intra-Network Server	Network Channels					Description
			Server Management	Cluster Heartbeat	Live Migrate	Storage	Virtual Machine	
192.0.2.0	c0000200		✓		✓			
hb_net	106b35576c			✓				
storage_net	108ba5ccb7				✓			
vm_net	1010f4c8f0					✓		

- Click the Virtual NICs link on the tab's toolbar.

Name	MAC Address	Network	Assigned to VM
00:21:16:00:00:0c	00:21:16:00:00:0c	vm_net	pvm1
00:21:16:00:00:01	00:21:16:00:00:01	vm_net	pvm_vm2
00:21:16:00:00:08	00:21:16:00:00:08	vm_net	pvm_vm3
00:21:16:00:00:10	00:21:16:00:00:10	vm_net	pvm_vm1
00:21:16:00:00:11	00:21:16:00:00:11	vm_net	pvm1

MAC addresses must be unique or collisions may occur if you are running multiple OVM Manager Server applications.

All virtual machines with a VNIC assignment appear in the lower pane.

Note that the dynamically assigned MAC addresses for your virtual machines lie within the range that you selected in a practice for the lesson titled “Managing Servers and Networks.”

- Click the Logout link in the global links located at the top of the Oracle VM Manager window to exit the UI.

Appendices: Remote Access Options

Chapter 7

Appendices: Remote Access Options – Overview

Appendices Overview

The five appendices show various options for accessing your student PC remotely:

- Appendix A: Using TigerVNC to Connect to **dom0**
- Appendix B: Using NoMachine Version 4 to Connect to **dom0**
- Appendix C: Using an NX Client to Connect to **dom0**
- Appendix D: Using an NX Player to Connect to **dom0**
- Appendix E: Using TightVNC to Connect Directly to VM Guests

Appendix A: Using TigerVNC to Connect to dom0

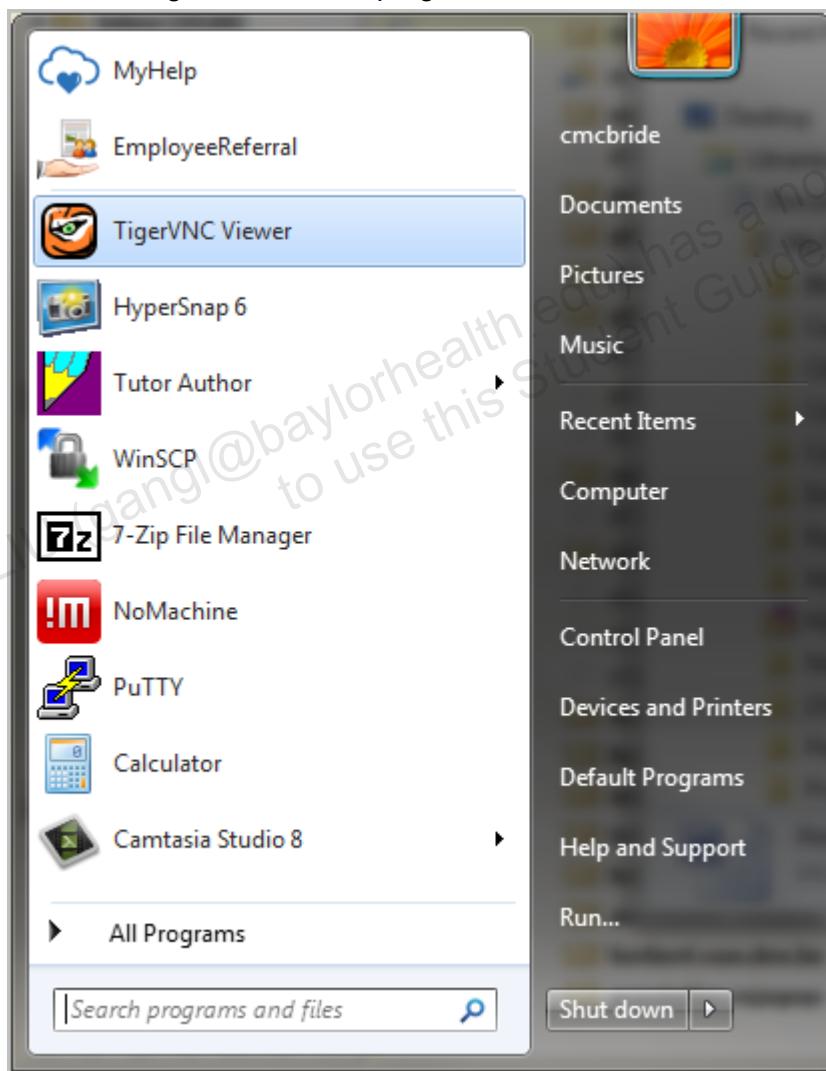
Overview

This appendix describes the procedure to access your lab machine remotely by using TigerVNC Viewer version 1.3.1.0 for Windows. This procedure assumes that you have downloaded and installed TigerVNC from MyDesktop or from the following location:
<http://tigervnc.software.informer.com/1.3/>.

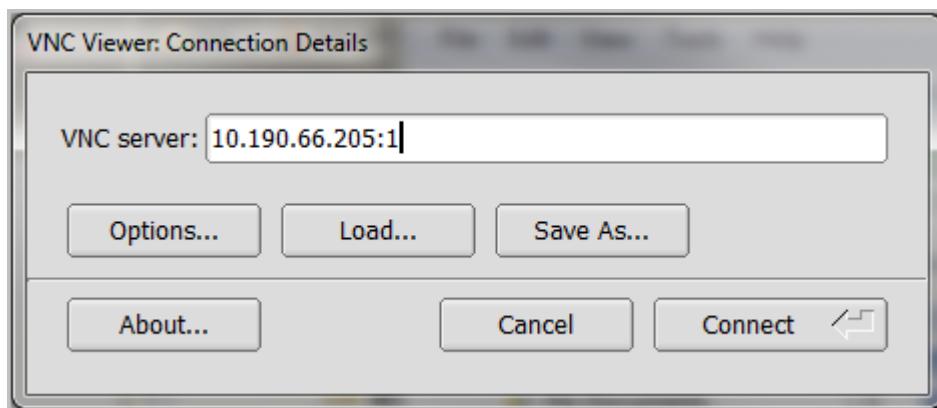
Note: If you are accessing your lab environment remotely, you have received instructions on how to access your lab machine. The following steps summarize the configuration and connection tasks when using the TigerVNC Viewer client for Windows 7.

Tasks

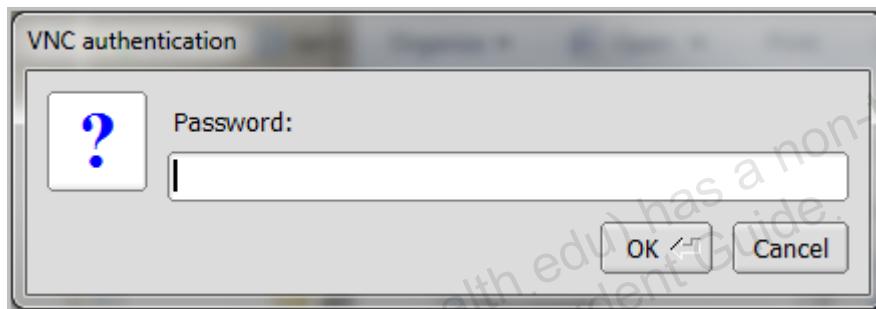
1. Select the TigerVNC Viewer program from the Windows Start menu.



2. Enter the IP address of your lab machine followed by :1. The following example assumes your lab machine IP address is 10.190.66.205:



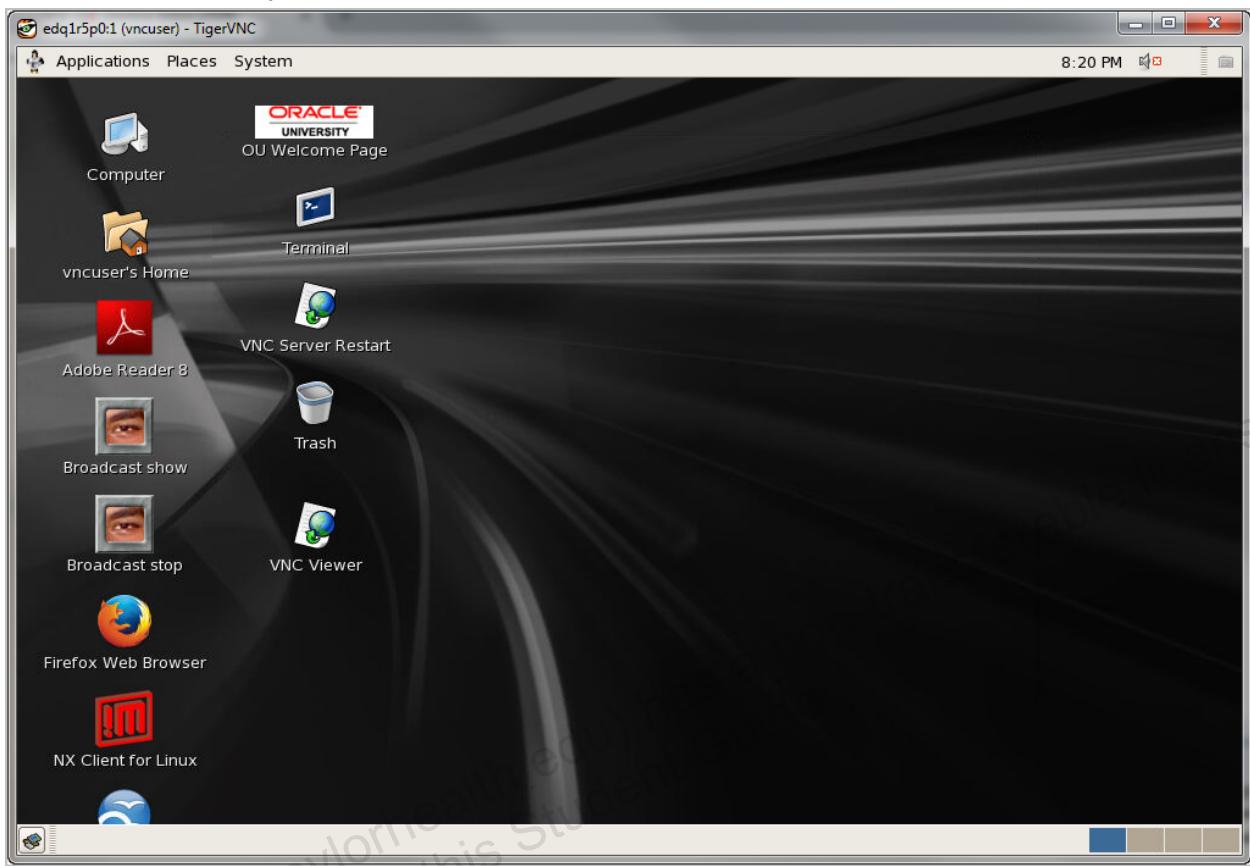
3. Press ENTER or click Connect to continue. You are then prompted for a Password as shown.



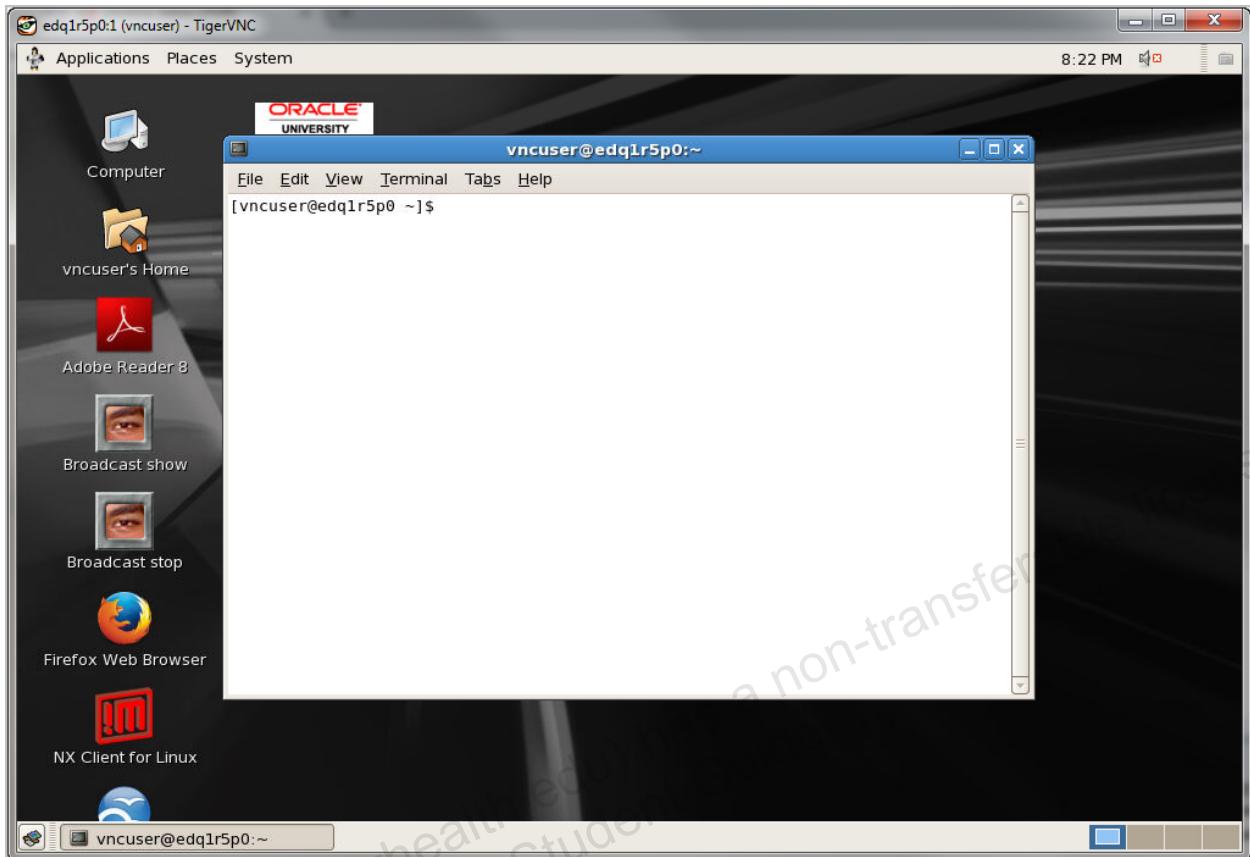
4. Enter vnctech for the password. The password characters are not displayed for security purposes as shown.



5. Press ENTER or click OK to continue. This completed the remote login. The GNOME desktop appears on your lab machine as shown.



6. Double click on the Terminal icon to open a terminal window.



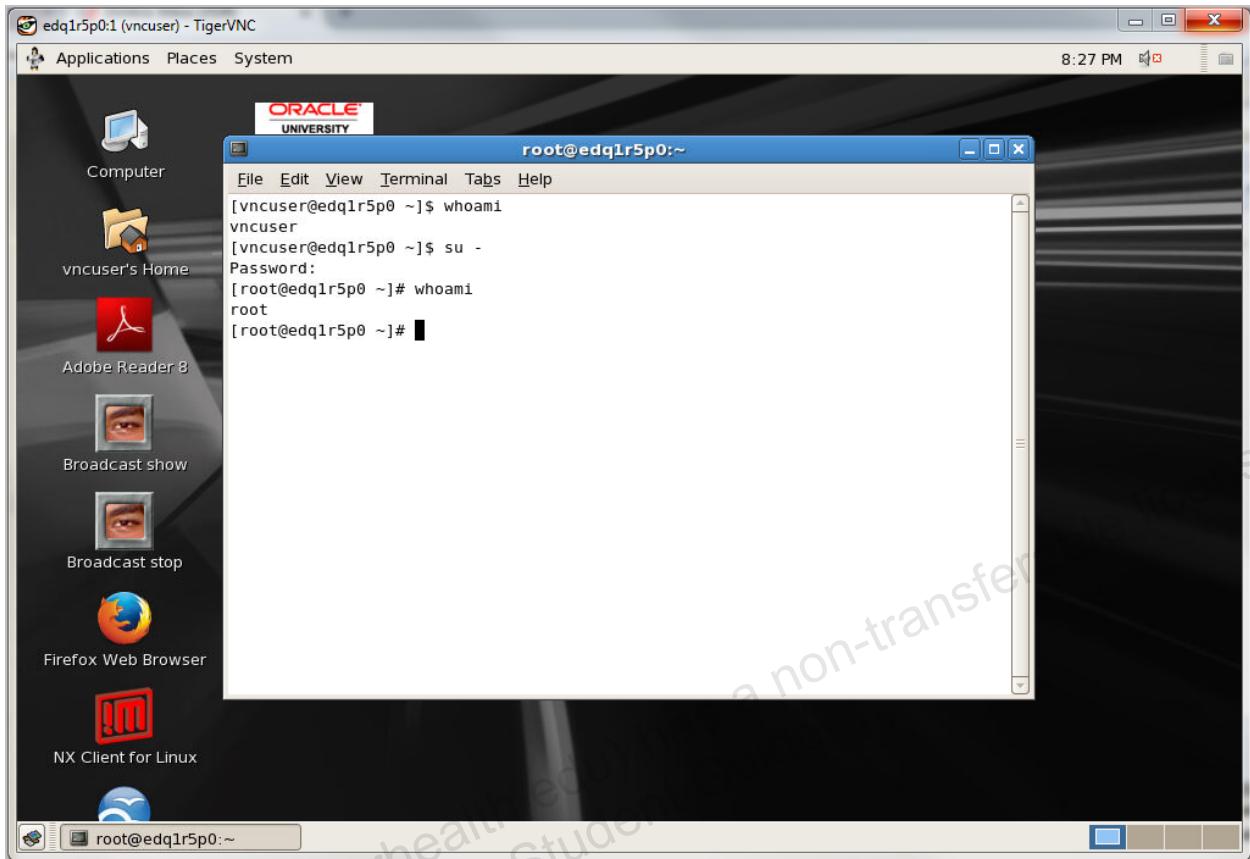
7. You are logged on as vncuser which is confirmed by using the whoami command as shown. You can become the root user by entering the su - command as shown. The root user password is oracle.

The screenshot shows a terminal window titled "root@edq1r5p0:~". The window has a standard Linux-style interface with a menu bar (File, Edit, View, Terminal, Tabs, Help) and a scroll bar on the right. The terminal session shows the following commands:

```
[vncuser@edq1r5p0 ~]$ whoami
vncuser
[vncuser@edq1r5p0 ~]$ su -
Password:
[root@edq1r5p0 ~]# whoami
root
[root@edq1r5p0 ~]#
```

A large watermark reading "GANG LIU (gangli@baylorhealth.edu) has a non-transferable license to use this Student Guide." is diagonally across the image.

8. Click the X in the TigerVNC window to close the login session.



Appendix B: Using NoMachine Version 4 to Connect to dom0

Overview

This appendix describes the procedure to access your lab machine remotely by using the NoMachine client for Windows. This procedure assumes that you have downloaded and installed the NoMachine client from the following location:

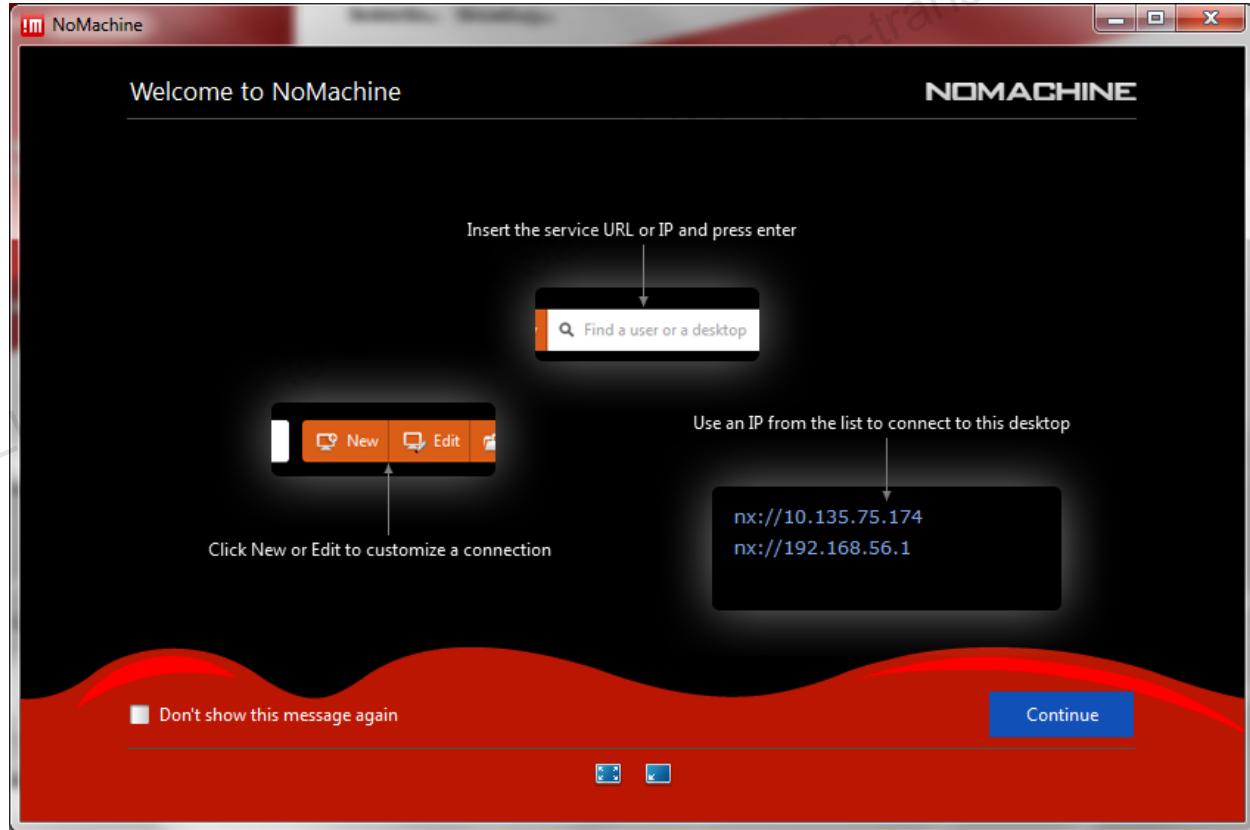
<http://www.nomachine.com/download.php>.

Note: If you are accessing your lab environment remotely, you have received instructions on how to access your lab machine. The following steps summarize the configuration and connection tasks when using the NoMachine client for Windows 7.

Tasks

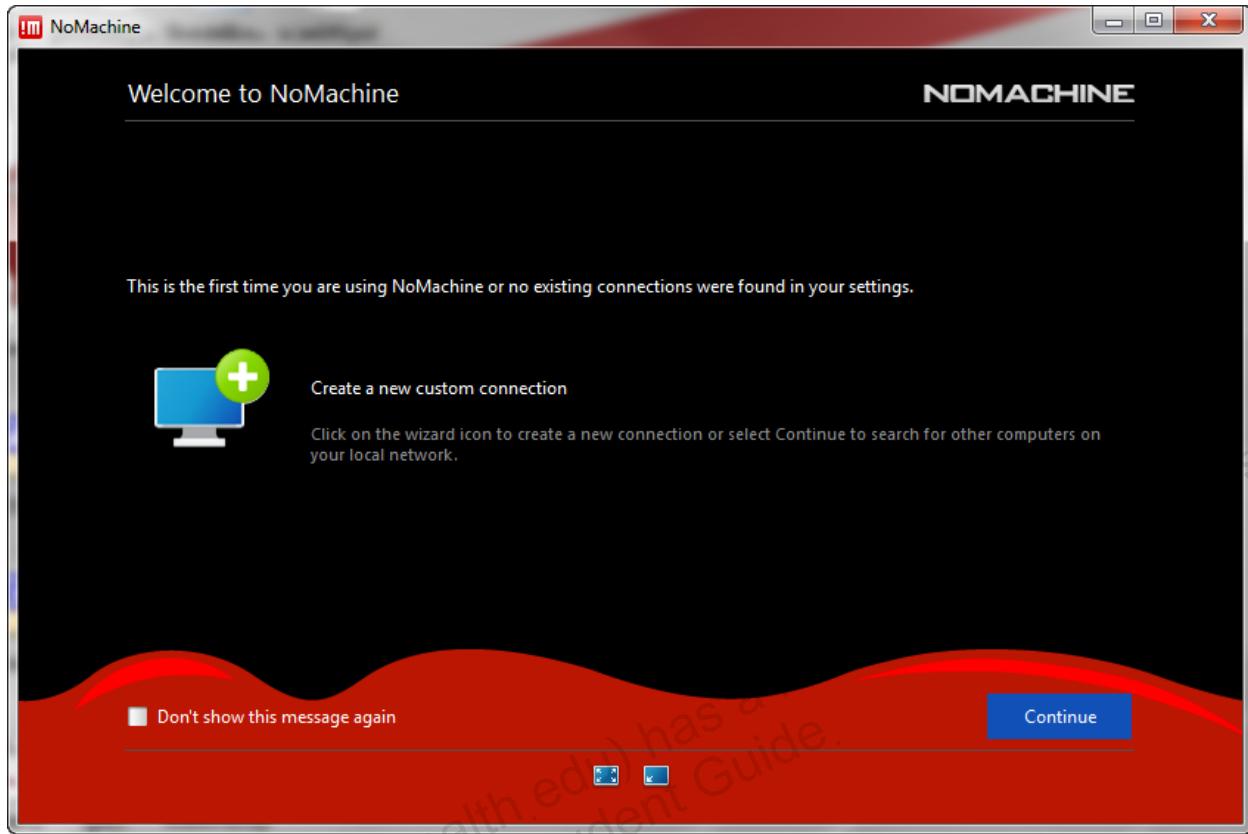
1. Create a session to your assigned lab machine by using the NoMachine Connection Wizard.
 - a. Select the NoMachine program from the Windows Start menu.

The Welcome to NoMachine window appears.

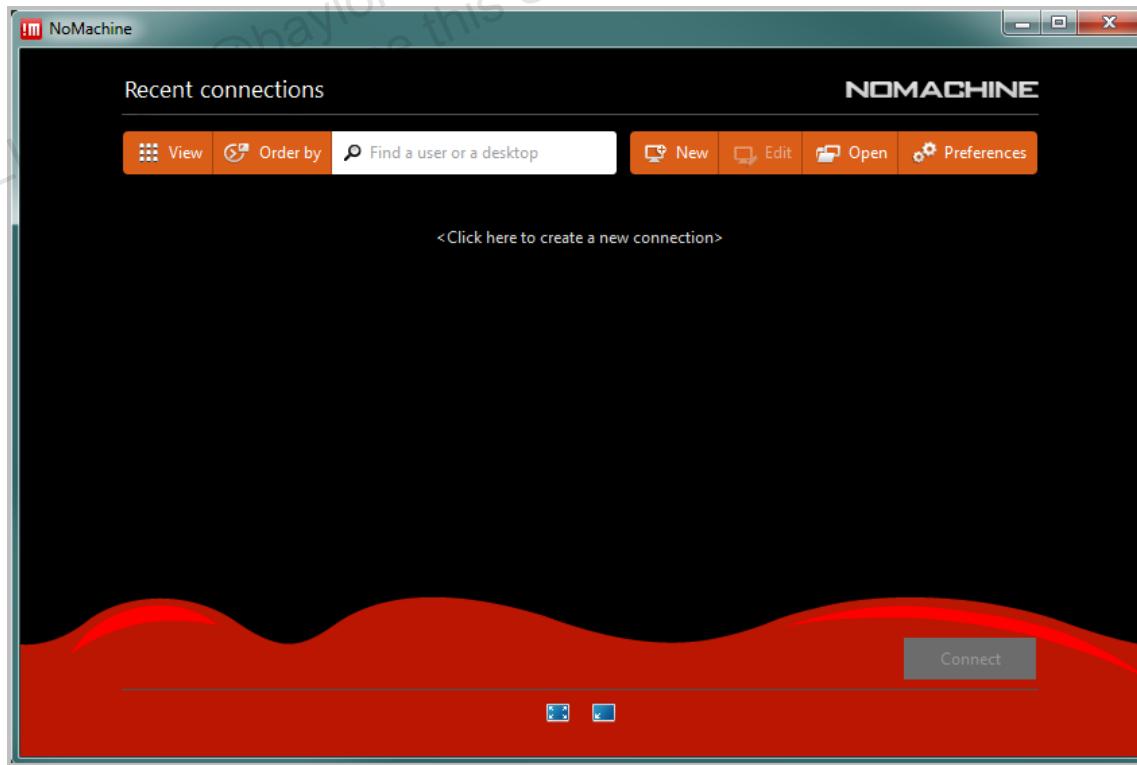


- b. Click Continue.

If this is the first time you are using NoMachine, the following window appears:



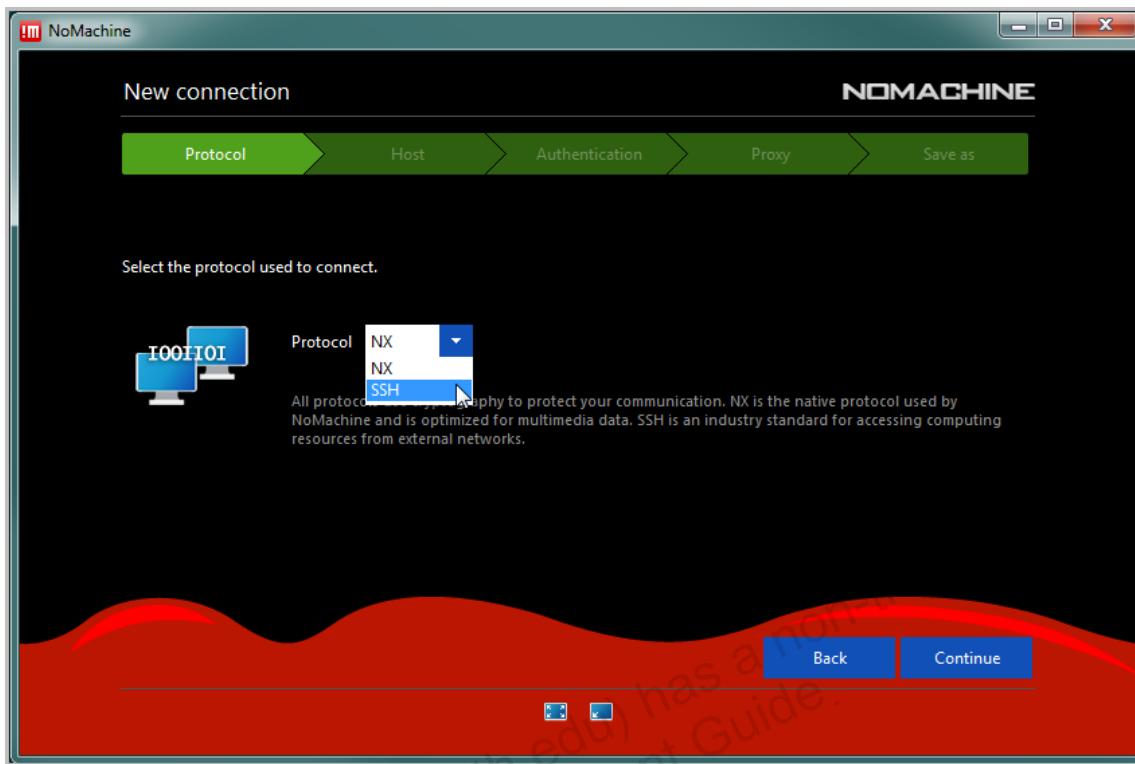
Otherwise, the Recent connections window appears.



- c. Click "New" to add a new connection.

The Protocol window of the New Connection Wizard appears.

- d. Select SSH from the Protocol drop-down list.

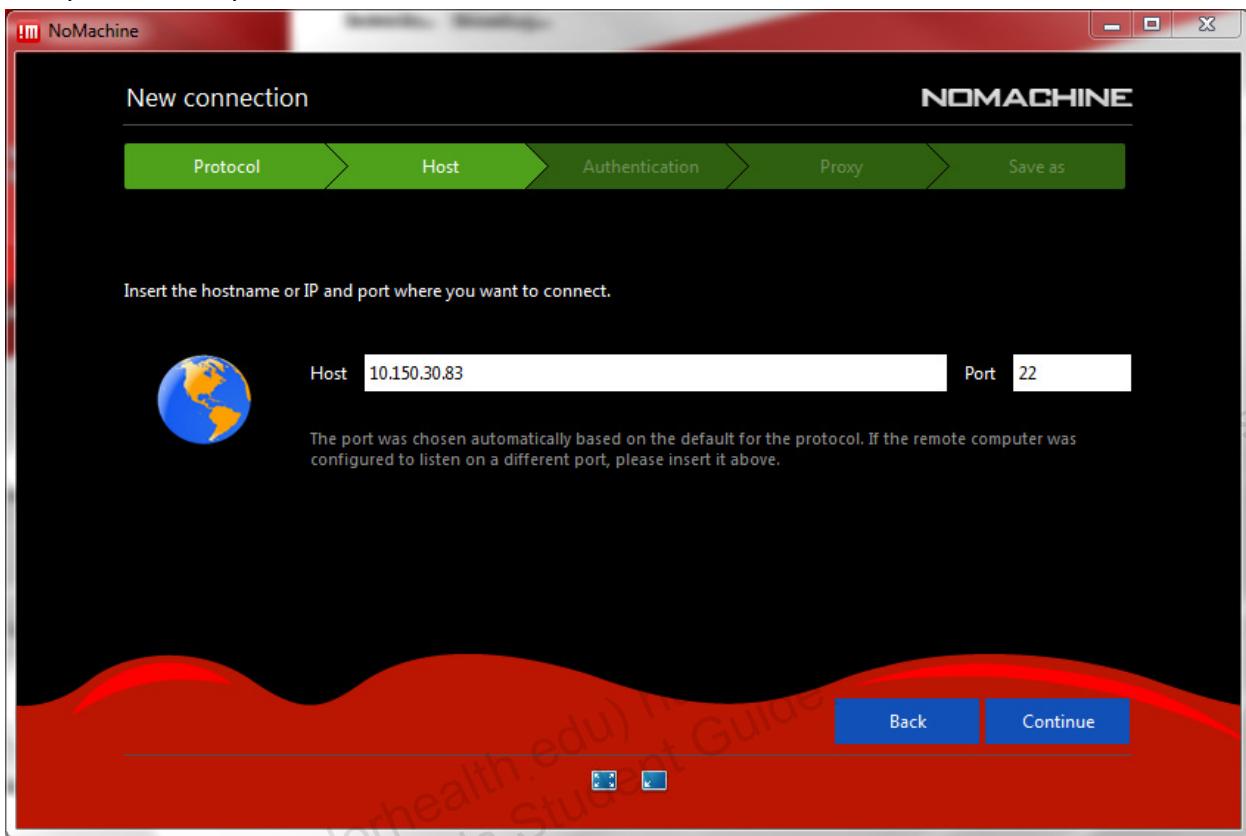


- e. Click the Continue button.

The Host window appears.

- f. In the Host field, enter the IP address that was provided to you by your instructor.

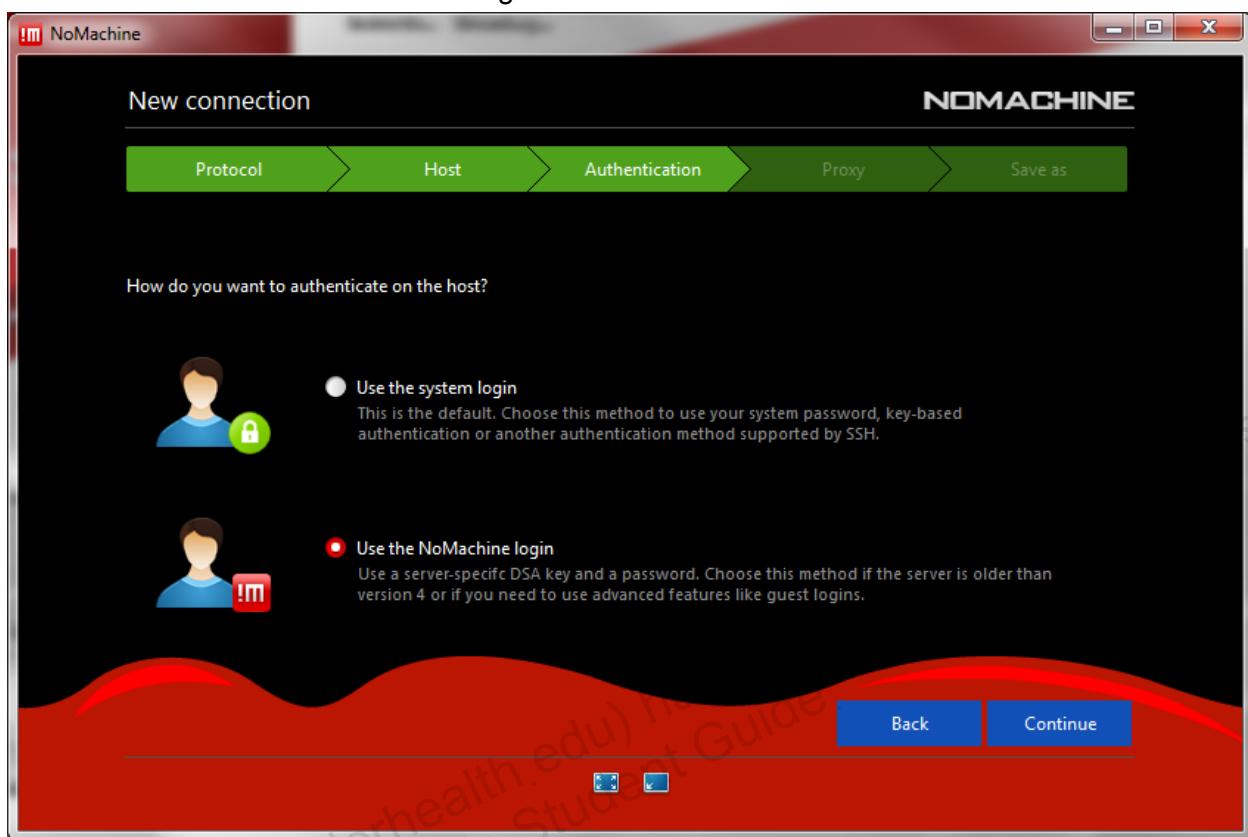
In this example, the 10.150.30.83 IP address is used.
Accept 22 for the port number.



- g. Click Continue.

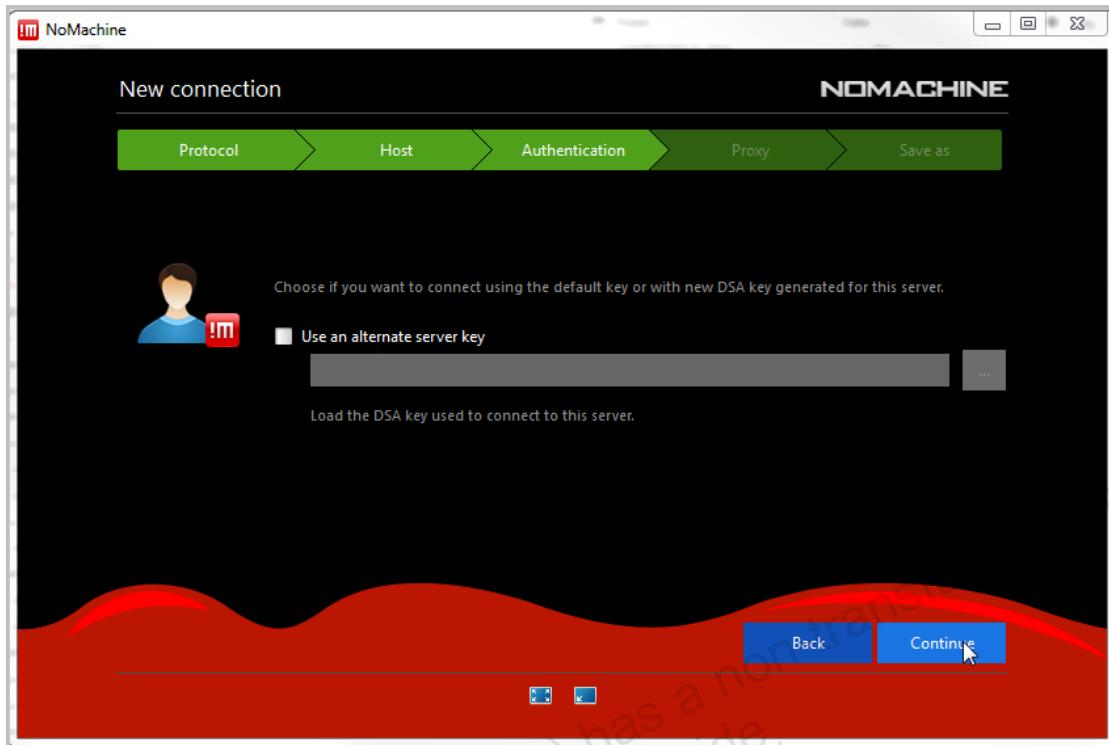
The Authentication window appears.

- h. Select the “Use the NoMachine login” radio button.

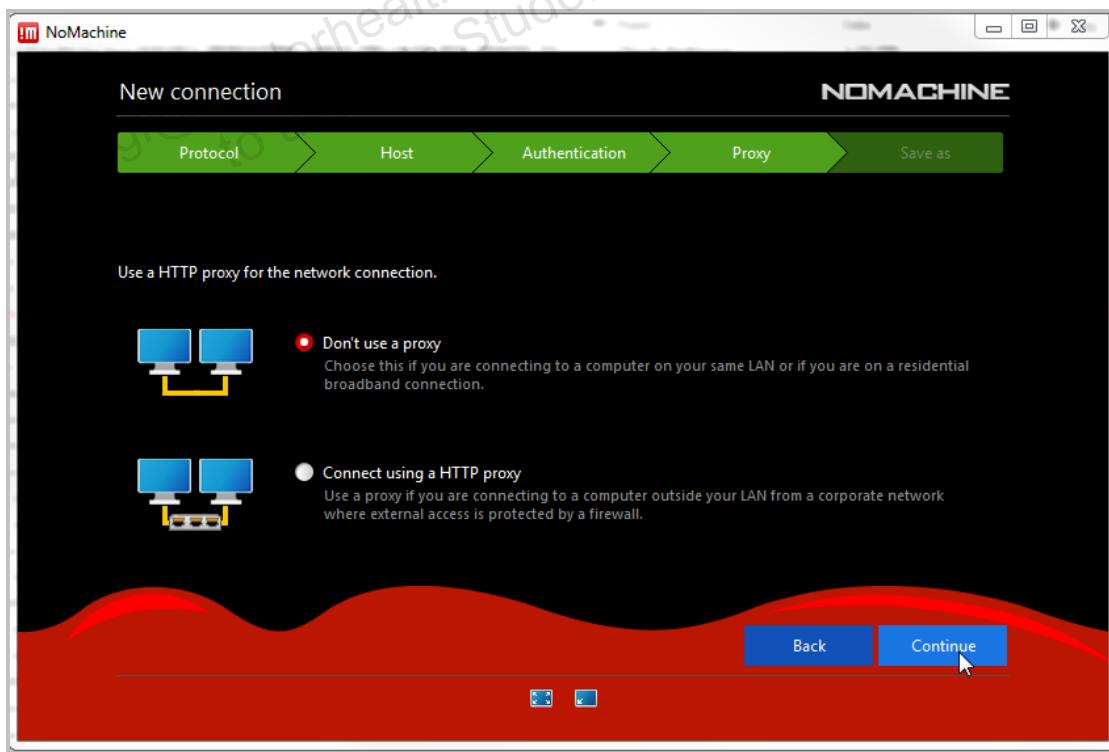


- i. Click Continue.

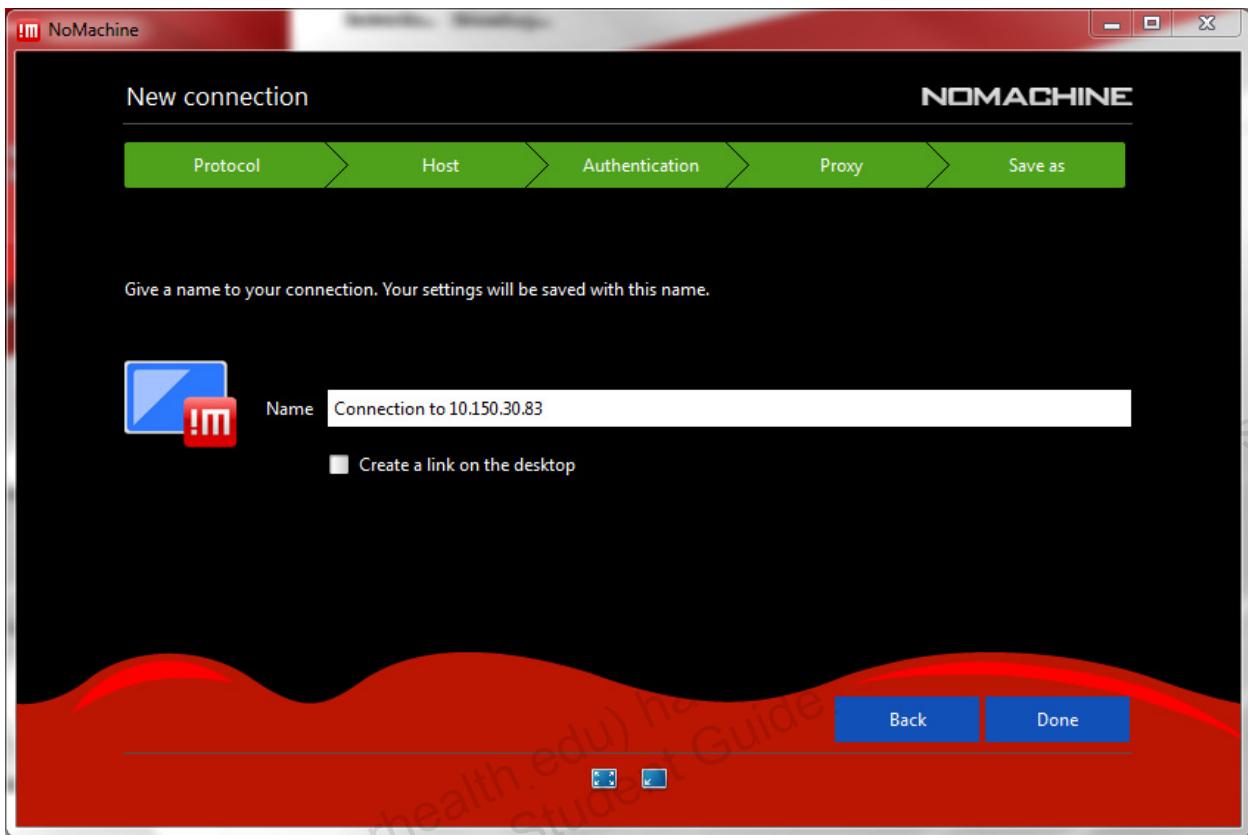
- j. Leave the “Use an alternate server key” check box unselected and click Continue.



- k. In the Proxy window, leave the “Don’t use a proxy” radio button selected and click Continue.

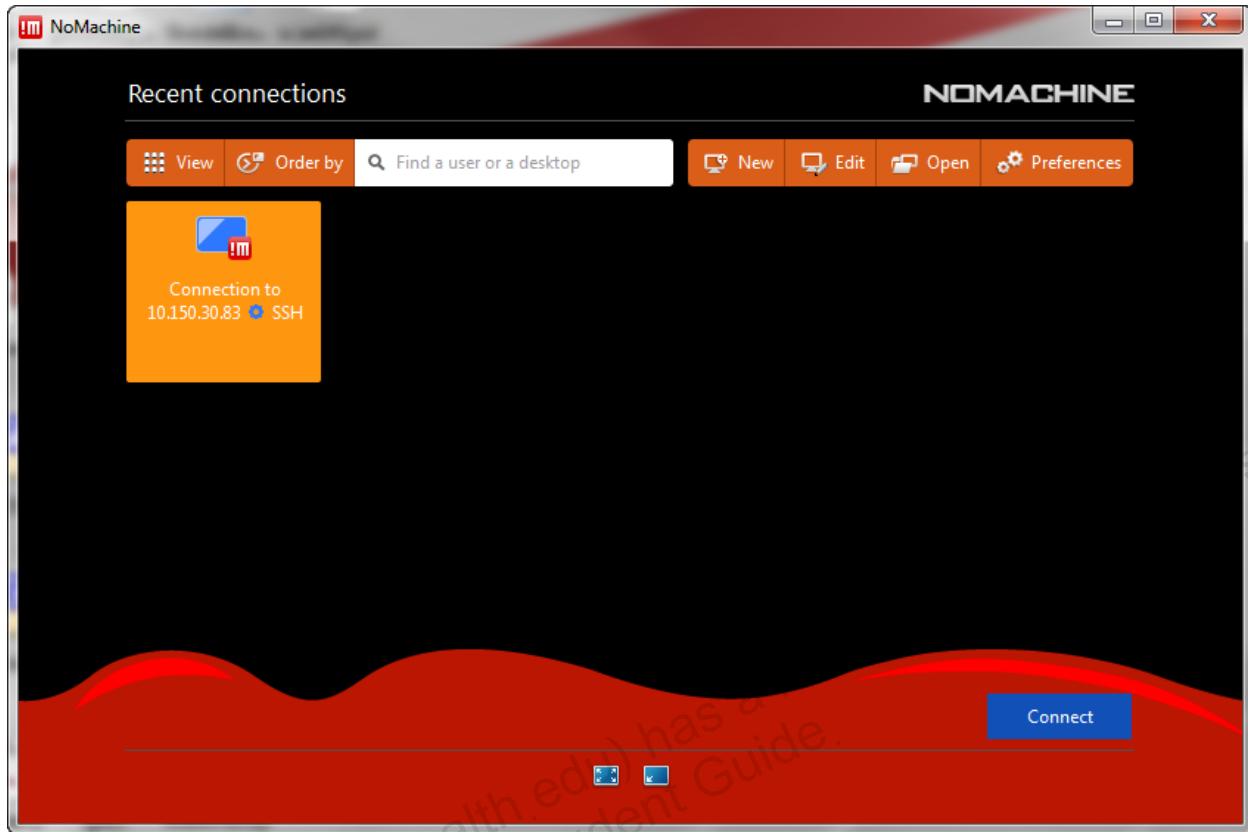


- I. In the “Save as” window, enter a name for your connection or accept the proposed name.

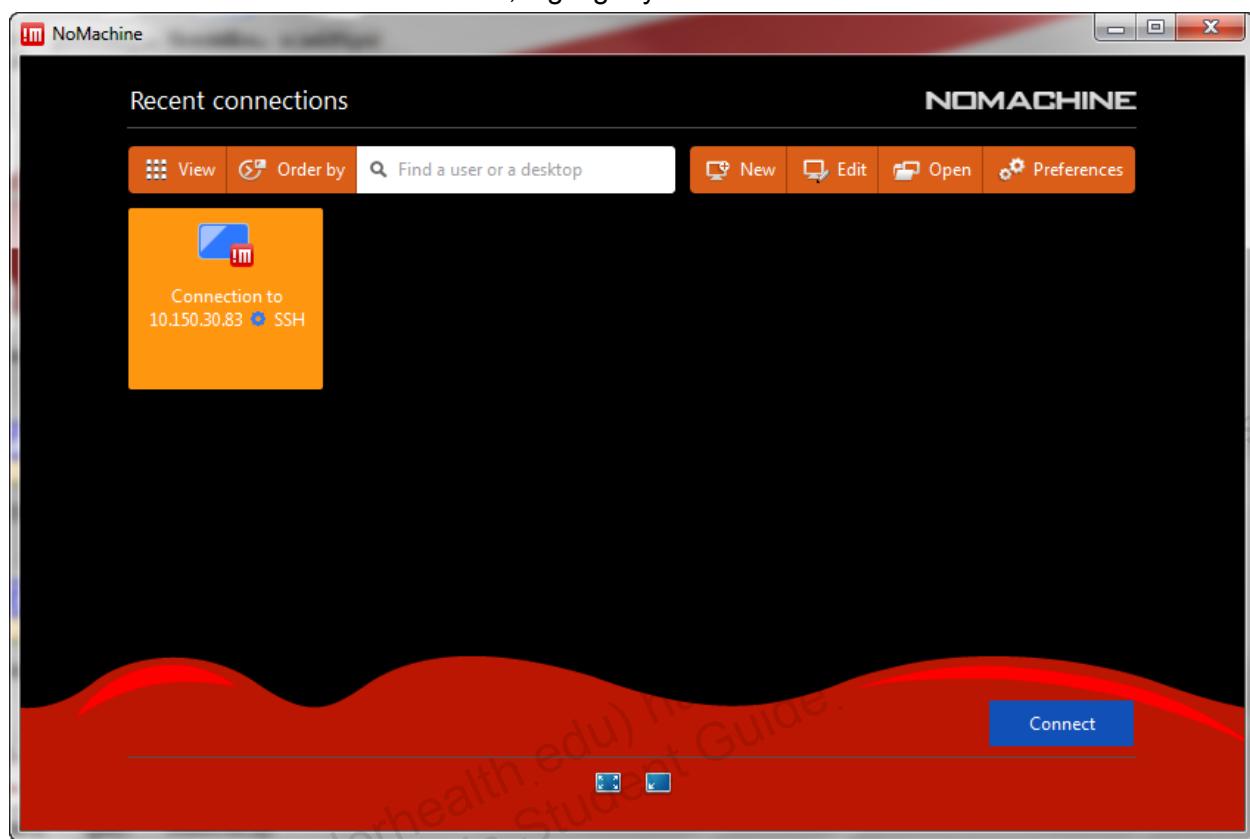


- m. Click Done.

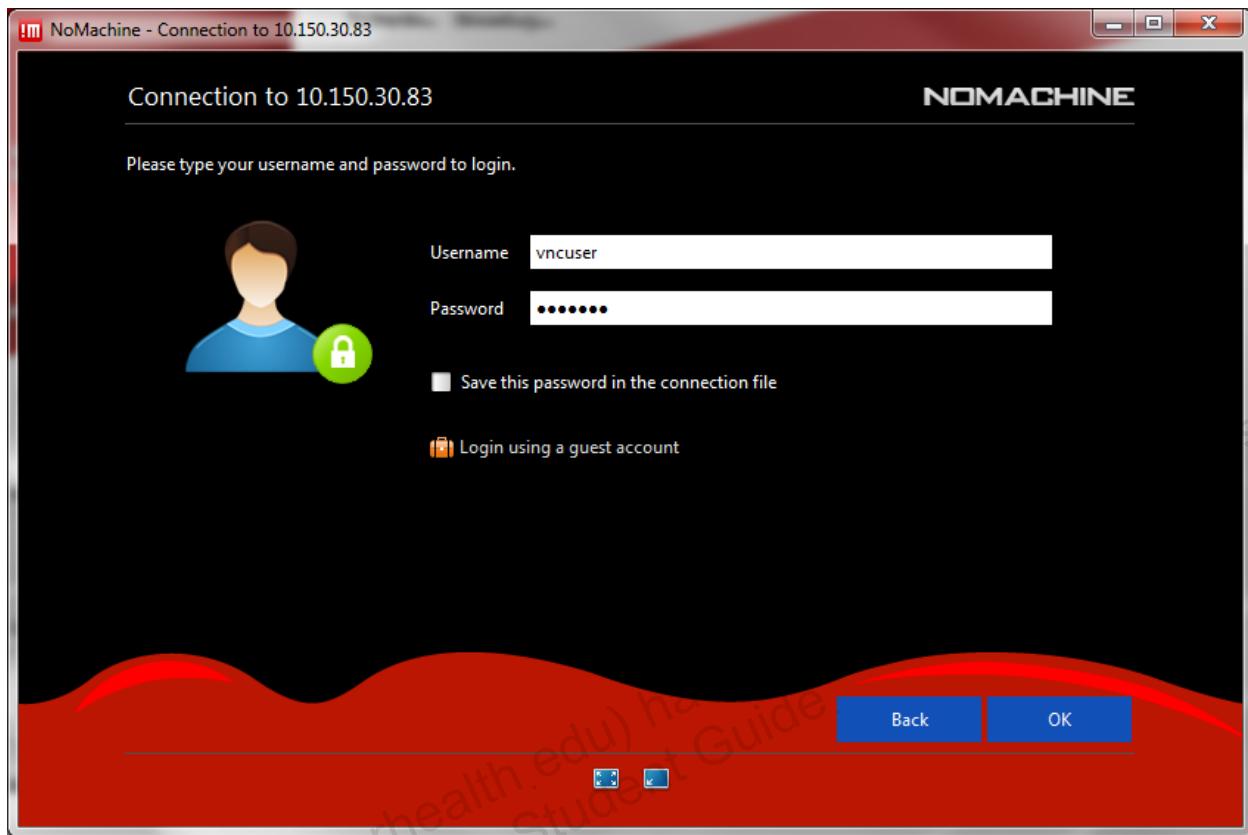
Your new connection appears in the Recent connections window.



2. Access your lab machine by using your newly created connection.
 - a. In the Recent connections window, highlight your new connection and click Connect.



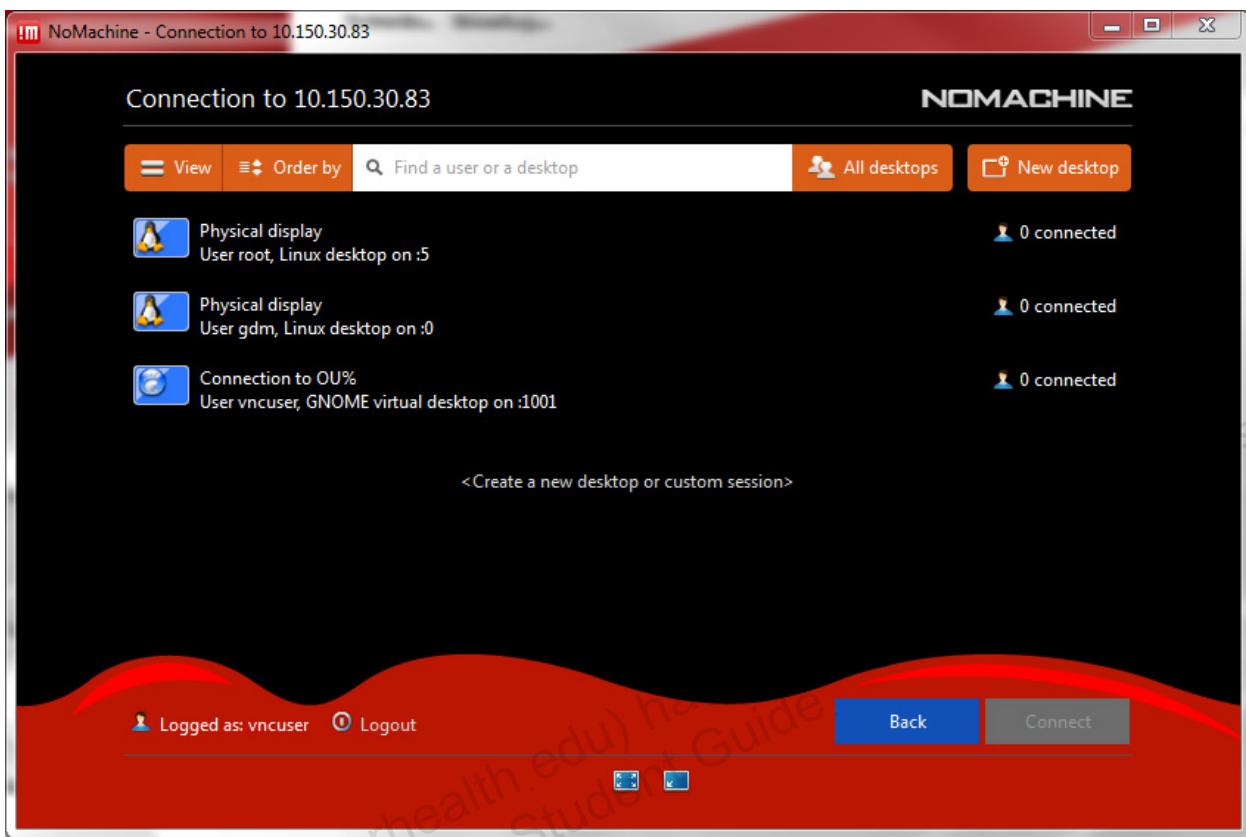
- b. On your new connection login screen, enter the login credentials provided by your instructor.



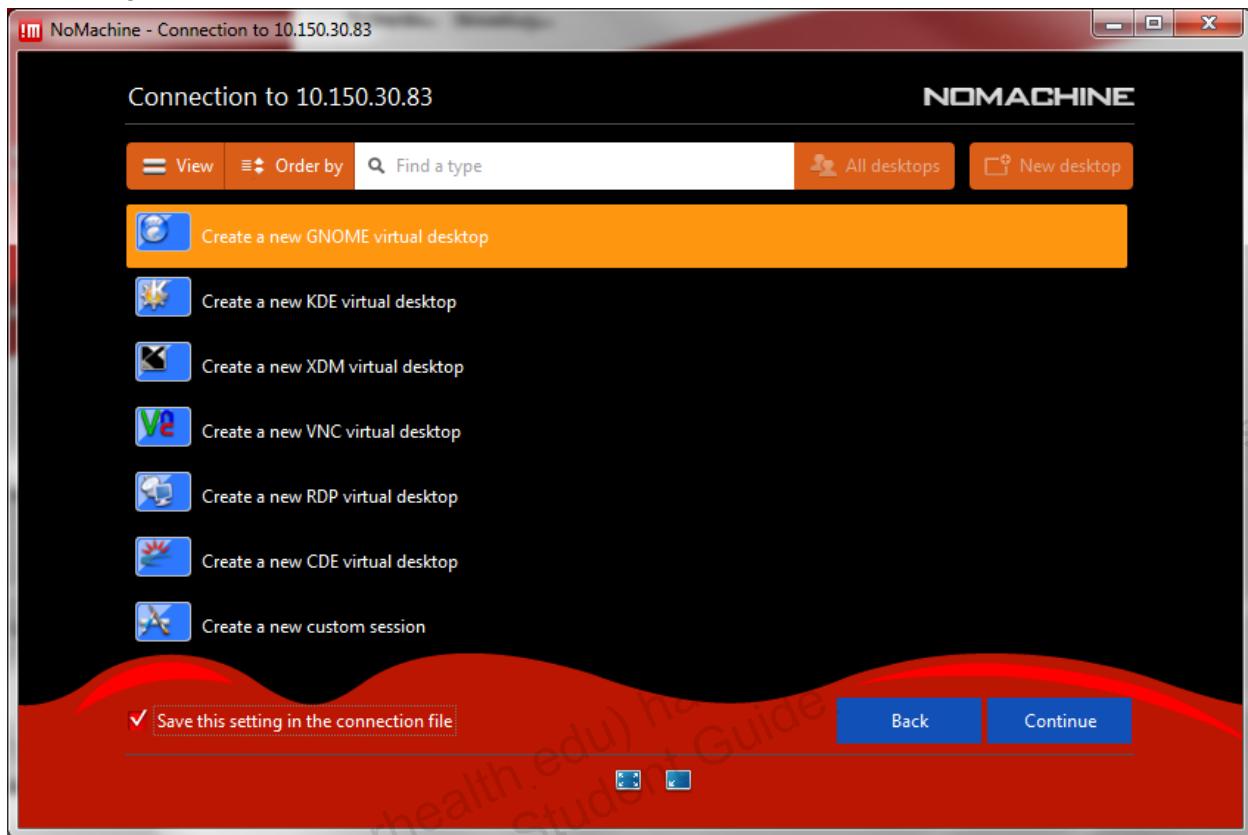
Optional, you can select the “Save this password in the configuration file” check box.

- c. Click OK.

- d. In the next window, click the “New desktop” session link located in the top-right area of the screen.

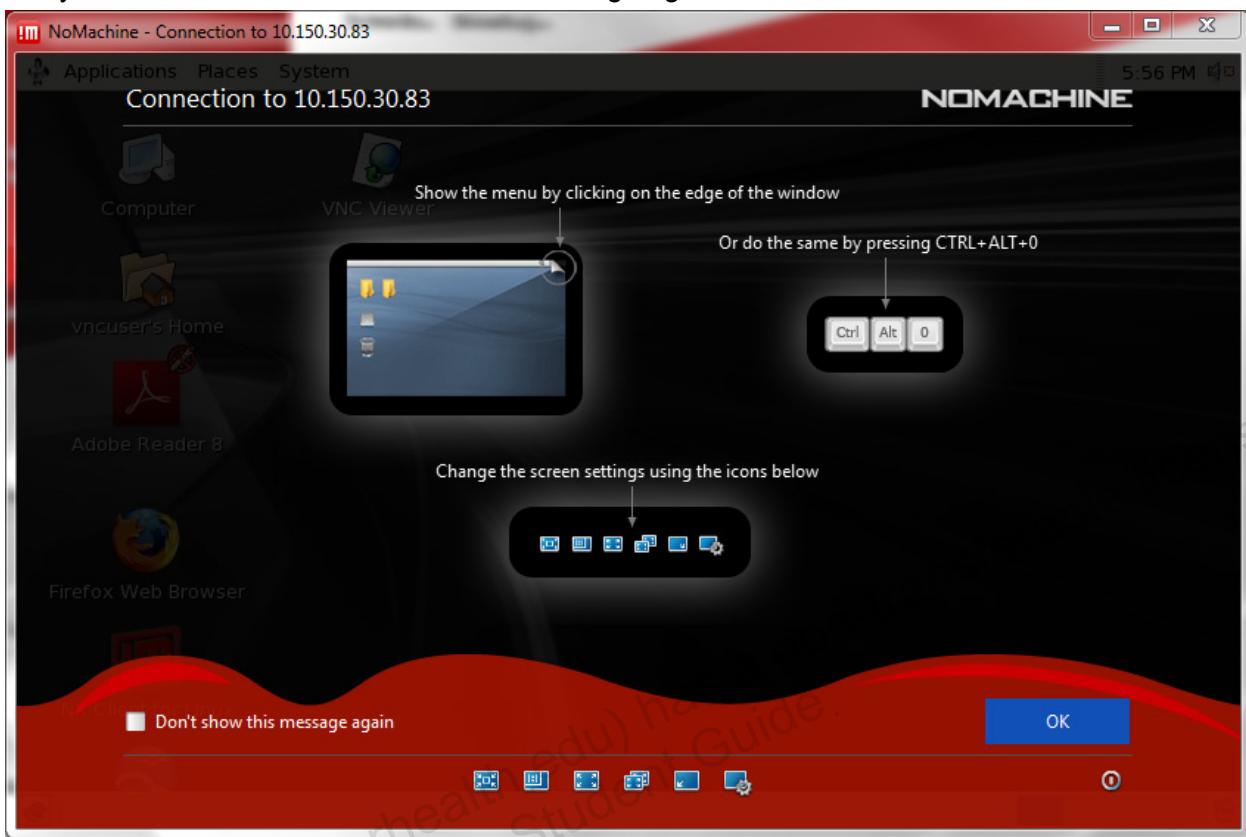


- e. Select “Create a new GNOME virtual desktop” and check the “Save this setting in the configuration file” selection box.

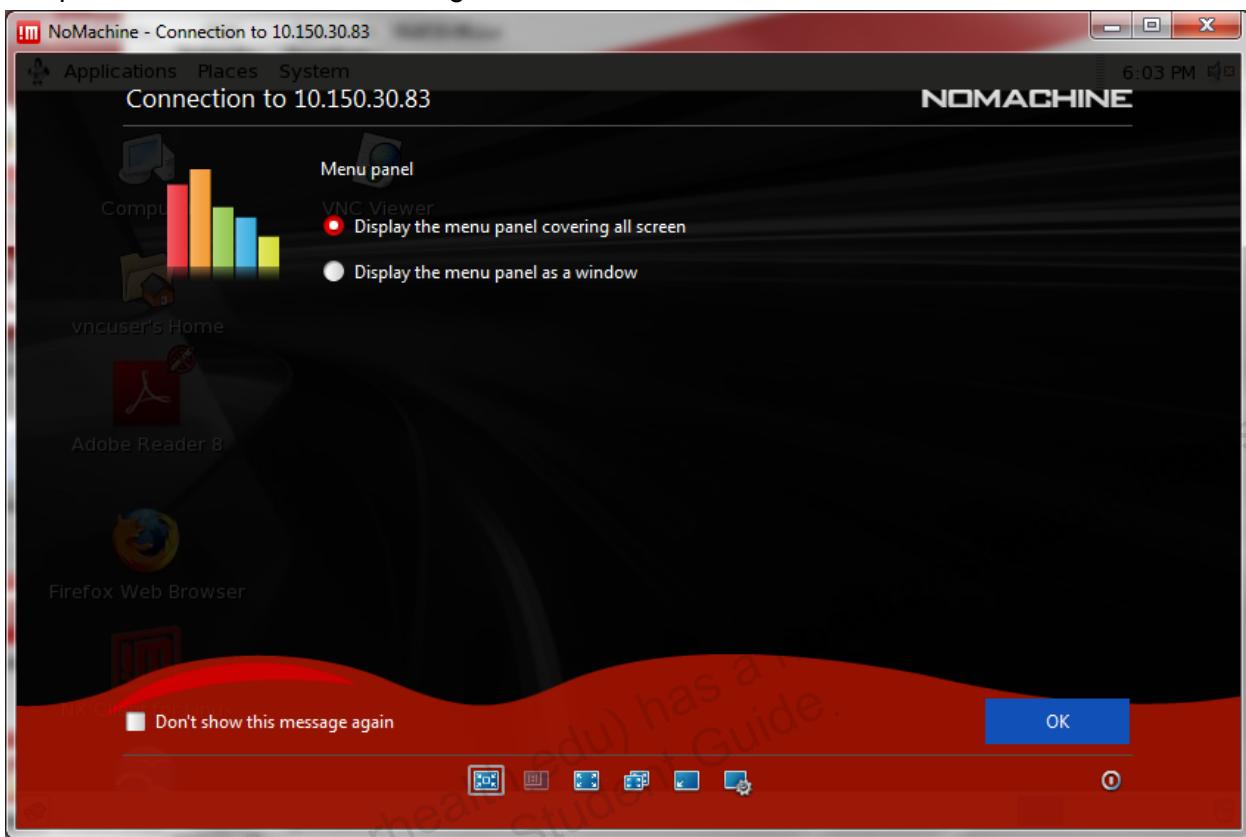


- f. Click Continue.

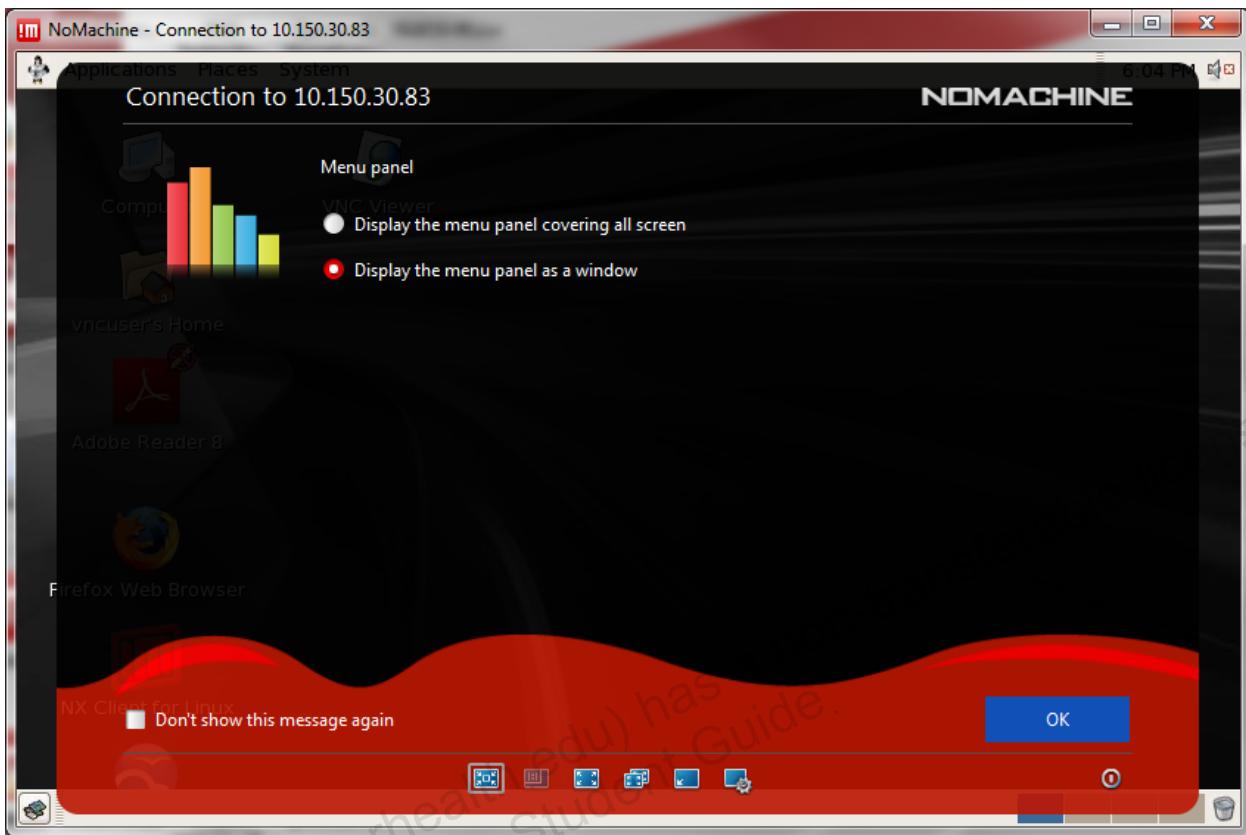
- g. Click OK to dismiss the next two windows that provide tips for navigation. Optionally you can select the “Don’t show this message again” check box on both screens.



- h. The Menu panel options window appears. You can accept the default for the Menu panel as shown in the following screenshot:

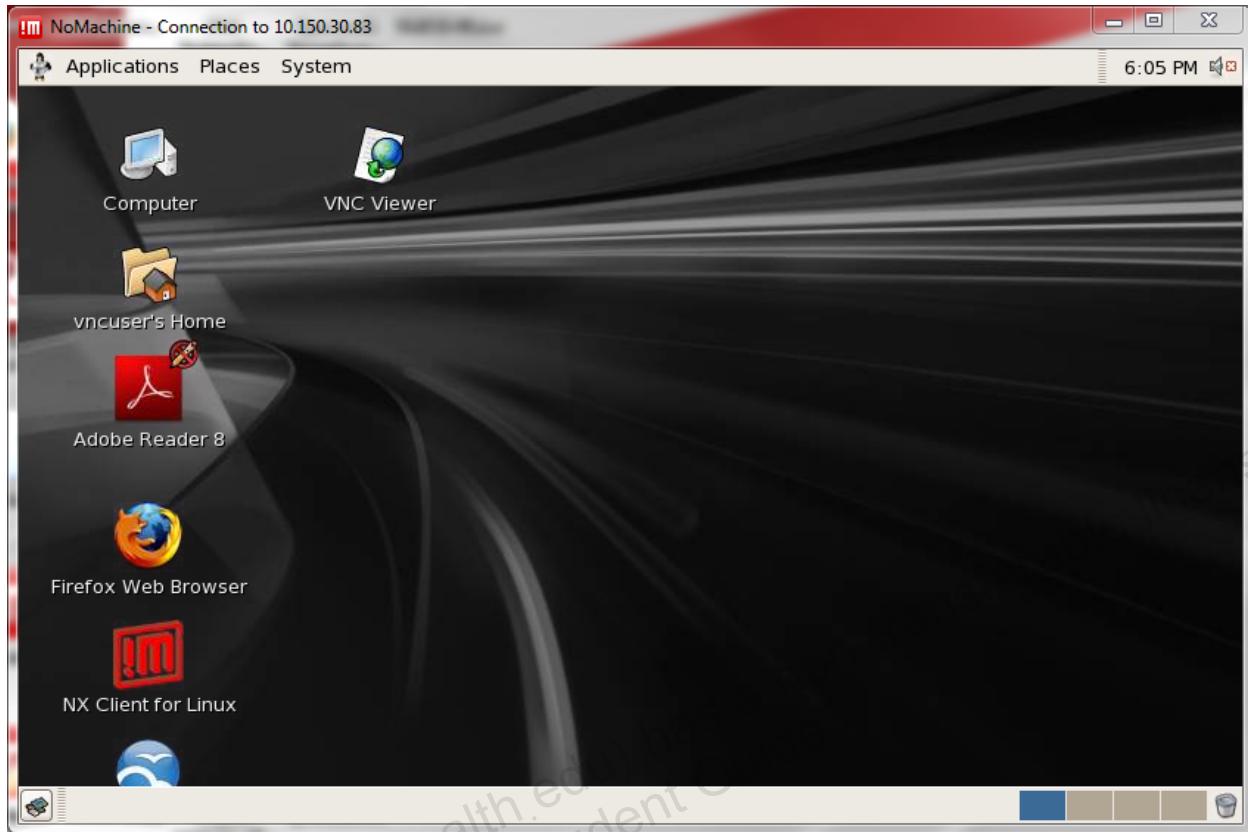


- i. Or select the “Display the menu panel as a window” option to display the Menu panel as a centered window.



- j. Click OK.

You are now connected to your lab machine.



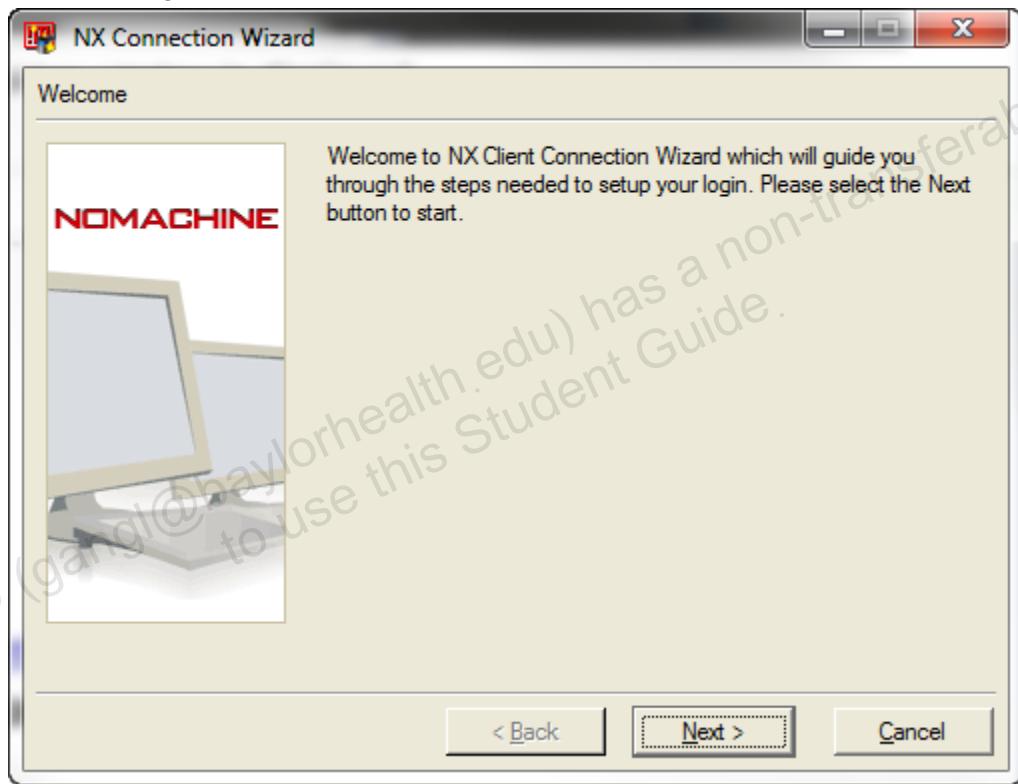
Appendix C: Using an NX Client to Connect to dom0

Overview

This appendix discusses accessing your student PC (**dom0**) remotely by using NX Client. The NX Client in this appendix is NX Client for Windows, Version 3.5.0-9.

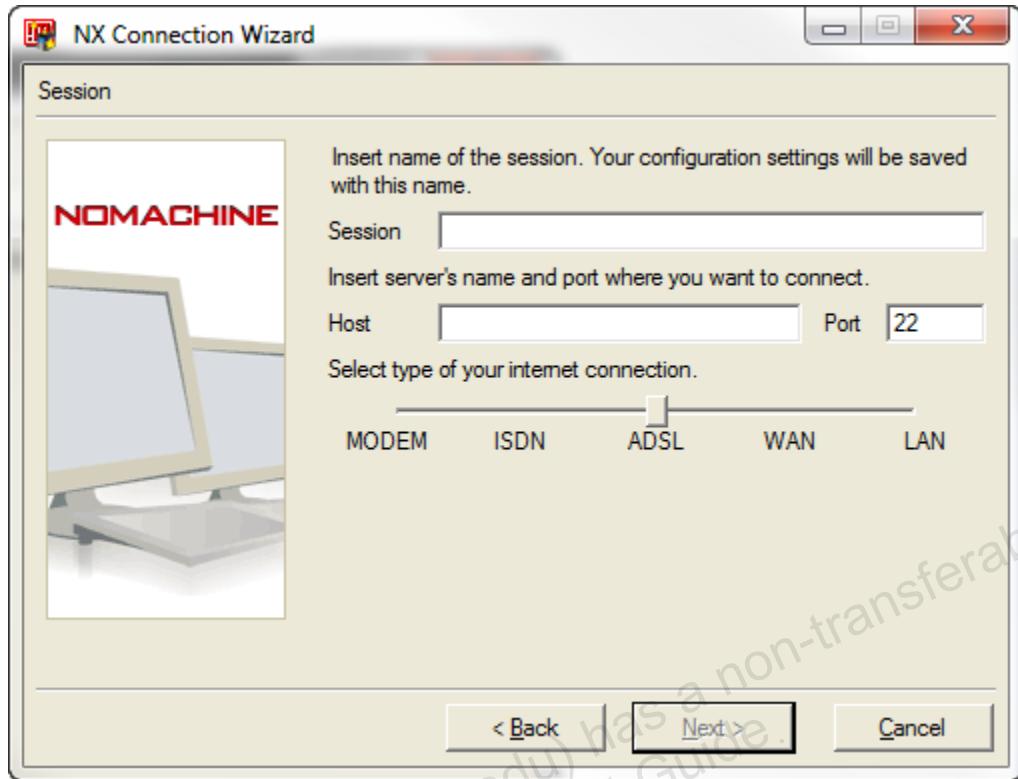
Steps

1. Install **NX Client** (if necessary) from <http://www.nomachine.com/download.php>.
2. Run **NX Client** (for example, select **NX Client for Windows** from the Windows Start menu).
 - An NX Connection Wizard steps you through creating the initial session.
 - The following Welcome window appears.



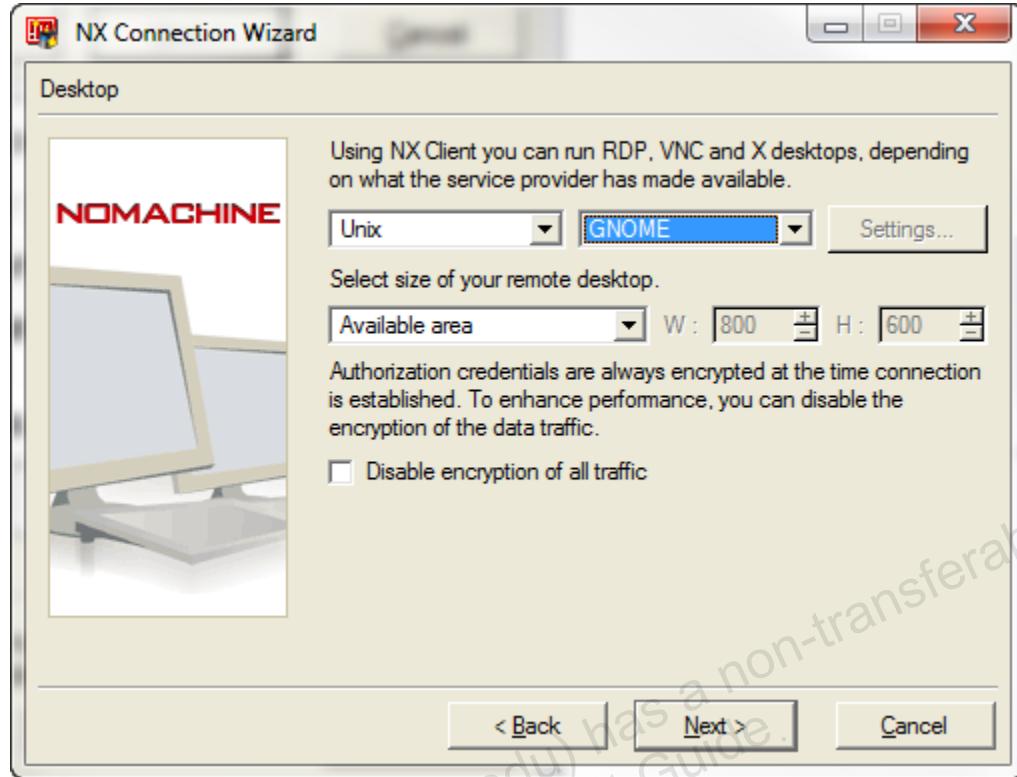
- a. Click **Next**.

- The following Session window appears.

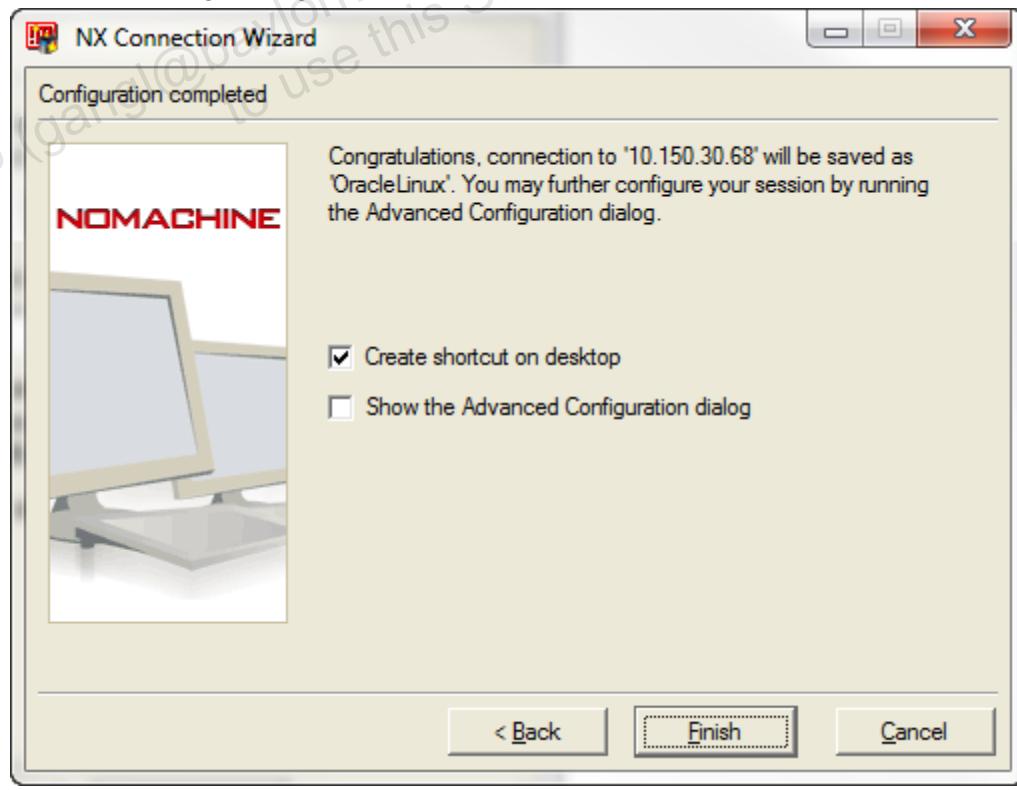


- b. Enter anything you like for **Session** (for example, OracleLinux).
- c. Enter the IP address (provided by your instructor) for **Host**.
- d. Accept the remaining defaults and click **Next**.
- e. The Desktop window appears. Change KDE to **GNOME** by selecting from the drop-down list.

- Your window must look like the following:

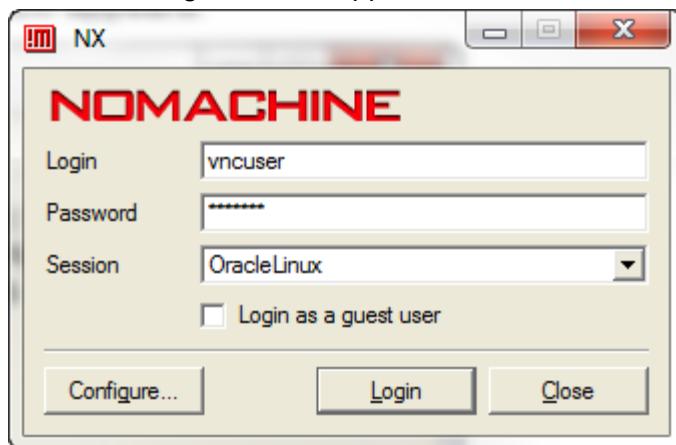


- f. Accept all other defaults and click **Next**.
- The following Configuration completed window appears.



g. Click **Finish**.

- The NX Login window appears.



h. For **Login**, enter vncuser.

i. For **Password**, enter vnctech.

j. Your **Session** defaults to the session that you just created. In this example, the **Session** is OracleLinux. Your session name may be different.

k. Click **Login**.

- The **dom0** GNOME virtual desktop window appears.
- Future connections will bypass the configuration wizard and only bring up the NX Login window.

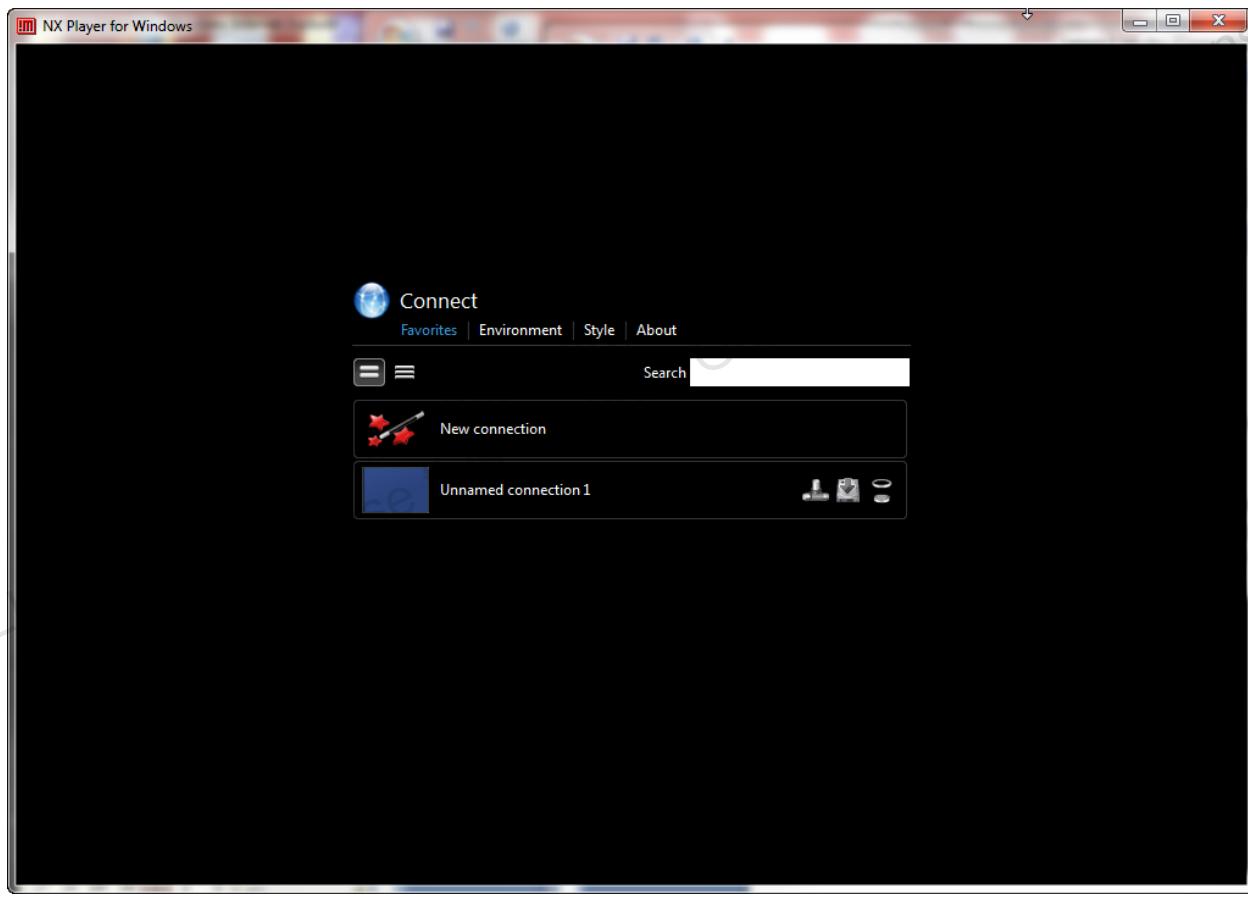
Appendix D: Using an NX Player to Connect to dom0

Overview

This appendix discusses accessing your student PC (**dom0**) remotely using NX Player. The NX Player in this appendix is NX Player for Windows, Preview 5, version 4.0.132.

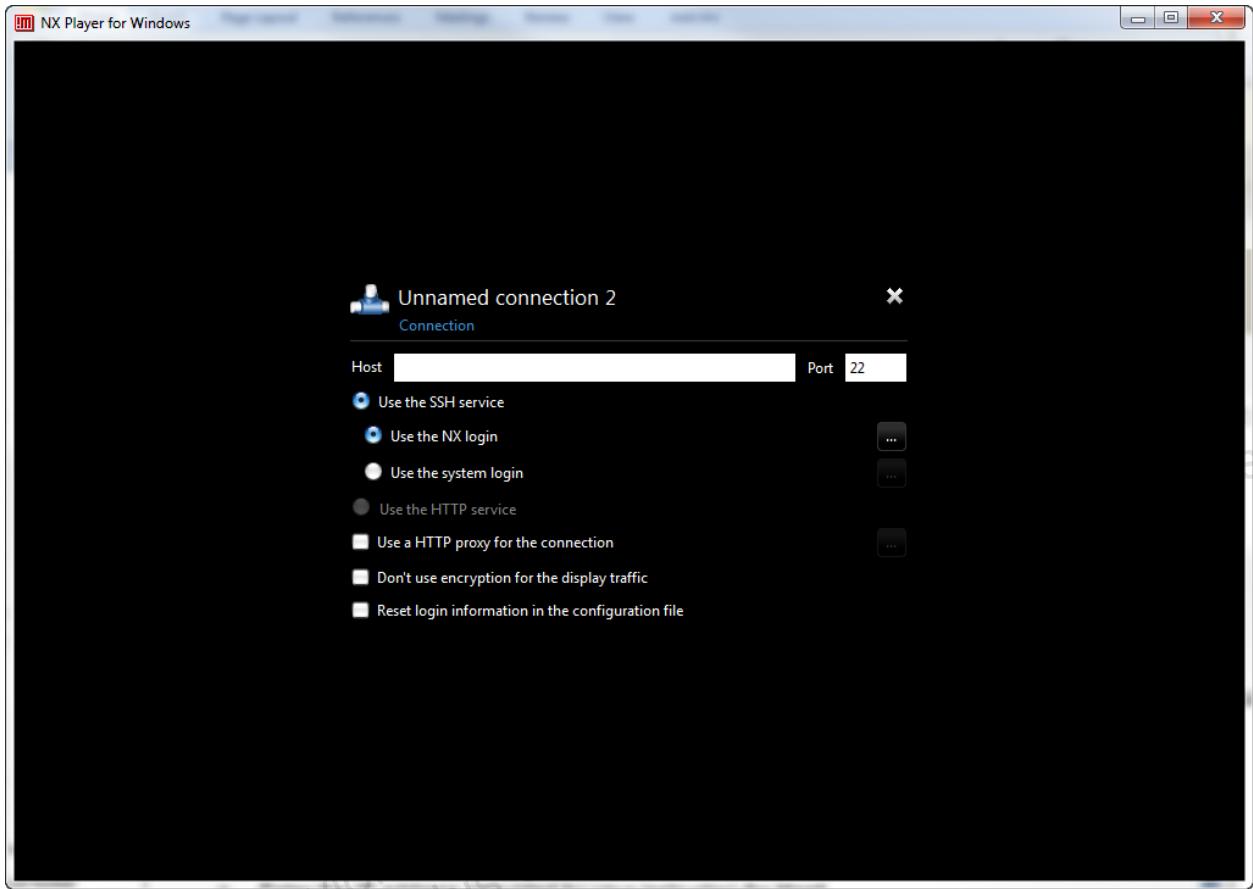
Steps

1. Install **NX Player** (if necessary) from <http://www.nomachine.com/download.php>.
2. Run **NX Player** (for example, select **NX Player for Windows** from the Windows Start menu).
 - a. Ensure that the **Favorites** tab is selected.
 - The Connect window appears.



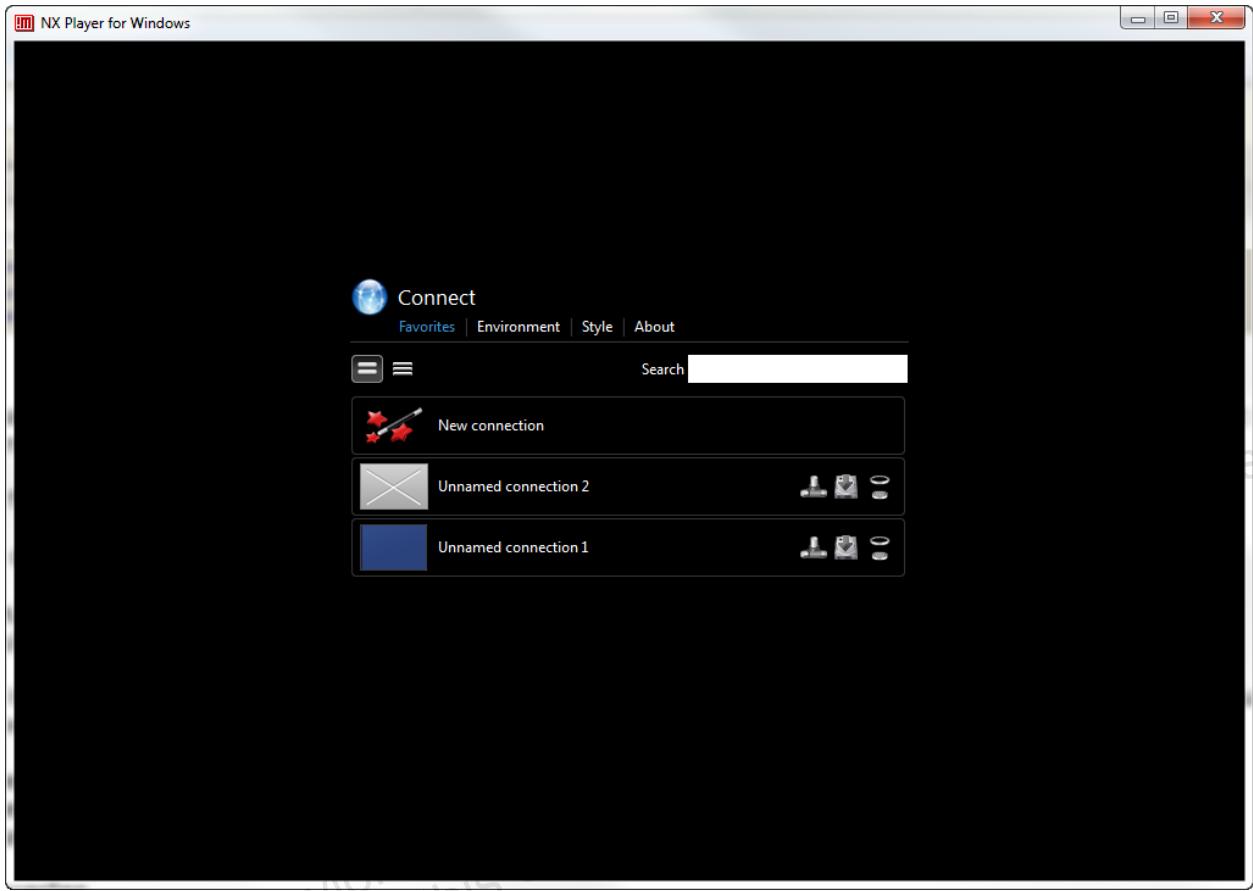
b.

Click **New connection** to display the following window.



- c. Enter the IP address (provided by your instructor) for **Host**.
- d. Accept the defaults:
 - 1) Port 22
 - 2) Use the SSH service
 - 3) Use the NX login
- e. Note the connection name. In this example it is **Unnamed connection 2**. Yours is most likely **Unnamed connect 1**.

f. Press **Enter**. The following window appears.

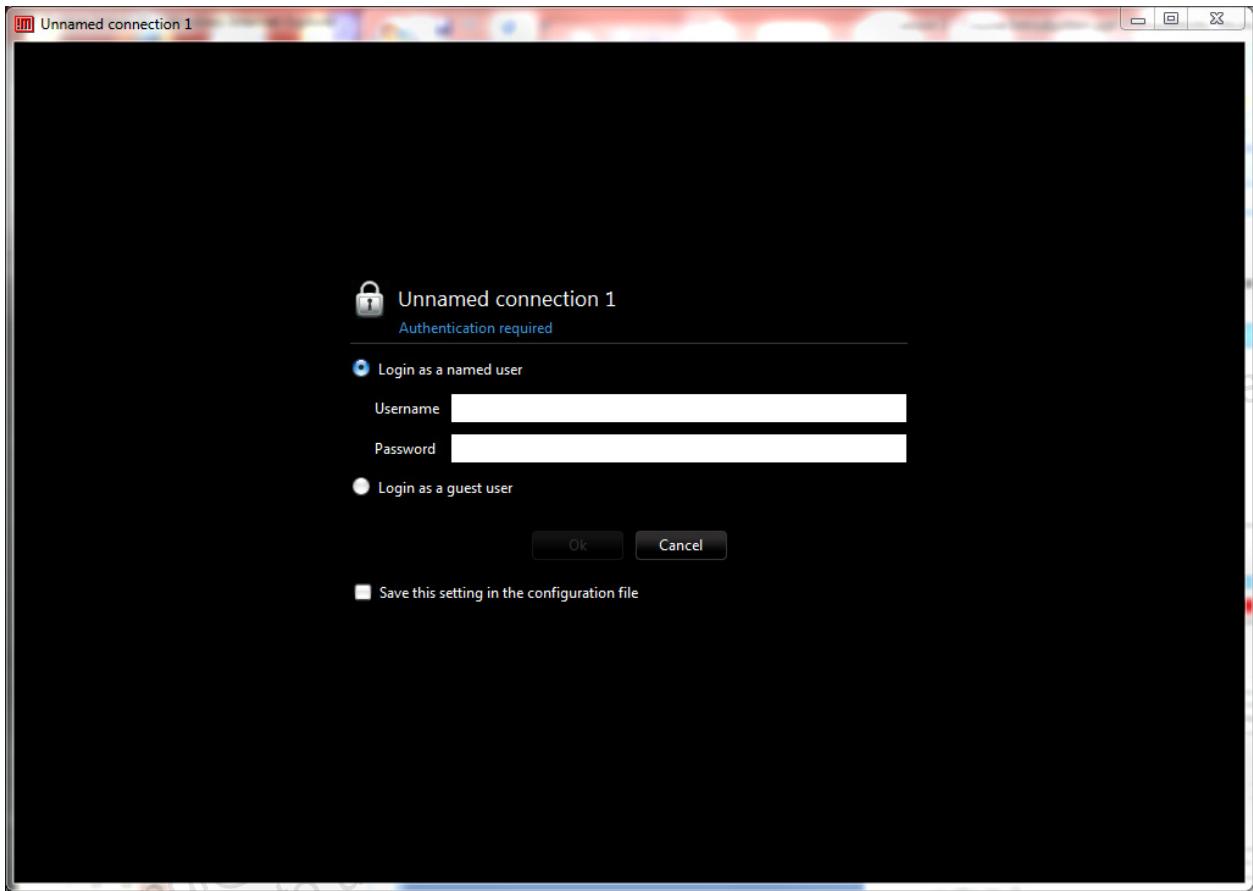


g. Click the connection that you just created (**Unnamed connection 1**, for example).

- The Login window appears.

3. Log in.

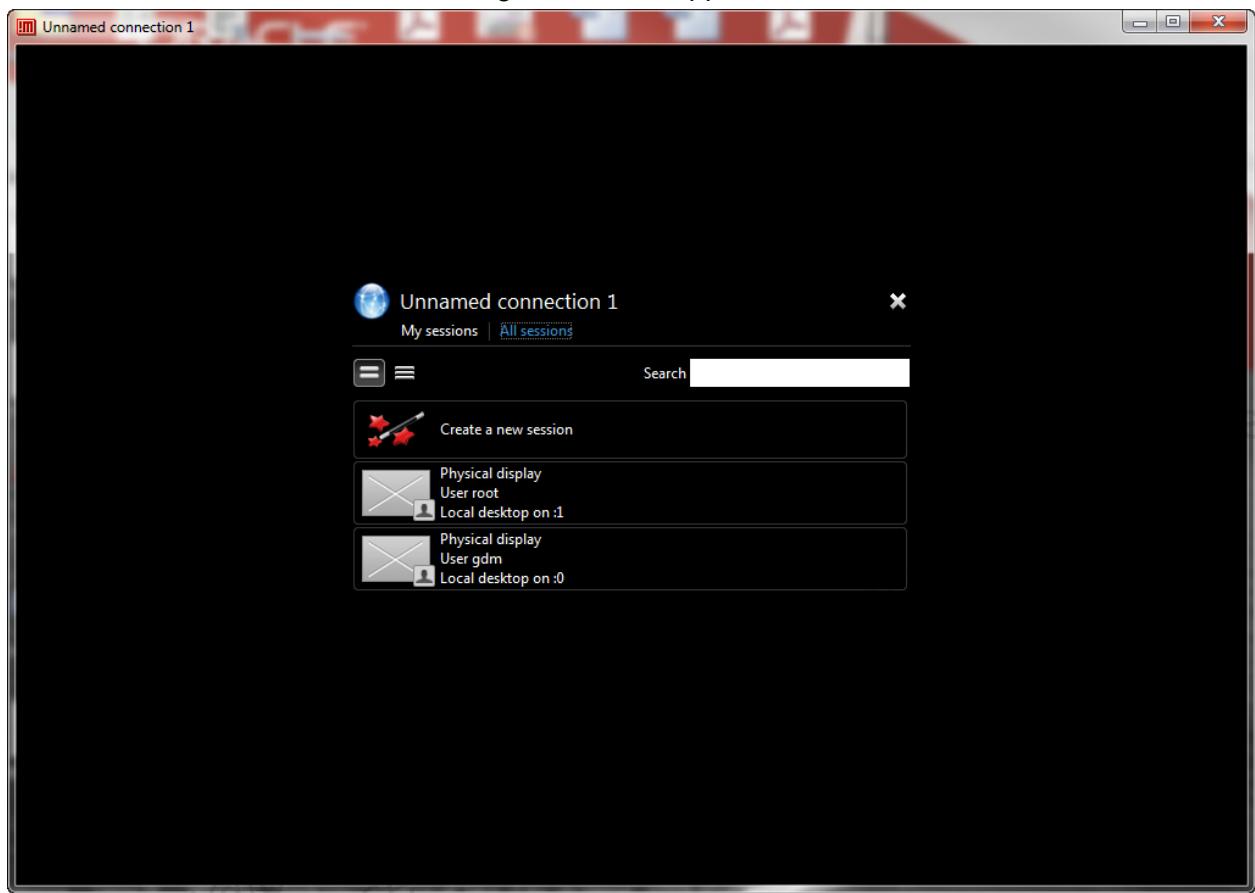
- The window shown in the following screenshot appears, prompting for login authentication.



- Ensure that **Login as a named user** is selected.
- For **Username**, enter vncuser.
- For **Password**, enter vnctech.
- Click **Ok**.

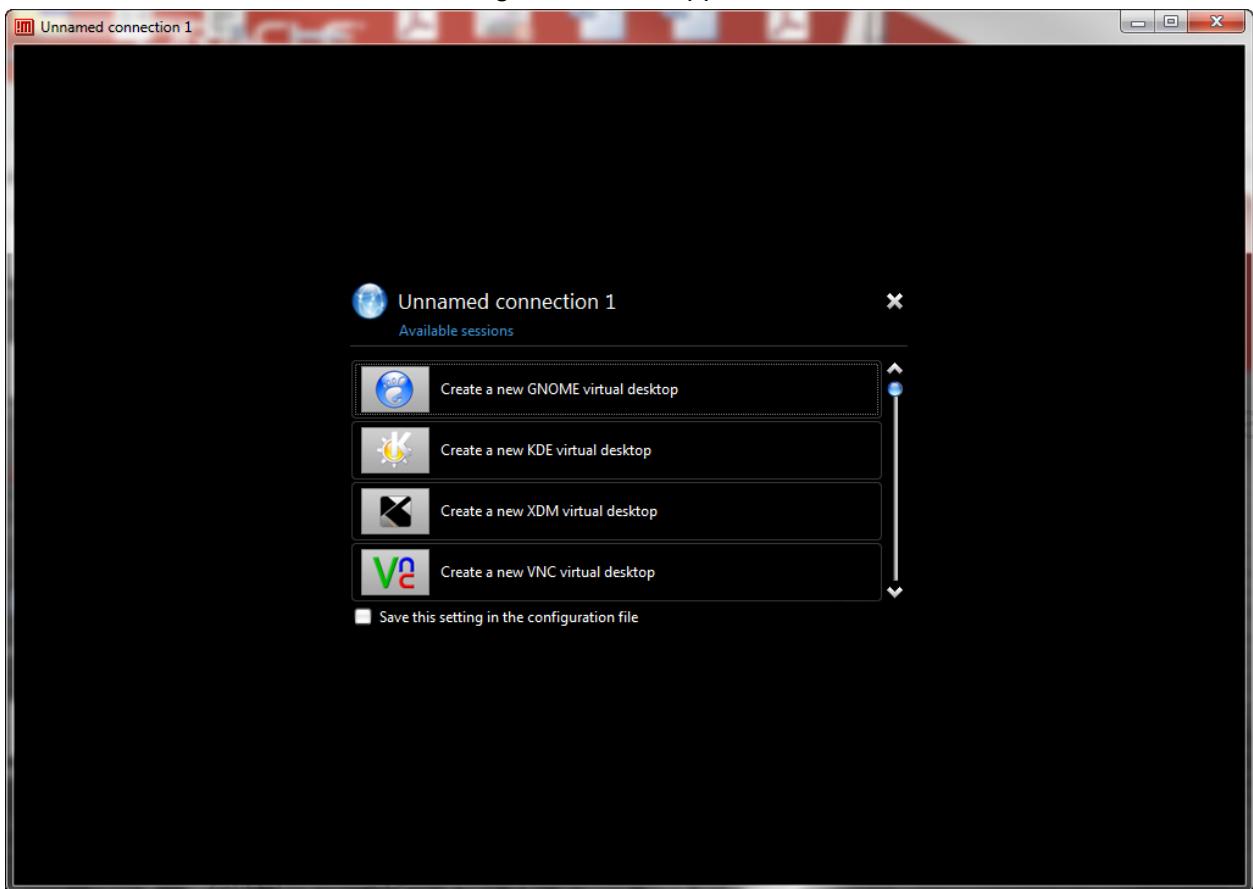
4. Create a new session.

- The window shown in the following screenshot appears.

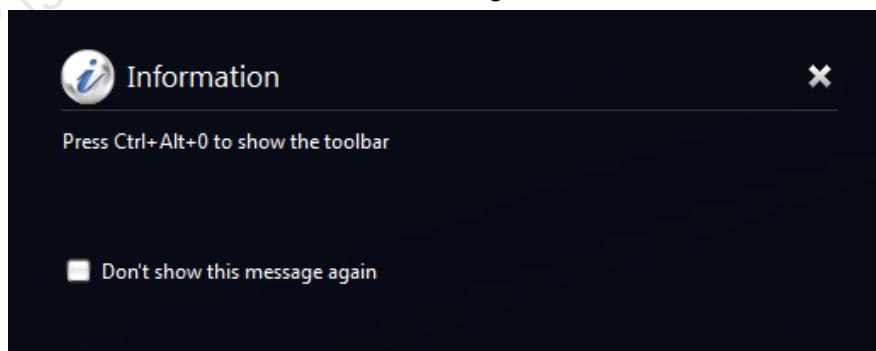


- a. Click Create a new session.

5. Create a new GNOME virtual desktop.
 - The window shown in the following screenshot appears.



- a. Click Create a new GNOME virtual desktop.
- b. Click the X in the **Information** message box to close the box.



- The **dom0** GNOME virtual desktop window appears.

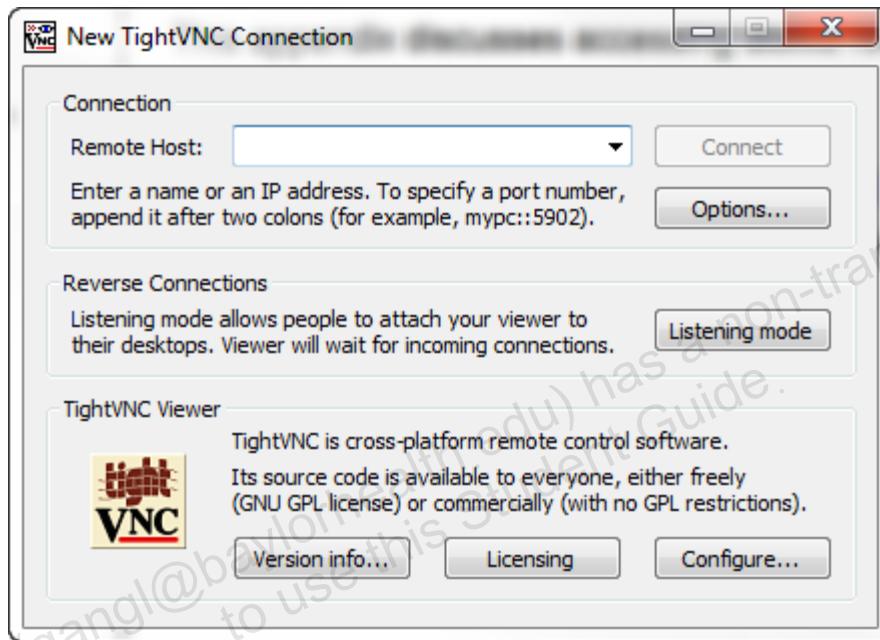
Appendix E: Using TightVNC to Connect Directly to VM Guests

Overview

This appendix discusses accessing the VM guest systems directly by using TightVNC.

Steps

1. Install **tightvnc** (if necessary) from <http://www.tightvnc.com/>.
2. Run **TightVNC Viewer** (for example, select **TightVNC Viewer** from the Windows Start menu).
 - The following New TightVNC Connection window appears.

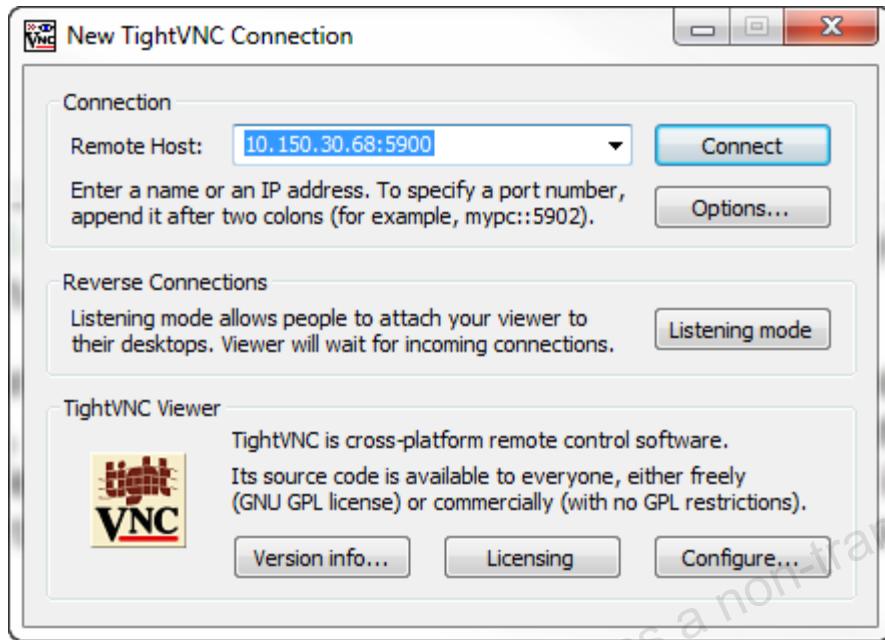


3. Connect directly to your **host01** virtual machine.
 - The following assumptions are made:
 - The **host01** VM was created first (has a port number of 5900).
 - The **host02** VM was created next (has a port number of 5902).
 - The **host03** VM was created last (has a port number of 5903).
 - The output of the following commands (from **dom0** as **root**) indicates that this assumption is true.

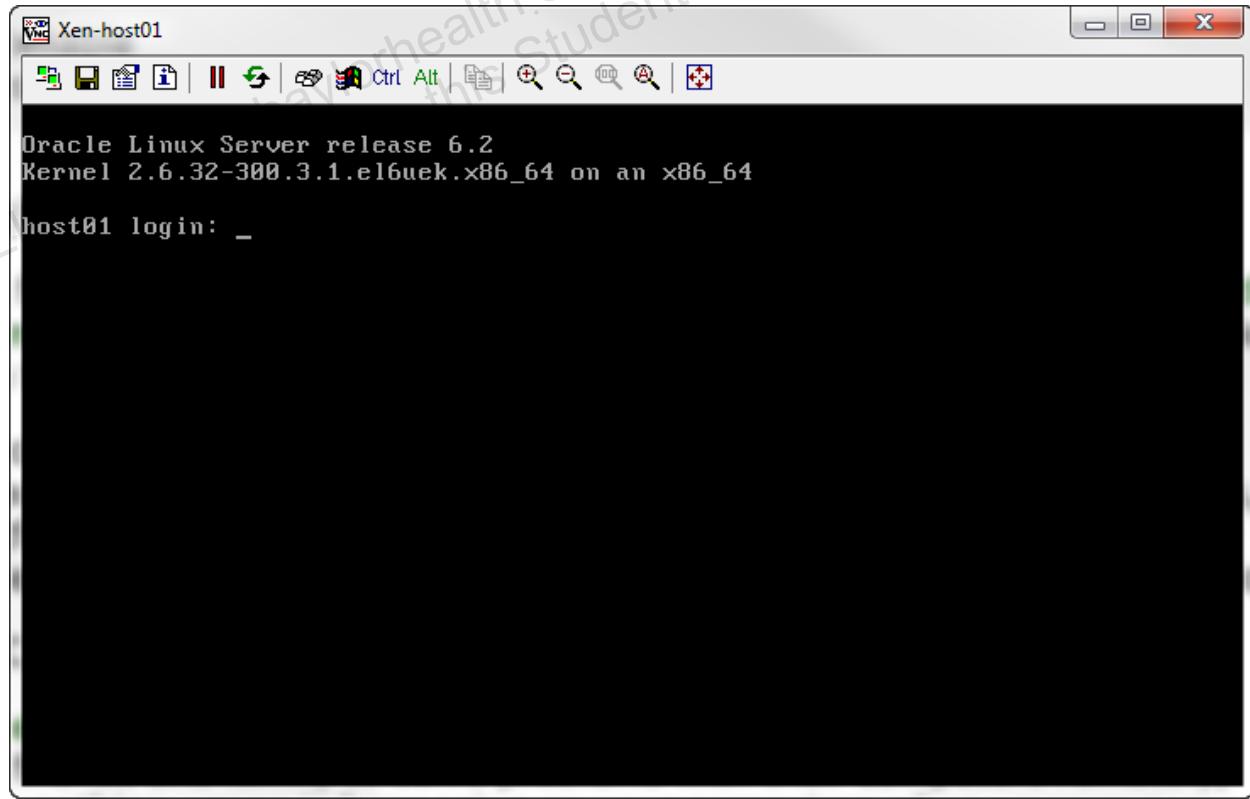
```
# xm list -l host01 | grep location
        (location 0.0.0.0:5900)
# xm list -l host02 | grep location
        (location 0.0.0.0:5902)
# xm list -l host03 | grep location
        (location 0.0.0.0:5903)
```

- Enter the IP address (provided by your instructor), followed by the port number to connect directly a VM guest.

- a. To connect directly to the **host01** VM, enter the following.
- In this example, the IP address of your student PC is 10.150.30.68. Your IP address is different.



- b. Click **Connect**.
- A terminal window appears.



- c. Log in as root password with 0racle (leading zero, not letter O).
- d. Enter the hostname command to confirm that you are logged in to **host01**.

```
# hostname  
host01.example.com
```

- e. Log off by entering the exit command.
- f. Close the VNC window by clicking the X in the top-right corner of the window.

Unauthorized reproduction or distribution prohibited. Copyright© 2019, Oracle and/or its affiliates.

GANG LIU (gangli@baylorhealth.edu) has a non-transferable license
to use this Student Guide.