Oracle VM 3:
Building a Demo Environment using Oracle VM VirtualBox
Introduction

This technical white paper explains how to create an Oracle VM 3 demonstration or learning environment on your laptop or personal computer using Oracle VM VirtualBox. The VirtualBox environment as explained in this document will allow the reader to simulate having 3 physical servers each installed with Oracle VM 3, starting with Oracle VM 3.1.1. One of the virtual machines will run Oracle VM Manager on Oracle Linux while the other two will run Oracle VM Server. This configuration represents the minimum number of servers needed to create a clustered, multi-node Oracle VM server pool. This is simply a starting point as larger and more complex environments can be implemented depending on the amount of memory available on your host computer.

The VirtualBox environment is a distinct improvement over less robust solutions such as using a single physical server to create a single node server pool with local disk. The advantage of using a “clustered” multi-node server pool with VirtualBox over a single server solution is that the reader will be able to experience all of the features offered by Oracle VM 3.

This document provides a step-by-step process for creating a simple demonstration/learning environment by installing and configuring Oracle VM VirtualBox Pre-built Appliances for Oracle VM 3. The final solution is completely self-contained, requiring no network access beyond the host computer and is geared toward readers that might not be familiar with either Oracle VM VirtualBox or Oracle VM 3.

Keep in mind that this document does not discuss how to set up and configure Oracle VM 3 server pools or guests. Please refer to the Getting Started Guide embedded within the Oracle VM Manager user interface or the Oracle VM user guides available from Oracle Technology Network for more detailed information about working with Oracle VM 3 server. Oracle VM VirtualBox has many beneficial features and capabilities not discussed in this document that allow for more complex and imaginative simulations of physical environments. Please visit the Oracle Technology Network for more information about VirtualBox appliances and access to the VirtualBox user guides and manuals.
Overview

The Concept

Oracle VM VirtualBox can be used to host an entire Oracle VM 3 environment using VirtualBox virtual machines to simulate bare metal servers. Oracle VirtualBox will allow the virtual machines containing Oracle VM 3 Manager and Servers to communicate with the desktop (and more) on the hosting platform. In this case, the hosting platform is simply a laptop or personal computer running Windows 7 Professional. The Oracle VM VirtualBox application is installed on the hosting platform.

Oracle has created and provides at no cost VirtualBox Pre-built Appliances containing both Oracle VM Manager and Oracle VM Server preinstalled. The pre-built appliances are used to create VirtualBox virtual machines that provide all the components needed to create an entire multi-node Oracle VM 3 server pool running Oracle VM 3 guests.

The VirtualBox application also provides the network infrastructure to allow the Oracle VM 3 environment to communicate with the desktop on the hosting platform, thus allowing the Oracle VM servers, manager and guests to be accessed via browser and terminal emulation directly from the desktop. The VirtualBox application can provide much more sophisticated network configurations that would allow the entire Oracle VM 3 environment access to networking beyond the hosting platform, but network access for the Oracle VM 3 environment will be limited to the hosting platform only for the purpose of this white paper.
The Process Flow

This document is written as a process flow with sections occurring in the order that you need to complete each task. The guide includes several easy steps to deploy a demonstration/learning environment on your laptop or PC using Oracle VM VirtualBox:

**Step 1** Import Oracle VM VirtualBox Pre-built Appliances
This document assumes the VirtualBox application is already installed on your hosting platform and the pre-built appliances for Oracle VM 3 have already been downloaded. This step describes how to create the VirtualBox virtual machines containing Oracle VM Manager and Server using the pre-built appliances as a template.

**Step 2** Prepare VirtualBox Network Interfaces
Network interfaces may need to be created and customized on the hosting platform to allow the Oracle VM 3 virtual machines to communicate with the hosting platform. This will allow you to access the virtual machines with a browser or ssh to the Oracle VM virtual machines from the desktop on the hosting platform.

**Step 3** Prepare Oracle VM Server and Manager Network Devices
This step describes how to associate the network devices contained within the Oracle VM 3 virtual machines (IE bond0) with the network devices that were configured in Step 2 on the hosting platform.

**Step 4** Initialize the Oracle VM Servers
This step describes how to start the virtual machines containing Oracle VM 3 Server to set the root password and configure networking so the Oracle VM Manager and Servers can communicate with each other as well as the hosting platform.

**Step 5** Initialize the Oracle VM Manager
This step describes how to start the virtual machines containing Oracle VM 3 Manager to set the root password and configure networking so the Oracle VM Manager and Servers can communicate with each other as well as the hosting platform.

**Step 6** Prepare Storage
Additional virtual disks will be needed as the pool file system and storage repository for the Oracle VM 3 server pool. This step describes how to create all additional virtual disks needed for the Oracle VM 3 environment.

**Step 7** Add Additional Storage to Oracle VM Manager
This step describes how to use the storage created in Step 6.

**Step 8** Configure the Oracle VM Manager as a NFS Server
This step describes how to configure the Oracle VM Manager to serve NFS. Unlike a normal implementation of Oracle VM in a data center, the Oracle VM management server will be configured to serve the pool file system and storage repository via NFS. Configuring Oracle VM Manager for NFS is only needed for this particular solution since it is assumed the reader will not have access to any other means of centralized storage — configuring the Oracle VM Manager for NFS is not normal.

**Step 9** Configure the Oracle VM Manager as a HTTP Server
This step describes how to configure the Oracle VM Manager to serve HTTP. Unlike a normal implementation of Oracle VM in a data center, the Oracle VM management server will be configured to serve Oracle VM templates & ISO images via HTTP. Configuring Oracle VM Manager for HTTP is only needed for this particular solution since it is assumed the reader will not have access to any other HTTP server — configuring the Oracle VM Manager for HTTP is not normal.

**Step 10** Begin Using the Oracle VM 3 Environment
You should be able to access a running Oracle VM 3 Manager at this point. Creating and managing Oracle VM 3 servers, server pools, and guests are not discussed in this document.

Figure 1: Implementation process flow

What You Need to Get Started

You will need the following hardware and software to complete the solution presented in this document:
• A laptop or personal computer with a minimum of 8GB of RAM and 130GB of free disk space
• The Oracle VM VirtualBox product (just the product, no extensions needed)
• The Oracle VM VirtualBox pre-built appliance for Oracle VM Manager
• The Oracle VM VirtualBox pre-built appliance for Oracle VM Server

Hardware
The solution presented in this white paper was created on a DELL Latitude E6420 with a 320 gigabyte internal disk with 130 gigabytes of free disk space, 8 gigabytes of RAM, a single Intel Core i5-2520M 2.5GHz processor running Microsoft 64-bit Windows 7 Professional Service Pack 1. This configuration represents the bare minimum needed for a limited demo/learning environment.

A better choice of hardware for a robust portable demo environment might be an Apple MacBook Pro with a 512 gigabyte flash drive, 16 gigabytes of RAM and a 2.3GHz Intel Core i7 processor.

A better choice of hardware for a robust non-portable learning environment might be a personal computer with a 1 terabyte internal disk, 32 gigabytes of RAM and an Intel i7 or AMD Athlon/Phenom II processor.

Disk Space Requirements
As noted above, you will need an internal disk with at least 130GB of free disk space which will be used to:
• Store the VirtualBox pre-built appliances downloaded from Oracle Technical Network
• Contain three VirtualBox virtual machines for the Oracle VM 3 Manager and Servers you will create using the downloaded VirtualBox pre-built appliances above
• Contain three additional virtual hard disks that will be used by the Oracle VM 3 server pool

Limitations with Eight Gigabytes of RAM
Needless to say, the amount of available memory is the most important aspect of your planned environment and greatly impacts your ability to simulate complex environments. Eight gigabytes of RAM represents the bare minimum needed to create a two node Oracle VM server pool with two Oracle VM Guests. With only eight gigabytes of RAM available on the host system the capabilities of the Oracle VM Guests will be extremely limited and will lack the resources needed to install databases or applications. However, 8 GB of RAM is sufficient to create an environment that is quite capable of being used as a tool for learning to configure and manage Oracle VM 3.

Supported Host Operating Systems
Although Microsoft Windows 7 was used as the host platform for the solution presented in this white paper, there are many other operating systems such as Solaris, MAC OS and Ubuntu that can be used as the platform of choice for Oracle VM VirtualBox. Please refer to VirtualBox Commercially Supported Platforms on Oracle Technology Network for a more complete list of supported operating systems that can be used as “host platforms” for your VirtualBox solution.
Limitations of Oracle VM Running within VirtualBox

Within the VirtualBox environment the VM guest types you can create using Oracle VM 3 are limited to PVM only (paravirtualized). Therefore, you will not be able to create Oracle VM Guests that host operating systems such as Microsoft Windows which require HVM as the virtualization type.

Important Notes

Here are few important things to keep in mind while working through this document:

Working with Oracle VM 3 is Not Discussed

Setting up and configuring the Oracle VM 3 server pool is beyond the scope or purpose of this document. Please use the Getting Started guide that is an integral part of the Oracle VM Manager interface to learn how to configure a Oracle VM server pool with Oracle VM Guests.

Object Names and Networking

Please note that the object names, locations and configuration examples are simply used to convey concepts and are not meant to be taken literally. Use IP addresses, VM guest names and storage device names that seem appropriate for your implementation.

Mouse Pointer Disappears

The mouse pointer will be captured (disappear) every time one of the Oracle VM VirtualBox windows is selected; this is normal. You will not be able to use the mouse for anything else on your desktop until the mouse pointer is released. Simply press the right hand Ctrl button on your keyboard to release the mouse pointer so you can use it again.

References to Two Different Managers

This white paper frequently makes references to the Oracle VM 3 Manager and Oracle VM VirtualBox Manager. These are two entirely different products. The entire purpose of this document is to configure the Oracle VM VirtualBox Manager to manage virtual machines that contain Oracle VM 3; one of the virtual machines contains the Oracle VM 3 Manager.
Any references to the Oracle VM VirtualBox Manager are referring to the interface for managing VirtualBox virtual machines and will look something like the screenshot in Figure 2 below showing the desktop of the host computer:

![Figure 2: Screenshot of the Oracle VM VirtualBox Manager](image)

Any references to the Oracle VM Manager are referring to the Oracle VM 3 Management interface that is contained within a VirtualBox virtual machine. The Oracle VM Manger will be accessible using a browser from the hosting desktop and look something like the screenshot in Figure 3 below:

![Figure 3: Screenshot of the Oracle VM 3 Manager](image)
Oracle VM VirtualBox Pre-built Appliances for Oracle VM 3

Oracle has created Oracle VM VirtualBox Pre-built Appliances with both Oracle VM Server and Oracle VM Manager pre-installed. You will need to download two Pre-built Appliances to your laptop or personal computer from the Pre-build Developer VMs site on Oracle Technology Network:

- Oracle VM Manager
- Oracle VM Server

Additional Resources

This white paper is not an exhaustive treatise on Oracle VM VirtualBox and it does not discuss anything related to preparing, building or managing Oracle VM 3 server pools or guests. The following is a list of resources that will be needed at the conclusion of this document:

- Oracle VM VirtualBox binaries and extensions can be downloaded from the Oracle VM VirtualBox site on Oracle Technology Network
- Oracle VM VirtualBox pre-built appliances for Oracle VM 3 Manager and Server can be downloaded from the Pre-build Developer VMs site on Oracle Technology Network
- Oracle VM Templates can be downloaded from the Oracle Software Delivery Cloud
- Oracle VM user guides can be downloaded from Oracle VM Documentation on Oracle Technology Network

For more information about Oracle’s virtualization, visit www.oracle.com/virtualization.
Step 1: Import Oracle VM VirtualBox Pre-built Appliances

The first task after installing the Oracle VM VirtualBox Manager is to download the Oracle VM Manager and Server pre-built appliances from the Pre-build Developer VMs site on Oracle Technology Network and import them into the VirtualBox Manager.

The process of importing the appliances is as simple as opening a native file manager such as Windows Explorer or selecting the Import Appliance item from the File pull down menu in the VirtualBox Manager. The screen shot in Figure 4 shows Windows 7 explorer – simply double-click on the downloaded pre-built appliances with an OVA extension to import each of the appliances.

Figure 4: Double click on the OVA file from a file manager
As Figure 5 below illustrates, double-click on the **Name** when the **Appliance Import Wizard** loads and change the name of the Oracle VM Server guest to a name you prefer; in this case the name has been changed to **myserver1** and **myserver2**.

**NOTE:** When importing two or more Oracle VM Server guests, you need enable the option – “Reinitialize the MAC address of all network cards”. In addition, you may need to change the amount of RAM allocated to each of the virtual machines if your laptop or personal computer only has 8GB of available memory. Each of the pre-built appliances come configured with 4GB of RAM which will be too large for host servers that only have 8GB of total memory available for use. If your laptop or personal computer only has 8GB of RAM, then change the value to 2GB of RAM for each virtual machine.

Choose the Import button to begin the process once all changes have been made.

![Figure 5: Change the name of each server guest to something meaningful in your learning environment](image-url)
A progress bar will be displayed once the import process begins as seen in Figure 6 below. The import of each image should normally only take a minute or two.

Figure 6: A progress bar appears once the import process begins

Repeat the previous steps for each Oracle VM Server appliance that you would like to create and finally import a single Oracle VM Manager appliance using the same process. You should have something like the screen shot shown in Figure 7 below once you have completed importing pre-built appliances.

Figure 7: Your environment should have at least two Oracle VM Servers and one Oracle VM Manager Guest

Proceed to the task in the next section once all the appliances are imported.
Step 2: Prepare VirtualBox Network Interfaces

VirtualBox comes with a few different types of network interfaces that can be used to allow communication between the VM guests and the host operating system, including network interfaces that will allow the VM guests to communicate with local and wide area networks accessed from your laptop or personal computer. However, for the purpose of the demonstration environment we will limit the network communication to include access just between your desktop and the virtual machines being managed by VirtualBox.

The install process for Oracle VM VirtualBox creates a single host-only network device on your laptop or personal computer. Using the host-only network device will allow you to open a browser on your desktop to access the Oracle VM Manager running within the VirtualBox VM guest. The device will only allow network traffic between the VM guests and your host operating system, but nothing outside the confines of your laptop or personal computer.

We will need to add a second host-only network since the Oracle VM Server appliance has both eth0 and eth1 configured. You can choose to use eth1 on the Oracle VM Servers or not use them – the choice is yours. But, at least the host side network device will exist if you decide to use it.

The network devices are created using the VirtualBox Manager. Begin by opening the preferences dialog box for VirtualBox as shown in Figure 8 below.

Figure 8: Open the preferences dialog box in the VirtualBox Manager
Choose the **Network** settings as shown below…

![Figure 9: Choose Network settings](image1)

Select **Add host-only** network as shown below…

![Figure 10: Add new host-only network adapter](image2)
A progress bar will appear once the adapter creation begins.

Figure 11: Showing the adapter creation progress bar

Finally, the second network adapter will be listed in the dialog box. The new adapter will be a completely different subnet from the first adapter and have a different IP range. The IP for the subnet can be changed later if so desired.

Figure 12: Showing the newly created host-only adapter
You will need to know the IP address assigned to the first network adapter. **Highlight** the first adapter and choose the **Edit** icon to open the **Network Details** dialog.

![Figure 13: Edit host-only adapter to gather IP information](image)

Make a note of the IP and netmask – this will be needed to create and assign static IP addresses to the Oracle VM Server and Manager. Although not discussed in this document you will also need to create one additional IP address for the server pool called the **Virtual IP** using an IP from the same address range shown in the **IPv4 Address** field shown below.

![Figure 14: The field showing the IP address for the first adapter](image)
The next screen shot illustrates where to disable the DHCP server – it will not be needed for the learning environment. Simply uncheck the **Enable Server** checkbox as shown in Figure 15 below.

![Figure 15: Disable the DHCP server](image)

Get the same information from the second network adapter you created.

![Figure 16: Choose the second host-only adapter](image)

After gathering all the IP information, choose OK to accept the changes to the DHCP server and close the network settings dialog - proceed to the next section.
Step 3: Prepare Oracle VM Server and Manager Network Devices

Now that the network devices have been configured on the server side, the focus will change to configuring the network on the client side for the VirtualBox virtual machines. The Oracle VM Server virtual machines (myserver1 & myserver2) come configured with both eth0 and eth1, but they are associated with bridged network devices on the server side. This is normally fine, but the server side network devices will need to be changed to the two host-only network devices configured in the previous section since the learning environment will be completely self-contained on your laptop or personal computer.

![Starting a virtual machine](image)

Figure 17: Starting a virtual machine
You will probably encounter the error message shown below if you attempt to start a virtual machine without first configuring the client side network settings.

![Probable network error when attempting to start a virtual machine for the first time](image1.png)

**Figure 18:** Probable network error when attempting to start a virtual machine for the first time

To begin, **highlight** the *myserver1* Oracle VM Server guest image and select **Settings** from the VirtualBox Manager toolbar.

![Select Settings icon to change client side network association for myserver1 and myserver2](image2.png)

**Figure 19:** Select Settings icon to change client side network association for myserver1 and myserver2

Choose the **Network** settings dialog from the selection list on the left side of the General settings dialog. Then change the following fields as shown in Figure 20 below:

- **Attached to:** Change to **Host-Only Adapter**
• Name: Change to **Host-Only Ethernet Adapter**

• Promiscuous Mode: Change to **Allow All**

![Image of network settings]

**Figure 20:** Change the adapter 1 settings as shown for **myserver1**

Choose the **Adapter 2** tab and make the same changes you did for the first adapter, but choose **Host-Only Ethernet Adapter #2** as shown in Figure 21 below: Choose **OK** once you have made changes to all the fields for both adapters to accept all the changes. Make the same changes to the network settings for the **myserver2**.

![Image of network settings]

**Figure 21:** Change the adapter 2 settings as shown for **myserver1**
The Oracle VM Manager virtual machine that we named mymanager comes pre-configure with only a single network interface (eth0). Make almost the same changes to mymanager as those made to myserver1 and myserver2. To begin, select the image for mymanager and choose the settings icon as shown in Figure 22 below.

Figure 22: Select Settings icon to change client side network association for mymanager

Make the same changes for Adapter 1 on mymanager that were made for myserver1 and myserver2 as shown in Figure 23 below. Ensure Adapter 2 is disabled by choosing the Adapter 2 tab and uncheck the Enable Network Adapter checkbox. Choose OK to accept the changes and close the settings dialog box – proceed to the next section.

Figure 23: Change the adapter 1 settings as shown for mymanager
Step 4: Initialize the Oracle VM Servers

At this point none of the Oracle VM virtual machines have networking or hostnames configured. This section describes how to start the Oracle VM Servers and Manager to add networking to the guest OS. Basically, the templates are designed to run an “interview” script the first time they are booted – answering the questions will automatically configure the networking for bond0. This process will need to be followed for both myserver1 and myserver2.

Note that the interview script only configures the first network interface which is named bond0 by default. The second network interface is configured after the servers have been “discovered” using Oracle VM Manager when creating networks.

Figure 24: Start myserver1
Since the host-only network interfaces that were created by Oracle VM VirtualBox are confined to the laptop or personal computer it was installed on, you can assign any IP addresses you would like as long as they are in the range shown in the VirtualBox network settings dialog for any given host-only interface.

Answer the questions using the values shown in the screen shot below. The value for the server IP address will be a made up value using the IP range you noted in the previous section showing how to configure the VirtualBox host-only network adapters. The default IP range for the first host-only adapter is normally 192.168.56.1 through 192.168.56.255. The netmask for the host-only interfaces is 255.255.255.0.

Use the same IP address that was assigned to the server for the gateway and the DNS server since neither will really exist in the learning environment - each server (myserver1 and myserver2) will use its own IP address for the gateway and DNS server.

Figure 25: Answer the interview questions for server IP, netmask, gateway and DNS server
Assign the hostname as myserver1.example.com and myserver2.example.com or something similar of your choosing.

Figure 26: Assign a hostname using the fully qualified domain name

The server will continue booting as normal after completing the interview script - eventually displaying the Oracle VM Server console screen as seen in Figure 27 below.

Figure 27: The Oracle VM Server console screen should eventually be displayed after completing the interview script
Ensure networking is configured correctly and works by pinging each of the Oracle VM Servers. Open a command window or terminal and try pinging the IP addresses for both myserver1 and myserver2.

![Image of command window with ping results]

Figure 28: Try pinging the newly configured servers using a command window from your Windows desktop

Ensure that the initial network configuration is completed on both myserver1 and myserver2, and then proceed to the next section where the Oracle VM Manger guest will be initialized.
Step 5: Initialize the Oracle VM Manager

The Oracle VM Manager guest called mymanager will need to be initialized just like the Oracle VM Servers. The process is slightly different. Begin by starting mymanager as shown below.

![Start mymanager VM guest](image)

**Figure 29: Start mymanager VM guest**

The Oracle VM Manager interview begins with a password prompt. The password provided here will be used to set the password for root only. All other relevant user account names and passwords can be found in the “READ ME FIRST” file shown on the Oracle VM Manager desktop in Figure 33 below.

![Enter a password for root and the Oracle VM Manager user interface](image)

**Figure 30: Enter a password for root and the Oracle VM Manager user interface**
Since the host-only network interfaces that were created by Oracle VM VirtualBox are confined to the laptop or personal computer it was installed on, you can assign any IP addresses you would like as long as they are in the range shown in the VirtualBox network settings dialog for any given host-only interface.

Answer the questions using the values shown in the screen shot below. The value for the server IP address will be a made up value using the IP range you noted in the previous section showing how to configure the VirtualBox host-only network adapters. The default IP range for the first host-only adapter is normally 192.168.56.1 through 192.168.56.255. The netmask for the host-only interfaces is 255.255.255.0.

Use the same IP address that was assigned to the server for the gateway and the DNS server since neither will really exist in the learning environment - each server (myserver1 and myserver2) will use its own IP address for the gateway and DNS server.

![Figure 31: Enter an IP address for the Oracle VM Manager](image-url)
Assign the hostname as mymanager.example.com or something similar of your choosing.

Figure 32: Assign a fully qualified hostname

The Oracle VM Manger guest will start a Gnome desktop after accepting all the values entered during the interview as shown in Figure 33 below. The boot process will take a few minutes to start the Oracle VM Manager and the Gnome desktop. User guides and help can be accessed from the desktop as well as the user interface for the Oracle VM Manager. The Oracle VM Manger can be accessed via any browser from either the Gnome desktop or from your laptop or personal computer.

Figure 33: Unlike the Oracle VM Server guest, the Oracle VM Manager starts a Gnome desktop
Whether starting a browser from the Gnome desktop within the VM guest or starting a browser from your laptop or personal computer, the following Oracle VM Manager login screen should be presented.

Use the following URL to ensure the Oracle VM Manager is accessible:

```
http://192.168.56.100:7001/ovm/console
```

The browser should display a log in screen very much like the one shown below.

![Oracle VM Manager login screen](image)

**Figure 34**: Ensure the Oracle VM Manager user interface is accessible

There are still additional steps that need to be completed before using the Oracle VM Manager. Proceed to the next section for additional steps needed to configure storage required to build server pools.
Step 6: Prepare Storage

The mymanager VirtualBox guest contains Oracle Linux and the Oracle VM Manager application which will be configured as a NFS server and a HTTPD server in subsequent steps. This is not something that would normally be done in a production setting and is only used to help build a demonstration/learning environment since the entire environment will be completely self-contained on your laptop or personal computer. Three additional virtual disks will need to be created using the Virtual Disk Image format (VDI).

The Purpose of the Virtual Disks

The additional three virtual disks will be attached to the Oracle VM management guest and used for the following purposes:

- Oracle VM server pool file system. This 12 gigabyte virtual disk will be attached to the Oracle VM management server, mounted and then presented to the Oracle VM Servers via NFS.
- Oracle VM server pool storage repository. This 64 gigabyte virtual disk will be attached to the Oracle VM management server, mounted and then presented to the Oracle VM Servers via NFS.
- Oracle VM Template import library. This 32 gigabyte virtual disk will be attached to the Oracle VM management server, mounted and the used as a temporary location for the HTTP server to serve Oracle VM Templates to the Oracle VM Manager during the template import process.

The pool file system disk must be at least 12 gigabytes, but the size and qty of the other disks can be anything that is appropriate for the learning environment being created in each individual case.

Creating the Virtual Disks

Use Oracle VM VirtualBox to create the following three virtual disks using the existing SATA controller. The disk names used here are simply examples; use any name that seems appropriate for your particular implementation when you are creating the following virtual hard disks:

- Pool file system: mypool1-poolfs (12 gigabytes)
- Storage repository: mypool1-repository1 (64 gigabytes)
- Template library: template-library1 (32 gigabytes)

Simply begin by selecting the VirtualBox VM guest for mymanager then choose the Settings icon in the top tool bar of the VirtualBox manager. This section only illustrates the creation of the pool file system, but you will need to step through the same process again for the other two disks.

Storage for YUM Repository

The Oracle VM Manager can also act as the YUM repository needed by the Oracle VM Server Update Manager to automatically detect patches and upgrades for the Oracle VM Servers. There is already a directory named /var/www/html/yum that exists on the image. There is more than enough disk space with 19 gigabytes available in the root partition to simply use /var/www/html/yum directory as is.
To begin creating the additional storage, select the **Settings icon** from the Oracle VM VirtualBox Manager toolbar and then choose **Storage dialog**.

![Oracle VM VirtualBox Manager](image)

**Figure 35:** Start mymanager if it is not already running

Choose **SATA Controller** from the Storage dialog to create the needed virtual disks. Three VDI disks will be created under the SATA controller so choose the **Add Hard Disk icon** as shown in Figure 36 below to begin creating the first disk.

![VirtualBox Storage Settings dialog](image)

**Figure 36:** Choose the SATA Controller from the VirtualBox Storage Settings dialog
Choose the Create New Disk button…

Figure 37: Choose to create a new disk

Select VDI file type…

Figure 38: Choose to create a VDI disk
Choose **Dynamically allocated…**

![Figure 39: Choose fixed size disk](image)

Virtual disks are simply files on your hard drive. Choose a directory location, file name and size for the virtual disks as shown in Figure 40 below. Create the following three disks:

- 12GB file named **mypool1-poolfs** (or choose a filename of your liking)
- 32GB file named **http-template-library** (or choose a filename of your liking)
- 64GB file named **mypool1-repository1** (or choose a filename of your liking)

![Figure 40: Give the virtual disk a file name and a directory location](image)
Choose the **Create** button to begin creating the file…

![Create button](image)

Figure 41: Begin creating the file

A progress bar will be displayed while the file creation is progressing. The larger files can take up to 20 minutes to create.

![Progress bar](image)

Figure 42: Progress bar displayed during file creation
The disks should look something like the following screen shot in Figure 43 after completing the creation of all three virtual hard disks.

Figure 43: Storage settings dialog showing all three newly created virtual disks

Proceed to the next section that explains how to add the storage that was created in this section to mymanager virtual machine.
Step 7: Add Additional Storage to Oracle VM Manager

This section describes how to prepare the newly created virtual disks for use by the NFS and HTTP servers discussed in the sections following this one. The VirtualBox storage wizard used in the last section created the virtual disks and presented them to the mymanager virtual machine as /dev/sdc, /dev/sdd and /dev/sde; these disks will automatically be made available when mymanager is started.

The following tasks can be completed either directly from the Gnome desktop running within mymanager using an xterm or the tasks can be completed using a ssh session from any terminal emulation application such as PuTTY. Skip the steps below showing logging in with PuTTY if you are going to use a terminal emulator from the Gnome desktop.

The following screen shots assume that PuTTY is being used from your laptop or personal computer. Begin by starting mymanager if it is not already running and minimize the window once it starts – use the IP address that was assigned while initializing mymanager for the first time.

![PuTTY Configuration](image)

Figure 44: Start an ssh session using a terminal emulator
Verify and associate the device special file name with the virtual disks that were created by the size of each disk. Using the disk size from the output in Figure 45 below shows the following (your output may be different):

- /dev/sdc is the 12 gigabyte disk for the pool file system
- /dev/sdd is the 32 gigabyte disk for the template library
- /dev/sde is the 64 gigabyte disk for the storage repository

![Figure 45: Output from fdisk helps determine which device special file belongs to each virtual disk](image)

Run the following commands on the command line; it is assumed these commands and tasks are familiar so very little output or explanation is supplied. Keep in mind that your device names might be different if you created them in a different order.

First create a single partition on each of the virtual disks using the entire disk for primary partition 1:

```
[root@mymanager ~]# fdisk /dev/sdc
[root@mymanager ~]# fdisk /dev/sdd
[root@mymanager ~]# fdisk /dev/sde
```

Format the partition on each disk - be sure to adjust for a different disk order if the order is different for your particular circumstance:

```
[root@mymanager ~]# mke2fs -j -L mypool1poolfs /dev/sdc1
[root@mymanager ~]# mke2fs -j -L osimages /dev/sdd1
[root@mymanager ~]# mke2fs -j -L mypool1reposfs1 /dev/sde1
```
Create the following mount points:

```
[root@mymanager ~]# mkdir -p /ovm3/mypool1/poolfs
[root@mymanager ~]# mkdir /ovm3/mypool1/repofs1
[root@mymanager ~]# mkdir /ovm3/osimages
```

Add the following entries to `/etc/fstab`:

```
LABEL=osimages /ovm3/osimages ext3 defaults 1 1
LABEL=mypool1repofs1 /ovm3/mypool1/repofs1 ext3 defaults 1 1
LABEL=mypool1poolfs /ovm3/mypool1/poolfs ext3 defaults 1 1
```

Run the following commands to finalize the storage configuration:

```
[root@mymanager ~]# mount -a
[root@mymanager ~]# cd /var/www/html
[root@mymanager ~]# ln -s /ovm3/osimages osimages
```

The storage should now be ready to use – proceed to the next section.
Step 8: Configure the Oracle VM Manager as a NFS Server

The NFS server will be used to serve the pool file systems and storage repositories to the Oracle VM Servers when building server pools once the learning environment is ready to go. Storage repositories and pool file systems (only one pool file system per server pool) can be presented to the Oracle VM Servers using NFS, iSCSI or FCP. To keep things simple, this document explains how to create an NFS server that can be used by the Oracle VM Servers to access centralized storage.

Although beyond the scope of this document, either the Oracle VM Manager or a completely different VirtualBox guest can be created and configured to serve the pool file system and storage repository using iSCSI. Your imagination is pretty much the only limitation to how you can build and enhance a self-contained learning environment on your laptop or personal computer.

Assuming the ssh session is still running from the previous section, add the following entries to /etc/exports on the Oracle VM Manager:

```
/ovm3/mypool1/repofs1 192.168.56.0/24(rw,no_root_squash)
/ovm3/mypool1/poolfs 192.168.56.0/24(rw,no_root_squash)
```

Enable the NFS server:

```
[root@mymanager ~]# chkconfig nfs on
[root@mymanager ~]# service nfs start
[root@mymanager ~]# exportfs -a
```

Test the mount the Oracle VM Manager to ensure it works:

```
[root@mymanager ~]# mount 192.168.56.100: /ovm3/mypool1/repofs1 /mnt
[root@mymanager ~]# touch /mnt/test
[root@mymanager ~]# rm /mnt/test
[root@mymanager ~]# umount /mnt
```

Finally, test the mount on both of the Oracle VM Servers using the same commands as above. Make sure that the NFS is un-mounted from both servers before proceeding any further:

```
[root@myserver1 ~]# mount 192.168.56.100: /ovm3/mypool1/repofs1 /mnt
[root@myserver1 ~]# touch /mnt/test
[root@myserver1 ~]# rm /mnt/test
[root@myserver1 ~]# umount /mnt
```
Step 9: Configure the Oracle VM Manager as a HTTP Server

The HTTP server will make Oracle VM Templates available to the Oracle VM Manager during the template importing process as described in the Oracle VM 3 user guides. The Oracle VM Manager Pre-built Appliance comes with the Apache HTTP server pre-installed and already enabled. This section simply describes a few steps needed to prepare the HTTP server for use with the learning or demo environment.

A little more explanation might be in order if you are not familiar with how Oracle VM Manager imports Oracle VM Templates, ISOs and Assemblies for use by server pools. Oracle VM Templates must normally be downloaded from Oracle Software Delivery Cloud to an intermediary location on an HTTP server anywhere within your intranet. Currently, Oracle VM Templates, ISO images and Assemblies cannot be imported directly from a storage repository or file system; they must be imported from either an FTP server or a HTTP server. So, the virtual machine called mymanager is simply going to be configured to serve Oracle VM Templates via HTTP using the virtual disk created earlier as the storage location.

Begin by ensuring the HTTP server is enabled to start whenever the virtual machine boots by running `chkconfig` as shown in Figure 46 below.

![Figure 46: Ensure the HTTP server is configured to start on boot](image)
A directory named `/ovm3/osimages` should already exist from tasks performed in Step 7. Create a test file that can be used to verify your web browser can access the HTTP server running on the Oracle VM Manager virtual machine:

```
[root@mymanager ~]# touch /ovm3/osimages/test
```

Figure 47: Create a test file to help verify the HTTP server is working correctly

Open a browser and use the following URL to access the HTTP server (your IP may be different):

```
http://192.168.56.100
```

The browser should display something like the following screenshot:
Ensure the test file is accessible by adding the `osimages` directory to the URL (you may have named the directory something else):

```
http://192.168.56.100/osimages
```

The browser should display something like the following screen shot:

![Index of /osimages](image)

<table>
<thead>
<tr>
<th>Name</th>
<th>Last modified</th>
<th>Size</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Directory</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>test</td>
<td>13-May-2012 14:55</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

Example of the browser output:

```
Apache/2.2.3 (Oracle) Server at 192.168.56.100 Port 80
```

Figure 48: The browser should display the test file created earlier

If that is successful, remove the test file.

Remember, this is the location for any Oracle VM Templates that are downloaded from the [Oracle Software Delivery Cloud](https://softwa...). It is simply an intermediary location for Oracle VM Templates, ISO images and assemblies before they are imported into Oracle VM Manager.
Step 10: Begin Using the Oracle VM 3 Environment

To begin using the environment, open a web browser from either of the following desktops:

- From the GNOME desktop running on the Oracle VM Manager guest itself
- From the desktop of your laptop or personal computer that is hosting the Oracle VM Manager guest

Simply open a browser from either desktop and use the following URL:

http://192.168.56.100:7001/ovm/console

Figure 49: The final step is to begin using the Oracle VM Manager