

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

ORACLE WHITE PAPER | APRIL 2016

Table of Contents	1
Introduction	1
Overview	2
The concept	2
The Process Flow	3
What You Need to Get Started	4
Hardware	4
Disk Space Requirements	4
Limitations with Eight Gigabytes of RAM	4
Supported Host Operating Systems	4
Limitations of Oracle VM Running within VirtualBox	5
Important Notes	5
Working with Oracle VM 3 is Not Discussed	5
Object Names and Networking	5
Mouse Pointer Disappears	5
References to Two Different Managers	5
Oracle VM VirtualBox Pre-built Appliances for Oracle VM 3	7
Additional Resources	7
Step 1: Import Oracle VM VirtualBox Pre-built Appliances	8
Step 2: Prepare VirtualBox Network Interfaces	10
Step 3: Prepare Oracle VM Server and Manager Network Devices	13
Step 4: Initialize the Oracle VM Servers	17
Step 5: Initialize the Oracle VM Manager	21
Step 6: Prepare Storage	24
The Purpose of the Virtual Disks	24
Creating the Virtual Disks	24
Storage for YUM Repository	24
Step 7: Add Additional Storage to Oracle VM Manager	29
Step 8: Configure the Oracle VM Manager as a NFS Server	32
Step 9: Configure the Oracle VM Manager as a HTTP Server	33
Step 10: Begin Using the Oracle VM 3 Environment	35
Conclusion	35



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 3.4.1. 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 of 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 documentation](#) available from Oracle Technology Network for more detailed information about working with Oracle VM. 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](#).

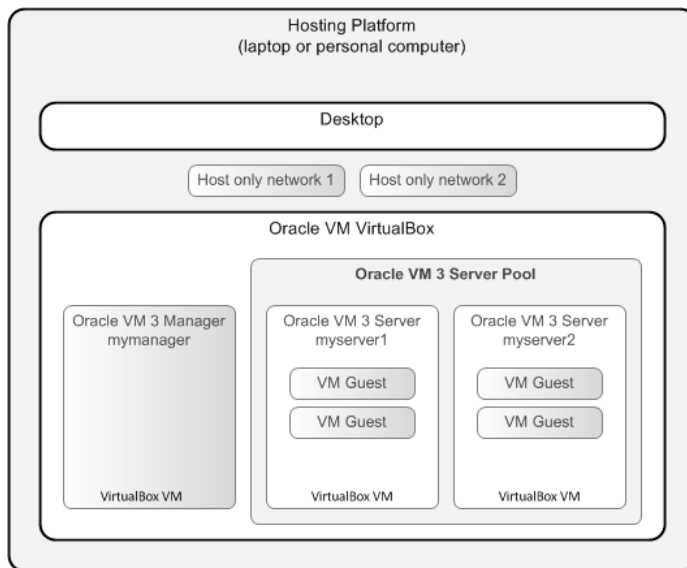
Overview

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:



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 3.4.1](#)
- The Oracle VM VirtualBox [pre-built appliance for Oracle VM Server 3.4.1](#)

Hardware

The solution presented in this white paper was created on a Apple MacBook Pro 2012 with a 500 gigabyte internal disk with 130 gigabytes of free disk space, 8 gigabytes of RAM, a single Intel Core i5-2520M 2.5GHz processor running OS X 10.11 El Capitan. 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 Core-i7 or AMD processor of the same band.

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 Apple OS X was used as the host platform for the solution presented in this white paper, there are many other operating systems such as Solaris, Microsoft Windows and all main Linux distributions 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 (or the button defined for your platform) 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:

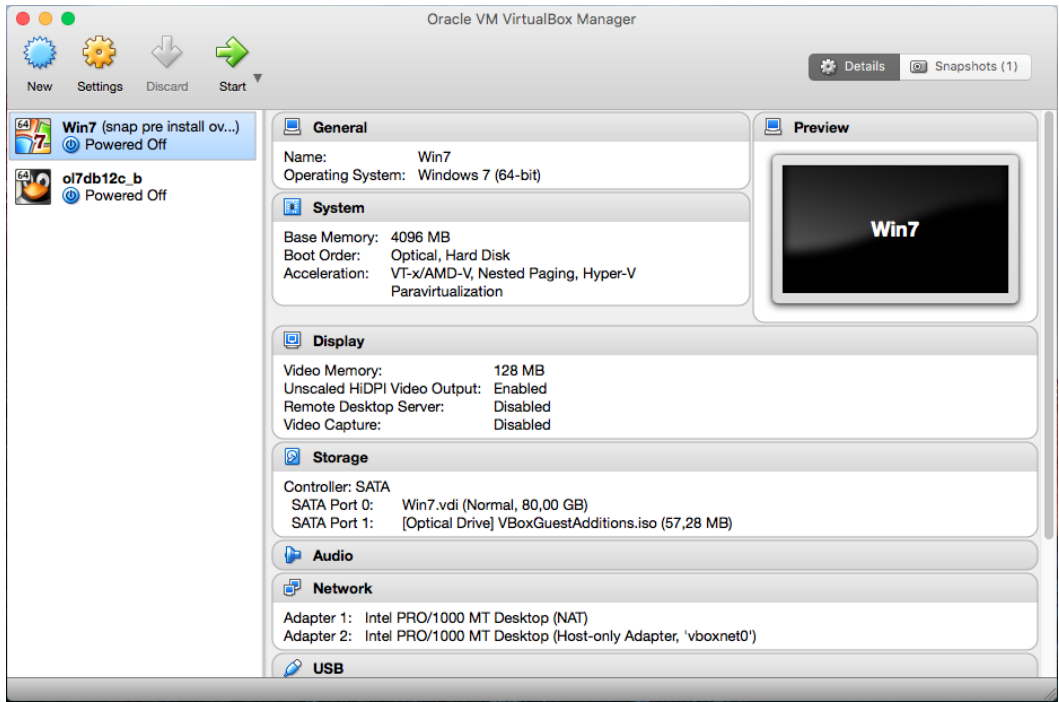


Figure 2: Screenshot of the Oracle VM VirtualBox Manager

Any references to the Oracle VM Manager are referring to the Oracle VM 3 Management interface that is 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



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 3.4.1
- Oracle VM Server 3.4.1

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.

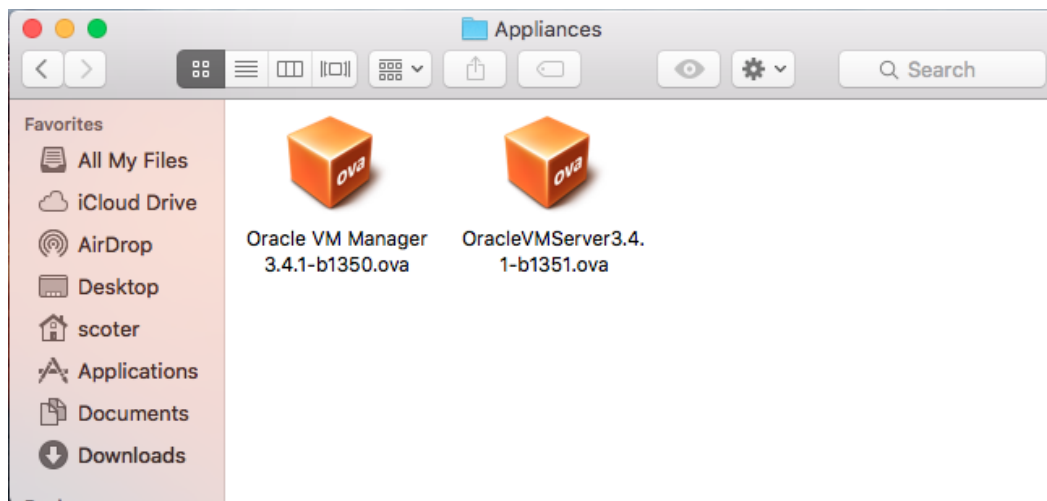


Figure 4: Double click on the OVA file from a file manager

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.

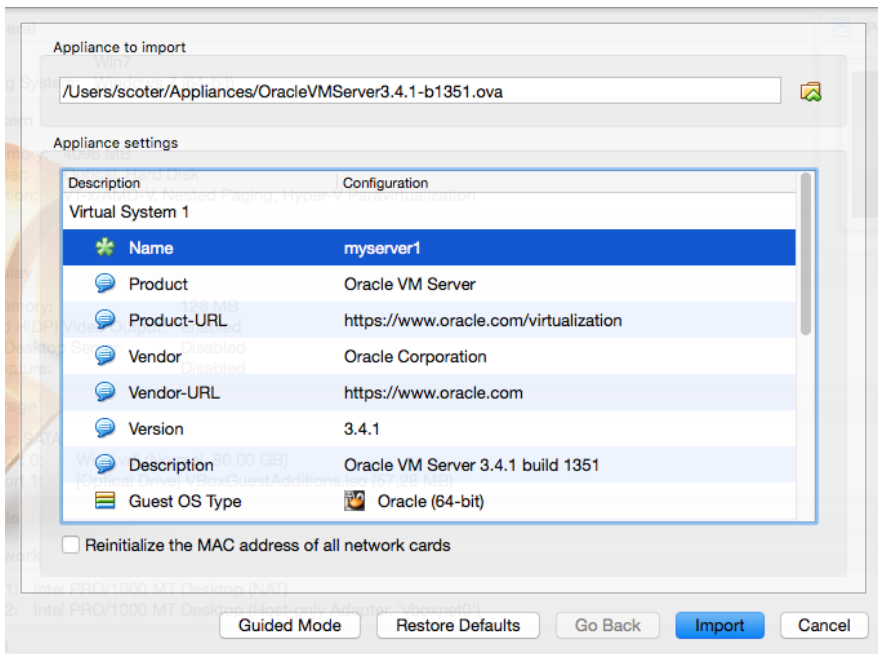


Figure 5: Change the name of each server guest to something meaningful in your learning environment

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.

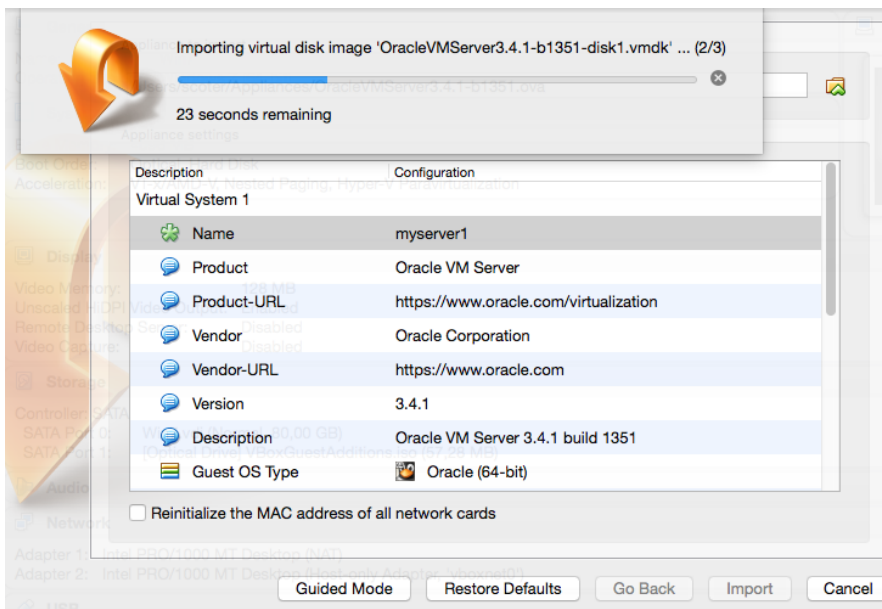


Figure 6: A progress bar appears once the import process begins

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.

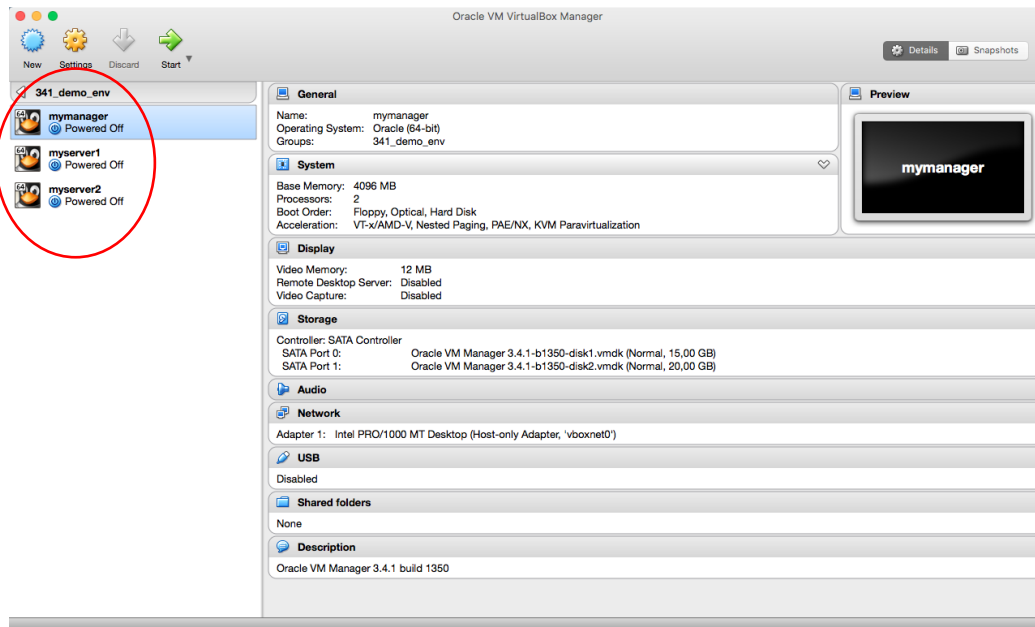


Figure 7: Your environment should have at least two Oracle VM Servers and one Oracle VM Manager Guest

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.

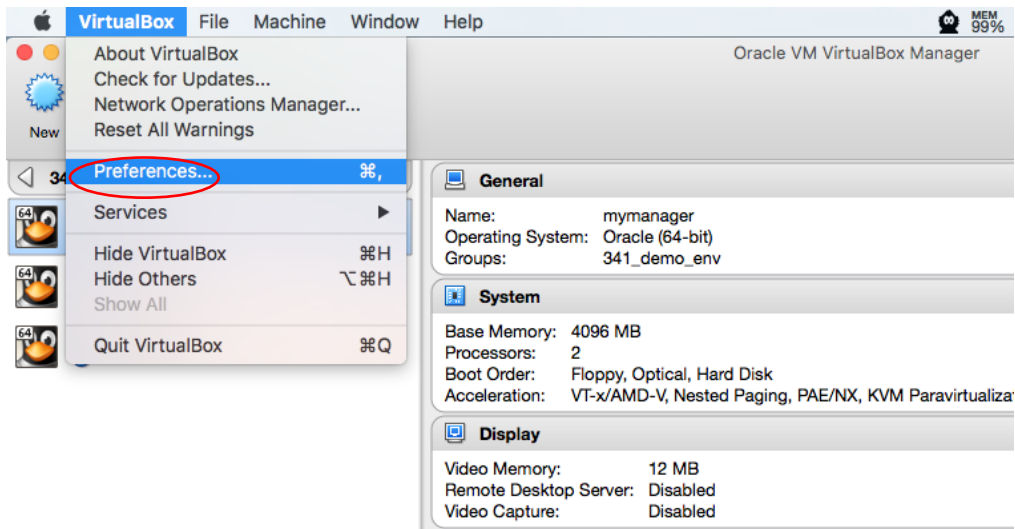


Figure 8: Open the preferences dialog box in the VirtualBox Manager

Choose the **Network** settings as shown below (Host-Only Networks).....

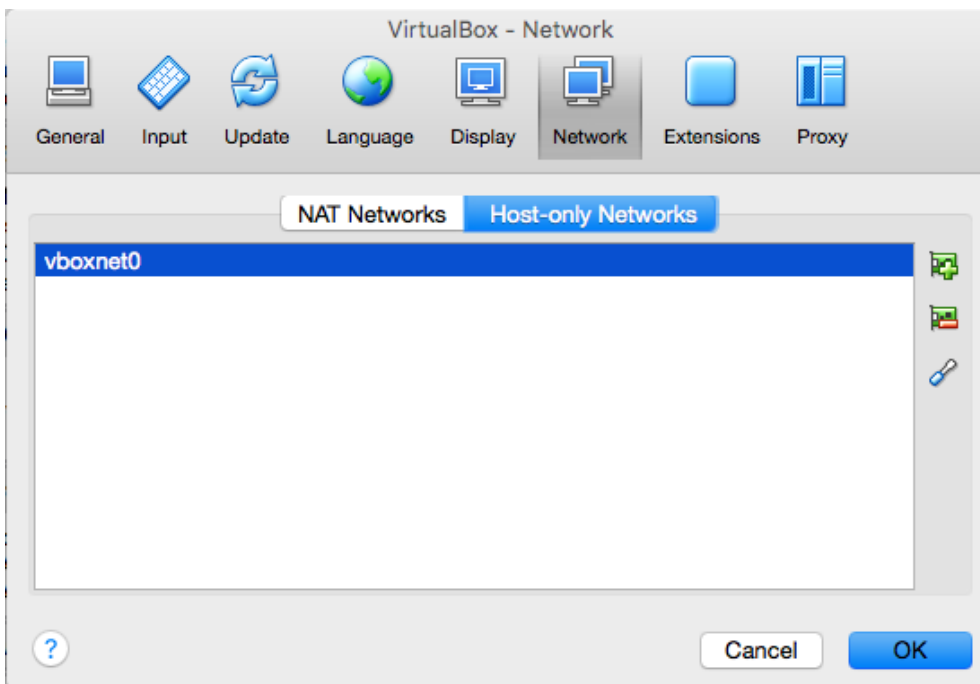


Figure 9: Choose Network settings

You will need to know the IP address assigned to the first network adapter. **Highlight** the adapter and choose the **Edit** icon to open the **Network Details** dialog.

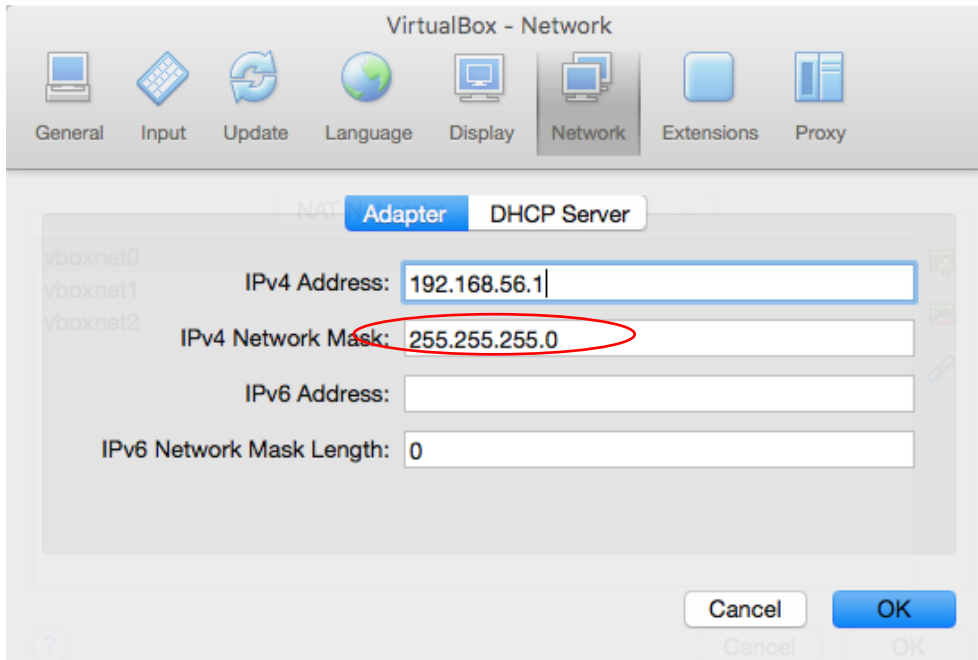


Figure 10: Edit host-only adapter to gather IP information

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.

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 11 below.

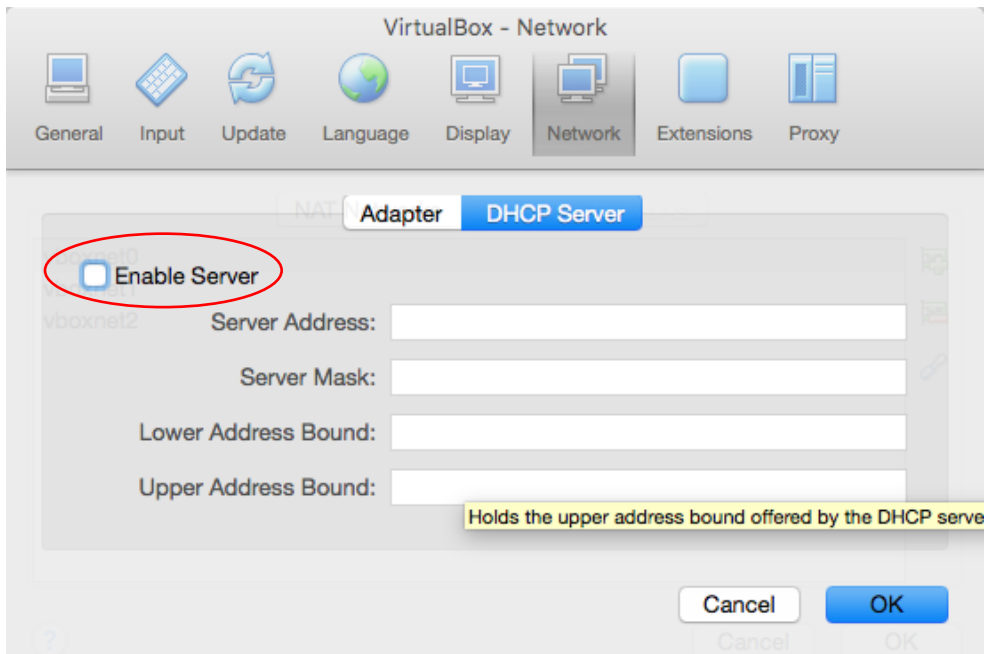


Figure 11: Disable the DHCP server

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.

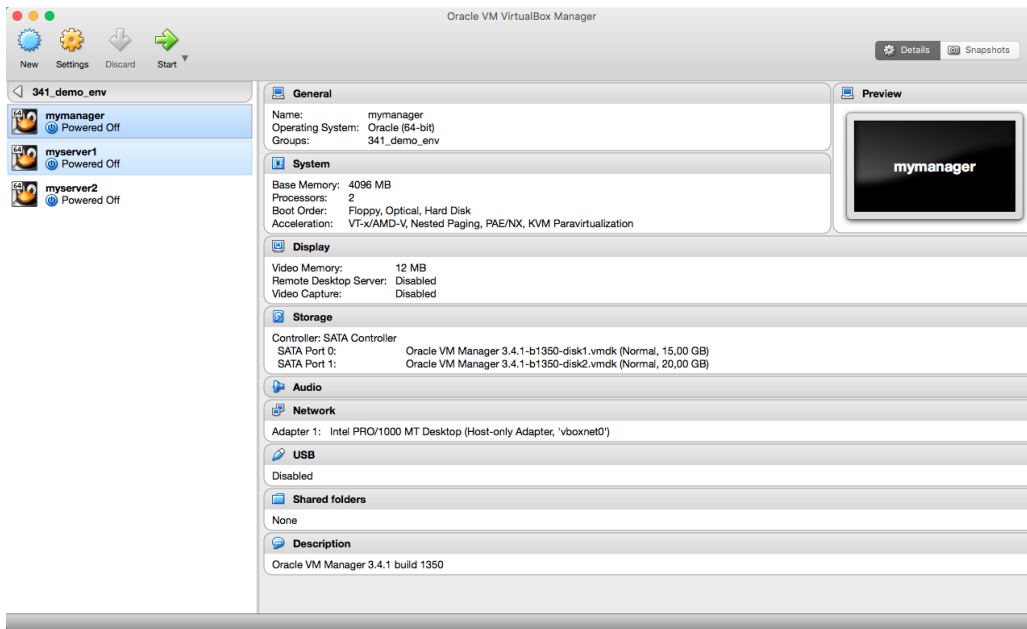


Figure 12: Starting a virtual machine

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.



Figure 13: 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.

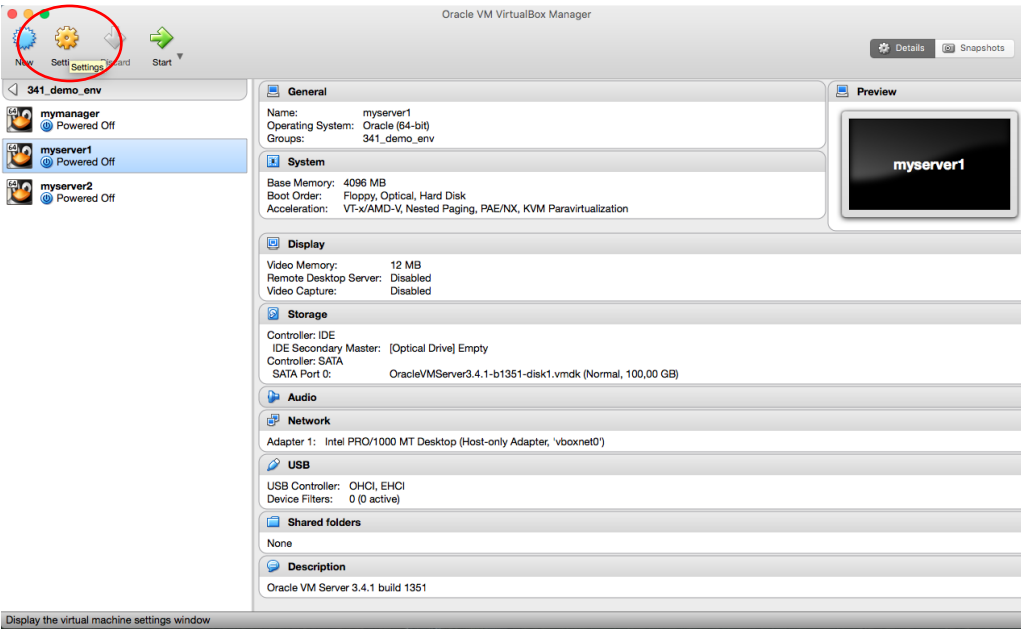


Figure 14: Select Settings icon to change client side network association for myservers1 and myservers2

Choose the **Network** settings dialog and change the following fields as shown in Figure 15 below:

- Attached to: Change to **Host-Only Adapter**
- Name: Change to **Host-Only Ethernet Adapter Created before (vboxnet0)**
- Promiscuous Mode: Change to **Allow All**

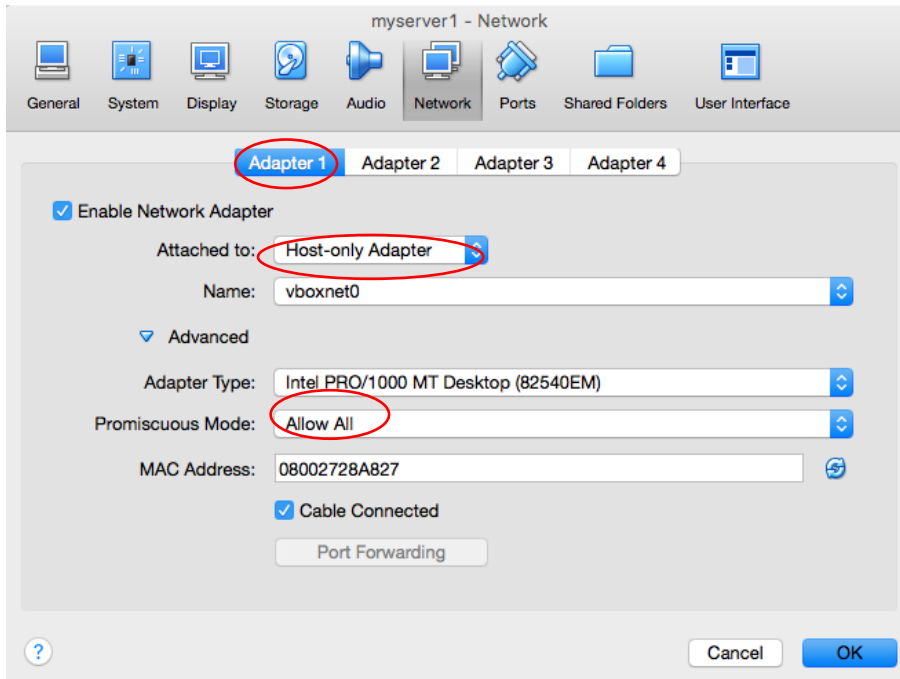


Figure 15: Change the adapter 1 settings as shown for myservers1

Make almost the same changes to **myserver2** as those made to **myserver1**. To begin, select the image for **myserver2** and choose the settings icon as shown in Figure 16 below.

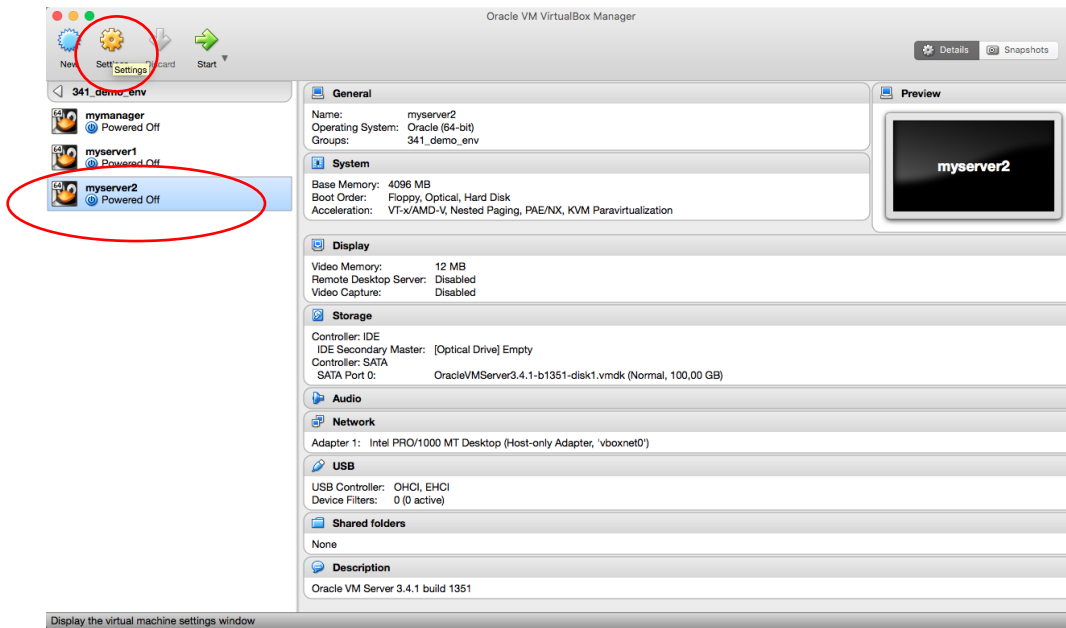


Figure 16: Select Settings icon to change client side network association for myservers2

Make the same changes for **Adapter 1** on **mymanager** like for myservers1 and myservers2 as shown in Figure 17 below. Choose **OK** to accept the changes and close the settings dialog box – proceed to the next section.

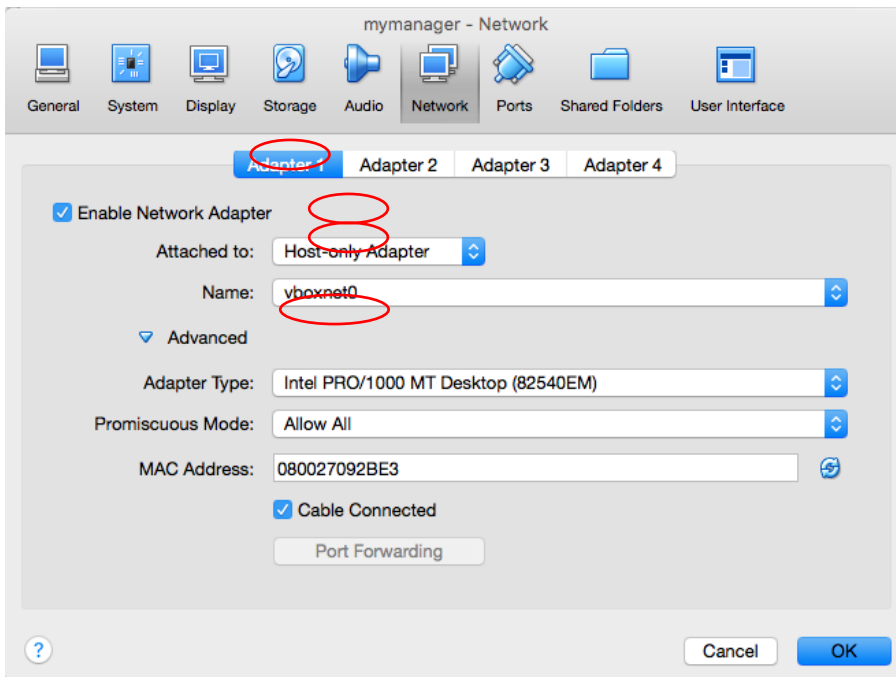


Figure 17: Change the adapter 1 settings as shown for mymanager

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 added to a bond interface by default. Other interfaces can be added once the configuration has been completed.

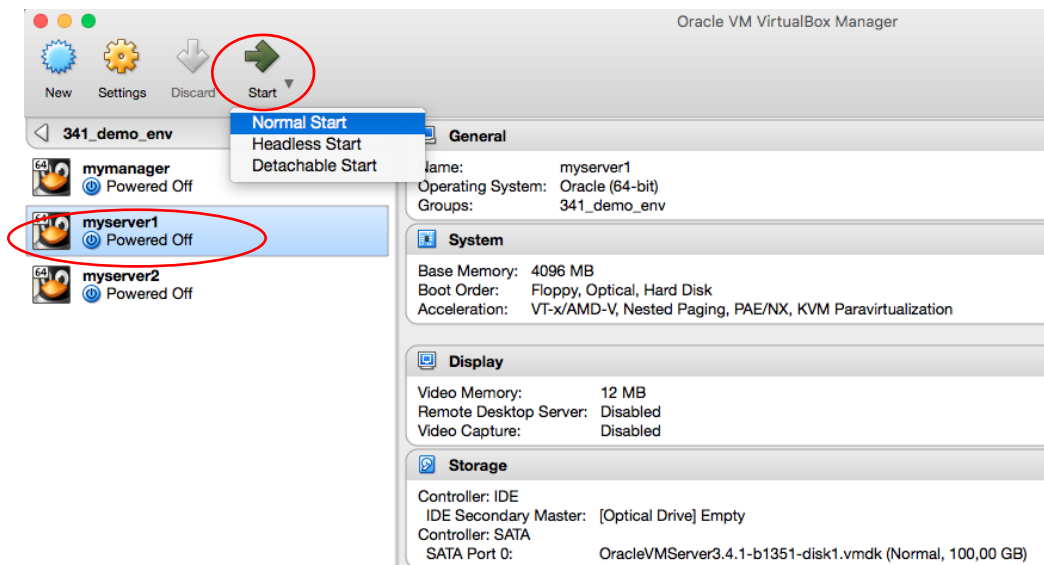


Figure 18: Start myserver1

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 192.168.56.2 through 192.168.56.255 (192.168.56.1 is, for default the IP assigned to the host system). 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.

The configuration will also ask a password for Linux user “root” and a password for the ovs-agent authentication that will be used by Oracle VM Manager once discovered.

Following questions will be presented:

Template Definition	Question	Value on this example
ovs-network	System Hostname	myserver1.example.com
ovs-network	Network device to assign to bond0	eth0
ovs-network	IP Address of the interface (bond0)	192.168.56.101
ovs-network	Netmask of the interface	255.255.255.0
ovs-network	Gateway IP Address	192.168.56.1
ovs-network	DNS Server separated by comma	192.168.56.1
ovs-network	DNS search domains separated by comma	example.com
authentication	System root password (linux user)	SimonCoter
ovs-agent	Oracle VM Server Agent Password	SimonCoter

```

myserver1 [Running]
Add partition mappings: [ OK ]
Setting up Logical Volume Management: Configuration setting "global/global_filter" unknown. [ OK ]
Checking filesystems
/dev/sda2: clean, 46944/3276800 files, 624785/13107200 blocks
/dev/sda1: clean, 348/128016 files, 113339/512000 blocks
Remounting root filesystem in read-write mode: [ OK ]
Mounting local filesystems: [ OK ]
Enabling /etc/fstab swaps: [ OK ]
Entering non-interactive startup
Starting OVM template configure: ovs-network: System host name, e.g., "localhost.localdomain": myserver1.example.com
ovs-network: Network device to associate to bond0 - OVM Management Network, e.g., "eth0": eth0
ovs-network: IP address of the interface.: 192.168.56.101
ovs-network: Netmask of the interface.: 255.255.255.0
ovs-network: Gateway IP address.: 192.168.56.1
ovs-network: DNS servers separated by comma, e.g., "8.8.8.8,8.8.4.4": 192.168.56.1
ovs-network: DNS search domains separated by comma, e.g., "us.example.com,cn.example.com": example.com
authentication: System root password.:
ovs-agent: Oracle VM Server Agent Password.: _
  
```

Figure 19: Answer the interview questions for server myservers1

The server will continue booting as normal after completing the interview script - eventually displaying the Oracle VM Server console screen as seen in Figure 20 below.

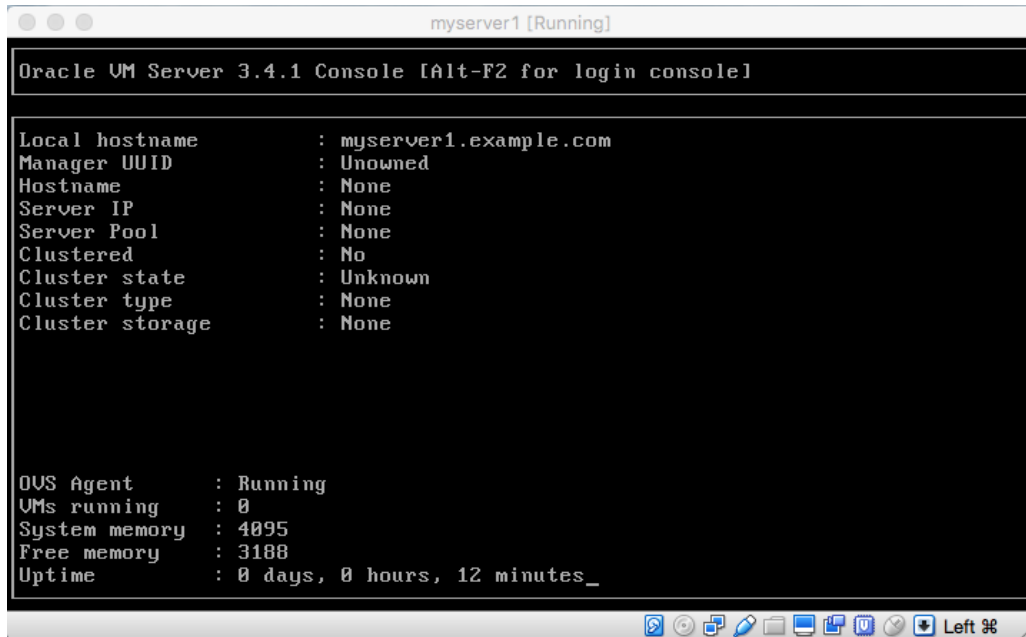


Figure 20: The Oracle VM Server console screen should eventually be displayed after completing the interview script

Execute the same steps also for “myserver2”.

Template Definition	Question	Value on this example
ovs-network	System Hostname	myserver2.example.com
ovs-network	Network device to assign to bond0	eth0
ovs-network	IP Address of the interface (bond0)	192.168.56.102
ovs-network	Netmask of the interface	255.255.255.0
ovs-network	Gateway IP Address	192.168.56.1
ovs-network	DNS Server separated by comma	192.168.56.1
ovs-network	DNS search domains separated by comma	example.com
authentication	System root password (linux user)	SimonCoter
ovs-agent	Oracle VM Server Agent Password	SimonCoter

```
myserver2 [Running]
Add partition mappings: [ OK ]
Setting up Logical Volume Management: Configuration setting "global/global_filter" unknown. [ OK ]
Checking filesystems
/dev/sda2: clean, 46944/3276800 files, 624785/13107200 blocks
/dev/sda1: clean, 348/128016 files, 113339/512000 blocks
Remounting root filesystem in read-write mode: [ OK ]
Mounting local filesystems: [ OK ]
Enabling /etc/fstab swaps: [ OK ]
Entering non-interactive startup
Starting OVM template configure: ovs-network: System host name, e.g., "localhost.localdomain".: myserver2.example.com
ovs-network: Network device to associate to bond0 - OVM Management Network, e.g., "eth0".: eth0
ovs-network: IP address of the interface.: 192.168.56.102
ovs-network: Netmask of the interface.: 255.255.255.0
ovs-network: Gateway IP address.: 192.168.56.1
ovs-network: DNS servers separated by comma, e.g., "8.8.8.8,8.8.4.4".: 192.168.56.1
ovs-network: DNS search domains separated by comma, e.g., "us.example.com,cn.example.com".: example.com
authentication: System root password.:
ovs-agent: Oracle VM Server Agent Password.: _
```

Figure 21: Answer the interview questions for server myserver2

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.

```
1. scoter@area51: ~ (bash)
[scoter@area51: ~]# ping 192.168.56.101
PING 192.168.56.101 (192.168.56.101): 56 data bytes
64 bytes from 192.168.56.101: icmp_seq=0 ttl=64 time=0.582 ms
64 bytes from 192.168.56.101: icmp_seq=1 ttl=64 time=0.338 ms
64 bytes from 192.168.56.101: icmp_seq=2 ttl=64 time=0.381 ms
64 bytes from 192.168.56.101: icmp_seq=3 ttl=64 time=0.405 ms
^C
--- 192.168.56.101 ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.338/0.426/0.582/0.093 ms
[scoter@area51: ~]# ping 192.168.56.102
PING 192.168.56.102 (192.168.56.102): 56 data bytes
64 bytes from 192.168.56.102: icmp_seq=0 ttl=64 time=0.556 ms
64 bytes from 192.168.56.102: icmp_seq=1 ttl=64 time=0.415 ms
64 bytes from 192.168.56.102: icmp_seq=2 ttl=64 time=0.326 ms
64 bytes from 192.168.56.102: icmp_seq=3 ttl=64 time=0.300 ms
^C
--- 192.168.56.102 ping statistics ---
4 packets transmitted, 4 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 0.300/0.399/0.556/0.100 ms
[scoter@area51: ~]#
```

Figure 22: 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.

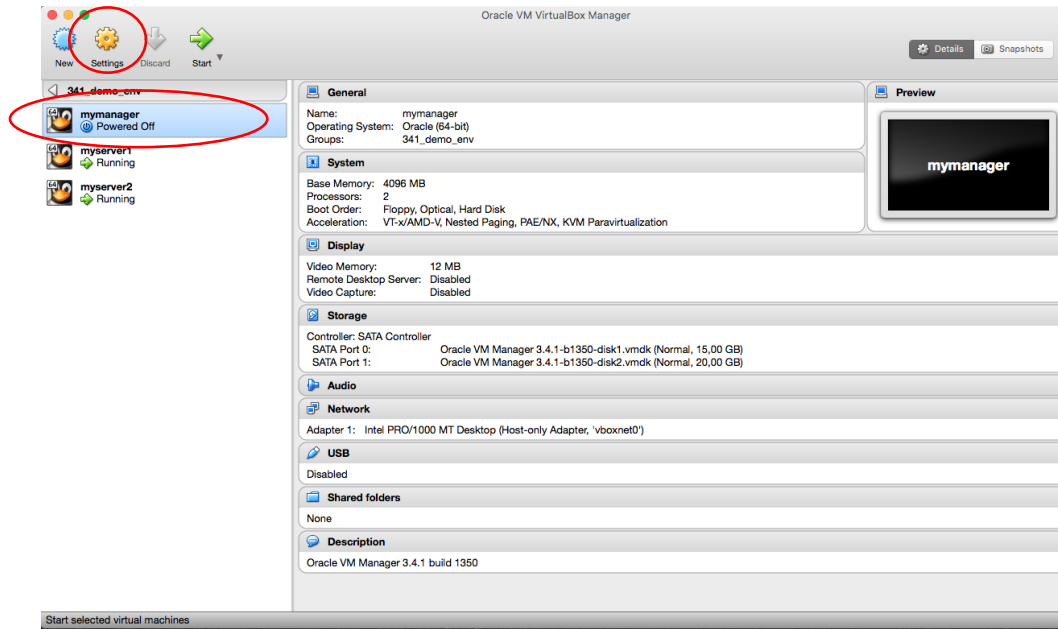
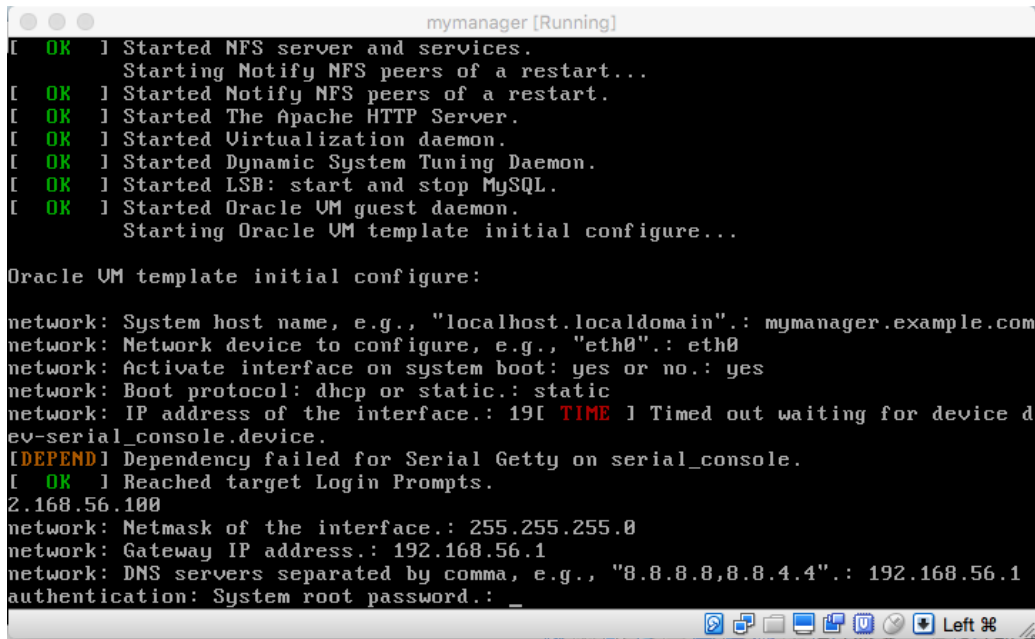


Figure 23: Start mymanager VM guest

The Oracle VM Manager interview begins and following questions will be presented:

Template Definition	Question	Value on this example
network	System Hostname	mymanager.example.com
network	Network device to configure	eth0
network	Activate Interface on System Boot	Yes
network	Boot Protocol: DHCP or Static	Static
network	IP Address of the interface (eth0)	192.168.56.100
network	Netmask of the interface	255.255.255.0
network	Gateway IP Address	192.168.56.1
network	DNS Server separated by comma	192.168.56.1
authentication	System root password (linux user)	SimonCoter

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 24 below.



```
mymanager [Running]
[ OK ] Started NFS server and services.
Starting Notify NFS peers of a restart...
[ OK ] Started Notify NFS peers of a restart.
[ OK ] Started The Apache HTTP Server.
[ OK ] Started Virtualization daemon.
[ OK ] Started Dynamic System Tuning Daemon.
[ OK ] Started LSB: start and stop MySQL.
[ OK ] Started Oracle VM guest daemon.
Starting Oracle VM template initial configure...

Oracle VM template initial configure:

network: System host name, e.g., "localhost.localdomain": mymanager.example.com
network: Network device to configure, e.g., "eth0": eth0
network: Activate interface on system boot: yes or no.: yes
network: Boot protocol: dhcp or static.: static
network: IP address of the interface.: 192.168.56.100 [ TIME ] Timed out waiting for device dev-serial_console.device.
[DEPEND] Dependency failed for Serial Getty on serial_console.
[ OK ] Reached target Login Prompts.
2.168.56.100
network: Netmask of the interface.: 255.255.255.0
network: Gateway IP address.: 192.168.56.1
network: DNS servers separated by comma, e.g., "8.8.8.8,8.8.4.4": 192.168.56.1
authentication: System root password.: _
```

Figure 24: 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.

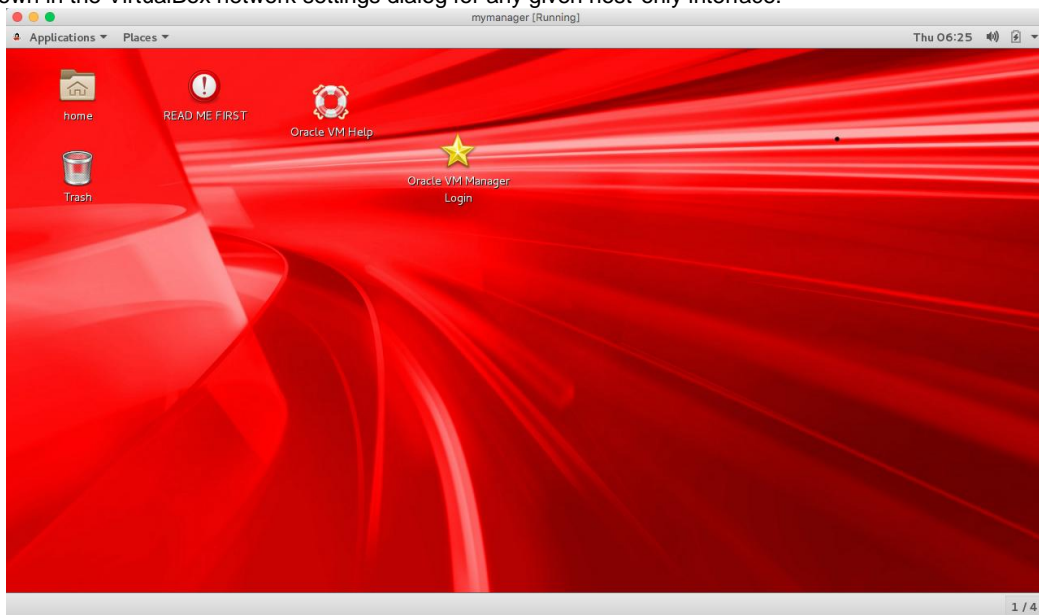


Figure 25: Unlike the Oracle VM Server guest, the Oracle VM Manager starts a Gnome desktop

The Oracle VM Manager guest will start a Gnome desktop after accepting all the values entered during the interview as shown in Figure 25 above. 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 Manager can be accessed via any browser from either the Gnome desktop or from your laptop or personal computer.

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:

<https://192.168.56.100:7002/ovm/console>

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

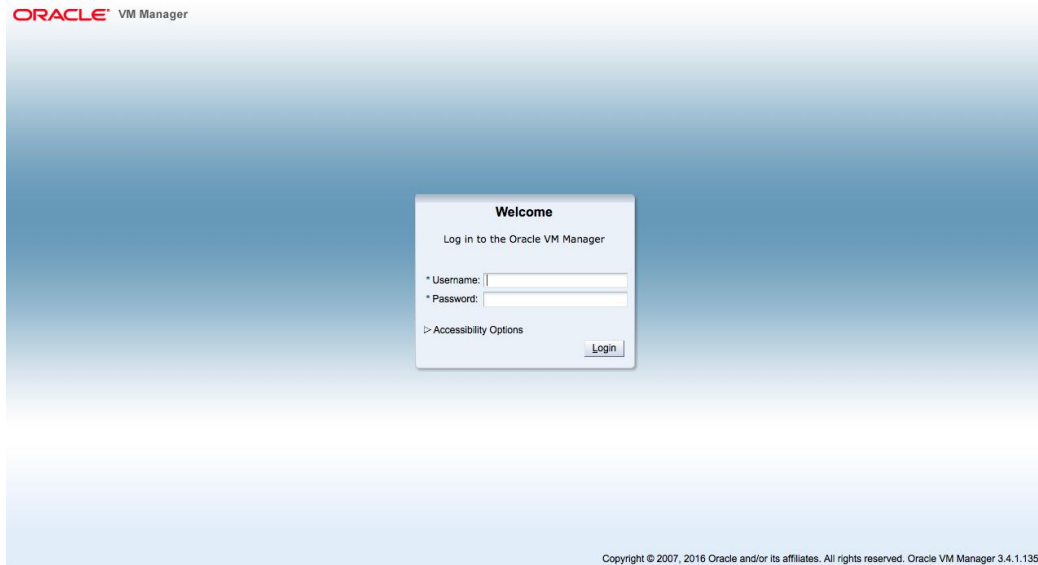


Figure 26: Ensure the Oracle VM Manager user interface is accessible

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) and with **mymanager** machine stopped.

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 13 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 (here we have a virtual-disk so it's better to have one 13 gigabytes vdisk), 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 (13 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, stop **mymanager** vm and once done, select the **Settings** icon from the Oracle VM VirtualBox Manager toolbar and then choose **Storage** dialog.

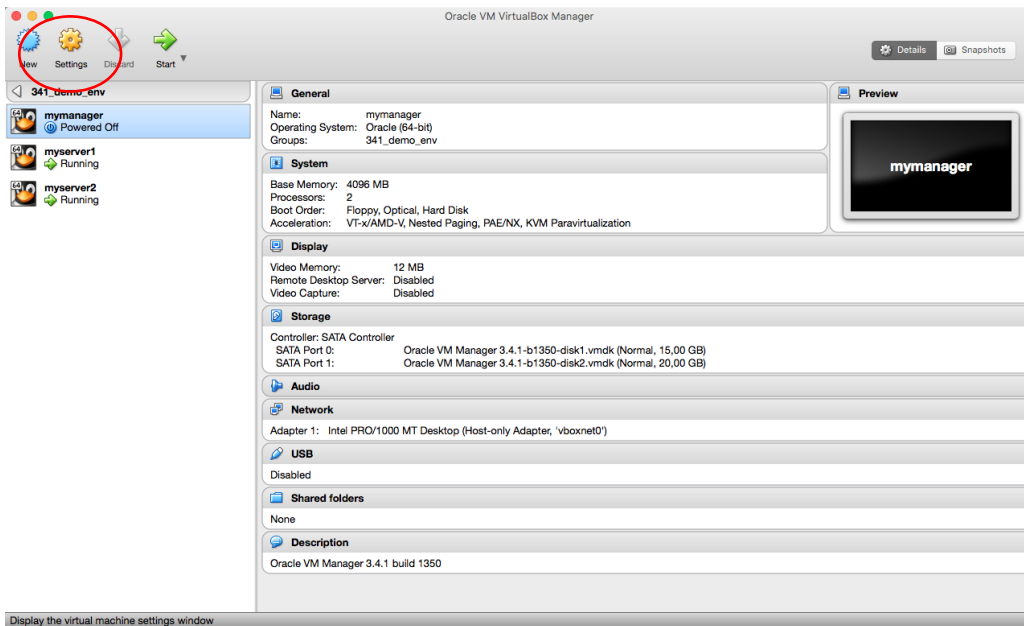


Figure 27: Start mymanager if it is not already running

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 below:

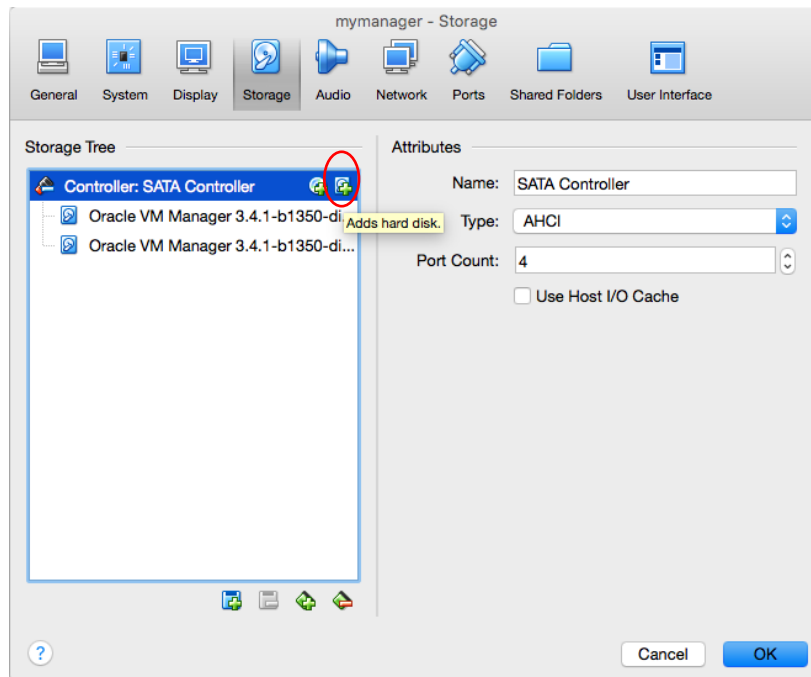


Figure 28: Choose the SATA Controller from the VirtualBox Storage Settings dialog

Choose the Create New Disk button...

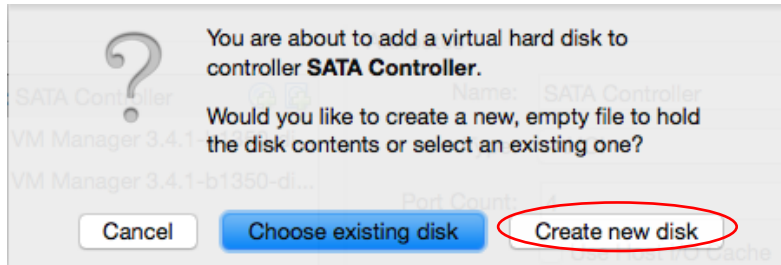


Figure 29: Choose to create a new disk

Select VDI file type...

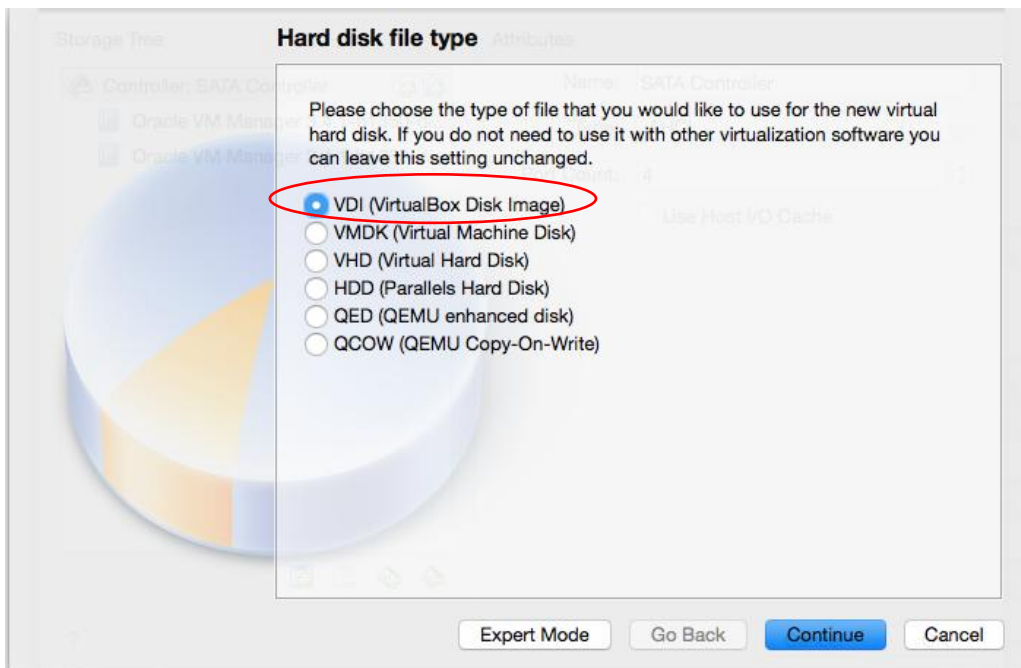


Figure 30: Choose to create a VDI disk

Choose **Dynamically allocated**...



Figure 31: Choose fixed size disk

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 32 below. Create the following three disks:

- 13GB 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)

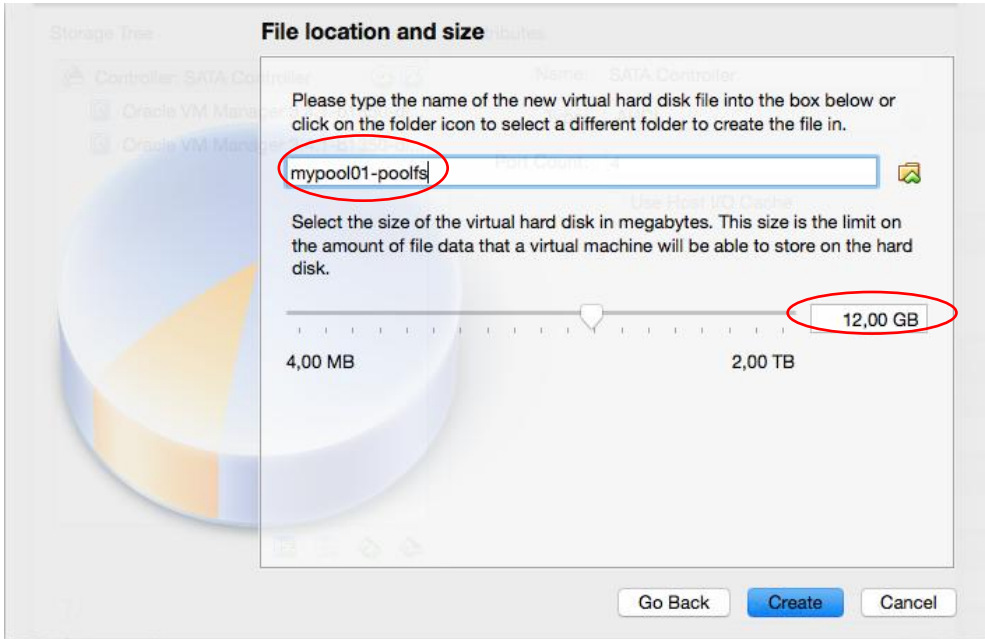


Figure 32: Give the virtual disk a file name and a directory location

Choose the **Create** button to confirm the vdisk creation.

The disks should look something like the following screen shot in Figure 33 after completing the creation of all three virtual hard disks.

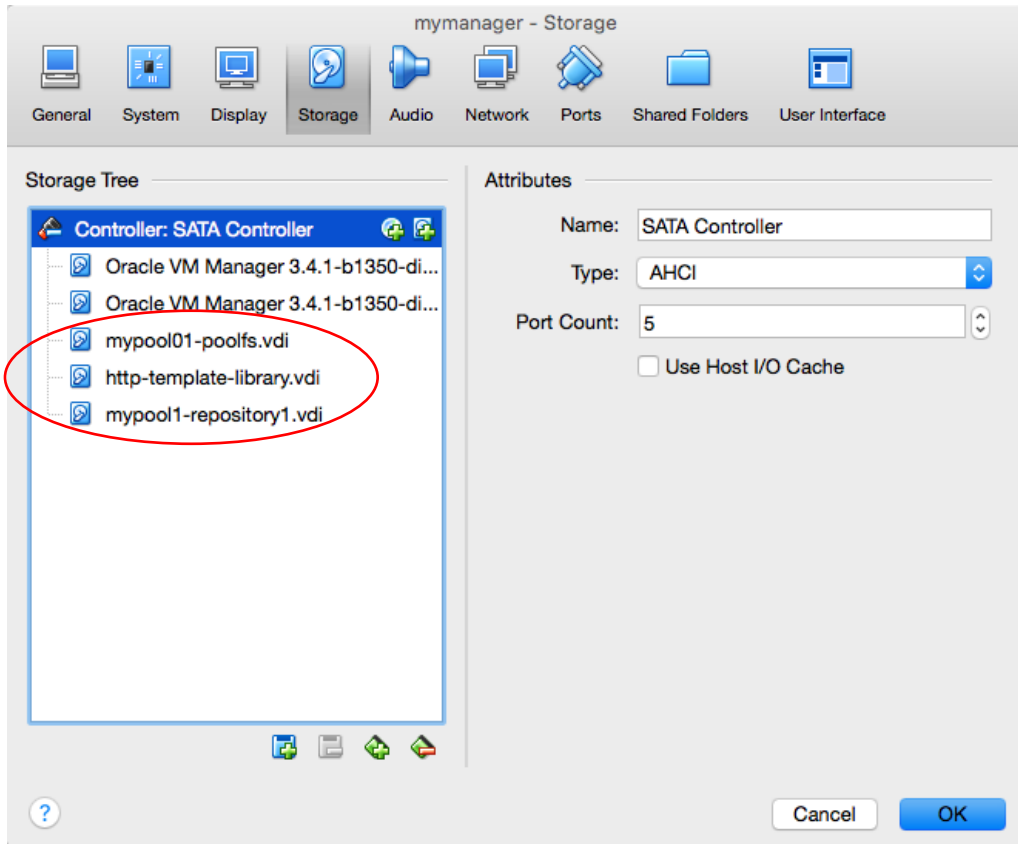


Figure 33: Storage settings dialog showing all three newly created virtual disks

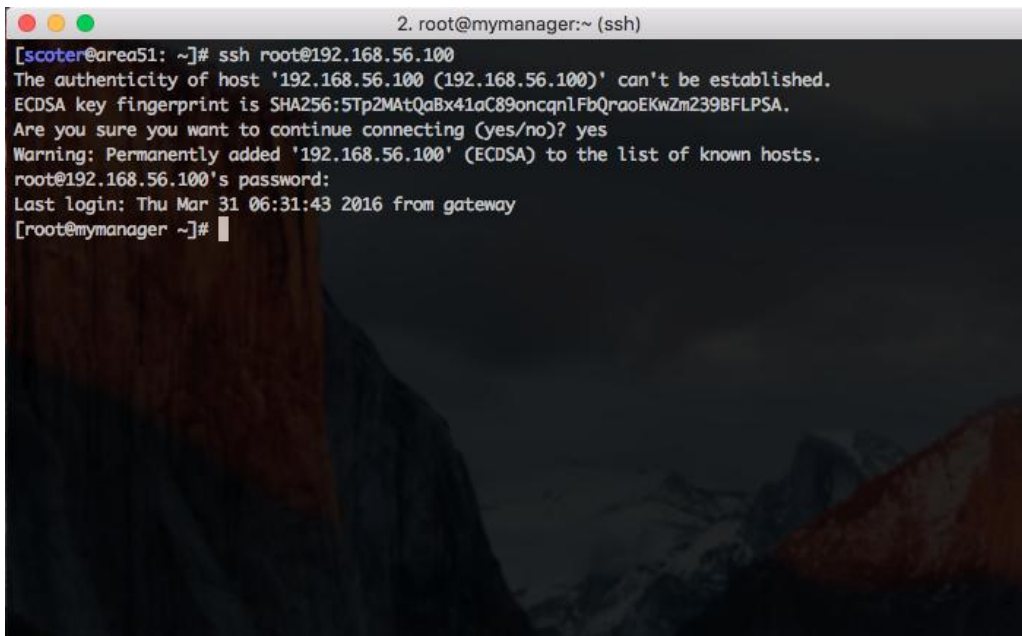
Proceed to the next section that explains how to add the storage that was created in this section to **mymanager** virtual machine.

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.

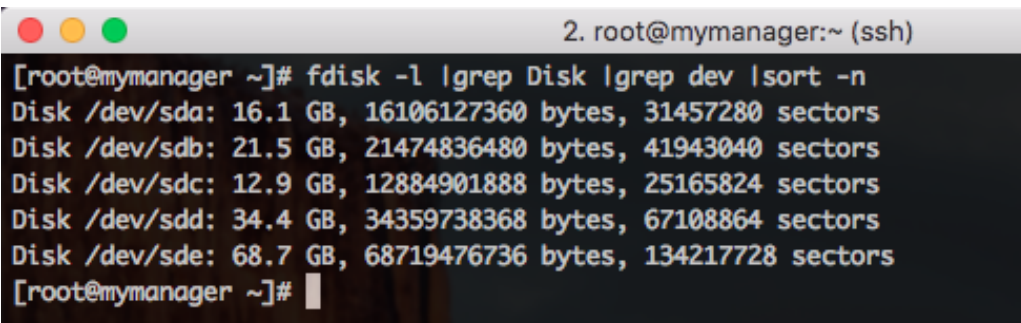


```
2. root@mymanager:~ (ssh)
[scoter@area51: ~]# ssh root@192.168.56.100
The authenticity of host '192.168.56.100 (192.168.56.100)' can't be established.
ECDSA key fingerprint is SHA256:5Tp2MAAtQaBx41aC89oncqn1FbQraoEKwZm239BFLPSA.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.56.100' (ECDSA) to the list of known hosts.
root@192.168.56.100's password:
Last login: Thu Mar 31 06:31:43 2016 from gateway
[root@mymanager ~]#
```

Figure 34: Start an ssh session using a terminal

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 35 below shows the following (your output may be different):

- /dev/sdc is the 13 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



```
2. root@mymanager:~ (ssh)
[root@mymanager ~]# fdisk -l | grep Disk | grep dev | sort -n
Disk /dev/sda: 16.1 GB, 16106127360 bytes, 31457280 sectors
Disk /dev/sdb: 21.5 GB, 21474836480 bytes, 41943040 sectors
Disk /dev/sdc: 12.9 GB, 12884901888 bytes, 25165824 sectors
Disk /dev/sdd: 34.4 GB, 34359738368 bytes, 67108864 sectors
Disk /dev/sde: 68.7 GB, 68719476736 bytes, 134217728 sectors
[root@mymanager ~]#
```

Figure 35: Output from fdisk helps determine which device special file belongs to each virtual disk

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 ~]# mkfs.btrfs /dev/sdc1 -L mypool1poolfs
[root@mymanager ~]# mkfs.btrfs /dev/sdd1 -L osimages
[root@mymanager ~]# mkfs.btrfs /dev/sde1 -L mypool1repofs1
```

Add the following entries to /etc/fstab:

```
LABEL=osimages /var/www/html btrfs defaults 1 1
LABEL=mypool1repofs1 /home/nfs/ovmdata btrfs defaults 1 1
LABEL=mypool1poolfs /home/nfs/ovmcluster btrfs defaults 1 1
```

Run the following commands to finalize the storage configuration and check mount-points:

```
# mount -a
# df -k
```



```
2. root@mymanager:~ (ssh)
For more details see mount(8).
[root@mymanager ~]# mount -a
[root@mymanager ~]# df -k
Filesystem      1K-blocks    Used Available Use% Mounted on
/dev/sda3       11019264 3128016  6130096  34% /
devtmpfs        2012556     0    2012556   0% /dev
tmpfs           2024336     88    2024248   1% /dev/shm
tmpfs           2024336    8784   2015552   1% /run
tmpfs           2024336     0    2024336   0% /sys/fs/cgroup
/dev/sdb1       20970496 4477720  14443944  24% /u01
/dev/sda1       510636    115064   395572  23% /boot
tmpfs           404868     0    404868   0% /run/user/54321
tmpfs           404868    12    404856   1% /run/user/501
tmpfs           404868     0    404868   0% /run/user/0
/dev/sdd1       33553408  512   31427328  1% /var/www/html
/dev/sde1       67107840  512   64981760  1% /home/nfs/ovmdata
/dev/sdc1       12581888  512   10455808  1% /home/nfs/ovmcluster
[root@mymanager ~]#
```

Figure 36: Output from “mount -a” and “df -k”

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:

```
/home/nfs/ovmdata 192.168.56.0/24(rw,no_root_squash)
/home/nfs/ovmcluster 192.168.56.0/24(rw,no_root_squash)
```

Enable the NFS server and disable “`iptables`” firewall:

```
[root@mymanager ~]# systemctl restart nfs-server.service
[root@mymanager ~]# systemctl enable nfs-server.service
[root@mymanager ~]# exportfs
[root@mymanager ~]# systemctl stop iptables.service
[root@mymanager ~]# systemctl stop ip6tables.service
[root@mymanager ~]# systemctl disable iptables.service
[root@mymanager ~]# systemctl disable ip6tables.service
```

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

```
[root@mymanager ~]# mount 192.168.56.100:/home/nfs/ovmcluster /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:/home/nfs/ovmdata /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

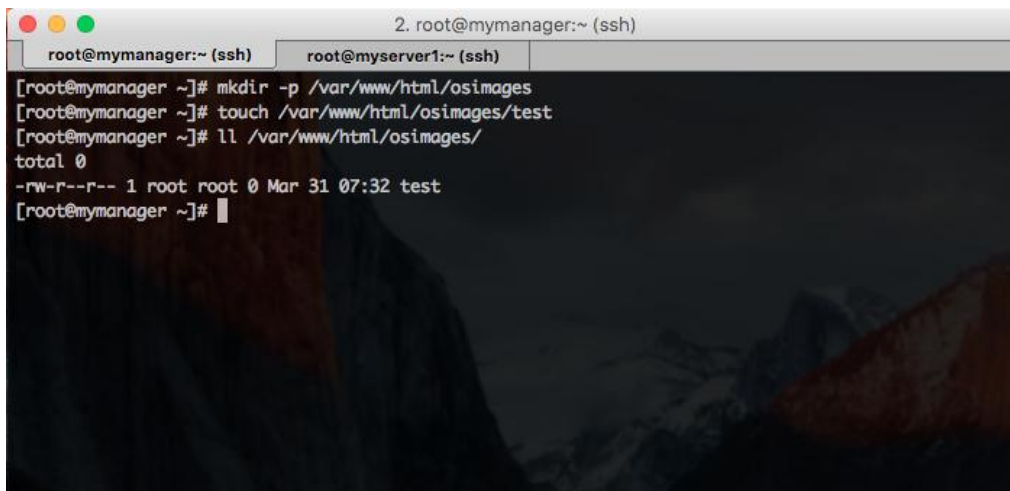
The HTTP server will make Oracle VM Templates available to the Oracle VM Manger during the template importing process as described in the Oracle VM 3 user guides. The Oracle VM Manger Pre-built Appliance comes with the Apache HTTP server pre-installed and already enabled. This section simply describes 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.

On this Appliance HTTP server is already installed and enabled so there is no need to verify its configuration.

A directory named “/var/www/html” should already exist; create a directory and 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 ~]# mkdir /var/www/html/osimages
[root@mymanager ~]# touch /var/www/html/osimages/test
```

A screenshot of a terminal window titled "2. root@mymanager:~ (ssh)". The terminal shows the following commands and output:

```
root@mymanager:~ (ssh)  root@myserver1:~ (ssh)
[root@mymanager ~]# mkdir -p /var/www/html/osimages
[root@mymanager ~]# touch /var/www/html/osimages/test
[root@mymanager ~]# ll /var/www/html/osimages/
total 0
-rw-r--r-- 1 root root 0 Mar 31 07:32 test
[root@mymanager ~]#
```

Figure 37: 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 screen shot:

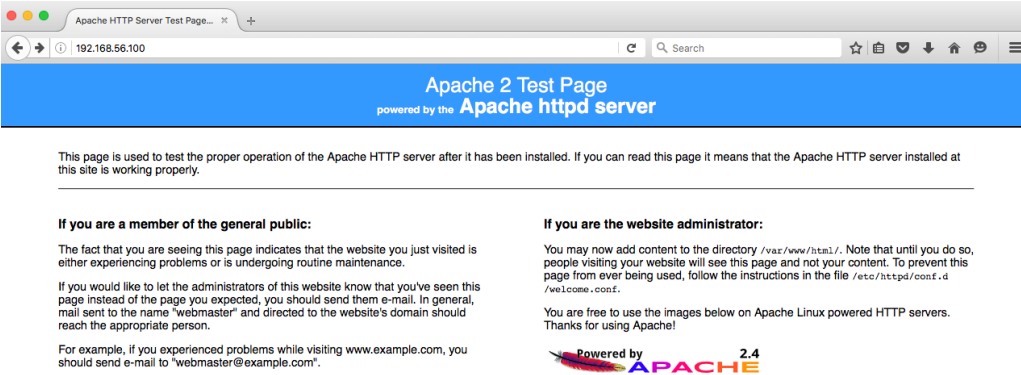


Figure 38: Create a test file to help verify the HTTP server is worker correctly

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:

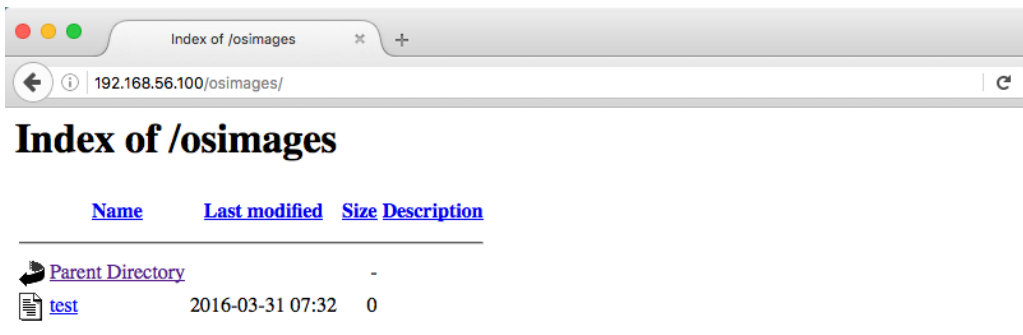


Figure 39: The browser should display the test file created earlier

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](#). 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:

```
https://192.168.56.100:7002/ovm/console
```

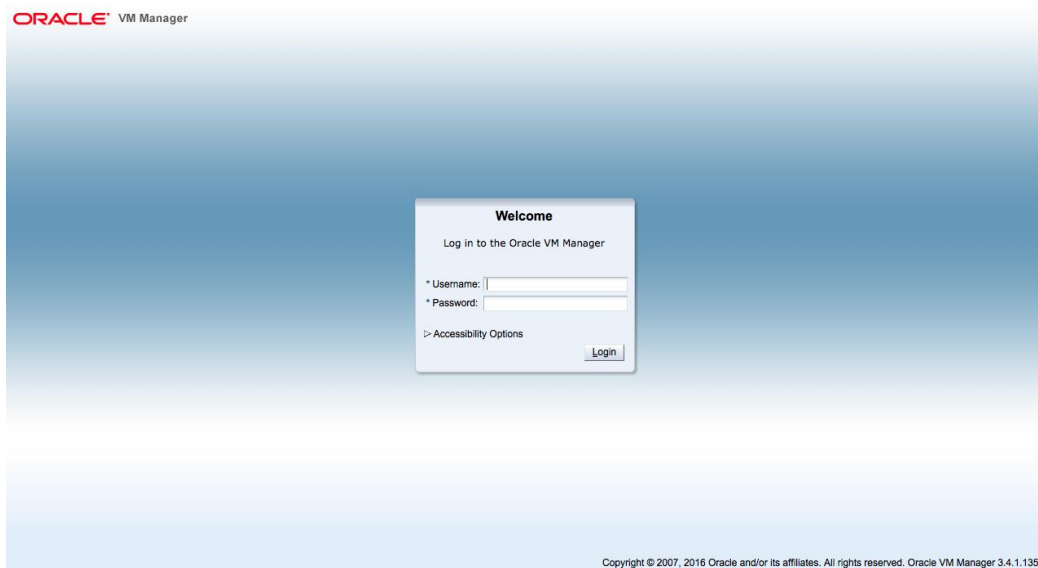


Figure 40: The final step is to begin using the Oracle VM Manager

Conclusion

This document contains all the steps needed to prepare the real foundation to have a demo clustered Oracle VM environment on top of VirtualBox.

Next steps, related to the Oracle VM configuration, are:

- Discover Oracle VM Server(s)
- Add a "File Server" – NFS - to the storages available (Oracle VM Manager serves like a File-server)
- Create a clustered Oracle VM Pool (starting from Oracle VM 3.4 a VIP dedicated to the pool is not more needed)
- Create Oracle VM Repository(ies)
- Import Templates/Appliances
- Create and run VMs

You can find further information and examples at the following link:

<http://www.oracle.com/technetwork/server-storage/vm/downloads/hol-oraclevm-2368799.html>



CONNECT WITH US



[Blogs.oracle.com/virtualization](http://blogs.oracle.com/virtualization)

[Facebook.com/OracleVirtualization](https://www.facebook.com/OracleVirtualization)

[Twitter.com/ORCL_Virtualize](https://twitter.com/ORCL_Virtualize)

oracle.com

Oracle Corporation, World Headquarters

500 Oracle Parkway
Redwood Shores, CA 94065, USA

Worldwide Inquiries

Phone: +1.650.506.7000
Fax: +1.650.506.7200

Hardware and Software, Engineered to Work Together

Copyright © 2015, Oracle and/or its affiliates. All rights reserved. This document is provided for information purposes only, and the contents hereof are subject to change without notice. This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document, and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission.

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

Intel and Intel Xeon are trademarks or registered trademarks of Intel Corporation. All SPARC trademarks are used under license and are trademarks or registered trademarks of SPARC International, Inc. AMD, Opteron, the AMD logo, and the AMD Opteron logo are trademarks or registered trademarks of Advanced Micro Devices. UNIX is a registered trademark of The Open Group. 0416

Oracle VM 3: Building a Demo Environment using Oracle VM VirtualBox
April 2016
Author: Simon Cotter, Gregory King

Revision: 6.0



Oracle is committed to developing practices and products that help protect the environment