

The logo consists of the words "ORACLE" and "WORLD" stacked vertically in a white, sans-serif font, with the word "OPEN" in a larger, bold, black font centered between them. The entire logo is enclosed in a white rectangular border.

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HOL9981

Best Practice for migrating to Oracle VM and Oracle Linux from VMware and Red Hat

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CONTENTS

1	Introduction.....	3
1.1	Lab objective	3
1.2	Preparation (done before LAB)	4
1.3	Summary of steps	5
1.4	Global picture	5
2	Detailed instructions.....	6
2.1	Start the 2 servers (VirtualBox VMs).....	6
2.2	Connect to the Oracle VM Manager 3.2.4 console	7
2.3	VERIFY ORACLE VM ENVIRONMENT CORRECTLY STARTED	9
2.4	IMPORT A TEST ASSEMBLY	14
2.5	Create ORACLE VM template based on the assembly	16
2.6	EDIT ORACLE VM TEMPLATE CREATED	18
2.7	Create guest BASED ON oracle vm TEMPLATE	20
2.8	Verify and start OrACLE VM guest created	22
2.9	MANUALLY MODIFY GUEST CONFIGURATION.....	27
2.10	Switch from redhat to Oracle linux	33
2.11	Create own TEMPLATE STARTING FROM A GUEST	40
2.12	End of lab: lab cleaning.....	48
3	Appendix A: preparation of environment.....	49
3.1	Purpose	49
3.2	Download required binaries	49
3.3	Installation of Oracle VM VirtualBox	50
3.4	Installation of Oracle VM Server	51
3.5	Installation of Oracle VM Manager.....	52
3.6	Export vmware guest in ova format	55
4	References.....	56
4.1	Oracle VM documentation.....	56
4.2	Get this document	56

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1 INTRODUCTION

1.1 LAB OBJECTIVE

This document details all actions that we will be run during Oracle OpenWorld 2013 session Hands On Lab HOL9981.

“In this lab, you will learn from our field experts on best practices of migrating both your VM and guest OS to an Oracle environment. This lab helps to simplify the migration process of moving an existing Oracle Database workload from VMware to Oracle VM. This lab also walks you through how to migrate your Red Hat guest to Oracle Linux by downloading the Unbreakable Kernel from the Oracle public Yum. The implementation of this lab helps to deploy an enterprise-proven infrastructure software layer at zero license cost to your virtualization or Linux environment.”

This hands-on lab takes you through the best practices on how to migrate from product such as VMWare and Redhat to Oracle VM and Oracle Linux.

Oracle VM is a free license products and it's the only virtualization x86 software solution certified for all Oracle products.

This lab will show the [“Open Virtualization Assembly”](#) format, the free-of-charge service supplied by [public-yum.oracle.com](#) where, without a subscription, Oracle Linux and Oracle VM can be maintained.

During this lab, we will use a demo environment built on a single x86 laptop (using Oracle VM VirtualBox) and containing 2 virtual servers and one Oracle VM Server guest:

- Oracle VM Server
- Oracle VM Manager
- Oracle VM guest imported as an assembly

1.2 PREPARATION (DONE BEFORE LAB)

To save time and fit in the one hour slot of Oracle OpenWorld labs, some actions were made before the actual lab.

Here is a quick list of these actions:

- Install Oracle Linux 6.4 (64 bits) on all the laptops.
- Install Oracle VM VirtualBox 4.2.16 + extensions on all the laptops.
- Disable Oracle Virtualbox DHCP server (default enabled)
- Install Oracle Java JRE 7 update 25 on all the laptops. (needed to get Oracle VMs console)
- Install and configure an Oracle VM Manager 3.2.4 server in a VirtualBox virtual machine.
- Install and configure an Oracle VM Server 3.2.4 server in a VirtualBox virtual machine.
- Configure network and VNICs (Virtual Network Interface Cards).
- Create an Oracle VM repository based on the assembly size.
- Export from third party virtualization solution (like VMWare) a guest in "ova" format.
- Configure default HTTP server on Oracle VM Manager (port 80)
- Prepare an Oracle Yum server based on <http://public-yum.oracle.com>

Note: to run this lab at home of office

- Requirements:
 - Have an X86 machine with at least 16GB of RAM and 4 cores CPU.
 - Any X86 Operating System supported by Oracle VM VirtualBox is OK (Microsoft Windows, Most linux distributions, Oracle Solaris X86, Apple Mac OSX, ...)
- Read appendix A

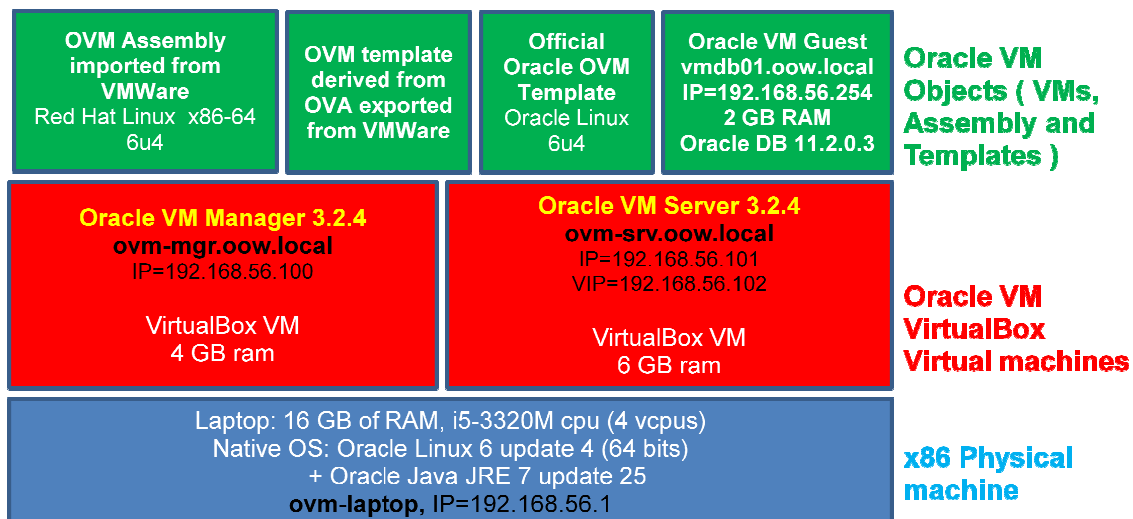
1.3 SUMMARY OF STEPS

In this lab, we will execute the following steps in Enterprise Manager Cloud Control 12c

- 1) Connect to Oracle VM Manager and become familiar with the product.
- 2) Verify that everything is ready to accommodate the lab.
- 3) Import the assembly with an Oracle Database on top, exported from VMWare.
- 4) Create an Oracle VM template based on the VMWare assembly.
- 5) Create a guest based on the Oracle VM template created.
- 6) Configure the guest and remove VMWare tools.
- 7) Switch from Redhat kernel to Oracle Linux Kernel ([UEK](#)) for free.
- 8) Transform the guest in an Oracle VM Template reusable ("Gold Image").

1.4 GLOBAL PICTURE

The following picture shows all the components (VirtualBox and Oracle VM virtual machines) with their names and configuration (memory, IP address, ...)




2 DETAILED INSTRUCTIONS

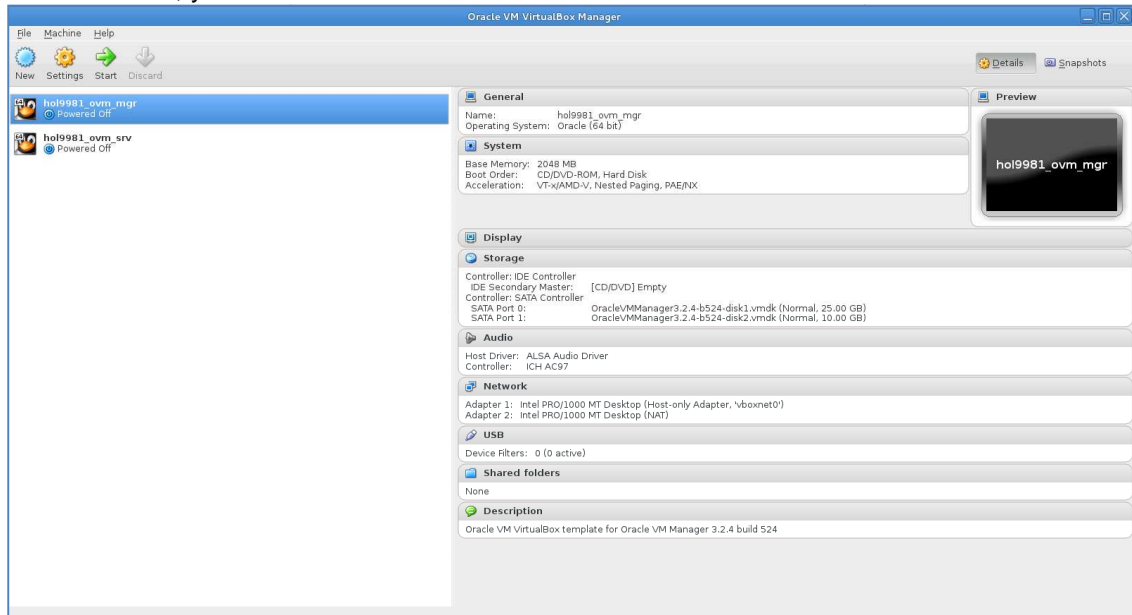
2.1 START THE 2 SERVERS (VIRTUALBOX VMS)



As previously explained, we will use Oracle VM VirtualBox to host the 2 servers (Oracle VM Server and Oracle VM Manager) on a single laptop.

Those 2 servers were pre-installed and preconfigured before this lab to same time. Thus, you just have to start them here.

IMPORTANT: Since the VMs startup can take time, we advise you to do this as soon as possible and then take time to read this documentation.

- a) Start the Oracle VM VirtualBox console if not yet started by clicking on icon 
- b) In this console, you should see the 2 VMs we will use in this lab.



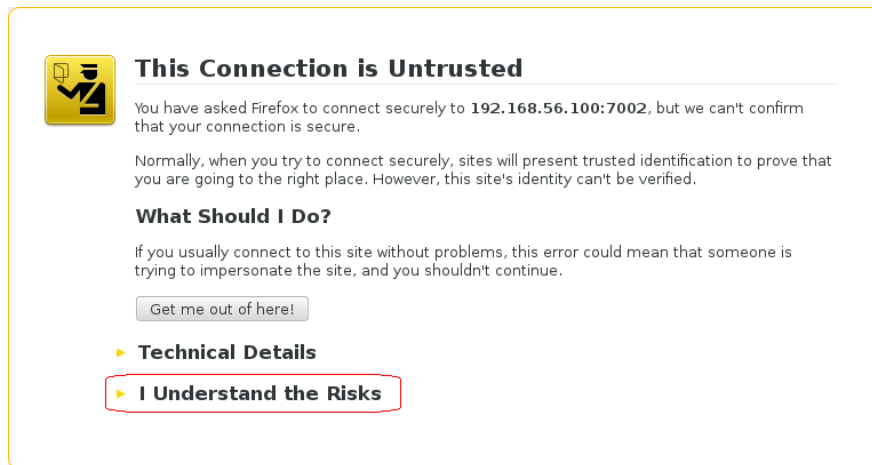
- c) Select the VM called “**hol9981_ovm_mgr**” and click on the icon  to start it
- d) Select the VM called “**hol9981_ovm_srv**” and click on the icon  to start it
- e) Wait for the 2 VMs to be ready
 - o Wait for the prompt (desktop started) on “**hol9981_ovm_mgr**” VM console
 - o When this prompt is displayed, all VMs are ready (since Oracle VM Manager is the longest to start)

2.2 CONNECT TO THE ORACLE VM MANAGER 3.2.4 CONSOLE

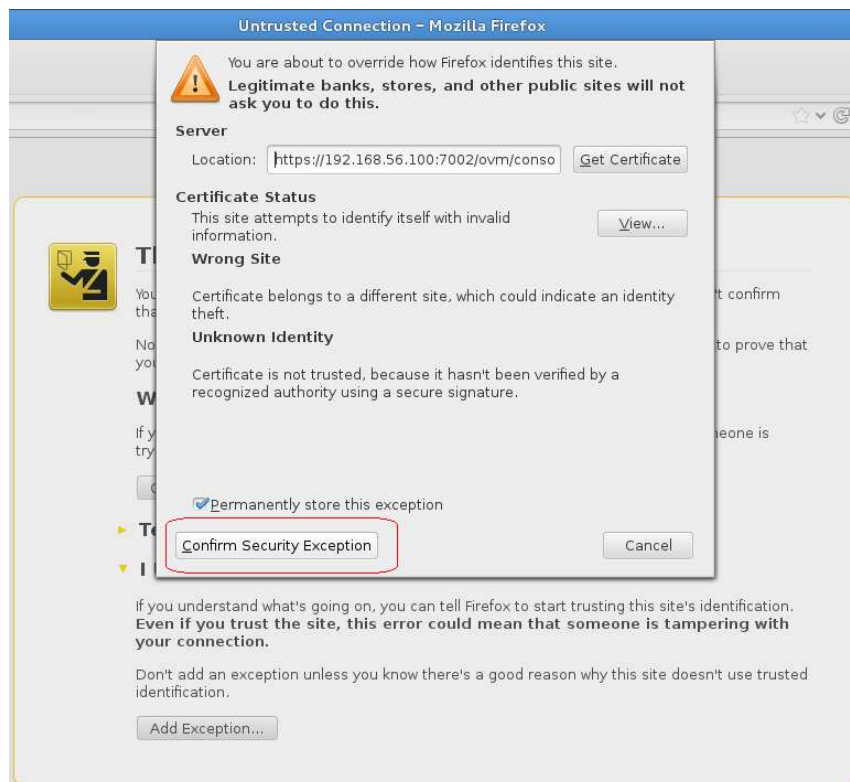
- a) On your Linux physical desktop open a Firefox browser and connect to the **Oracle VM Manager 3.2.4** console using URL <https://192.168.56.100:7002/ovm/console>

In the case that you receive some warnings proceed as described in the following screens:

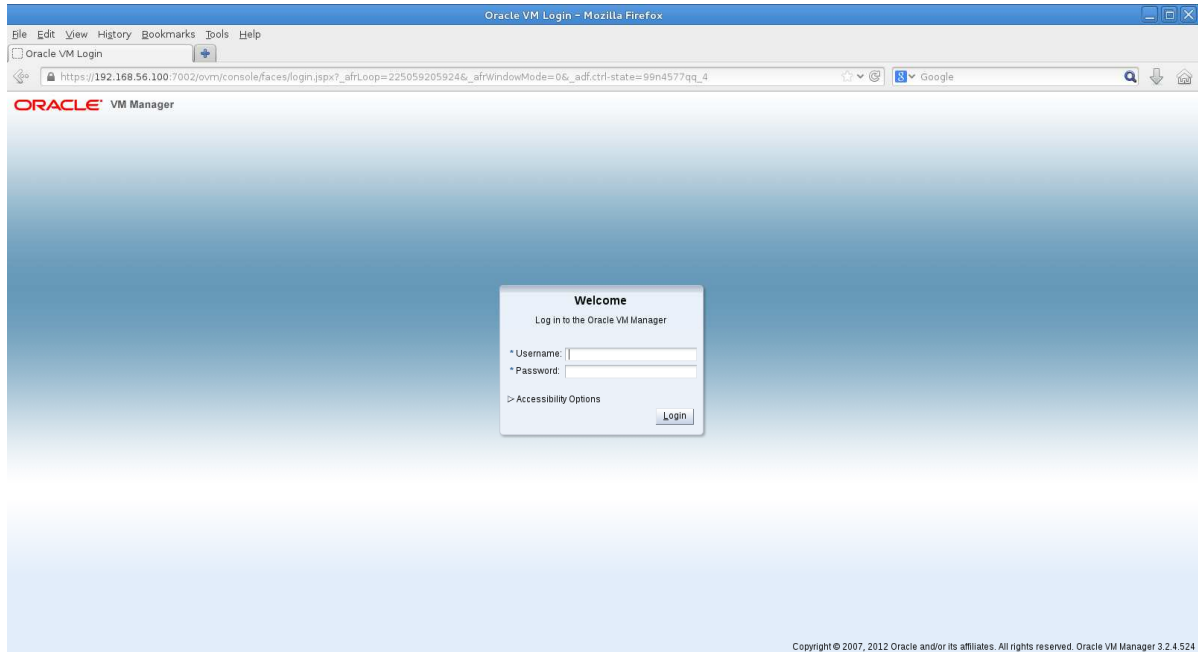
Click on **"I Understand the Risks"** and on **"Add exception"**:



Finally click on "Confirm Security Exception":



After security exception managed you should get the following login window:

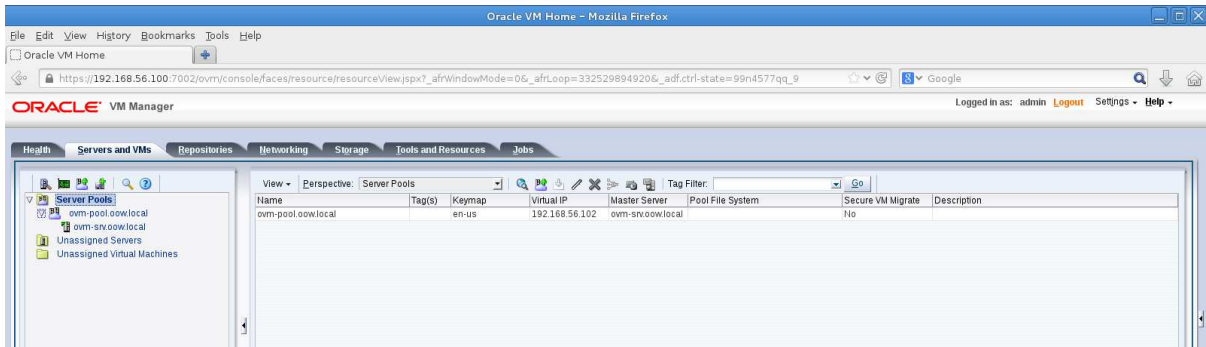


b) Log in using the following credentials:

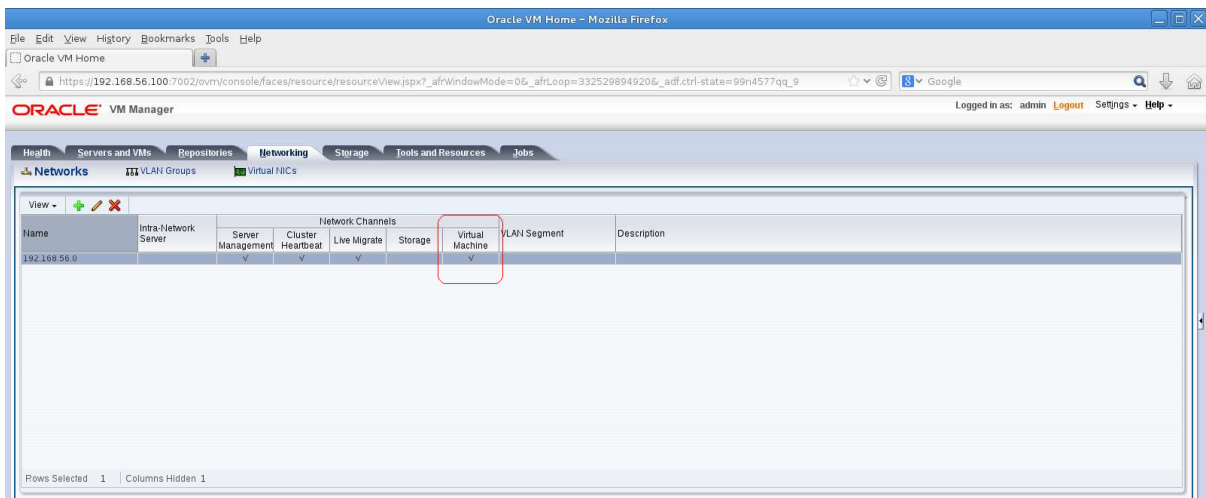
- Login : **admin** (default Oracle VM Manager Administrator)
- Password : **Welcome1** (W is uppercase)

2.3 VERIFY ORACLE VM ENVIRONMENT CORRECTLY STARTED

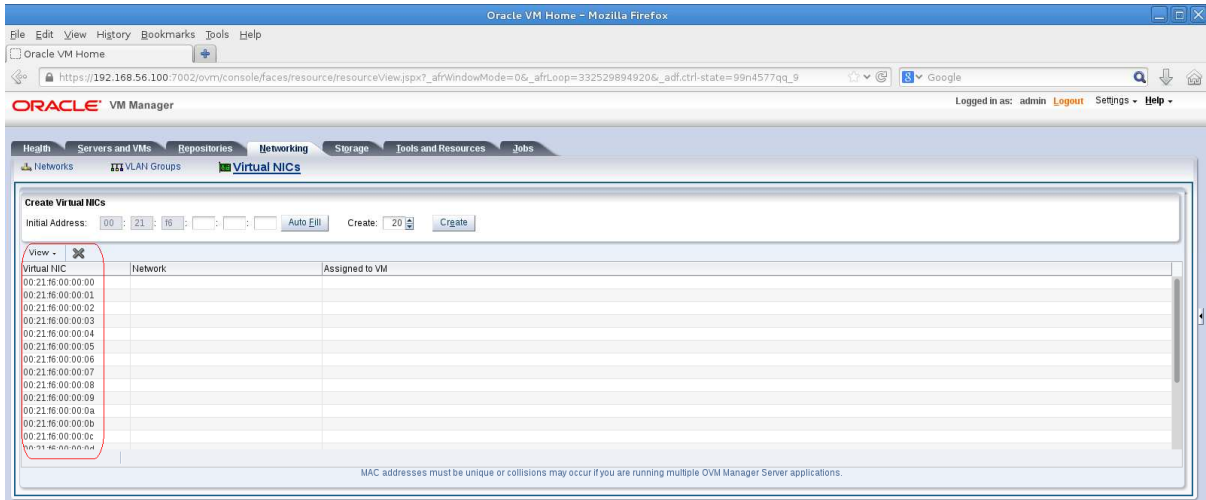
- a) Once logged in the Oracle VM Manager console, go to the **“Servers and VMs”** tab and verify the status of Oracle VM pool and Server; everything should be as in this picture.



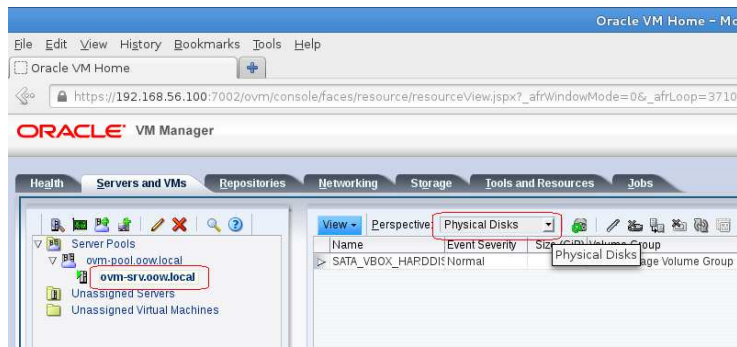
- b) Click on **“Networking”** tab and verify that existing network is usable by guests



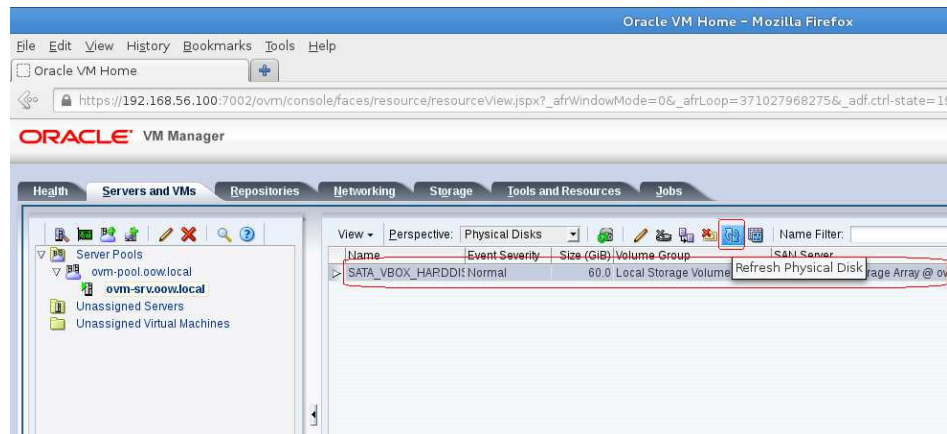
- c) Click on **“Virtual NICs”** hyperlink (below **“Networking”**) and verify that you have free Virtual Nics MAC-Addresses; if you don't see **“Virtual NICs”** available, click on **“Auto Fill”** and **“Create”** to create new Virtual NICs.



- d) Click on **“Servers and VMs”**, expand pool named **“ovm-pool.oow.local”**, click on the server named **“ovm-srv.oow.local”** and select perspective **“Physical Disks”** in the right-window.



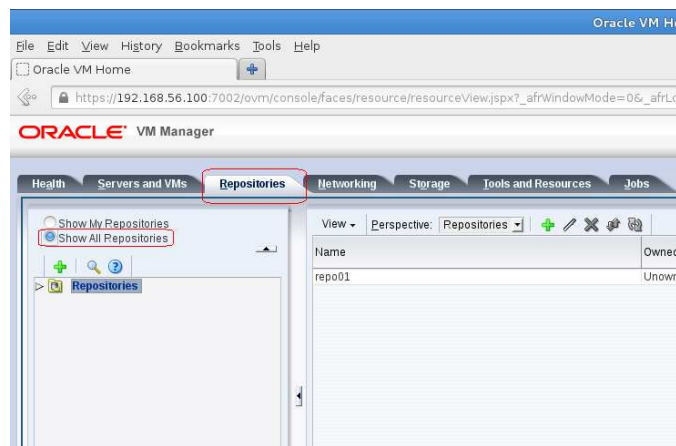
- e) Select physical disk named **“SATA_VBOX_HARDDISK”** and click on button **“Refresh Physical Disk”**.



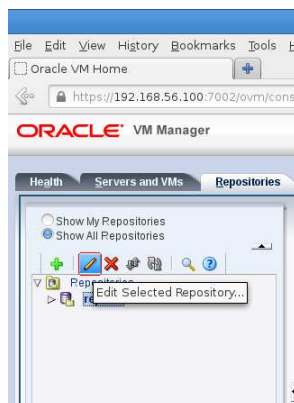
- f) Confirm the refresh of physical disk with **“OK”**.



- g) Click on “**Repositories**” and select radio button “**Show all repositories**”.



- h) Expand “**Repositories**”, click on repository named “**repo01**” and click on “**Edit**” button.



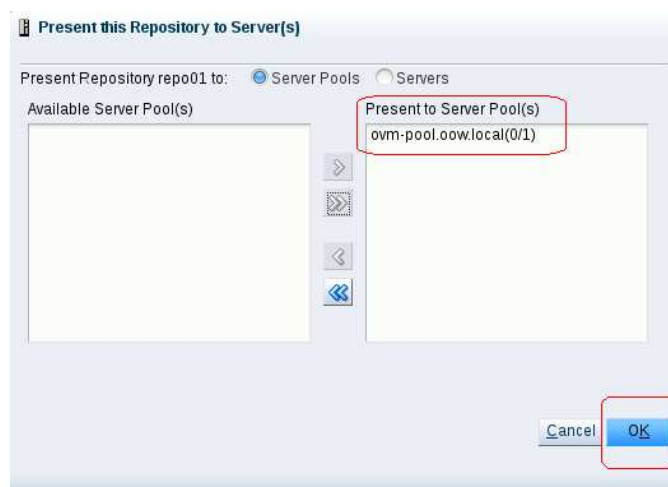
- i) On the new window click on “**Take ownership**” and confirm with “**OK**”.



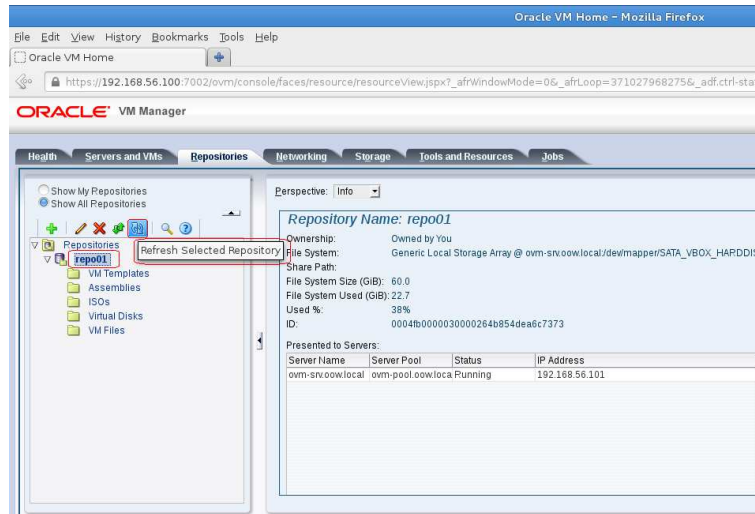
- j) Re-select “**Repositories**” and then “**repo01**” selected click on button “**Present/Unpresent repository**”.



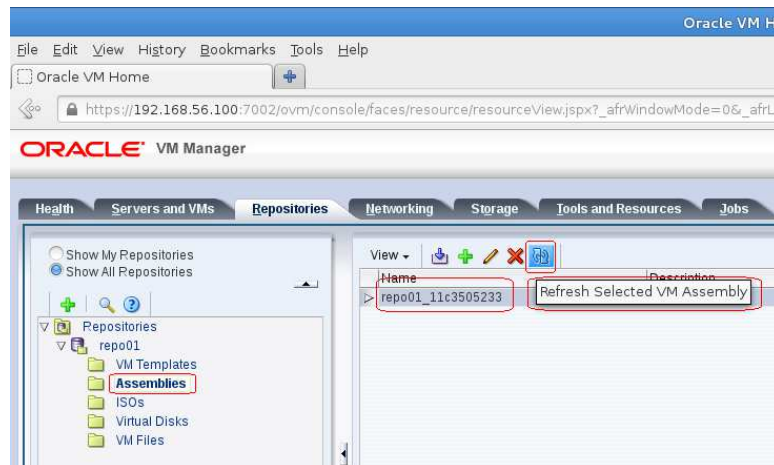
- k) On the new window named “**Present this repository to server(s)**” move right the server-pool named “**ovm-pool.oow.local**” and confirm with “**OK**”.



- l) Select repository “**repo01**” and click on button “**Refresh Selected Repository**”.



- m) Click on folder “**Assemblies**”, select the assembly named “**repo01_<code>**” and click on “**Refresh selected VM Assembly**”.



2.4 IMPORT A TEST ASSEMBLY


The scope of this chapter is to show how-to import a little assembly downloaded from official Oracle Site:

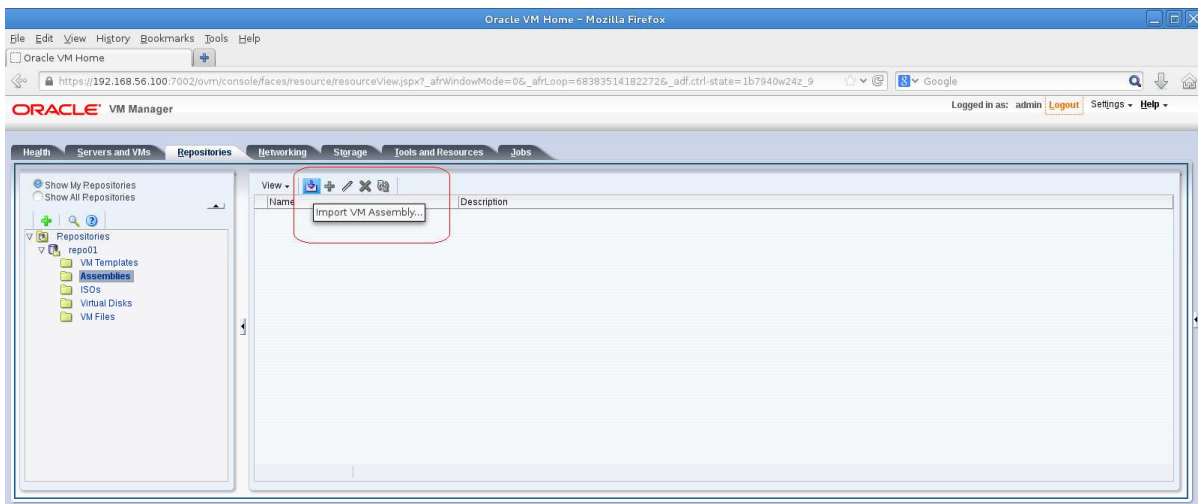
<http://edelivery.oracle.com/linux>

The assembly that will be imported is a small virtual-server and it's only for test purpose; in fact the assembly that will be used (a real server exported from VMWare with Oracle Database on board) in the rest of the lab is already placed into Oracle VM repository. This decision has been taken due to long wait (about 15 minutes) to import the real-server.

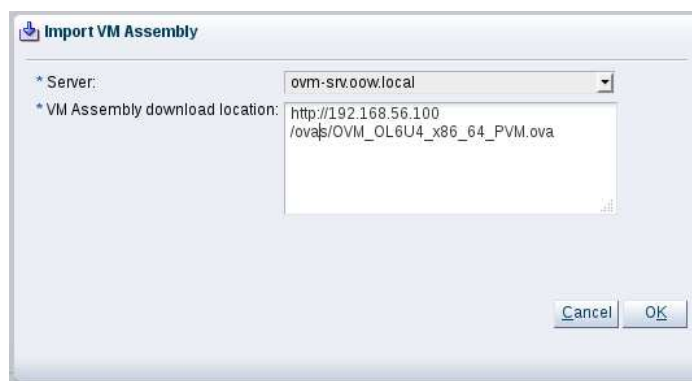
Reminder: Importing assemblies and/or templates on Oracle VM

Oracle VM Templates can be imported from an HTTP or FTP server. In our case, we will use an HTTP server previously configured on the Oracle VM Manager. The assembly file was copied on this HTTP server before the lab.

- a) Click on **"Repositories"** tab, expand the repository **"repo01"** and select the **"Assemblies"** directory; after that click on the  icon to proceed with the Assembly import.



- b) Enter the following URL in the new window:
http://192.168.56.100/ovas/OVM_OL6U4_x86_64_PVM.ova



- c) In the same window confirm with “OK” and, after that, follow the job progression in the “Job Summary” window.

Description	Status	Message
Import VM Assembly http://192.168.56.100/ovas/OVM_0	In Progress	Downloading Assembly 1/1, 234 MB/513 MB
Refresh File System of Repository repo01	Completed	
Delete VM Assembly CentOS-6.2-x86-Test.ova	Completed	

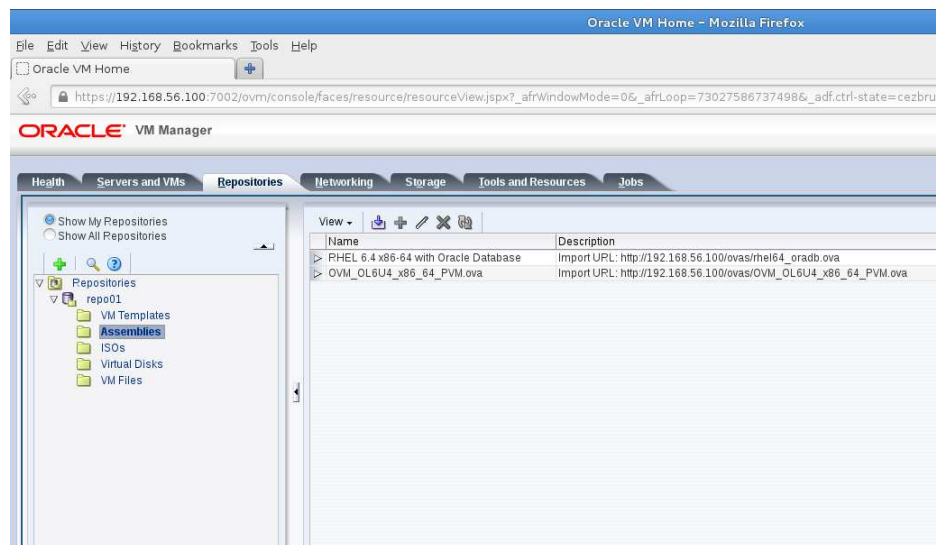
- d) At the end of this section there will be two “Assemblies”:

“repo01_c11c2505233”

Redhat Linux Assembly exported from a VMWare installation and already imported in Oracle VM.

“OVM_OL6U4_X86_64_PVM”

Oracle Linux Assembly directly downloaded from official edelivery Oracle site.




2.5 CREATE ORACLE VM TEMPLATE STARTING FROM AN ASSEMBLY

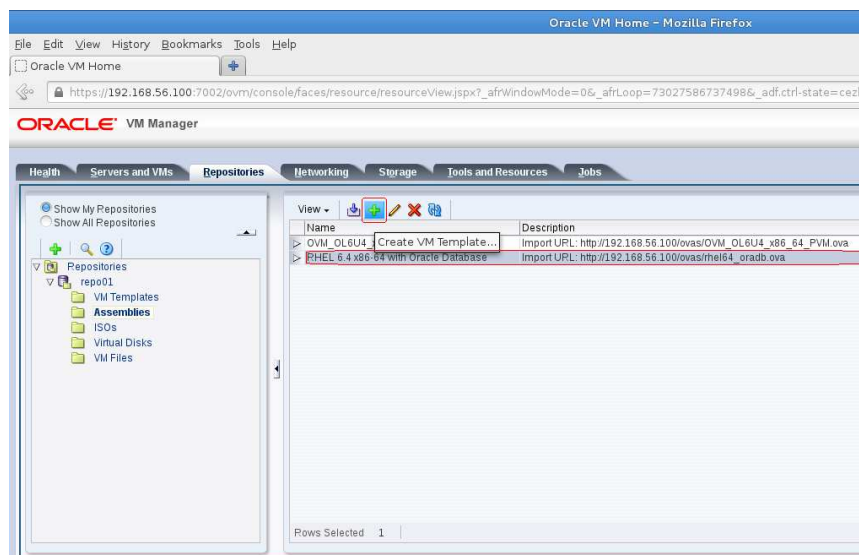
The scope of this chapter is to show how-to create an Oracle VM Template starting from an assembly. Assemblies can be described as a template of a group of virtual machines, or a collection of multiple VM templates. In Oracle VM Manager, templates and assemblies appear in different folders of the storage repository, but their VM configuration files and disk images are stored in the same location as those of other virtual machines and templates.

The procedure to obtain a new virtual guest starting from an assembly is:

“Assembly” => “Template” => “New Guest(s)”

To create the Template based on “**RHEL 6.4 x86-64 with Oracle Database**” assembly proceed with these steps:

- a) Click on “**Repositories**” tab, expand the repository “**repo01**” and select the “**Assemblies**” directory; after that click on “**repo01_c11c2505233**” row and select the “Add” button 



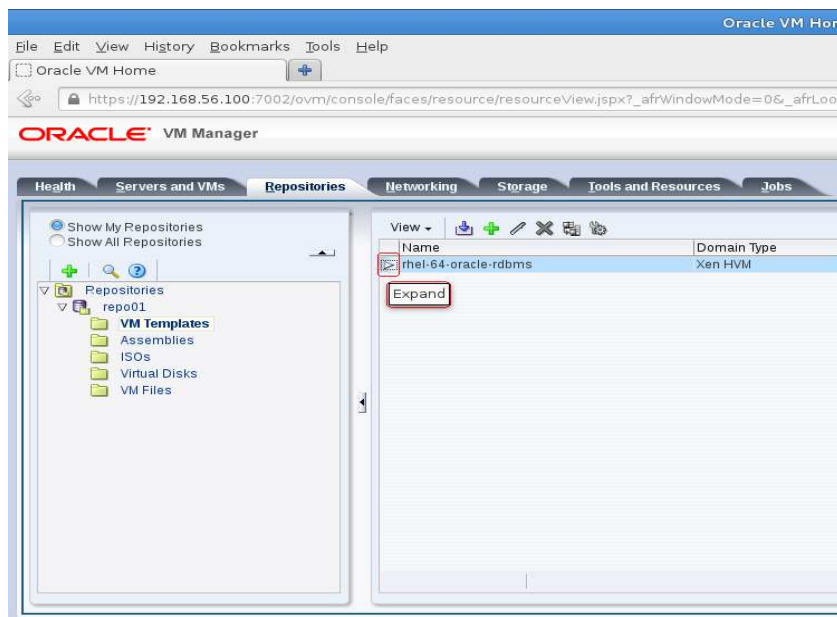
- b) Enter the following details in the new window:
 VM Template Name: “**rhel-64-oracle-rdbms**”
 Description: “**Redhat 6.4 x86-64 exported from VMWare with Oracle Database on board**”



- c) In the same window confirm with “OK” and, after that, follow the job progression in the “**Job Summary**” window.

Description	Status	Message
Refresh File System of Repository repo01	Pending	
Create VM Template rhel-64-oracle-rdbms from Assembly Virtual Machine vm	In Progress	
Refresh File System of Repository repo01	Completed	

- d) When the jobs are completed verify that the template is correctly created and ready to use. Click on “**Repositories**” tab, expand the repository “**repo01**” and select the “**VM Templates**” directory; after that click on the template and expand it.




- e) Oracle VM Template configuration should be like this one:

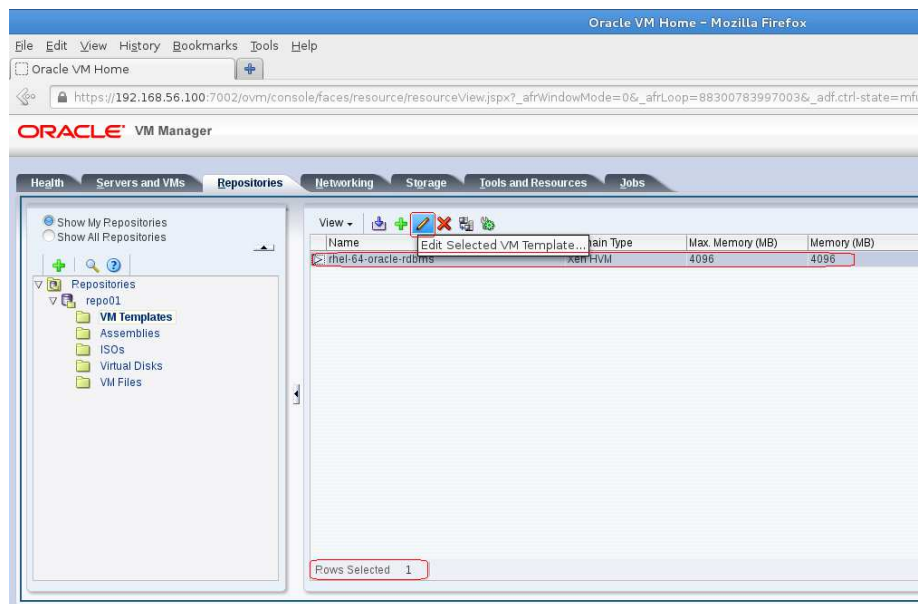
Name	Domain Type	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors
rhel-64-oracle-rdbms	Xen HVM	4096	4096	1	1

Configuration		Networks	Disks
Name:	rhel-64-oracle-rdbms	Processor Cap:	100
Operating System:	oracle-rdbms	Priority:	50
Max. Processors:	1	Mouse Type:	Default
Processors:	1	Domain Type:	Xen HVM
Max. Memory (MB):	4096	High Availability:	No
Memory (MB):	4096	Boot Order:	
ID:	0004fb0000140000b5cc4394e8f8d4a1		
Origin:	http://192.168.56.100/ovas/rhel64_oradb.ova		
Description:	Fedhat 6.4 x86-64 exported from VMWare with Oracle Database on board		

2.6 EDIT ORACLE VM TEMPLATE CREATED

This template, derived from an assembly exported from VMWare, needs correct sizing and network configuration; so in this chapter shows how to edit an Oracle VM template.

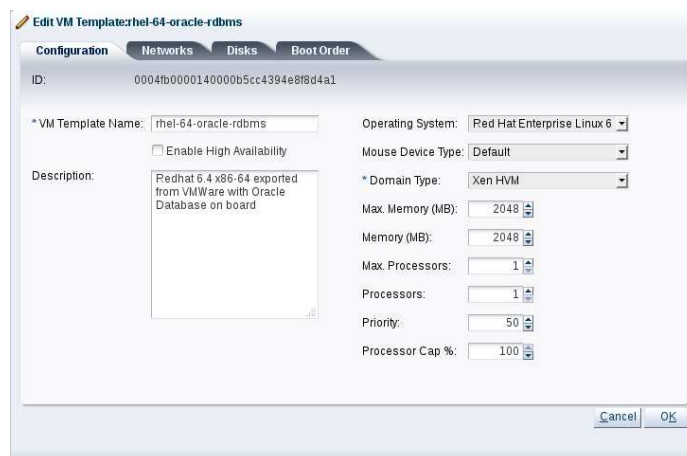
- a) Click on **“Repositories”** tab, expand the repository **“repo01”** and select the **“VM Templates”** directory; after that click on the template named **“rhel-64-oracle-rdbms”** row and select the **“Edit”** button 



- b) In the new windows enter the following details:

Section **“Configuration”**



Operating System: **“Red Hat Enterprise Linux 6”**
 Domain Type: **“XEN PVM”**
 Max. Memory(MB): **“2048”**
 Memory(MB): **“2048”**



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Section “Networks”

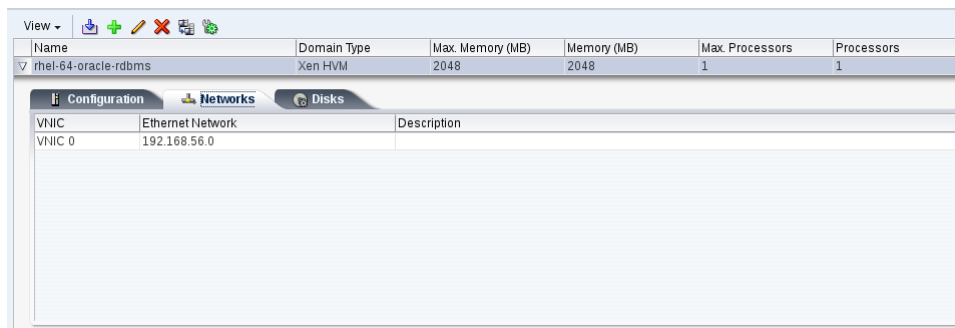
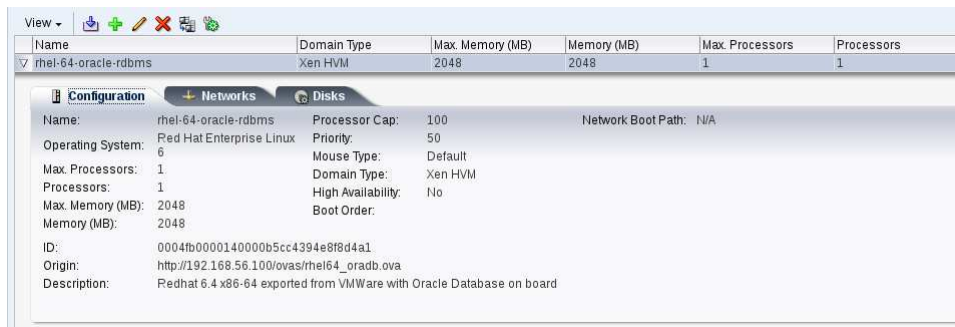
Selected Ethernet Networks: “192.168.56.0”

Nb: select network “192.168.56.0” and move it on the right with button  or .



Section “Disks” and section “Boot Order” don’t need any configuration change.

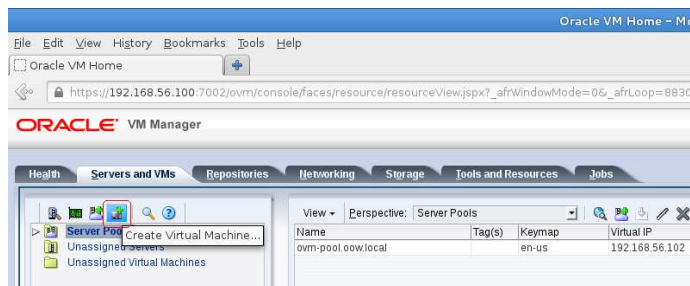
- c) The configuration result of this configurations is shown in the picture below (“Configuration” and “Networks”):



2.7 CREATE GUEST BASED ON ORACLE VM TEMPLATE

We will now create a “first” guest based on the template created just above. This chapter will show how-to create a guest from an Oracle VM Template (in our case, Oracle VM Template has been derived from a virtual-machine exported from VMWare).

- a) Click on “**Servers and VMs**” tab and select the button “**Create New Virtual Machine...**” 

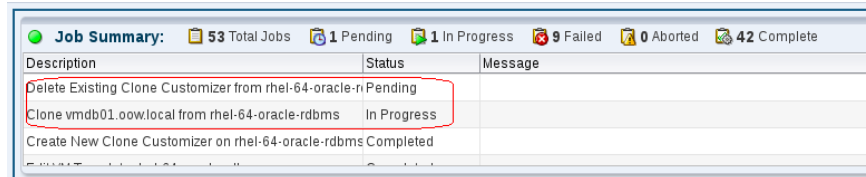


- a) In the “**Create Virtual Machine**” window choose the option “Clone from an existing VM Template” and, after that, enter the following details:

- Clone count : **1**
- Repository : **repo01**
- VM Template : **rhel-64-oracle-rdbms**
- VM Name : **vmdb01.oow.local**
- Server Pool : **ovm-pool.oow.local**
- Description : **first guest created from a VMWare OVA**

and then click finish to confirm the guest creation.

- b) Verify that creation jobs complete successfully.



The screenshot shows a 'Job Summary' window with a table of job statuses. The table has three columns: Description, Status, and Message. The jobs listed are:

Description	Status	Message
Delete Existing Clone Customizer from rhel-64-oracle-n	Pending	
Clone vmdb01.oow.local from rhel-64-oracle-rdbms	In Progress	
Create New Clone Customizer on rhel-64-oracle-rdbms	Completed	


Note: Immediate VM creation on OCFS2

The VM creation should be almost immediate since the repository use OCFS2 filesystem and the reflink feature. This avoids to copy all blocks of the template files, but instead uses pointers to existing blocks in the new files.

(see details on the OCFS2 reflink feature on https://blogs.oracle.com/wim/entry/ocfs2_reflink)

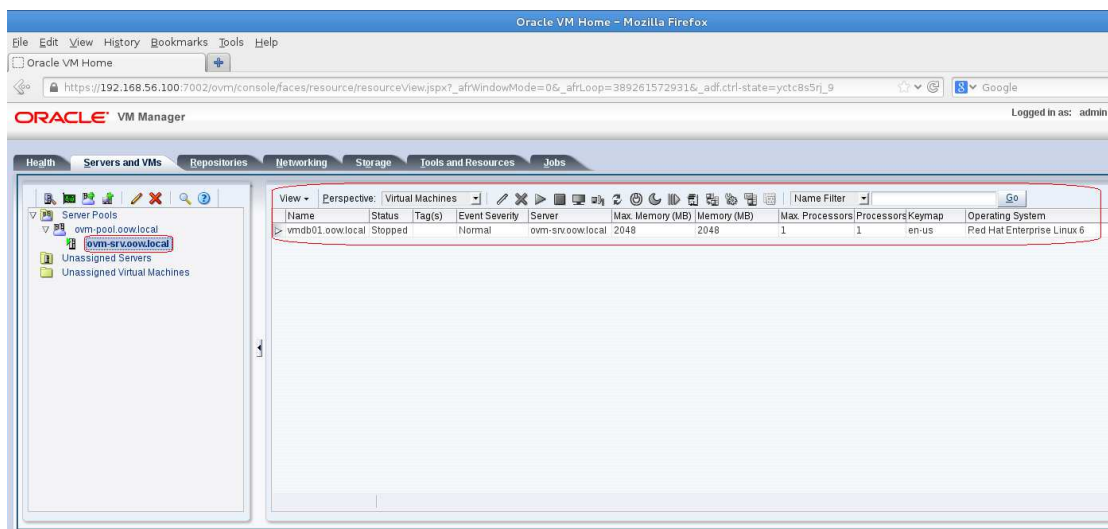
2.8 VERIFY AND START ORACLE VM GUEST CREATED


Our guest is ready but, before to start it, we need to verify that everything is accomplished. This chapter will show how-to edit a guest server, modify and start it.

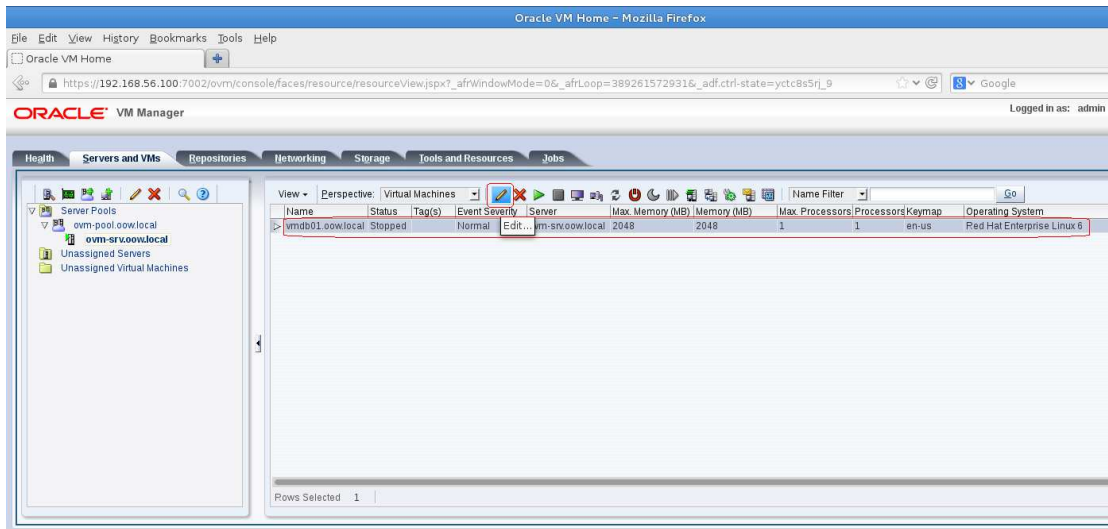
- a) Click on **“Servers & VMs”** tab, expand **“Server Pools”** and the pool named **“ovm-pool.oow.local”** with the button 



- a) Select the physical server (dom0) named **“ovm-srv.oow.local”** and, in the window on the right guest created will appear.



- b) Select the guest named **“vmdb01.oow.local”** and click on the edit button 



c) In the “Edit Virtual Machine: vmdb01.oow.local” window verify following details:

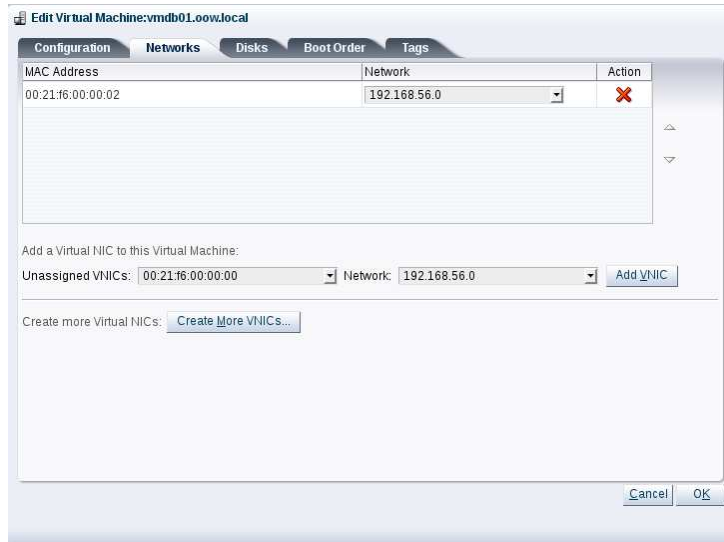
Section “Configuration”

Name: “vmdb01.oow.local”
 Operating System: “Red Hat Enterprise Linux 6”
 Domain Type: “XEN PVM”
 Max. Memory(MB): “2048”
 Memory(MB): “2048”
 Max. Processors: “1”
 Processors: “1”
 Priority: “50”
 Processor Cap %: “100”



Section “Networks”

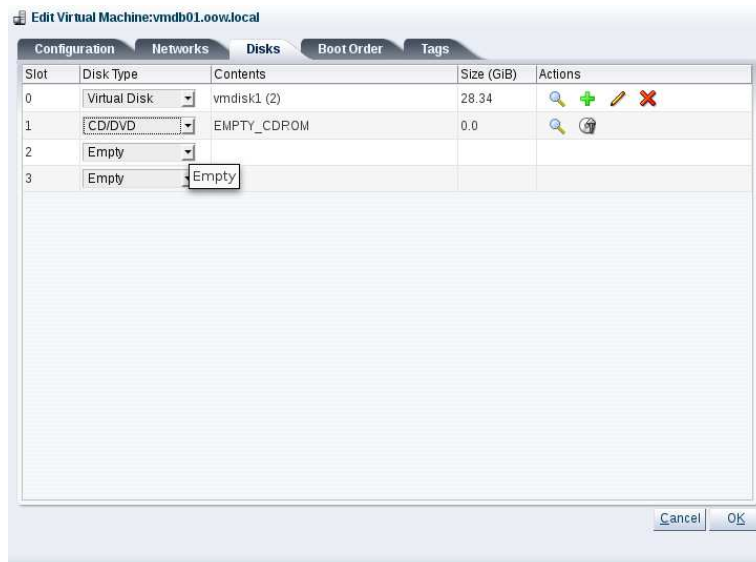
Network: **“192.168.56.0”**



Section “Disks”

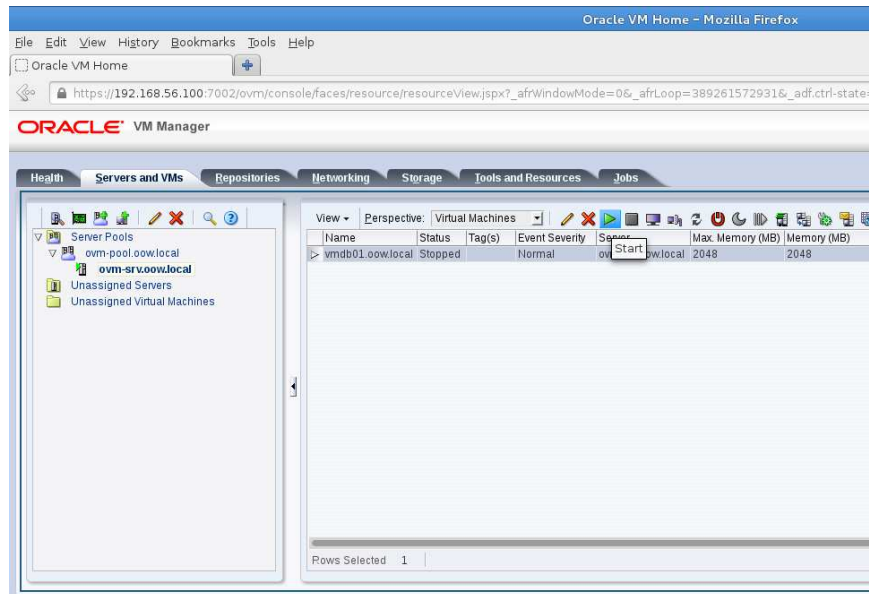
Slot 0 => Disk Type “**Virtual Disk**” (no changes)

Slot 1 => Disk Type “**Empty**” (modify from “**CD/DVD**” to “**Empty**”)

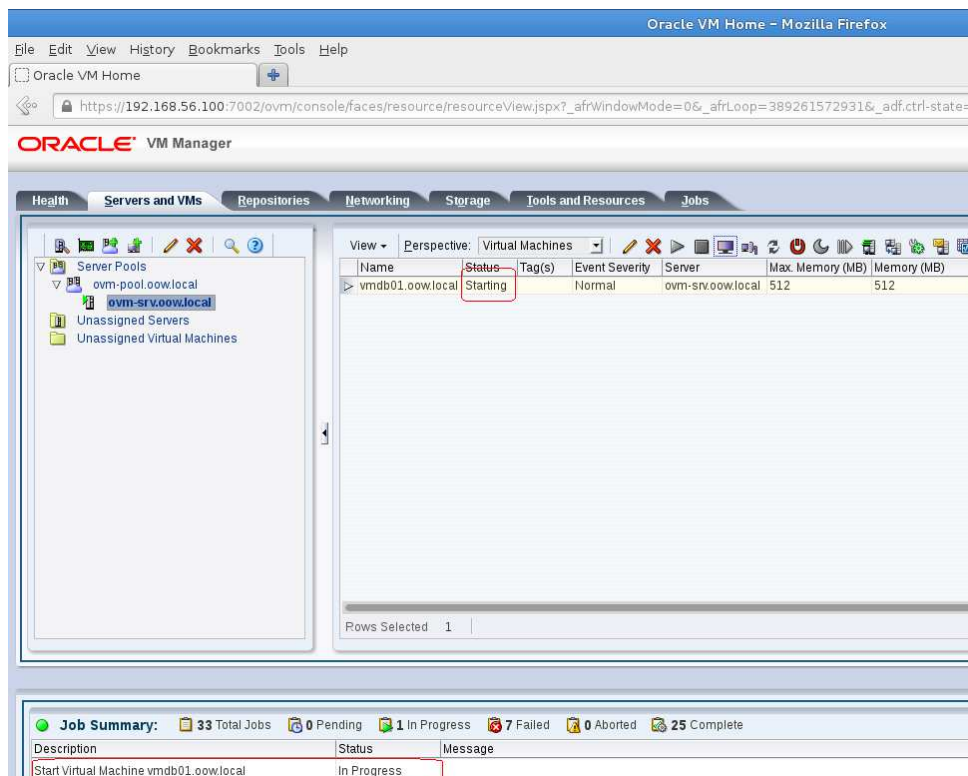


Confirm with “**OK**” changes applied.

d) Start guest “**vmdb01.oow.local**” with the button



The guest will temporarily pass to the **“Starting”** state; you can also verify that the job completed successfully. If we want we can also click on **“Job Details”** to see a detailed log of the start.



- e) Verify that the job completed successfully; you can evaluate the result in **“Job Summary”** and also on the **“Guest informations”**.

The screenshot shows the Oracle VM Manager web interface in Mozilla Firefox. The browser address bar shows the URL: https://192.168.56.100:7002/ovm/console/faces/resource/resourceView.jspx?_afrcWindowMode=06_afrcLoop=389261572931&_adf.ctrl-state=...

The interface has several tabs: Health, Servers and VMs (selected), Repositories, Networking, Storage, Tools and Resources, and Jobs. The left sidebar shows a tree view with 'Server Pools' expanded to 'oovm-pool.oow.local', which contains 'oovm-srv.oow.local'. Below this are 'Unassigned Servers' and 'Unassigned Virtual Machines'.

The main area shows a table of Virtual Machines. The 'Status' column for the selected VM 'vmdb01.oow.local' is 'Punning'. The 'Event Severity' is 'Normal'. The 'Server' is 'oovm-srv.oow.local'. The 'Max. Memory (MB)' and 'Memory (MB)' are both 512.

At the bottom, there is a 'Job Summary' section with the following statistics: 33 Total Jobs, 0 Pending, 0 In Progress, 7 Failed, 0 Aborted, and 26 Complete. Below this is a table with the following data:

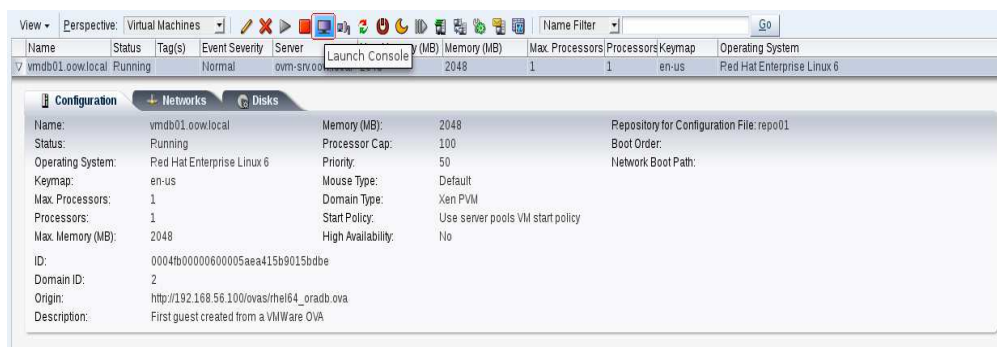
Description	Status	Message
Start Virtual Machine vmdb01.oow.local	Completed	

2.9 MANUALLY MODIFY GUEST CONFIGURATION

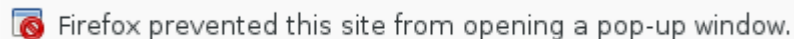
Obviously this guest machine needs some changes, first of all, the network configuration; default network configuration on VMWare is on network 192.168.93.0/24 while default VirtualBox network configuration is 192.168.56.0/24.

Guest “ovmdb01.oow.local” is not network reachable, so you have to connect to its console to modify network configuration; this chapter will show how-to open a guest console and modify its network configuration.

- a) Select the guest named “ovmdb01.oow.local” and click on the console button 

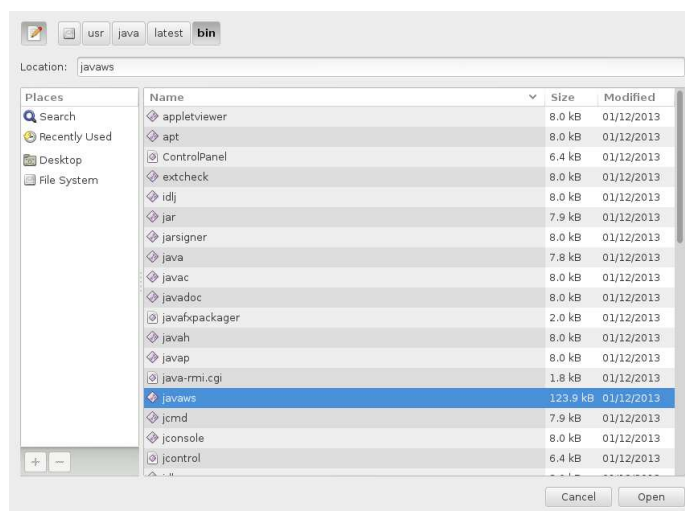


- b) A “pop-up” blocker could appear (sort it out by allowing pop-ups to Oracle VM Manager)

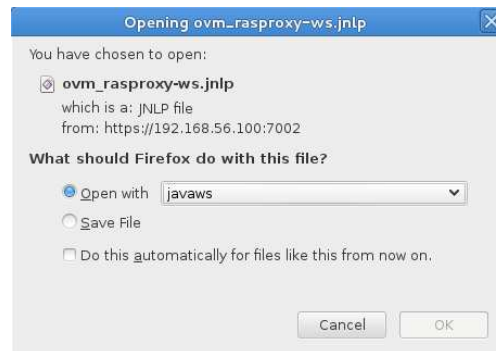


- c) The browser will ask what to do with a file (ovm_rasproty-ws.jnlp); choose “Open with” and select:

`/usr/java/latest/bin/javaws` (latest installed jre on your Linux laptop)



Click “OK” to confirm.



- d) The console, with guest prompt login, will appear but without login prompt:

```
vmdb01.oow.local - TigerVNC
TNSLSNR for Linux: Version 11.2.0.3.0 - Production
System parameter file is /u01/app/oracle/product/11.2.0/db/network/admin/listener.ora
Log messages written to /u01/app/oracle/diag/tnslsnr/vmdb02/listener_oowdb/alert/log.xml
Error listening on: (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=vmdb01.oow.local)(PORT=1521)))
TNS-12545: Connect failed because target host or object does not exist
TNS-12560: TNS:protocol adapter error
TNS-00515: Connect failed because target host or object does not exist
Linux Error: 110: Connection timed out

Listener failed to start. See the error message(s) above...

SQL*Plus: Release 11.2.0.3.0 Production on Fri Sep 13 12:10:42 2013
Copyright (c) 1982, 2011, Oracle. All rights reserved.

Connected to an idle instance.

SQL> ORACLE instance started.

Total System Global Area 680607744 bytes
Fixed Size 2231472 bytes
Variable Size 406048336 bytes
Database Buffers 268435456 bytes
Redo Buffers 3092400 bytes
Database mounted.
Database opened.
SQL>
System altered.

SQL> Disconnected from Oracle Database 11g Enterprise Edition Release 11.2.0.3.0 - 64bit Production
With the Partitioning, OLAP, Data Mining and Real Application Testing options
Starting atd: [ OK ]
Starting rsmcrttd... [ OK ]
CE: xen increased min_delta_ns to 150000 nsec
```

- e) To obtain a login prompt, move your mouse arrow on the VNC console window, select (click) it, and press “F8” function button on your keyboard; a menu will appear and here, you will have to select “ALT radio button”.

```

TNSLSNR for Linux: Version 11.2.0.3.0 - Production
System parameter file is /u01/app/oracle/product/11.2.0/db/network/admin/listener.ora
Log messages written to /u01/app/oracle/diag/tnslsnr/vmdb02/listener_00wdb/alert/log.xml
Error listening on: (DESCRIPTION=(ADDRESS=(PROTOCOL=TCP)(HOST=vmb01.oow.local)(PORT=1521)))
TNS-12545: Connect failed because target host or object does not exist
TNS-12560: TNS:protocol adapter error
TNS-00515: Connect failed because target host or object does not exist
Linux Error: 118: Connection timed out

Listener failed to start. See the error message(s) above...

SQL*Plus: Release 11.2.0.3.0 Production on Fri Sep 13 12:18:42 2013
Copyright (c) 1982, 2011, Oracle. All rights reserved.

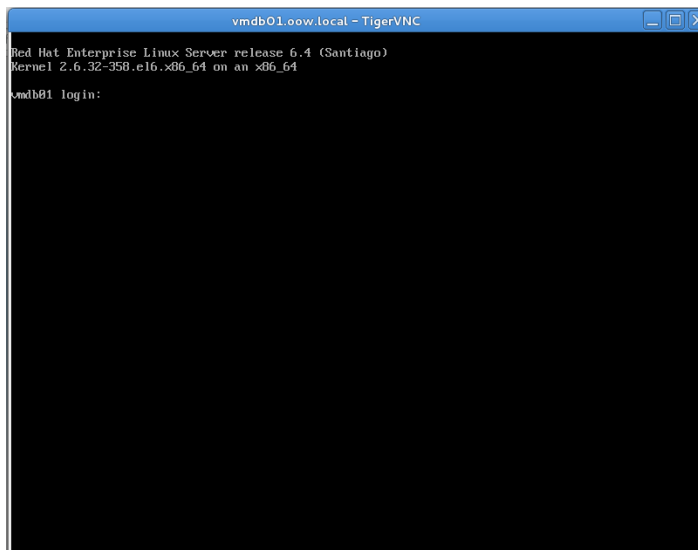
Connected to an idle instance.

SQL> ORACLE instance started.

Total System Global Area 688687744 bytes
Fixed Size 2231472 bytes
Variable Size 486848336 bytes
Database Buffers 268435456 bytes
Redo Buffers 3892488 bytes
Database mounted.
Database opened.
SQL>
System altered.

SQL> Disconnected from Oracle Database 11g Enterprise
Edition with the Partitioning, OLAP, Data Mining and Real Application
Monitoring components.
Starting atd:
Starting rshmcrtid...
CE: xen increased min_delta_ns to 150000 nsec
  
```

- f) Now press “F2” function button to open “**Console Window number 2**” and you’ll see the login prompt; at this point you have to deselect the “ALT” option: so click again “F8” and then **clear selection on “ALT radio button”**.



Login with:
User: “root”
Password: “ovsroot”

- g) First step is to drop vmware-tools installation; to proceed with the removal execute:

```
# vmware-uninstall-tools.pl
```

```

vmdb01.oow.local - TigerVNC
Red Hat Enterprise Linux Server release 6.4 (Santiago)
Kernel 2.6.32-358.el6.x86_64 on an x86_64
vmdb01 login: root
Password:
Last login: Thu Aug 15 01:08:16 on tty1
[root@vmdb01 ~]# vmware-uninstall-tools.pl _

```

h) Verify that the removal result is like this one:

```

vmdb01.oow.local - TigerVNC
This program previously created the directory
/usr/lib/vmware-tools/lib64/libconf/etc/fonts, and was about to remove it.
Since there are files in that directory that this program did not create, it
will not be removed.

This program previously created the directory
/usr/lib/vmware-tools/lib/libvmtoolsd2.so, and was about to remove it. Somebody
else apparently did it already.

This program previously created the directory
/usr/lib/vmware-tools/lib64/libconf/etc, and was about to remove it. Since
there are files in that directory that this program did not create, it will not
be removed.

This program previously created the directory
/usr/lib/vmware-tools/lib/libvmtoolsd.so, and was about to remove it. Somebody
else apparently did it already.

This program previously created the directory
/usr/lib/vmware-tools/lib64/libconf, and was about to remove it. Since there
are files in that directory that this program did not create, it will not be
removed.

This program previously created the directory /usr/lib/vmware-tools/lib64, and
was about to remove it. Since there are files in that directory that this
program did not create, it will not be removed.

This program previously created the directory /usr/lib/vmware-tools, and was
about to remove it. Since there are files in that directory that this program
did not create, it will not be removed.

The removal of VMware Tools 9.2.3 build-1031368 for Linux completed
successfully. Thank you for having tried this software.

[root@vmdb01 ~]#
[root@vmdb01 ~]# _

```

i) By Oracle VM Console verify guest ip address (taken by dhcp server installed on Oracle VM Manager):

```
# ifconfig eth0
```

```
vmdb01.oow.local - TigerVNC
[root@vmdb01 ~]# ifconfig eth0
eth0      Link encap:Ethernet  HWaddr 00:21:F6:00:00:02
          inet addr:192.168.56.254  Bcast:192.168.56.255  Mask:255.255.255.0
          inet6 addr: fe80::221:f6ff:fe00:2/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:11 errors:0 dropped:0 overruns:0 frame:0
          TX packets:16 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:1216 (1.1 KiB)  TX bytes:1650 (1.6 KiB)
          Interrupt:245
[root@vmdb01 ~]# _
```

An alternative to see which IP Address has been assigned to “vmdb01.oow.local” is:

1. Connect to Oracle VM Manager “ovm-mgr.oow.local – 192.168.56.100” via ssh (ssh [root@192.168.56.100](ssh://root@192.168.56.100)) – root password is “ovsroot”
2. Execute the command : “tail -50 /var/log/messages |grep DHCPACK”, example:
[root@ovm-mgr ~]# tail -50 /var/log/messages |grep DHCPACK
Aug 16 01:59:30 ovm-mgr dhcpd: DHCPACK on 192.168.56.254 to 00:21:f6:00:00:02 via eth0

j) Open a terminal on your Linux Laptop and connect to the guest with the IP address above:

```
# ssh root@<ip_address_obtained>
nb: guest root password is “ovsroot”
```

```
root@vmdb01:~
[scoter@area51: ~]# ssh root@192.168.56.254
root@192.168.56.254's password:
Last login: Thu Aug 15 02:19:14 2013 from 192.168.56.1
[root@vmdb01 ~]#
```



k) Verify “Oracle Database” and “Oracle Listener” status with the following commands:

```
# service oraOOWDB status
# ps -edaf |grep oracle
```

The output should be similar to this one:

```

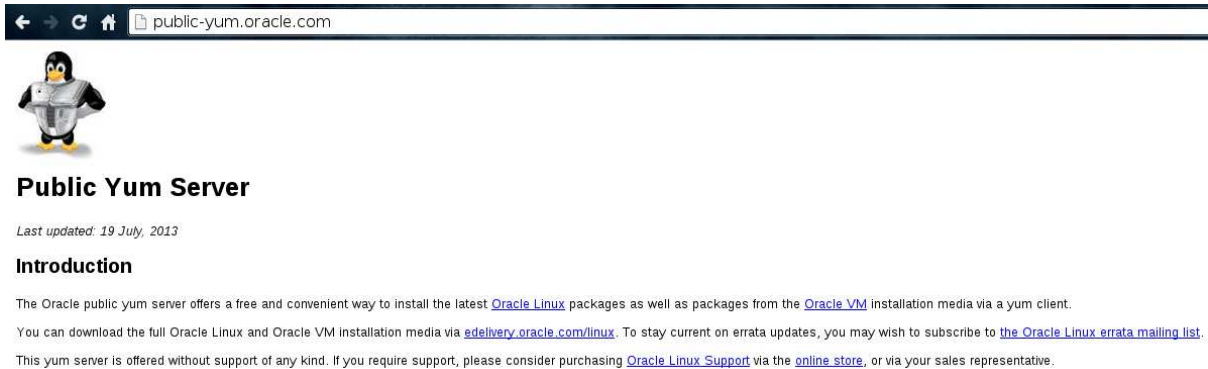
root@vmb01:~# service ora00wDB status
ora_pmon_00wDB (pid 1277) is running...
tnslsnr (pid 1287) is running...
root@vmb01 ~]# ps -ef | grep oracle
oracle 1287 1 0 02:10 ? 00:00:00 /u01/app/oracle/product/11.2.0/db/bin/tnslsnr LISTENER_00wDB -inherit
oracle 1277 1 0 02:10 ? 00:00:01 ora_pmon_00wDB
oracle 1279 1 0 02:10 ? 00:00:02 ora_psp0_00wDB
oracle 1281 1 0 02:10 ? 00:02:21 ora_vktm_00wDB
oracle 1285 1 0 02:10 ? 00:00:00 ora_gen0_00wDB
oracle 1287 1 0 02:10 ? 00:00:00 ora_diag_00wDB
oracle 1289 1 0 02:10 ? 00:00:00 ora_dbrm_00wDB
oracle 1291 1 0 02:10 ? 00:00:03 ora_dis0_00wDB
oracle 1293 1 0 02:10 ? 00:00:01 ora_mman_00wDB
oracle 1295 1 0 02:10 ? 00:00:00 ora_dbw0_00wDB
oracle 1297 1 0 02:10 ? 00:00:00 ora_lgwr_00wDB
oracle 1299 1 0 02:10 ? 00:00:01 ora_ckpt_00wDB
oracle 1301 1 0 02:10 ? 00:00:00 ora_smon_00wDB
oracle 1303 1 0 02:10 ? 00:00:00 ora_reco_00wDB
oracle 1305 1 0 02:10 ? 00:00:03 ora_mmon_00wDB
oracle 1307 1 0 02:10 ? 00:00:02 ora_mmnl_00wDB
oracle 1309 1 0 02:10 ? 00:00:00 ora_q000_00wDB
oracle 1311 1 0 02:10 ? 00:00:00 ora_s000_00wDB
oracle 1378 1 0 02:11 ? 00:00:00 ora_qmnc_00wDB
oracle 1447 1 0 02:11 ? 00:00:00 ora_q001_00wDB
oracle 1449 1 0 02:11 ? 00:00:00 ora_q001_00wDB
oracle 1451 1 0 02:11 ? 00:00:01 ora_cjq0_00wDB
oracle 1657 1 0 02:16 ? 00:00:00 ora_smco_00wDB
oracle 1913 1 0 02:26 ? 00:00:00 ora_w000_00wDB
root 1994 1998 0 02:37 pts/1 00:00:00 grep oracle
root@vmb01 ~]#

```


2.10 SWITCH FROM REDHAT TO ORACLE LINUX

One of the targets of this lab is to show Oracle Public Yum:

<http://public-yum.oracle.com>



Public Yum Server

Last updated: 19 July, 2013

Introduction

The Oracle public yum server offers a free and convenient way to install the latest [Oracle Linux](#) packages as well as packages from the [Oracle VM](#) installation media via a yum client.

You can download the full Oracle Linux and Oracle VM installation media via [edelivery.oracle.com/linux](#). To stay current on errata updates, you may wish to subscribe to [the Oracle Linux errata mailing list](#).

This yum server is offered without support of any kind. If you require support, please consider purchasing [Oracle Linux Support](#) via the [online store](#), or via your sales representative.

Site reports:

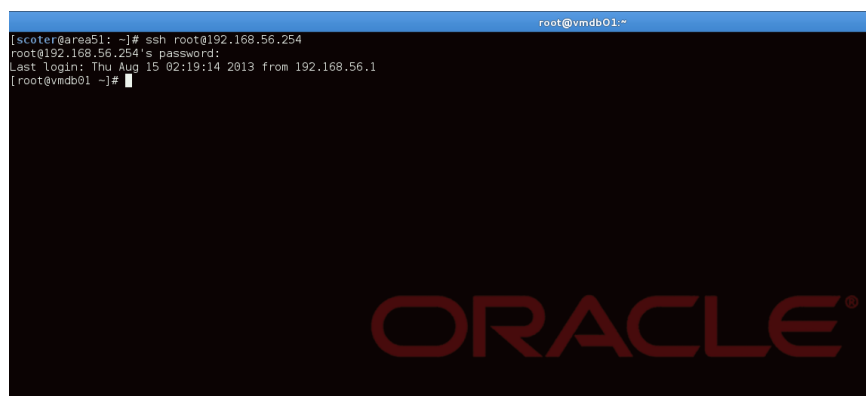
The Oracle public yum server offers a free and convenient way to install the latest [Oracle Linux](#) packages as well as packages from the [Oracle VM](#) installation media via a yum client. You can download the full Oracle Linux and Oracle VM installation media via [edelivery.oracle.com/linux](#). To stay current on errata updates, you may wish to subscribe to [the Oracle Linux errata mailing list](#). This yum server is offered without support of any kind. If you require support, please consider purchasing [Oracle Linux Support](#) via the [online store](#), or via your sales representative.

In this lab we replicated a local “Oracle Public Yum” to speed up switching process.
The role local “Oracle Public Yum” belongs to the server “ovm-mgr.oow.local – 192.168.56.100”.

- Connect by a terminal (if not already connected) to your guest “vmdb01.oow.local”
- Execute this command to copy yum configuration:

```
# scp 192.168.56.100:/etc/yum.repos.d/myRepo.repo /etc/yum.repos.d/
```

nb: root password requested from ovm-mgr.oow.local is “**ovsroot**”



```
root@vmdb01:~#
[scoter@area51: ~]# ssh root@192.168.56.254
root@192.168.56.254's password:
Last login: Thu Aug 15 02:19:14 2013 from 192.168.56.1
[root@vmdb01 ~]#
```

- c) First step is to pass the package “redhat-release” to “oracle-release”.
To complete this step execute the following commands:

```
# yumdownloader oraclelinux-release.x86_64 oraclelinux-release-notes.x86_64
```

```
root@vmb01:~  
[root@vmb01 ~]# yumdownloader oraclelinux-release.x86_64 oraclelinux-release-notes.x86_64  
Loaded plugins: product-id, refresh-packagekit  
oraclelinux-release-6Server-4.0.4.x86_64.rpm  
oraclelinux-release-notes-6Server-9.x86_64.rpm  
[root@vmb01 ~]#
```

```
# rpm -Uhv --force oraclelinux-release*
```

```
root@vmb01:~  
[root@vmb01 ~]# rpm -Uhv --force oraclelinux-release-*  
warning: oraclelinux-release-6Server-4.0.4.x86_64.rpm: Header V3 RSA/SHA256 Signature, key ID ec551f03: NOKEY  
Preparing... ##### [100%]  
1:oraclelinux-release-not##### [ 50%]  
2:oraclelinux-release ##### [100%]  
[root@vmb01 ~]#
```

- d) Install “Oracle Linux Distribution” packages and Oracle Unbreakable Kernel with the following command:

```
# yum install oracle-logos.noarch oracle-rdbms-server-11gR2-preinstall.x86_64 oracleasm-support.x86_64
```

nb: this command will replace Redhat logos, will install Oracle Linux Kernel (due to dependencies) and, latest but not least important, Oracle softwares preinstall packages such as:

- oracle-rdbms-server-11GR2-preinstall
- oracle-em-agent-12cR1-preinstall

*These pre-install packages are available for x86_64 only.
Specifically, these packages:*

- *Causes the download and installation of various software packages and specific versions needed for database installation, with package dependencies resolved via yum*
- *Creates, if needed, the user oracle and the groups oinstall and dba, which are the defaults used during database installation*
- *Modifies kernel parameters in /etc/sysctl.conf to change settings for shared memory, semaphores, the maximum number of file descriptors, and so on*
- *Sets hard and soft shell resource limits in /etc/security/limits.conf, such as the number of open files, the number of processes, and stack size to the minimum required based on the Oracle Database 11g Release 2 Server installation requirements*
- *Sets numa=off in the kernel boot parameters for x86_64 machine*

These packages automates and prepare Oracle Linux to accommodate Oracle Enterprise software such as Database, Weblogic, Cloud Control, eBusiness Suite, ecc....

Yum will ask a confirmation to proceed with the install of packages; reply with “Y”:

```

root@vmbd01:~# yum install oracle-logos-noarch oracle-rdbms-server-11gR2-preinstall.x86_64 oracleasm-support.x86_64 kernel-uek.x86_64 kernel-uek-firmware.noarch libXxf86dga.x86_64 libdmx.x86_64 xorg-x11-utils.x86_64
myRepo/primary | 2.1 MB | 00:00
myRepo | 3787/3787
Setting up Install Process
Resolving Dependencies
--> Running transaction check
--> Package oracle-logos.noarch 0:60.0.14-1.0.1.el6 will be obsoleting
--> Package oracle-rdbms-server-11gR2-preinstall.x86_64 0:1.0-7.el6 will be installed
--> Processing Dependency: xorg-x11-utils for package: oracle-rdbms-server-11gR2-preinstall-1.0-7.el6.x86_64
--> Processing Dependency: kernel-uek for package: oracle-rdbms-server-11gR2-preinstall-1.0-7.el6.x86_64
--> Package oracleasm-support.x86_64 0:2.1.8-1.el6 will be installed
--> Package redhat-logos.noarch 0:60.0.14-1.el6 will be obsoleted
--> Running transaction check
--> Package kernel-uek.x86_64 0:2.6.39-400.17.1.el6uek will be installed
--> Processing Dependency: kernel-uek-firmware = 2.6.39-400.17.1.el6uek for package: kernel-uek-2.6.39-400.17.1.el6uek.x86_64
--> Processing Dependency: libdmx.so.1()(64bit) for package: xorg-x11-utils-7.5-6.el6.x86_64
--> Processing Dependency: libXxf86dga.so.1()(64bit) for package: xorg-x11-utils-7.5-6.el6.x86_64
--> Running transaction check
--> Package kernel-uek-firmware.noarch 0:2.6.39-400.17.1.el6uek will be installed
--> Package libXxf86dga.x86_64 0:1.1.3-2.el6 will be installed
--> Package libdmx.x86_64 0:1.1.2-2.el6 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

Package Arch Version Repository Size
Installing:
oracle-logos noarch 60.0.14-1.0.1.el6 myRepo 12 M
replacing redhat-logos.noarch 60.0.14-1.el6
oracle-rdbms-server-11gR2-preinstall x86_64 1.0-7.el6 myRepo 15 k
oracleasm-support x86_64 2.1.8-1.el6 myRepo 73 k
Installing for dependencies:
kernel-uek x86_64 2.6.39-400.17.1.el6uek myRepo 27 M
kernel-uek-firmware noarch 2.6.39-400.17.1.el6uek myRepo 3.5 M
libXxf86dga x86_64 1.1.3-2.el6 myRepo 24 k
libdmx x86_64 1.1.2-2.el6 myRepo 20 k
xorg-x11-utils x86_64 7.5-6.el6 myRepo 94 k

Transaction Summary
Install 8 Package(s)
Total download size: 43 M
Is this ok [y/N]: Y
  
```

The install process will complete in 2/3 minutes as show below:

```

root@vmbd01:~# yum install oracle-logos-noarch oracle-rdbms-server-11gR2-preinstall.x86_64 oracleasm-support.x86_64 kernel-uek.x86_64 kernel-uek-firmware.noarch libXxf86dga.x86_64 libdmx.x86_64 xorg-x11-utils.x86_64
(2/8): kernel-uek-firmware-2.6.39-400.17.1.el6uek.noarch.rpm | 3.5 MB | 00:00
(3/8): libXxf86dga-1.1.3-2.el6.x86_64.rpm | 24 kB | 00:00
(4/8): libdmx-1.1.2-2.el6.x86_64.rpm | 20 kB | 00:00
(5/8): oracle-logos-60.0.14-1.0.1.el6.noarch.rpm | 12 MB | 00:00
(6/8): oracle-rdbms-server-11gR2-preinstall-1.0-7.el6.x86_64.rpm | 15 kB | 00:00
(7/8): oracleasm-support-2.1.8-1.el6.x86_64.rpm | 73 kB | 00:00
(8/8): xorg-x11-utils-7.5-6.el6.x86_64.rpm | 94 kB | 00:00
-----
Total | 17 MB/s | 43 MB | 00:02
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
Warning: RPMDB altered outside of yum.
Installing : libdmx-1.1.2-2.el6.x86_64 | 1/9
Installing : kernel-uek-firmware-2.6.39-400.17.1.el6uek.noarch | 2/9
Installing : kernel-uek-2.6.39-400.17.1.el6uek.x86_64 | 3/9
Installing : libXxf86dga-1.1.3-2.el6.x86_64 | 4/9
Installing : xorg-x11-utils-7.5-6.el6.x86_64 | 5/9
Installing : oracle-rdbms-server-11gR2-preinstall-1.0-7.el6.x86_64 | 6/9
Installing : oracle-logos-60.0.14-1.0.1.el6.noarch | 7/9
Installing : oracleasm-support-2.1.8-1.el6.x86_64 | 8/9
Erasing : redhat-logos-60.0.14-1.0.1.el6.noarch | 9/9
Verifying : kernel-uek-2.6.39-400.17.1.el6uek.x86_64 | 1/9
Verifying : xorg-x11-utils-7.5-6.el6.x86_64 | 2/9
Verifying : oracleasm-support-2.1.8-1.el6.x86_64 | 3/9
Verifying : oracle-rdbms-server-11gR2-preinstall-1.0-7.el6.x86_64 | 4/9
Verifying : libXxf86dga-1.1.3-2.el6.x86_64 | 5/9
Verifying : kernel-uek-firmware-2.6.39-400.17.1.el6uek.noarch | 6/9
Verifying : oracle-logos-60.0.14-1.0.1.el6.noarch | 7/9
Verifying : libdmx-1.1.2-2.el6.x86_64 | 8/9
Verifying : redhat-logos-60.0.14-1.0.1.el6.noarch | 9/9

Installed:
oracle-logos.noarch 0:60.0.14-1.0.1.el6 oracle-rdbms-server-11gR2-preinstall.x86_64 0:1.0-7.el6 oracleasm-support.x86_64 0:2.1.8-1.el6
Dependency Installed:
kernel-uek.x86_64 0:2.6.39-400.17.1.el6uek kernel-uek-firmware.noarch 0:2.6.39-400.17.1.el6uek libXxf86dga.x86_64 0:1.1.3-2.el6 libdmx.x86_64 0:1.1.2-2.el6
xorg-x11-utils.x86_64 0:7.5-6.el6
Replaced:
redhat-logos.noarch 0:60.0.14-1.0.1.el6

Complete!
You have new mail in /var/spool/mail/root
[root@vmbd01 ~]#
  
```

- e) Verify “vmdb01.oow.local” grub configuration to assure that will boot with the new Oracle UEK Kernel.

You can verify your grub configuration with the command “`cat /boot/grub/grub.conf`”, example:

```

root@vmdb01 ~# cat /boot/grub/grub.conf
# grub.conf generated by anaconda
#
# Note that you do not have to run grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#         kernel /vmlinuz-version ro root=/dev/mapper/vg_vmdb01-lv_root
#         initrd /initrd-[generic]-version.img
#boot=/dev/sda
default=1
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux Server (2.6.39-400.17.1.el6uek.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.39-400.17.1.el6uek.x86_64 ro root=/dev/mapper/vg_vmdb01-lv_root rd_NO_LUKS rd_LVM_LV=vg_vmdb01/lv_root rd_NO_MD SYSFONT=latacyryheb-sun16 rd_LVM_LV=
vg_vmdb01/lv_swap KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM LANG=en_US.UTF-8 rhgb quiet numa=off
    initrd /initramfs-2.6.39-400.17.1.el6uek.x86_64.img
title Red Hat Enterprise Linux (2.6.32-358.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-358.el6.x86_64 ro root=/dev/mapper/vg_vmdb01-lv_root rd_NO_LUKS rd_LVM_LV=vg_vmdb01/lv_root rd_NO_MD SYSFONT=latacyryheb-sun16 crashkernel=auto
rd_LVM_LV=v
vg_vmdb01/lv_swap KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM LANG=en_US.UTF-8 rhgb quiet numa=off
    initrd /initramfs-2.6.32-358.el6.x86_64.img
root@vmdb01 ~#
  
```

In this case the “**default kernel (1)**” is the old Red Hat kernel; so we have to modify the “**default**” value to “**0**”.

We would like also to see all boot steps and, so, we need to remove the “rhgb quiet” from the boot kernel command line.

As root, open the “`/boot/grub/grub.conf`” file and edit “default” value from “1” to “0” and remove the “rhgb quiet” where exists; to complete this task you can use an editor like “vi” or, if you don’t know this tool, execute the following command:

```

# sed -i s/default=1/default=0/ /boot/grub/grub.conf
# sed -i s/rhgb\ quiet// /boot/grub/grub.conf
  
```

After that, verify that “default” value is correctly set (value is 0).

```

# cat /boot/grub/grub.conf
  
```

```

root@vmdb01 ~# sed -i 's/default=1/default=0/' /boot/grub/grub.conf
root@vmdb01 ~# cat /boot/grub/grub.conf
# grub.conf generated by anaconda
#
# Note that you do not have to run grub after making changes to this file
# NOTICE: You have a /boot partition. This means that
#         all kernel and initrd paths are relative to /boot/, eg.
#         root (hd0,0)
#         kernel /vmlinuz-version ro root=/dev/mapper/vg_vmdb01-lv_root
#         initrd /initrd-[generic]-version.img
#boot=/dev/sda
default=0
timeout=5
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Red Hat Enterprise Linux Server (2.6.39-400.17.1.el6uek.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.39-400.17.1.el6uek.x86_64 ro root=/dev/mapper/vg_vmdb01-lv_root rd_NO_LUKS rd_LVM_LV=vg_vmdb01/lv_root rd_NO_MD SYSFONT=latacyryheb-sun16 rd_LVM_LV=
vg_vmdb01/lv_swap KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM LANG=en_US.UTF-8 rhgb quiet numa=off
    initrd /initramfs-2.6.39-400.17.1.el6uek.x86_64.img
title Red Hat Enterprise Linux (2.6.32-358.el6.x86_64)
    root (hd0,0)
    kernel /vmlinuz-2.6.32-358.el6.x86_64 ro root=/dev/mapper/vg_vmdb01-lv_root rd_NO_LUKS rd_LVM_LV=vg_vmdb01/lv_root rd_NO_MD SYSFONT=latacyryheb-sun16 crashkernel=auto
rd_LVM_LV=v
vg_vmdb01/lv_swap KEYBOARDTYPE=pc KEYTABLE=us rd_NO_DM LANG=en_US.UTF-8 rhgb quiet numa=off
    initrd /initramfs-2.6.32-358.el6.x86_64.img
root@vmdb01 ~#
  
```

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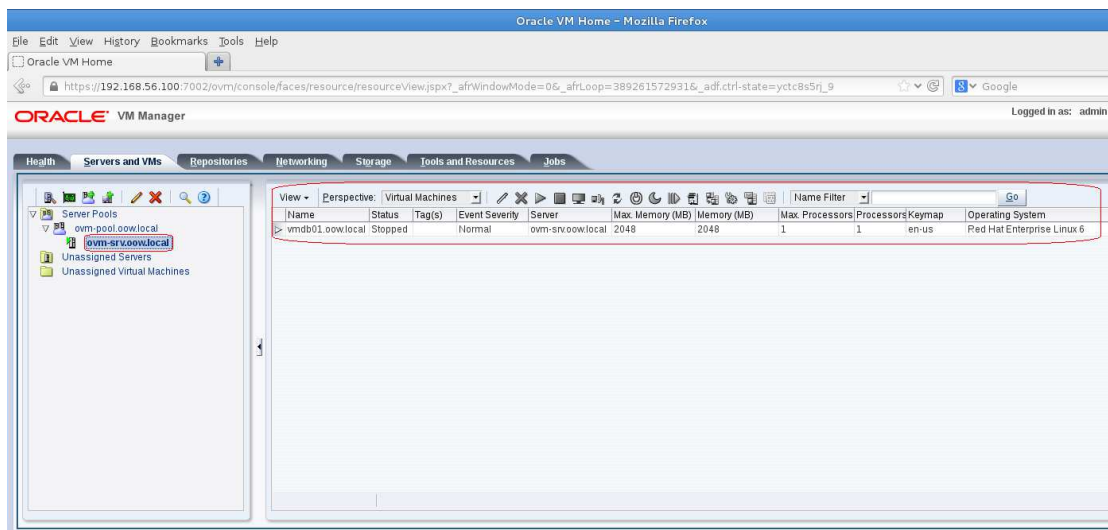
- f) Disable linux services not needed:

```
# chkconfig rhsmcertd off  
# chkconfig rhnsd off
```

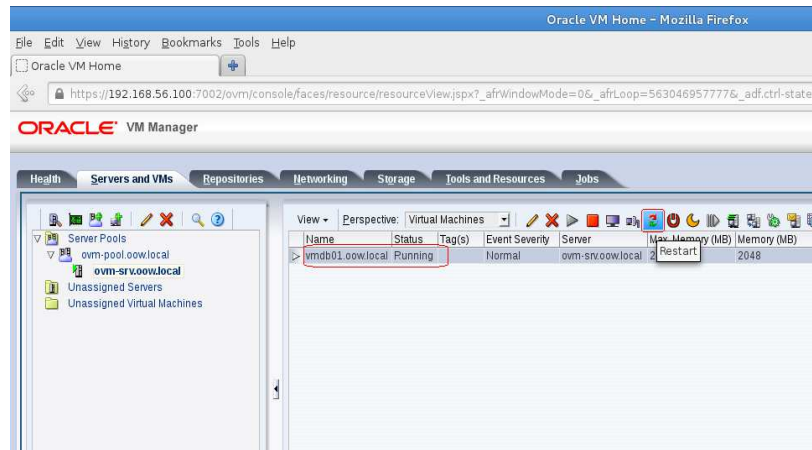
- g) Reboot guest “**vmdb01.oow.local**” by Oracle VM Manager.
Click on “**Servers & VMs**” tab, expand “**Server Pools**” and the pool named “**ovm-pool.oow.local**” with the button 



Select the physical server (dom0) named “**ovm-srv.oow.local**” and, in the window on the right guest running will appear.



Select the guest named “**vmdb01.oow.local**” and click on the restart button 



Confirm with "OK" the reboot of the guest.



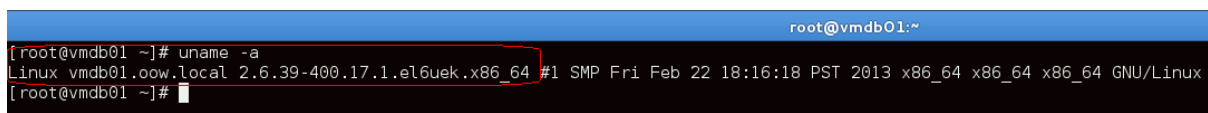
- h) Wait for the guest reboot (you can follow its reboot by console opened before) and when reboot is completed reconnect by ssh and verify new Oracle Linux Kernel and parameters introduced by preinstall package "**oracle-rdbms-server-11GR2-preinstall**".

ssh root@<ip_address_of_guest> (in this example is 192.168.56.254)

Login with:
Username: "root"
Password: "ovsroot"



uname -a (to verify Oracle Kernel loaded)



cat /etc/sysctl.conf (to verify Kernel parameters introduced by preinstall-rdbms package)

```

root@
# oracle-rdbms-server-11gR2-preinstall setting for nofile soft limit is 1024
oracle soft nofile 1024
# oracle-rdbms-server-11gR2-preinstall setting for nofile hard limit is 65536
oracle hard nofile 65536
# oracle-rdbms-server-11gR2-preinstall setting for nproc soft limit is 2047
oracle soft nproc 2047
# oracle-rdbms-server-11gR2-preinstall setting for nproc hard limit is 16384
oracle hard nproc 16384
# oracle-rdbms-server-11gR2-preinstall setting for stack soft limit is 10240KB
oracle soft stack 10240
# oracle-rdbms-server-11gR2-preinstall setting for stack hard limit is 32768KB
oracle hard stack 32768
[root@vmdb01 ~]#

```

cat /etc/security/limits.conf (to verify settings for linux user “oracle” introduced by preinstall package)

```

root@
# - data - max data size (KB)
# - fsize - maximum filesize (KB)
# - memlock - max locked-in-memory address space (KB)
# - nofile - max number of open files
# - rss - max resident set size (KB)
# - stack - max stack size (KB)
# - cpu - max CPU time (MIN)
# - nproc - max number of processes
# - as - address space limit (KB)
# - maxlogins - max number of logins for this user
# - maxsyslogins - max number of logins on the system
# - priority - the priority to run user process with
# - locks - max number of file locks the user can hold
# - sigpending - max number of pending signals
# - msgqueue - max memory used by POSIX message queues (bytes)
# - nice - max nice priority allowed to raise to values: [-20, 19]
# - rtprio - max realtime priority
#<domain> <type> <item> <value>
##
##* soft core 0
##* hard rss 10000
#@student hard nproc 20
#@faculty soft nproc 20
#@faculty hard nproc 50
#ftp hard nproc 0
#@student - maxlogins 4
# End of file

# oracle-rdbms-server-11gR2-preinstall setting for nofile soft limit is 1024
oracle soft nofile 1024
# oracle-rdbms-server-11gR2-preinstall setting for nofile hard limit is 65536
oracle hard nofile 65536
# oracle-rdbms-server-11gR2-preinstall setting for nproc soft limit is 2047
oracle soft nproc 2047
# oracle-rdbms-server-11gR2-preinstall setting for nproc hard limit is 16384
oracle hard nproc 16384
# oracle-rdbms-server-11gR2-preinstall setting for stack soft limit is 10240KB
oracle soft stack 10240
# oracle-rdbms-server-11gR2-preinstall setting for stack hard limit is 32768KB
oracle hard stack 32768
[root@vmdb01 ~]#

```

With these steps we obtained a fully supported and certified configuration for our Oracle Database; while on VMWare Oracle Database was only supported and not certified, with this kind of configuration:

Oracle VM => Oracle Linux => Oracle Database 11g Release 2

We obtained a fully certified “Oracle Database” with a cheaper virtualization solution. You can obtain further details on MOS (My Oracle Support) note:

Support Position for Oracle Products Running on VMWare Virtualized Environments (Doc ID 249212.1)

Where the first statement reported is:

“Oracle has not certified any of its products on VMware virtualized environments.

...
.....”

2.11 CREATE OWN TEMPLATE STARTING FROM A GUEST

This chapter will describe steps on how to build an Oracle VM Template starting from an existing guest (in our case a guest created by a VMWare OVA).

An Oracle VM Template is a re-usable guest on which we will be able to create more guest automatically.

- a) First step is to install RPMs that supply “Oracle VM APIs”; in this configuration you can complete this task with the command:

```
# yum install ovm*
```

Main packages that will be installed are:

- ovm-template-config: Oracle VM Template configuration tool.
- ovmd: Oracle VM guest daemon
- libovmapi: Oracle VM APIs

```
root@vmdb01~# yum install ovm*
Loaded plugins: product-id, refresh-packagekit, security, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register.
Setting up Install Process
Resolving Dependencies
--> Running transaction check
--> Package ovm-template-config.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-authentication.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-datetime.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-firewall.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-network.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-selinux.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-ssh.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-system.noarch 0:3.0-73.el6 will be installed
--> Package ovm-template-config-user.noarch 0:3.0-73.el6 will be installed
--> Package ovmd.x86_64 0:3.0-38.el6 will be installed
--> Processing Dependency: libovmapi.so()(64bit) for package: ovmd-3.0-38.el6.x86_64
--> Running transaction check
--> Package libovmapi.x86_64 0:3.0-6.el6 will be installed
--> Finished Dependency Resolution
Dependencies Resolved

Package Arch Version Repository Size
-----
Installing:
ovm-template-config noarch 3.0-73.el6 addons 61 k
ovm-template-config-authentication noarch 3.0-73.el6 addons 17 k
ovm-template-config-datetime noarch 3.0-73.el6 addons 17 k
ovm-template-config-firewall noarch 3.0-73.el6 addons 17 k
ovm-template-config-network noarch 3.0-73.el6 addons 18 k
ovm-template-config-selinux noarch 3.0-73.el6 addons 17 k
ovm-template-config-ssh noarch 3.0-73.el6 addons 18 k
ovm-template-config-system noarch 3.0-73.el6 addons 17 k
ovm-template-config-user noarch 3.0-73.el6 addons 17 k
ovmd x86_64 3.0-38.el6 addons 31 k
Installing for dependencies:
libovmapi x86_64 3.0-6.el6 addons 19 k

Transaction Summary
-----
Install 11 Package(s)
Total download size: 249 k
Installed size: 302 k
Is this ok [y/N]: y
```

- b) The task will complete in few seconds, and the result will be similar to this:


```

root@vmdb01~
(6/11): ovm-template-config-network-3.0-73.el6.noarch.rpm | 18 kB | 00:00
(7/11): ovm-template-config-selinux-3.0-73.el6.noarch.rpm | 17 kB | 00:00
(8/11): ovm-template-config-ssh-3.0-73.el6.noarch.rpm | 18 kB | 00:00
(9/11): ovm-template-config-system-3.0-73.el6.noarch.rpm | 17 kB | 00:00
(10/11): ovm-template-config-user-3.0-73.el6.noarch.rpm | 17 kB | 00:00
(11/11): ovmd-3.0-38.el6.x86_64.rpm | 31 kB | 00:00
-----
Total | |
Running rpm_check_debug | 1.2 Mb/s | 249 kB | 00:00
Running Transaction Test
Transaction Test Succeeded
Running Transaction
Installing : ovm-template-config-3.0-73.el6.noarch | 1/11
Installing : libovmapi-3.0-6.el6.x86_64 | 2/11
Installing : ovmd-3.0-38.el6.x86_64 | 3/11
Installing : ovm-template-config-selinux-3.0-73.el6.noarch | 4/11
Installing : ovm-template-config-ssh-3.0-73.el6.noarch | 5/11
Installing : ovm-template-config-authentication-3.0-73.el6.noarch | 6/11
Installing : ovm-template-config-datetime-3.0-73.el6.noarch | 7/11
Installing : ovm-template-config-system-3.0-73.el6.noarch | 8/11
Installing : ovm-template-config-network-3.0-73.el6.noarch | 9/11
Installing : ovm-template-config-user-3.0-73.el6.noarch | 10/11
Installing : ovm-template-config-firewall-3.0-73.el6.noarch | 11/11
Verifying : ovm-template-config-selinux-3.0-73.el6.noarch | 1/11
Verifying : ovm-template-config-3.0-73.el6.noarch | 2/11
Verifying : ovm-template-config-ssh-3.0-73.el6.noarch | 3/11
Verifying : libovmapi-3.0-6.el6.x86_64 | 4/11
Verifying : ovm-template-config-authentication-3.0-73.el6.noarch | 5/11
Verifying : ovm-template-config-datetime-3.0-73.el6.noarch | 6/11
Verifying : ovm-template-config-system-3.0-73.el6.noarch | 7/11
Verifying : ovm-template-config-network-3.0-73.el6.noarch | 8/11
Verifying : ovm-template-config-user-3.0-73.el6.noarch | 9/11
Verifying : ovm-template-config-firewall-3.0-73.el6.noarch | 10/11
Verifying : ovmd-3.0-38.el6.x86_64 | 11/11

Installed:
  ovm-template-config.noarch 0:3.0-73.el6
  ovm-template-config-firewall.noarch 0:3.0-73.el6
  ovm-template-config-ssh.noarch 0:3.0-73.el6
  ovm-template-config-selinux.noarch 0:3.0-73.el6
  ovm-template-config-system.noarch 0:3.0-73.el6
  ovm-template-config-network.noarch 0:3.0-73.el6
  ovm-template-config-authentication.noarch 0:3.0-73.el6
  ovm-template-config-datetime.noarch 0:3.0-73.el6
  ovm-template-config-user.noarch 0:3.0-73.el6
  ovmd.x86_64 0:3.0-38.el6

Dependency Installed:
  libovmapi.x86_64 0:3.0-6.el6

Complete!
[root@vmdb01 ~]#
  
```

c) Connect to the guest console by Oracle VM Manager and prepare the guest to transform in an Oracle VM Template; once the console is opened execute the following commands:

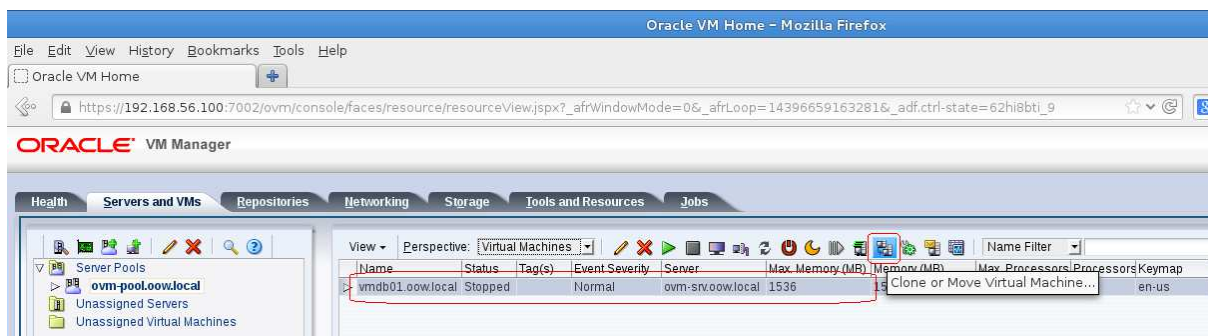
```

# ovmd -s cleanup
# chkconfig ovmd on
# service ovmd enable-initial-config
# shutdown -h now
  
```

```

vmdb01.oow.local - TigerVNC
[root@vmdb01 ~]# ovmd -s cleanup
[root@vmdb01 ~]# chkconfig ovmd on
[root@vmdb01 ~]# service ovmd enable-initial-config
[root@vmdb01 ~]# shutdown -h now
  
```

d) Verify that your guest is stopped and, after that, clone it to a new Oracle VM Template. Connect to Oracle VM Manager, select “Servers and VMs” tab, select pool named “ovm-pool.oow.local” and select perspective “Virtual Machines”. Click on the guest “vmdb01.oow.local” and click on the button “Clone or move Virtual Machine”.

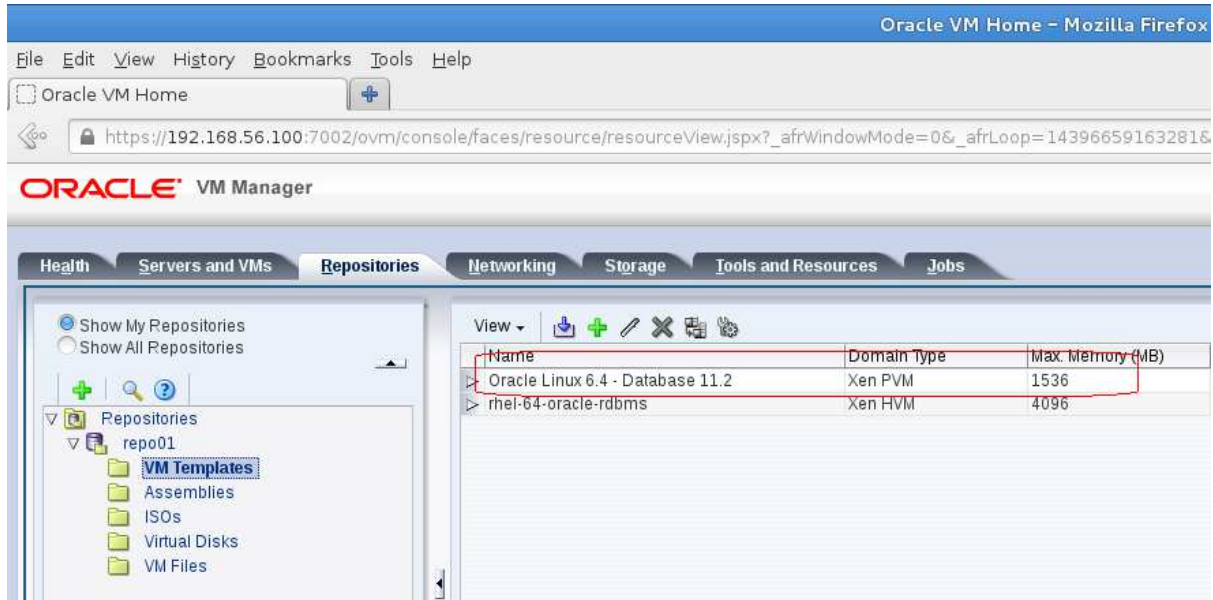


- e) In the next windows named “Clone or Move Virtual Machine: vmdb01.oow.local” select the **first left option** and click “Next”.

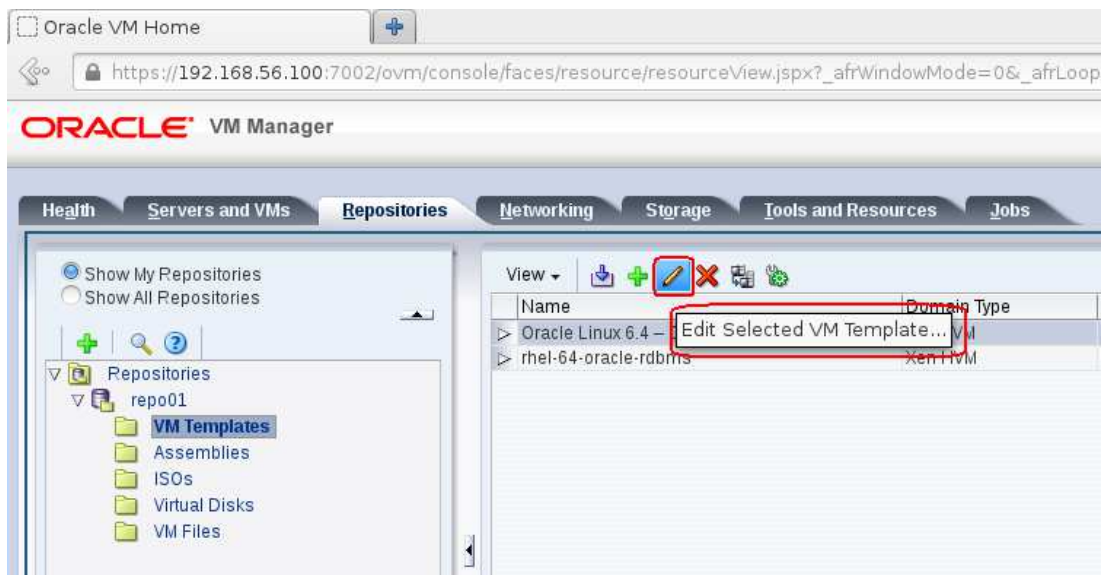
- f) In the next step, enter the following details:
- Clone to a: **“Template”**
 - Clone count: **“1”**
 - Clone name: **“Oracle Linux 6.4 – Oracle Database 11.2”**
 - Target Server pool: **“ovm-pool.oow.local”**
 - Description: **“Oracle Linux Template with Oracle 11.2 Database on board”**

Click “OK” to confirm the creation of the new Oracle VM Template.

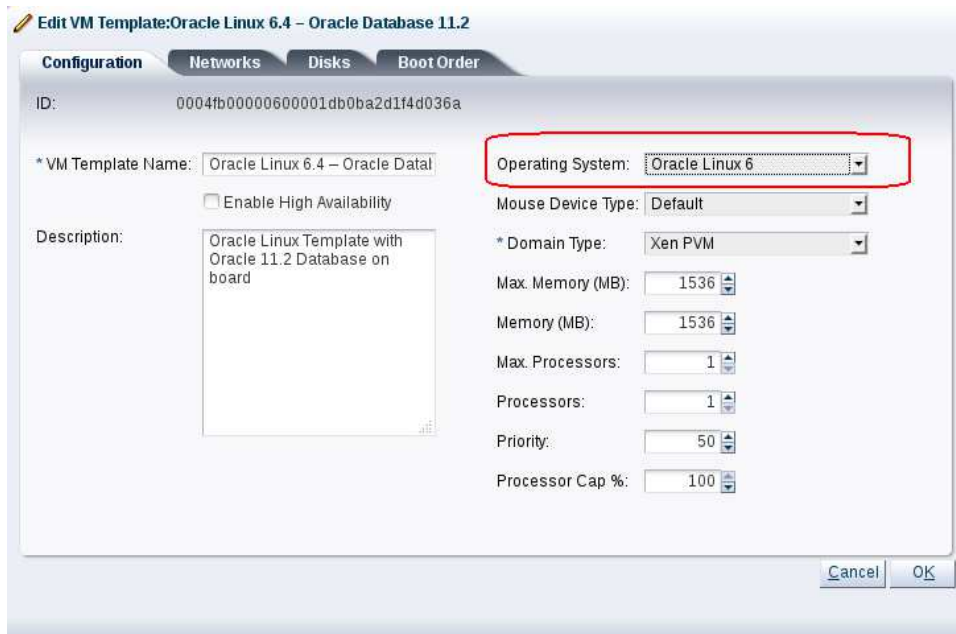
- g) Verify the creation of your Oracle VM Template.
Click on **“Repositories”** tab, expand repository **“repo01”** and click on **“VM Templates”** folder .




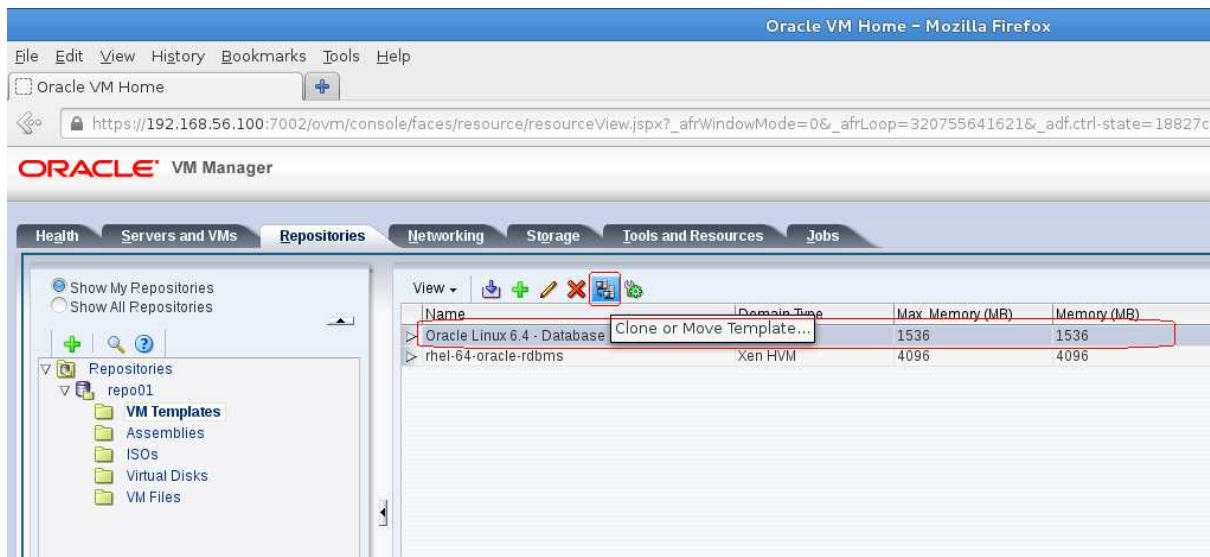
- h) Select the the new Oracle VM Template named **“Oracle Linux 6.4 – Database 11.2”** and click on button **“Edit”**



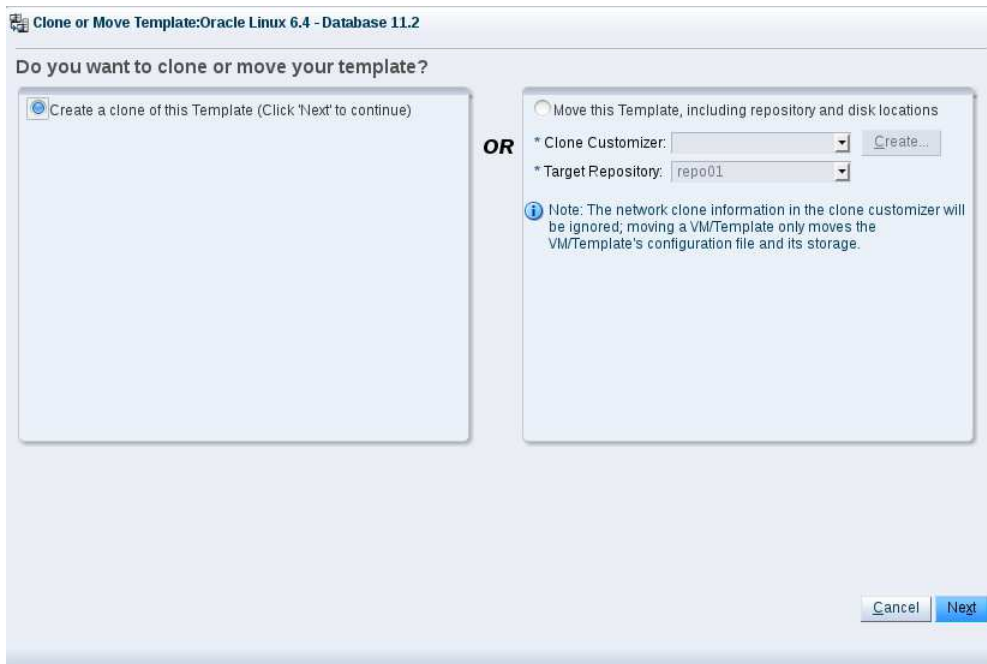
- i) Change the **“Operating System”** from **“Red Hat Enterprise Linux 6”** to **“Oracle Linux 6”** and confirm with **“OK”**.



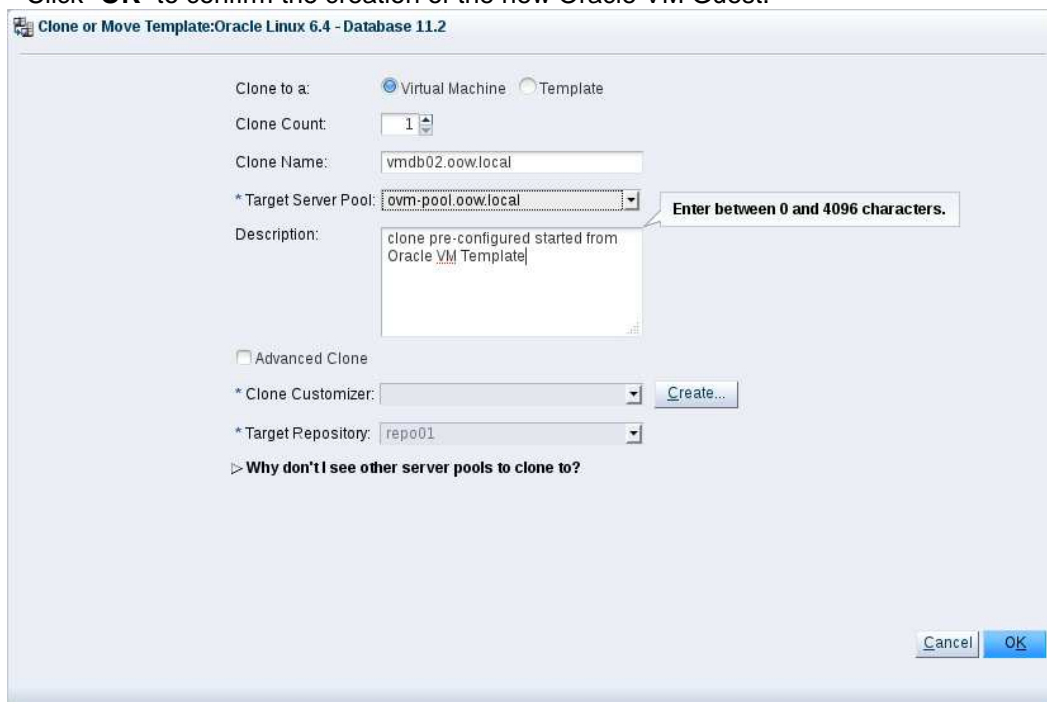
- j) Create a new guest named “vmdb02” starting from the new Oracle Linux template. Select the the new Oracle VM Template named **“Oracle Linux 6.4 – Database 11.2”** and click on button **“Clone or Move Template”** 




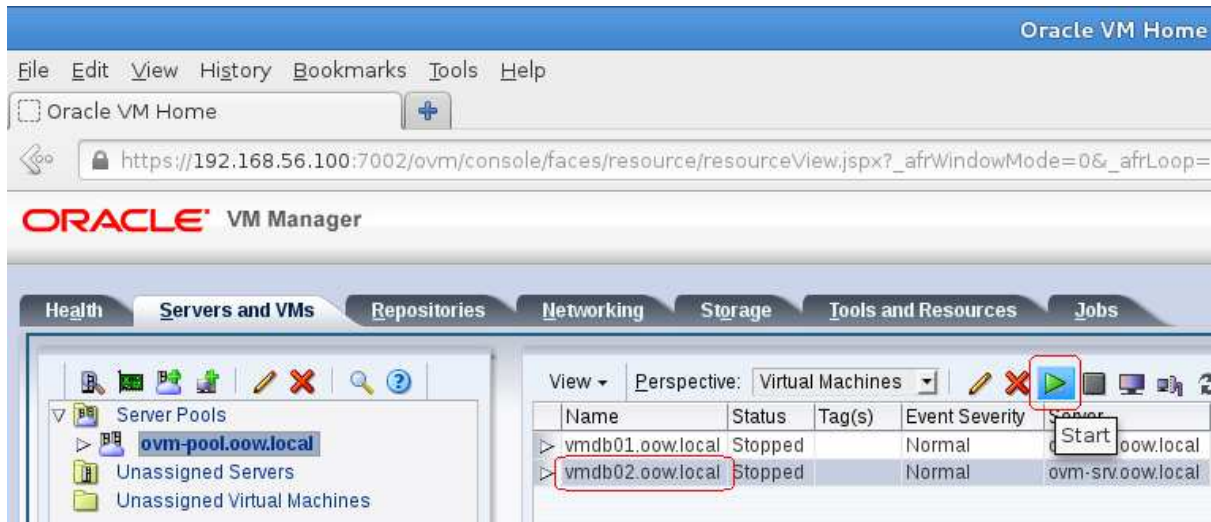
- k) In the next window named **“Clone or Move Template: Oracle Linux 6.4 – Database 11.2”** select the option **“Create a clone of this Template”**




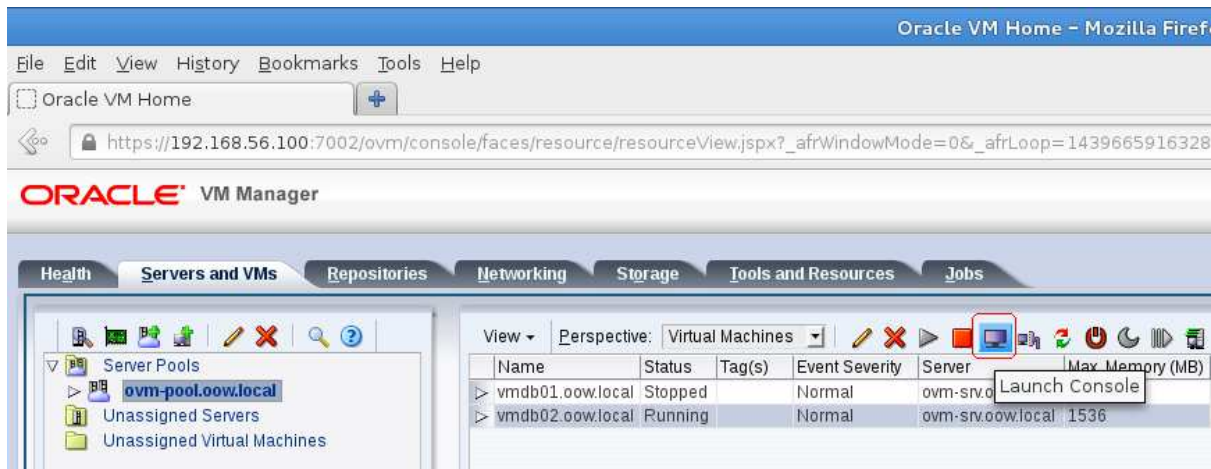
- l) In the next step, enter the following details:
 Clone to a: **“Virtual Machine”**
 Clone count: **“1”**
 Clone name: **“vmdb02.oow.local”**
 Target Server pool: **“ovm-pool.oow.local”**
 Description: **“clone pre-configured started from an Oracle VM Template”**
 Click **“OK”** to confirm the creation of the new Oracle VM Guest.



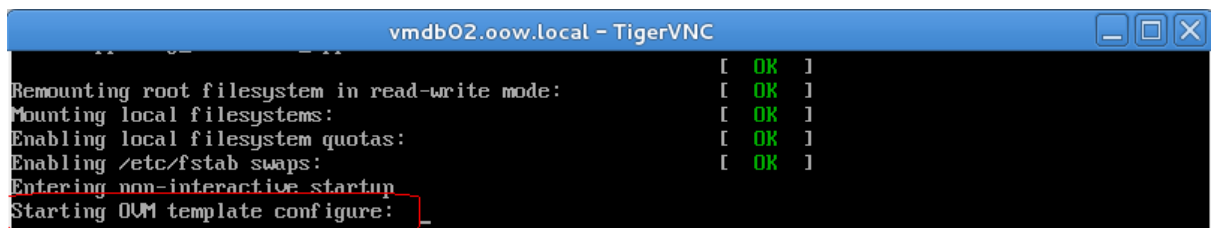
- m) Start the new Oracle VM Guest “**vmdb02.oow.local**”.
Select “**Servers and VMs**”, expand pool name “**ovm-pool.oow.local**”, select the guest named “**vmdb02.oow.local**” and click on button .



- n) Open “**vmdb02.oow.local**” console by clicking on  button.



- o) One of first Oracle Linux services that you will see to start by console will be “**OVM Template configure**”.



- p) OVM Template configure will ask informations for new guest “vmdb02.oow.local”; enter the following details:

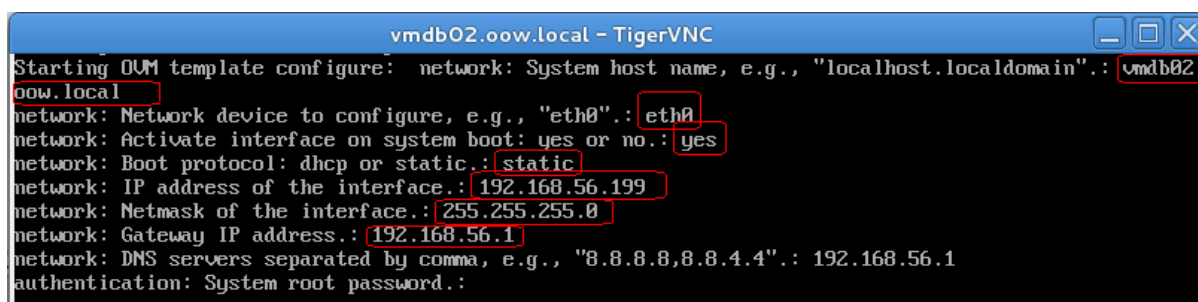
Category: NETWORK

System Hostname: “vmdb02.oow.local”
Network device to configure: “eth0”
Activate interface on system boot: “yes”
Boot protocol: dhcp or static: “static”
IP address of the interface: “192.168.56.199”
Netmask of the interface: “255.255.255.0”
Gateway IP address: “192.168.56.1”
DNS servers separated by comma: “192.168.56.1”

Category: AUTHENTICATION

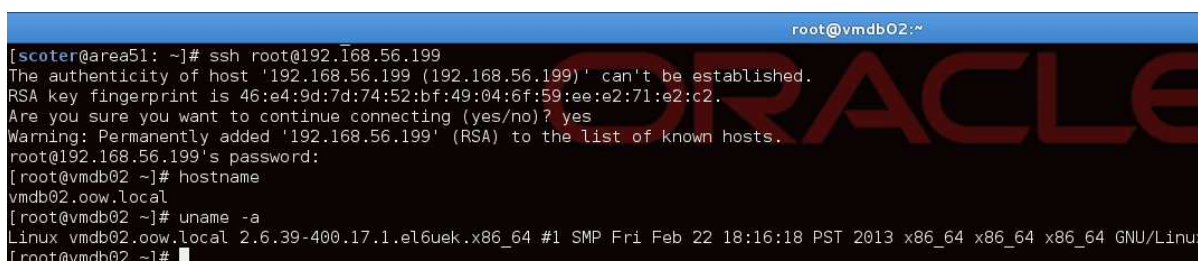
System root password: “<your_name>+<your_surname>+1>” ***

*** = due to security policies we have to insert one long password with, at least, one number.



```
vmdb02.oow.local - TigerVNC
Starting OVM template configure: network: System host name, e.g., "localhost.localdomain": vmdb02.oow.local
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.: 192.168.56.199
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:
```

- q) Open a terminal on your laptop and connect by ssh to your new guest (IP 192.168.56.199)
Commands such as “hostname”, “ifconfig” and “uname -a” will show you new details.



```
root@vmdb02:~
[scoter@area51: ~]# ssh root@192.168.56.199
The authenticity of host '192.168.56.199 (192.168.56.199)' can't be established.
RSA key fingerprint is 46:e4:9d:7d:74:52:bf:49:04:6f:59:ee:e2:71:e2:c2.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.56.199' (RSA) to the list of known hosts.
root@192.168.56.199's password:
[root@vmdb02 ~]# hostname
vmdb02.oow.local
[root@vmdb02 ~]# uname -a
Linux vmdb02.oow.local 2.6.39-400.17.1.el6uek.x86_64 #1 SMP Fri Feb 22 18:16:18 PST 2013 x86_64 x86_64 x86_64 GNU/Linux
[root@vmdb02 ~]#
```

Congratulations !

You have successfully imported a guest from VMWare to Oracle VM, switched from Red Hat to Oracle Linux, and created your first Oracle VM Template using Oracle VM Template configuration scripts.

You could now master your knowledge and create your own Oracle VM Template configuration scripts by following guide deployed by **Wim Coekaerts** on his Oracle blog :

https://blogs.oracle.com/wim/entry/oracle_vm_template_config_script

Migration approach followed by this lab is not the only one; other valid methods of migrations are based on official Oracle VM Templates like “[Oracle VM Templates for Oracle Database](#)”.

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2.12 END OF LAB: LAB CLEANING

When you have finished this will, we would appreciate if you could stop the 3 VirtualBox virtual machines (Oracle VM Server, Oracle VM Manager and Oracle Enterprise Manager) to save time for the next labs taking place in this room.

To do that, execute the following actions for each VirtualBox virtual machine:

- Select a virtual machine in VirtualBox console
- Click on **“Show”**
- Click on **Machine, Close**, and then **“Power off the machine”**

We hope you enjoyed this hands on lab and your trip in San Francisco at Oracle OpenWorld 2013.

3 APPENDIX A: PREPARATION OF ENVIRONMENT

3.1 PURPOSE

This section explains how to prepare the environment to run this lab. It is useful if you want to run this lab at home or office.

The first step is to find an X86 machine (server, desktop or laptop) and install Oracle VM VirtualBox on it.

Then, there are 2 servers to install (2 VirtualBox virtual machines in fact):

- The Oracle VM Server
- The Oracle VM Manager

3.2 DOWNLOAD REQUIRED BINARIES

This section lists the required binaries and explains how to download them.

For your X86 machine:

- 1. Oracle Java Runtime Environment (JRE) 7**
Download the version for your OS from <http://java.com/en/download/manual.jsp>
- 2. Oracle VM VirtualBox 4.2.x binaries** (4.2.16 during writing of this document)
Download the version for your OS from <https://www.virtualbox.org/wiki/Downloads>
Filename: For Oracle/Redhat Linux 6 64bits: **VirtualBox-4.2-4.2.16_86992_el6-1.x86_64.rpm** (size **69 MB**)
For Microsoft Windows: **VirtualBox-4.2.16-86992-Win.exe** (size **95 MB**)
For others...
- 3. Oracle VM VirtualBox extension Pack 4.2.x**
Download from <https://www.virtualbox.org/wiki/Downloads> (same file for all OSes)
Direct link: http://download.virtualbox.org/virtualbox/4.2.16/Oracle_VM_VirtualBox_Extension_Pack-4.2.16-86992.vbox-extpack
Filename: **Oracle_VM_VirtualBox_Extension_Pack-4.2.16-86992.vbox-extpack** (size **11 MB**)

For Oracle VM Server:

- 4. VirtualBox template for Oracle VM Server 3.2.4**
<http://www.oracle.com/technetwork/server-storage/vm/template-1482544.html>
Filename: **Oracle VMServer.3.2.4-b525.ova** (size **249 MB**)

For Oracle VM Manager:

- 5. VirtualBox template for Oracle VM Manager 3.2.4**
<http://www.oracle.com/technetwork/server-storage/vm/template-1482544.html>
Filename: **Oracle VMManager.3.2.4-b524.ova** (size **2.75 GB**)
- 6. Oracle VM template for Oracle Linux 6 update 4 (PVM 64 bits)**
Download for Oracle E-delivery Linux/Oracle VM platform (<https://edelivery.oracle.com/OracleVM>)

Look for “Oracle VM Templates for Oracle Enterprise Linux 6 Media Pack for x86_64 (64 bit)”

3.3 INSTALLATION OF ORACLE VM VIRTUALBOX

1. Find an x86 machine (desktop, laptop, server) matching the following prerequisites:
 - At least 16 GB of RAM
 - X86 64 bits CPU (Intel or AMD) with at least 4 cpus threads and with Virtualization Extensions (Intel VT or AMD-V)
 - OS supported by VirtualBox (Microsoft Windows, misc. Linux distributions, oracle Solaris 10 or 11, Apple Mac OSX)
 - 100 GB of disk space
2. Install the Oracle Java JRE on your OS (javaws binary needed to get the VNC console)
3. Install the Oracle VM VirtualBox 4.2.x binaries on your x86 machine
4. Start the Oracle VM VirtualBox console
5. If not already created, create an host only network in VirtualBox using the defaults IP information (IPv4 address 192.168.56.1 and Netmask 255.255.255.0 for your x86 machine). (go to File, Preferences, Network) and disable default Virtualbox DHCP Server.
6. Choose the folder you want to use to store the virtual machines files. (go to File, Preferences, General, Default Machine Folder)
7. Install the Oracle VM VirtualBox extension Pack (go to File, Preferences, Extensions)

3.4 INSTALLATION OF ORACLE VM SERVER

1. In the Oracle VM VirtualBox console, import the VM from the Oracle VM Server template
 - File
 - Import Appliance
 - Select the file **Oracle VMServer.3.2.4-b525.ova**
 - Next
 - Change the name of the Virtual System 1 from “**Oracle VM Server 3.2.4-b525**” to “**hol9981_ovm_srv**”
 - Import
2. Modify the settings of the virtual machine “**hol9981_ovm_srv**”
 - Set Amount of memory to **6144MB** (System)
 - Configure the network (Network, Adapter 1, Attached to Host only Adapter)
 - Configure storage by removing the second 20GB disk and by adding a new-one of 60GB.
3. Start the virtual machine “**hol9981_ovm_srv**”
4. Configure the virtual machine (in the VM console)
 - Configure network
 - IP address : **192.168.56.101**
 - Netmask : **255.255.255.0**
 - Gateway : **192.168.56.1**
 - DNS server : **192.168.56.1**
(we will not use DNS, but we have to give an IP address here)
 - Hostname : **ovm-srv.oow.local**
 - Wait for the end of boot
5. Open a terminal on your Unix/Linux x86 machine and connect to the VM with ssh (you can use Putty on Microsoft Windows)
\$ **ssh root@192.168.56.101** (password is **ovsroot**)
6. Add the following lines to the /etc/hosts file

```
192.168.56.100 ovm-mgr.oow.local ovm-mgr
192.168.56.199 vmdb02.oow.local vmdb02
```

3.5 INSTALLATION OF ORACLE VM MANAGER

1. In the Oracle VM VirtualBox console, import the VM from the Oracle VM Manager template
 - File
 - Import Appliance
 - Select the file **Oracle VMManger.3.2.4-b524.ova**
 - Next
 - Change the name of the Virtual System 1 from “**Oracle VM Manager 3.2.4-b524**” to “**hol9981_ovm_mgr**”
 - Import
2. Modify the settings of the virtual machine “**hol9981_ovm_mgr**”
 - Configure the network (Network, Adapter 1, Attached to Host only Adapter)
3. Start the virtual machine “**hol9981_ovm_mgr**”
4. Configure the virtual machine (in the VM console)
 - Set root password to **ovsroot**
 - Configure network
 - IP address : **192.168.56.100**
 - Netmask : **255.255.255.0**
 - Gateway : **192.168.56.1**
 - DNS server : **192.168.56.1**
(we will not use DNS, but we have to give an IP address here)
 - Hostname : **ovm-mgr.oow.local**
 - Wait for the end of boot

5. Open a terminal on your Unix/Linux x86 machine and connect to the VM with ssh (you can use Putty on Microsoft Windows)

```
$ ssh root@192.168.56.100 (password is ovsroot)
```

6. Add the following lines to the file /etc/hosts

```
192.168.56.101 ovm-srv.oow.local ovm-srv
192.168.56.100 vmdb02.oow.local vmdb02
```

7. Enable Apache “httpd daemon” on the manager (will be used to upload templates)

```
# service httpd start
# chkconfig httpd on
```

8. Configure directories that will support http daemon used for ovas files and yum server.

```
# mkdir -p /web/ovas
# mkdir -p /web/yum
# cd /var/www/html; ln -s /web/ovas .; ln -s /web/yum .
```

9. Copy “ova” exported from VMWare into the new directory created.

```
[root@ovm-mgr ovas]# ls -l
total 10179152
-rwxr-xr-x 1 ovm ovm 513034240 Aug 13 14:33 OVM_OL6U4_x86_64_PVM.ova
-rwxr-xr-x 1 ovm ovm 9900220416 Aug 19 13:02 rhel64_oradb.ova
[root@ovm-mgr ovas]# pwd
/web/ovas
```

10. Prepare a yum repository for Oracle Linux 6 based on <http://public-yum.oracle.com>. (Oracle VM Manager guest will need internet access so you have to temporary modify your network connection).

Download public-yum repo file to install new packages.

```
# cd /etc/yum.repos.d
# wget https://public-yum.oracle.com/public-yum-el5.repo
```

Install tools needed to build-up your local yum repository.

```
# yum install yum-utils createrepo
```

Download public yum repo file for Oracle Linux 6 (target release Oracle VM Red Hat Guest in this lab and remove Oracle Linux 5 repo file (used to install packages above)).

```
# rm -f /etc/yum.repos.d/public-yum-el5.repo
# cd /etc/yum.repos.d
# wget https://public-yum.oracle.com/public-yum-ol6.repo
```

Create the local repository on Oracle VM Manager machine.

(nb: it will take many hours depending on your internet connection bandwidth because it will download about 27GB; if you haven't so much time, see alternative option below).

```
# /usr/bin/reposync --repoid=ol6_latest --repoid=ol6_UEK_latest --repoid=ol6_addons -p /web/yum
# /usr/bin/createrepo /web/yum/ol6_latest/getPackage/
# /usr/bin/createrepo /web/yum/ol6_UEK_latest/getPackage/
# /usr/bin/createrepo /web/yum/ol6_addons/getPackage/
```

**** : an alternative option is to use directly <http://public-yum.oracle.com> in this lab; to implement this alternative you will need to have internet access and, at the same time, configure your Oracle VM Manager guest to reach external sites.*

Prepare file “.repo” to use on your future Oracle VM Guest (with Oracle Linux 6 x86-64):

```
[local_ol6_latest]
name=Oracle Linux $releasever Latest ($basearch)
baseurl=http://192.168.56.100/yum/OracleLinux/OL6/latest/$basearch/
gpgkey=http://192.168.56.100/RPM-GPG-KEY-oracle-ol6
gpgcheck=0
enabled=1

[local_ol6_UEK_latest]
name=Latest Unbreakable Enterprise Kernel for Oracle Linux $releasever ($basearch)
baseurl=http://192.168.56.100/yum/OracleLinux/OL6/UEK/latest/$basearch/
gpgkey=http://192.168.56.100/RPM-GPG-KEY-oracle-ol6
gpgcheck=0
enabled=1
```

11. Install and implement “DHCP Server” on Oracle VM Manager; we need this function to supply IPs on the guest that will be created on our Oracle VM Server.

```
# wget http://public-yum.oracle.com/repo/OracleLinux/OL5/9/base/x86_64/dhcp-3.0.5-31.el5_8.1.x86_64.rpm
```

Here an example of dhcpd.conf to implement (/etc/dhcpd.conf):

```
# DHCP Server Configuration file.
# see /usr/share/doc/dhcp*/dhcpd.conf.sample
#
ddns-update-style interim;
```

```
ignore client-updates;
subnet 192.168.56.0 netmask 255.255.255.0 {

    option routers          192.168.56.1;
    option subnet-mask     255.255.255.0;
    option nis-domain       "oow.local";
    option domain-name      "oow.local";
    option domain-name-servers 192.168.56.1;
    range dynamic-bootp 192.168.56.250 192.168.56.254;
    default-lease-time 86400;
    max-lease-time 86400;
}
```

```
# chkconfig dhcpd on
# service dhcpd start
```

3.6 EXPORT VMWARE GUEST IN OVA FORMAT

In this lab we created more than one guest and an Oracle VM Template starting from a guest exported from VMWare.

To proceed with an export of a guest into an "OVA" format there are more than one method. Method used in this lab is in text-mode with the tool named "ovftool".

Syntax used on this tool is like:

```
# ovftool /app/vmware/RH_Linux_6_x86-64/rhel_6_64-bit.vmx /app/rhel.ova
```

Guest exported for this lab was:

OS: Red Hat Enterprise Linux 6.4 x86-64

vCPUs: 2

vRAM: 8192 MB

Disks: one disk of 30gb

Applications: Oracle Database Enterprise Edition 11.2.0.3

If you are going to export a Microsoft Windows guest from VMWare you could encounter a known problem: "**BSOD** (*blue screen of desktop*) on the first run of your guest on Oracle VM).

To sort out this problem you have two options to follow before export the guest:

- a) Connect to your Windows guest and extract "Driver.cab" files already present on Microsoft Windows distribution.



`extract_ide_drivers_`
`from_cab.reg`

- b) Install Oracle VM PV Drivers for Microsoft Windows.

Download Oracle VM PV Drivers for Microsoft Windows at:

[Oracle Software Delivery Cloud](#)

Reference:

Oracle VM Windows Paravirtual (PV) Drivers for Microsoft Windows Guests (XP/Vista/7/2003/2008/2008 R2) 3.0.1 - 32-bit/64-bit (signed by Microsoft for the Windows Logo Program for Windows 2008, Windows 2008 R2, Windows 2003 and Windows 7)

4 REFERENCES

4.1 ORACLE VM DOCUMENTATION

<http://www.oracle.com/technetwork/server-storage/vm/documentation/index.html>

Release 3.2.1

Oracle VM Release 3.2.1 Documentation

The Oracle VM Release 3.2.1 documentation set includes information on Release 3.2.1, which is the initial release of Oracle VM Release 3.2. This documentation set should also be used for any future 3.2.x releases. Use this documentation set in addition to any README files included with the 3.2.x patch updates.

Oracle VM Release 3.2.x patch updates can be downloaded from <http://www.oracle.com/technetwork/server-storage/vm/downloads/index.html>.

Oracle VM Release Notes for 3.2.1	HTML	PDF	ePub
Oracle VM Installation and Upgrade Guide for Release 3.2.1	HTML	PDF	ePub
Oracle VM Getting Started Guide for Release 3.2.1	HTML	PDF	ePub
Oracle VM User's Guide for Release 3.2.1	HTML	PDF	ePub
Oracle VM Paravirtual Drivers Installation Guide for Microsoft Windows for Release 3.2.1	HTML	PDF	ePub
Oracle VM Utilities Guide for Release 3	HTML	PDF	ePub
Oracle VM Security Guide for Release 3	HTML	PDF	ePub
Oracle VM Command Line Interface User's Guide for Release 3.2.1	HTML	PDF	ePub

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