

Building of..

Oracle Virtual Machine- Cloud

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Brief of Project:

This architecture has been built considering Oracle private cloud architecture. The need of Oracle Private Cloud was due to using Oracle DB and several other intranet sites had to be run in such flow that other servers can be excluded. This architecture is built using 2 Physical servers (with Heavy configuration used as Oracle Virtual Server), 1 SAN (used as sharing storage where VM resides and separate LUN given for DB) and 1 Basic configuration (initially used as Oracle Virtual Manager then later rolled out and migrated to VM inside). The most premium benefit of using OVM is you don't need to configure multipath manually or even bonding too. Oracle cloud manages itself all.

Description

In this architecture, initially 3 machines are used to start-with “building of Oracle VM-Cloud”. 2 are used in building Oracle VM Server (OVS) and last one, is used for building Oracle VM Server (OVMM). Later, the OVMM was moved to VM.

Basic allocations of Hardware for all above machines is described below:

Current Hardware/Software configuration of Physical & Virtual Nodes.

Hardware Configuration:

S.No	Device	Desc	Size	Used For
1	Server 1	HDD (Raid)	1199.2GB	OVM-S
		RAM	256GB	
		Processor	20core	
		NICs	2	
		Fibre port	2(HBA)	
2	Server 1	HDD (Raid)	1199.2GB	OVM-S
		RAM	256GB	
		Processor	20core	
		NICs	2	
		Fibre port	2(HBA)	
3	SAN	SAS	150GB	Server_pool
4	SAN	SAS	2.7TB	VM Disk Files
5	SAN	SSD	2.9TB	Mounting to DB_VM.

> For OV-Manager (Physical) :

This is a temporary machine used for configuring Pool over both OVS. After transferring OVMM from physical to VM, physical machine was removed. Specs and steps to configure OVMM is described below.

> For OV-Manager (VM) :

SPECS:

- 1) VM_Name: CBS-OVMM
- 2) Memore: 10Gb
- 3) Processors: 2 threads

4) HDD: 25 GB (RHEL6)

> Software Configuration:

Partition Table on **both OVM-S:**

/boot	500MB
/	50GB (lvm)
swap	4GB
/var/lib/xenstored	2.9GB

Properties of **OVM-m** (inside VM):

Partition Table

/	30GB (lvm)
/boot	500MB
swap	8GB (lvm)

Processor : 2

Properties of OVM-VM (**CSB-APP1 & CSB-APP2**)

Partition Table (10.10.10.11/12) {TOTAL HDD Size= 620GB}

/	100GB (lvm)
/boot	500MB
/tmp	10GB (lvm)
/app	200GB (lvm)
/appbackup	300GB (lvm)
swap	8GB (lvm)

Prcoessors: 12

Properties of OVM-VM (**CSB-DB & CSB-DB-clone**)

Partition Table (10.10.10.15) {TOTAL HDD Size= 350GB}

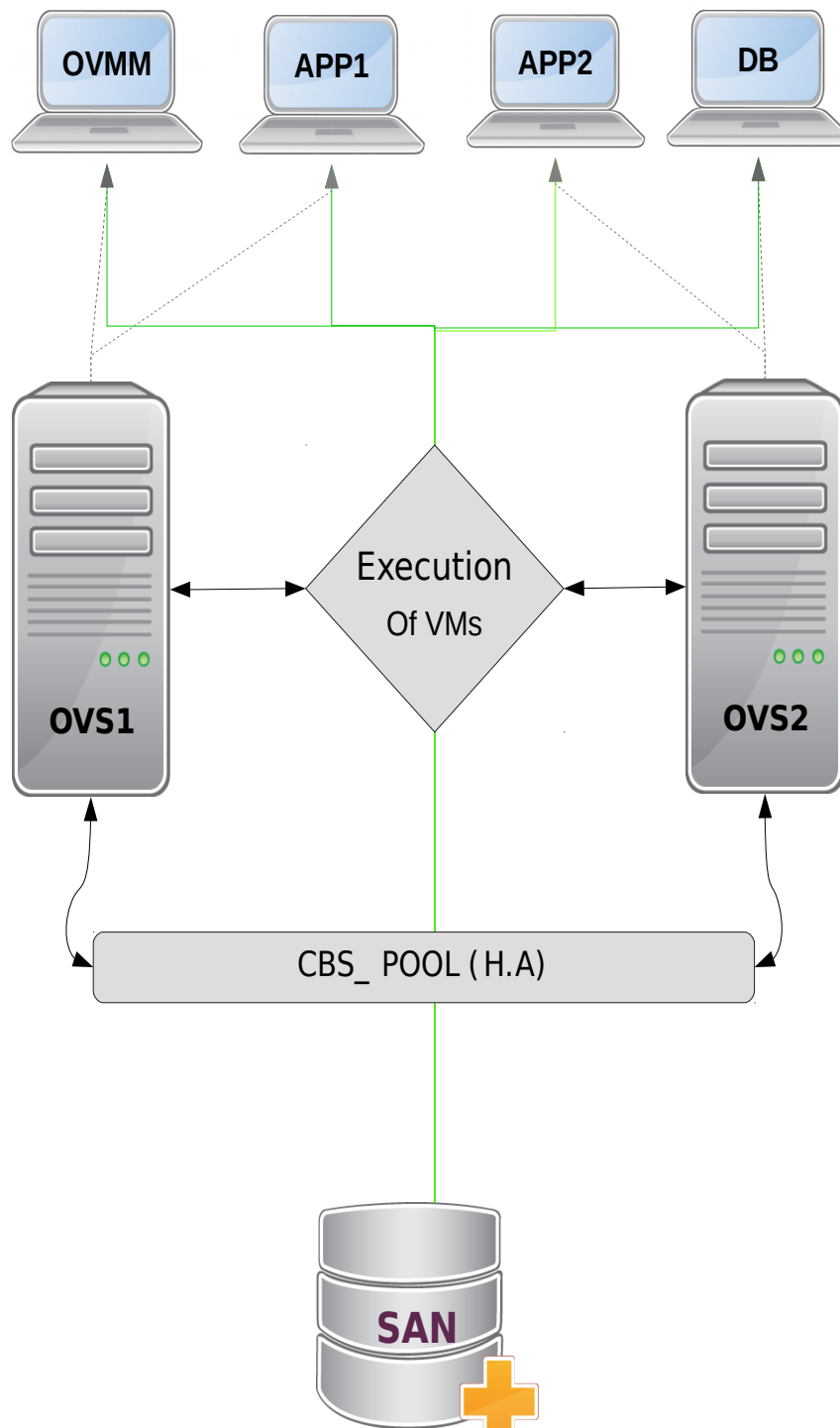
/	200GB (lvm)
/boot	500MB
/home	100GB(lvm)
swap	30GB (lvm)
tmp	15GB (lvm)

Prcoessors: 12

****SSD LUN mounted on CSB-DB1 with lvm partioned and mounted in below segmentation:**

/dev/xvdc1	459G	77G	359G	18%	/vol1
/dev/xvdc2	459G	66G	370G	16%	/vol2
/dev/xvdc3	459G	26G	410G	6%	/vol3
/dev/xvdc4	459G	1.8G	434G	1%	/vol4
/dev/xvdc5	184G	12G	163G	7%	/oracle
/dev/xvdc7	1.2T	203G	905G	19%	/backups
/dev/xvdc6	459G	156G	280G	36%	/arch

OVM Architecture



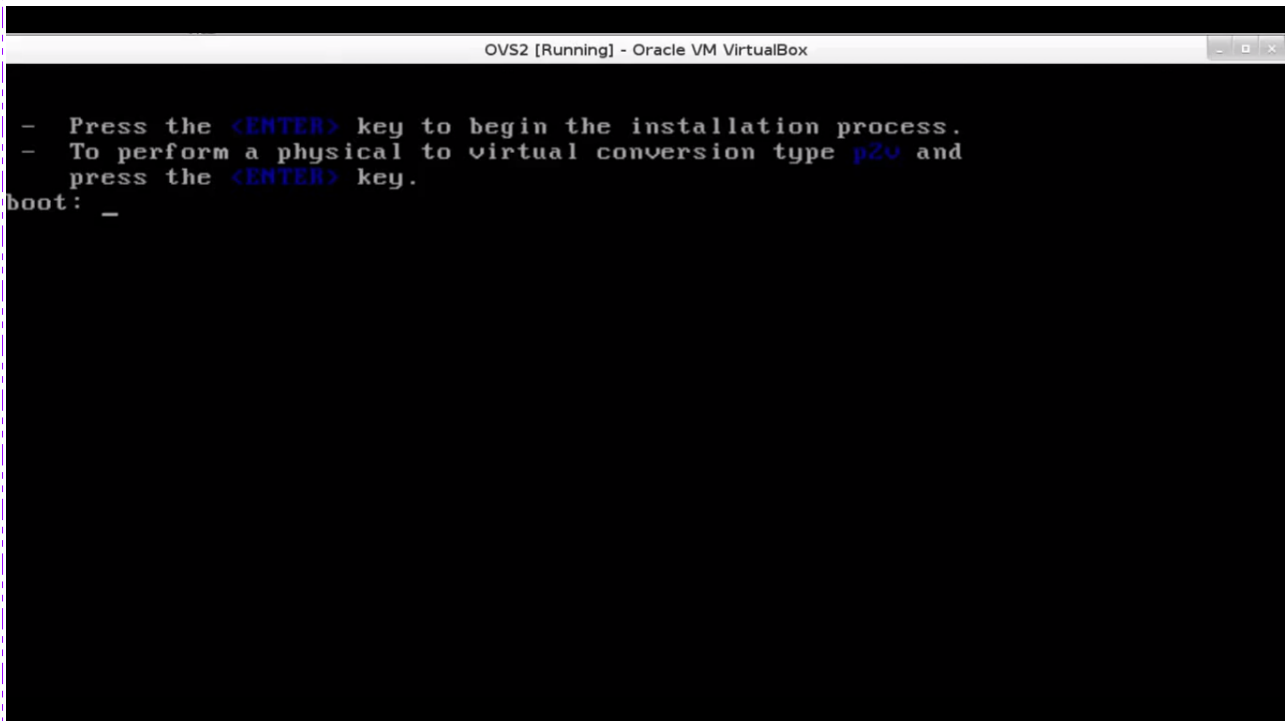
 VM are running on this node

 VM are on SAN

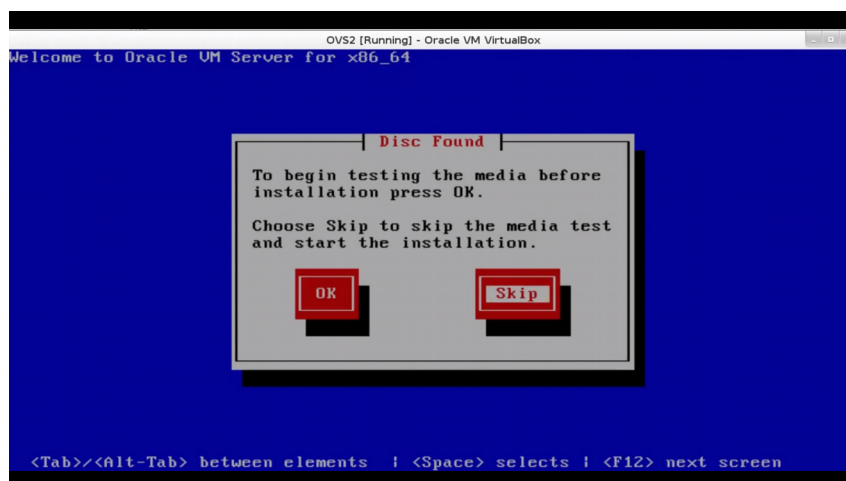
Oracle VM- Server (OVS)

Moving forward to implement OVM architecture, deployment started from installing 2 OVM-Servers. Step are as followed:

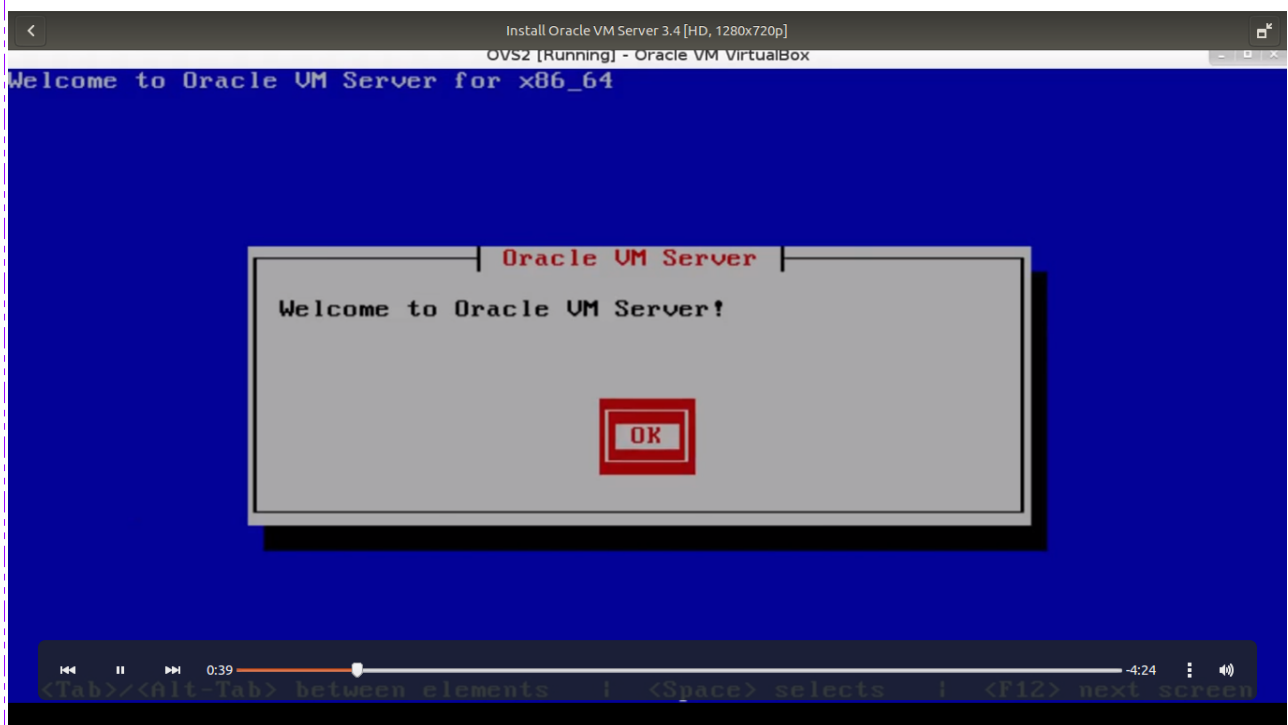
- Make sure that the server BIOS is set to boot from CD.
- Insert the Oracle VM Server CD into your CD drive.
- Boot the server with the Oracle VM Server CD.
- The Oracle VM Server screen is displayed.



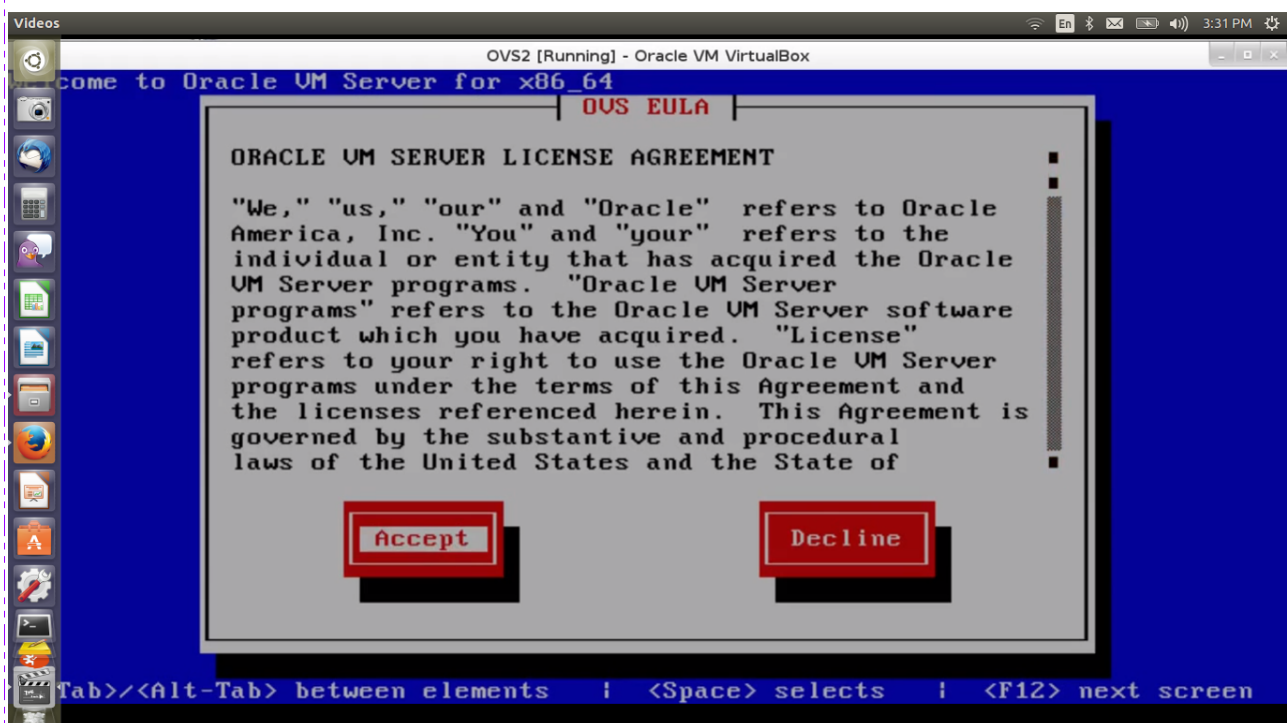
Confirmation will be asked for testing the installation source.



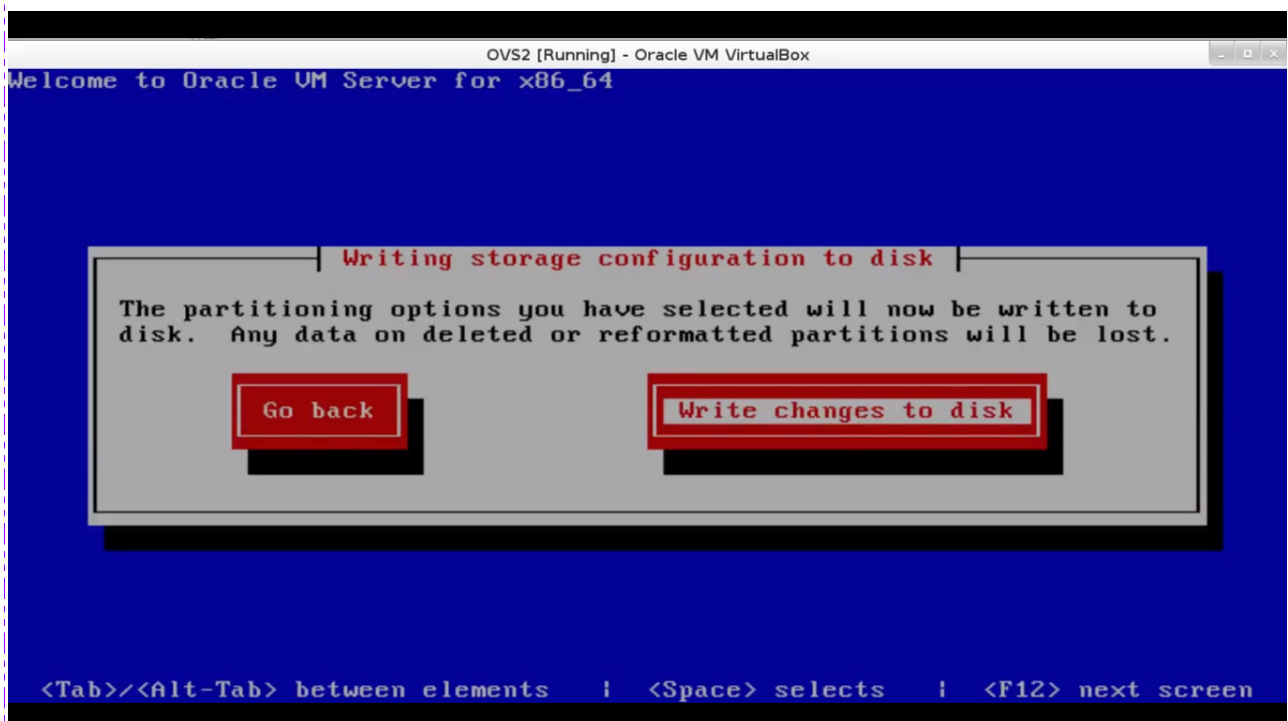
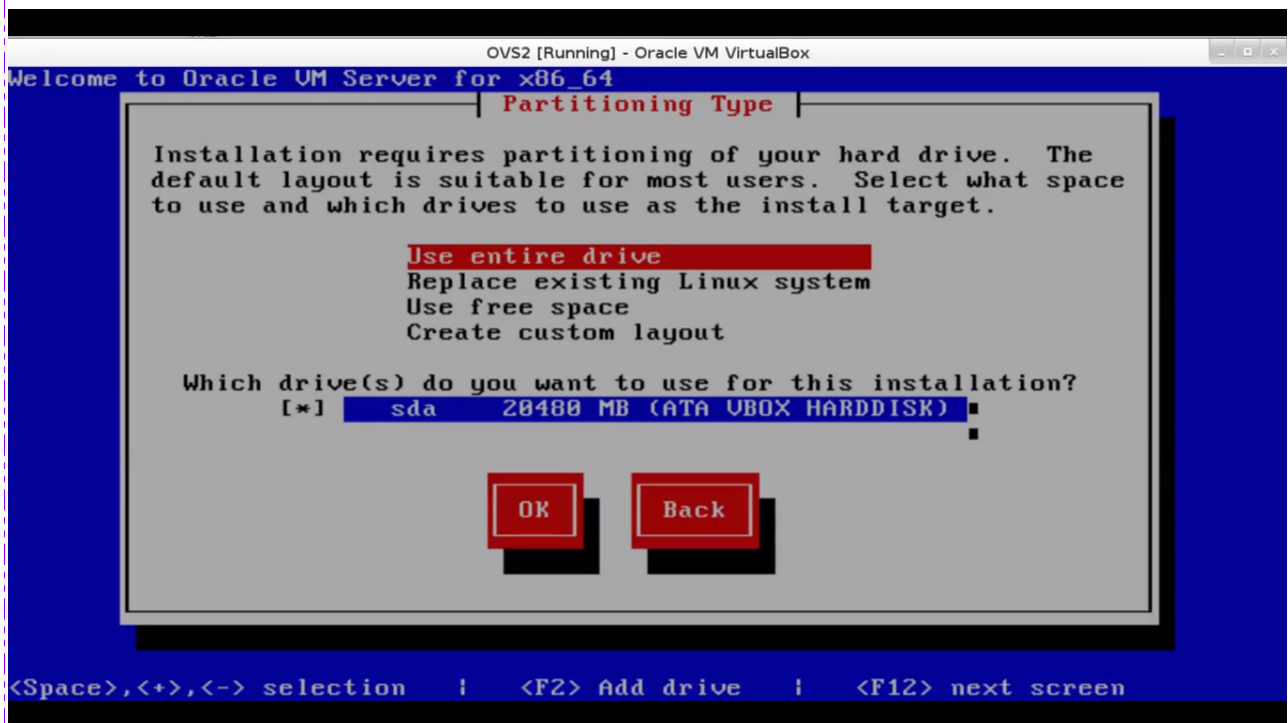
Notification of type of OS installation to be started.

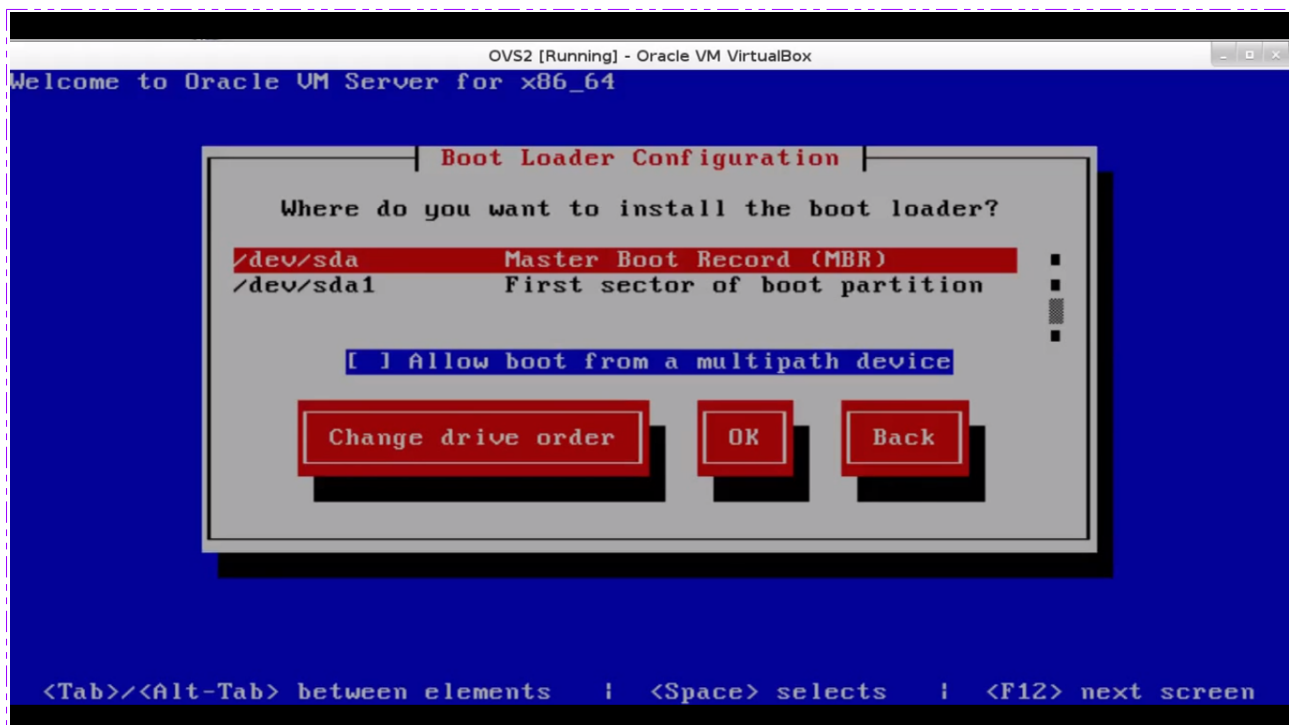


The Oracle VM Server 3.0 End User License Agreement screen is displayed.

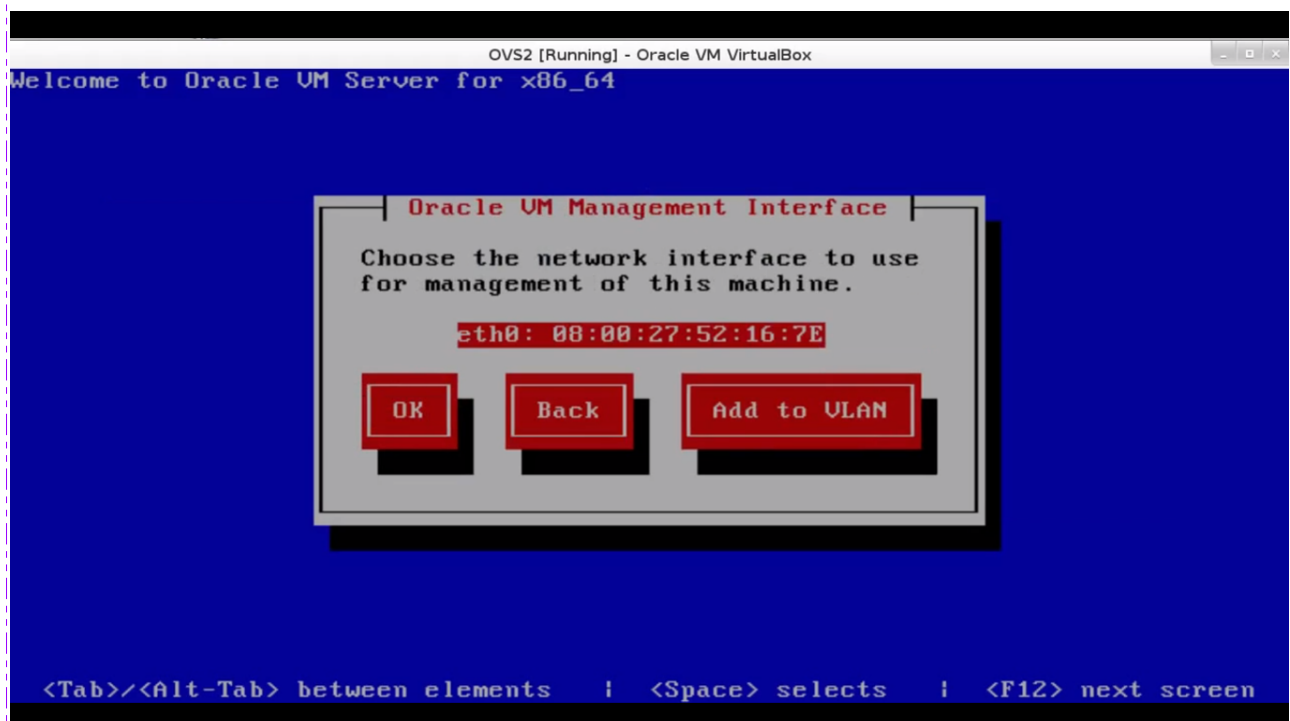


The Partitioning Type screen is displayed.

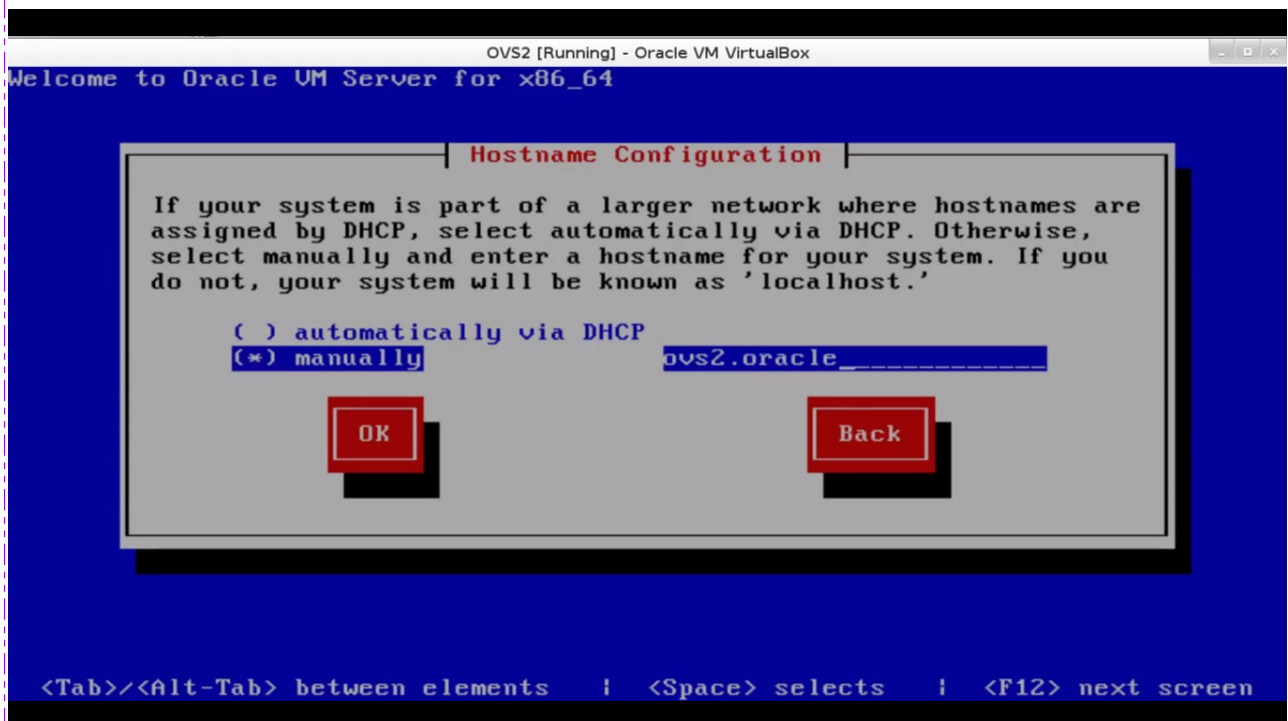




Network Setup:

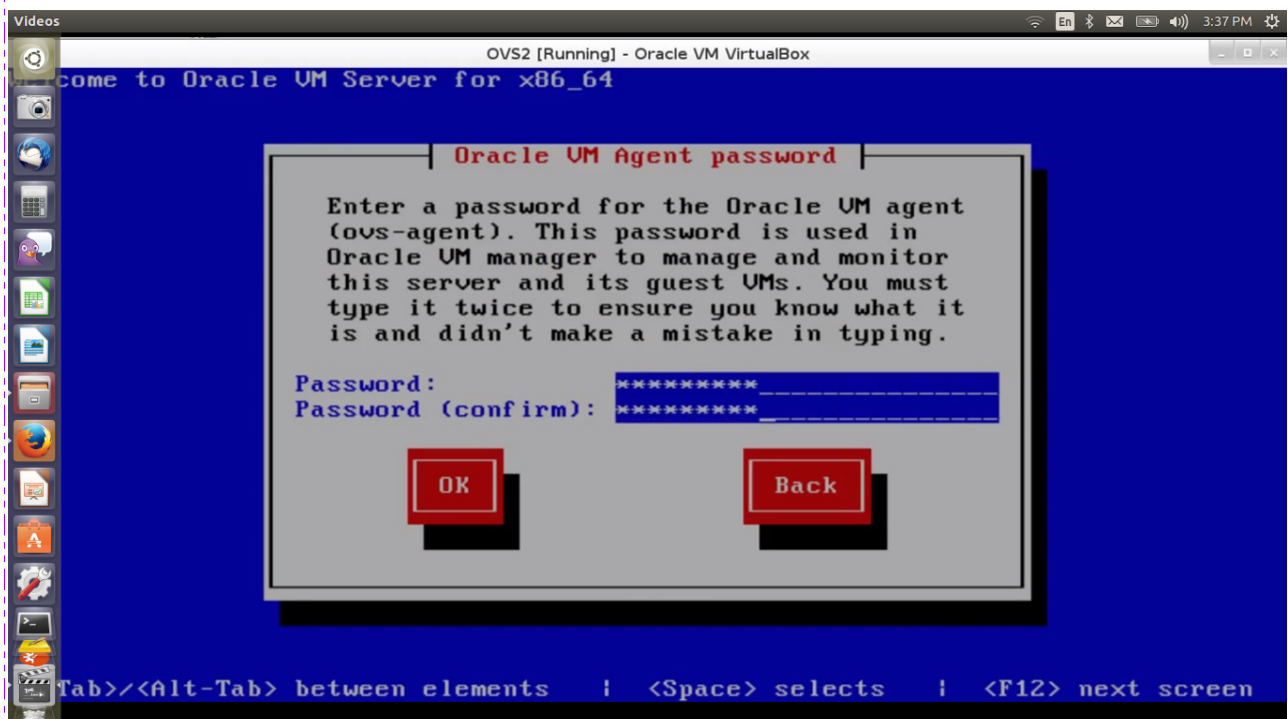


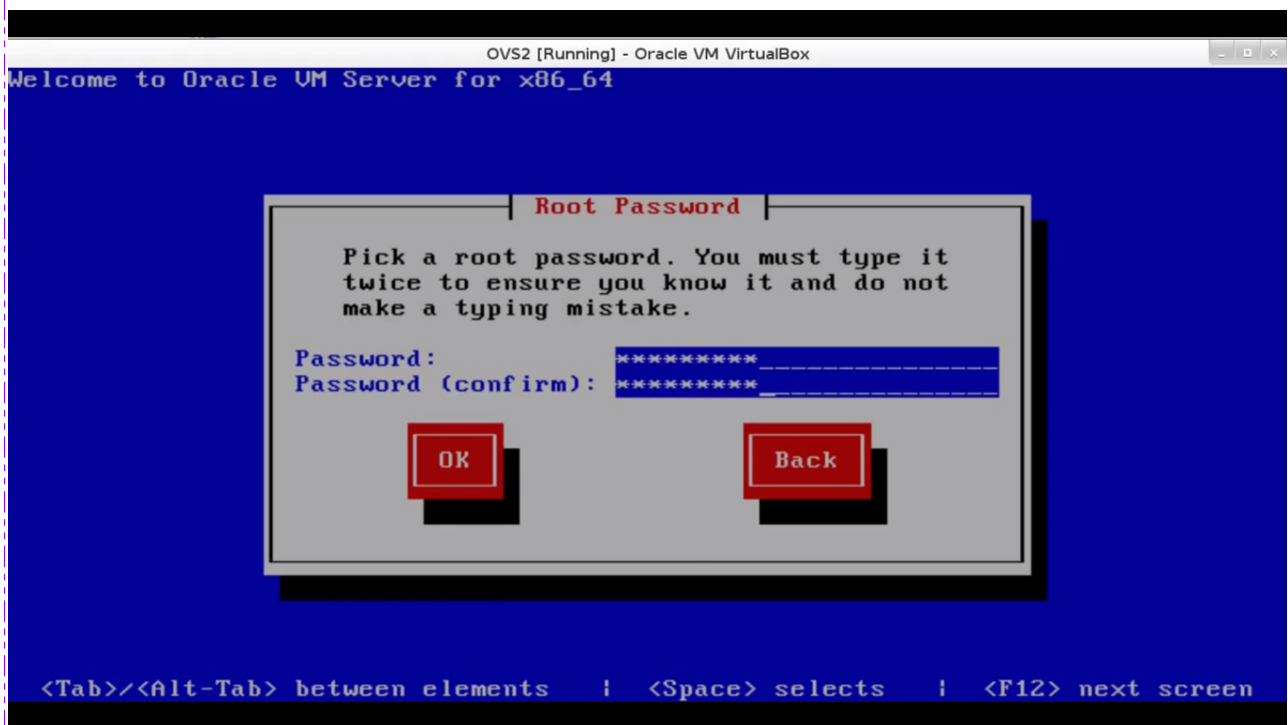
Hostname Setup:



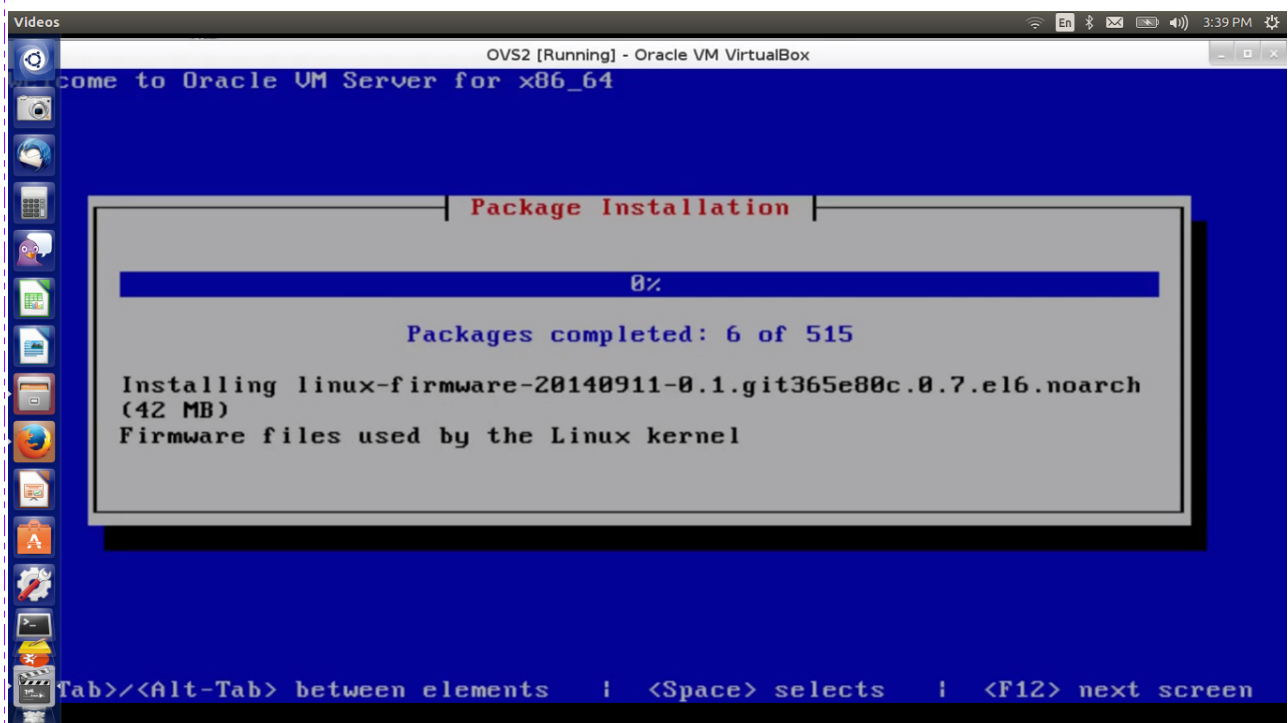
Real Name : CSFB-OVS2-PROD.capitalbank for Node2 and for Node1= CSFB-OVS1-PROD.capitalbank

Password setup





Installation started:



Same steps were followed on Node 2 (named: CSFB-OVS1-PROD.capitalbank).

Oracle VM-Manager (OVM)

Here 2 instances are made of same machine, *namely OVMM*. Firstly, physical machine is used to build OVMM (steps are below). Later, this running OVMM is shifted inside VM. Steps to Migrating inside VM is given in the end.

Steps for Installing OVMM

Before you can run the Oracle VM Manager installer, you must mount the installation media.

```
# mkdir /OVMCD
# mount -o loop OracleVM-Manager-3.x.x.iso /OVMCD
# cd /OVMCD
# ./runInstaller.sh
```

Please select an installation type:

- 1: Demo
- 2: Production
- 3: Uninstall
- 4: Help

Select Number (1-2): 2

Start installing the configured components:

- 1: Continue
- 2: Abort

Select Number (1-2): 1

Step 1 of 9 : Database ...

Installing Database ...

Database installation skipped ...

Step 2 of 9 : Java ...

Installing Java ...

When the installation is complete a summary similar to the following is displayed:

Installation Summary

Database configuration:

```
Database host name       : localhost
Database instance name (SID): MYDB
Database listener port   : 1521
Application Express port  : 8080
Oracle VM Manager schema : ovs
```

Weblogic Server configuration:

```
Administration username : weblogic
```

Oracle VM Manager configuration:

```
Username           : admin
Core management port : 54321
UUID               : 0004fb0000010000cc1b57e39ff77ea9
```

Passwords:

There are no default passwords for any users. The passwords to use for Oracle VM

Manager, Oracle Database 11g XE, and Oracle WebLogic Server have been set by you during this installation. In the case of a demo install, all passwords are the same.

Oracle VM Manager UI:

<http://myserver.example.com:7001/ovm/console>

<https://myserver.example.com:7002/ovm/console>

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

Please note that you need to install tightvnc-java on this computer to access a virtual machine's console.

For more information about Oracle Virtualization, please visit:

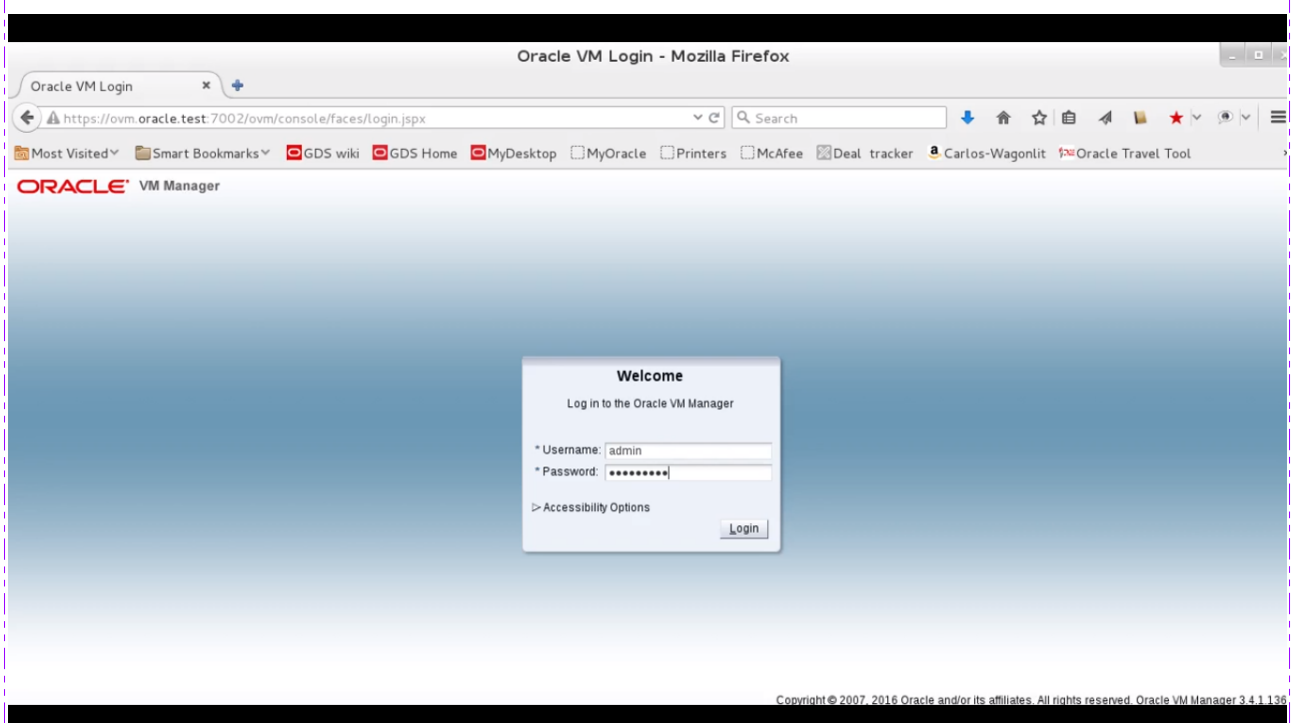
<http://www.oracle.com/virtualization/>

Oracle VM Manager installation complete.

Please remove configuration file `/tmp/ovm_configid`.

Installation Directories

Component	Location
Java	/u01/app/oracle/java
Oracle WebLogic Server 11g	/u01/app/oracle/Middleware/
Oracle ADF	/u01/app/oracle/Middleware/
Oracle VM Manager application	/u01/app/oracle/ovm-manager-3/
Oracle WebLogic Server domain	/u01/app/oracle/ovm-manager-3/machine1/base_adf_domain



Oracle Virtual Machine-Cloud

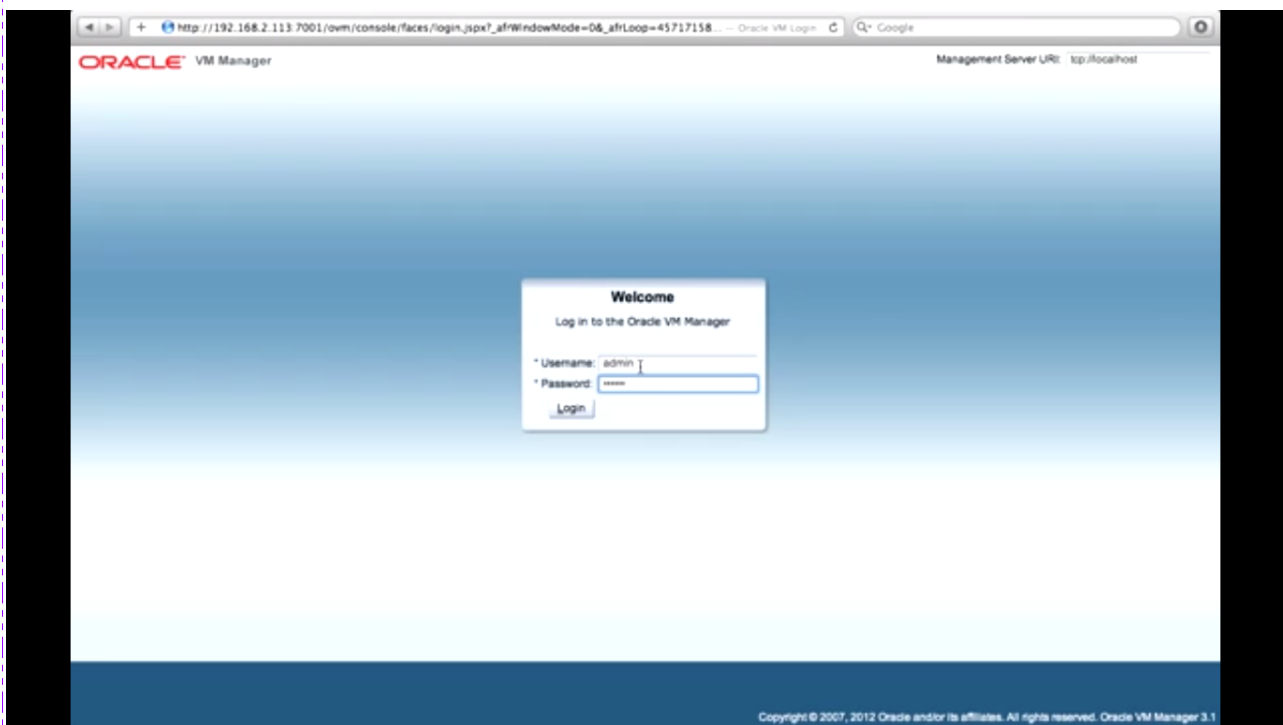
-Prerequisites Readiness..

Next step is to build Oracle-VM over server(s) through OVM-M. Basic steps involved are-

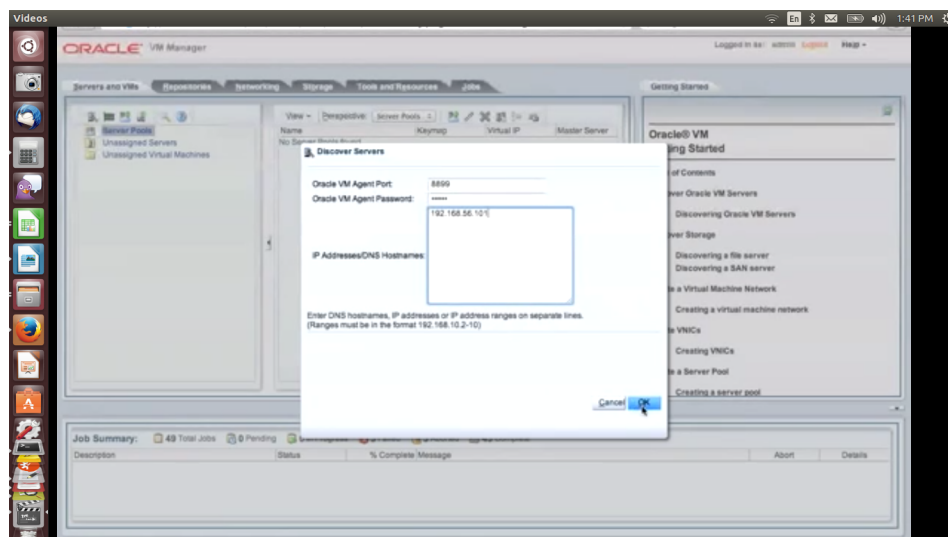
1. Recognizing Storage,
2. Creating Server_Pool,
3. Building repositories ,
4. and then finally building the VM.

Artifacts are:

Log-in to <https://10.10.10.6:7002/ovm/console/faces/login.jspx>



Discover the servers as per the image below



Next, step is “Creation of storage”. For this 3 LUNs were made projected for building OVM architecture. One for providing to Server_Pool (size=150GB) , second is assigning to Repositories (size= 2643GB) and last one for mounting to VM (for residing oracle database, size= 2979GB).

As direct projections have been made through F_S/W from SAN to OVM-S, so there just rescanning physical disk at both Nodes will be make LUNs visible on Servers.

The screenshot shows the Oracle VM Manager console with the 'Rescan Physical Disks' option highlighted in the context menu. Below the menu, a job summary table is visible:

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Refresh storage layer on Server: CSFB-OVS2-PROD...	Success			Dec 29, 2016 1:48:16 pm	8s	Abort	Details
Refresh storage layer on Server: CSFB-OVS1-PROD...	Success			Dec 29, 2016 1:48:07 pm	9s	Abort	Details

Now moving ahead to validate the “Storage” tab that all LUNs are visible are not:

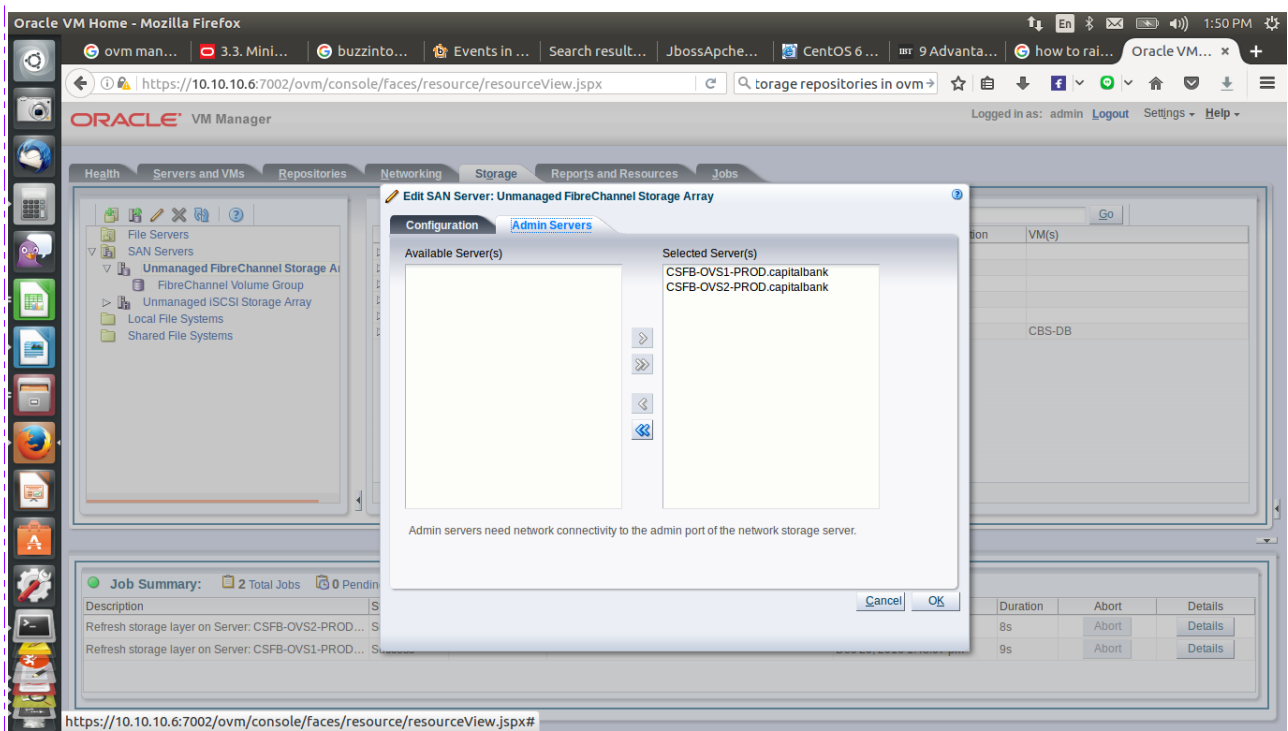
The screenshot shows the Oracle VM Manager console with the 'Storage' tab selected. A table of physical disks is displayed:

Name	Event Severity	Size (GiB)	Server	Status	Shareable	Description	VM(s)
OVM_Server_P...	Informational	150.0	CSFB-OVS1-P...		No		
Opslag (2)	Warning	150.0	CSFB-OVS1-P...		No		
Opslag (3)	Warning	2643.0	CSFB-OVS1-P...		No		
Opslag (4)	Warning	2979.0	CSFB-OVS1-P...		No		
SAS_LUN	Informational	2643.0	CSFB-OVS1-P...		No		
SSD_LUN	Informational	2979.0	CSFB-OVS1-P...		Yes		CBS-DB

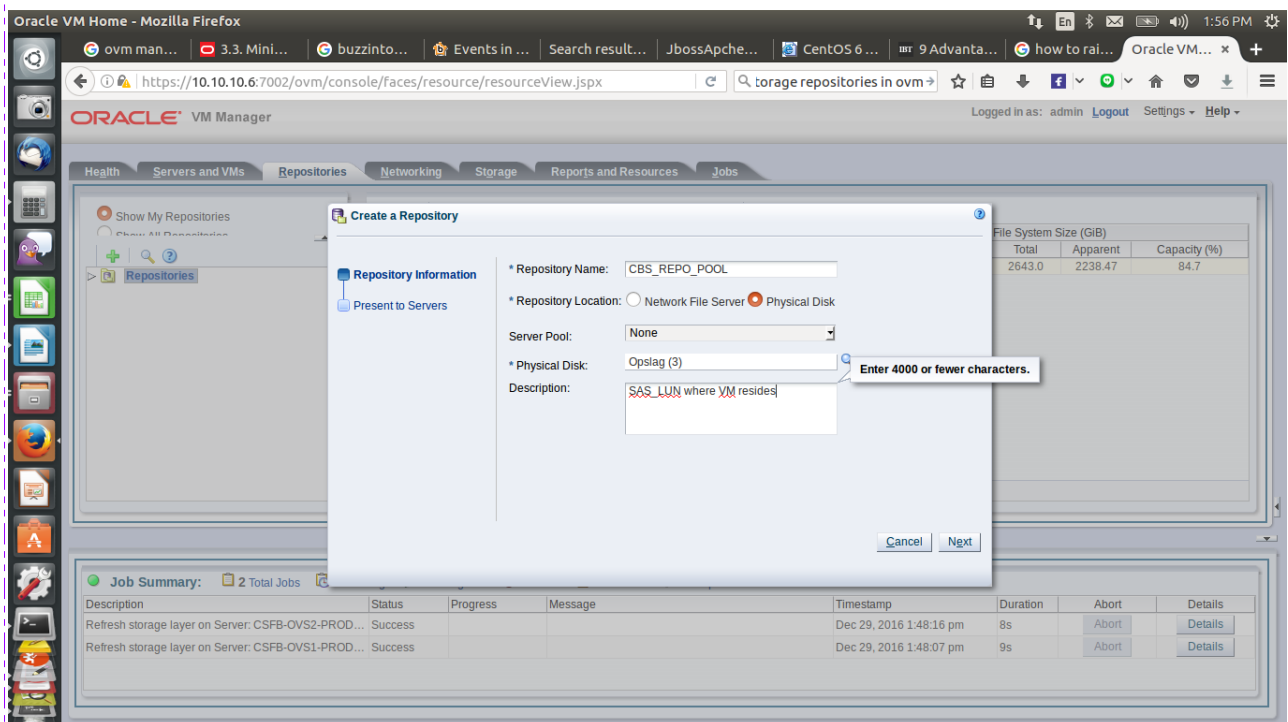
Below the table, a job summary table is also visible:

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Refresh storage layer on Server: CSFB-OVS2-PROD...	Success			Dec 29, 2016 1:48:16 pm	8s	Abort	Details
Refresh storage layer on Server: CSFB-OVS1-PROD...	Success			Dec 29, 2016 1:48:07 pm	9s	Abort	Details

One workaround needs to be done in FC projection of LUN is making admin server of Unmanaged Fibre Channel Storage:

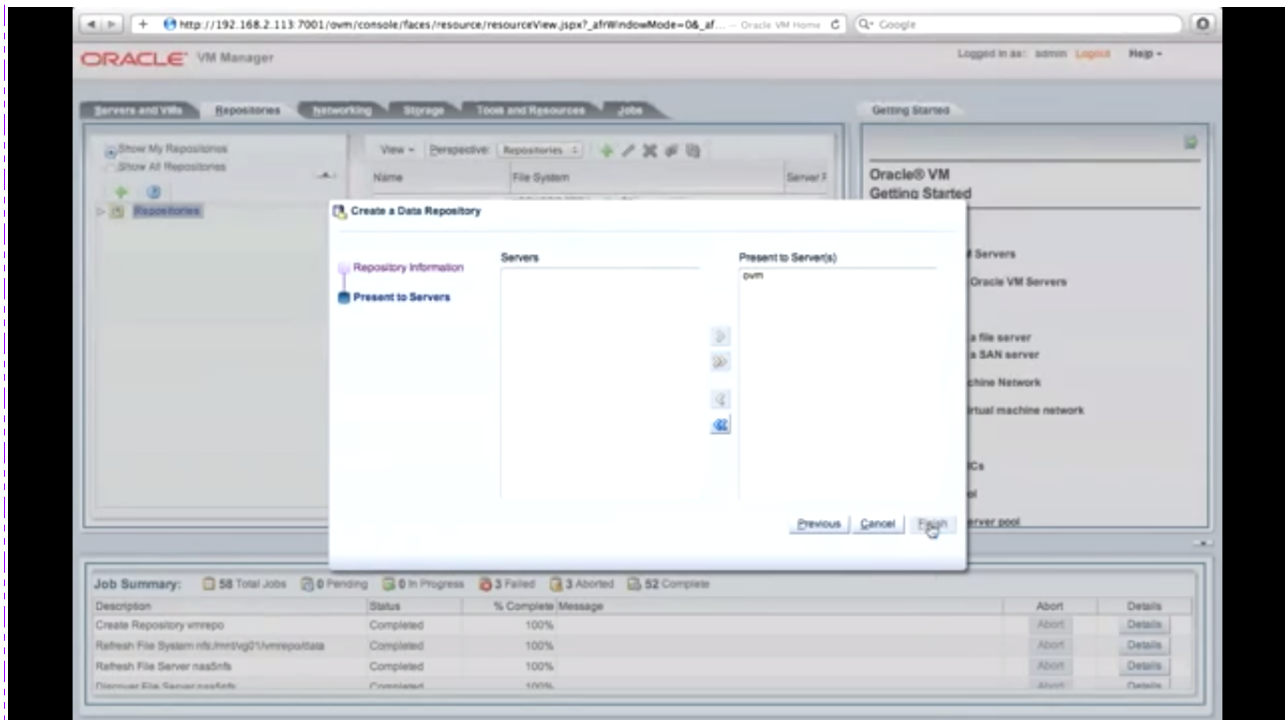


Next, is creating Repositories:



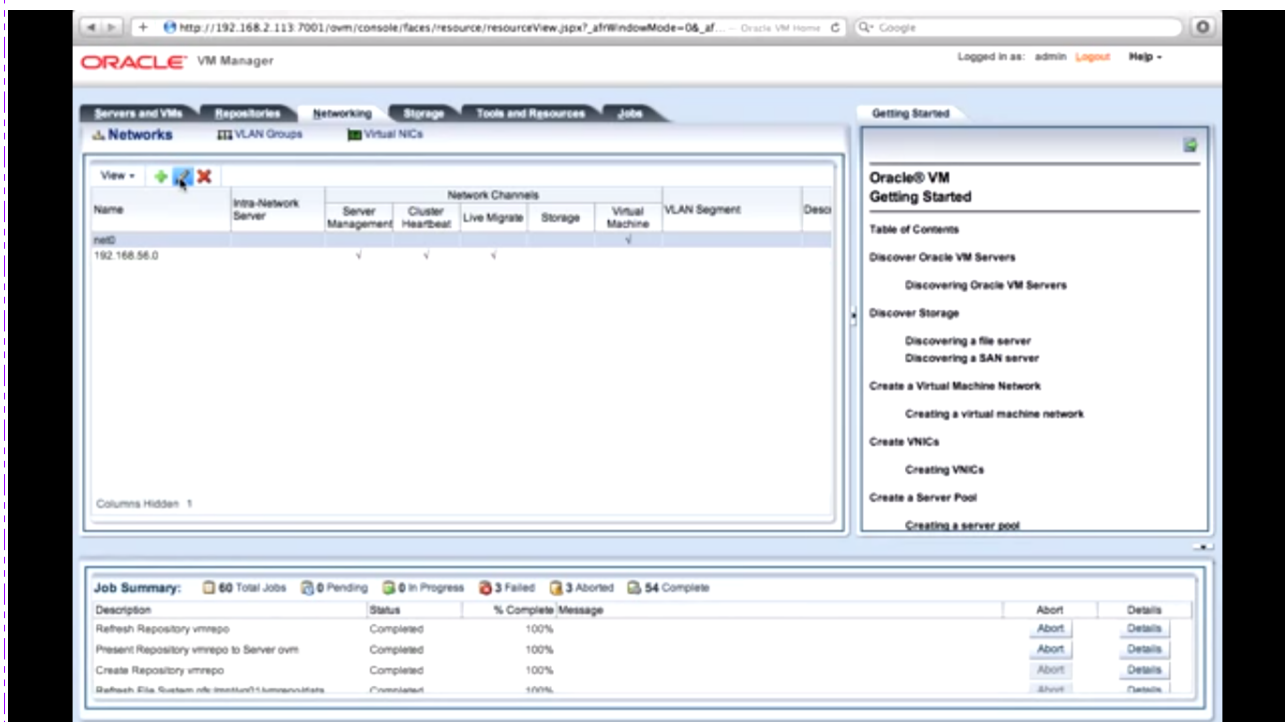
This LUN is of 2643GB where VM disk file will be residing. (SAS Volume)

Next is making admin. Here admin are CSFB-OVS1-PROD.capitalbank and CSFB-OVS2-PROD.capitalbank.

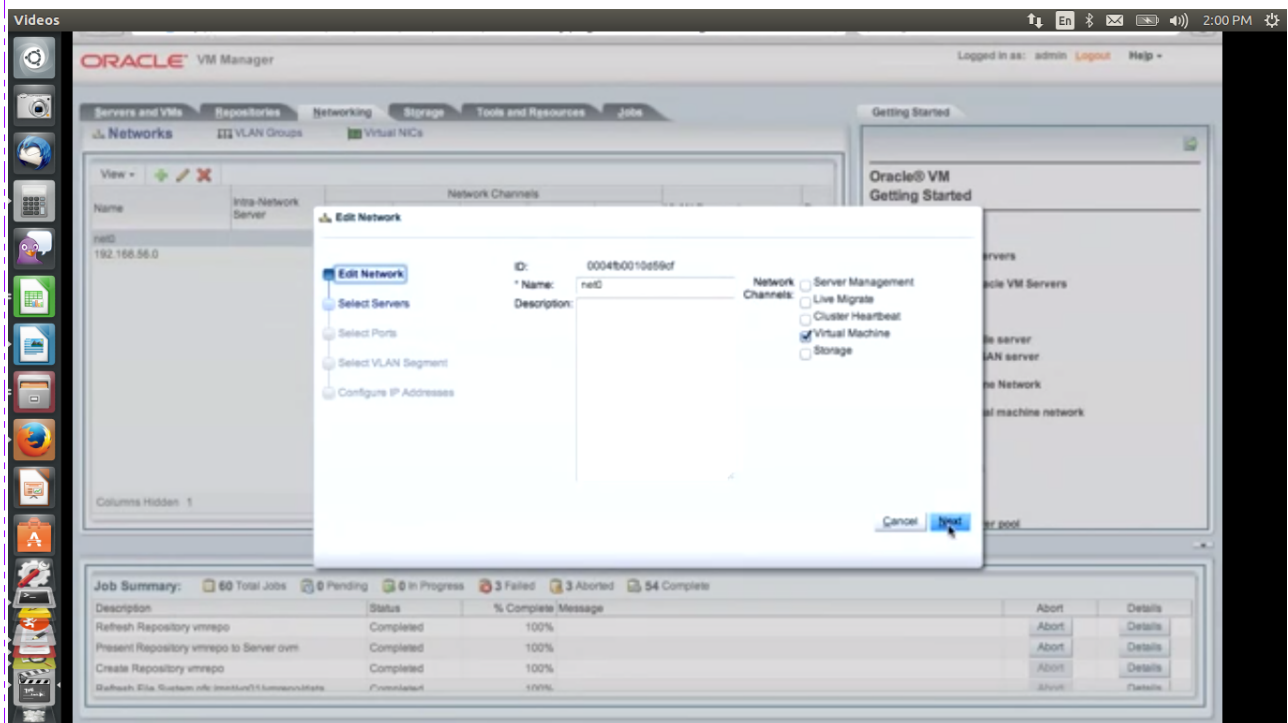


Now, we need to modify Network tab to make enable to work in VM environment. Below is the procedure;

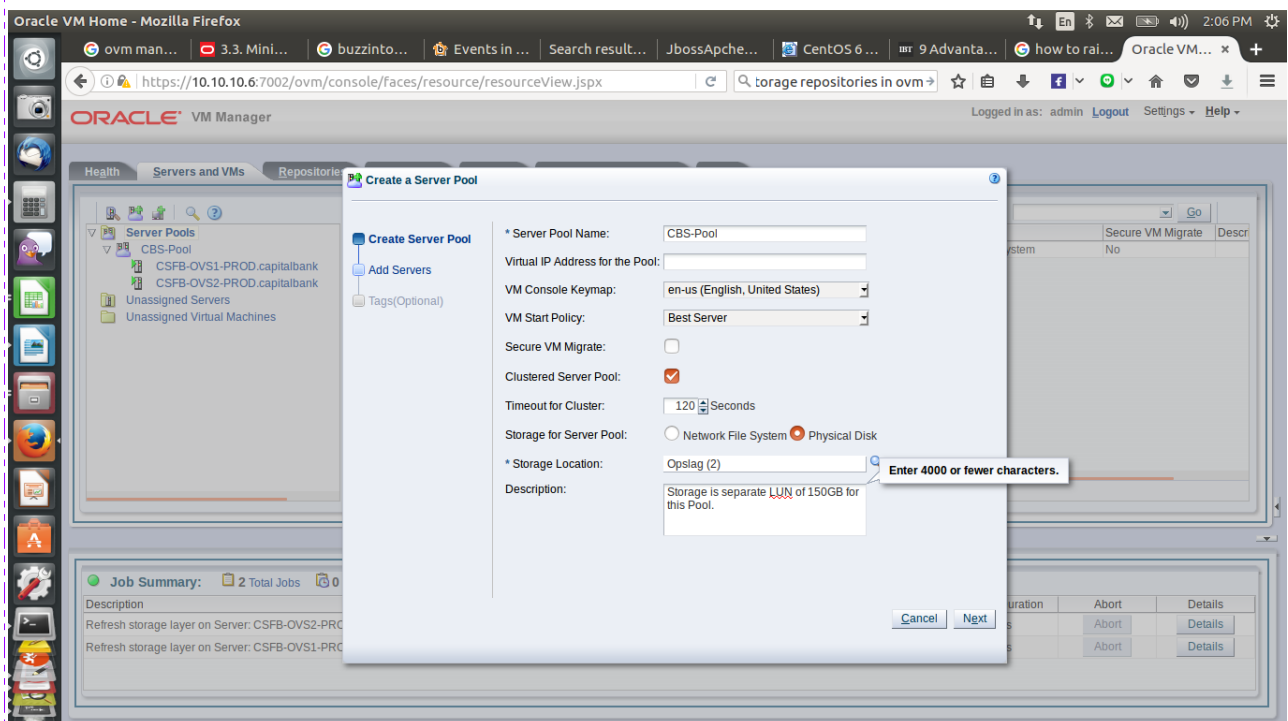
1) Click on 'Edit' button after selecting 10.10..... row:



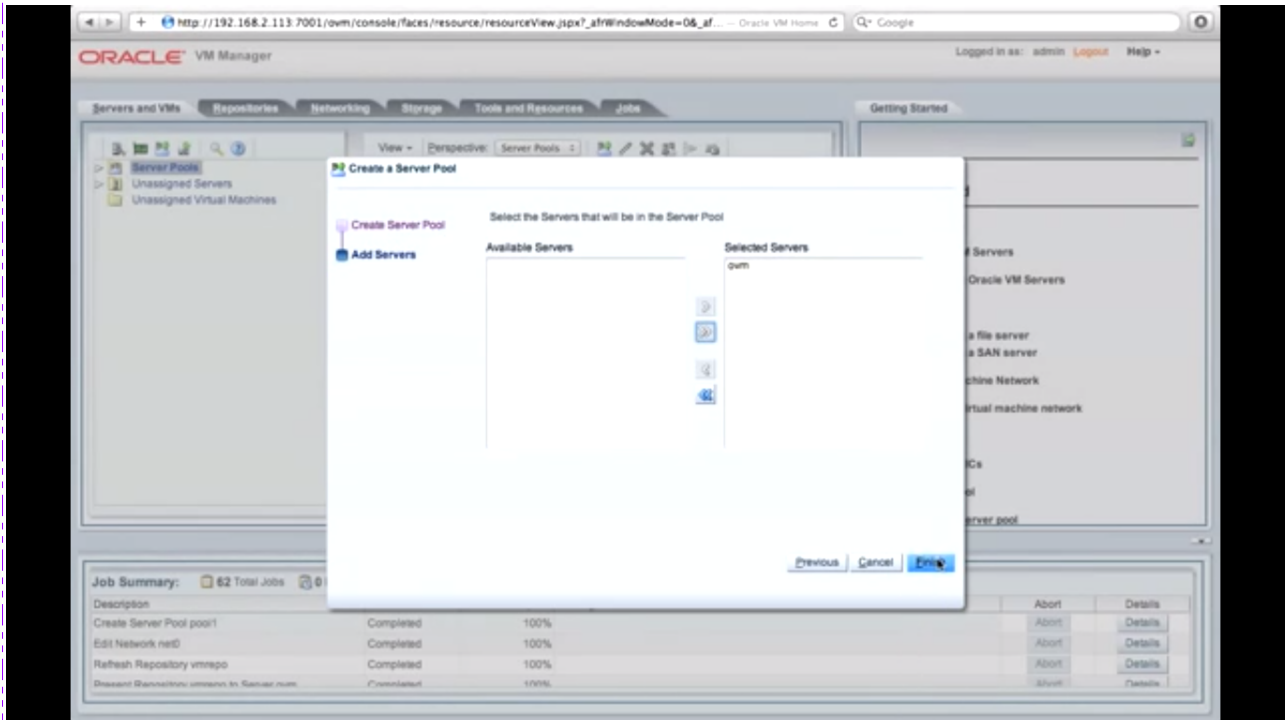
Now click the radio button of 'Virtual Machine' in the wizard.



Now the time comes of creating 'Server Pool' with discovered servers, assigned storage and available repositories.



Now clicking Next button will confirm the servers to be added in cluster out of the available ones.



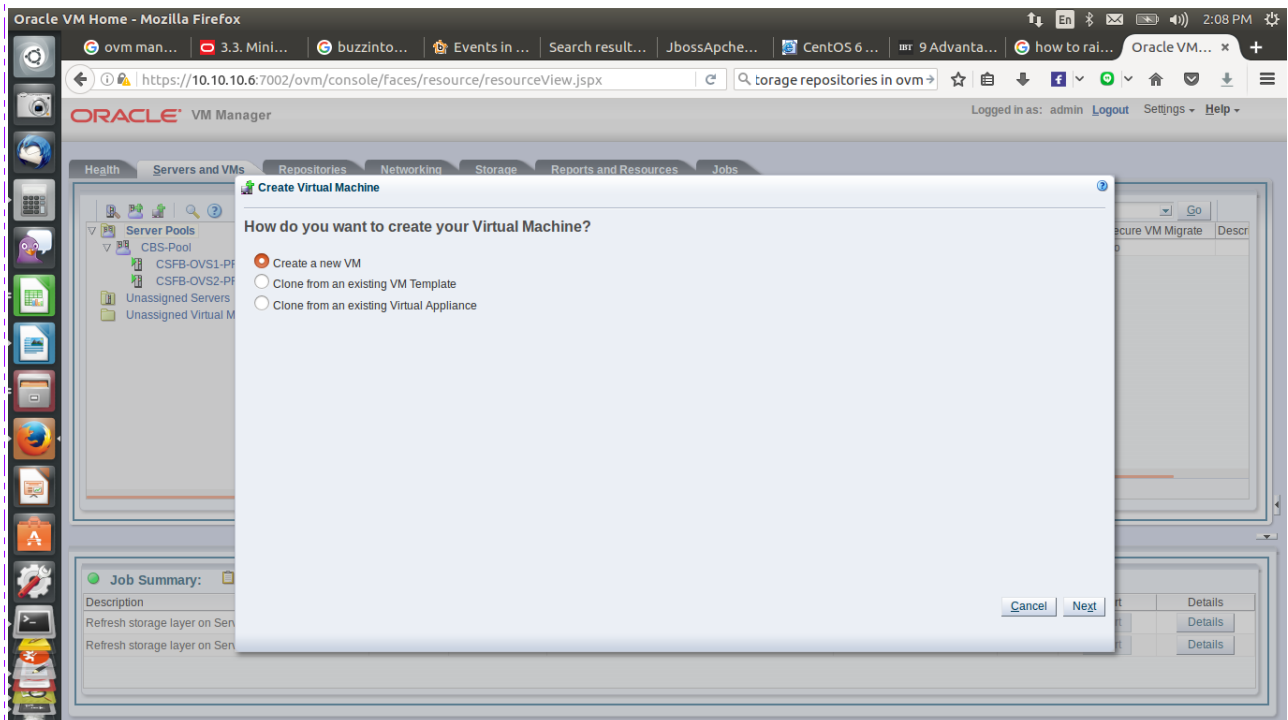
In above diagram only one server was added initially. And 2VM were built over it. Later second server was added and another 2 more VM were created on them. Compiling this, your architecture is ready to built number of VM you wanted (restriction to the hardware resources available).

VM creation is described in next section.

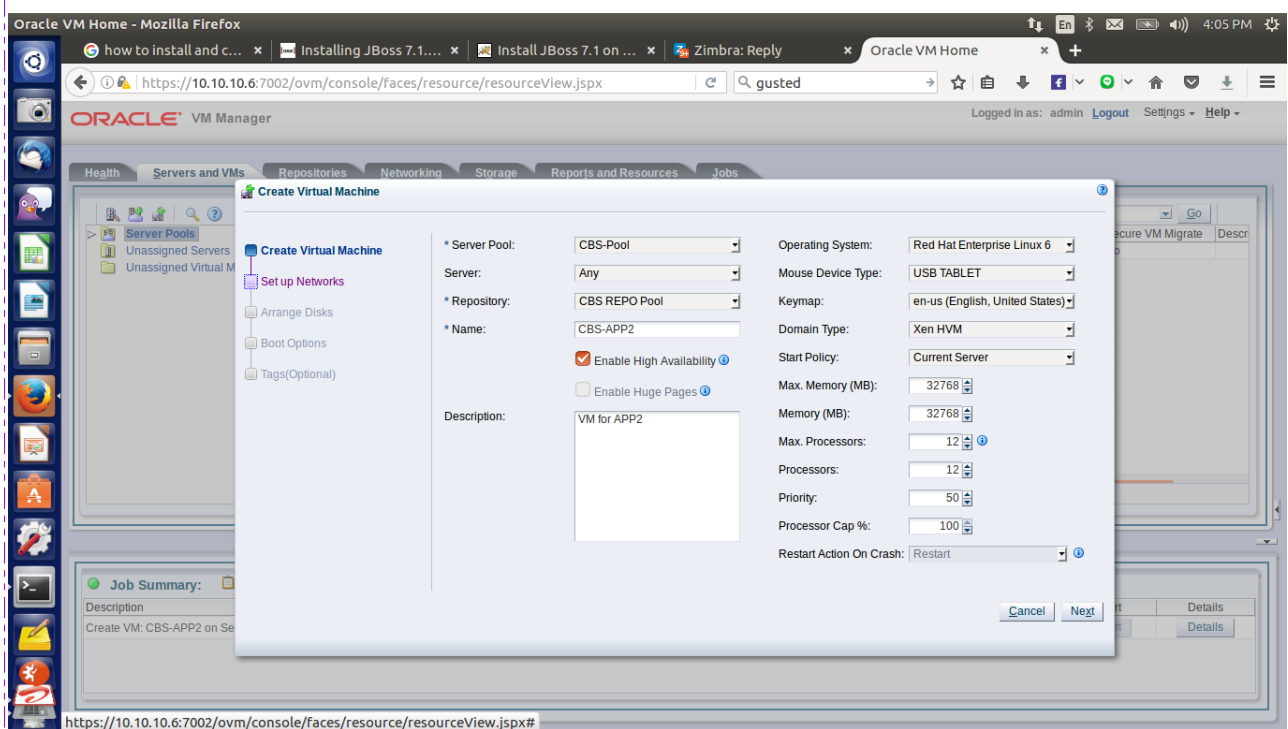
Oracle Virtual Machine

-Building VM

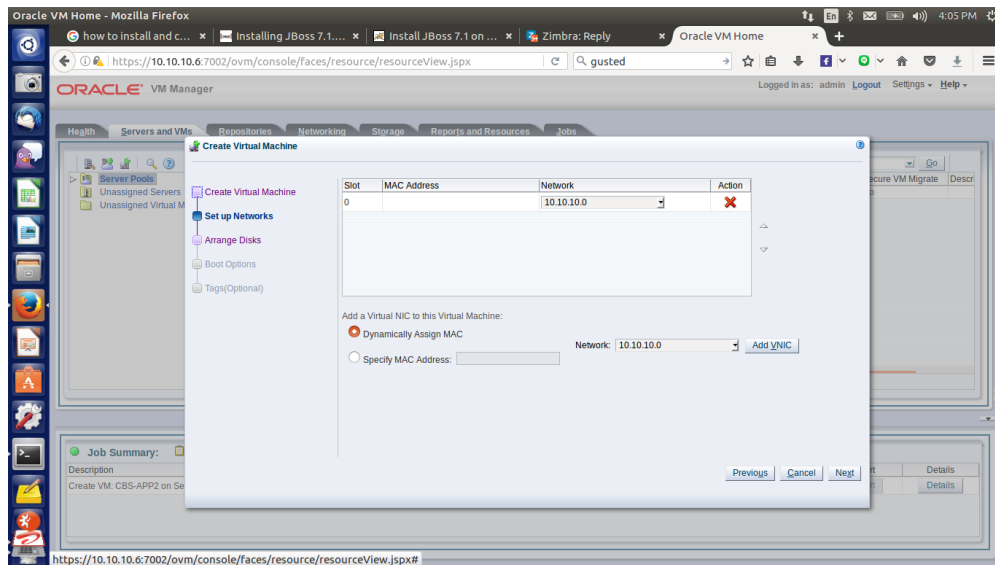
Now the time to built VM in OVM environment. Right click the newly created server pool (CBS_POOL). And click option 'Create Virtual Machine'. Below Wizard will appear and move ahead with described details in this further document:



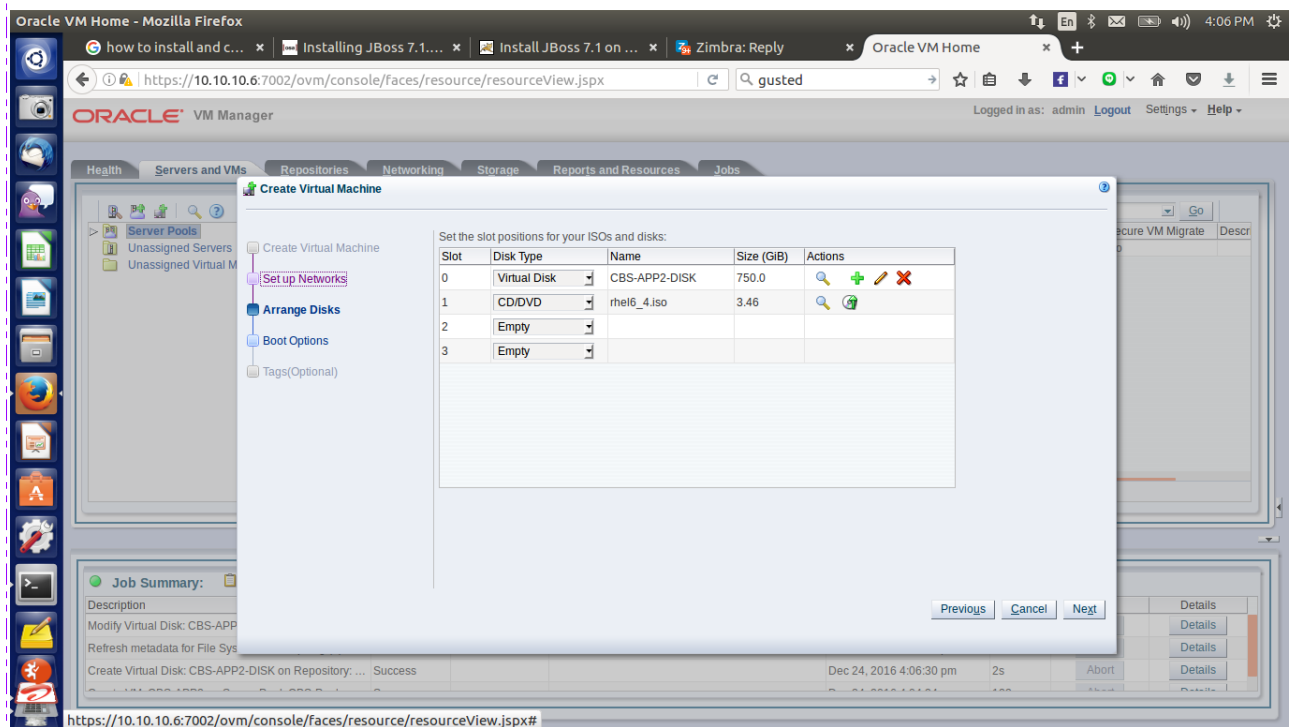
Specifications for creating VM:



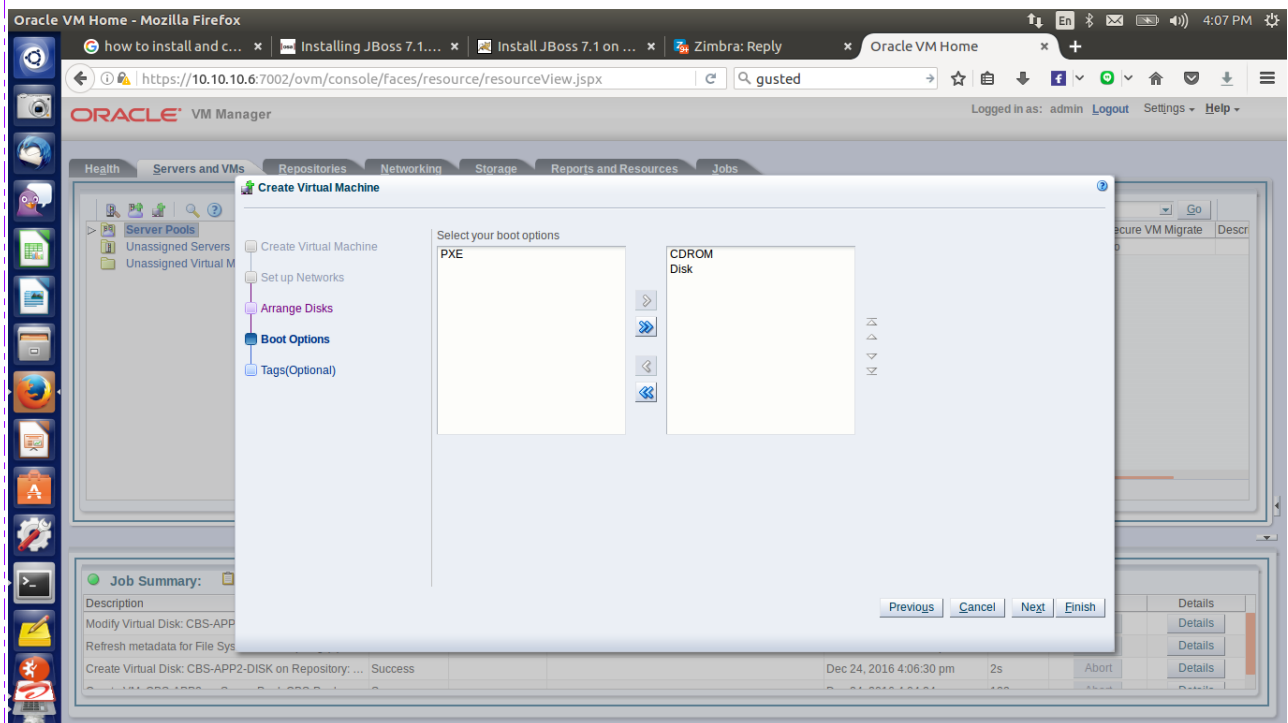
Assigning VNC to vm:



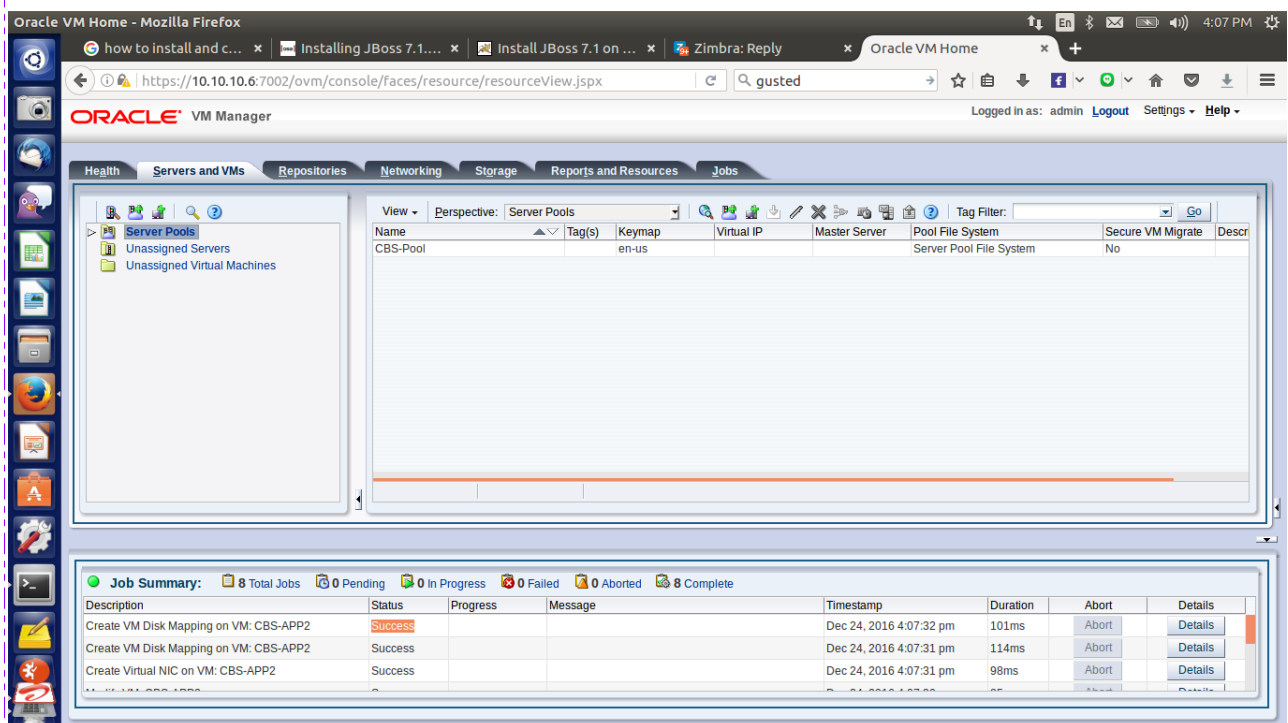
Alloting amount of Disk and installation source for VM:



Boot Order Description:



Status :



Console Button:

The screenshot shows the Oracle VM Manager interface. The 'Virtual Machines' table lists three VMs: CBS-APP2, CBS-DB, and CBS-OVMM1. The 'Launch Console' button is highlighted for CBS-APP2. Below the table is a 'Job Summary' section showing a list of jobs with columns for Description, Status, Progress, Message, Timestamp, Duration, Abort, and Details.

Name	Status	Tag(s)	Event Severity	Server	Max. Memory (MB)	Memory (MB)	Max. Processors	Processors	Keymap	Operating System
CBS-APP2	Running		Informational	CSFB-OVSL-P...	16384	131072	12	12	en-us	Red Hat Enterprise Linux 6.4
CBS-DB	Running		Informational	CSFB-OVSL-P...	16384	131072	12	12	en-us	Red Hat Enterprise Linux 6.4
CBS-OVMM1	Running		Informational	CSFB-OVSL-P...	16384	16384	4	4	en-us	Red Hat Enterprise Linux 6.4

Description	Status	Progress	Message	Timestamp	Duration	Abort	Details
Start VM: CBS-APP2	Success			Dec 24, 2016 4:08:18 pm	2s	Abort	Details
Create VM Disk Mapping on VM: CBS-APP2	Success			Dec 24, 2016 4:07:32 pm	101ms	Abort	Details
Create VM Disk Mapping on VM: CBS-APP2	Success			Dec 24, 2016 4:07:31 pm	114ms	Abort	Details

Thus, VM has been created:

The screenshot shows the Oracle VM Console for the CBS-APP2 VM. The console displays the Red Hat Enterprise Linux 6.4 installation screen. The screen includes a welcome message, a list of installation options, and the Red Hat logo.

```
Welcome to Red Hat Enterprise Linux 6.4!  
  
Install or upgrade an existing system  
Install system with basic video driver  
Rescue installed system  
Boot from local drive  
Memory test  
  
Press [Tab] to edit options  
  
RED HAT®  
ENTERPRISE LINUX® 6  
  
Copyright © 2003-2010 Red Hat, Inc. and others. All rights reserved.
```

Troubleshooting

(1) SOP For Flushing DB of OVM-S

This can be the case when both OVM-S are not able to join cluster due to different cluster.conf file or mismatch databases on both nodes or service misbehaviour (by service i only mean ovs-agent). So, in this scenario one of the workarounds will be:

1) Stop the ovs-agent service

```
/etc/init.d/ovs-agent stop
```

2) backup the database of OVM-S at /root.

```
#mv /etc/ovs-agent/db /root/db-date
```

3) Clear the cluster.conf.

```
/dev/null > /etc/ocfs2/cluster.conf
```

4) Start the ovs-agent service

```
/etc/init.d/ovs-agent start
```

***Please be informed that this step has to be performed at both Nodes simultaneously. ***

(2) SOP For changing IP and Network of whole architecture

1) Firstly, new IP has to be assigned to the machines in environment..

```
#ip a add 192.168.0.207/24 dev eth0
```

2) Now, browse OVMM via new IP.

3) New virtual adapter needs to be created in Networking via choosing below perimeters.

Create Network

Enter Network Name and Use.

* Name:

Description:

Network Uses:

- ☒ Management
- ☒ Live Migrate
- ☒ Cluster Heartbeat
- ☒ Virtual Machine
- ☐ Storage

4) Now login via NEW IP and rediscover the OVS.

SOP For Back-up & Restore OVM-M

Link: https://docs.oracle.com/cd/E50245_01/E50251/html/vmadm-manager-backup-restore.html

BACKING-UP OVM-M:

OVM stores its own configuration in MySQL by default. So backup procedure has 2 easy steps:-

1) create a directory under /home.

```
# mkdir /home/backup-ovm
```

2) copy the .config file of ovm to /home/backup-ovm

```
cp -pvr /u01/app/oracle/ovm-manager-3/.config /home/backup-ovm
```

4a) As of Oracle VM Manager Release 3.2.1, backups of the local MySQL database are performed automatically every 24 hours. Backups are stored within /u01/app/oracle/mysql/dbbackup by default, and are rotated regularly so that only the 21 most recent backups are stored at any point in time. Backups make use of the MySQL Enterprise Backup utility.

```
#cp -pvr /u01/app/oracle/mysql/dbbackup /home/backup-ovm
```

4b) To perform manual backup-

It is possible to initiate a backup manually. This is usually done when performing an upgrade of Oracle VM Manager. While it is possible to invoke the **mysqlbackup** utility directly, it is recommended that you initiate a backup directly from the Oracle VM Manager core. This can be achieved using the provided backup script at

/u01/app/oracle/ovm-manager-3/ovm_tools/bin/BackupDatabase script:

```
# /u01/app/oracle/ovm-manager-3/ovm_tools/bin/BackupDatabase -w
```

Enter your OVM Manager username: *admin*

Enter your OVM Manager password:

INFO: Backup started to:

/u01/app/oracle/mysql/dbbackup/ManualBackup-20140324_102412

Job: 'Start Backup to: ManualBackup'

By default, the backup script stores the backup as a manual backup, to avoid the rotation that takes place for other automatic backups. The backup script prompts you for your Oracle VM Manager username and password.

Link:- https://docs.oracle.com/cd/E50245_01/E50251/html/vmadm-manager-restore.html

RESTORING OVM-M:

First step is to install OVM-M on separate machine using existing uuid.

```
# ./runInstaller.sh --uuid 0004FB000000100002CB7F2DFFA8D8
```

2. After installation, reinstallation or upgrade, stop the Oracle VM Manager Command Line Interface, Oracle VM Manager, and the database before you restore the backup:

```
# /sbin/service ovmcli stop
# /sbin/service ovmm stop
# /sbin/service ovmm_mysql stop
```

3. Before you restore the database, ensure that no database files already exist on the Oracle VM Manager host:

```
# cd /u01/app/oracle/mysql/data/
# rm -rf appfw ibdata1 ib_logfile0 ib_logfile1 mysql ovs performance_schema
```

Important: Do not remove any of the following files from /u01/app/oracle/mysql/data/:

- auto.cnf
- my.cnf
- .mysqlconfig
- mysql_upgrade_info

4. To initiate the database restore, as the **oracle** user, use the RestoreDatabase command located in /u01/app/oracle/ovm-manager-3/ovm_tools/bin, for example:

```
# su - oracle
$ bash /u01/app/oracle/ovm-manager-3/ovm_tools/bin/RestoreDatabase.sh \
ManualBackup-20140324_102412
```

```
INFO: Expanding the backup image...
INFO: Applying logs to the backup snapshot...
INFO: Restoring the backup...
INFO: Restoring OVM keystores and certificates
INFO: Success - Done!
INFO: Log of operations performed is available at:
/u01/app/oracle/mysql/dbbackup/ManualBackup-20140324_102412/Restore.log
```

5. Restart the database and Oracle VM Manager, and the Oracle VM Manager Command Line Interface.

```
# /sbin/service ovmm_mysql start
# /sbin/service ovmm start
# /sbin/service ovmcli start
```

6. Since the certificates required to authenticate various components, such as the Oracle VM Manager Web Interface and Oracle VM Manager Command Line Interface, are regenerated during the new installation and the mappings for

these are overwritten by the database restore, it is necessary to reconfigure the certificates used to authenticate these components. This is achieved by running the following script to reconfigure the Oracle WebLogic Server:

```
# export MW_HOME=/u01/app/oracle/Middleware  
# /u01/app/oracle/ovm-manager-3/ovm_upgrade/bin/ovmkeytool.sh setupWebLogic
```

Once you have run this command, you must restart Oracle VM Manager and then run the client certificate configuration script:

```
# /sbin/service ovmm restart  
# /u01/app/oracle/ovm-manager-3/bin/configure_client_cert_login.sh  
  
# /sbin/service ovmm restart
```

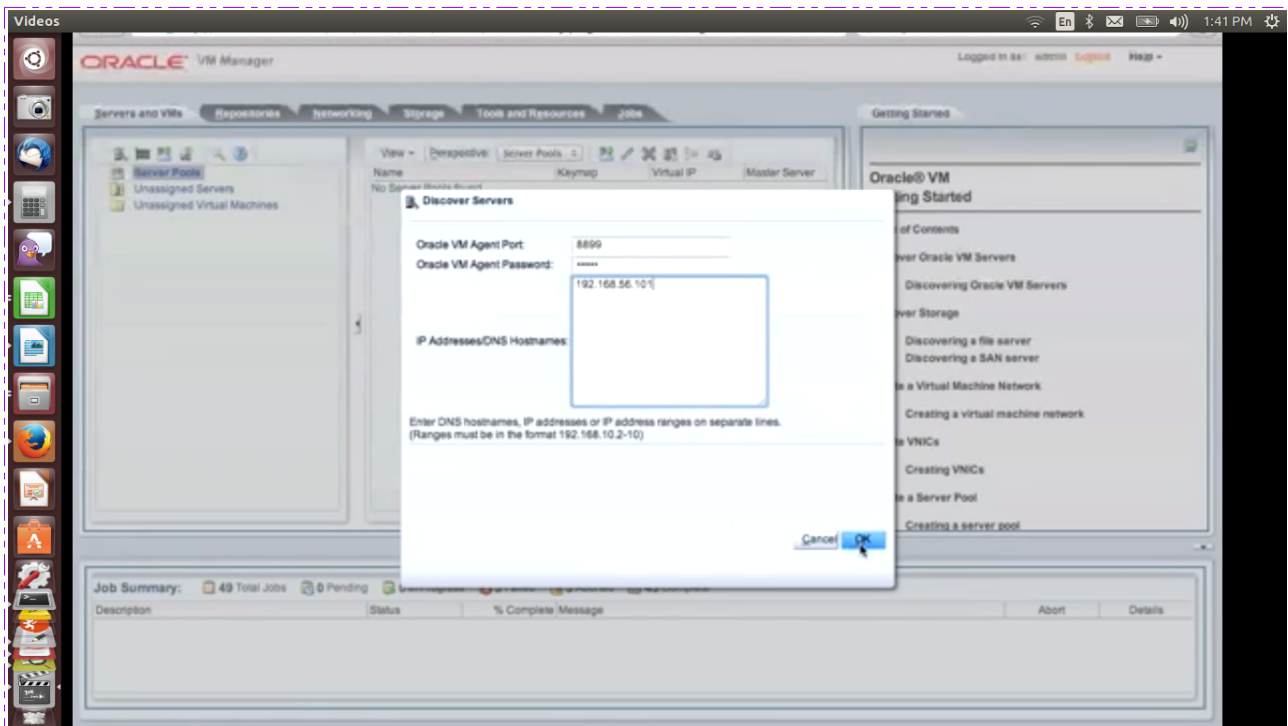
Within Oracle VM Manager go to the **Servers and VMs** tab and perform a **Refresh All** on your existing *server pools*.

OR

1) install OVM-M on separate machine using existing uuid (same step is followed to shift OVMM inside VM).

```
# ./runInstaller.sh --uuid 0004FB000000100002CB7F2DFFA8D8
```

2) Lastly, Discover the OVS via IP in OVM



>>>> Finally all other configuration will be loaded in next 30 minutes. >>>>

Thanking You

Regards,

Kamal Kishore

Tetra Information Services Ltd.