Cat **Oracle Cloud Infrastructure Labs**

Creating Oracle Linux Images

V2.0

ORACLE LAB BOOK | APRIL 2018

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Disclaimer

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1. Overview

Lab Overview

The lab exercises are designed to complement your training, reinforcing the key concepts by applying and demonstrating what you learned in the presentation sessions. This lab book is comprised of individual exercises. These exercises allow you to get first hands-on exposure working with the Oracle OCI Infrastructure Cloud, where you will see how key features and functionality are deployed in the software. Using what you learn in the presentations and individual exercises working with the software, you will collaborate as a team in developing and delivering practice presentations.

Launch and configure a Virtual Machine (VM) Instance in Oracle OCI

In the lab you will create an Oracle Linux instance, add a 2. Disk and mount it, install VNC and install Oracle 12c. Client on the instance.

Configure your Cloud

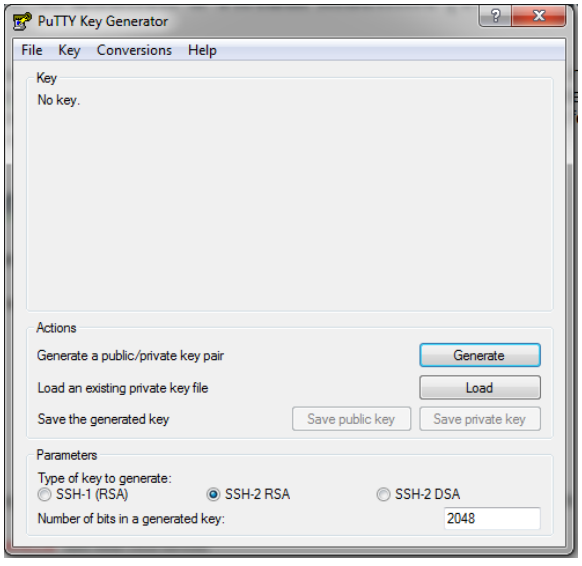
Prereq

To build the instance is to have a public/private key set, used for ssh authentication. It is strongly recommended to use public/private key and block for any login with username/password. Always protect the private key with a passphrase.

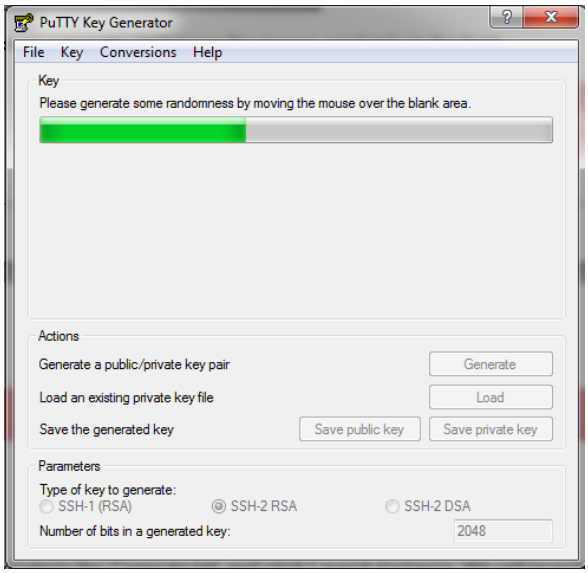
1.1 Generation of public and private key, with putty

For the generation of a public/private key set.

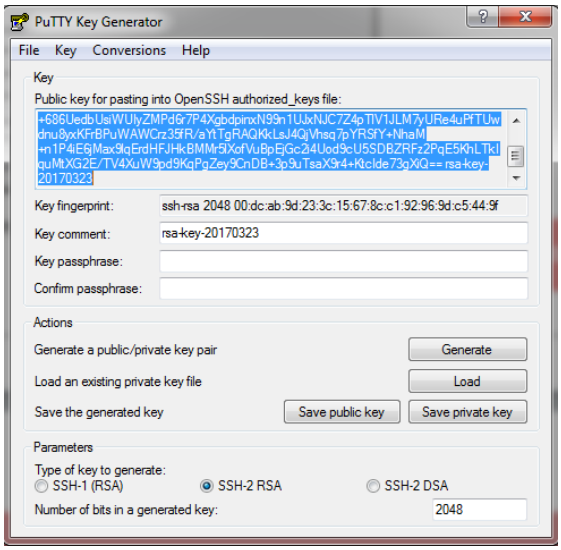
1. For windows with putty installed, start puttygen

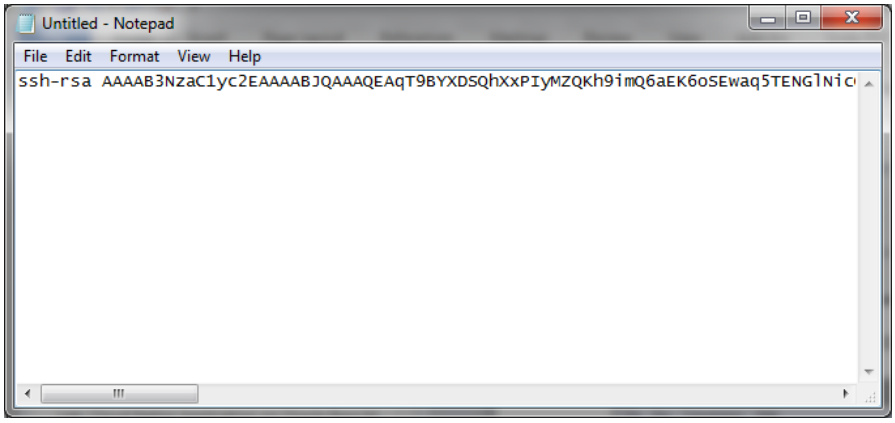


2. Click on generate, and move the mouse randomly in the field

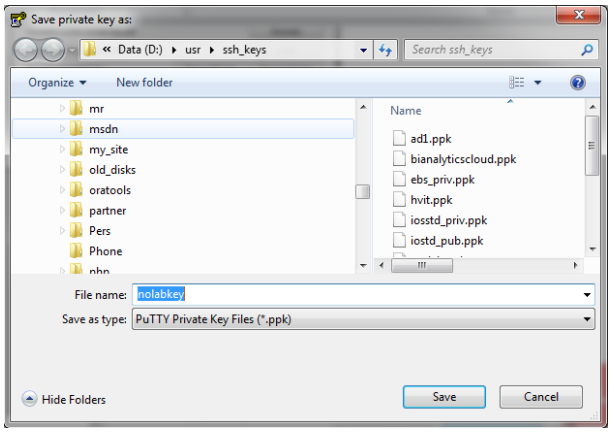


3. When the key is generated, copy the public key onto ie. notepad





4. Save the private key and add a passphrase.



1.2 Generation of public and private key, with Linux, Mac

The public, private keypair is created with ssh-keygen command as follows:

sh-keygen -t rsa -b 4096 -C "your mailadress"

The keys will be stored in $HOME/.ssh with id_rsa as private key and id_rsa.pub as the public key. The latter is used as ssh key for instance creating on Oracle OCI.

```
[oracle@myvbox ~]$ ssh-keygen -t rsa -b 4096 -C "demo@oracle.com"
Generating public/private rsa key pair.
Enter file in which to save the key (/home/oracle/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in /home/oracle/.ssh/id_rsa.
Your public key has been saved in /home/oracle/.ssh/id_rsa.pub.
The key fingerprint is:
ac:a0:7d:c1:05:e7:ad:cc:81:4e:3b:7a:55:11:b8:93 demo@oracle.com
```

```
The key's randomart image is:
+--[ RSA 4096]----+
|       . ..o.    |
|        =.. .    |
|       o +oo     |
|      + *E+      |
|     . * S.      |
|    o o =        |
|   . o +         |
|      o          |
|                 |
+-----------------+
```

The key is now stored locally in $HOME/.ssh:
id_rsa, your private key
id_rsa.pub your public key.

Cat $HOME/.ssh/id_rsa.pub and copy to your OCI environment.

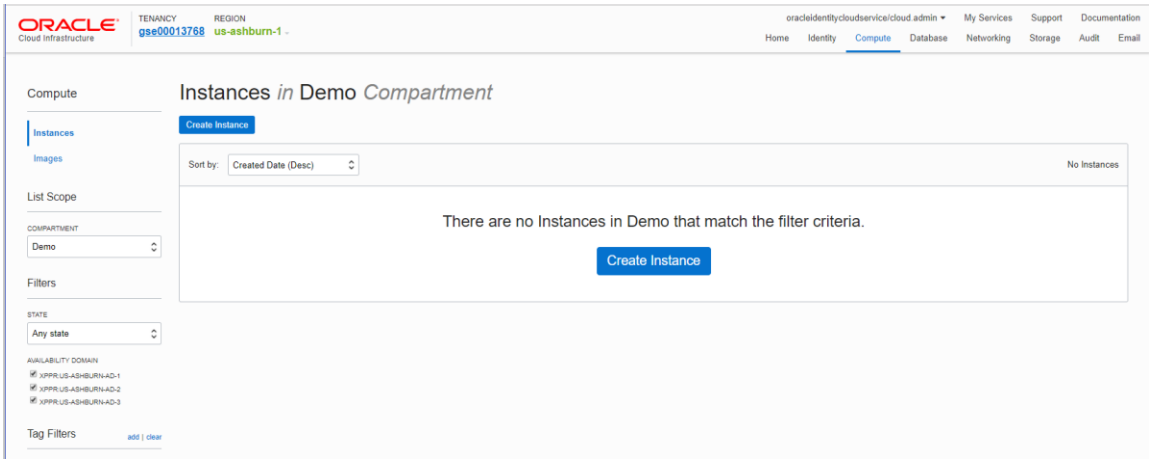
```
[oracle@myvbox ~]$ cat ~/.ssh/id_rsa.pub

ssh-rsa
AAAAB3NzaC1yc2EAAAABIwAAAgEA6qGAwZZIajAQJN/aSKK9b+P9I/s2IVbuLIxpnzmldJU35BWIedbzKH
KwmNoktbUnPj4RvGrKMU+69gApfTTPa2jfHgQYBGMzOzmPc/k8kNQmcQpgQGZADSXDxfNqcJbVdNI1FJNx
VgFg1cDANhddMrIcumBbbNAtuxg0g0dA5p61iX2mDQd9d6C8Ecs6msphXnZ8YczAi1/q04X6xxj42bsX0s
ZONLG//du1hKua+6dzjYuoPgztizyYi6OObu6rM9m+Mz1bFQkhuRo2Q9vxzRthVkp1/zzEmJq1gC4WLMRe
u+FF+SuYeqvZ1ng8XmlD/bg/kgdlcmIok+Tav52kZVz212VSx5M3yOJx3q/5gj2h5SF7xiiS8yPPWEOfUf
bN1uruvGejBdcoIVeK6G9P5XrlOXygG5VO+PZ4GYQBc1XyY44xDw4nC1gpug0dPN6Lq8rRat2R3TZ+44lK
MiHMWTbgzWlLizX4833YmEcAJq2MXOQHYs7iZZ/nNtW98GAkt96lLUv1IBgbSR2IEr6Hv0lNfjLtH3lALg
7+TMnwGEu9nFsRiNCYYnndq9xV/OYWYF490asemVj+MBIVPURq7YbmQCX2GOTdsiExy+KvtGwtF6lhboqM
40saAer8wuEFOVlzQ5ADGCtpcgtCaPno7EX05KGD54vo9p8jE/QWO9M= demo@oracle.com
```

For additional example on Mac and Linux, please refer to ie. https://help.github.com/articles/generating-a-new-ssh-key-and-adding-it-to-the-ssh-agent/#platform-mac

1.3 Create the VM

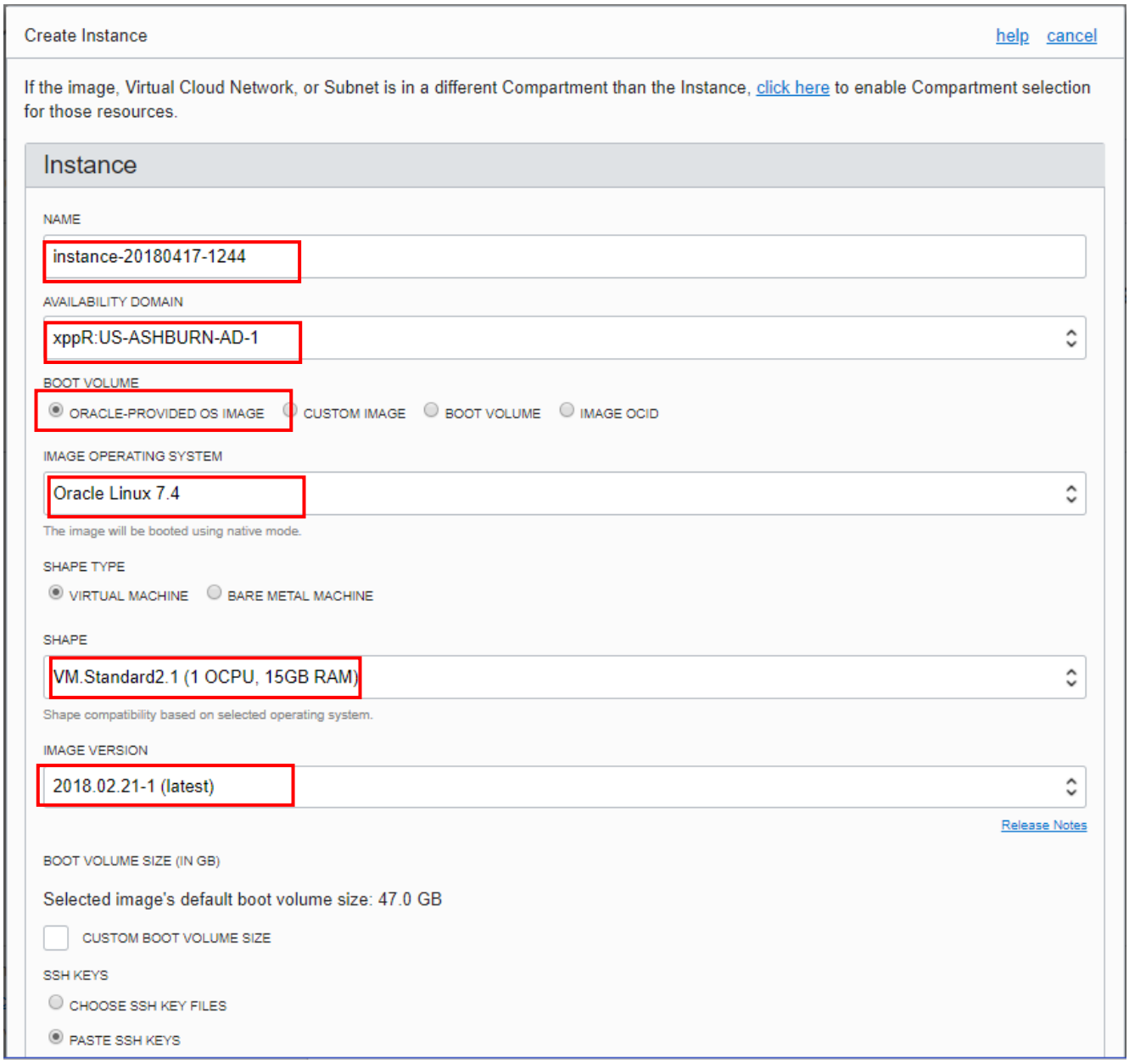
Navigate to the Compute tab and click Launch Instance. We will launch a VM instance for this lab

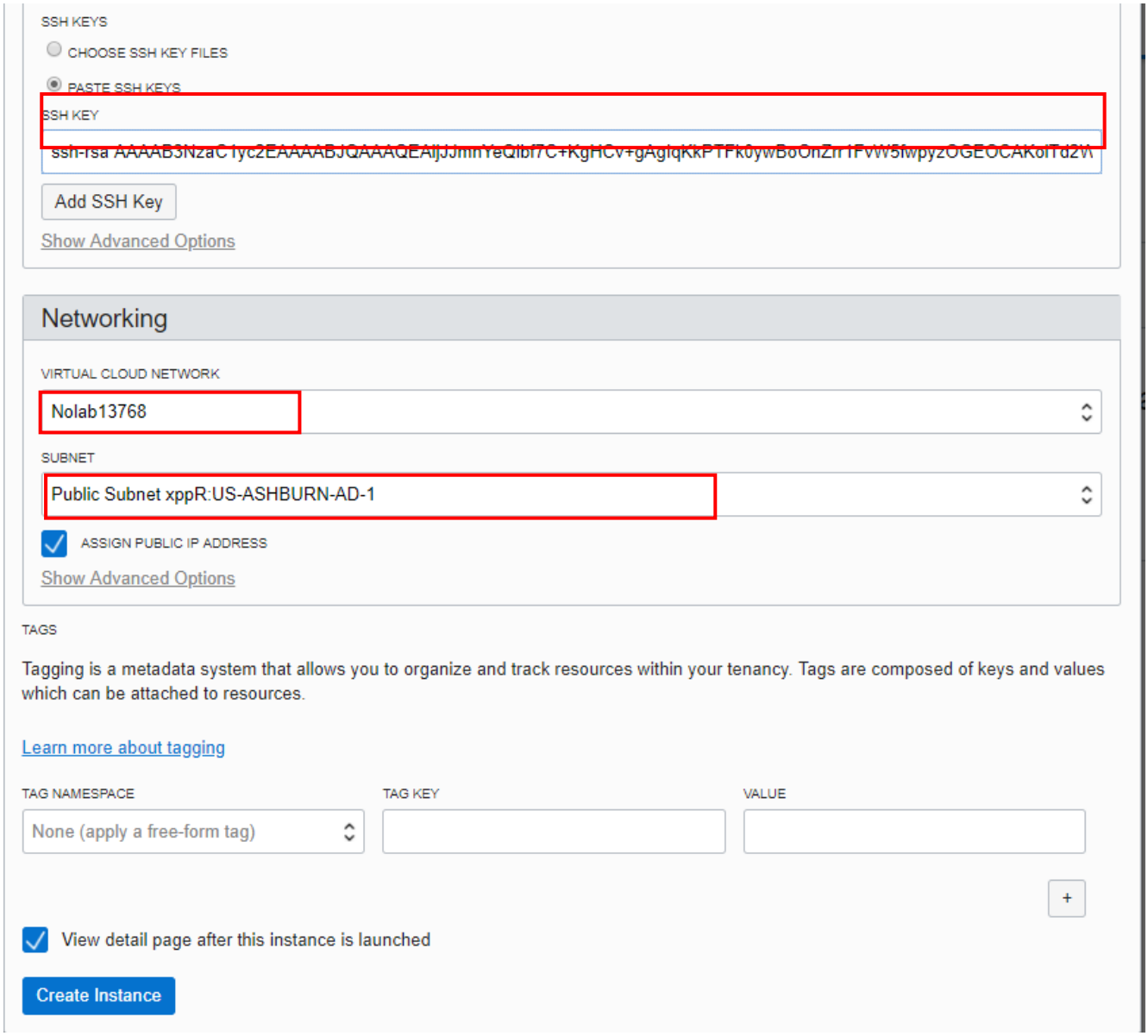
Make sure you have selected the correct compartment.



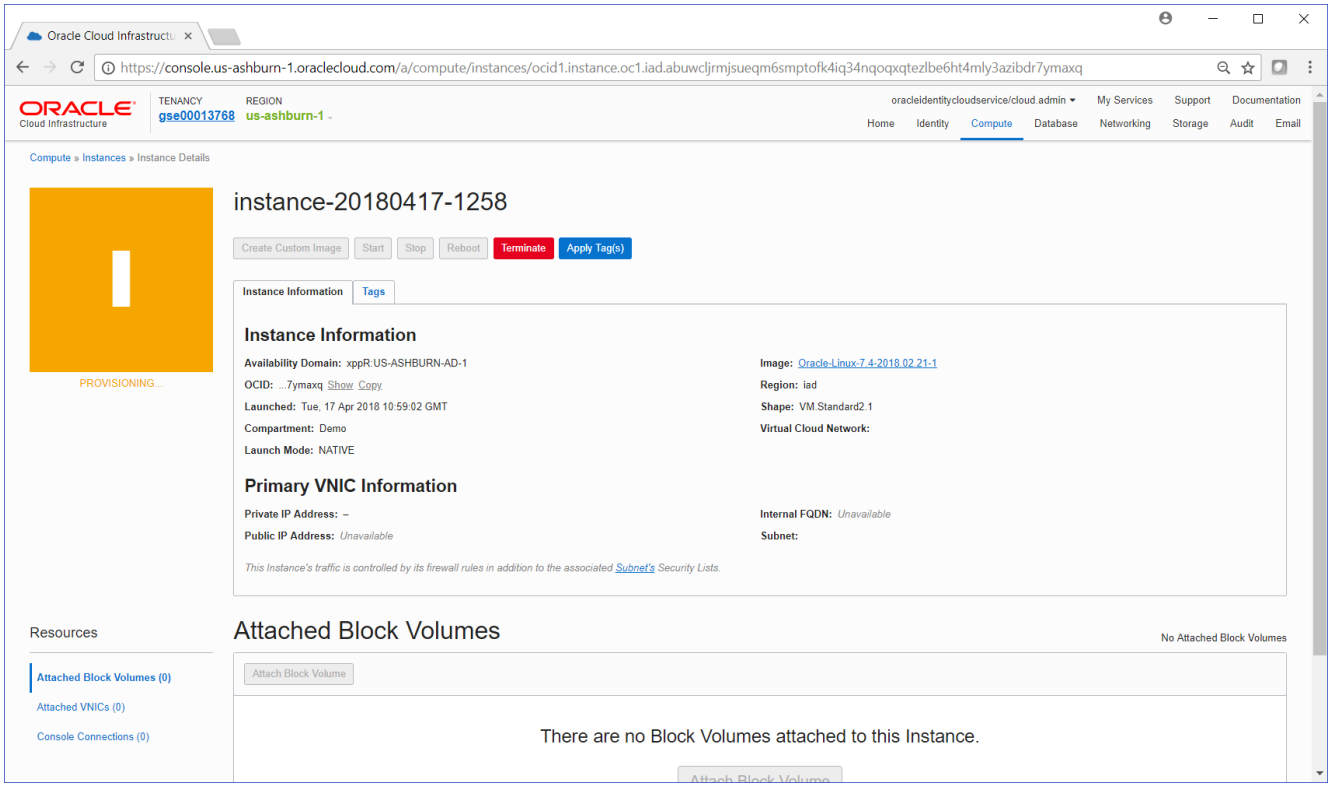
In order to launch the instance, choose an image (Oracle Linux 7.4), choose a shape of the instance (VM.Standard1.4), AD to launch the instance (choose the correct AD as per below), the VCN network, subnet and the public SSH keys (generated in previous step) to access the instance. In this lab, we will focus on launching only a single instance VM in one AD. Provide the values as shown below and click on Launch Instance.

If you get host out of capacity error, choose a different AD and try again. As you select a specific AD, the subnet dropdown will show you the correct subnet for the particular AD.

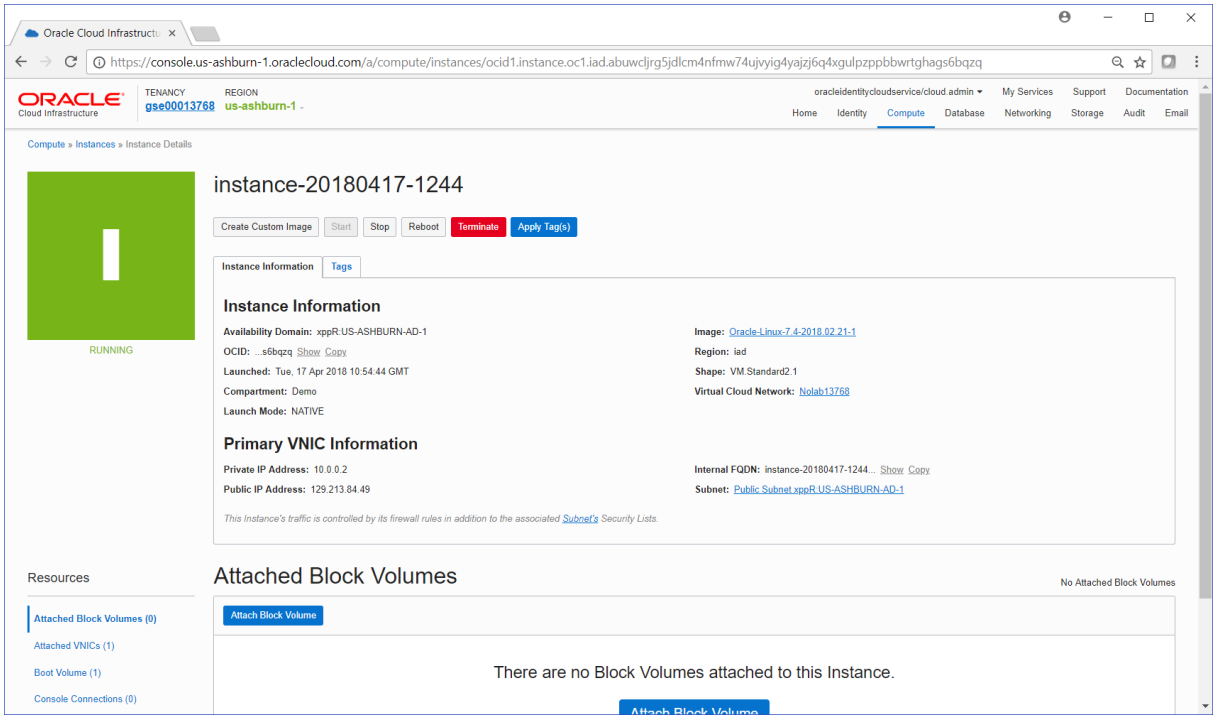

Create Instance
help
cancel
If the image, Virtual Cloud Network, or Subnet is in a different Compartment than the Instance, click here to enable Compartment selection for those resources.
Instance
NAME
instance-20180417-1244
AVAILABILITY DOMAIN
xppR:US-ASHBURN-AD-1
BOOT VOLUME
ORACLE-PROVIDED OS IMAGE
CUSTOM IMAGE
BOOT VOLUME
IMAGE OCID
IMAGE OPERATING SYSTEM
Oracle Linux 7.4
The image will be booted using native mode.
SHAPE TYPE
VIRTUAL MACHINE
BARE METAL MACHINE
SHAPE
VM.Standard2.1 (1 OCPU, 15GB RAM)
Shape compatibility based on selected operating system.
IMAGE VERSION
2018.02.21-1 (latest)
Release Notes
BOOT VOLUME SIZE (IN GB)
Selected image's default boot volume size: 47.0 GB
CUSTOM BOOT VOLUME SIZE
SSH KEYS
CHOOSE SSH KEY FILES
PASTE SSH KEYS



Launching an instance is simple and intuitive with few options to select. You will see a screen like this with the provisioning underway:

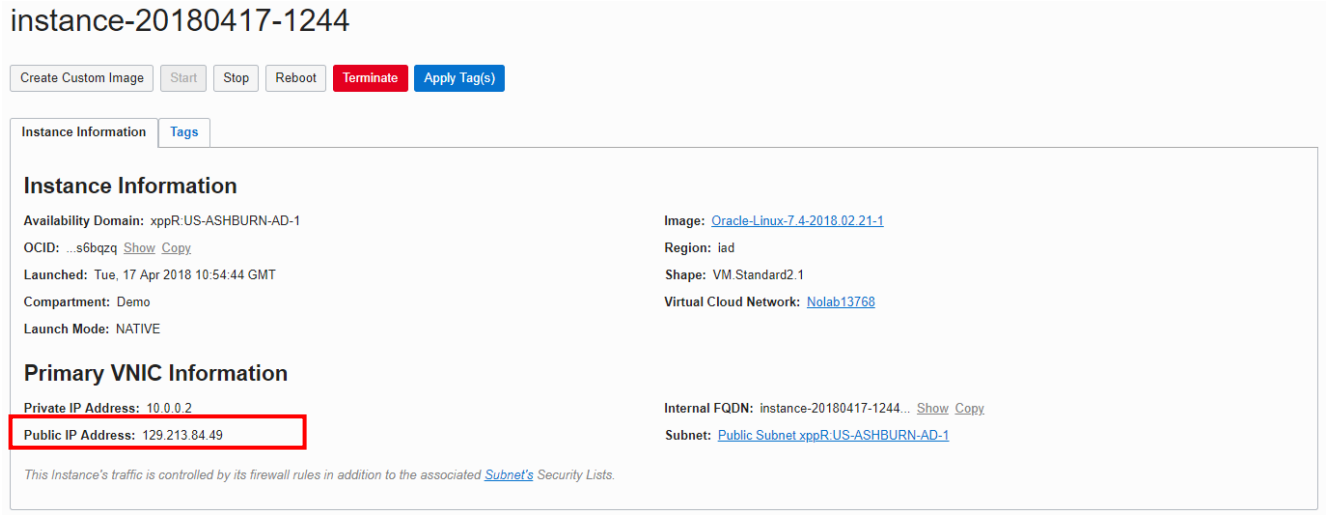


When the instance creation is complete the screen looks like this:



1.4 Connect to the Instance

1. Once the instance state changes to Running, you can SSH to the Public IP address of the instance. Click on the labvm01 and you will find the public IP address listed there.

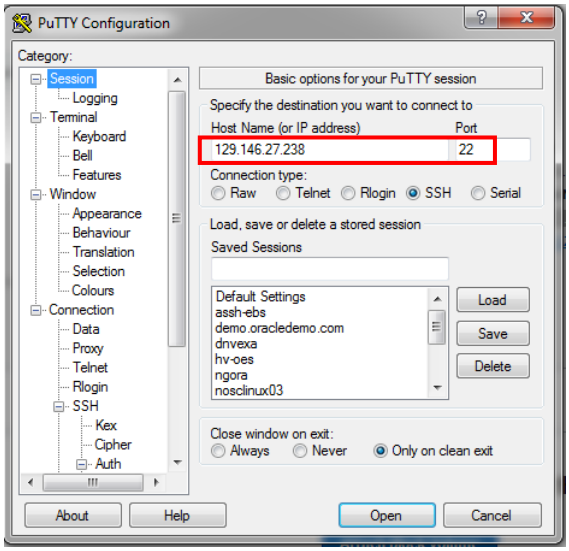


2. SSH to the instance and mount the Volume as provided in next section.

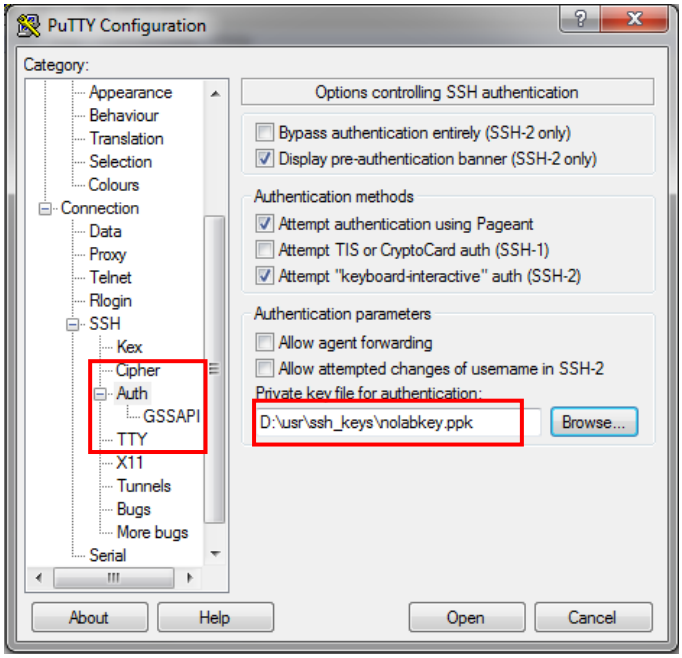
You can use the following command to SSH into the OCI VM on UNIX-style system (including Linux, Solaris, BSD, and OS X).

```
$ ssh -i </path/privateKey> <PublicIP_Address>
```

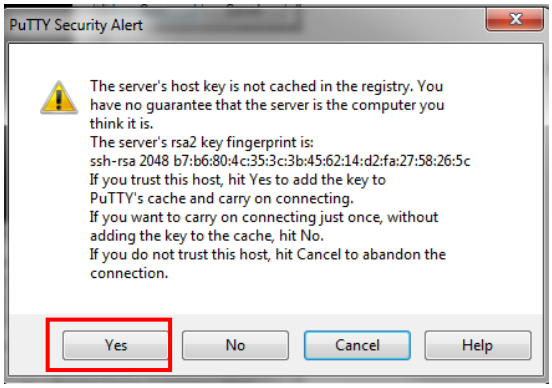
3. For windows, use a tool like PUTTY as shown below – provide the public IP address of the OCI VM.



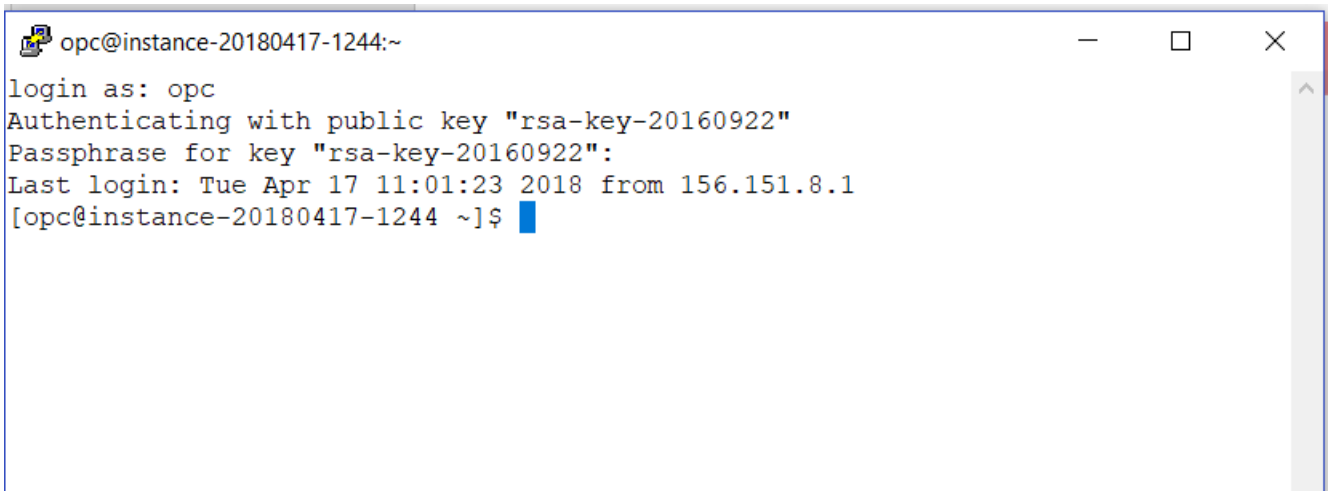
4. Expand on SSH in the LHS menu, click on Auth. Click on browse, and provide the Private SSH key that you had saved in Exercise 1.



5. Click on Yes in the PUTTY Security Alert window.



6. Login with the user name **opc** as shown below.

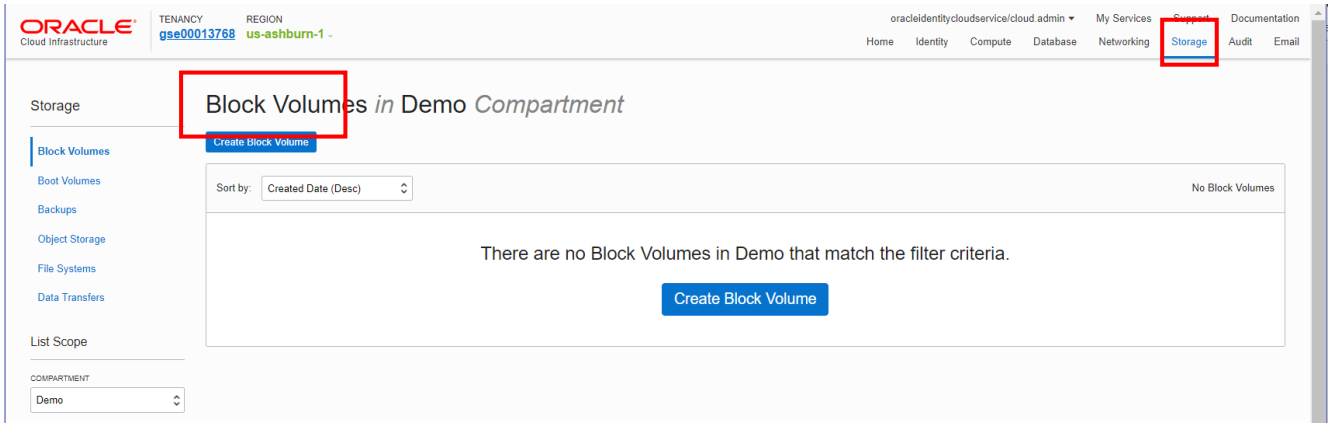


Key Takeaway:

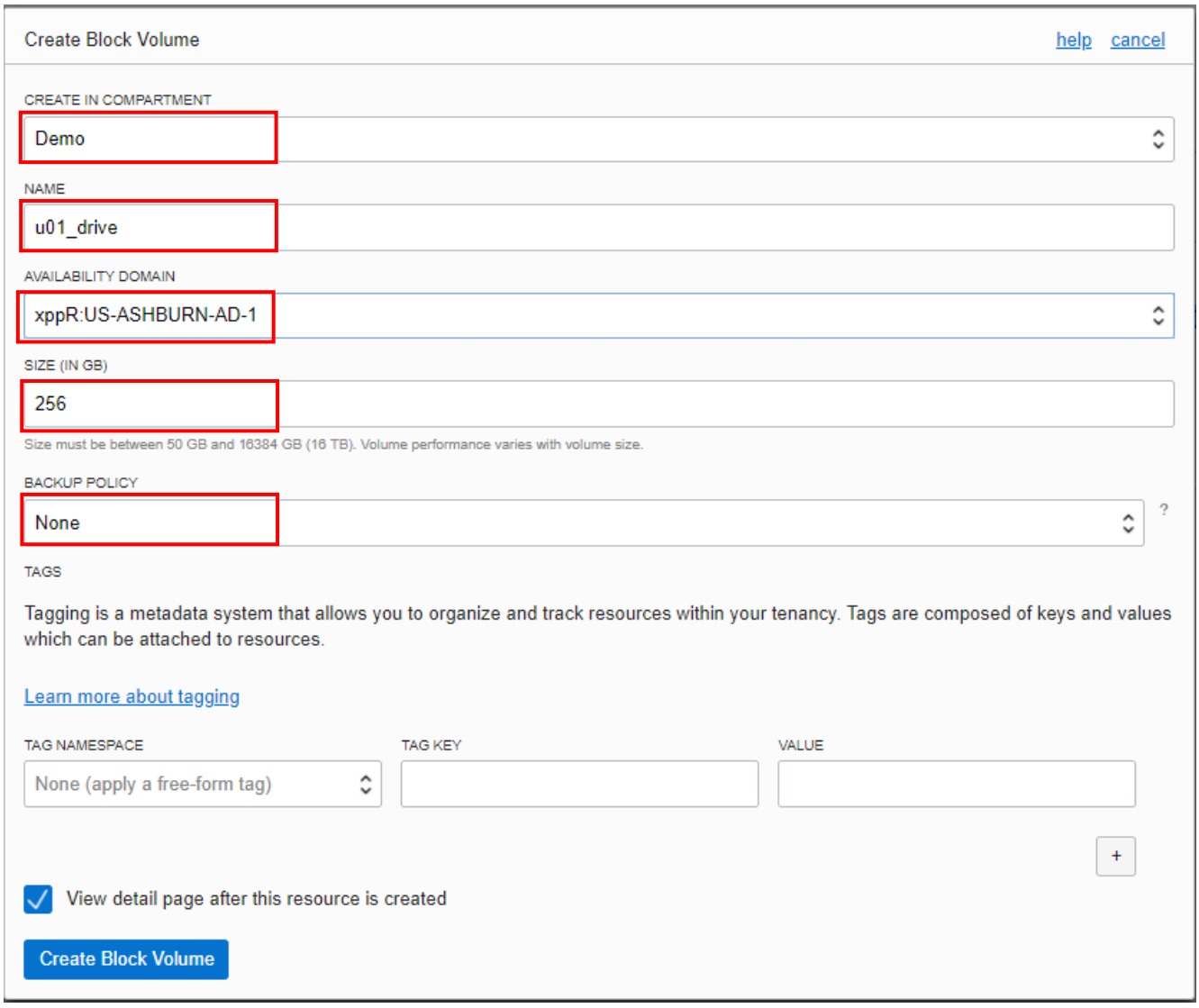
- ✓ Customers can reboot their instance (Stop and Start) and Oracle Bare Metal Cloud Services preserves their Private IP address and Public IP address.

1.5 Create and Mount Block Volume Storage

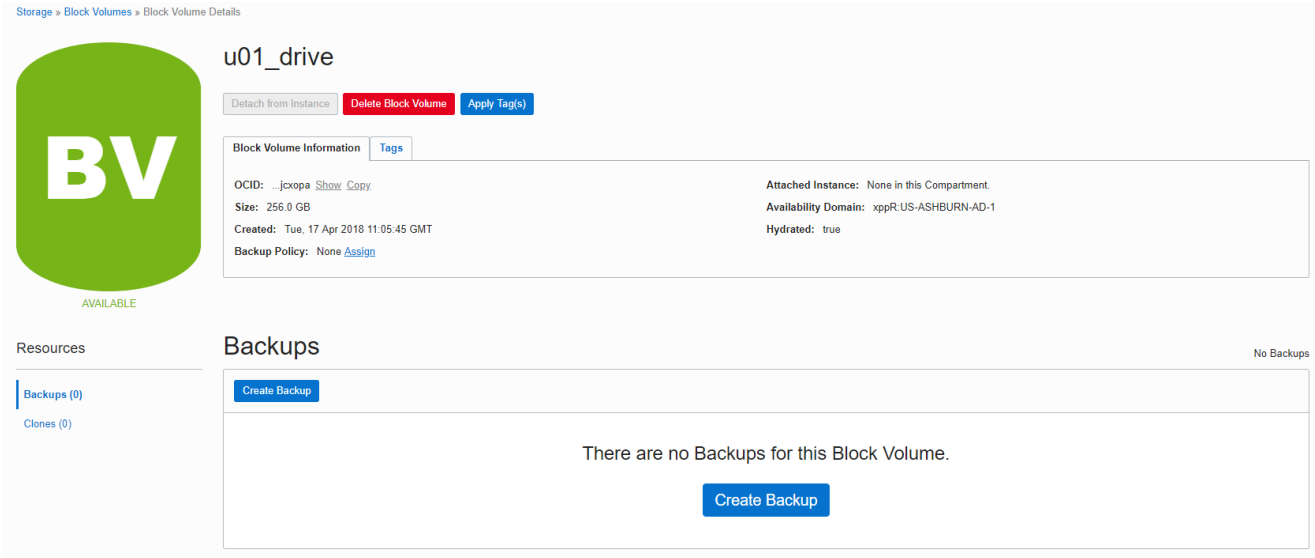
1. Navigate to the Storage tab on top right hand corner and click on Create Block Volume.



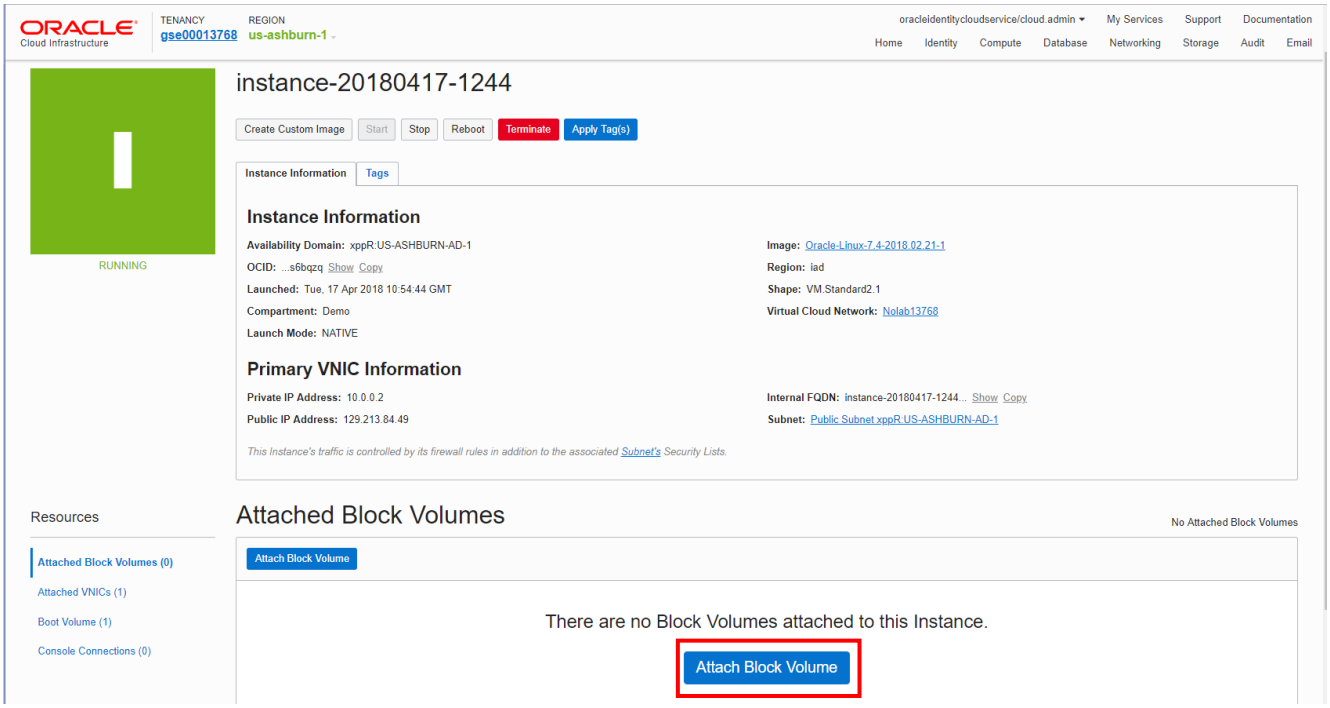
2. Click on Create Block Volume that opens the window below and fill in the appropriate information as below. Make sure that your block volume is in the same AD as your instance. You can choose a 256.0 GB volume for this lab. Click Create Block Volume.



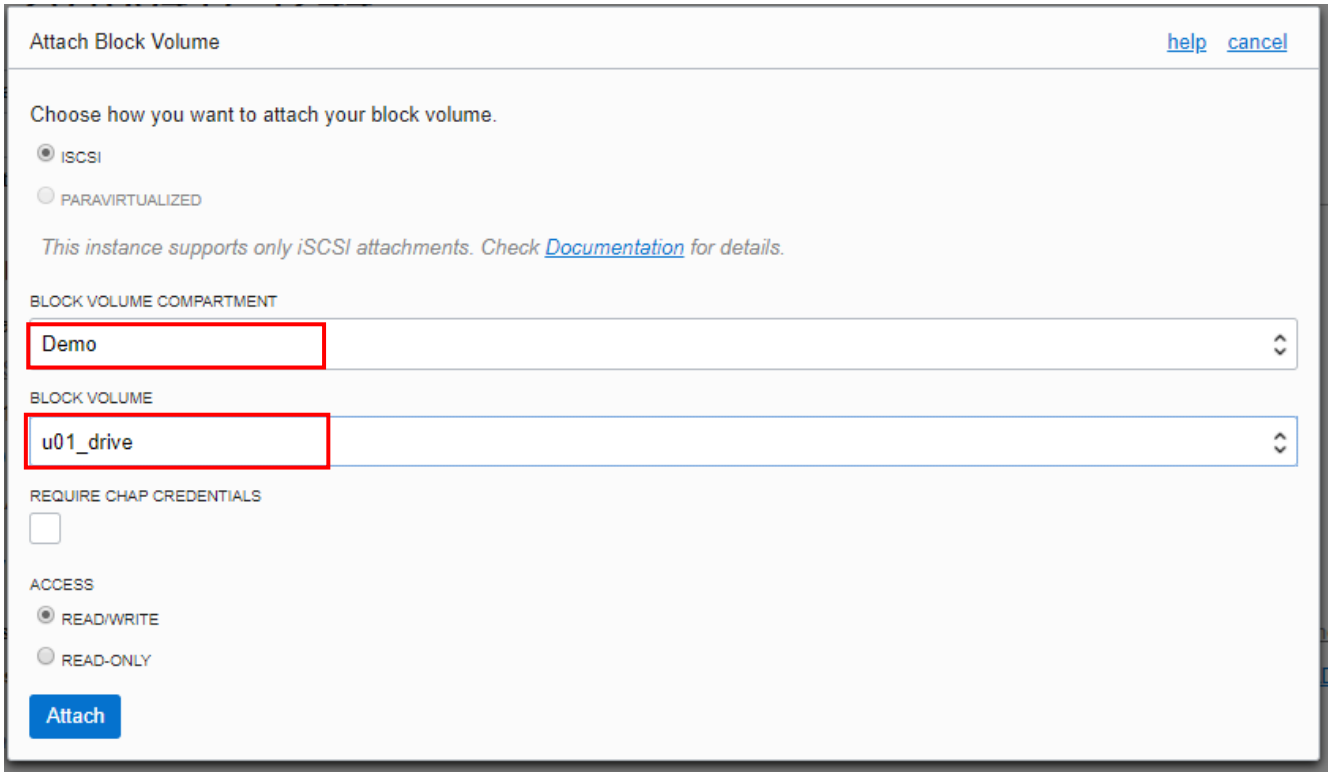
Check that the block volume has been created



3. Once the Block Volume is created, you can attach it to the VM instance you just launched. Go to the Compute instance tab, and navigate to the VM instance and click on the Attach Block Volume button.

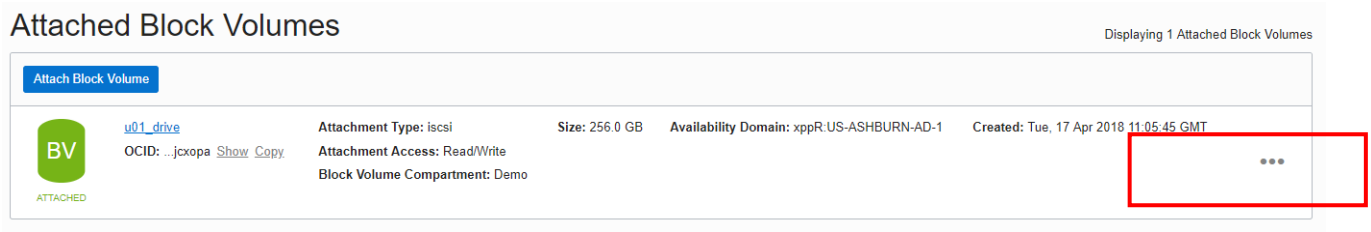


4. Select the block volume you created earlier from the drop down and click on attach.

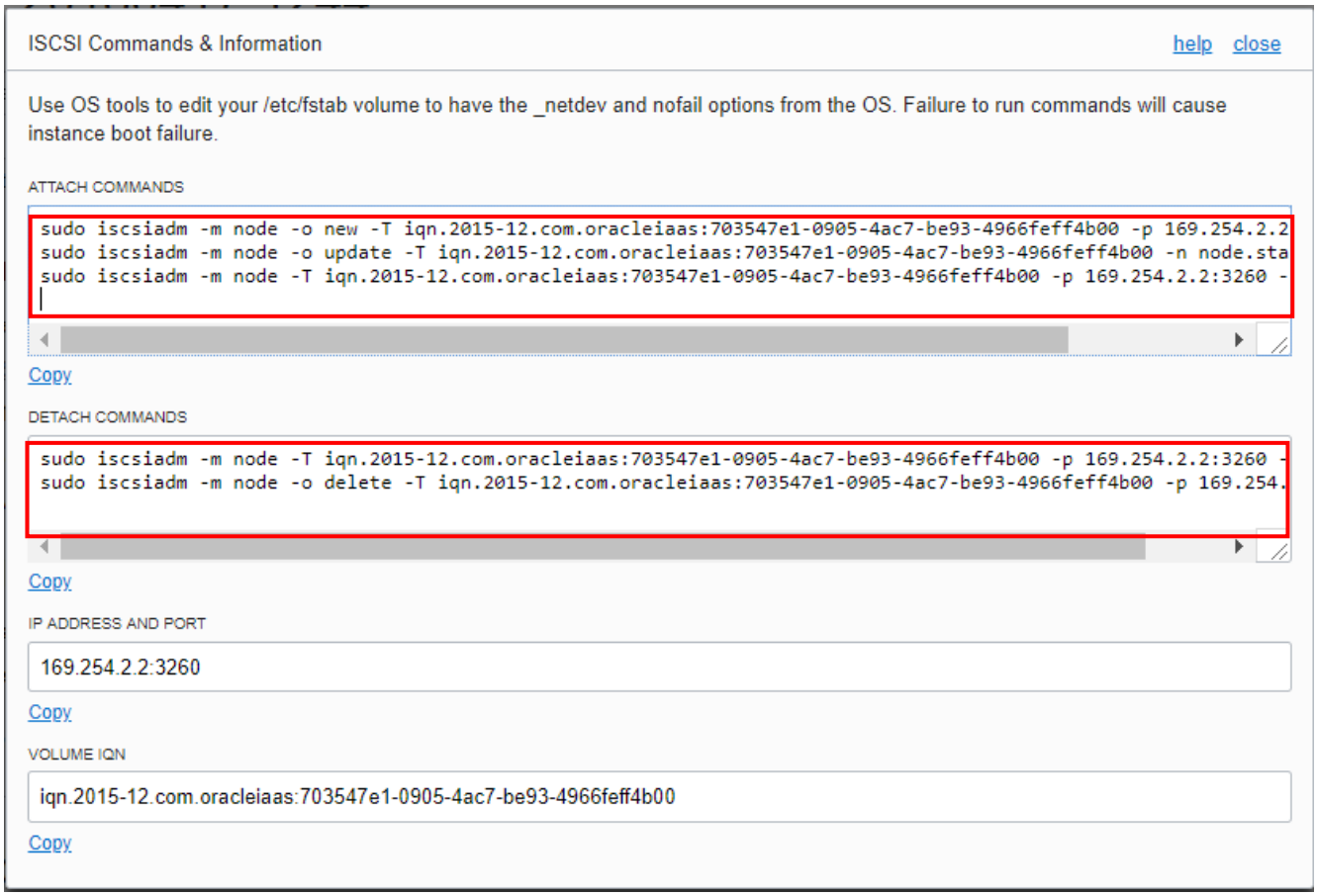


Note: For the purpose of this lab, leave the "Require CHAP Credentials" box unchecked. In customer scenarios, this provides added authentication to attach the volume with an instance.

5. Once the block volume is attached, you can navigate to view the iSCSI details for the volume in order to connect to the volume. It takes a minute for the volume to complete attaching. More details on connecting to volume is in our docs (https://docs.us-az-phoenix-1.oracleiaas.com/Content/Block/Tasks/connectingtoavolume.htm?Highlight=mounting%20block%20volume)


Attached Block Volumes
Displaying 1 Attached Block Volumes
Attach Block Volume
BV
ATTACHED
u01_drive
OCID: ...jcxopa Show Copy
Attachment Type: iscsi
Attachment Access: Read/Write
Block Volume Compartment: Demo
Size: 256.0 GB
Availability Domain: xppR:US-ASHBURN-AD-1
Created: Tue, 17 Apr 2018 11:05:45 GMT

Click on the ellipsis and then click **iSCSI Command and Information link.** Connect to the instance through SSH and **run the iSCSI commands** as provided in the ISCSI Command and Information link shown below. The first two commands are for configure iSCSI and the last one is for logging to iSCSI. Do not proceed without connecting to the volume! Run these commands one at a time.



6. You can now format (if needed) and mount the volume. To get a list of mountable iSCSI devices on the instance, run the following command:

```
[opc@instance-20180417-1244 ~]$ sudo bash
[root@instance-20180417-1244 ~]# fdisk -l
```

7. Run the following commands

```
[root@instance-20180417-1244 ~]# mkfs -t ext4 /dev/sdb
# Press y when prompted
[root@instance-20180417-1244 ~]# mkdir /mnt/home
[root@instance-20180417-1244 ~]# mount /dev/sdb /mnt/home
```

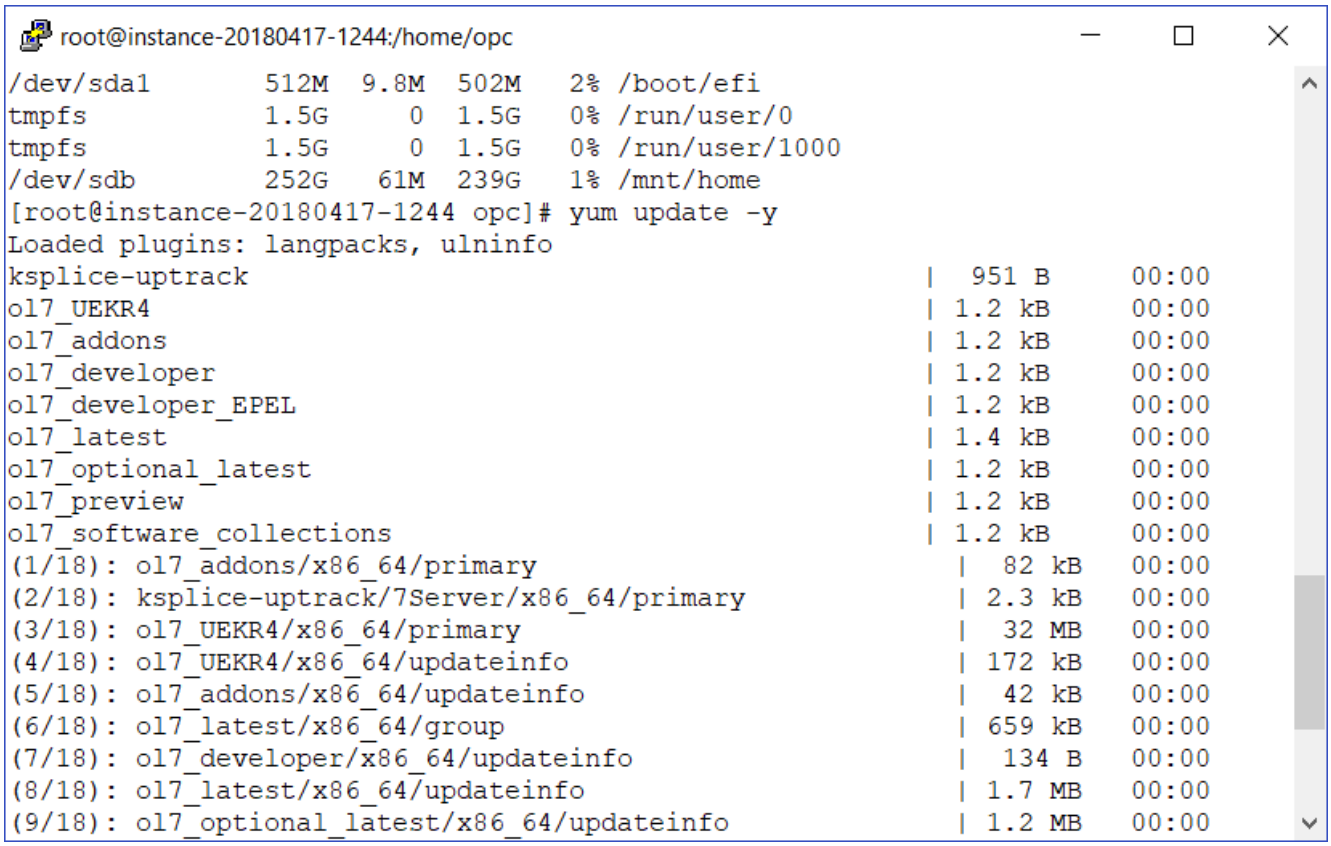
Verify with the df command

```
[root@instance-20180417-1244 opc]# df -h
Filesystem      Size  Used Avail Use% Mounted on
devtmpfs        7.2G     0  7.2G   0% /dev
tmpfs           7.3G     0  7.3G   0% /dev/shm
tmpfs           7.3G  8.5M  7.3G   1% /run
tmpfs           7.3G     0  7.3G   0% /sys/fs/cgroup
/dev/sda3        39G  1.8G   37G   5% /
/dev/sda1       512M  9.8M  502M   2% /boot/efi
tmpfs           1.5G     0  1.5G   0% /run/user/0
tmpfs           1.5G     0  1.5G   0% /run/user/1000
/dev/sdb        252G   61M  239G   1% /mnt/home
```

Update linux with latest updates

Update linux with yum

```
[root@instance-20180417-1244 ~]# yum update -y
```



Create and configure the oracle user

Step1: Create the oracle usr

For the oracle user two groups is created oinstall and dba. Oinstall will be default group during logon. A additional directory will be created in the /mnt/home/home directory.

First create the groups and add user

```
[root@instance-20180417-1244 ~]# groupadd -g 600 dba
```

```
[root@instance-20180417-1244 ~]# groupadd -g 601 oinstall
```

Create the oracle user and add supplemental groups

```
[root@instance-20180417-1244 ~]# useradd -g oinstall oracle
[root@instance-20180417-1244 ~]# usermod -G dba oracle
```

It could be convenient to be able to su directly from user opc to user oracle. Define a password for oracle.

An alternative is to use sudo su – oracle over su – oracle with password

Set password for user oracle to Oracle123

```
[root@instance-20180417-1244 ~]# passwd oracle
Changing password for user oracle.
New password:
BAD PASSWORD: it is based on a dictionary word
Retype new password:
passwd: all authentication tokens updated successfully.
```

The simple approach is to configure the oracle user to use the same public key as opc. Copy the SSH key for user opc

```
[root@instance-20180417-1244 ~]# cd /home/oracle
[root@instance-20180417-1244 ~]# cp -R /home/opc/.ssh .
[root@instance-20180417-1244 ~]# chown -R oracle:oinstall .ssh
```

1.6 Download and Configure VNC

This lab is added. Often software require a UI or browser to install. Most VM's in the OCI Classic and OCI cloud services is without UI, just stripped to the command line. This procedure will give you a UI for the VM.

There are the steps needed for downloading and installing vnc server:

- Update the Linux installation on the VM
- Install required X-resources on the VM
- Install tigervnc server
- Configure the tigervnc server
- Create SSH tunnel for the vnc traffic
- Connect with vnc viewer from local laptop to VM

Step1: Add additional features to the Linux installation on the instance

Download wget , zip and unzip for pulling an image from a web page, and unpack software

```
[root@instance-20180417-1244 ~]# yum install wget -y
[root@instance-20180417-1244 ~]# yum install zip -y
[root@instance-20180417-1244 ~]# yum install unzip  -y
```

Disable the firewall since we are sitting behind the cloud firewall (OEL 6)

```
[root@instance-20180417-1244 ~]# sh /etc/init.d/iptables stop
```

Disable the firewall since we are sitting behind the cloud firewall (OEL 7)

```
[root@instance-20180417-1244 ~]# systemctl stop firewalld
[root@instance-20180417-1244 ~]# systemctl disable firewalld
```

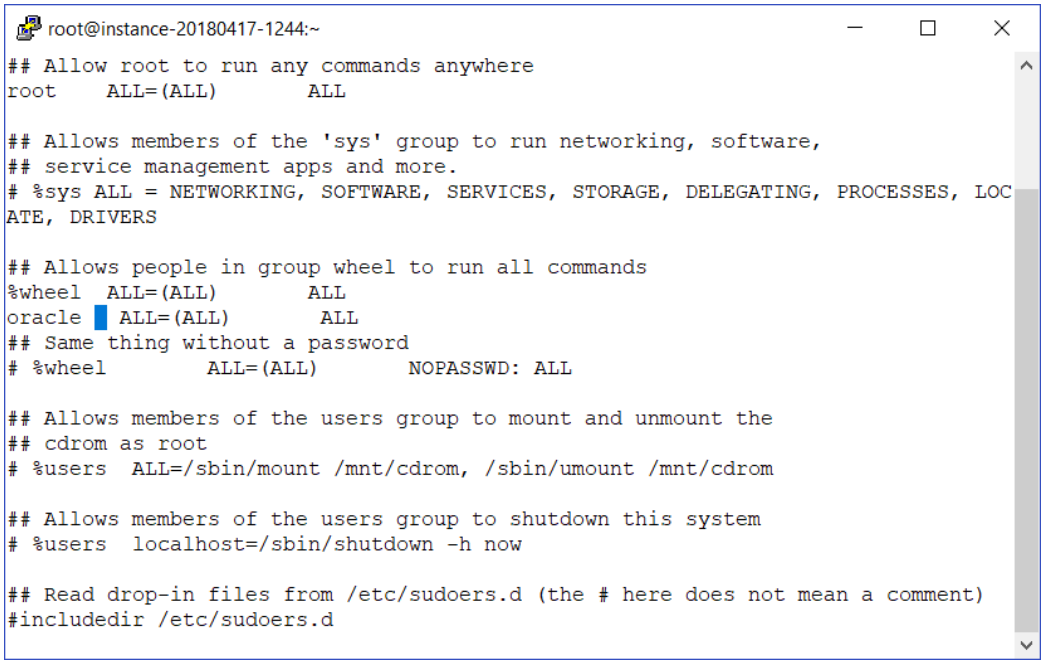
Create the directory for ORACLE_BASE (oracle software install) (sudo to root)

```
[root@instance-20180417-1244 ~]# mkdir /mnt/home/oracle
[root@instance-20180417-1244 ~]# chown oracle:oinstall /mnt/home/oracle
```

The final step is to add user oracle to the sudoers file. Edit the file /etc/sudoers and add the line:

```
oracle    ALL=(ALL)       NOPASSWD: ALL
```

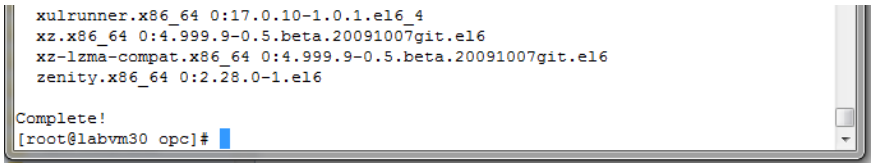
Tip of the day, /etc/sudoers is write protected. If you use vi, save changes with :w!, and exit with :q



Step 2a: Install required X-resources on the instance, OEL6

Install required X-Software

```
[root@labvm30 opc]# yum groupinstall "X Window System" "Desktop" "Desktop
Platform" "General Purpose Desktop" -y
```



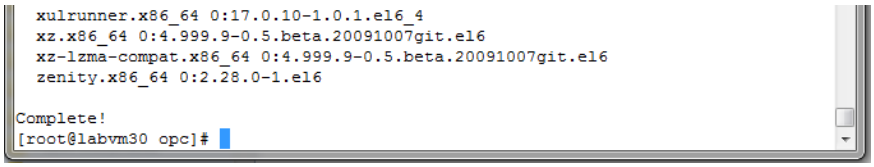
Install X-Init

```
[root@labvm30 opc]# yum install xorg-x11-xinit-session -y
```

Step 2a: Install required X-resources on the instance, OEL7

Install required X-Software

```
[root@instance-20180417-1244 ~]# yum install mesa-libGL -y
[root@instance-20180417-1244 ~]# yum groupinstall "Server with GUI" -y
```



Step 3: Install and configure tigervnc server

Install TigerVNC server

```
[root@instance-20180417-1244 ~]# yum install tigervnc-server -y
```

Tiger VNC requiers the dbus service to be running (OEL 6 Only)

```
[root@labv05 init.d]# /etc/init.d/messagebus start
```

Exit back to your opc usr, and sudo to usr oracle. Do an initial start of vncserver. This generates the .vnc directory. Enter password Oracle123.

```
$[root@instance-20180417-1244 ~]# exit
Exit
[opc@instance-20180417-1244 ~]$ sudo su - oracle
[oracle@instance-20180417-1244 ~]$ vncserver :1

You will require a password to access your desktops.

Password:

Verify:

xauth:  file /home/oracle/.Xauthority does not exist

xauth: (stdin):1:  bad display name "labvm30:1" in "add" command



New 'labvm30:1 (oracle)' desktop is labvm30:1


Creating default startup script /home/oracle/.vnc/xstartup
Starting applications specified in /home/oracle/.vnc/xstartup
Log file is /home/oracle/.vnc/labvm30:1.log
```

Stop the vnc server with the –kill option

We now need to create a xstartupfile that gives a normal gnome desktop. To do this:

- cd to .vnc
- Rename xtsartup to xstartup_old
- Create a new xstartup
- Set file permissions correctly

Set correct directory and kill the vncserver

```
[oracle@ instance-20180417-1244 ~]$ cd .vnc
[oracle@ instance-20180417-1244 .vnc]$ vncserver -kill :1
```

Rename xstartup

```
[oracle@instance-20180417-1244 .vnc]$ mv xstartup xstart_org
```

Create new xstartupfile

```
[oracle@instance-20180417-1244 .vnc]$ vi xstartup
```

Enter the following content to the new xstartup file

```
#!/bin/sh
```

```
# Uncomment the following two lines for normal desktop:

unset SESSION_MANAGER

exec /etc/X11/xinit/xinitrc

[ -x /etc/vnc/xstartup ] && exec /etc/vnc/xstartup

[ -r $HOME/.Xresources ] && xrdb $HOME/.Xresources

xsetroot -solid grey

vncconfig -iconic &

xterm -geometry 80x24+10+10 -ls -title "$VNCDESKTOP Desktop" &

#twm &

gnome-session&
```

Set file permissions and restart the vncserver

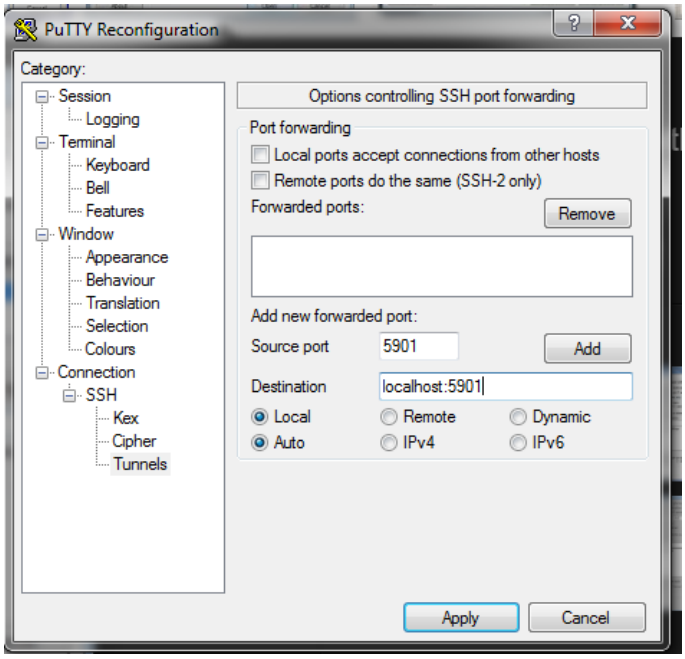
```
[oracle@instance-20180417-1244 .vnc]$ chmod a+x xstartup

[oracle@instance-20180417-1244 .vnc]$ vncserver :1
```

Step 4: Create SSH tunnel for the vnc traffic

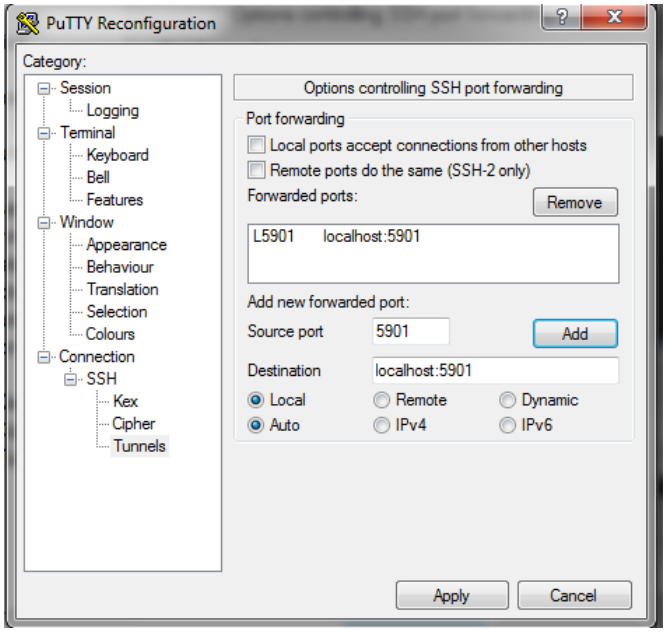
For security reasons we have not opened the firewall for the X- or VNC traffic. The best option, if not a VPN gateway s installed, is to tunnel the vnc traffic via ssh, in our case with putty.

Go to putty change setting, and click on connection ->ssh->Tunnels

Enter soruce port 5901 and destination localhost:5901 and clik add

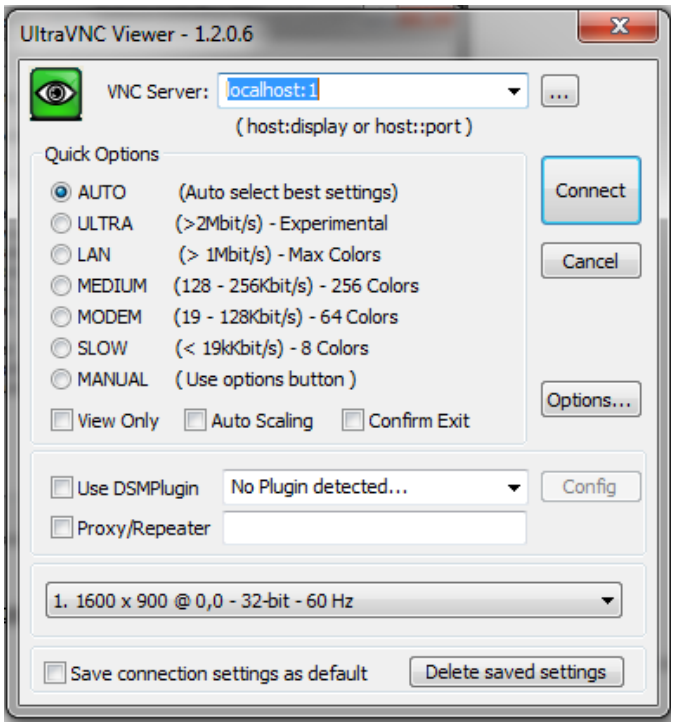


Your putty config should now look like below

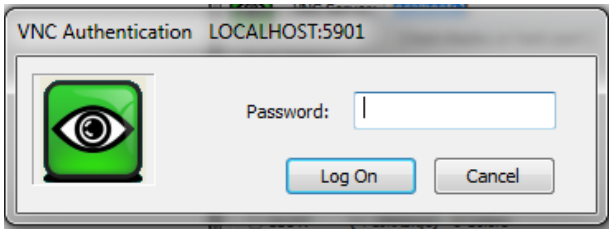


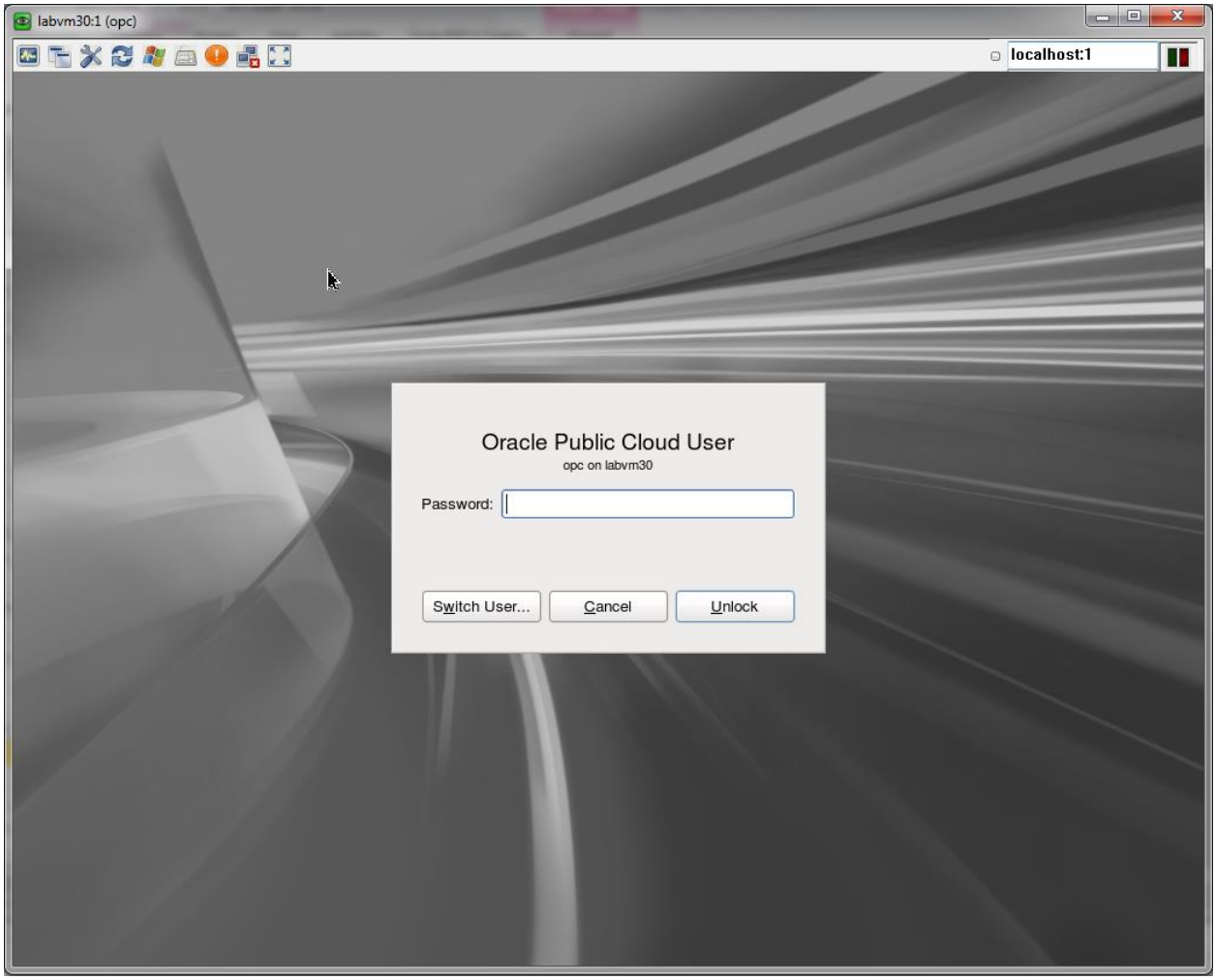
Step 5: Connect with vnc viewer from local laptop to VM

If you run ultravnc or vncviewer, connect to localhost:1



The display should look like the display below:





Step 6: Install firefox

To have access with firefox might be very convenient. Install firefox:

```
[oracle@instance-20180417-1244 .vnc]$ cd
[oracle@instance-20180417-1244 ~]$ sudo yum install firefox -y
```