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Oracle Cloud Infrastructure Fundamentals

Activity Guide

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Oracle Bare Metal Cloud Services
MEAN stack Hands on Lab (HOL)

V1.0

ORACLE LAB BOOK | SEPTEMBER 2017

Oracle Bare Metal Cloud Services MEAN stack Hands on Lab (HOL)

Overview

Oracle has built Bare Metal Cloud Services (BMCS) platform that can run both Oracle workloads and cloud native applications. In this hands on lab, we will walk through getting a cloud native application stack on BMC. The purpose of this lab is to get familiar with Bare Metal Cloud primitives. At the end of this lab, you will be familiar with creating a network, launching an instance, and accessing the instance.

For this lab, we will go through installing and running MEAN (MongoDB, Express, AngularJS, and Node.js) stack that is used widely by many applications. MongoDB is a popular NoSQL document database that is used by a wide variety of applications. Express is a Node.js server side application framework. AngularJS is the client side web application framework, and Node.js is a JavaScript run time popular for being a web server platform.

Pre-Requisites

- Bare Metal Cloud Services account credentials (User, Password, and Tenant)
- SSH key generated and available

SSH key generation

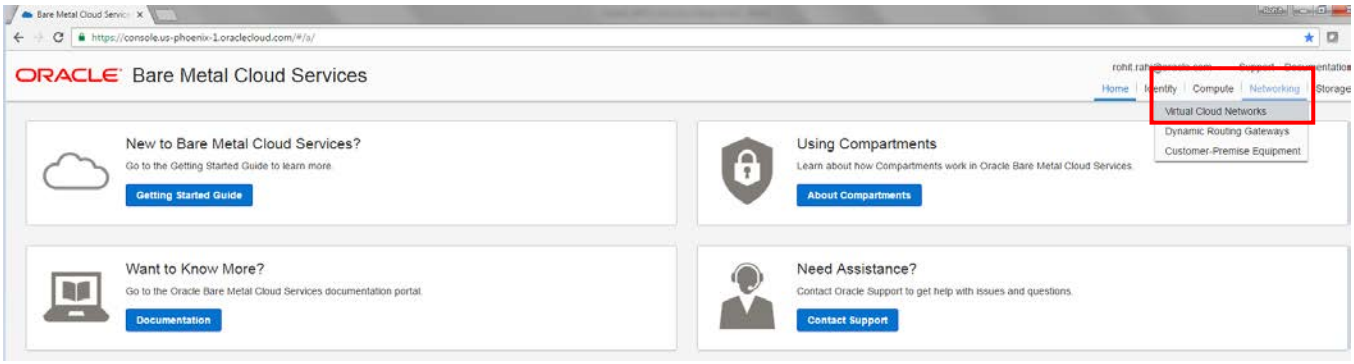
If you already have a public / private key pair, you can use that for SSH. If you need to generate an SSH key, refer for additional doc here: https://git-scm.com/book/en/v2/Git-on-the-Server-Generating-Your-SSH-Public-Key

Exercise 1: Sign into the Console and locate your compartment

1. Go to https://demo.oracle.com and get the user id, password, and tenant id to login to Bare Metal Cloud Services.
2. Navigate to https://console.us-phoenix-1.oraclecloud.com/. This is the URL to access the BMCS console.
3. Enter your credentials to sign-in:
4. User: <>
5. Password: <>
6. Tenant: <>

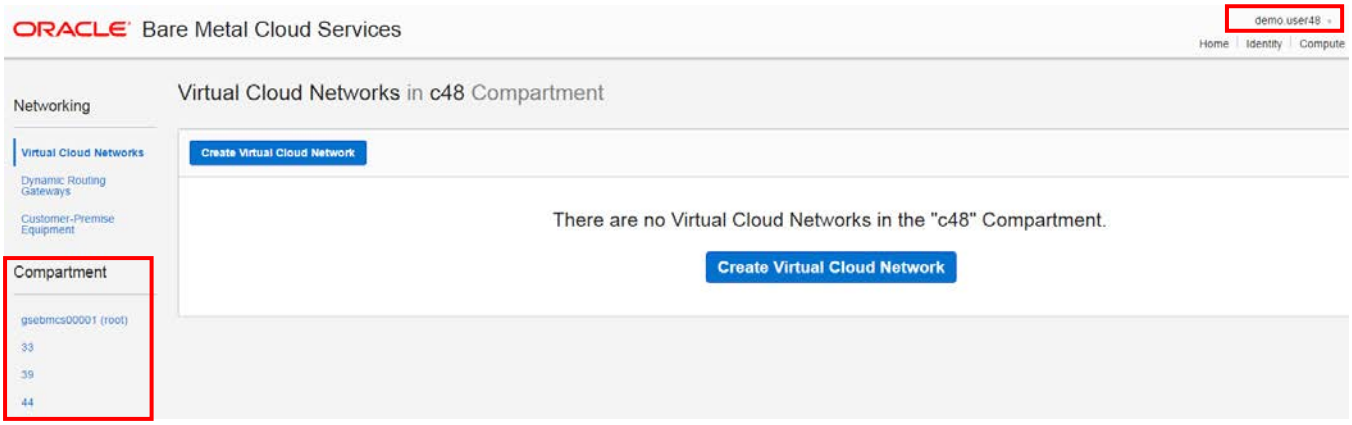
Reach out to your room champion if you have any questions on account access.

Step 1: After you login to the BMCS console, navigate to the networking tab and select Virtual Cloud Networks.



STOP and make sure you locate your compartment names.

E.g. for a user with a username such as demo.user48, the correct compartment name is c48 and so on. If you don't select the correct compartment, none of the steps below will work. You might need to scroll down under the compartment heading on the left navigation menu to locate your specific compartment number. In all the steps below, you will be using your specific compartment number (and not the root compartment).

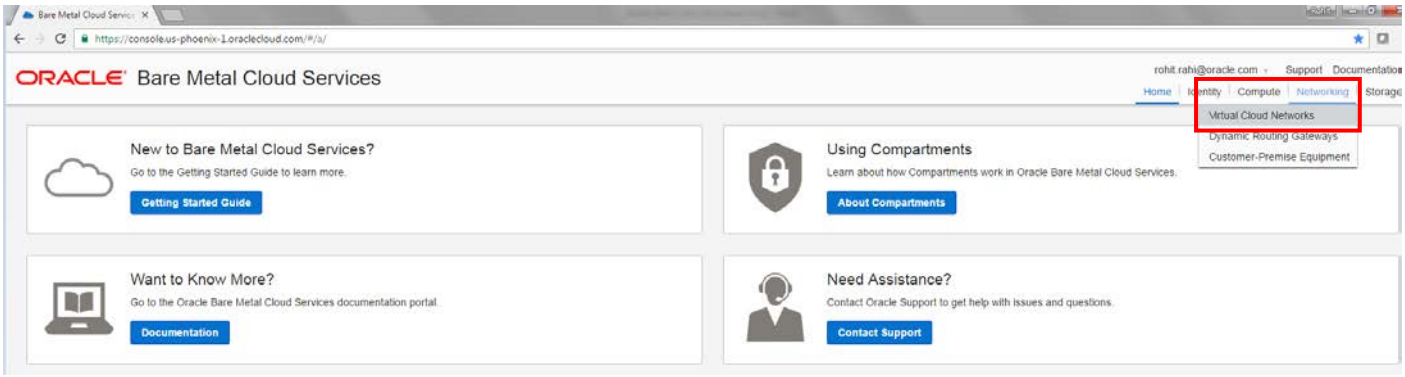


Exercise 2: Create a Virtual Cloud Network (VCN)

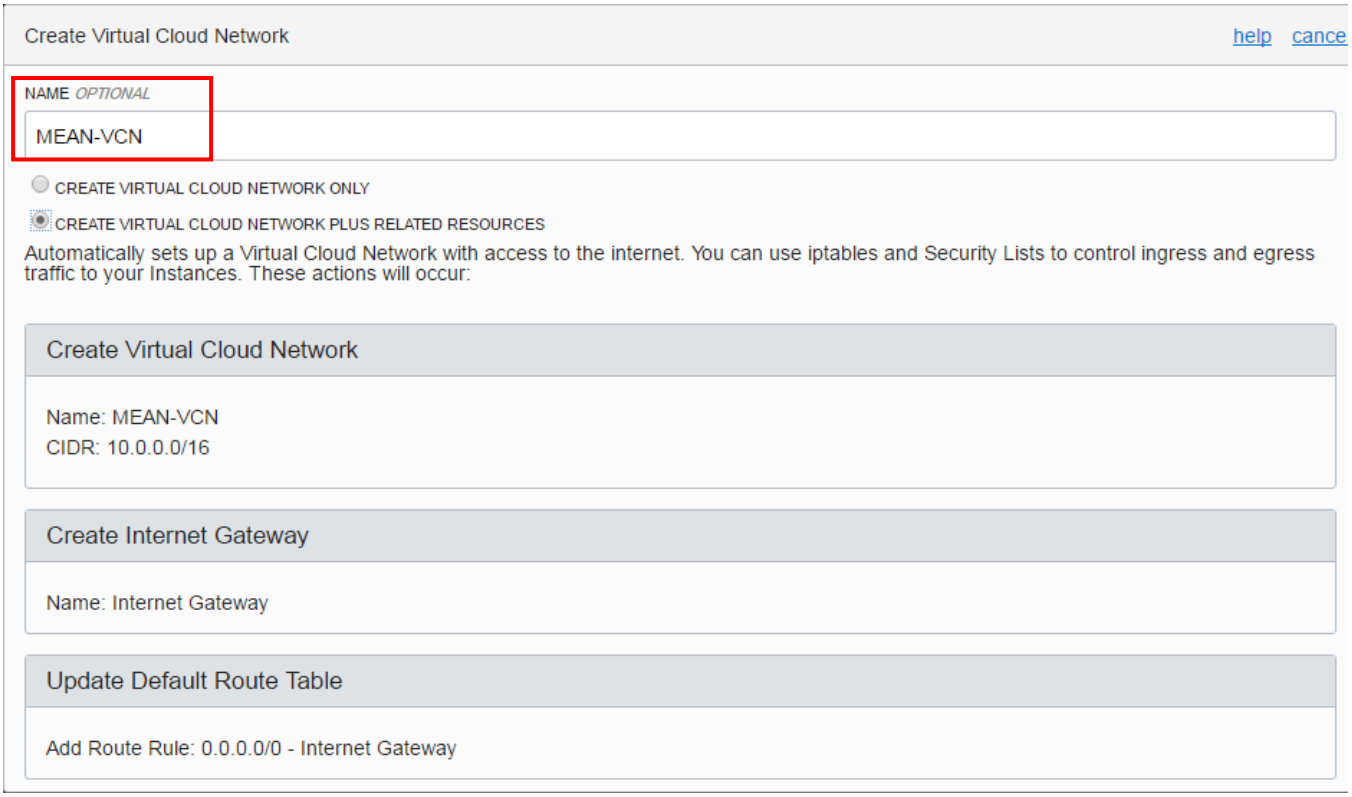
A Virtual Cloud Network (VCN) is a virtual version of a traditional network—including subnets, route tables, and gateways—on which your compute instances run. Customers can bring their network topology to the cloud with VCN. Creating a VCN involves a few key aspects such as:

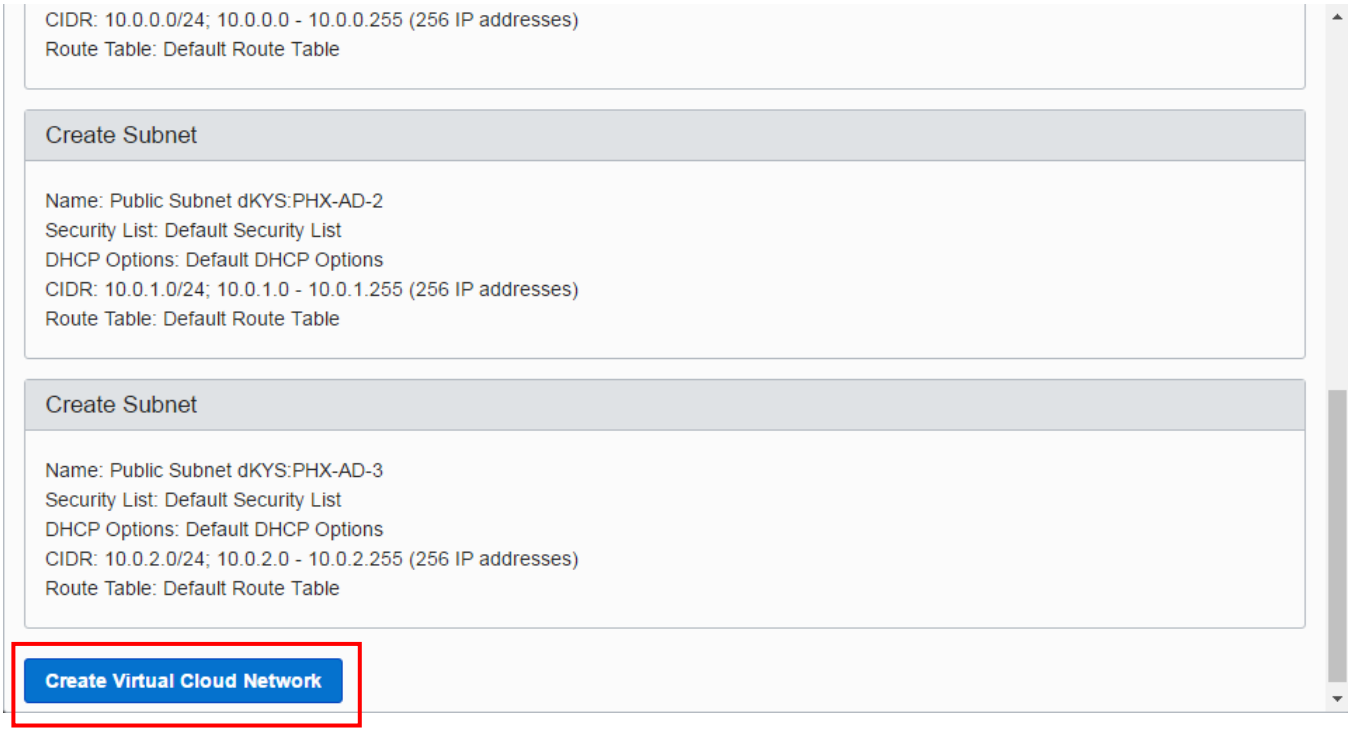
- Allocate a private IP block for the cloud (CIDR range for the VCN). Customers can bring their own RFC1918 IP addresses.
- Create Subnets by partitioning the CIDR range into smaller networks (sub networks for front end, back end, database)
- Create an optional Internet Gateway to connect VCN subnet with Internet. Instances created in this subnet will have a public IP address.
- Create Route table with route rules for Internet access
- Create Security Group to allow relevant ports for ingress and egress access

Step 1: After you login, navigate to the networking tab and select Virtual Cloud Networks.

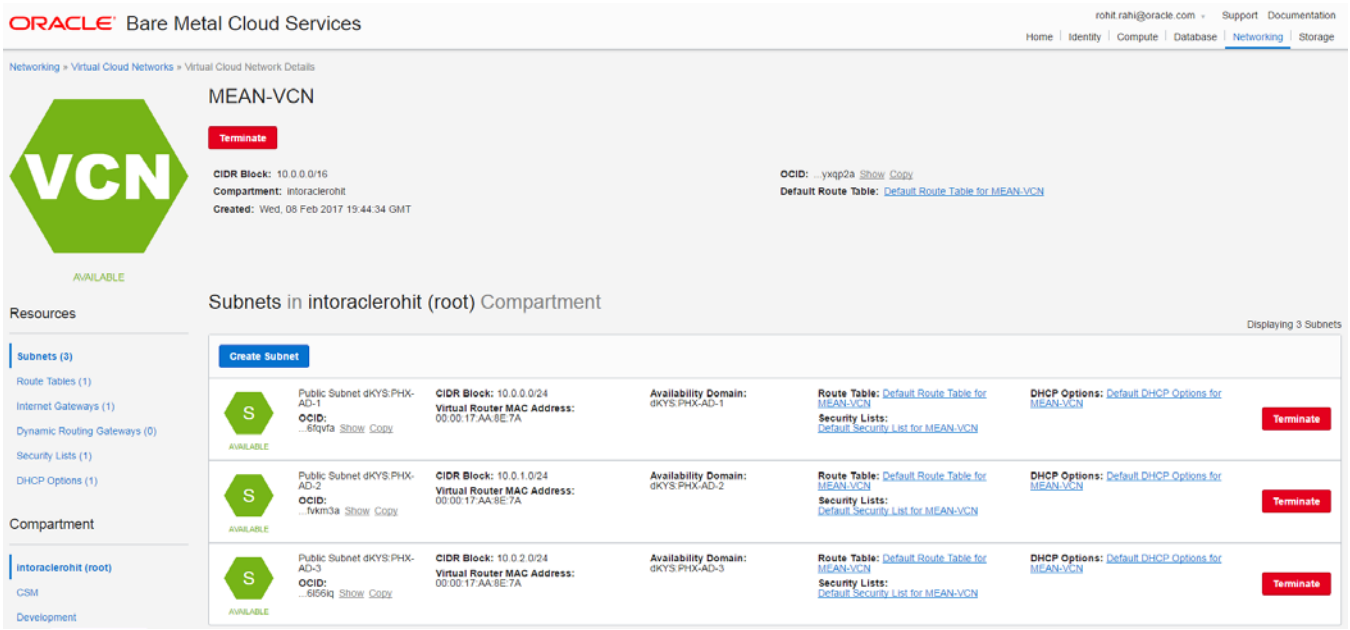


Step 2: Create a Cloud Network by specifying a name for your VCN and selecting the "**Create VIRTUAL CLOUD NETWORK PLUS RELATED RESOURCES**" option. This will create a VCN, Subnets, Routing Table, Security Groups and Internet Gateway using a 10.0.0.0/16 CIDR range. Scroll to the bottom of the screen and click "create Virtual Cloud Network" button.



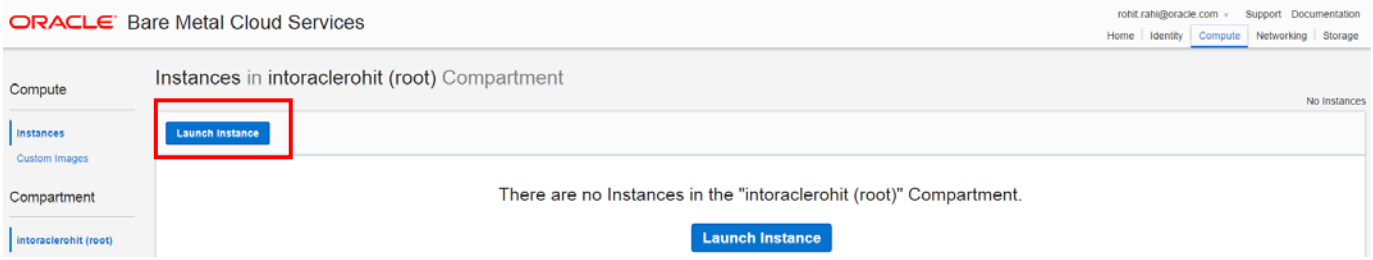


Once the VCN is created, navigating to list of VCN's, you can see the "MEAN-VCN", which you just created in the step above.



Exercise 3: Launch a Virtual Machine (VM) Instance

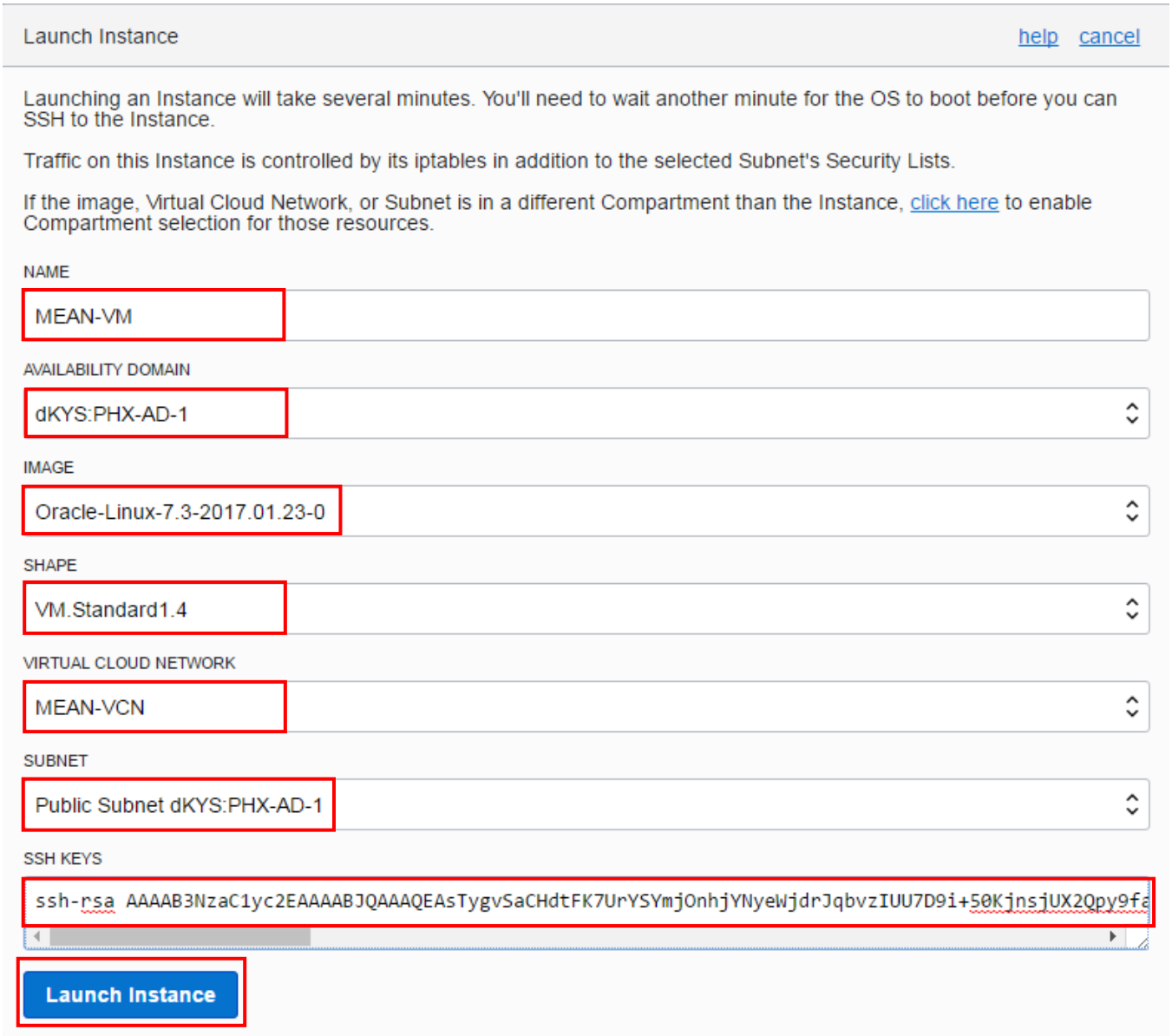
Step 1: Navigate to the Compute tab and click Launch Instance. We will launch a VM instance for this lab.



Step 2: In order to launch the instance, choose an image (Oracle Linux 7.3), choose a shape of the instance (VM.Standard1.4), AD to launch the instance (AD1, AD2 or AD3), the VCN network created above, subnet (in the appropriate Availability Domain) and the public SSH keys to access the instance. In this lab, we will focus on launching only a single instance VM in one AD. 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. To select the correct AD, follow this rule –

- Select AD1 if your tenant id is any of these - gsebmcs00002, gsebmcs00004, gsebmcs00007, gsebmcs00010, gsebmcs00011
- Select AD2 if your tenant is any of these - gsebmcs00006, gsebmcs00008, gsebmcs00009, gsebmcs00012
- Select AD3 if your tenant is any of these gsebmcs00001, gsebmcs00003, gsebmcs00005

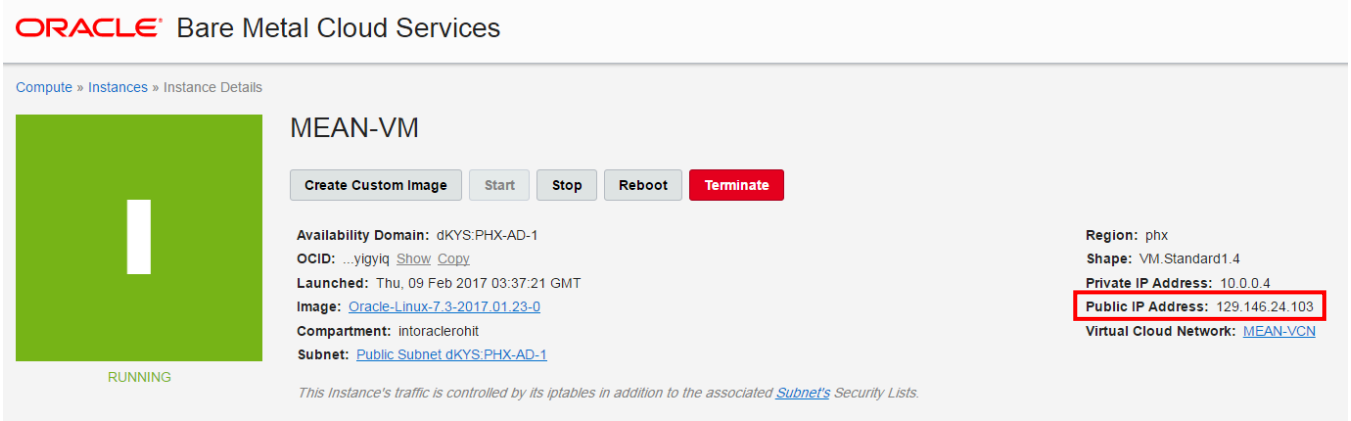
If you get host out of capacity error, choose a different Availability Domain and try again. As you select a specific AD, the subnet dropdown will show you the correct subnet for the particular AD.



Launching an instance is simple and intuitive with few options to select. Provisioning of the compute instance will complete in less than a minute and the instance state will change from provisioning to running.

Exercise 4: Connect to the Instance

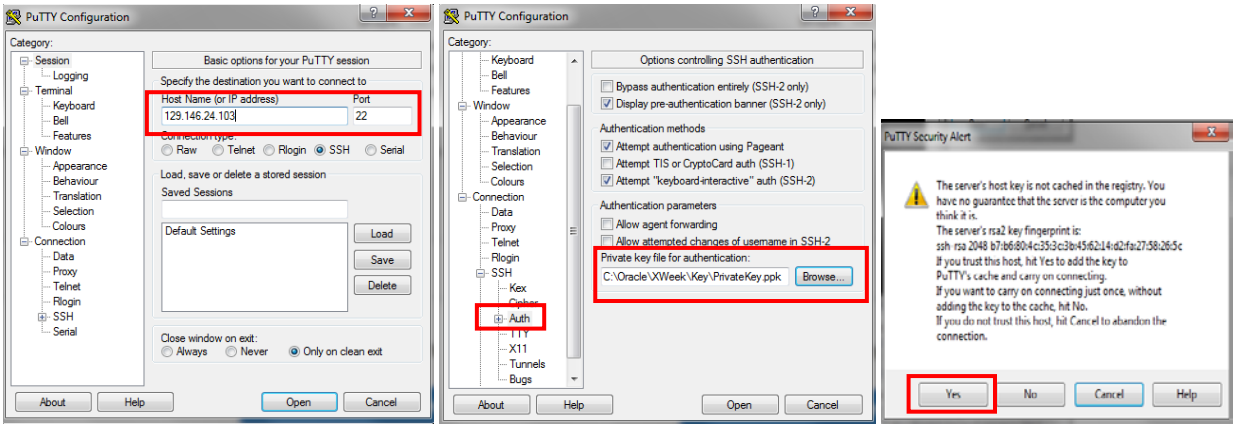
Step 1: Once the instance state changes to Running, you can SSH to the Public IP address of the instance. Click on the MEAN-VM link and you will find the public IP address listed there.



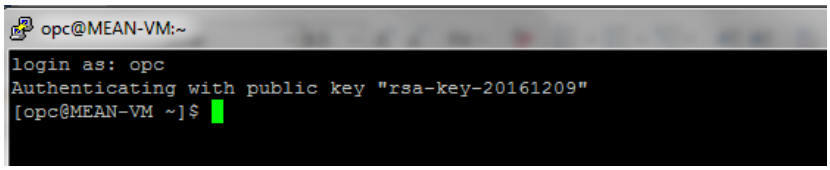
Step 2: SSH to the instance and mount the Volume as provided in next section. You can use the following command to SSH into the BMCS VM on UNIX-style system (including Linux, Solaris, BSD, and OS X).

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

For windows, use a tool like PUTTY as shown below – provide the public IP address of the BMCS VM. Expand on SSH in the LHS menu, click on Auth. Click on browse, and provide the Private SSH key that you had saved earlier while generating the SSH key pair. Click on Yes in the PUTTY Security Alert window.



Step 3: Login with the user name **opc** as shown below.

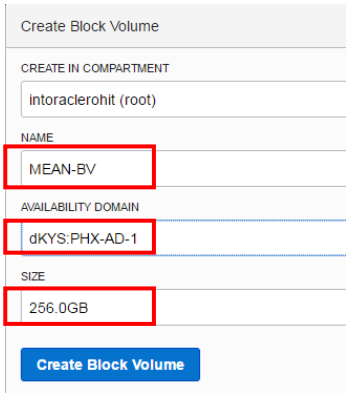


Exercise 5: Create and Mount Block Volume Storage

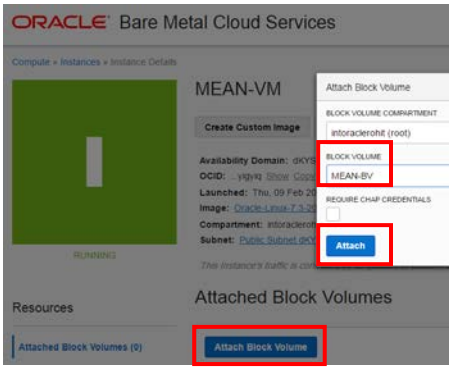
Step1: Navigate to the Storage tab on top right hand corner and click on Create Block Volume.



Step 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.



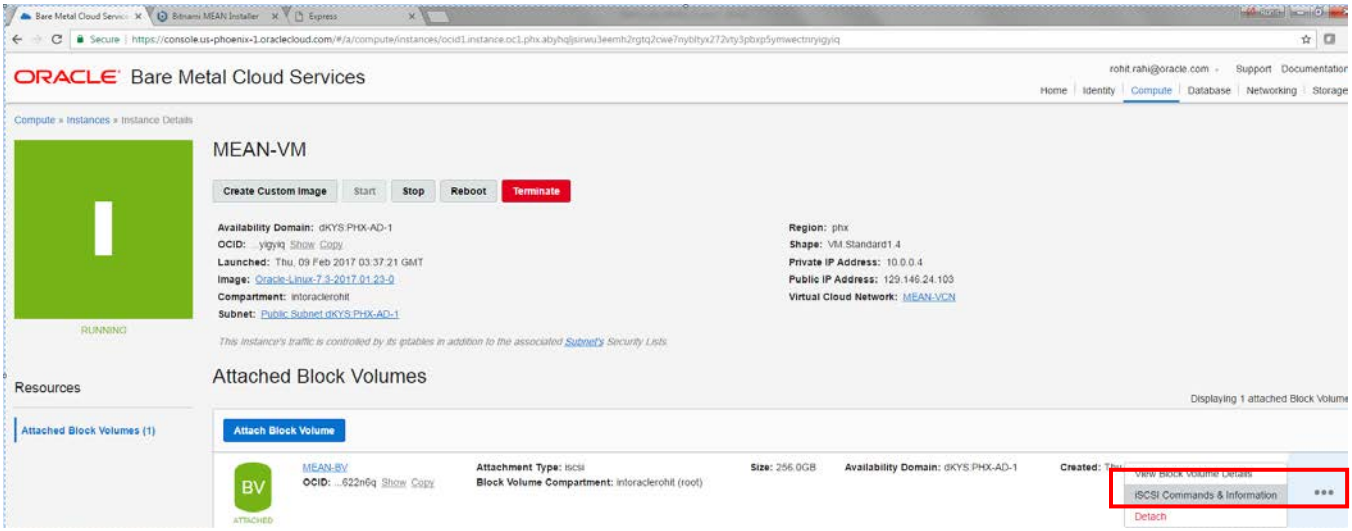
Step 3: Once the Block Volume is created, you can attach it to the VM instance you just launched. Go to the Compute instance tab, and navigate to the VM instance and click on the Attach Block Volume button. Select the block volume you created earlier from the drop down and click on attach.

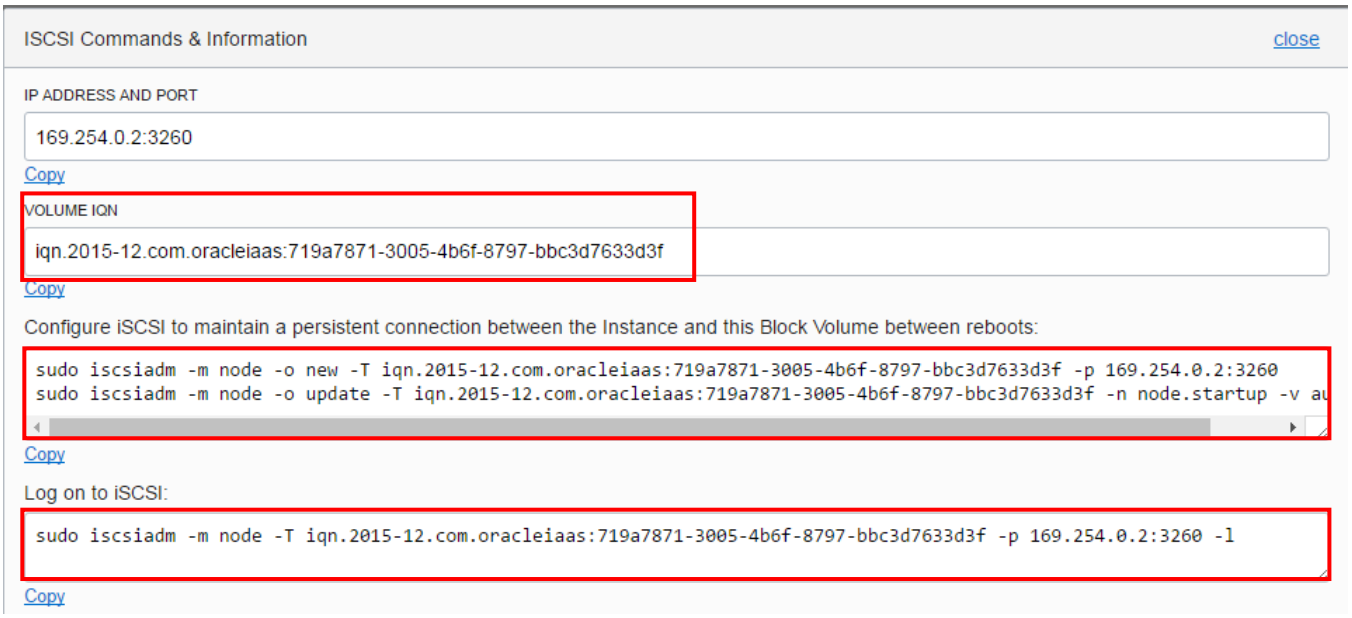


Note: For the purpose of this lab, leave the “Require CHAP Credentials” box unchecked. In customer scenarios, this provides added authentication to attach the volume with an instance.

Step 4: 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)

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.





Step 5: 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@MEAN-VM ~]$ sudo fdisk -l
```

Run the following commands

```
[opc@ MEAN-VM ~]$ sudo mkfs -t ext4 /dev/sdb
# Press y when prompted
[opc@ MEAN-VM ~]$ sudo mkdir /mnt/home
[opc@ MEAN-VM ~]$ sudo mount /dev/sdb /mnt/home
```

Exercise 6: Download and Configure MEAN Stack

For this lab, we are going to use a Bitnami MEAN Stack that provides a complete development environment for MongoDB and Node.js that can be deployed in one click. It includes the latest stable release of MongoDB, Express, Angular, Node.js, Git, PHP and RockMongo.

Step1: use the following commands to download and install the MEAN stack on Linux. The downloaded file will be named 'bitnami-mean-linux-installer.run'.

```
$ sudo yum install wget -y
$ wget -O bitnami-mean-linux-installer.run
https://bitnami.com/stack/mean/download_latest/linux-x64
```

To begin the installation process, give the installer executable permissions and then execute the installation file, as shown below:

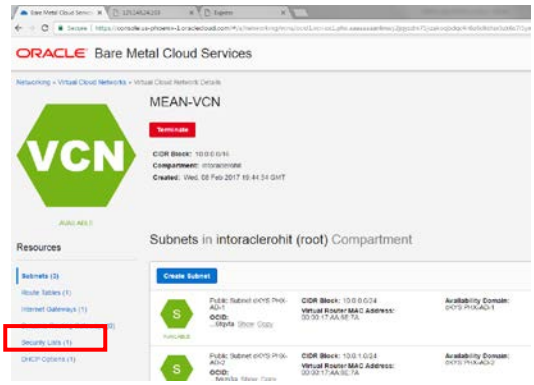
```
$ chmod 755 bitnami-mean-linux-installer.run
$ ./bitnami-mean-linux-installer.run
# follow the prompts and install Python, Git, ImageMagic, RockMongo, PHP
# provide name for a root folder for MEAN (choose any name)
# provide strong password for Mongo (choose any password)
# provide yes for launching Bitnami MEAN
```

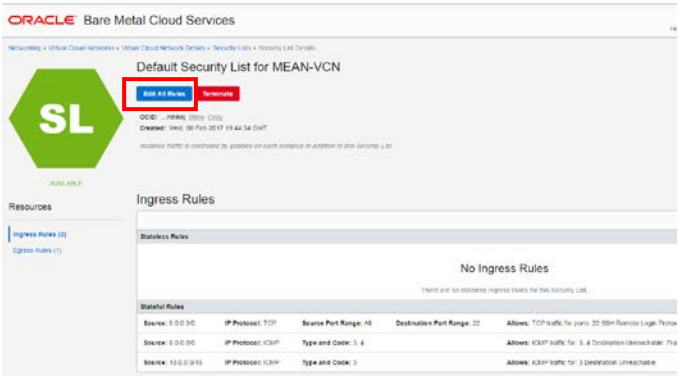
Step 2: Enable firewall to have these ports 8080 and 3000 added

```
$ sudo firewall-cmd --permanent --add-port=8080/tcp
$ sudo firewall-cmd --permanent --add-port=3000/tcp
$ sudo firewall-cmd --reload
```

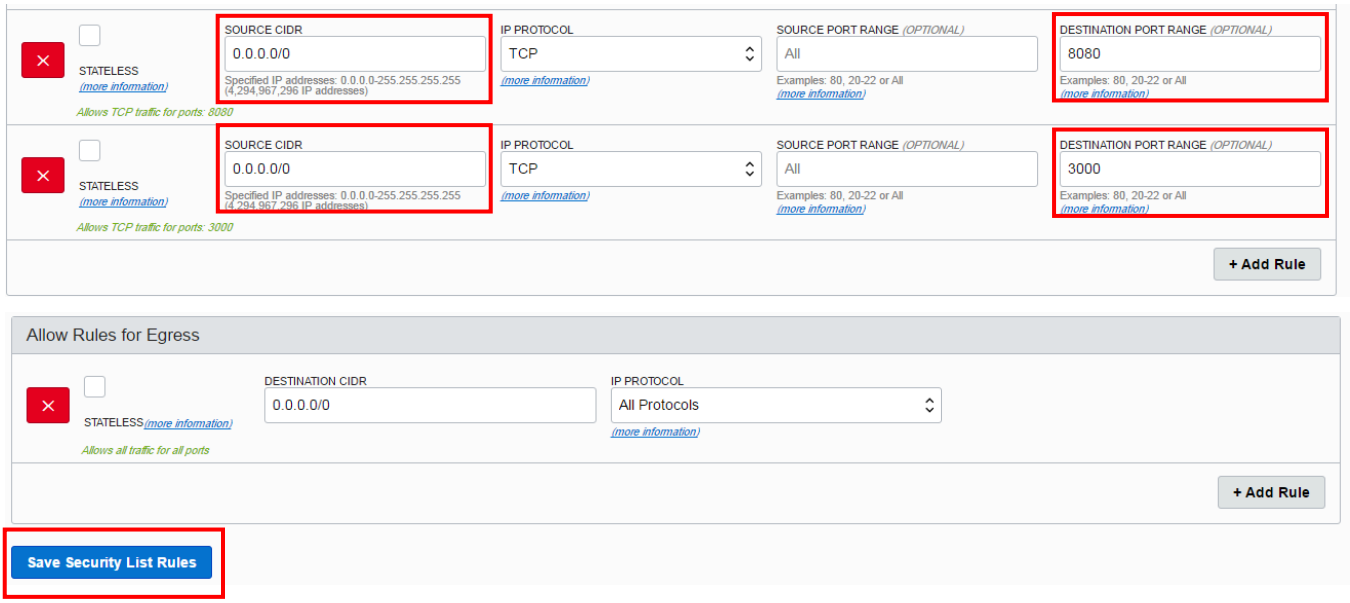
Navigate to http://<ipaddress>:8080 (the IP address of the MEAN VM) in your browser. Note that it doesn't return anything; that's because the Virtual Cloud Network needs to open certain ports for the MEAN stack to work.

Step 3: click on Virtual Cloud Network and then the VCN you created above, named MEAN-VCN. Click on Security Lists on the left navigation bar for the VCN. Then click on the Default Security List for the MEAN-VCN. Here you need to open certain ports. Click on edit all rules.

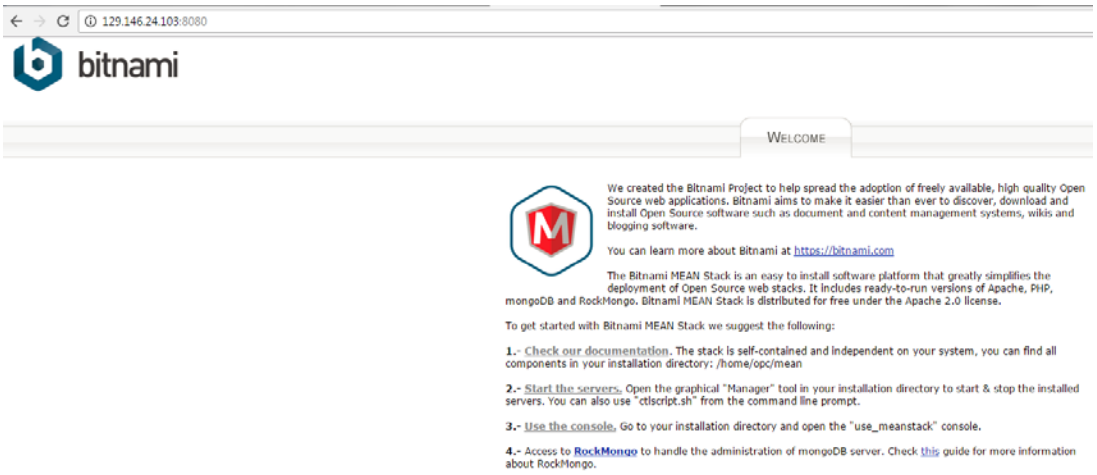




Step 4: click on +Add Rule twice and add the following values as shown below under the Allow Rules for Ingress. Click on Save Security List Rules at the bottom.



Navigate to http://<ipaddress>:8080 (the IP address of the MEAN VM) in your browser. Now you should see the following page:



Summary

In this lab, you were able to quickly create a virtual network in the cloud, launch an instance, download MEAN stack on to the instance, install and configure it for running on Oracle Bare Metal Cloud platform.

Oracle Bare Metal Cloud Services
Block Volume Service Hands on Lab (HOL)

V1.0

ORACLE LAB BOOK | SEPTEMBER 2017

Practice 5-1: Creating a Volume Using the Block Volume Service

Overview

Oracle Bare Metal Cloud Block Volume Service lets you dynamically provision and manage block storage volumes. You can create, attach, connect, and move volumes to meet your storage and application requirements. Once attached and connected to an instance, you can use a volume like a regular hard drive. Volumes can also be disconnected from one instance and attached to another instance without any loss of data.

Typical Block Volume Service scenarios are the following:

- Expanding an instance's storage: Adding storage capacity to an Oracle Bare Metal Cloud Services instance.
- Persistent and durable storage: Volume can be detached from an instance and moved to a different instance without loss of data.

The following components are required to create a volume and attach it to an instance:

- **Instance:** A bare metal compute host running in the cloud
- **iSCSI:** A TCP/IP-based standard used for communication between a volume and attached instance
- **Volume:** A detachable block storage device that allows you to dynamically expand the storage capacity of an instance

Assumptions

Get familiar with the key concepts and terminology of Oracle Cloud Infrastructure. You have been provisioned a tenancy in Oracle Cloud Infrastructure with the required access.

Note: Some of the UIs might look a little different than the screenshots included in the instructions, but students can still use the instructions to complete the hands-on labs.

Before You Begin

To sign in to the Console, you need the following:

- User name and password (user name and password provided by the trainer)
- URL for the Console: https://console.us-phoenix-1.oraclecloud.com.

Duration: 10 minutes

Tasks

1. Create a Volume Using the Block Volume Service

   Note: Users must be granted permission to perform actions in a compartment via group policies created by administrators.

   a. Sign in to the Console, click **Storage**, and then click **Block Volumes**.

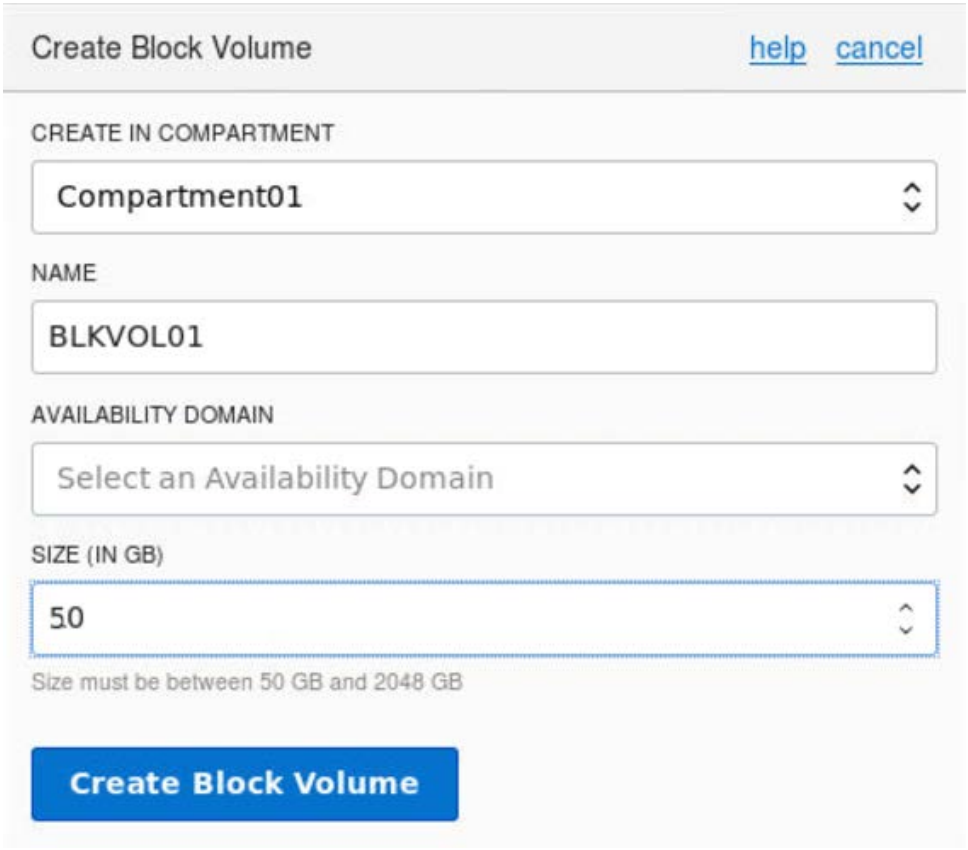
   b. Click **Create Block Volume**.

   c. In the **Create Block Volume** dialog box, enter the following:

1) **Create in Compartment:** This field defaults to the currently selected compartment. Select the compartment that you want to create the volume in, if it's not already selected.
2) **Name:** Enter a user-friendly name.
3) **Availability Domain:** Select the Availability Domain.

   Note: This is the first AD in the list. Remember to select the same AD when you create an instance in your next practice. The volume and the instance must be in the same Availability Domain.

4) **Size:** Select 50 GB.



d. Click **Create Block Volume**.

   The volume can be attached once its icon in the volume list no longer lists it as PROVISIONING.

