Oracle Cloud Infrastructure – Enterprise Application Migration to Oracle Cloud

Hands on Lab

ORACLE

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1. Disclaimer

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.

In the document, value of information such as user name, password etc. is shown as XXXX or YYYY etc. Also, if actual value is shown in screenshots, consider it as an example value.

2. Introduction

Background

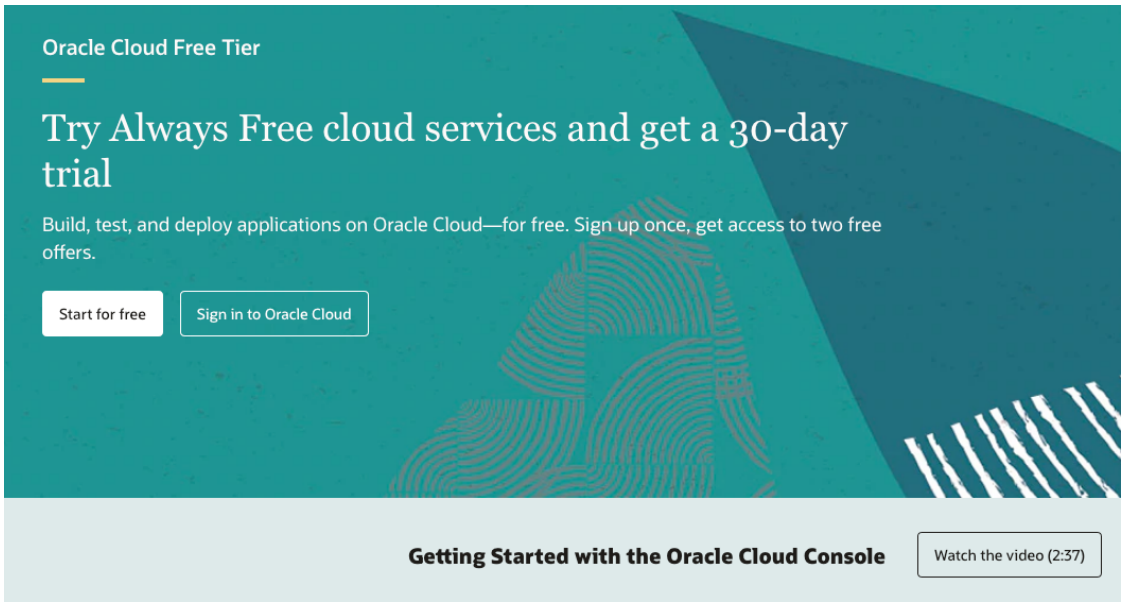
Oracle Cloud Infrastructure (OCI) is a set of complementary cloud services that enable you to build and run a wide range of applications and services in a highly available hosted environment. Oracle Cloud Infrastructure offers high-performance compute capabilities (as physical hardware instances) and storage capacity in a flexible overlay virtual network that is securely accessible from your on-premises network.

3. Pre-Requisites

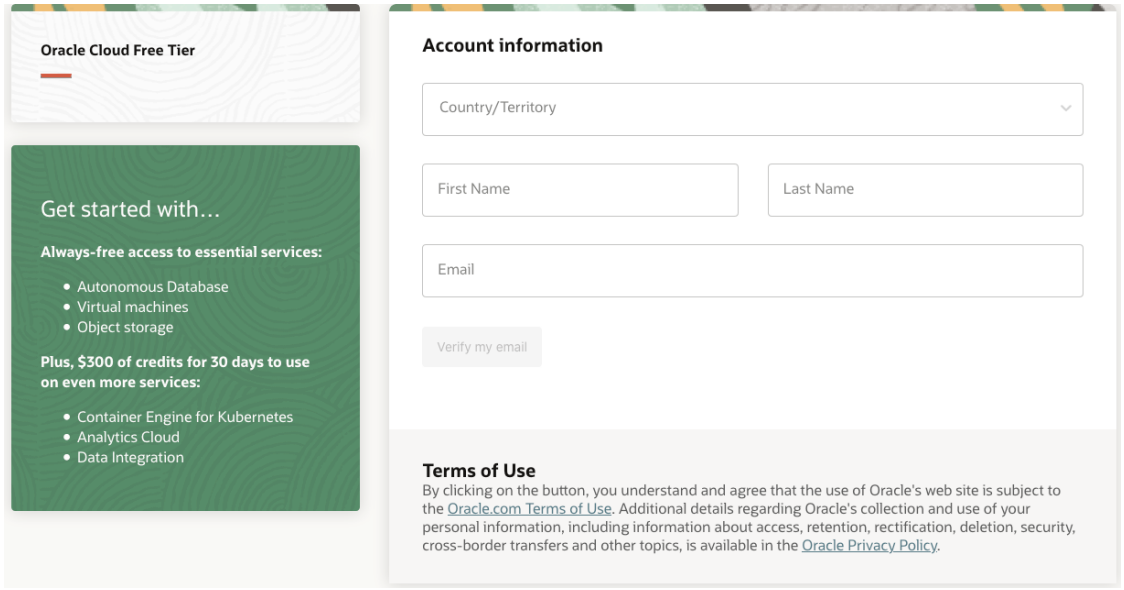
Create Cloud Account

To perform the steps in this tutorial, you must have an active subscription to Oracle Cloud Infrastructure or a Free Trial Account.

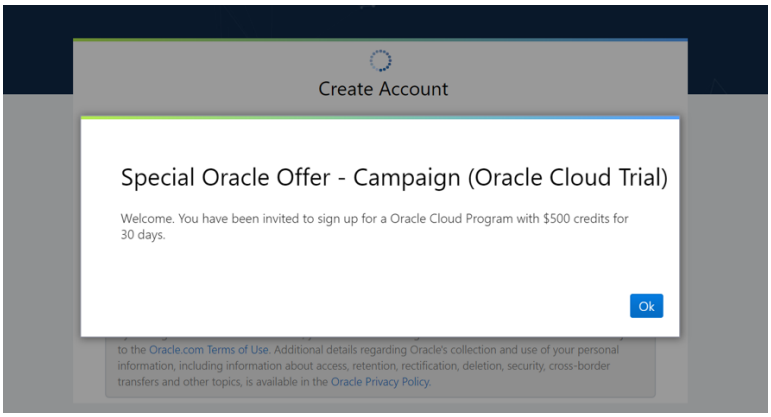
1. Go to https://www.oracle.com/cloud/free/ and click the *Start for free* button:



2. Select your home territory and enter the email address **that you have used to register to the WinterCamp**, so that you get the 400€ of free Universal Credits:



3. After clicking *Verify my email*, you **must** get a popup message similar to this one:



If you don't get it, **do not go ahead with the subscription**. Let us know through the Linkedin group (or ZOOM Q&A if you're live in the session) and provide the right email address for us to get it whitelisted and get your training promotion of free Universal Credits.

4. Enter your personal information in the next form. You can select either Personal or Company use for *Account Type*. Type in your *Cloud Account Name*, which must be unique across all Oracle Cloud. Select your *Home Region* mainly based on your geographic location. Take into account that trial accounts like this one, will NOT allow you to subscribe to other Oracle Cloud regions (with paid accounts you can subscribe to any region you want, without any additional cost) nor changing it afterwards.

   You may want to review first the Cloud Services available on each one here before selecting Home Region.

   If you're located in Europe, we suggest to use Frankfurt, Amsterdam or London.

5. Enter the password you will use later for Cloud login.
6. Click on *Review Terms and Conditions* and *Complete Sign-Up*
7. Review your email INBOX. You will receive two separate mails. Wait until you receive a message with the subject "**Your Oracle Cloud Account is Fully Provisioned**" and follow the instructions inside.

Download VMDK file (optional)

Download the virtual machine VMDK file found at:

https://objectstorage.eu-frankfurt-1.oraclecloud.com/p/3Q-BaT8gbGxwdqdddz044u-_U3ISJsB_aZTnV8hpI8GtyWRlhsV6wyGV86hdTvQL/n/emeasespainsandbox/b/WinterCamp2021/o/MigrationVM.vmdk

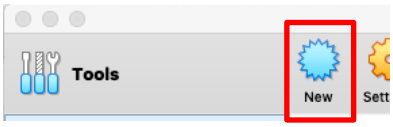
Note: Be careful when copying & pasting the above URL as extra carriage-returns are likely added. Use notepad *or other text editor tool to check that or simply click the link to download the file locally.*

During the HOL, you'll have the option to use a pre-upload image to save time. However, if you want to test the real procedure and have a nice internet bandwidth, you can download the image that will be later uploaded to your own Cloud Tenant.

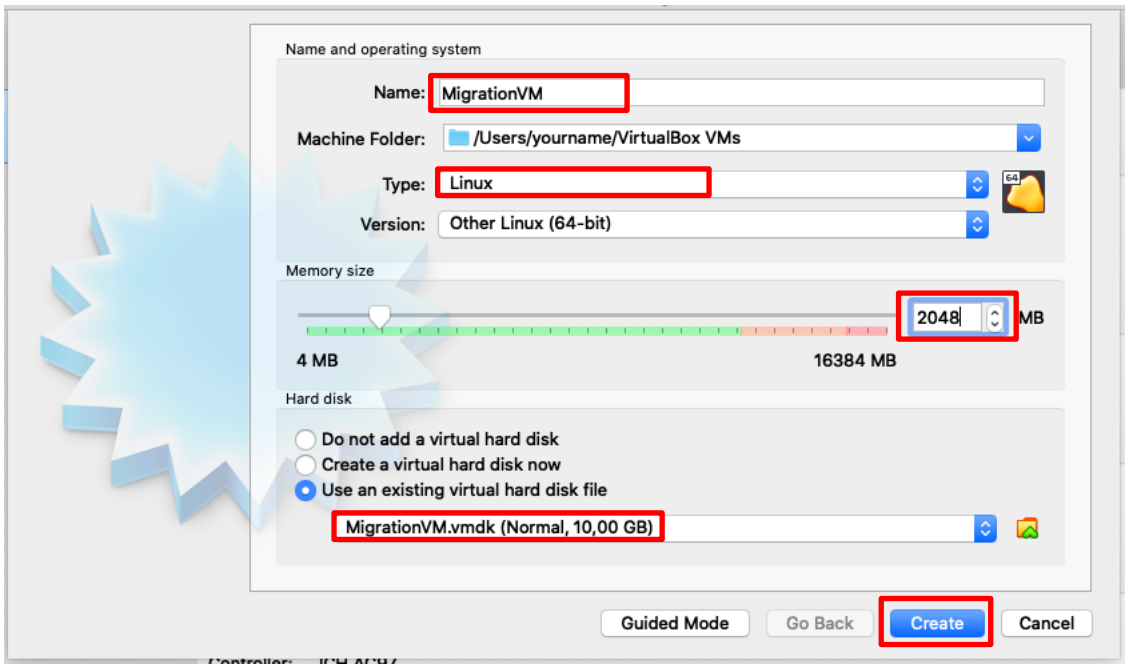
Test VM locally (optional)

Try the VM locally in your laptop: on this HOL, we're *simulating* the lift&shift of a VM that you potentially have in your DataCenter. If you want to test the VM first in your own environment/laptop, you can follow the next instructions:

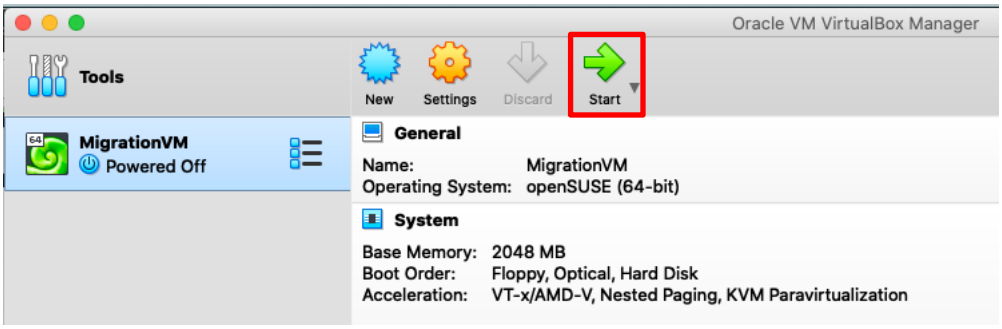
1. You first need to download the VMDK file as noted in the previous step.
2. You need VirtualBox 6 to create and run the VM.
3. Once installed, open VirtualBox and click on New button:



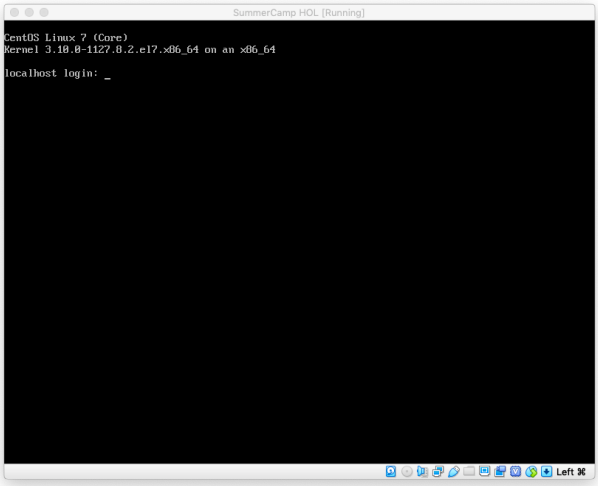
4. Type a *Name* for the VM, set at least `2048 MB` for the *Memory size*, select *Use an existing virtual hard disk file* selecting the `MigrationVM.vmdk` file previously downloaded and click *Create*:



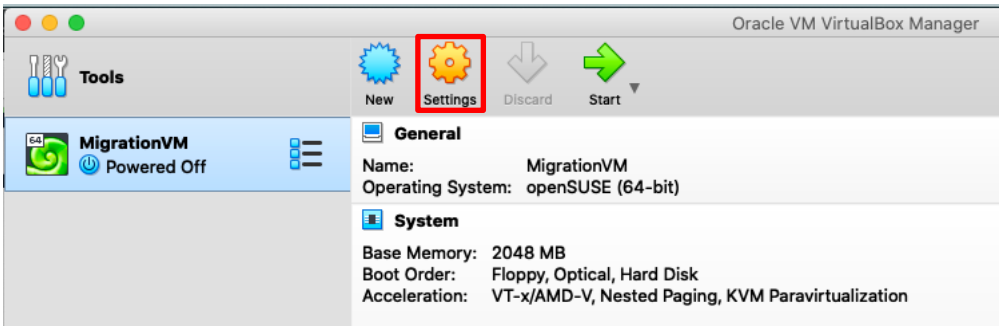
5. Once created, click on *Start*:



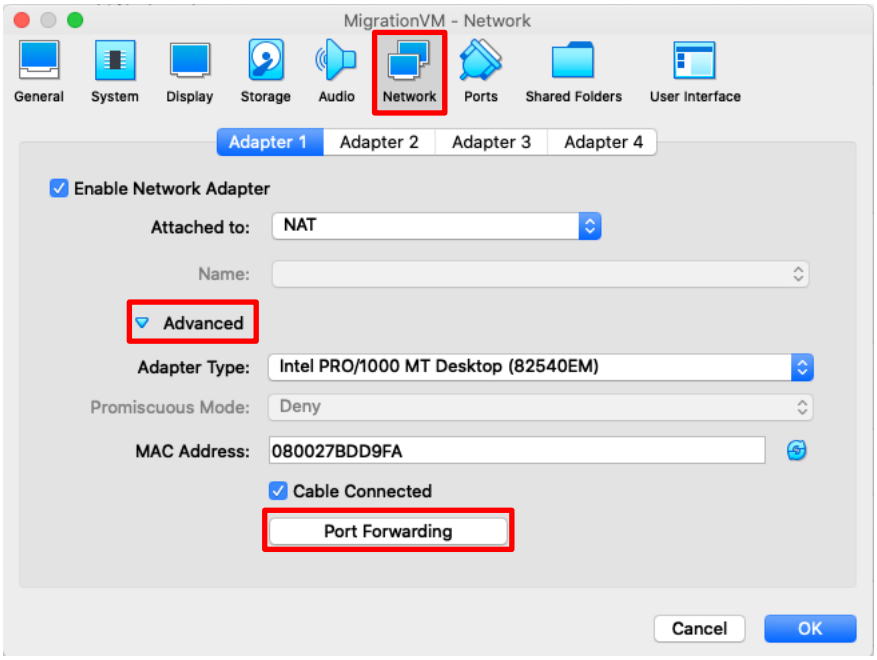
6. Once started successfully, you should get a console login prompt:



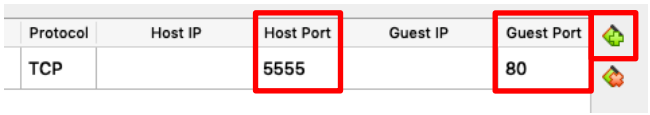
7. In the background, a NGINX server has automatically started hosting a simple web page. To get access to it, configure VM's NAT port forwarding by clicking in the VM settings icon:



Go to *Network*, expand the *Advanced* menu and click *Port Forwarding*:

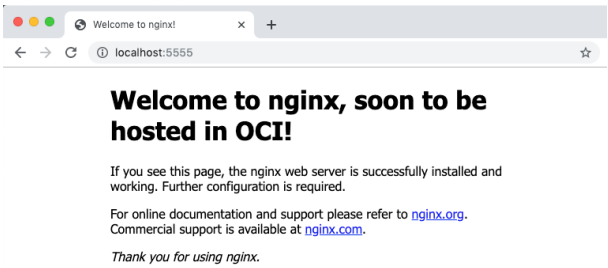


Click the *+* button to add a new rule and type `5555` (or any port known to be free in your laptop) for *Host Port*, and `80` for the *Guest Port*:



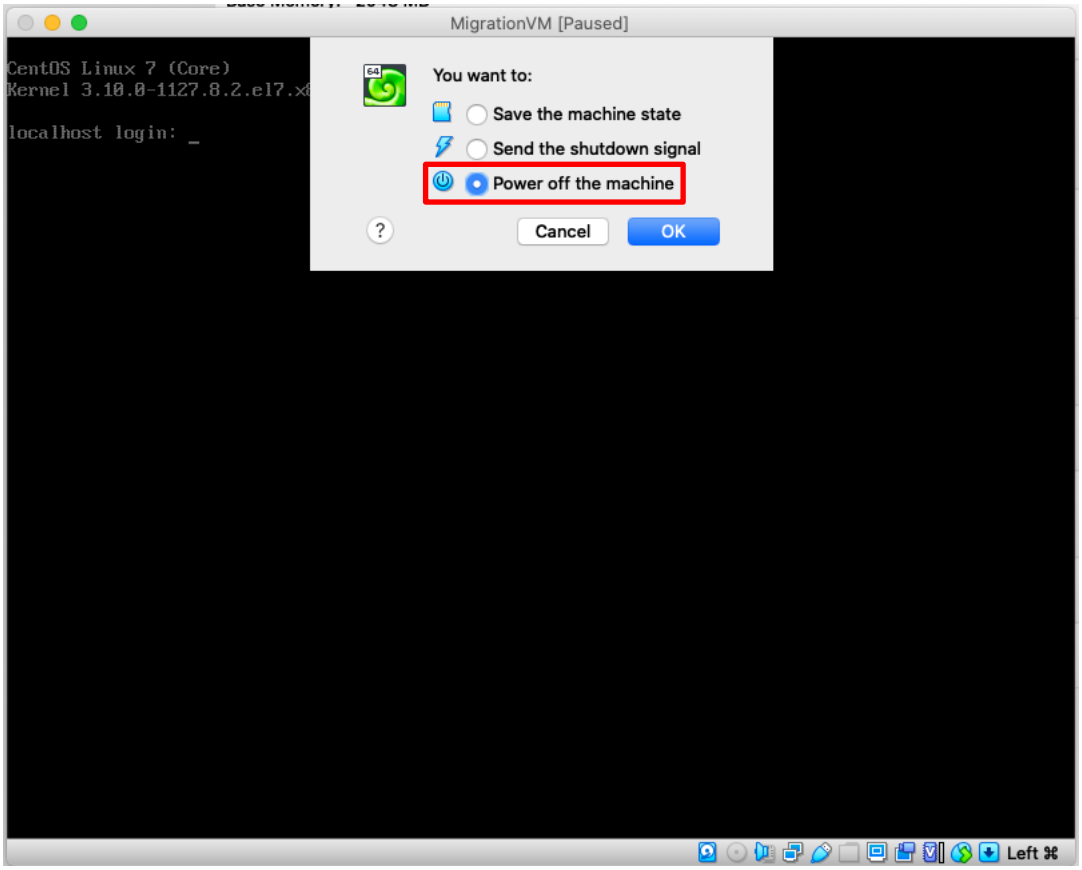
Click *OK* twice to save the new settings.

8. You can now open a browser in your laptop and go to the address http://localhost:5555 (or the port used before for the *Host Port* setting):



Congratulations, you're now ready to move this server to the Oracle Cloud!

9. Don't forget to close the VM Console window and Power off the machine, before continuing:



Create an SSH key pair using the OCI Cloud Shell

Sign into the OCI console using the button/link provided in the email mentioned before, or you can also use the common OCI console URL:

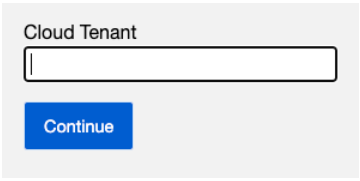
`https://console.<your region id>.oraclecloud.com/`

where `<your region id>` depends on the Home Region you selected during the registration. For example:

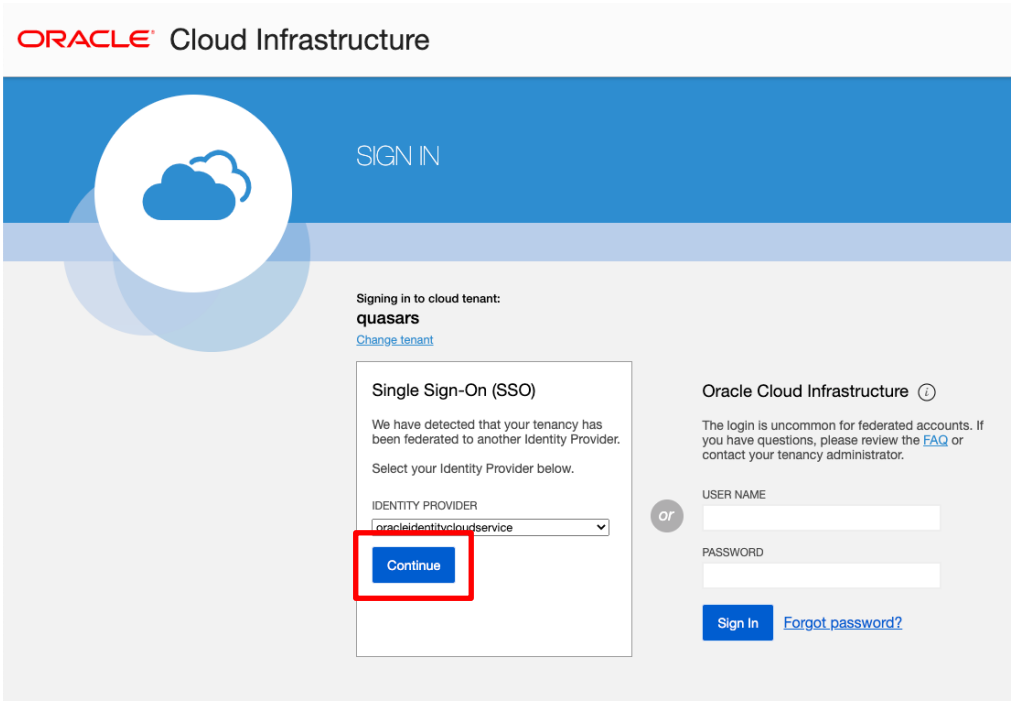
Region Name	Region Id	OCI Console URL
Netherlands Northwest (Amsterdam)	eu-amsterdam-1	https://console.eu-amsterdam-1.oraclecloud.com
UK South (London)	uk-london-1	https://console.uk-london-1.oraclecloud.com
Germany Central (Frankfurt)	eu-frankfurt-1	https://console.eu-frankfurt-1.oraclecloud.com

For a complete and updated list of regions and id's check here.

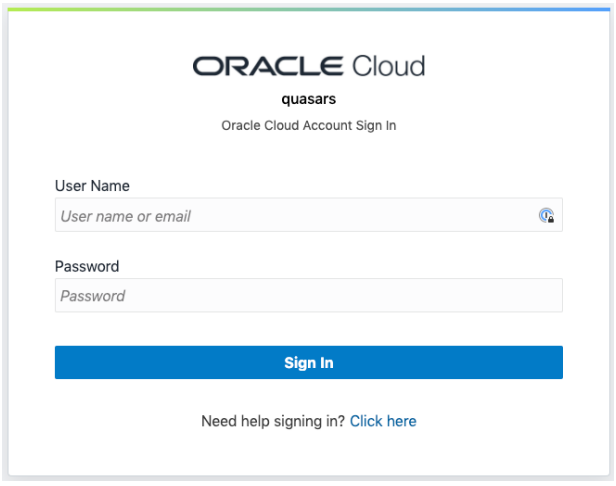
If you're requested to enter your Cloud Tenant, type in the tenant name you used during the registration:



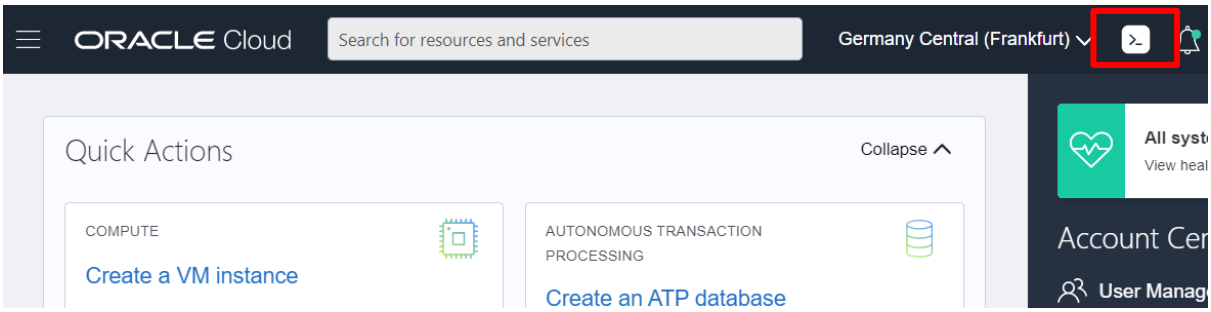
On the *SIGN IN* screen, make sure you use the *Single Sign-On (SSO)* option by clicking the *Continue* button on the left:



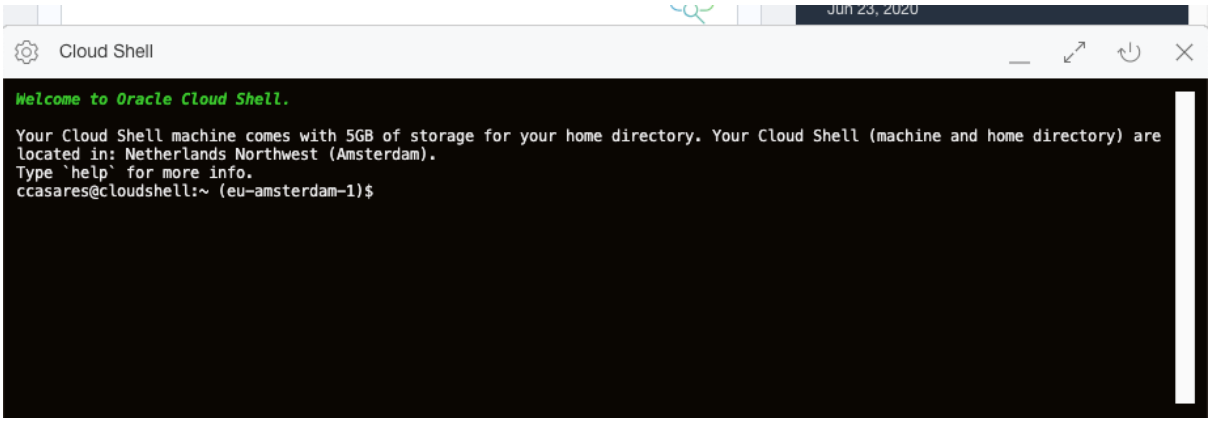
In the *Oracle Cloud Account Sign In* screen type the *User Name* and *Password* used during the registration and click *Sign In*:



Once you are logged in the console, click on the *Cloud Shell* button to launch the cloud shell:



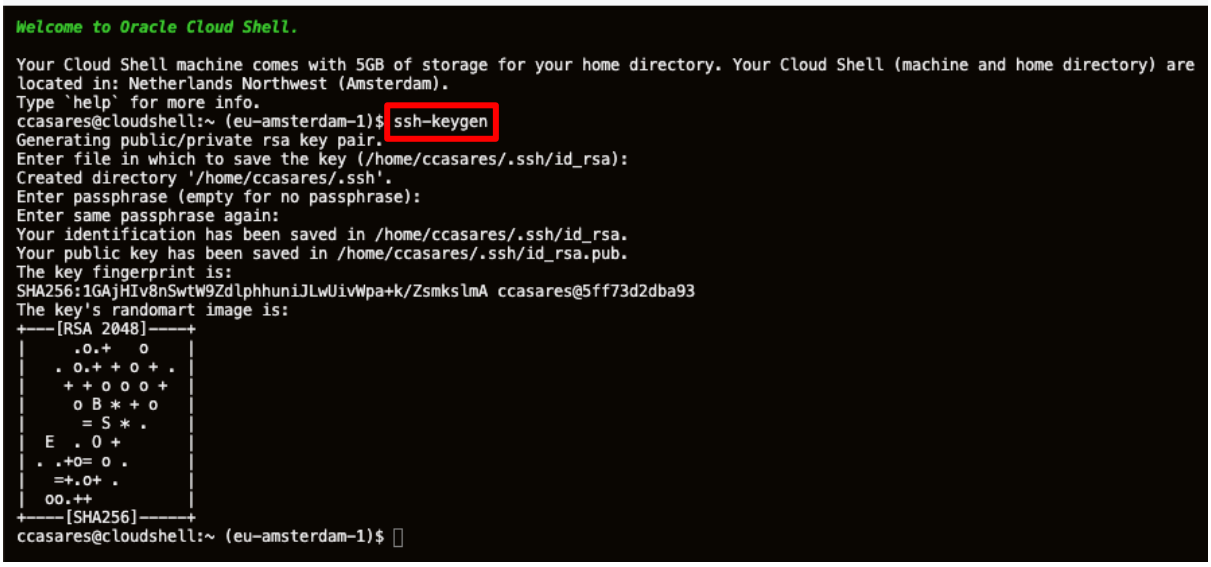
Once the cloud shell is launched on the bottom of the screen, you can generate the SSH key pair:



Run the following command:

```
ssh-keygen
```


Hit “Enter” on all the prompts until the creation process is completed:



4. Signing in to the OCI Console

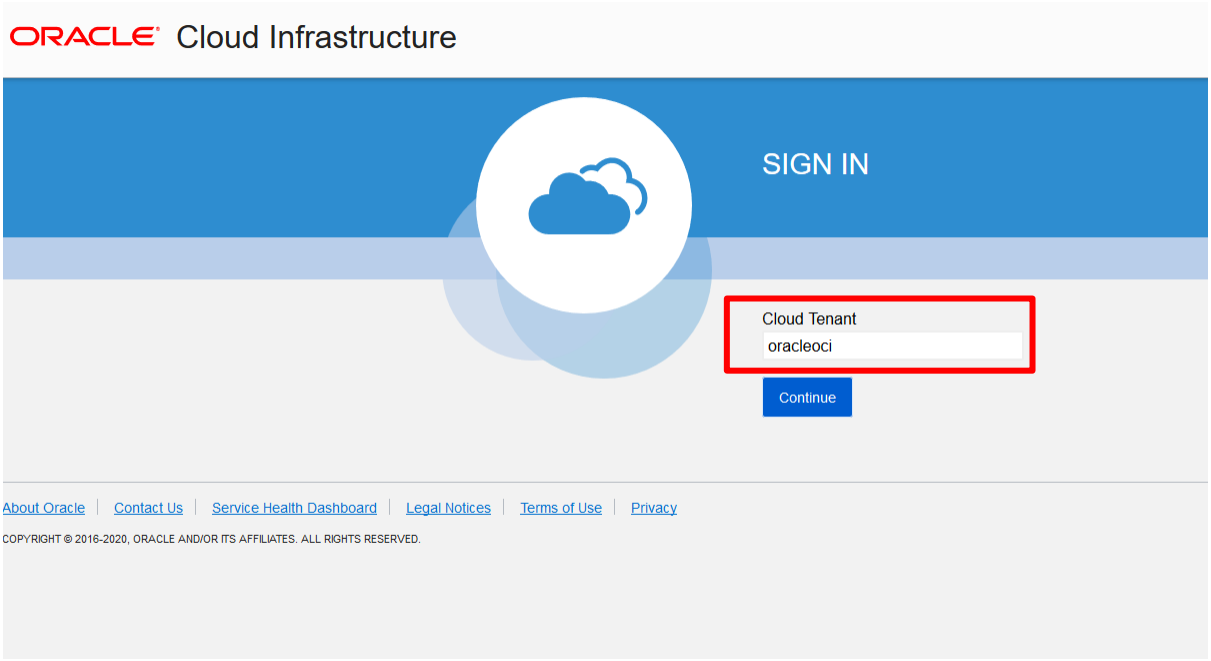
Oracle Cloud Infrastructure Identity and Access Management (IAM) Service lets you control who has access to your cloud resources. You control the types of access a group of users has and to which specific resources. The purpose of this lab is to give you an overview of the IAM Service components and an example scenario to help you understand how they work together.

Pre-requisites:

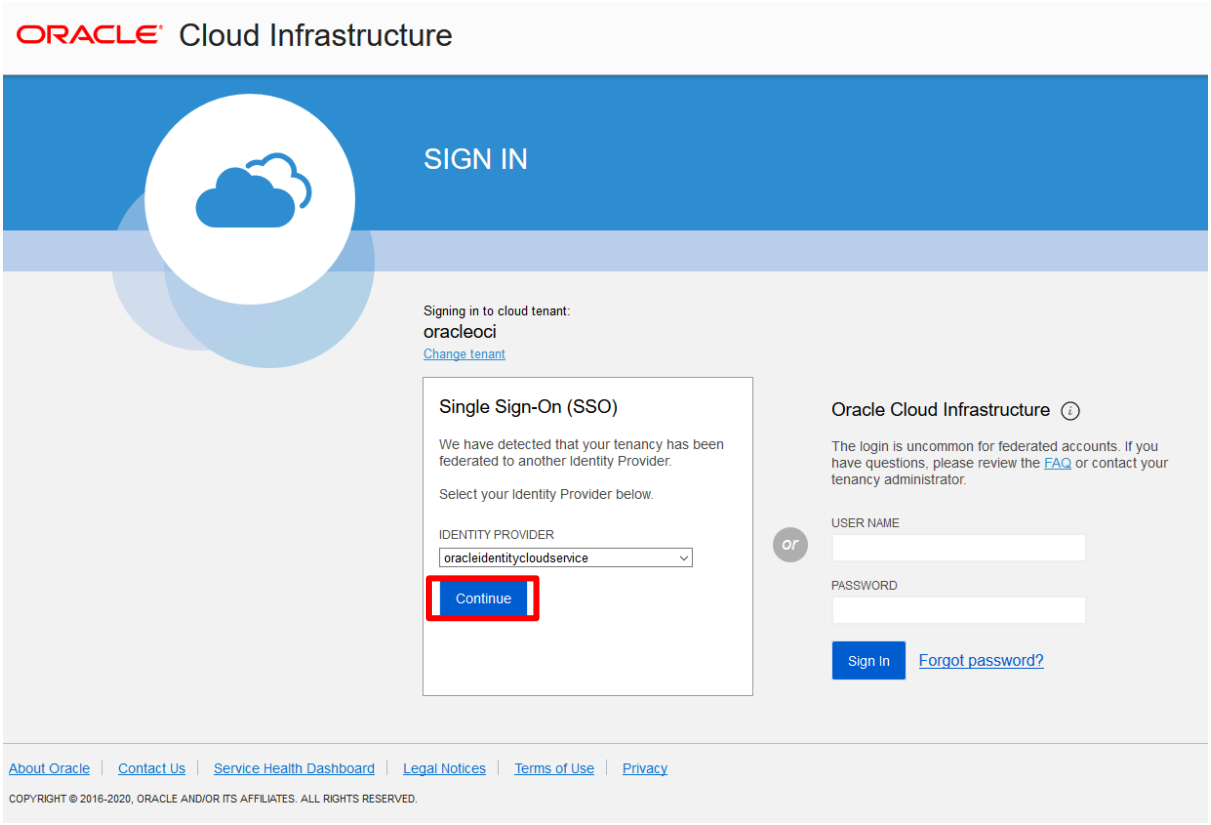
- Oracle Cloud Infrastructure account credentials (User, Password, and Tenancy)
- To sign in to the Console, you need the following:
    - Tenant, User name and Password
    - URL for the Console: `https://console.<your region id>.oraclecloud.com` (for `<your region id>`, see the Prerequisites section above).
    - Oracle Cloud Infrastructure supports the latest versions of Google Chrome, Firefox, Microsoft Edge and Internet Explorer 11

In this Lab, you will sign in to the Oracle Cloud Infrastructure console using your credentials.

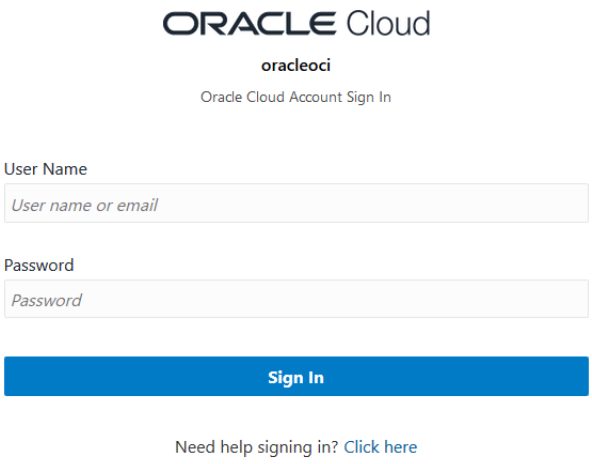
1. Open a supported browser and go to the Console URL
2. If requested, enter your tenant name and click *Continue*



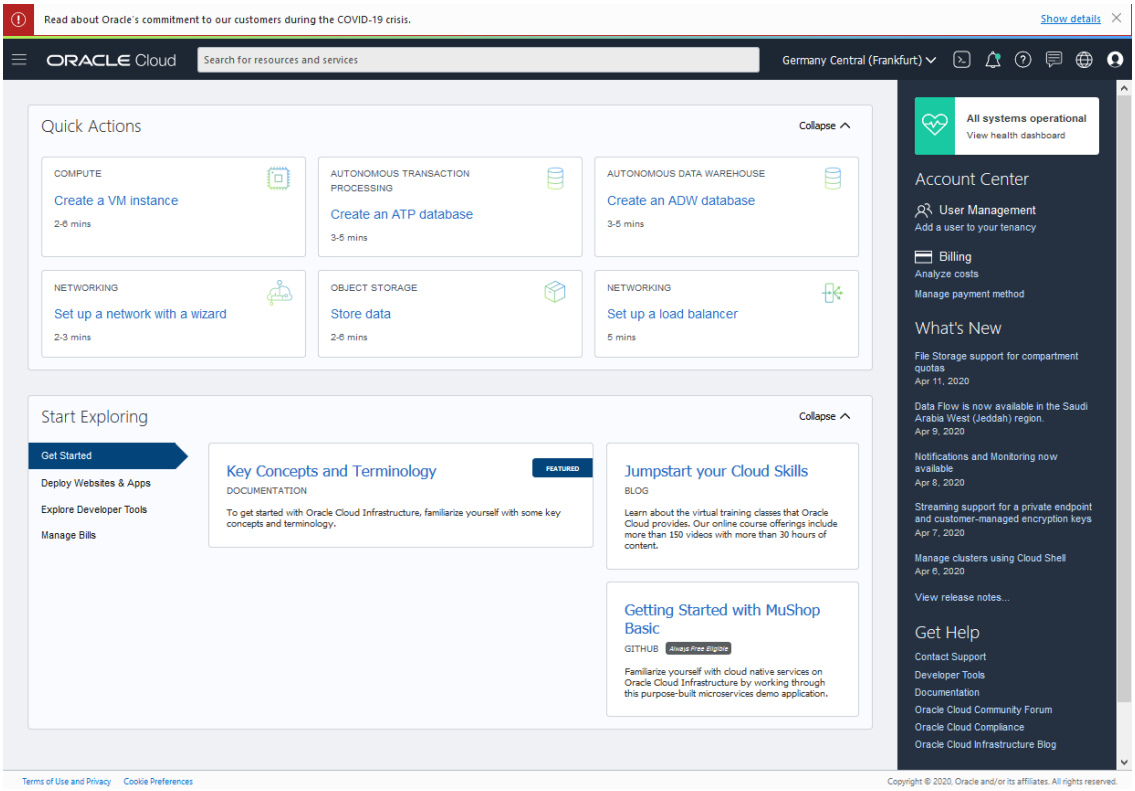
3. Oracle Cloud Infrastructure is integrated with Identity Cloud Services, you will see a screen validating your Identity Provider. Click *Continue* on the Single Sign-On (SSO) section as shown below:



4. Enter your user name and password



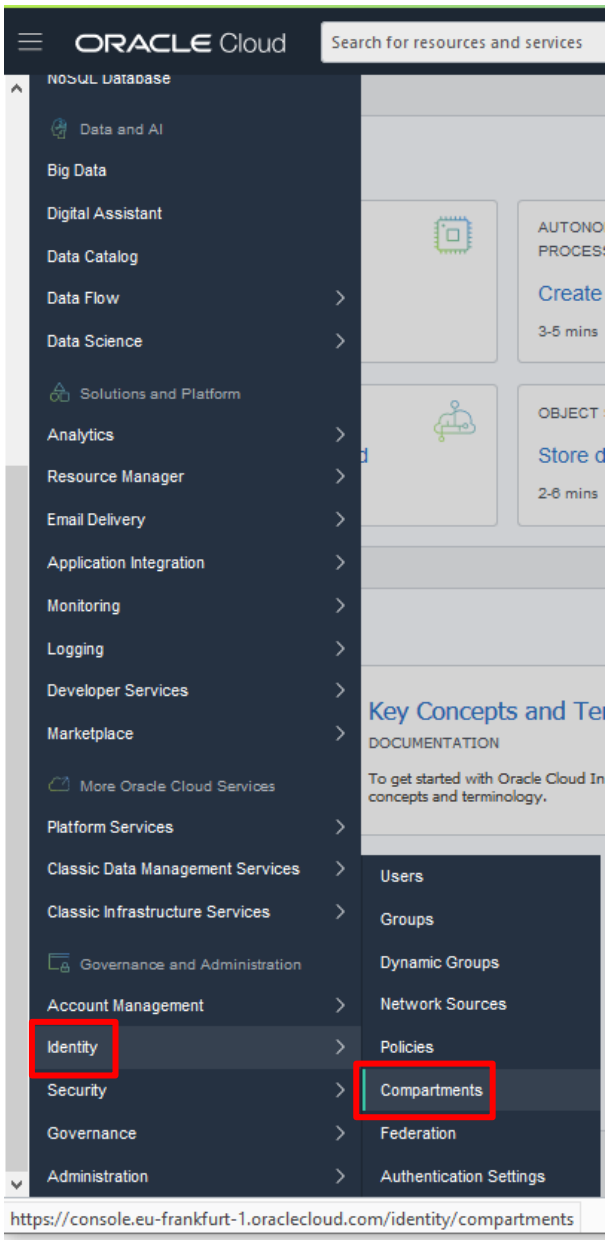
5. When you sign in to the Console, the dashboard is displayed.



5. Creation of a compartment

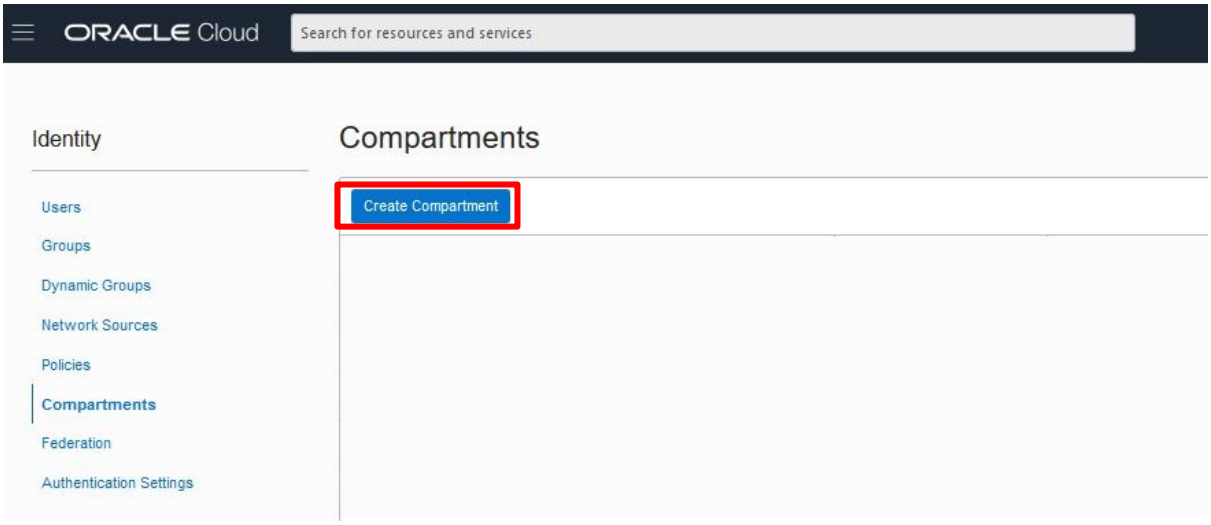
A **compartment** – is a collection of related resources that can be accessed only by certain groups that have been given permission by an administrator in your organization. When you first start working with Oracle Cloud Infrastructure, you need to think carefully about how you want to use compartments to organize and isolate your cloud resources. Compartments are fundamental to that process. Most resources can be moved between compartments.

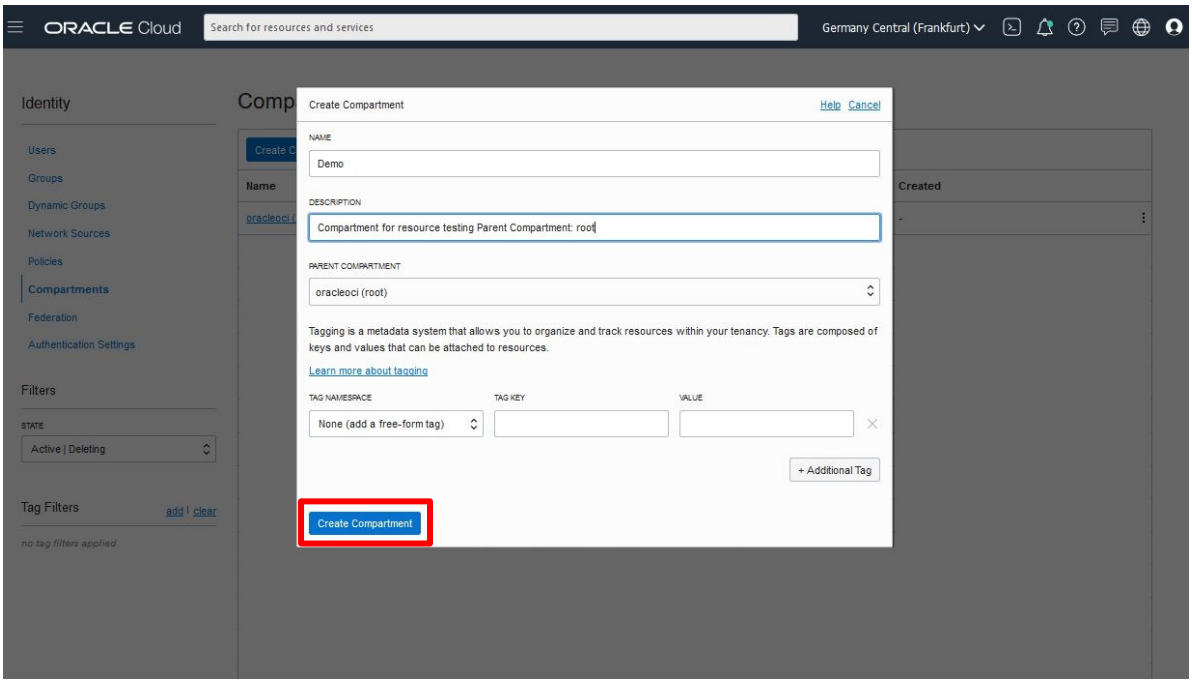
In order to view and create a compartment in your tenancy, please navigate to *Main Menu*, *Governance and Administration* section, *Identity* and select *Compartments*.



Click on *Create Compartment* and fill the information:

Name: *Demo*
Description: *Compartment for resource testing Parent Compartment: root*





To learn more about compartments in OCI, please visit: https://docs.cloud.oracle.com/en-us/iaas/Content/Identity/Tasks/managingcompartments.htm

6. Creation of Network resources

When you work with Oracle Cloud Infrastructure, one of the first steps is to set up a virtual cloud network (VCN) for your cloud resources. The network components you will be setting up for this HOL are:

Virtual Cloud Network (VCN): A VCN is a software-defined network that you set up in the Oracle Cloud Infrastructure data centers in a particular region.

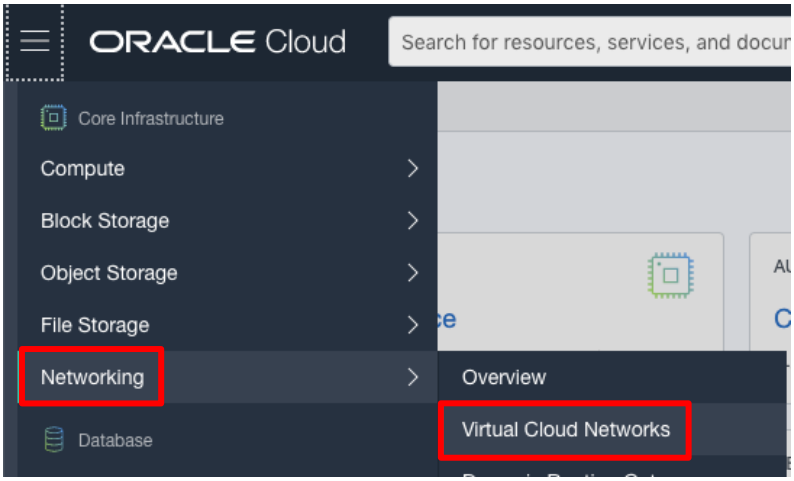
Subnets: A subnet is a subdivision of a VCN. Each subnet in a VCN consists of a contiguous range of IPv4 addresses that do not overlap with other subnets in the VCN. They can be either public or private and local to a specific Availability Domain or Regional Subnets (one subnet that expands to all ADs in the same region).

Route Tables: Rules to route traffic from subnets to destinations outside the VCN by way of gateways or specially configured instances.

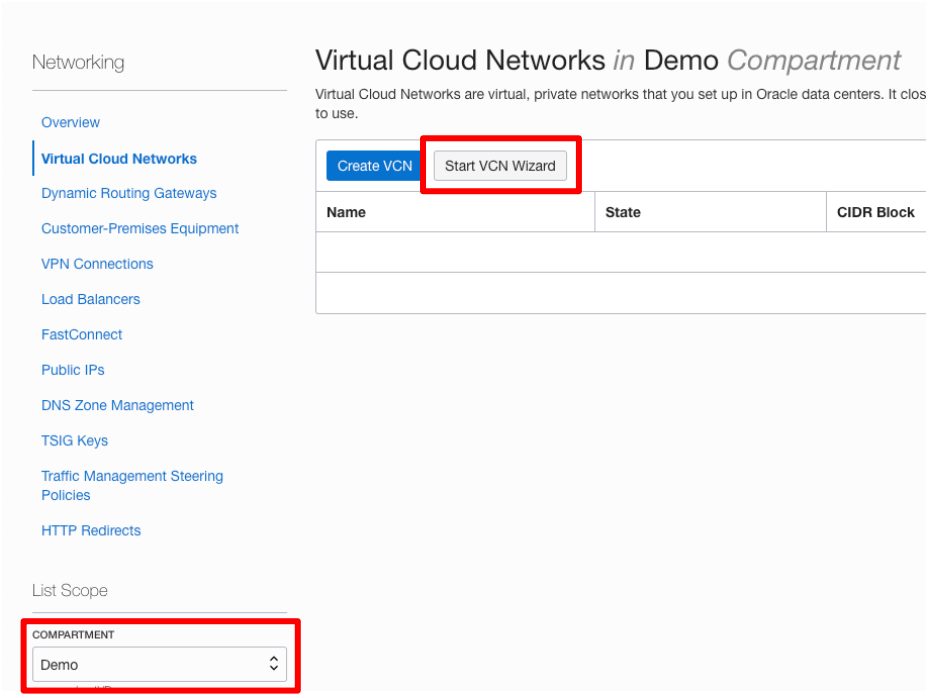
Security Rules: Ingress and egress rules that specify the types of traffic (protocol and port) allowed in and out of the instances

For a complete description of OCI Networking see here.

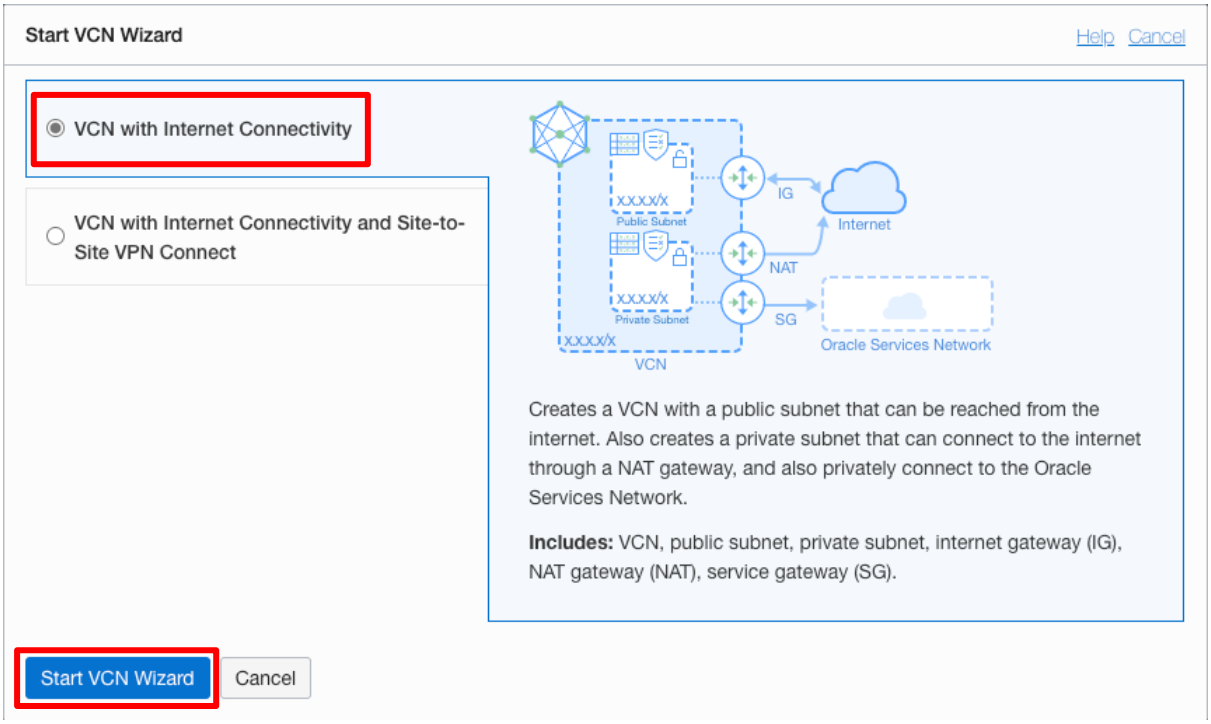
In the OCI console, go to *Networking* and *Virtual Cloud Networks*:



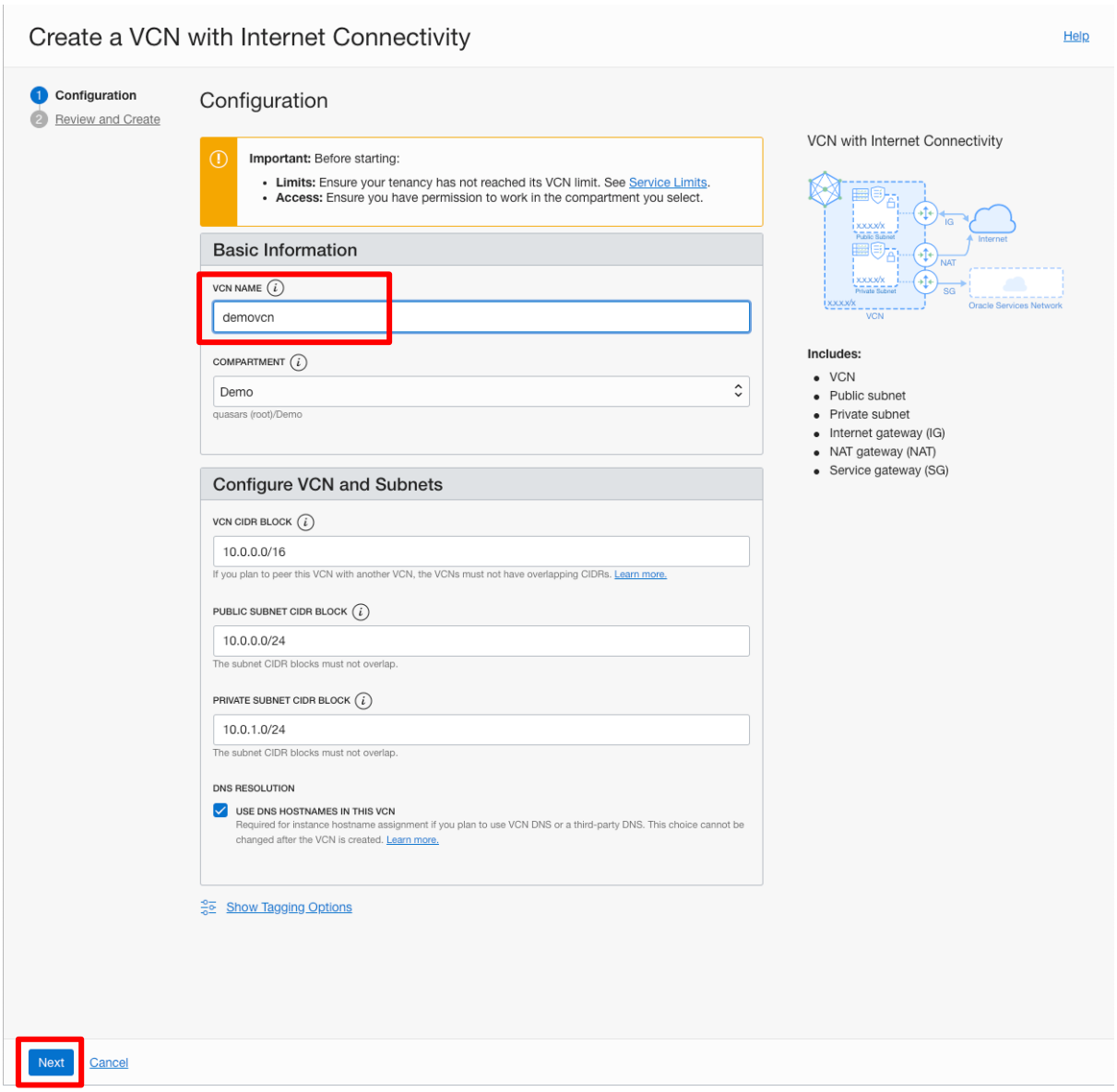
You can create an empty VCN and set the different elements afterwards or use the wizard. We will this last option so click the *Start VCN Wizard* making sure you have the `Demo` compartment selected first:



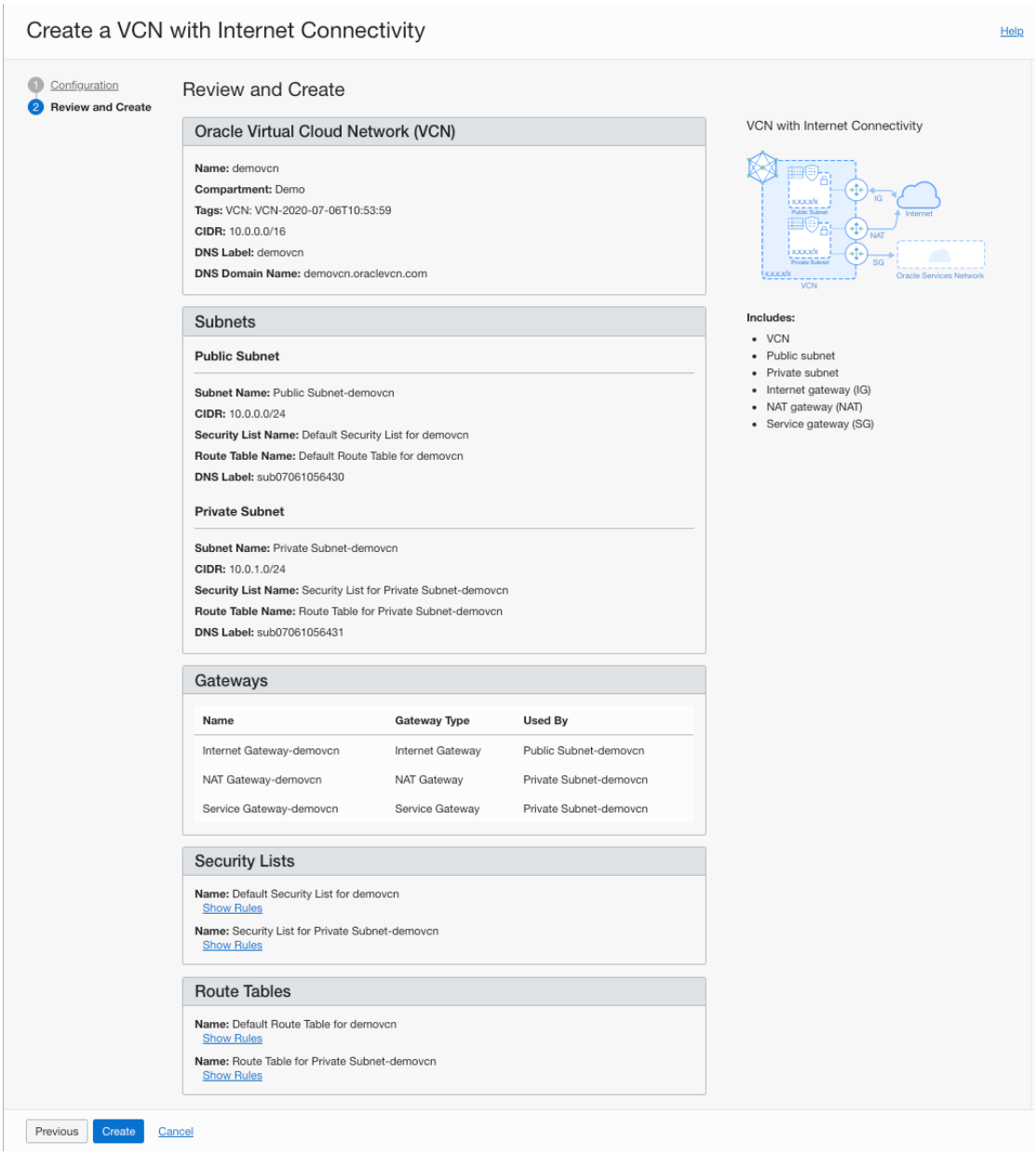
For the purpose of this HOL, we want all resources within this VCN to have access to and from the Internet, so select *VCN with Internet Connectivity* option and click *Start VCN Wizard*:



In the Configuration screen, enter a *VCN NAME* (e.g.: `demovcn`), leave the rest of the values as default and click *Next*:



In the *Review and Create* screen, you are notified about the network elements that will be automatically created for you for being using the wizard. Click *Create* to continue:



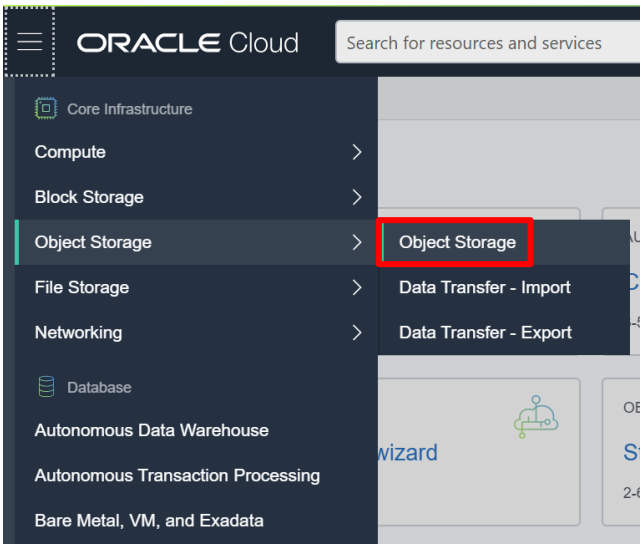
Once created, you can click *View Virtual Cloud Network* to see all the assets created.

7. Create an object storage bucket and upload the VM (optional)

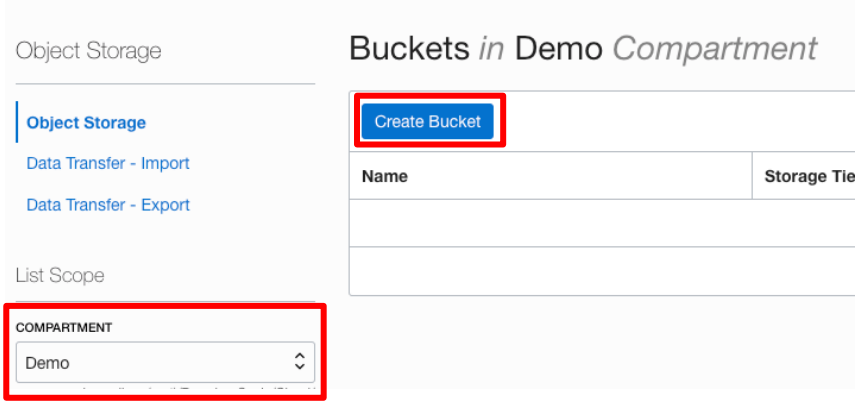
This step might require a certain amount of time to complete, as you are going to upload a 7GB file size to the Cloud. Based on your upload bandwidth, this can take a few minutes, 1 hour or more.

You can make use of the already provided URL in the pre-requisites to, later on, create the Custom Image. If you want, just skip to section 8.

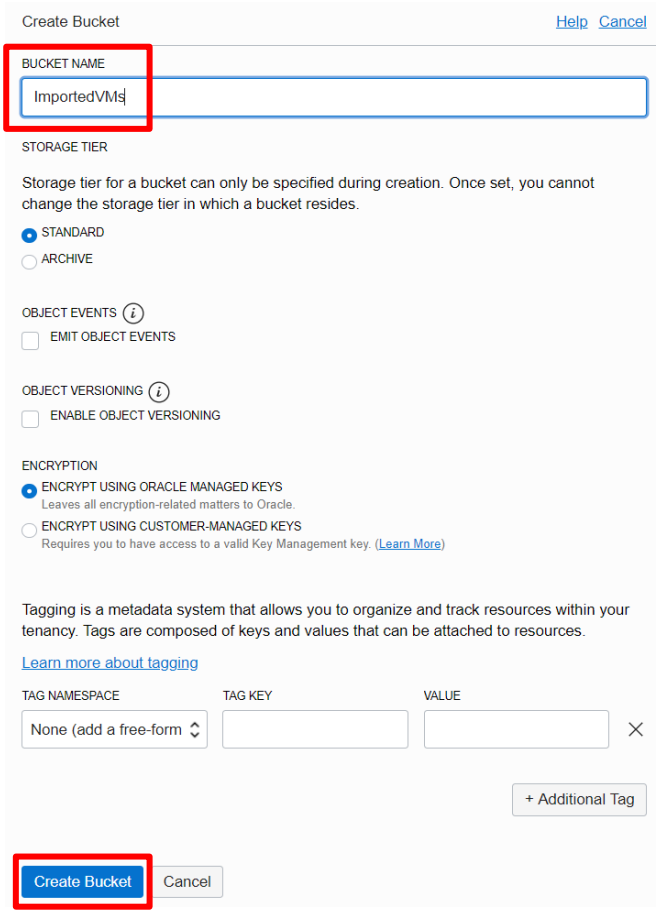
Please navigate to *Main Menu*, *Object Storage* section and select *Object Storage*



Using the drop down at the left of the page select the compartment you have created and click the *Create Bucket* button.

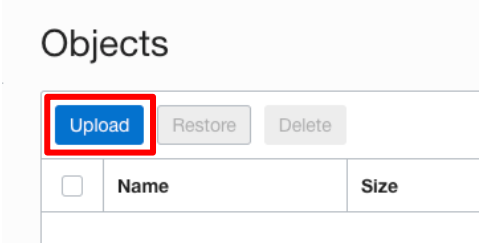


Enter a name of your choice for the new bucket, e.g. `ImportedVMs`, and click the *Create Bucket* button leaving all other settings as default:

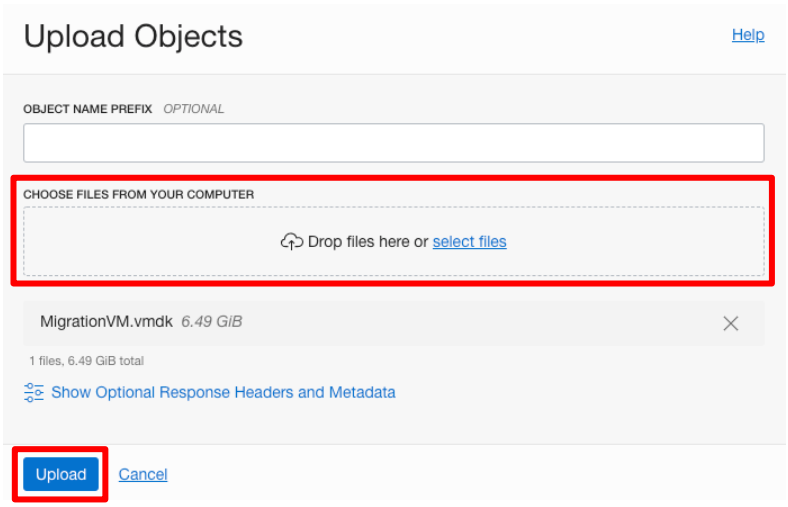


Click on your just created bucket:

And click on the *Upload* button:



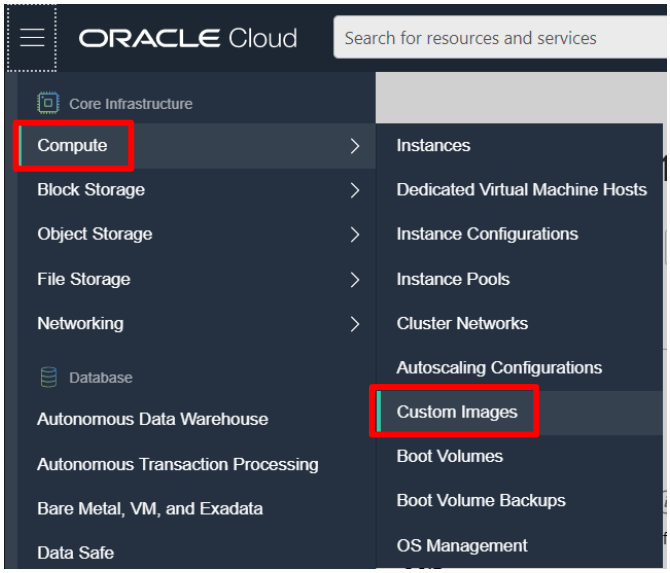
Drag and drop the file you downloaded in the pre-requisites steps on the *Drop files here* section of the windows and click the *Upload* button:



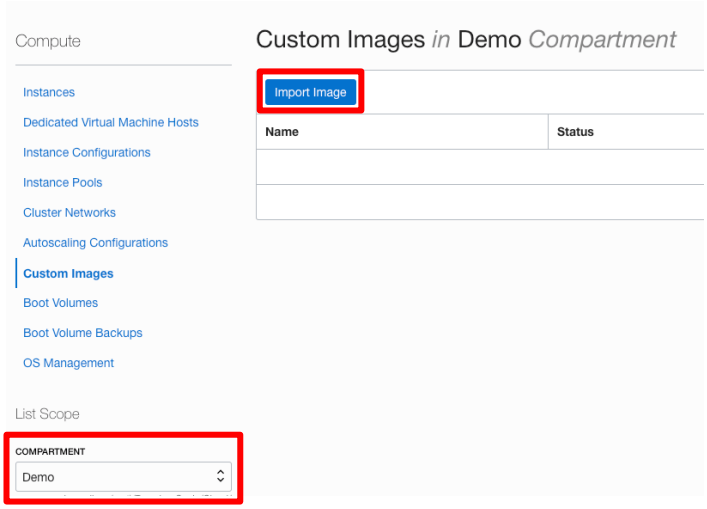
Based on the available bandwidth of your internet connection the upload process may take anything from 10 minutes to up to an hour. Once is finished proceed to the next step.

8. Convert the uploaded VM to a custom image

Once the upload process initiated at the end of the previous step is completed you may start the conversion process of the VM, turning it into a Custom Image. Navigate to *Compute*, *Custom Images*:



Make sure you are using the compartment you have created and click the *Import Image* button:

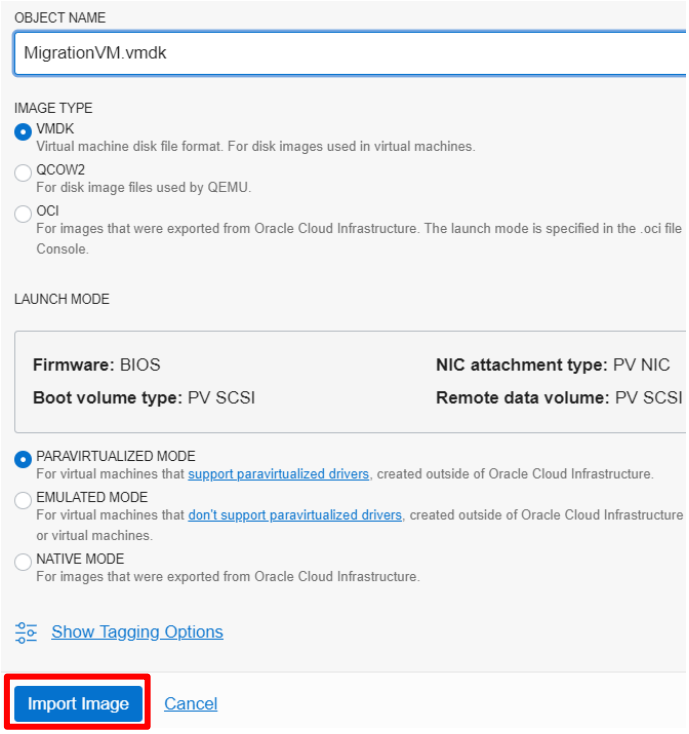


Provide a name (e.g.: `BYOIVM`), select the Linux operating system and based on what you did in step 7, you have to select:

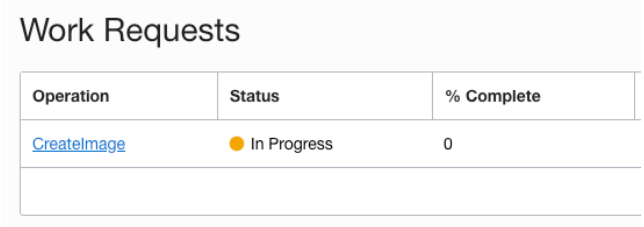
- *IMPORT FROM AN OBJECT STORAGE BUCKET* if you have actually uploaded the VMDK file
    - Select the Bucket name (`ImportedVMs`) and then the object name of the uploaded VMDK file
- *IMPORT FROM AN OBJECT STORAGE URL* if you have skipped step 7
    - Type https://objectstorage.eu-frankfurt-1.oraclecloud.com/p/3Q-BaT8gbGxwdqdddz044u-_U3ISJsB_aZTnV8hpI8GtyWRlhsV6wyGV86hdTvQL/n/emeasespainsandbox/b/WinterCamp2021/o/MigrationVM.vmdk for the *OBJECT STORAGE URL*

      Note: Be careful when copying & pasting the above URL as extra carriage-returns or blank spaces are likely added. Use notepad *or other text editor tool to check that or simply click the link to download the file locally.*

Make sure you keep `VMDK` as the *IMAGE TYPE* and *PARAVIRTUALIZED MODE* options. Click *Import Image* to continue:

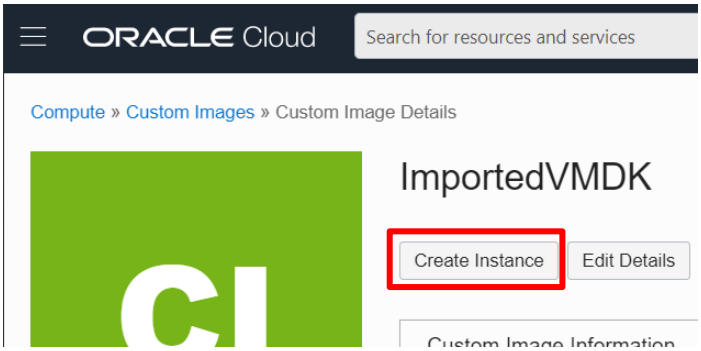


The import process will take about **15 minutes** to complete. Once finished you can move on to the next chapter.

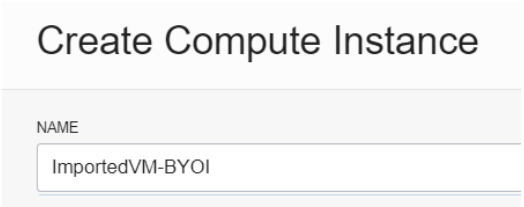


9. Deploy a cloud instance based on the new custom image

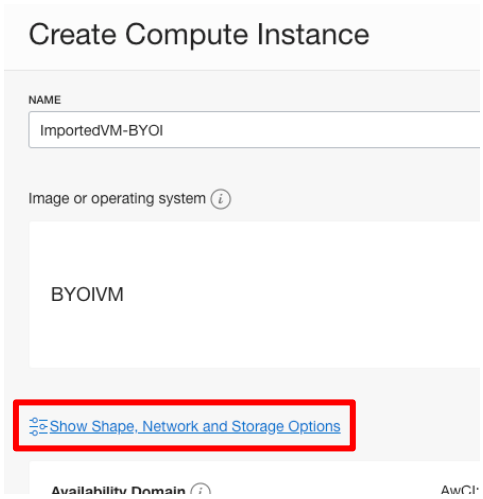
Once the previous import process is completed, click the *Create Instance* button:



Provide a name of your choice for your instance:



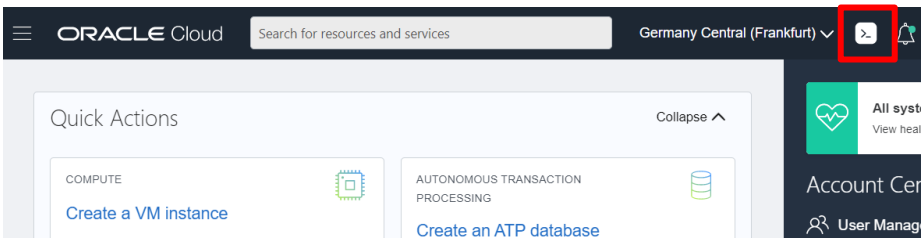
You'll notice that your just created custom image is the one selected for this VM. Click on *Show Shape, Network and Storage Options* link to display all available options:



Leave the *AVAILABILITY DOMAIN* and *Shape* options as default.

Select your previously created VCN and Public subnet, and check the *ASSIGN A PUBLIC IP ADDRESS* option:

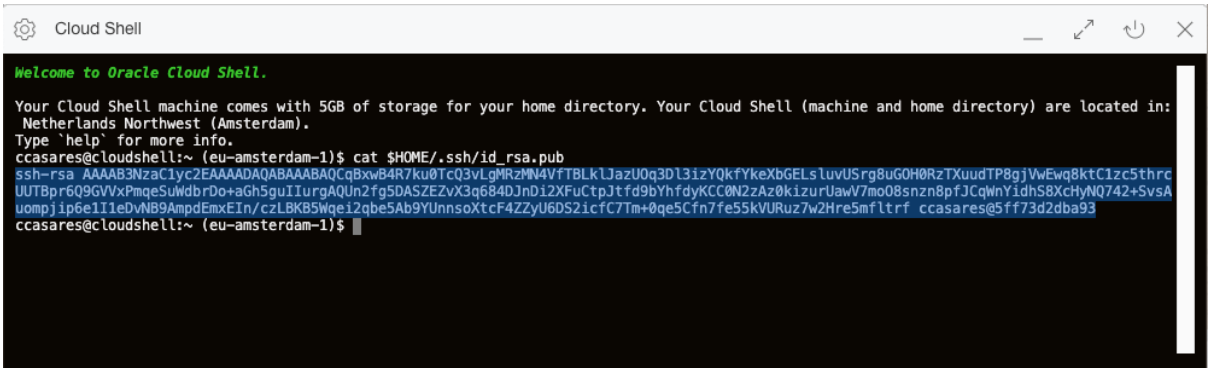
You still need to provide a Public Key to be able to login to the image. You will use the previously created public key. Open the *Cloud Shell*:



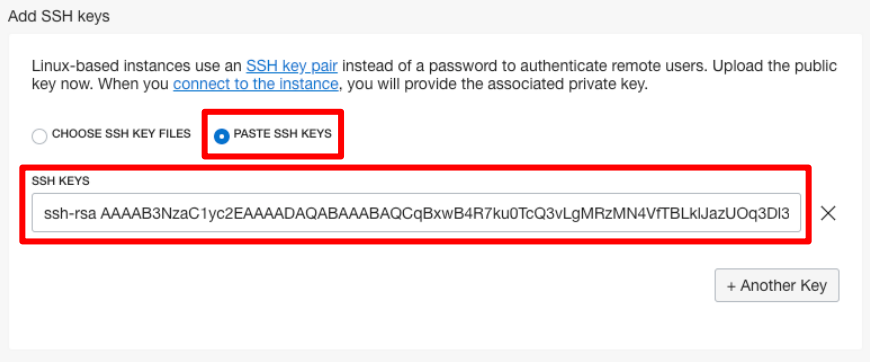
And once it's launched execute the following command to display the contents of the public key:

```
cat $HOME/.ssh/id_rsa.pub
```

Select the key contents by using your mouse and use **Ctrl + Insert** (**⌘-C** in MACOS) to copy it to your clipboard.

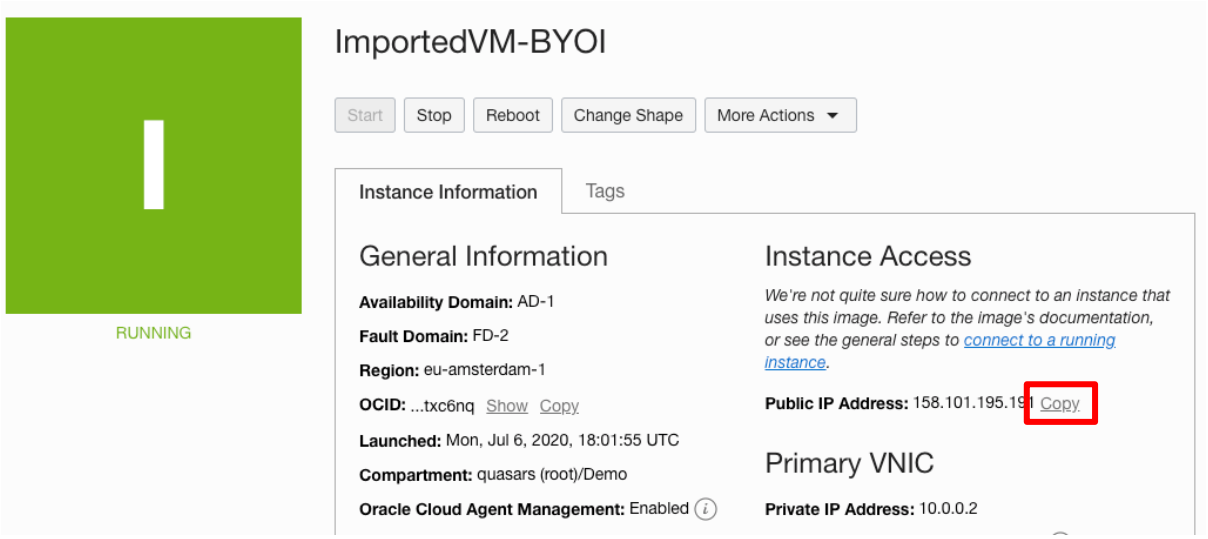


In the *Add SSH keys* section, select the *Paste SSH Keys* option and paste the content of the previously copied key and click the *Create* button:



The instance creation process will take about 1 minute or so.

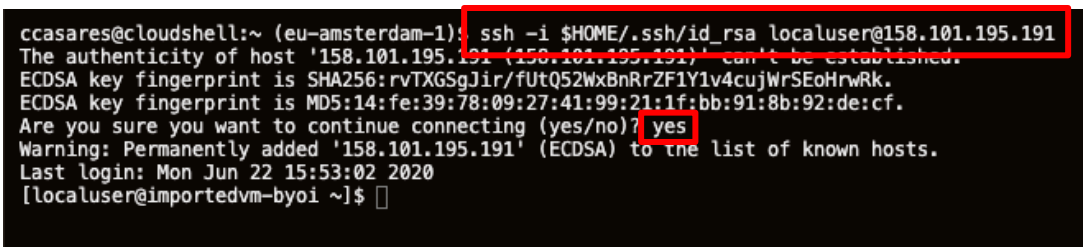
Once created and in RUNNING state, we can login to it. First, copy the assigned *Public IP Address* by clicking the *Copy* link close to it:



Go back to the Cloud Shell window and execute the following command:

```
ssh -i $HOME/.ssh/id_rsa localuser@<InstancePublicIPAddress>
```

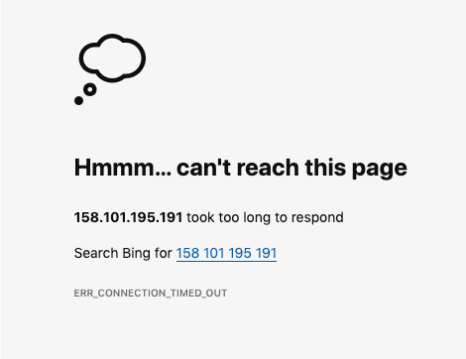
Type `yes` when requested and you should be logged in!!



Finally, let's see if our "app" (NGINX service) is up and accessible.

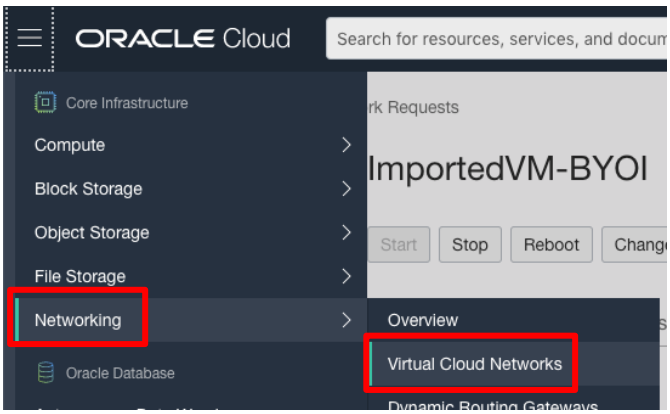
Open a browser and go to the following URL: `http://<InstancePublicIPAddress>`

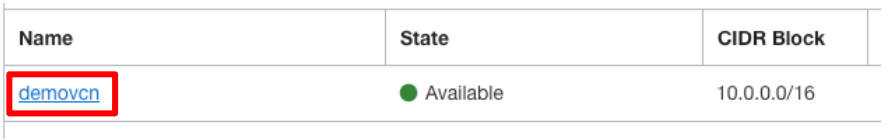
You should get a timeout in your browser:



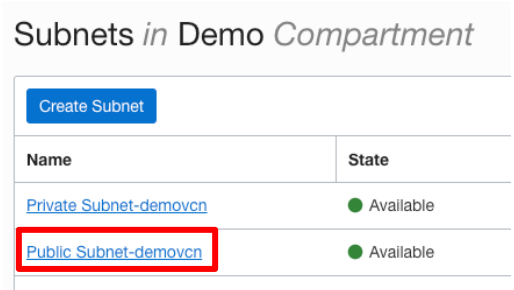
Why? We haven't opened the VCN's *firewall* for port 80. We have been able to do an SSH to the instance, because port 22 is opened by default.

To do so, open the *Virtual Cloud Networks* menu and click on your `demovcn` VCN link:

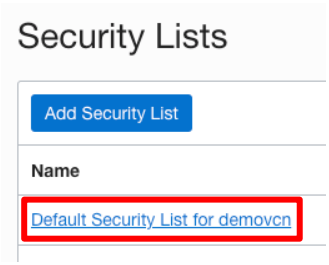




In the *Subnets* section, click on the *Public Subnet* link:

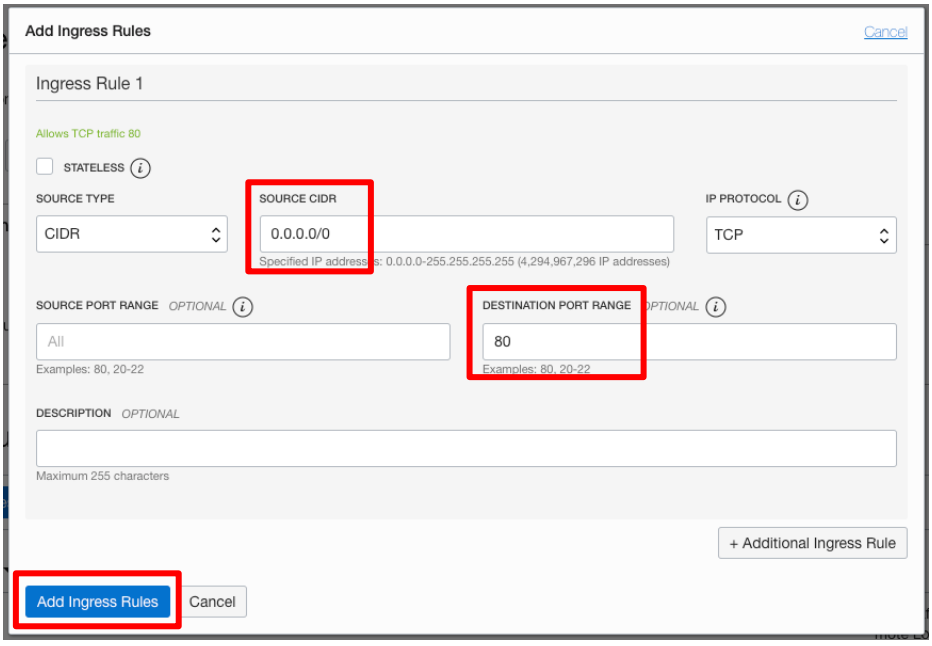


Then, click on the *Default Security List* link:

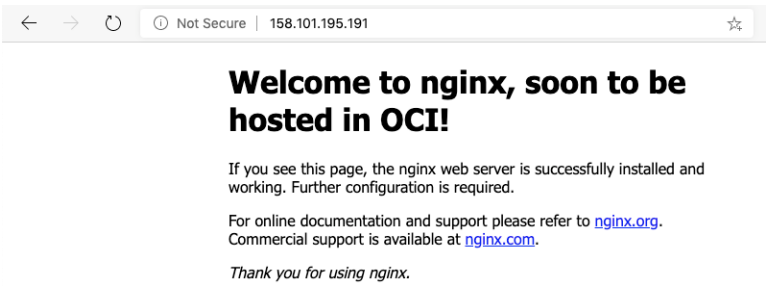


The *Security Lists* define the INGRESS and EGRESS rules for a whole subnet and all VMs attached to such subnet. If you want to create INGRESS and EGRESS rules for a specific VM, you can make use of the *Network Security Groups*. Learn more about *Security Lists* and *Network Security Groups* here and here.

Click the *Add Ingress Rules* button and type `0.0.0.0/0` for the *SOURCE CIDR* (which means any IPv4 address is a valid source for this rule) and `80` for the *DESTINATION PORT RANGE*, and click *Add Ingress Rules* button:



Once applied, simply refresh your browser's tab and you should see now the NGINX response page!



Congratulations, you have successfully completed the Hands On Lab!

