

OCI Fast Track

Hands On Lab Guide



OCI Fast track

Hands On Lab Guide

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Introduction

On this guide, we're going to work on creating some Oracle Cloud virtual machines, following different processes and good implementation techniques

We'll explore each and every one of the available resources on Infrastructure as Code (IaaS), going from network, storage, virtual machines, and Load Balancer. To begin, it's important to check if the user has a clear understanding of OCI's basic components like: Regions, Compartments, and Availability Domains

Through this guide, we're going to provision :

- Network (VCN, and subnets)
- Compute Instances (Linux and Windows)
- Block Storage
- Object Storage
- Load Balancer

Our goal is that, in the end of this workshop, attendees will be able to deploy their own infrastructure segments following OCI's best practices

Tools used on this Workshop

This lab will require the user to download and install:

- [PuTTY](#) e PuTTY KeyGen (for Windows Users)

PuTTY



PuTTY is a telnet and SSH client developed to grant Windows users, access to Linux/Unix Servers. Putty is a Open Source Software.

PuTTY can be downloaded on <https://www.putty.org/>.

Used Images

This LAB will basically use 2 different images:

- Oracle Linux 7.6
- Microsoft Windows 2016 Standard

Lab 1.

Accessing Oracle Cloud

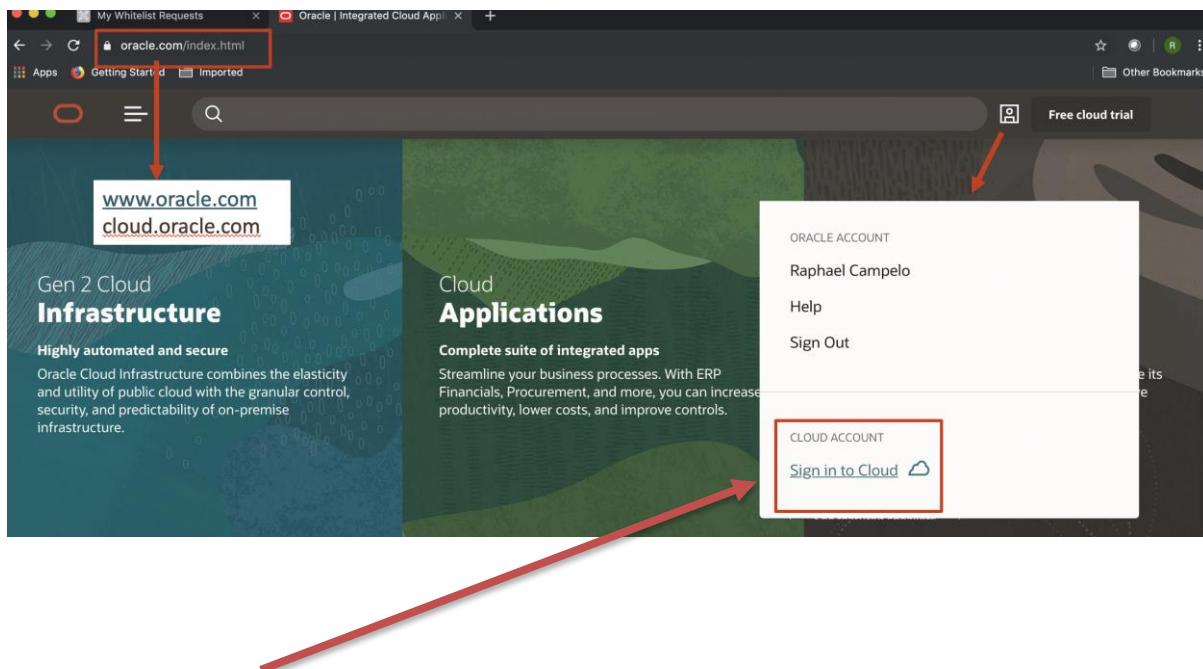
Lab 1. Accessing Oracle Cloud

Objectives

- Access Oracle Cloud Console
- Known IaaS and PaaS Services
- Become acquainted with OCI Interface

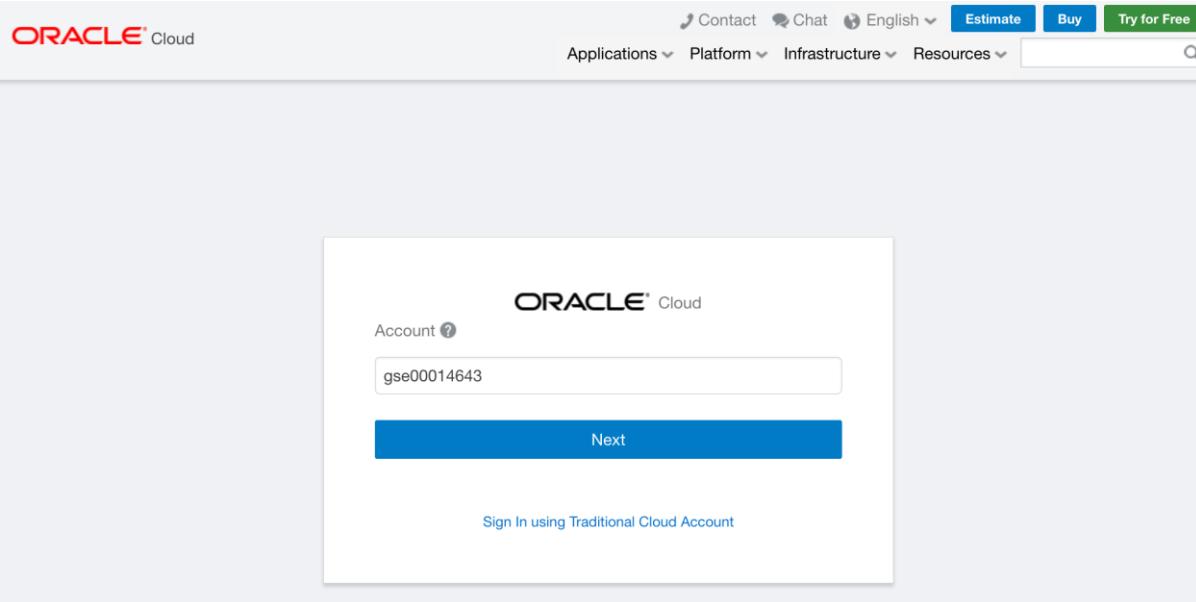
In this Section, you will learn more about the initial steps on Oracle Cloud Portal

On your preferred browser, type: cloud.oracle.com, or www.oracle.com. You can also change your language:



Hit the “[Sign in to Cloud](#)” link, and you will be redirected to the Cloud Connection screen, as follows:

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To more recent deployed environments, login must be made through "[Identity Cloud Service Account](#)". Where will be necessary to input "Account Name" (which is the defined name for the Tenant).

After Tenant identification, you'll be able to insert username and password for environment access

A large, empty rectangular box with a dark blue border, likely a placeholder for a sign-in form.

<Your account Name>

.....|

Sign In

Can't sign in?

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Once identified, you'll reach Oracle's Cloud main screen, from where you can reach all the available services. Your default main screen will look like this.

The screenshot shows the Oracle Cloud main dashboard. In the top left, there's a "Quick Actions" section with six cards: "COMPUTE Create a VM instance" (2-6 mins), "AUTONOMOUS TRANSACTION PROCESSING Create a database" (3-5 mins), "AUTONOMOUS DATA WAREHOUSE Create a data warehouse" (3-5 mins), "NETWORKING Create a virtual cloud network" (1-3 mins), "OBJECT STORAGE Store data" (2-6 mins), and "NETWORKING SOLUTIONS Create an IPsec VPN connection" (2-3 mins). To the right is the "Action Center" which includes "User Management" (Add a user to your tenancy), "Billing" (Current billing cycle charges \$0.00, Days elapsed in billing cycle 22 / 30), and "Analyze costs" (Manage payment method). Below the Action Center is the "What's New" section, which lists announcements such as "Announcing Free Tier: Use Always Free resources free of charge for the life of your account" (See 16, 2019) and "Console experience enhancements: Oracle IaaS, PaaS, and SaaS" (See 9, 2019). There's also a note about "Oracle Functions is now generally available and recommended for event-driven workloads" (v1.31+ 2019).

From the “Action Menu” (Top left corner), you can reach the available services on our console

The screenshot shows the Oracle Cloud Action Menu on the left side of the screen. It lists various services under categories: Core Infrastructure (Compute, Block Storage, Object Storage, File Storage, Networking), Database (Bare Metal, VM, and Exadata, Autonomous Data Warehouse, Autonomous Transaction Processing), Data Safe, Exadata Cloud at Customer, Solutions and Platform (Analytics, Resource Manager, Email Delivery, Application Integration, Monitoring, Developer Services, Marketplace), and Governance and Administration (Account Management, Identity, Security). To the right of the menu, there are several cards with service descriptions and images: "AUTONOMOUS TRANSACTION PROCESSING Create a database" (3-5 mins), "OBJECT STORAGE Store data" (2-6 mins), "Evaluate the PeopleSoft Validated Solution Architecture" (1-3 mins), "Meet your business and technical goals for PeopleSoft in the cloud.", "Migrate custom applications onto Oracle Cloud" (2-6 mins), "Deploy a three-tier web application using Always Free resources.", "Deploy Oracle and third party software from our Marketplace" (2-6 mins), and "Understanding compartments".

Understanding OCI Basic Concepts

Objectives

- Understand Availability Domain (AD) concept
- Understand Compartments
- Understand Fault Domains

In this section, you'll learn about OCI's high availability architecture.

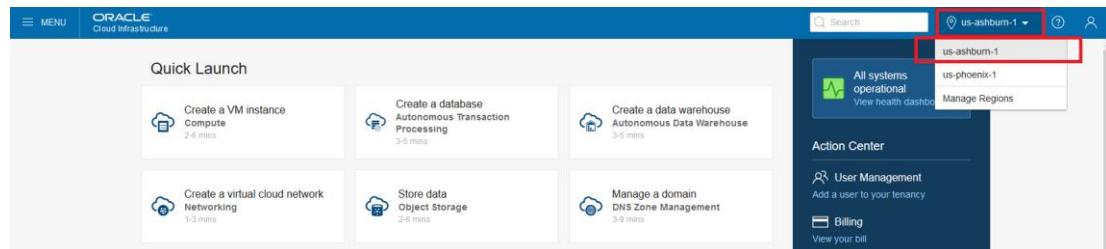
Regions

Oracle Cloud Infrastructure is hosted in regions and availability domains. A region is a localized geographic area. A region is composed of one or more availability domains. Most Oracle Cloud Infrastructure resources are either region-specific, such as a virtual cloud network, or availability domain-specific, such as a compute instance.

Regions are completely independent of other regions and can be separated by vast distances—across countries or even continents. Generally, you would deploy an application in the region where it is most heavily used, since using nearby resources is faster than using distant resources. However, you can also deploy applications in different regions to:

- mitigate the risk of region-wide events, such as large weather systems or earthquakes
- meet varying requirements for legal jurisdictions, tax domains, and other business or social criteria

After accessing the environment, is possible to change your region with just one click:



Availability Domains

In a Region, you may have up to three Availability Domains.

The availability domains within the same region are connected to each other by a low latency, high bandwidth network, which makes it possible for you to provide high-availability connectivity to the Internet and customer premises, and to build replicated systems in multiple availability domains for both high-availability and disaster recovery.

Availability domains are isolated from each other, fault tolerant, and very unlikely to fail simultaneously. Because availability domains do not share infrastructure such as power or cooling, or the internal availability domain network, a failure at one availability domain within a region is unlikely to impact the availability of the others within the same region.

Working With Compartments

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. Once you put a resource in a compartment, you can't move it, so it's important to think through your compartment design for your organization up front, before implementing anything.

When creating a new compartment, you must provide a name for it (maximum 100 characters, including letters, numbers, periods, hyphens, and underscores) that is unique within its parent compartment. You must also provide a description, which is a non-unique, changeable description for the compartment, between 1 and 400 characters. Oracle will also assign the compartment a unique ID called an Oracle Cloud ID

Once a resource is created in a compartment, you can't move it to another.

The Console is designed to display your resources by compartment within the current region. When you work with your resources in the Console, you must choose which compartment to work in from a list on the page.

That list is filtered to show only the compartments in the tenancy that you have permission to access. If you're an administrator, you'll have permission to view all compartments and work with any compartment's resources, but if you're a user with limited access, you probably won't

Compartments are global, across regions, when you create a compartment, it is available in every region that your tenancy is subscribed to.

Compute

Instances *in testetrial (root) Compartment*

[Instances](#)[Instance Configurations](#)[Instance Pools](#)[Custom Images](#)[Boot Volumes](#)[Boot Volume Backups](#)[Create Instance](#)Sort by: [Created Date \(Desc\)](#)

There are no Instances in testetrial (root) Compartment

[Create Instance](#)

List Scope

COMPARTMENT

testetrial (root)

Search compartments

- testetrial (root)

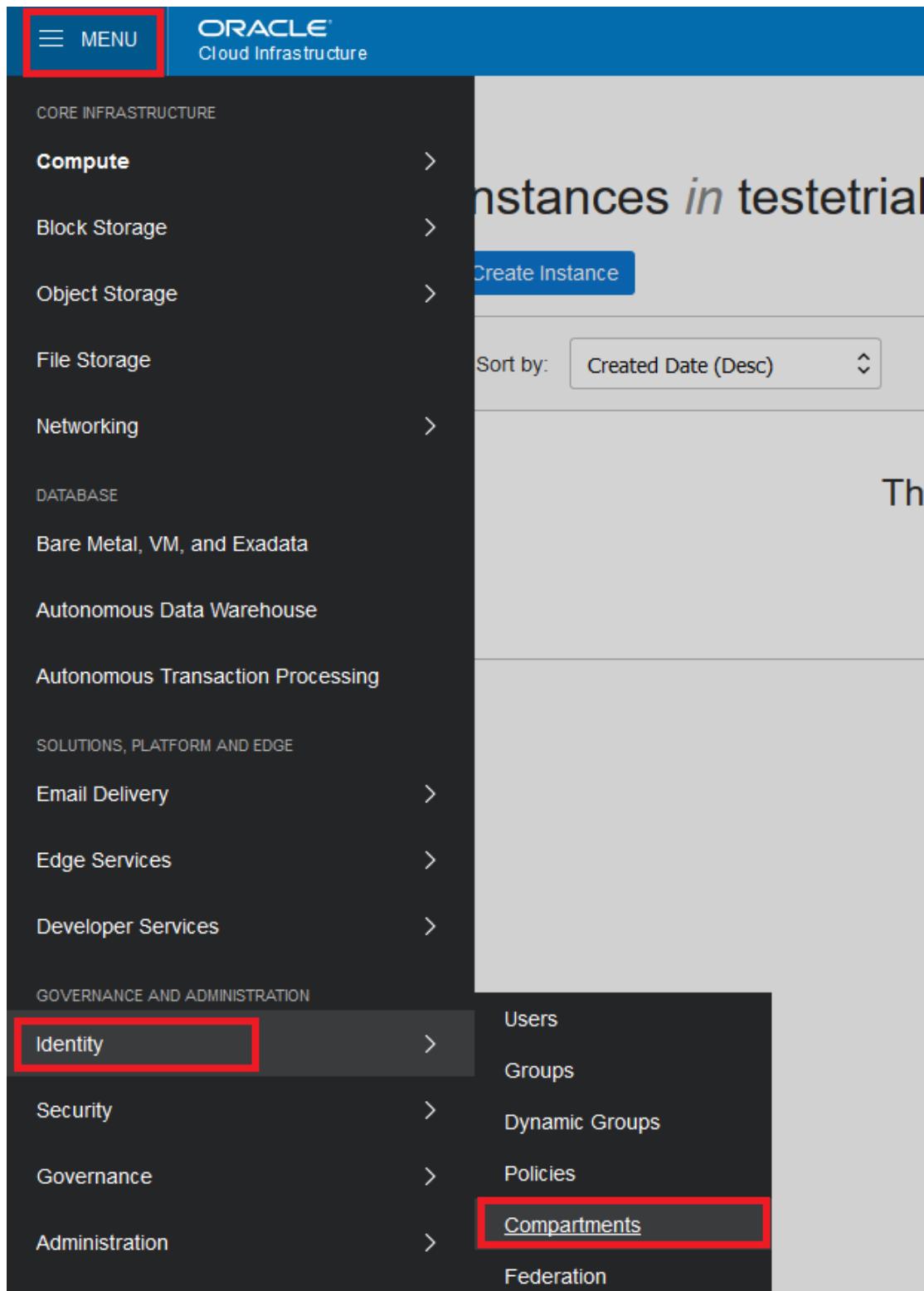
COMPUTE-TESTS
ManagedCompartmentForPaaS
OnPrem
Vitor-for-PaaS
VPN-Compartment

AVAILABILITY DOMAIN

- TMYY:US-ASHBURN-AD-1
- TMYY:US-ASHBURN-AD-2
- TMYY:US-ASHBURN-AD-3

Creating Compartments

On the main menu, Hit “Identity”, then choose “Compartments”



Click on “Create Compartment” and fill the information:

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Name: Compartimento-Trial

Description: Compartimento para recursos de testes

Parent Compartment: root

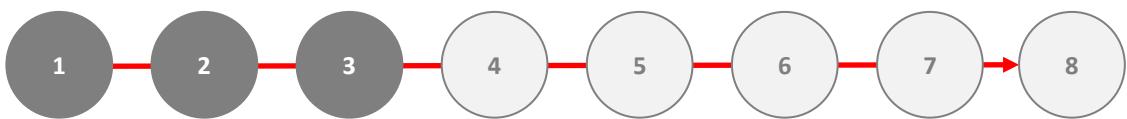
The screenshot shows the OCI Cloud Infrastructure Compartments page. At the top, there is a navigation bar with 'MENU' and the 'ORACLE Cloud Infrastructure' logo. Below the navigation bar, the page title is 'Compartments'. There are two tabs: 'Identity' and 'Users', with 'Identity' being the active tab. A prominent blue button labeled 'Create Compartment' is highlighted with a red box.

The main form is titled 'Create Compartment'. It includes fields for 'NAME' (containing 'Compartimento-Trial'), 'DESCRIPTION' (containing 'Compartimento para recursos de testes'), 'PARENT COMPARTMENT' (set to 'testetrial (root)'), and 'TAGS' (with a note 'What is tagging?'). Below the form, there is a section for adding tags, which includes a 'TAG NAMESPACE' dropdown ('None (apply a free-form tag)'), 'TAG KEY' and 'VALUE' input fields, and a '+ Additional Tag' button. Another blue 'Create Compartment' button is located at the bottom of this section, also highlighted with a red box.

Lab 2.

Networking

Virtual Cloud Network and It's Resources



Lab 2. Networking

Virtual Cloud Network and It's Resources

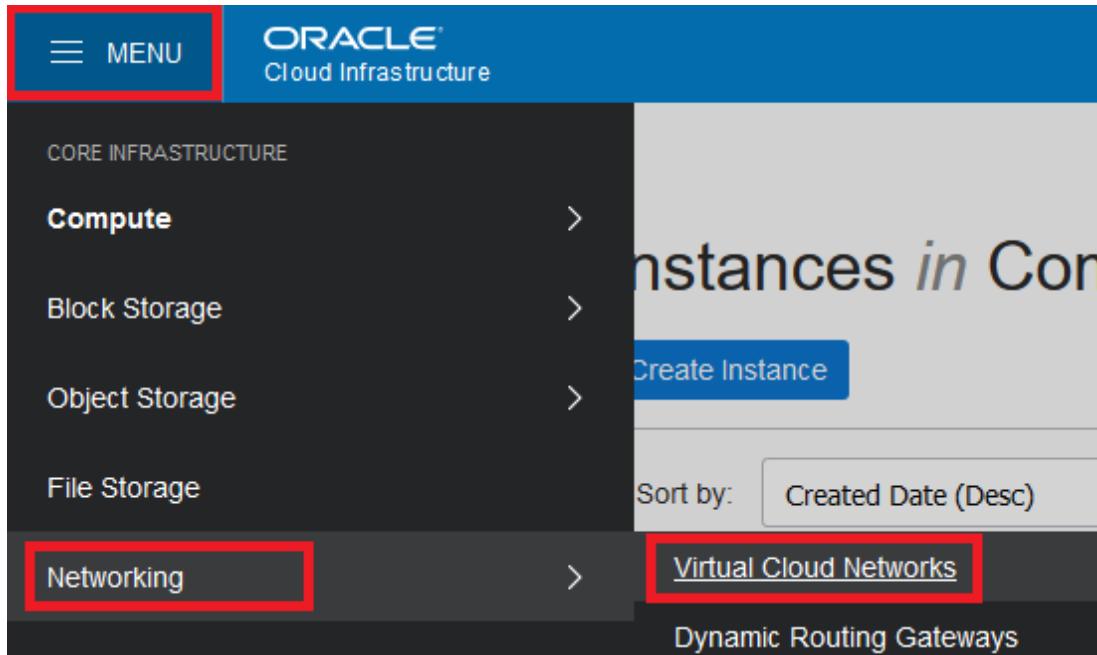
Objectives

- Create Oracle Cloud Network (VCN)
- Configure 3 subnets on 3 Ads
- Provision an Internet Gateway, which will allow your VCN access to public internet
- Configure Route Table

Create Oracle Cloud Network (VCN)

To create a network, remember to choose your compartment, then hit: Networking>>Virtual Cloud Networks, on main menu.

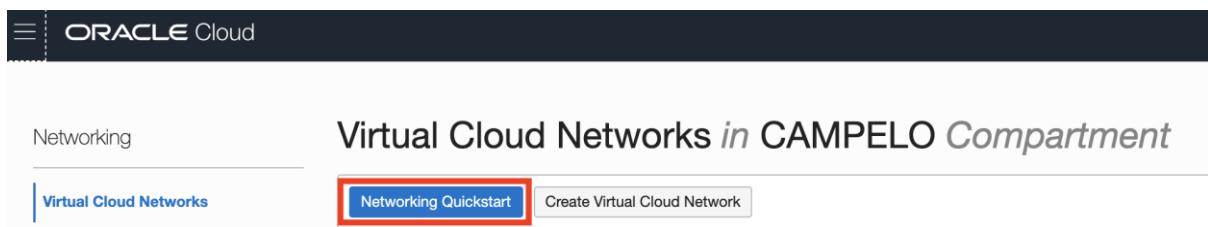
The screenshot shows the Oracle Cloud Infrastructure (OCI) Compute service interface. On the left, there's a sidebar with 'Compute' and 'Instances' listed. Below 'Instances' is a 'Create Instance' button. To its right is a 'Sort by:' dropdown set to 'Create'. At the bottom of the sidebar is a 'COMPARTMENT' dropdown, which is currently set to 'Compartimento-Trial'. This dropdown is highlighted with a red box. Other options in the dropdown include 'All Compartments' and 'My Compartments'.



Entering the Virtual Network Module, you'll be presented to 2 options for creating an OCI Network:

- You can individually create the network components
- You can run through a wizard based creation process, that will assist you on setting up network components, and basic connectivity setup.

On this example, we will use the wizard based process, started by choosing the option “Networking Quickstart” button below



Starting the process, you'll be guided by OCI interface through the process.

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1 – Choose the type of connectivity you want, you can choose a VPN model, or standard internet access through internet gateway

Networking Quickstart [help](#) [cancel](#)

VCN with Internet Connectivity

VCN with VPN Connect and Internet Connectivity

Creates a VCN with a public subnet that can be reached from the internet. Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network.

Includes: VCN, public subnet, private subnet, internet gateway (IG), NAT gateway (NAT), service gateway (SG).

[Start Workflow](#) [Cancel](#)

Please note, the provided blueprint on the right side of the screen, it works as an illustration of how your connectivity will be set. On our tests, we'll use a simple internet connectivity model

Networking Quickstart [help](#) [cancel](#)

VCN with Internet Connectivity

VCN with VPN Connect and Internet Connectivity

Creates a VCN with a public subnet that can be reached from the internet. Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network.

Includes: VCN, public subnet, private subnet, internet gateway (IG), NAT gateway (NAT), service gateway (SG).

[Start Workflow](#) [Cancel](#)

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2 – Setup Basic VCN parameters:

Name: VCN-TRIAL

Compartment: Choose your own compartment

Configuration

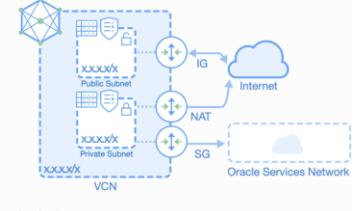
Basic Information

VCN NAME *(i)*
vcn-trial

COMPARTMENT *(i)*
gse00014643 (root)/CAMPBELL

Your compartment compartment name goes here

VCN with Internet Connectivity



Then, input CIDR Block information for VCN and it's subnets

VCN CIDR Block: 10.0.0.0/16

Public Subnet: 10.0.0.0/24

PrivateSubnet: 10.0.1.0/24

- CIDR Block info provided here are for sample setup only.

Configure VCN and Subnets

VCN CIDR BLOCK *(i)*
10.0.0.0/16
Example: 10.0.0.0/16
If you plan to peer this VCN with another VCN, the VCNs must not have overlapping CIDRs. [Learn more.](#)

PUBLIC SUBNET CIDR BLOCK *(i)*
10.0.0.0/24
Example: 10.0.0.0/24
The subnet CIDR blocks must not overlap.

PRIVATE SUBNET CIDR BLOCK *(i)*
10.0.1.0/24
Example: 10.0.1.0/24
The subnet CIDR blocks must not overlap.

DNS RESOLUTION

USE DNS HOSTNAMES IN THIS VCN
Required for instance hostname assignment if you plan to use VCN DNS or a third-party DNS. This choice cannot be changed after the VCN is created. [Learn more.](#)

Previous Next Cancel

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At the end, Hit “Next” button, and you’ll be directed to “review and create page” where the networking components will be created:

Review and Create

Oracle Virtual Cloud Network (VCN)

Name: vcn-trial
Compartment: CAMPELO
Tags: VCN: VCN-2019-12-13T18:41:58
CIDR: 10.0.0.0/16
DNS Label: vcntrial
DNS Domain Name: vcntrial.oraclevcn.com

Subnets

Public Subnet
Subnet Name: Public Subnet-vcn-trial
CIDR: 10.0.0.0/24
Security List Name: Default Security List for vcn-trial
Route Table Name: Default Route Table for vcn-trial
DNS Label: sub12131849010

Private Subnet
Subnet Name: Private Subnet-vcn-trial
CIDR: 10.0.1.0/24
Security List Name: Security List for Private Subnet-vcn-trial
Route Table Name: Route Table for Private Subnet-vcn-trial
DNS Label: sub12131849011

Gateways

Name	Gateway Type	Used By
Internet Gateway-vcn-trial	Internet Gateway	Public Subnet-vcn-trial
NAT Gateway-vcn-trial	NAT Gateway	Private Subnet-vcn-trial
Service Gateway-vcn-trial	Service Gateway	Private Subnet-vcn-trial

Security Lists

Name: Default Security List for vcn-trial [Show Rules](#)
Name: Security List for Private Subnet-vcn-trial [Show Rules](#)

Route Tables

Name: Default Route Table for vcn-trial [Show Rules](#)

Check the provided information, and hit the “Create” blue button at the end of the screen. Finishing the process, you can follow the all the creation steps executed by the interface:

Created Virtual Cloud Network

Creating Resources

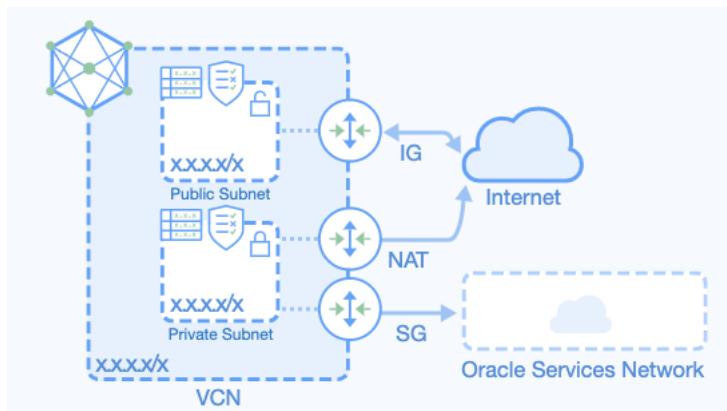
	Virtual Cloud Network creation complete
»	Create Virtual Cloud Network (1 resolved) Done ✓
»	Create Subnets (2 resolved) Done ✓
»	Create Internet Gateway (1 resolved) Done ✓
»	Create NAT Gateway (1 resolved) Done ✓
»	Create Service Gateway (1 resolved) Done ✓
»	Create Route Table for Private Subnet (1 resolved) Done ✓
»	Create Security List for Private Subnet (1 resolved) Done ✓
»	Update Route Tables (2 resolved) Done ✓
»	Update Private Subnet (1 resolved) Done ✓

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The networking creation process is very quick, when finished, will be shown as below:

The screenshot shows the OCI Console interface for Networking. The left sidebar has 'Virtual Cloud Networks' selected. The main area title is 'Virtual Cloud Networks in Compartimento-Trial Compartment'. It displays one item: 'VCN-Trial' (OCID: ...mno4za). The table includes columns for CIDR Block, Default Route Table, DNS Domain Name, and Created Date. The status is 'AVAILABLE'. Navigation links at the bottom say 'Displaying 1 Virtual Cloud Networks < Page 1 >'.

We can take a look at the “reference blueprint” showed at the start of the VCN creation process, and review the elements that were automatically created by OCI wizard:



We got : 1 VCN, 2 Regional Subnets (public and private), 1 Internet Gateway, 1 NAT Gateway, and 1 Service Gateway, all already setup and ready for use.

Lab 3.

Compute Instances



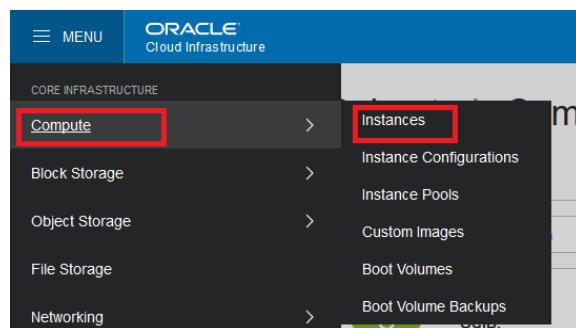
Lab 3. Compute Instances

Creating Windows Server 2016 Virtual Machine

Objectives

- Quickly create a Virtual Machine
- Identify main information needed for a OCI Compute Instance Creation

To access main screen, Hit Menu > Compute > Instances.



Begin Windows VM Creation

Hit “Create Instance”.

The screenshot shows the 'Instances' page under the 'Compute' section. The left sidebar has 'Instances' selected. The main area displays a message: 'Instances in Compartimento-Trial Compartment' and 'There are no Instances in Compartimento-Trial that match the filter criteria.' A blue 'Create Instance' button is located at the bottom right of this message area, highlighted with a red box. The top navigation bar includes 'MENU', the 'ORACLE Cloud Infrastructure' logo, a search bar, and a user profile icon.

Name you instance: VM-Windows2016-AD1

Availability Domain: AD 1

Operating System: Windows Server 2016 Standard

Instance Type: Virtual Machine

Instance Shape: VM.Standard2.1

Custom boot volume: 300 GB

Virtual Cloud Network Compartment: Compartimento-Trial

Virtual Cloud Network: VCN-Trial

Subnet Compartment: Compartimento-Trial

Subnet: Subrede-AD1

Assign Public IP Address

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≡ ORACLE Cloud

Create Compute Instance

Name your instance
instance-20191215-1229

Choose an operating system or image source ⓘ

 Windows Server 2016 Standard
Image Build: Gen2-2019.11.15-0
Windows Server 2016 supports running production Windows workloads on Oracle Cloud Infrastructure.

[Change Image Source](#)

[Hide Shape, Network, Storage Options](#)

Availability Domain

AD 1 PqLC:US-ASHBURN-AD-1

AD 2 PqLC:US-ASHBURN-AD-2

AD 3 PqLC:US-ASHBURN-AD-3

Instance Type

Virtual Machine
A virtual machine is an independent computing environment that runs on top of physical bare metal hardware.

Bare Metal Machine
A bare metal compute instance gives you dedicated physical server access for highest performance and strong isolation.

Instance Shape

VM.Standard2.1 (Virtual Machine)
1 Core OCPU, 15 GB Memory

[Change Shape](#)

Configure networking

Virtual cloud network compartment
CAMPELO

Virtual cloud network
vcn-trial

Subnet compartment
CAMPELO

Subnet ⓘ
Public Subnet-vcn-trial (Regional)

Use network security groups to control traffic ⓘ

Assign a public IP address Do not assign a public IP address

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! Assigning a public IP address makes this instance accessible from the internet. If you're not sure whether you need a public IP address, you can always assign one later.

Boot volume

Default boot volume size: 256.0 GB

- Custom boot volume size (in GB)
- Use in-transit encryption ⓘ
- Choose a key from Key Management to encrypt this volume

Login Credentials

Upon creating this instance, both a user name and an initial password will be generated for you. They will be available on the details screen for the newly launched Instance. You must create a new password upon logging into the instance for the first time.

Show Advanced Options

[Create](#) [Cancel](#)

After instance creation, you'll see:

Sort by: Created Date (Desc) ▾		Displaying 1 Instances < Page 1 >		
 VM-Windows2016	OCID: ...wyaq3a Show Copy	Shape: VM.Standard2.1 Region: iad Availability Domain: tmy:US-ASHBURN-AD-1 Fault Domain: FAULT-DOMAIN-2	Created: Thu, 10 Jan 2019 16:33:49 GMT Maintenance Reboot: -	...
Displaying 1 Instances < Page 1 >				

Before step forward, find the VM's public IP, and copy it :

Compute > Instances > Instance Details

VM-Windows2016-AD1

Start Stop Reboot Move Resource Apply Tag(s) Actions ▾

Instance Information Tags

Instance Information

Availability Domain: UcEsUS-ASHBURN-AD-1
Fault Domain: FAULT-DOMAIN-1
Region: iad
Shape: VM.Standard2.1
Username: opc
Initial Password: ... [Show](#) [Copy](#)
Maintenance Reboot: -

Primary VNIC Information

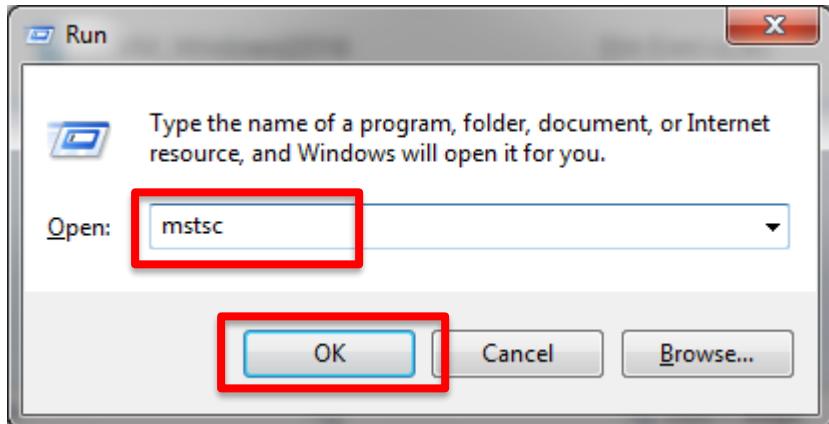
Private IP Address: 10.0.0.2
Public IP Address: 129.213.58.169
Network Security Groups: None [Edit](#)

Image: Windows-Server-2016-Standard-Edition-VM-Gen2-2019.09.26-0
OCID: ...xz554q [Show](#) [Copy](#)
Launched: Wed, 02 Oct 2019 19:16:29 UTC
Compartment: guine01 (root)/Compartimento-Trial
Virtual Cloud Network: VCN-Trial
Launch Mode: NATIVE

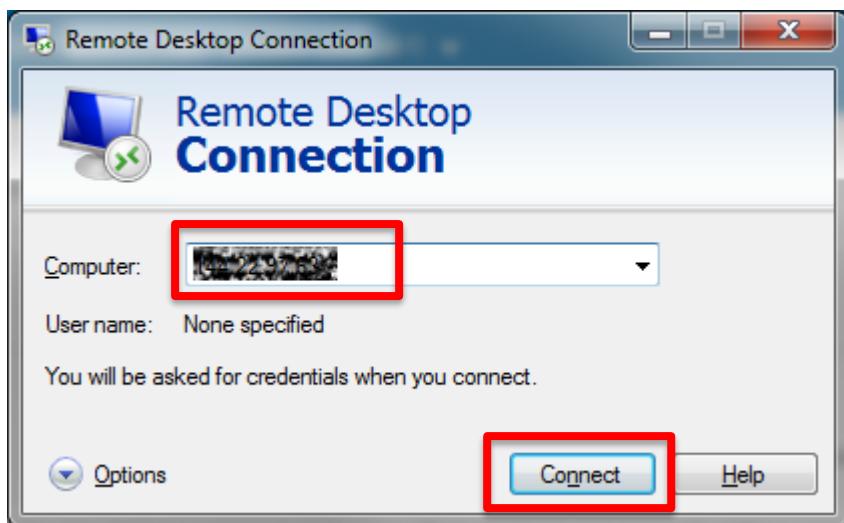
Internal FQDN: vm-windows2016-ad1... [Show](#) [Copy](#)
Subnet: Public Subnet UcEsUS-ASHBURN-AD-1

Now try to access it, using "Remote Desktop Connection".

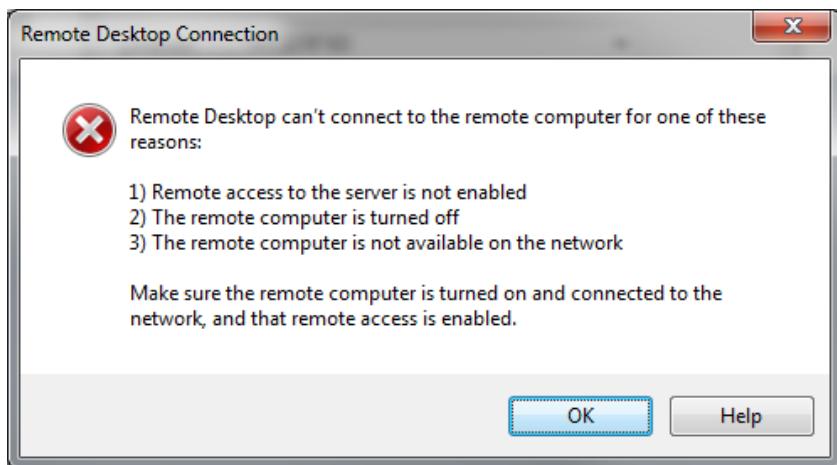
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Use instance's Public IP address, and hit “Connect”.



You'll get the following error when trying to connect.



Don't worry, that's the expected behavior. In order to access a compute instance on Oracle Public Cloud, you need to configure firewall "Access Rules" first. On the next session, we'll configure other resources, that can be created before the VM, and provide access permissions as well

Security Rules

You probably noticed that Linux VM could be accessed by SSH key right after it's creation, but Windows instance could not be accessed through RDP.

To access Windows Compute, we'll need to configure some firewall rules.

Firewall rules are set inside in an object called “**Security List**”, that can be accessed within a subnet.

Security Rules are inside the Security List, from there, we can setup which ports and protocols are allowed traffic inside a subnet.

Click on: **Networking -> Virtual Cloud Networks -> VCN-Trial**

Name	State	CIDR Block	Default Route Table	DNS Domain Name	Created
VCN-Trial	Available	10.0.0.0/16	Default Route Table for VCN-Trial	vcntrial.oraclevcn.com	Mon, Oct 28, 2019, 2:07:23 AM UTC

Click on: **Security List -> Default Security List for VCN-Trial**

Name	State	Created
Default Security List for vcn1	Available	Mon, Sep 23, 2019, 9:33:54 PM UTC

To access the VCN's firewall rules, choose the Security List you want to configure. In our example, you'll find the “Default Security List” already created on our VCN. Click on the “Default Security List” security list and then the access rules console will come up.

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Now you can add/edit Access Rules to the VCN ... Hit “Add Ingress Rules” to add more access conditions.

Default Security List for VCN_PROVA

Instance traffic is controlled by firewall rules on each instance in addition to this Security List

Move Resource Add Tags Terminate

Security List Information Tags

OCID: ...xrwfza Show Copy
Created: Sat, Mar 30, 2019, 7:36:46 PM UTC

Resources

Ingress Rules (5)

Egress Rules (1)

Ingress Rules

Add Ingress Rules Edit Remove

<input type="checkbox"/>	Stateless ▾	Source	IP Protocol	Source Port Range
<input type="checkbox"/>	No	0.0.0.0/0	TCP	All
<input type="checkbox"/>	No	0.0.0.0/0	ICMP	

RDP Setting permissions

Inside Security List, hit “Add Ingress Rules” option.

Networking » Virtual Cloud Networks » VCN_WKSP » Security List Details

Default Security List for VCN_WKSP

Instance traffic is controlled by firewall rules on each instance in addition to this Security List

Move Resource Add Tags Terminate

Security List Information Tags

OCID: ...32iloa Show Copy
Created: Tue, Mar 12, 2019, 1:25:57 PM UTC

Resources

Ingress Rules (12)

Egress Rules (1)

Ingress Rules

Add Ingress Rules Remove

<input type="checkbox"/>	Stateless ▾	Source	IP Protocol	Source Port Range
<input type="checkbox"/>	No	0.0.0.0/0	TCP	All

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Add Ingress Rules [cancel](#)

Ingress Rule 1

Allows TCP traffic for ports: 3389

STATELESS [i](#)

SOURCE TYPE [CIDR](#) SOURCE CIDR [0.0.0.0/0](#) IP PROTOCOL [RDP \(TCP/3389\)](#)

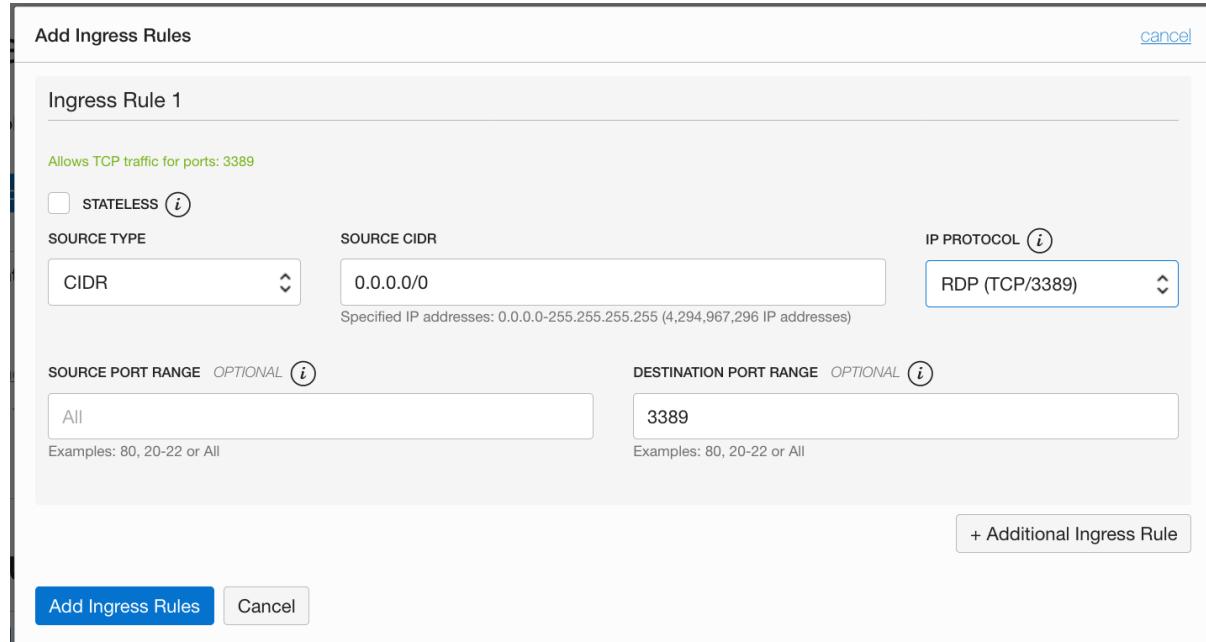
SPECIFIED IP ADDRESSES: 0.0.0.0-255.255.255.255 (4,294,967,296 IP ADDRESSES)

SOURCE PORT RANGE [OPTIONAL](#) [All](#) DESTINATION PORT RANGE [OPTIONAL](#) [3389](#)

EXAMPLES: 80, 20-22 OR All

+ Additional Ingress Rule

[Add Ingress Rules](#) [Cancel](#)



Fill the blanks as follows:

Source Type: CIDR

Source CIDR: 0.0.0.0/0

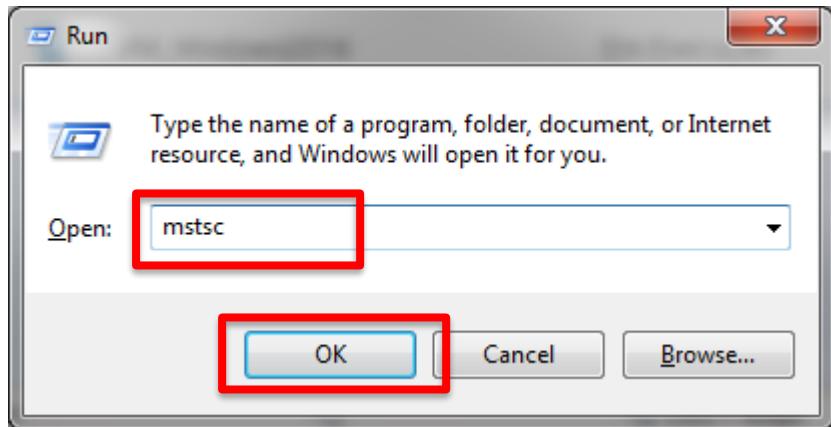
IP Protocol: RDP (TCP/3389)

Source Port Range: All

Destination Port Range: 3389

Windows access through Remote Desktop

To access Windows VM, on Main Menu choose “Run”, type “mstsc”, then hit “OK”.



Input Instance's Public IP, then hit “Connect”



IF everything was properly configured, you'll be transported to Windows login page, where you will need to change OPC password on first access.

Oracle Linux 7.7 Compute Instance Creation

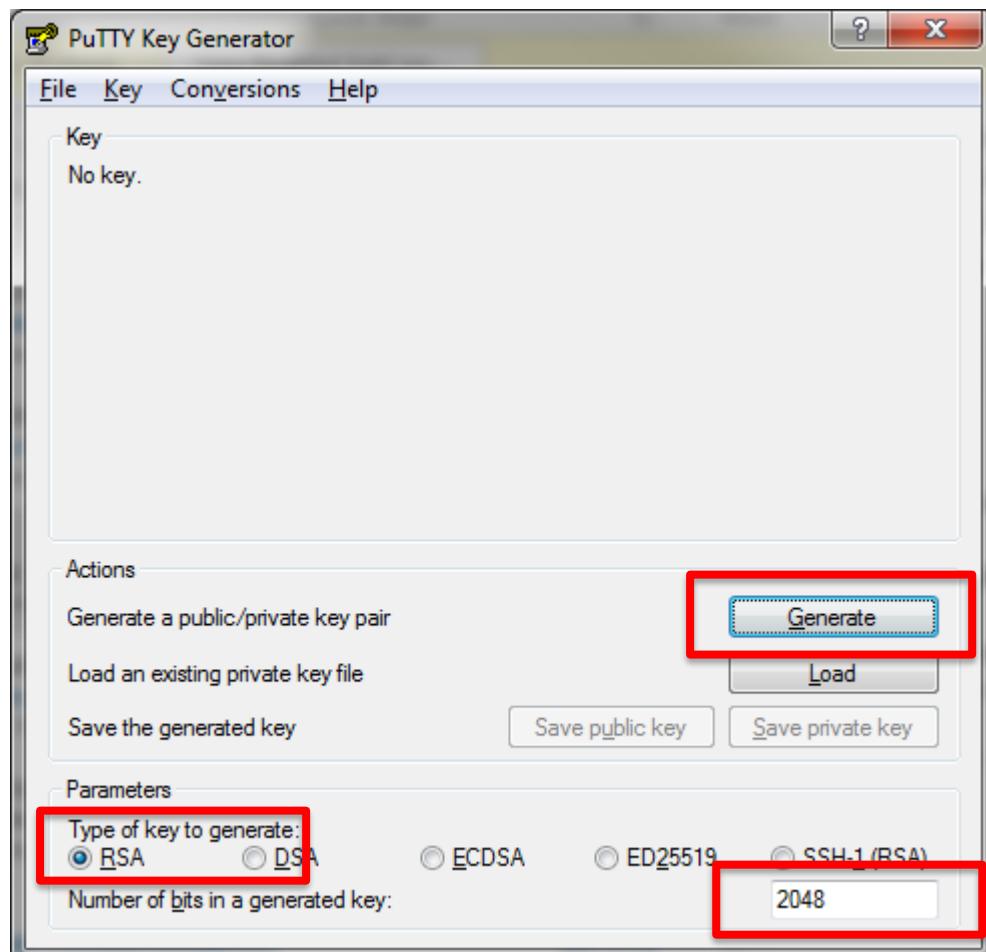
Objectives

- Create SSH key pair with PuTTY Gen
- Create Oracle Linux 7.7 virtual Machine
- Access compute instance using PuTTY

SSH Key pair creation

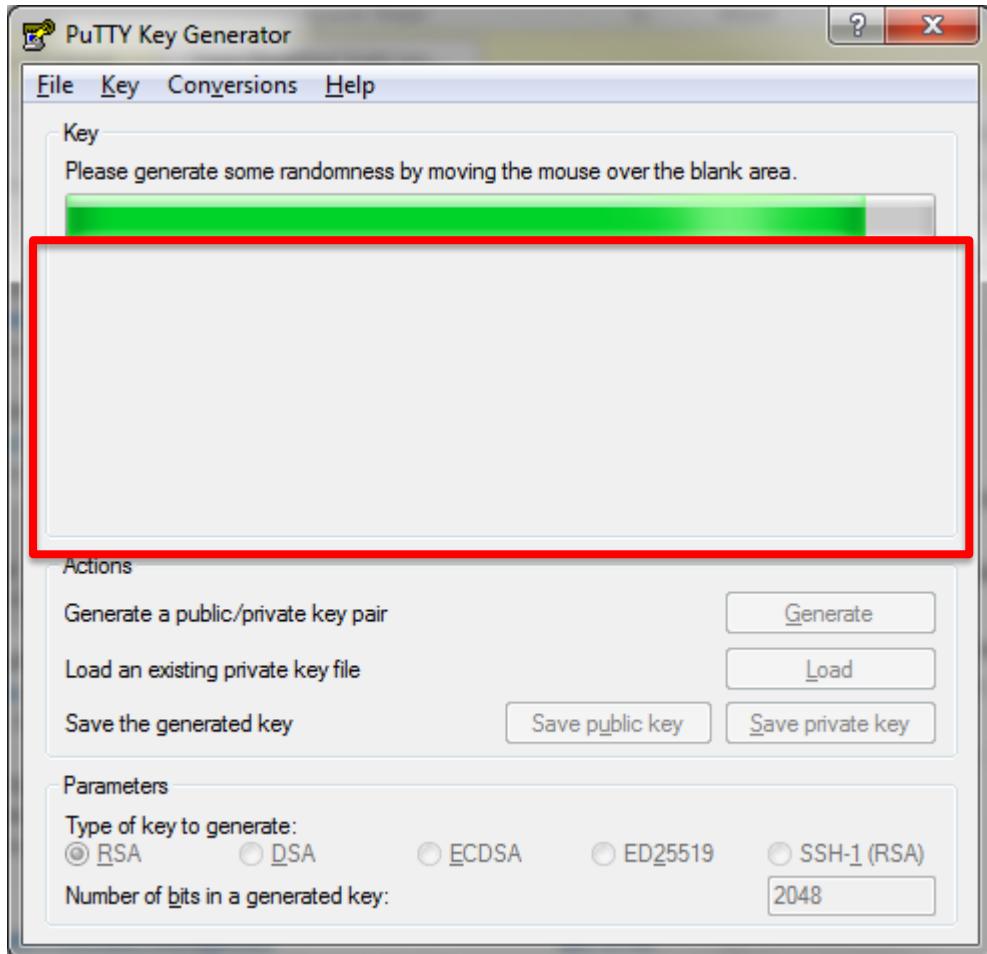
First step, before start VM Creation, is to create a SSH key pair. To do it, we'll use Putty Key Generator

Open the application, choose a RSA type key, and a 2048 bits key. Then hit “Generate”

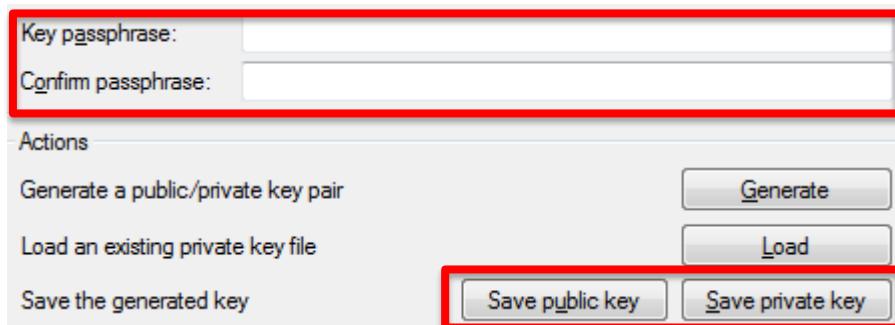


Move the mouse until the green bar stops moving

OCI Fast Track – Hands On Guide



Save private and public Keys in safe place.
“Key Passphrase” fields are optional



```
ssh-rsa AAAAB3NzaC1yc2EAAAQABQAAAQEAus7Gzn1GjIowTGATq4DwB2oqyDmNxvu20gbg0Xo9IWaxaefihKG+Wlcuwu2/7Fz/v7dCmj+qd6ocBASBoSaMAbObMYA9NWS+9ckVnwa8N98kXDrsKm42m/431X7t1U99t/WjKOinQyOf65VdW/C3gwxaRkRDQz8jcyUQlOko7mKgy5Hb5KKCiz7v
```

For VM creation, we'll use public key. Private key will only be used for connection.

Creating Virtual Machine

In Main Menu, hit : Compute > Instances, than “Create Instance” :

- Name you instance:** VM-OracleLinux-AD2
- Availability Domain:** AD 2
- Operating System:** Oracle Linux 7.7
- Instance Type:** Virtual Machine
- Instance Shape:** VM.Standard2.1
 - **Choose SSH Key File:** Insert public key file (.pub)
- Virtual Cloud Network Compartment:** Compartimento-Trial
- Virtual Cloud Network:** VCN-Trial
- Subnet Compartment:** Compartimento-Trial
- Subnet:** Subrede-AD2
- Assign Public IP Address**

The screenshot shows the 'Create Compute Instance' wizard. In the 'Choose an operating system or image source' section, there's a list of available images, with 'Oracle Linux 7.7' selected. A red callout with the text 'Hit this option to expand network and shape options' points to the 'Show Shape, Network and Storage Options' button, which is highlighted with a red box.

After expanding Shape's and networking options, input the necessary data to finish the creation process:

The screenshot shows the expanded configuration options. Under 'Availability Domain', 'AD 2' is selected. Under 'Instance Type', 'Virtual Machine' is selected. Under 'Instance Shape', 'VM.Standard2.1 (Virtual Machine)' is selected. A red callout lists a bullet point: 'Remember to choose your AD, and compartment'.

- Remember to choose your AD, and compartment

OCI Fast Track – Hands On Guide

When entering Networking information, remember to choose the option “**Assign a Public IP address**”

Configure networking

Virtual cloud network compartment
CAMPELO
gse00014643 (root)/CAMPELO

Virtual cloud network
vcn-trial

Subnet compartment
CAMPELO
gse00014643 (root)/CAMPELO

Subnet ⓘ
Public Subnet-vcn-trial (Regional)

Use network security groups to control traffic ⓘ

Assign a public IP address Do not assign a public IP address

ⓘ Assigning a public IP address makes this instance accessible from the internet. If you're not sure whether you need a public IP address, you can always assign one later.

Upload the SSH key and hit the “Create” button

Boot volume

Default boot volume size: 46.6 GB

Custom boot volume size (in GB)
 Use in-transit encryption ⓘ
 Choose a key from Key Management to encrypt this volume

Add SSH key ⓘ

Choose SSH key file Paste SSH keys

Choose SSH key file (.pub) from your computer

chave_cloud_01.pub

↳ Show Advanced Options

OCI Fast Track – Hands On Guide

You will probably have the new instance properly created in a few minutes. After finishing the creation process, the main screen will look like this:

The screenshot shows the Oracle Cloud Instance Details page for an instance named 'instance-20191213-1601'. The instance is currently 'RUNNING'. Key details include:

- Instance Information:** Availability Domain: PqlC:US-ASHBURN-AD-2, Fault Domain: FAULT-DOMAIN-3, Region:iad, Shape: VM.Standard2.1, Virtual Cloud Network: vcn-trial.
- Primary VNIC Information:** Private IP Address: 10.0.0.2, Public IP Address: 150.136.145.15, Network Security Groups: None.
- Image:** Oracle-Linux-7.7-2019.11.12-0
- OCID:** ...hrvkma
- Launched:** Fri, 13 Dec 2019 19:21:46 UTC
- Compartment:** gse00014643 (root)/CAMPVELO
- Launch Mode:** NATIVE

Creating Virtual Machine Linux 2

In Main Menu, hit : Compute > Instances, than “Create Instance” :

Name you instance: VM-OracleLinux-AD3

Availability Domain: AD 3

Operating System: Oracle Linux 7.7

Instance Type: Virtual Machine

Instance Shape: VM.Standard2.1

○ **Choose SSH Key File:** Insert public key file (.pub)

Virtual Cloud Network Compartment: Compartimento-Trial

Virtual Cloud Network: VCN-Trial

Subnet Compartment: Compartimento-Trial

Subnet: Subrede-AD3

Assign Public IP Address

Finishing this task, you'll see that we now have 3 compute instances, each on it's own AD.

OCI Fast Track – Hands On Guide

Instances in Compartimento-Trial Compartment

Create Instance				
Sort by:		Created Date (Desc)		Displaying 3 Instances < Page 1 >
	VM-OracleLinux-AD3 OCID: ...jaktaa Show Copy	Shape: VM.Standard2.1	Region: iad Availability Domain: UcEs:US-ASHBURN-AD-3 Fault Domain: FAULT-DOMAIN-2	Created: Wed, 02 Oct 2019 19:30:18 UTC Maintenance Reboot: ···
	VM-OracleLinux-AD2 OCID: ...all2ja Show Copy	Shape: VM.Standard2.1	Region: iad Availability Domain: UcEs:US-ASHBURN-AD-2 Fault Domain: FAULT-DOMAIN-1	Created: Wed, 02 Oct 2019 19:25:09 UTC Maintenance Reboot: - ···
	VM-Windows2016-AD1 OCID: ...xz554q Show Copy	Shape: VM.Standard2.1	Region: iad Availability Domain: UcEs:US-ASHBURN-AD-1 Fault Domain: FAULT-DOMAIN-1	Created: Wed, 02 Oct 2019 19:16:29 UTC Maintenance Reboot: - ···

Accessing Linux Compute Instance with PuTTY

First step: Get instance's Public IP

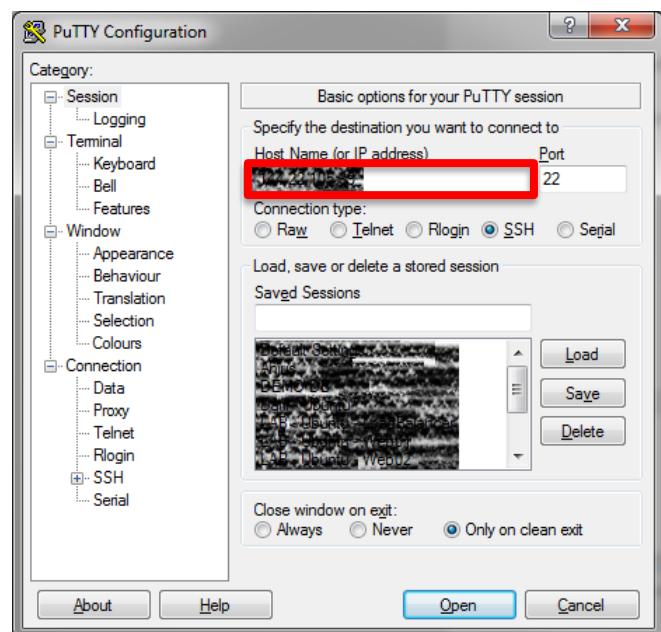
Instances *in* Compartimento-Trial Compartment

The screenshot shows the OCI Instances page with two running instances:

- VM-OracleLinux**: Shape: VM.Standard2.1, Region: iad, Availability Domain: tmyY:US-ASHBURN-AD-2, Fault Domain: FAULT-DOMAIN-2. OCID: ...nh2k6a.
- VM-Windows2016**: Shape: VM.Standard2.1, Region: iad, Availability Domain: tmyY:US-ASHBURN-AD-1, Fault Domain: FAULT-DOMAIN-2. OCID: ...wyaq3a.

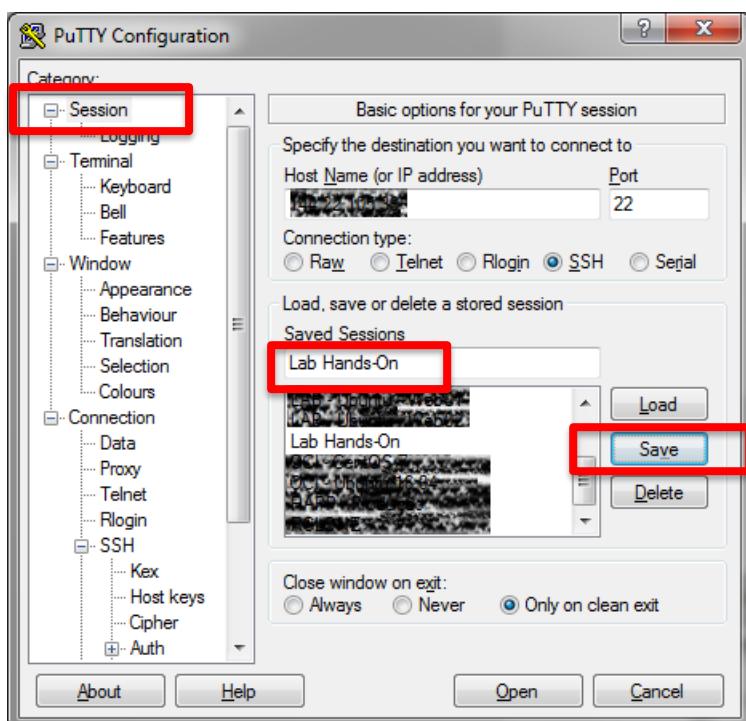
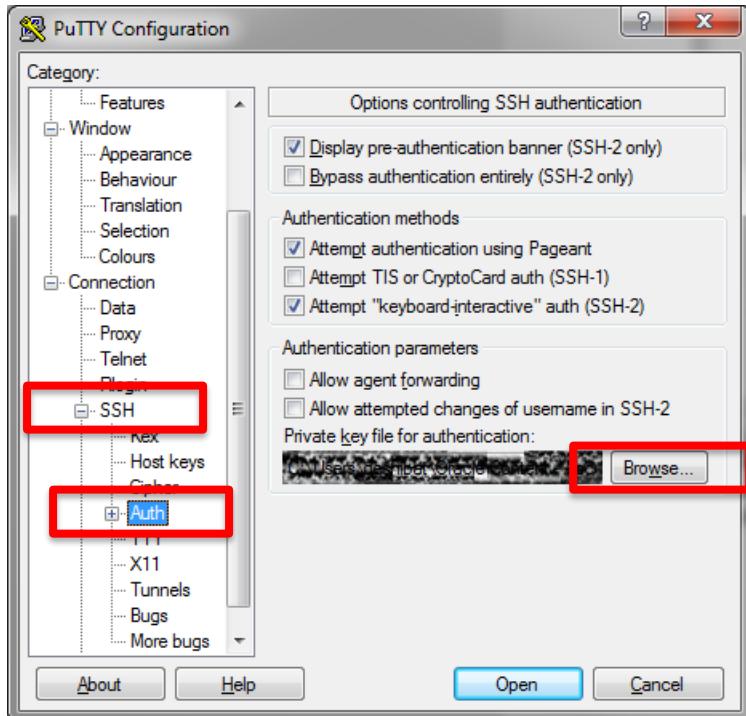
In the modal for **VM-OracleLinux**, the Public IP Address is highlighted: **129.213.59.80**.

Open PuTTY. Fill “Host Name (or IP Address)” with the public IP address

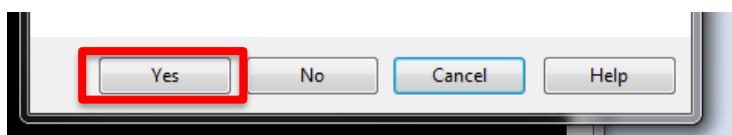


Expand “SSH” option on the left, then hit “Auth”. Use the “Browse...” button, to search for the private key file generated previously.

OCI Fast Track – Hands On Guide



After saving the configuration, Hit Open, and you'll establish connection to the VM



User to connect: opc (When connecting to Oracle Cloud Compute instances, always use the user opc)

OCI Fast Track – Hands On Guide

```
login as: opc
```

```
root@localhost:/home/opc
login as: opc
Authenticating with public key "rsa-key-20180703"
[opc@localhost ~]$ sudo su
[root@localhost opc]#
```

Lab 4.

Storage Cloud Services



Lab 4. Storage Cloud Services

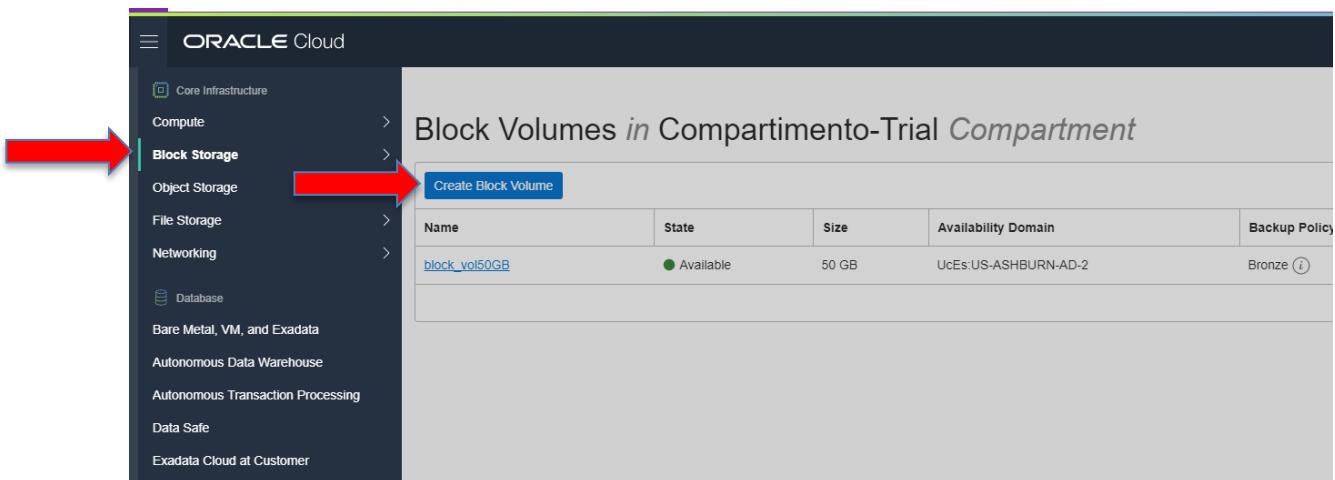
Block Storage

Objectives

- Create a Block Storage Volumes (50GB and 500GB) and Assign Block Storage volumes to Compute Instances
- Configure Backup Options

Creating Block Storage Volumes

You can create block volumes through “Block Storage” interface. To access it: From main menu, you choose Block Storage, than “Block Volume”.



Block Volume creation process is a very straight forward process, you just need to hit “Create Block Volume”, and fill the requested information:

Name: block_vol50GB

Create in Compartment: Compartimento-Trial

Virtual Cloud Network: VCN-Trial

Availability Domain: AD2

Size: 50GB

Backup Policy: Bronze

Volume Performance: Balanced

OCI Fast Track – Hands On Guide

NAME

CREATE IN COMPARTMENT

gse00014643 (root)/CAMPELO



AVAILABILITY DOMAIN



SIZE (IN GB)

Size must be between 50 GB and 32,768 GB (32 TB). Volume performance varies with volume size.

COMPARTMENT FOR BACKUP POLICIES

gse00014643 (root)/CAMPELO



BACKUP POLICY *(i)*



VOLUME PERFORMANCE



Balanced choice for most workloads including those that perform random I/O such as boot disks. [Learn more](#)

IOPS: 25000 IOPS (60 IOPS/GB)

Throughput: 480 MB/s (480 KB/s/GB)

ENCRYPTION

ENCRYPT USING ORACLE-MANAGED KEYS

Leaves all encryption-related matters to Oracle.

ENCRYPT USING CUSTOMER-MANAGED KEYS

TAGS

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE	TAG KEY	VALUE
None (add a free-form tag)		

VIEW DETAIL PAGE AFTER THIS BLOCK VOLUME IS CREATED

After setup, OCI Will begin provisioning. Provision time depends on the volume size, on our example (50 GB), it will take no more than 30 seconds:

OCI Fast Track – Hands On Guide

Repeat the steps above and create a 500GB block storage;

Name: block_vol500GB

Create in Compartment: Compartimento-Trial

Virtual Cloud Network: VCN-Trial

Availability Domain: AD2

Size: 500GB

Backup Policy: Bronze

Volume Performance: Balanced

Block Volumes *in* Compartimento-Trial *Compartment*

Create Block Volume					
Name	State	Size	Availability Domain	Backup Policy	Created
block_vol500GB	Available	500 GB	UcEs:US-ASHBURN-AD-2	Bronze <small>(i)</small>	Thu, Oct 3, 2019, 1:59:07 PM UTC
block_vol50GB	Available	50 GB	UcEs:US-ASHBURN-AD-2	Bronze <small>(i)</small>	Thu, Oct 3, 2019, 1:46:03 PM UTC
Showing 2 Items					<small>< Page 1 ></small>

Connecting Block Volumes to Compute Instance

To connect Block Volumes to compute instances, you need to access “Compute Instance” home screen, and from VM’s detail page, hit “Attach Block Volume”.

Compute > Instances > Instance Details > Attached Block Volumes

VM-OracleLinux-AD2

Start Stop Reboot Move Resource Apply Tag(s) Actions ▾

Instance Information Tags

Instance Information

Availability Domain: UcEs:US-ASHBURN-AD-2
Fault Domain: FAULT-DOMAIN-1
Region: iad
Shape: VM.Standard2.1
Virtual Cloud Network: VCN-Trial
Maintenance Reboot: -

Image: Oracle-Linux-7.7-2019.09.25-0
OCID: ...all2ja Show Copy
Launched: Wed, 02 Oct 2019 19:25:09 UTC
Compartment: guine01 (root)/Compartimento-Trial
Launch Mode: NATIVE

Primary VNIC Information

Private IP Address: 10.0.1.2
Public IP Address: 132.145.156.158
Network Security Groups: None Edit

Internal FQDN: vm-oraclelinux-ad2... Show Copy
Subnet: Public Subnet UcEs:US-ASHBURN-AD-2

This instance's traffic is controlled by its firewall rules in addition to the associated Subnet's security lists and the VNIC's network security groups.

Launch Options

NIC Attachment Type: VFIO
Remote Data Volume: PARAVIRTUALIZED

Firmware: UEFI_64
Boot Volume Type: PARAVIRTUALIZED

OCI Fast Track – Hands On Guide

Resources

Attached Block Volumes

Metrics

Attached Block Volumes (0)

Attached VNICs (1)

Boot Volume (1)

Console Connections (0)

Work Requests (0)

Attach Block Volume

There are no Block Volumes attached to this Instance.

Attach Block Volume

First Attach the 50GB Block Volume

Attach Block Volume

Choose how you want to attach your block volume.

ISCSI

PARAVIRTUALIZED

READ/WRITE
Configures the volume attachment as read/write, not shared with other instances. This is the default configuration.

READ-ONLY
Select to configure the volume attachment as read-only, enabling attachment to multiple instances.

SELECT VOLUME ENTER VOLUME OCID

BLOCK VOLUME COMPARTMENT

Compartimento-Trial

guine01 (root)/Compartimento-Trial

block_vol50GB

DEVICE PATH *i*

/dev/oracleoci/oraclevdb

REQUIRE CHAP CREDENTIALS

Attach

**ISCSI : disk must be detected manually (fdisk)
PARAVIRTUALIZED : disk is detected automatically.
But in both cases, disk must mounted manually**

Next Attach the 500GB Block Volume

OCI Fast Track – Hands On Guide

Attach Block Volume

[help](#) [cancel](#)

Choose how you want to attach your block volume.

- iSCSI
- PARAVIRTUALIZED

ACCESS

- READ/WRITE

Configures the volume attachment as read/write, not shared with other instances. This is the default configuration.

- READ-ONLY

Select to configure the volume attachment as read-only, enabling attachment to multiple instances.

- SELECT VOLUME
- ENTER VOLUME OCID

BLOCK VOLUME COMPARTMENT

Compartimento-Trial

guine01 (root)/Compartimento-Trial

block_vol500GB

DEVICE PATH [i](#)

/dev/oracleoci/oraclevdc

REQUIRE CHAP CREDENTIALS

Attach

Once disks are properly attached, we can mount it on Compute Instance

To ease disk attachment process, Oracle Cloud Infrastructure provides the necessary commands to detect the new disk from the VM. On the right side of the disk information, you'll find a three dot's menu.

Attached Block Volumes

Displaying 2 Attached Block Volumes

Attached Block Volumes					
Displaying 2 Attached Block Volumes					
Attach Block Volume					
 BV ATTACHED	block_vol500GB OCID: ...p5i6va Show Copy Attachment OCID: ...ubo6ga Show Copy	Attachment Type: iSCSI Attachment Access: Read/Write Block Volume Compartment: Compartimento-Trial	Size: 500.0 GB Device Path: /dev/oracleoci/oraclevdc	In-transit Encryption: Disabled Created: Thu, 03 Oct 2019 13:46:03 UTC Available in AD-2	View Block Volume Details iSCSI Commands & Information Detach
 BV ATTACHED	block_vol500GB OCID: ...kmqtzq Show Copy Attachment OCID: ...smiffa Show Copy	Attachment Type: iSCSI Attachment Access: Read/Write Block Volume Compartment: Compartimento-Trial	Size: 500.0 GB Device Path: /dev/oracleoci/oraclevdb	In-transit Encryption: Disabled Created: Thu, 03 Oct 2019 13:46:03 UTC Available in AD-2	View Block Volume Details iSCSI Commands & Information Detach

If you choose the “iSCSI Commands & Information”, you’ll get the necessary commands to detect the recently created disk:

OCI Fast Track – Hands On Guide

iSCSI Commands & Information

[help](#) [close](#)

Use OS tools to edit your /etc/fstab volume to have the _netdev and nofail options from the OS. Failure to run commands will cause instance boot failure.

ATTACH COMMANDS

```
sudo iscsiadm -m node -o new -T iqn.2015-12.com.oracleiaas:3c3718e6-bb0d-4826-8c15-dd24d8a961a2 -p 169.254.2.2:3260  
sudo iscsiadm -m node -o update -T iqn.2015-12.com.oracleiaas:3c3718e6-bb0d-4826-8c15-dd24d8a961a2 -n node.startup -v automatic
```

[Copy](#)

DETACH COMMANDS

```
sudo iscsiadm -m node -T iqn.2015-12.com.oracleiaas:3c3718e6-bb0d-4826-8c15-dd24d8a961a2 -p 169.254.2.2:3260 -u  
sudo iscsiadm -m node -o delete -T iqn.2015-12.com.oracleiaas:3c3718e6-bb0d-4826-8c15-dd24d8a961a2 -p 169.254.2.2:3260
```

[Copy](#)

IP ADDRESS AND PORT

169.254.2.2:3260

[Copy](#)

VOLUME IQN

iqn.2015-12.com.oracleiaas:3c3718e6-bb0d-4826-8c15-dd24d8a961a2

[Copy](#)

=➔ Execute the procedure for the 50GB and 500GB disks.

All you need to do, is copy the commands, and execute it on the Linux server.

After disk detection, you need to format and mount the new disk:

Connect with root ➔ sudo su -

1st – Detect the new device with “fdisk -l” command, you’ll note the disk : /dev/sdb

2nd – Format the disk wih “mkfs /dev/sdb”

3rd – Mount he filesystem

OCI Fast Track – Hands On Guide

```
[opc@vm-oraclelinux-ad2 ~]$ sudo su -
[root@vm-oraclelinux-ad2 ~]# fdisk -l
1
WARNING: fdisk GPT support is currently new, and therefore in an experimental phase.

Disk /dev/sda: 50.0 GB, 50010783744 bytes, 97677312 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes
Disk label type: gpt
Disk identifier: 55333A97-0254-4C27-AE53-78CF37C38A1E

#          Start      End    Size   Type      Name
1        2048    411647    200M  EFI System    EFI System Partition
2       411648  17188863      8G  Linux swap
3     17188864  97675263   38.4G Microsoft basic

Disk /dev/sdb: 536.9 GB, 536870912000 bytes, 1048576000 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes

Disk /dev/sdc: 53.7 GB, 53687091200 bytes, 104857600 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 4096 bytes
I/O size (minimum/optimal): 4096 bytes / 1048576 bytes

[root@vm-oraclelinux-ad2 ~]# mkfs /dev/sdb
2
mke2fs 1.42.9 (28-Dec-2013)
/dev/sdb is entire device, not just one partition!
Proceed anyway? (y,n) y
Filesystem label=
OS type: Linux
```

```
[root@vm-oraclelinux-ad2 ~]# mkfs /dev/sdc
mke2fs 1.42.9 (28-Dec-2013)
/dev/sdc is entire device, not just one partition!
Proceed anyway? (y,n) y
Filesystem label=
```

```
[root@vm-oraclelinux-ad2 ~]# mkdir /vol500GB
[root@vm-oraclelinux-ad2 ~]# mount /dev/sdb /vol500GB
3
[root@vm-oraclelinux-ad2 ~]# mkdir /vol50GB
[root@vm-oraclelinux-ad2 ~]# mount /dev/sdc /vol50GB
[root@vm-oraclelinux-ad2 ~]# df -kh
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  8.6M  7.2G  1% /run
tmpfs          7.3G    0  7.3G  0% /sys/fs/cgroup
/dev/sda3       39G  1.9G  37G  5% /
/dev/sdal      200M  9.7M 191M  5% /boot/efi
tmpfs          1.5G    0  1.5G  0% /run/user/1000
/dev/sdb       493G  70M 468G  1% /vol500GB
/dev/sdc        50G  52M   47G  1% /vol50GB
[root@vm-oraclelinux-ad2 ~]#
```

Testing Block Volume performance

According to our documentation, Block Volume's performance may vary from 3.000 IOPS to 25.000 IOPS according to disk size. In the next test, we're going to validate the true performance delivered by the provisioned Block Volume.

Step 1 Test the true performance of the already provisioned Block Volume (/dev/sdb):

1 – Install FIO utility on the recently created Linux Compute instance: (as ROOT user, issue the command : “yum install fio”)

```
[root@wksp-001 ~]# yum install fio
Loaded plugins: langpacks, ulninfo
ol7_UEKRS
ol7_addons
ol7_developer
ol7_developer_EPEL
ol7_ksplice
ol7_latest
ol7_optional_latest
ol7_software_collections
(1/17): ol7_UEKRS/x86_64/updateinfo
(2/17): ol7_developer/x86_64/primary_db
(3/17): ol7_developer_EPEL/x86_64/updateinfo
Dependency Installed:
  boost-iostreams.x86_64 0:1.53.0-27.el7  boost-random.x86_64 0:1.53.0-27.el7  daxctl-libs.x86_64 0:65-1.0.1.el7  libibverbs.x86_64 0:17.2-3.el7
  libpmemblk.x86_64 0:1.4-3.0.3.el7  librados2.x86_64 1:10.2.5-4.el7  librbd1.x86_64 1:10.2.5-4.el7
  librdmacm.x86_64 0:17.2-3.el7  ndctl-libs.x86_64 0:65-1.0.1.el7  rdma-core.x86_64 0:17.2-3.el7
Dependency Installed:
  boost-iostreams.x86_64 0:1.53.0-27.el7  boost-random.x86_64 0:1.53.0-27.el7  daxctl-libs.x86_64 0:65-1.0.1.el7  libibverbs.x86_64 0:17.2-3.el7
  libpmemblk.x86_64 0:1.4-3.0.3.el7  librados2.x86_64 1:10.2.5-4.el7  librbd1.x86_64 1:10.2.5-4.el7
  librdmacm.x86_64 0:17.2-3.el7  ndctl-libs.x86_64 0:65-1.0.1.el7  rdma-core.x86_64 0:17.2-3.el7
Complete!
[root@wksp-001 ~]#
```

2 – Run FIO utility against the new disk:

```
sudo fio --filename=/dev/sdb --direct=1 --rw=randread --bs=4k \
--ioengine=libaio --iodepth=256 --runtime=30 --numjobs=4 --time_based \
--group_reporting --name=iops-test-job --eta-newline=1 --readonly
```

```
[root@vm-oraclelinux-ad2 ~]# sudo fio --filename=/dev/sdb --direct=1 --rw=randread --bs=4k \
> --ioengine=libaio --iodepth=256 --runtime=30 --numjobs=4 --time based \
> --group_reporting --name=iops-test-job --eta-newline=1 --readonly
iops-test-job: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, ioengine=libaio, iodepth=256
...
fio-3.7
Starting 4 processes
Jobs: 4 (f=4): [r(4)] [10.0%] [r=124MiB/s, w=0KiB/s] [r=31.7k, w=0 IOPS] [eta 00m:27s]
Jobs: 4 (f=4): [r(4)] [16.7%] [r=110MiB/s, w=0KiB/s] [r=28.3k, w=0 IOPS] [eta 00m:25s]
Jobs: 4 (f=4): [r(4)] [23.3%] [r=103MiB/s, w=0KiB/s] [r=26.5k, w=0 IOPS] [eta 00m:23s]
Jobs: 4 (f=4): [r(4)] [26.7%] [r=112MiB/s, w=0KiB/s] [r=28.6k, w=0 IOPS] [eta 00m:22s]
Jobs: 4 (f=4): [r(4)] [33.3%] [r=97.9MiB/s, w=0KiB/s] [r=25.1k, w=0 IOPS] [eta 00m:20s]
Jobs: 4 (f=4): [r(4)] [40.0%] [r=98.0MiB/s, w=0KiB/s] [r=25.3k, w=0 IOPS] [eta 00m:18s]
Jobs: 4 (f=4): [r(4)] [46.7%] [r=96.2MiB/s, w=0KiB/s] [r=24.6k, w=0 IOPS] [eta 00m:16s]
Jobs: 4 (f=4): [r(4)] [53.3%] [r=95.6MiB/s, w=0KiB/s] [r=24.5k, w=0 IOPS] [eta 00m:14s]
Jobs: 4 (f=4): [r(4)] [60.0%] [r=102MiB/s, w=0KiB/s] [r=25.0k, w=0 IOPS] [eta 00m:12s]
Jobs: 4 (f=4): [r(4)] [66.7%] [r=96.0MiB/s, w=0KiB/s] [r=24.8k, w=0 IOPS] [eta 00m:10s]
Jobs: 4 (f=4): [r(4)] [73.3%] [r=94.7MiB/s, w=0KiB/s] [r=24.2k, w=0 IOPS] [eta 00m:08s]
Jobs: 4 (f=4): [r(4)] [80.0%] [r=100MiB/s, w=0KiB/s] [r=25.6k, w=0 IOPS] [eta 00m:06s]
Jobs: 4 (f=4): [r(4)] [86.7%] [r=96.5MiB/s, w=0KiB/s] [r=24.7k, w=0 IOPS] [eta 00m:04s]
Jobs: 4 (f=4): [r(4)] [93.3%] [r=93.4MiB/s, w=0KiB/s] [r=23.9k, w=0 IOPS] [eta 00m:02s]
Jobs: 4 (f=4): [r(4)] [100.0%] [r=103MiB/s, w=0KiB/s] [r=26.4k, w=0 IOPS] [eta 00m:00s]
iops-test-job: (group_id=0, jobs=4): err= 0: pid=3109: Thu Oct  3 14:29:43 2019
  read: IOPS=26.1k, BW=102MiB/s (107MB/s) (3056MiB/30015mssec)
  write: IOPS=26.1k, BW=102MiB/s (107MB/s) (3056MiB/30015mssec)
```

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```
[root@vm-oraclelinux-ad2 ~]# sudo fio --filename=/dev/sdc --direct=1 --rw=randread --bs=4k --ioengine=libaio --iodepth=100 --group_reporting --name=iops-test-job -eta=newline=1 --readonly
iops-test-job: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, ioengine=libaio, iodepth=256
...
fio-3.7
Starting 4 processes
Jobs: 4 (f=4): [r(4)][10.0%][r=11.7MiB/s,w=0KiB/s][r=3000,w=0 IOPS][eta 00m:27s]
Jobs: 4 (f=4): [r(4)][16.7%][r=11.3MiB/s,w=0KiB/s][r=2885,w=0 IOPS][eta 00m:25s]
Jobs: 4 (f=4): [r(4)][23.3%][r=11.8MiB/s,w=0KiB/s][r=3008,w=0 IOPS][eta 00m:23s]
Jobs: 4 (f=4): [r(4)][30.0%][r=12.3MiB/s,w=0KiB/s][r=3139,w=0 IOPS][eta 00m:21s]
Jobs: 4 (f=4): [r(4)][36.7%][r=12.1MiB/s,w=0KiB/s][r=3107,w=0 IOPS][eta 00m:19s]
Jobs: 4 (f=4): [r(4)][43.3%][r=11.4MiB/s,w=0KiB/s][r=2914,w=0 IOPS][eta 00m:17s]
Jobs: 4 (f=4): [r(4)][50.0%][r=11.1MiB/s,w=0KiB/s][r=2848,w=0 IOPS][eta 00m:15s]
Jobs: 4 (f=4): [r(4)][56.7%][r=11.2MiB/s,w=0KiB/s][r=2855,w=0 IOPS][eta 00m:13s]
Jobs: 4 (f=4): [r(4)][63.3%][r=11.8MiB/s,w=0KiB/s][r=3011,w=0 IOPS][eta 00m:11s]
Jobs: 4 (f=4): [r(4)][70.0%][r=11.6MiB/s,w=0KiB/s][r=2978,w=0 IOPS][eta 00m:09s]
Jobs: 4 (f=4): [r(4)][76.7%][r=11.6MiB/s,w=0KiB/s][r=2981,w=0 IOPS][eta 00m:07s]
Jobs: 4 (f=4): [r(4)][83.3%][r=11.4MiB/s,w=0KiB/s][r=2914,w=0 IOPS][eta 00m:05s]
Jobs: 4 (f=4): [r(4)][90.0%][r=12.0MiB/s,w=0KiB/s][r=3077,w=0 IOPS][eta 00m:03s]
Jobs: 4 (f=4): [r(4)][96.7%][r=11.5MiB/s,w=0KiB/s][r=2946,w=0 IOPS][eta 00m:01s]
Jobs: 4 (f=4): [r(4)][100.0%][r=11.4MiB/s,w=0KiB/s][r=2917,w=0 IOPS][eta 00m:00s]
iops-test-job: (groupid=0, jobs=4): err=0: pid=3138: Thu Oct  3 14:31:37 2019
  read: IOPS=3139, BW=12.3MiB/s (12.9MB/s) (369MiB/30069msec)
```

We can see 3000 IOPS throughput for 50GB disk and 26000 IOPS for 500GB disk

Setting Backup Policies for Block Storage

Objectives

- Set Backup Policies

On Oracle Cloud Infrastructure, Block Volume (including boot volumes), and compute nodes backups are independent. Backup policies can be set on the Block Storage home page (Main Menu > Block Storage > Block Volumes):

Block Volumes in CAMPELO Compartment					
		Create Block Volume			
Sort by: Created Date (Desc)		Displaying 6 Block Volumes < Page 1 >			
BV	disk_1st	Attached Instance: inxrv02	Size: 50.0 GB	Encry:	View Block Volume Details
	OCID: ...g2eecc	Date Attached: Mon, 04 Mar 2019 02:39:58 GMT	Availability Domain: PqlC-US-ASHBURN-AD-1	Creat:	Create Manual Backup
		Protocol: iscsi		GMT:	Assign Backup Policy
		Attachment Access: Read/Write		Back:	...
BV	disk_restore	Attached Instance: LNXSRV01	Size: 50.0 GB	Encry:	Create Clone
	OCID: ...ujpz7q	Date Attached: Tue, 19 Feb 2019 20:22:47 GMT	Availability Domain: PqlC-US-ASHBURN-AD-3	Creat:	Resize
		Protocol: iscsi		GMT:	Assign-Master-Encryption-Key
		Attachment Access: Read-only		Back:	...
BV	bklidsk02	Attached Instance: LNXSRV01	Size: 50.0 GB	Encry:	Apply Tag(s)
	OCID: ...	Date Attached: Wed, 13 Feb 2019 02:20:30	Availability Domain: PqlC-US-	Creat:	Terminate
				GMT:	...

Backup options can be easily accessed from the “fast menu” (Three dots on the right), option “Assign Backup Policy”

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Assign Backup Policy

[help](#) [cancel](#)

BRONZE

Monthly incremental backups. At midnight on the 1st of the month. Retain 12 months. Yearly full backups. At midnight January 1. Retain 5 years.

SILVER

Weekly incremental backups. At midnight Sunday. Retain 4 weeks. Monthly incremental backups. At midnight on the 1st of the month. Retain 12 months. Yearly full backups. At midnight January 1. Retain 5 years.

GOLD

Daily incremental backups at midnight. Retain 7 days. Weekly incremental backups. At midnight Sunday. Retain 4 weeks. Monthly incremental backups. At midnight on the 1st of the month. Retain 12 months. Yearly full backups. At midnight January 1. Retain 5 years.

[Assign Backup Policy](#)

Where you can choose the most appropriate backup policy for your data.

Lab 5.

File Storage Service



Lab 5. FileStorage Service

Oracle Cloud Infrastructure File Storage service provides a durable, scalable, secure, enterprise-grade network file system. You can connect to a File Storage service file system from any bare metal, virtual machine, or container instance in your Virtual Cloud Network (VCN). You can also access a file system from outside the VCN using Oracle Cloud Infrastructure FastConnect and Internet Protocol security (IPSec) virtual private network (VPN)

Using the File Storage service requires an understanding of the following concepts, including some that pertain to Oracle Cloud Infrastructure Networking:

- **Mount Target**
An NFS endpoint that lives in a subnet of your choice and is highly available. The mount target provides the IP address or DNS name that is used in the mount command when connecting NFS clients to a file system. A single mount target can export many file systems
- **Export**
Exports control how NFS clients access file systems when they connect to a mount target. File systems are exported (made available) through mount targets. Each mount target maintains an export set which contains one or many exports.

Objective

- Create a FileStorage Service filesystem, and access it through a Linux Compute Instance

Creating File Storage Service FileSystem

1 – Access FileStorage Service main screen through OCI Main page on Action Menu



Hit Create File system Button on the right

The screenshot shows the Oracle Cloud File Systems interface. At the top, there's a navigation bar with the Oracle Cloud logo. Below it, the main title is "File Systems in". Underneath, there are two tabs: "File Systems (3)" which is selected, and "Mount Targets (3)". A "Create File System" button is located at the top right of the list area. The list itself has columns for Name and Status.

You'll see a pop-up screen requesting the main information to identify FileStorage Service. You will note, that the main fields are already filled with default information. Use the “Edit” button on the right, to customize the filesystem info with your data.

The screenshot shows the "Create File System" dialog box. It has sections for "File System Information" and "Export Information". In the "File System Information" section, there are fields for "Name" (FileSystem-20190325-1902) and "Availability Domain" (PqLC:US-ASHBURN-AD-1). A red arrow points to the "Edit Details" button in this section. The "Export Information" section contains fields for "Export Path" (/FileSystem-20190325-1902) and "Use Secure Export Options" (Disabled). The "Mount Target Information" section lists a single mount target with name MountTarget-20190320-1525 and compartment gse00014643 (root)/CAMPELO. At the bottom, there are "Create" and "Cancel" buttons.

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Create File System

[help](#) [cancel](#)

File Storage provides durable, scalable, and secure file systems.

File System Information

[Hide Details](#)

NAME OPTIONAL

FS_WKSHP

AVAILABILITY DOMAIN

UcEs:US-ASHBURN-AD-1



ENCRYPTION

ENCRYPT USING ORACLE-MANAGED KEYS

Leaves all encryption-related matters to Oracle.

ENCRYPT USING CUSTOMER-MANAGED KEYS

Requires you to have access to a valid Key Management key. ([Learn More](#))

TAGS

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE

None (add a free-form tag)

TAG KEY

VALUE

[+ Additional Tag](#)

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Mount Target Information Hide Details

Mount targets are NFS endpoints used to access your file systems. The following mount target will be created and associated with your new file system. [Learn more](#).

If you want your mount target, virtual cloud network, or subnet in different compartments than your file system, [click here](#) to enable compartment selection for those resources.

SELECT AN EXISTING MOUNT TARGET CREATE NEW MOUNT TARGET

NEW MOUNT TARGET NAME OPTIONAL

MT_WKSHP

VIRTUAL CLOUD NETWORK

VCN-Trial

SUBNET

Public Subnet UcEs:US-ASHBURN-AD-1

TAGS

Tagging is a metadata system that allows you to organize and track resources within your tenancy. Tags are composed of keys and values that can be attached to resources.

[Learn more about tagging](#)

TAG NAMESPACE	TAG KEY	VALUE
None (add a free-form tag)		

+ Additional Tag

Show Advanced Options

Create Cancel

You will have to provide:

- FileSystem Name
- Availability Domain
- Export Path Name
- Mount Target Name
- Compartment

Creating Mount Targets

Please note, that a Mount Target is automatically created by the Cloud Orchestration. All you have to do, is select the Mount Target, and get the connection details.

Select the created Mount Target to get it's details, then, on the “Export’s” action menu, on the right, select “Mount Commands”, and you'll get a screen with connectivity information regarding the Mount Target.

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File Storage > Mount Targets > Mount Target Details

FS_WKSHP

ACTIVE

Mount Target Information Tags

OCID: ...yqaaaa Created: Tue, Mar 12, 2019, 1:42:57 PM UTC Availability Domain: PqLC:US-ASHBURN-AD-2 Compartment: gse00014643 (root)/CAMPENO Reported Size (GiB): 8589934592 (i) Reported Inodes (Gi): 8589934592 (i)

Virtual Cloud Network: VCN_WKSP Subnet: Public Subnet PqLC:US-ASHBURN-AD-2 IP Address: 10.0.1.5 Hostname: - Fully Qualified Domain Name: Enter a hostname Export Set OCID: ...yqaaaa (i)

Exports

Export Path	State	File System	Created
/FSWKSHP	Active	FS_WKSHP	Tue, Mar 12, 2019, 1:43:03 PM UTC

Here Oracle Cloud follows the same behavior as in the other wizards. All you need to do, is “copy” and “Paste” the Linux commands on SSH prompt.

Mount Commands help close

IMAGE

Oracle Linux

COMMAND TO INSTALL NFS CLIENT

```
sudo yum install nfs-utils
```

Copy

COMMAND TO CREATE THE MOUNT POINT DIRECTORY

```
sudo mkdir -p /mnt/FSWKSHP
```

Copy

COMMAND TO MOUNT THE FILE SYSTEM

```
sudo mount 10.0.1.5:/FSWKSHP /mnt/FSWKSHP
```

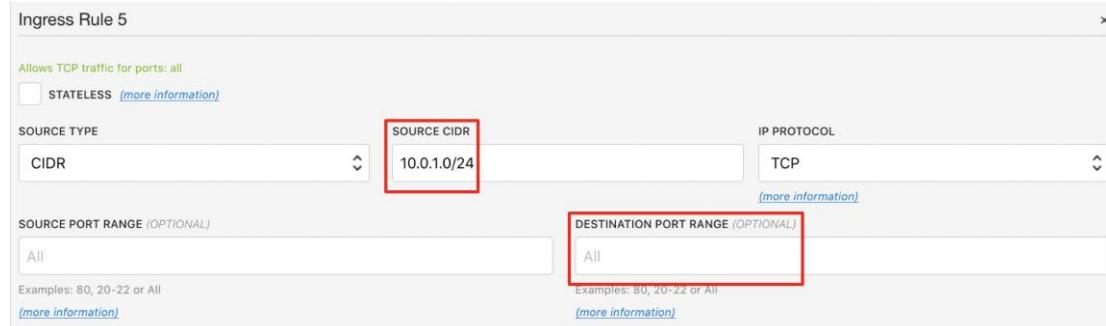
Copy

Close

Connectivity Issues

FileStorage is a network service, and as such, its usage, is subordinated to firewall rules. In order to mount the created mount target, we're going to create an Ingress Security Rule, to allow FileStorage Service IP traffic.

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SOURCE CIDR is the IP address attached to the Mount Target. In our case, it's the IP from the Instance network (10.0.0.0/24, 10.0.1.0/24 or 10.0.2.0/24)

DESTINATION PORT, File Storage requires some ports do be opened (2048 – 2050, 111, 2048 and 111). In our example, we don't need to specify any port, so all traffic from File Storage's IP will be allowed.

Connect to the linux-AD2 and linux-AD3 servers and run the mount command;

After the mount command you can see 8.0E available to be used;

```
[root@vm-oraclelinux-ad2 ~]# df -kh
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  8.6M  7.2G  1% /run
tmpfs          7.3G   0    7.3G  0% /sys/fs/cgroup
/dev/sda3       39G  2.1G  37G  6% /
/dev/sdal      200M  9.7M 191M  5% /boot/efi
tmpfs          1.5G   0    1.5G  0% /run/user/1000
/dev/sdb        493G  70M  468G  1% /vol500GB
/dev/sdc        50G   52M   47G  1% /vol50GB
10.0.0.6:/FSWKSHP 8.0E   0   8.0E  0% /mnt/FSWKSHP
[root@vm-oraclelinux-ad2 ~]#
```

Create a file and see the sharing between the linux servers;

```
[root@vm-oraclelinux-ad2 ~]# echo 'Testing my FSS' > /mnt/FSWKSHP/test.txt
[root@vm-oraclelinux-ad2 ~]# ls -lrt /mnt/FSWKSHP/test.txt
-rw-r--r--. 1 root root 15 Oct  3 15:00 /mnt/FSWKSHP/test.txt
[root@vm-oraclelinux-ad2 ~]#
```

```
[root@vm-oraclelinux-ad3 ~]# ls -lrt /mnt/FSWKSHP/test.txt
-rw-r--r--. 1 root root 15 Oct  3 15:00 /mnt/FSWKSHP/test.txt
[root@vm-oraclelinux-ad3 ~]#
```

Lab 6.

Load Balancer



Lab 6. Load Balancer

The Oracle Cloud Infrastructure Load Balancing service provides automated traffic distribution from one entry point to multiple servers reachable from your virtual cloud network (VCN). The service offers a load balancer with your choice of a public or private IP address, and provisioned bandwidth.

The Load Balancing service enables you to create a public or private load balancer within your VCN. A public load balancer has a public IP address that is accessible from the internet. A private load balancer has an IP address from the hosting subnet, which is visible only within your VCN. You can configure multiple for an IP address to load balance transport Layer 4 and Layer 7 (TCP and HTTP) traffic. Both public and private load balancers can route data traffic to any backend server that is reachable from the VCN.

Your load balancer has a backend set to route incoming traffic to your Compute instances. The backend set is a logical entity that includes:

- A list of backend servers.
- A load balancing policy.
- A health check policy.
- Optional SSL handling.
- Optional session persistence configuration.

Load Balancing Concepts

backend server

An application server responsible for generating content in reply to the incoming TCP or HTTP traffic. You typically identify application servers with a unique combination of overlay (private) IPv4 address and port, for example, 10.10.10.1:8080 and 10.10.10.2:8080.

backend set

A logical entity defined by a list of backend servers, a load balancing policy, and a health check policy. SSL configuration is optional. The backend set determines how the load balancer directs traffic to the collection of backend servers.

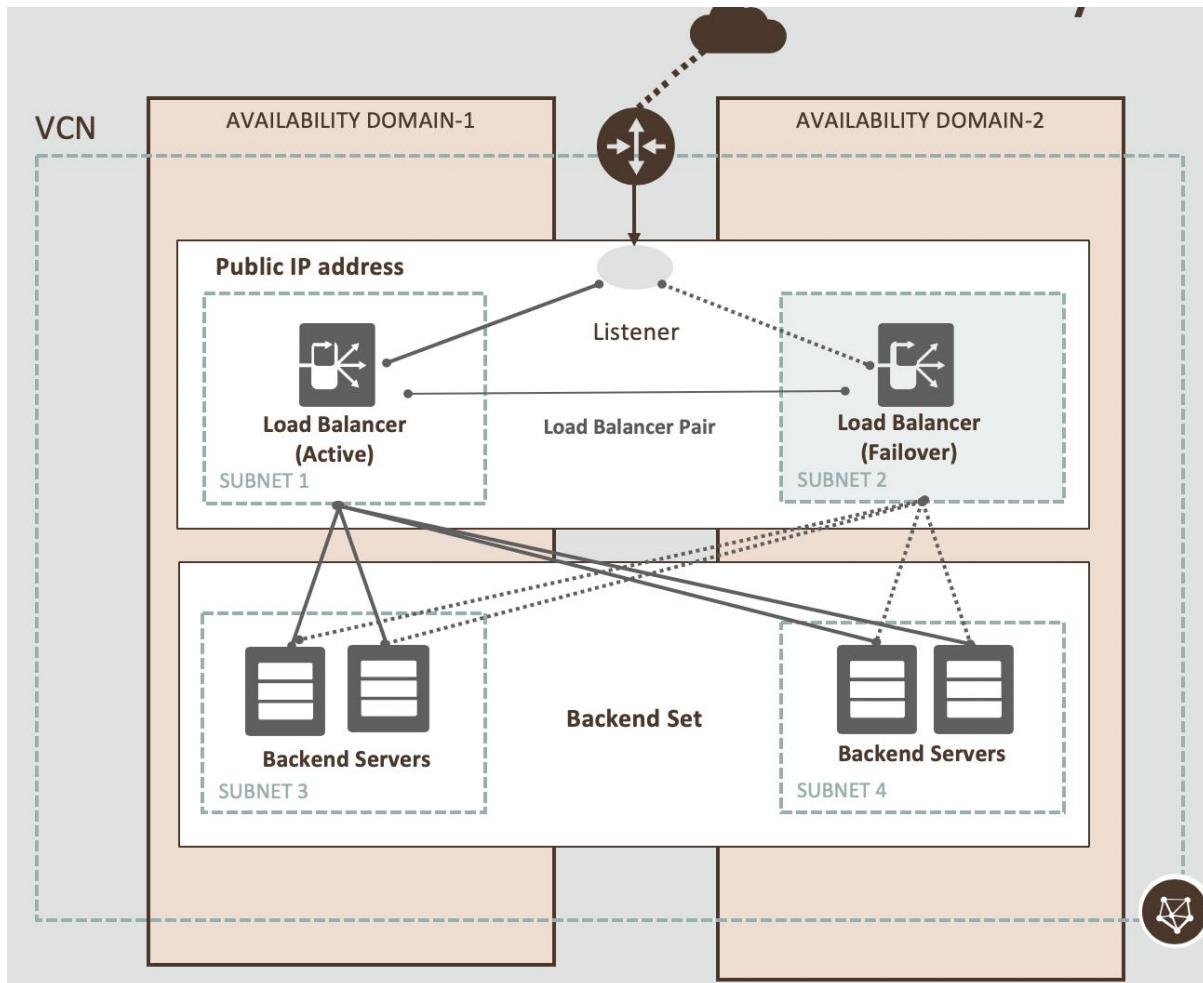
certificates

If you use HTTPS or SSL for your listener, you must associate an SSL server certificate (X.509) with your load balancer. A certificate enables the load balancer to terminate the connection and decrypt incoming requests before passing them to the backend servers.

health check

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A test to confirm the availability of backend servers. A health check can be a request or a connection attempt. Based on a time interval you specify, the load balancer applies the health check policy to continuously monitor backend servers. If a server fails the health check, the load balancer takes the server temporarily out of rotation. If the server subsequently passes the health check, the load balancer returns it to the rotation.



Objective

Create a Public Load Balancer Service, with 2 backends.

Before we start creating our LB service, please note that there are some important tasks to do. In order to have some “service” to be tested by the Load Balancer, we need to install an application server on the Linux server.

To be successful, we need to execute the tasks in the following way:

1 – Create a new Linux Server. Be sure to create the second server on an Availability Domain that is different from the first one.

2 – Install Apache Application Server on each server:

Following, you'll find the necessary commands to start a Apache Web Server:

1. sudo yum install httpd -y
2. sudo apachectl start

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3. sudo systemctl enable httpd
4. sudo apachectl configtest

5. sudo firewall-cmd --permanent --zone=public --add-service=http
6. sudo firewall-cmd --reload
7. sudo su -
8. echo 'This is Oracle webserver 1 running on OCI Workshop' > /var/www/html/index.html

To the second instance you will repeat the commands from 1 to 7 and the command 8 will be:

8. echo 'This is Oracle webserver 2 running on OCI Workshop' > /var/www/html/index.html

3 - Test Apache's behavior, all you need to do, is use the Compute Instance's public IP on the browser to check if Apache's main page will come up.

REMINDER: Before test Apache on your browser, be Shure that you have already created an Ingress Rule on the VCN's Security List, so Port 80 is cleared for traffic.

Networking > Virtual Cloud Networks > Virtual Cloud Network Details > Security Lists

VCN-Trial

Move Resource Add Tags Terminate

VCN Information Tags

CIDR Block: 10.0.0.0/16
Compartment: Compartimento-Trial
Created: Wed, Oct 2, 2019, 7:09:57 PM UTC

OCID: ...fib52a Show Copy
Default Route Table: Default Route Table for VCN-Trial
DNS Domain Name: vcntrial.oraclevcn.com

Resources

Subnets (3)
Route Tables (1)
Internet Gateways (1)
Dynamic Routing Gateways (0)
Network Security Groups (0)
Security Lists (1)

Security Lists in Compartimento-Trial Compartment

Create Security List

Name	State	Created
Default Security List for VCN-Trial	Available	Wed, Oct 2, 2019

Add Ingress Rules cancel

Ingress Rule 1

Allows TCP Traffic 80

STATELESS i

SOURCE TYPE
CIDR i

SOURCE CIDR
0.0.0.0/0
Specified IP addresses: 0.0.0.0-255.255.255.255 (4,294,967,296 IP addresses)

IP PROTOCOL i
TCP i

SOURCE PORT RANGE OPTIONAL i
All
Examples: 80, 20-22

DESTINATION PORT RANGE OPTIONAL i
80
Examples: 80, 20-22

+ Additional Ingress Rule

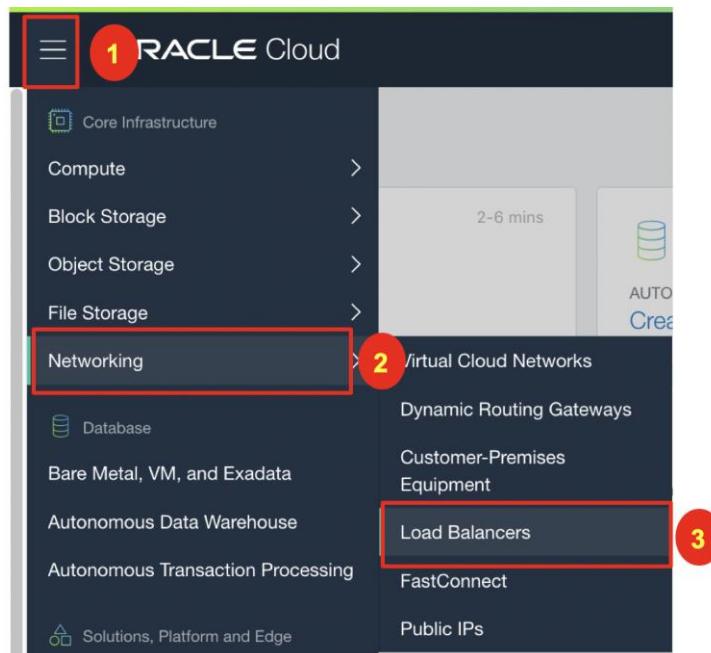
Add Ingress Rules Cancel

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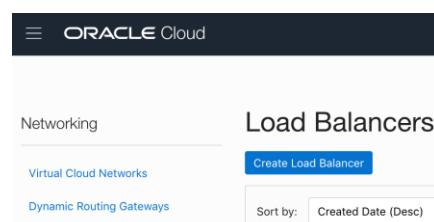
Be sure to start Load Balancer creation only after both calls on apache is working. This is important, because if you create the load balancer without an available service, it will be created in “Error” state. Load Balancer usually takes 5 minutes to “calibrate” its status. Our Goal, is to create Load Balancer service only after both Apache servers are running, so LB service will have “ready” state, and will be ready to be tested.

Load Balancer Creation Process

To access Load Balancer interface, again, we’re going to start from the “Action Menu”



Then Hit the Create Load Balancer button:



Creating Load Balancer

The Load Balancer creation screen is a Wizard Based model, where you’ll be guided on the process by the interface. In the main screen, you’ll provide the information below:

Name: lb-apache

Visibility Type: Public

Bandwidth: Small 100Mbps

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VCN: VCN-trial

Subnet1: SubnetAD2

Subnet2: SubnetAD3

(choose 2 subnets, same subnets where your compute instances were created)

Create Load Balancer

1 Add Details

A load balancer provides automated traffic distribution from one entry point to multiple servers in a backend set. The load balancer ensures that your services remain available by directing traffic only to healthy servers in the backend set.

LOAD BALANCER NAME
lb-apache

CHOOSE VISIBILITY TYPE

Public
You can use the assigned public IP address as a front end for incoming traffic.

Private
You can use the assigned private IP address as a front end for internal incoming VCN traffic.

CHOOSE THE MAXIMUM TOTAL BANDWIDTH (i)

Micro
10 Mbps
Always Free Eligible

Small
100 Mbps

Medium
400 Mbps

Large
8000 Mbps

CHOOSE NETWORKING

VIRTUAL CLOUD NETWORK in Compartimento-Trial (Change Compartment)
VCN-Trial

To create a public load balancer, specify a single regional subnet (recommended), or two availability domain-specific subnets in different availability domains.

SUBNET (1 OF 2) in Compartimento-Trial (Change Compartment)
Public Subnet UcEs:US-ASHBURN-AD-2

SUBNET (2 OF 2) in Compartimento-Trial (Change Compartment)
Public Subnet UcEs:US-ASHBURN-AD-3

USE NETWORK SECURITY GROUPS TO CONTROL TRAFFIC (i)

Next Step **Cancel**

Set the Load Balancer Policy

1 Add Details

A load balancer distributes traffic to backend servers within a backend set. A backend set is a logical entity defined by a load balancing policy, a health check policy, and a list of backend servers (Compute instances).

SPECIFY A LOAD BALANCING POLICY

Weighted Round Robin
This policy distributes incoming traffic sequentially to each server in a backend set list.

IP Hash
This policy ensures that requests from a particular client are always directed to the same backend server.

Least Connections
This policy routes incoming request traffic to the backend server with the fewest active connections.

SELECT BACKEND SERVERS (OPTIONAL)

Enter the Backend Set servers:

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Add Backends

Specify the compute instances to include in your set of backend servers.

INSTANCES in CAMPELO ([Change Compartment](#))

<input type="checkbox"/>	Name	IP Address	OCID	Availability Domain
<input type="checkbox"/>	BMTESTE	10.0.0.3	...wnyfta	Show Copy PqLC:US-ASHBURN-AD-1
<input checked="" type="checkbox"/>	VM-LB01	10.0.0.7	...qyp4kq	Show Copy PqLC:US-ASHBURN-AD-1
<input type="checkbox"/>	VM-Petros	10.200.1.2	...quiv6a	Show Copy PqLC:US-ASHBURN-AD-1
<input checked="" type="checkbox"/>	VM-LB02	10.0.1.11	...fwewaa	Show Copy PqLC:US-ASHBURN-AD-2
<input type="checkbox"/>	WKSP_001	10.0.1.2	...mrizcq	Show Copy PqLC:US-ASHBURN-AD-2

2 Selected

Showing 5 Item(s) < Page 1 >

As a last step, define the type of traffic that will be handled

Create Load Balancer

Add Details

Choose Backends

Configure Listener

A listener is a logical entity that checks for incoming traffic on the load balancer's IP address. To handle TCP, HTTP and HTTPS traffic, you must configure at least one listener per traffic type. You can configure additional listeners after you create your load balancer.

SPECIFY THE TYPE OF TRAFFIC YOUR LISTENER HANDLES

HTTPS

HTTP

TCP

SPECIFY THE PORT YOUR LISTENER MONITORS FOR INGRESS TRAFFIC

80

Once the creation process is finished, you'll have the following information:

The screenshot shows the Oracle Cloud interface for a Load Balancer named 'LB-APACUE'. The main view displays 'Load Balancer Information' including the OCID, creation date (Wed, 26 Jun 2019 13:43:13 GMT), shape (400Mbps), and IP address (150.136.193.117). It also lists two subnets: 'Public Subnet PqLC:US-ASHBURN-AD-1' and 'Public Subnet PqLC:US-ASHBURN-AD-2'. The 'Overall Health' section shows a warning icon. The 'Backend Sets Health' section indicates 1 warning, 0 critical, 0 unknown, and 0 OK. A large green hexagonal icon on the left is labeled 'ACTIVE'.

Load Balancer Testing

In order to simulate an application environment, we need to start a web service on both Compute instances.

To get different output's on load balancer calls, add different contents to Index.html file on each compute.

← → ⌂ ⓘ Não seguro | 150.136.199.93

This is Oracle webserver vm-oraclelinux-AD3 running on OCI Workshop

Lab 7.

Autonomous Database



Lab 7. Autonomous Database

Objectives

- Provisioning and usage of Autonomous database

Overview

Oracle Cloud Infrastructure's Autonomous Database is a fully managed, preconfigured database environment with two workload types available, Autonomous Transaction Processing and Autonomous Data Warehouse. You do not need to configure or manage any hardware, or install any software. After provisioning, you can scale the number of CPU cores or the storage capacity of the database at any time without impacting availability or performance. Autonomous Database handles creating the database, as well as the following maintenance tasks:

- Backing up the database
- Patching the database
- Upgrading the database
- Tuning the database

Available Workload Types

Autonomous Database offers two workload types:

- The Autonomous Transaction Processing workload type configures the database for a transactional workload, with a bias towards high volumes of random data access.
- For a complete product overview of Autonomous Transaction Processing, see Autonomous Transaction Processing

The Autonomous Data Warehouse workload type configures the database for a decision support or data warehouse workload, with a bias towards large data scanning operations.

For a complete product overview of Autonomous Data Warehouse, see Autonomous Data Warehouse.

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Autonomous Database Provisioning

The screenshot shows the Oracle Cloud Infrastructure (OCI) console dashboard. At the top, there are several tabs: "Oracle Cloud Infrastructure", "Move & Improve Apps Unlimited", "Oracle Cloud Infrastructure", and "Overview of Autonomous Data". Below the tabs, there's a navigation bar with icons for "Apps", "Getting Started", and "Imported". A red circle highlights the "ORACLE Cloud" logo in the top left corner of the dashboard area.

Quick Actions:

- COMPUTE: Create a VM instance (2-6 mins)
- AUTONOMOUS TRANSACTION PROCESSING: Create a database (3-5 mins)
- AUTONOMOUS DATA WAREHOUSE: Create a data warehouse (3-5 mins)
- NETWORKING: Create a virtual cloud network (1-3 mins)
- OBJECT STORAGE: Store data (2-6 mins)
- NETWORKING SOLUTIONS: Create an IPsec VPN connection (2-3 mins)

Solutions:

- Jump Start:** Hands-on use of Oracle Cloud Infrastructure with self-paced learning and demo labs, for free.
- Mission Critical Databases:** Leverage a range of modern cloud data management options, with 100% on-premises compatibility.
- Resource Manager:** Automate the provisioning of your cloud infrastructure resources using HashiCorp Terraform.
- Big Data and Analytics:** Deploy popular technologies like Cloudera, Datastax, Confluent, and H2O on the fastest cloud infrastructure.

Action Center:

- User Management: Add a user to your tenancy
- Billing: View your bill

What's New:

- Oracle and Microsoft announce cloud interoperability to support multicloud deployments (Jun 5, 2019)
- Meet demand with auto scaling and on-demand scaling for Autonomous Database (Jun 4, 2019)
- Add new spatial intelligence support to your Autonomous Data Warehouse workloads (May 30, 2019)
- Leverage Border Gateway Protocol (BGP) dynamic routing for IPsec VPNs (May 21, 2019)

To start Autonomous Database creation process, you can choose between two different starting points:

1. Hit Action menu on the left side of the main screen, then choose “Autonomous Database”
2. Hit the desktop shortcut on the main screen (blue rectangle), and you’ll be redirected to Autonomous database creation.

Autonomous Database Creation

The screenshot shows the "Autonomous Database" creation page in the OCI console. The left sidebar has a "COMPARTMENT" dropdown set to "wkrsp_oc1". A red box highlights the "Create Autonomous Database" button at the top of the main content area. A red callout bubble points to the "COMPARTMENT" dropdown with the text "Don't forget to choose your compartment".

Autonomous Database

Autonomous Database (highlighted)

Autonomous Container Database

Autonomous Exadata Infrastructure

List Scope

COMPARTMENT: wkrsp_oc1

Create Autonomous Database

Autonomous Databases in wkrsp_oc1 Compartmet

Name	Database Name	State	Dedicated Infrastructure	CPU Core Count
				No items

Filters

WORKLOAD TYPE: Data Warehouse

Don't forget to choose your compartment

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Create Autonomous Database

Provide basic information for the Autonomous Database

Choose a compartment
Compartimento-Trial
mylestemailbr3 (root)/Compartimento-Trial

Display name
DB 201909292218

Database name
DB201909292218
The name must contain only letters and numbers, starting with a letter. Maximum of 14 characters.

Choose a workload type

Data Warehouse
Configures the database for a decision support or data warehouse workload, with a bias towards large data scanning operations.

Transaction Processing
Configures the database for a transactional workload, with a bias towards high volumes of random data access.

Choose a deployment type

Serverless
Run Autonomous Database without provisioning infrastructure.

Dedicated Infrastructure
Run Autonomous Database on dedicated Exadata infrastructure.

Configure the database

Always Free ⓘ
 Show only Always Free configuration options

CPU core count
1
The number of CPU cores to enable. Available cores are subject to your tenancy's service limits.

Storage (TB)
1
The amount of storage to allocate.

Auto scaling
Allows system to use up to three times the provisioned number of cores as the workload increases. [Learn more](#).

On the screen creation process, you'll need to answer only 5 questions:

1. Compartment
2. Service display name
3. Database name
4. Workload type (ADW / ATP) : For the Workshop, please **CHOOSE “Data Warehouse”**
5. Serverless
6. Number of CPU's and Storage Volume. You can choose between 1 and 128 OCPU's and TB for storage

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On the second half of the screen, you'll find:

Create administrator credentials ⓘ

Username READ-ONLY
ADMIN

Password

Confirm password

Choose a license type

Bring Your Own Licence (BYOL)
Bring my organization's Oracle Database software licenses to the Database service.
[Learn more](#)

License Included
Subscribe to new Oracle Database software licenses and the Database service.

Show Advanced Options

Create Autonomous Database

Then input:

1. Administrator password
2. Choose your license type model

After providing all this data, just hit “Create Autonomous Database” in the bottom of the screen, and provisioning process will start

Autonomous provisioning takes no more than 5 min. You'll then get the screen :

≡ ORACLE Cloud

Autonomous Database » Autonomous Database Details

DB 201909292218

DB Connection Performance Hub Service Console Scale Up/Down Stop Actions ▾

Autonomous Database Information Tags

General Information

Database Name: DB201909292218
Workload Type: Data Warehouse
Compartment: mytestemailbr3 (root)/Compartimento-Trial
OCID: ...oauqna [Show Copy](#)
Created: Mon, Sep 30, 2019, 1:22:33 AM UTC
CPU Core Count: 1
Storage (TB): 1
License Type: Bring Your Own Licence (BYOL)
Database Version: 18c
Auto Scaling: Disabled ⓘ
Lifecycle State: Available
Instance Type: Paid

Infrastructure

Dedicated Infrastructure: No

Backup

Last Automatic Backup: No active backups exist for this database.

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Most operations for Autonomous database can be done on the top 5 buttons of the screen:

The screenshot shows the 'Autonomous Database Details' page. At the top left is the breadcrumb 'Autonomous Database » Autonomous Database Details'. To the right is a large green banner with 'ADW' in white. Next to it is the database name 'DB_WRKSP'. Below the banner are five buttons: 'DB Connection', 'Service Console', 'Scale Up/Down', 'Stop', and 'Actions ▾'. A horizontal bar below these buttons contains two tabs: 'Autonomous Database Information' (selected) and 'Tags'.

This new version of Autonomous, brings an already loaded version of SQL Developer, which can be reached from :

1. Hit the “**Service Console**” button
2. On the right side of the screen, hit “**Development**”, and you’ll be redirected to the screen where you can choose several administrative option, from client download, to rest API Services and SQL console

The screenshot shows the 'Autonomous Data Warehouse' service console. On the left is a sidebar with four options: 'Overview' (selected), 'Activity', 'Administration', and 'Development'. The 'Development' option is highlighted with a red box. The main content area is currently empty.

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3 Hit “SQL Developer Web” Button

The screenshot shows the Oracle Autonomous Data Warehouse interface. On the left, there's a sidebar with 'Autonomous Data Warehouse' sections: Overview, Activity, Administration, and Development (which is selected). Below that is a 'DATABASE' section with 'DB201909292218'. The main content area has three sections: 'Oracle APEX', 'SQL Developer Web' (which is highlighted with a red arrow), and 'RESTful Services and SODA'. The 'SQL Developer Web' section contains a URL: <https://xsq1vh8hoywptm-db201909292218.adb.us-ashburn-1.oraclecloudapps.com/ords/>.

In the Worksheet tab, use the worksheet screen to right some SQL statements to query ADW database content:

The screenshot shows the Oracle SQL Developer interface with the 'Worksheet' tab selected. The left sidebar shows a 'Navigator' with 'SH' selected, and a 'Tables' dropdown. The main area shows a SQL worksheet with the following code:

```
1 SELECT
2   PROD_ID,
3   CUST_ID,
4   TIME_ID,
5   CHANNEL_ID,
6   PROMO_ID,
7   QUANTITY SOLD,
8   AMOUNT SOLD
9  FROM
10   SH.SALES;
```

Below the worksheet is a 'Query Result' table with the following data:

	prod_id	cust_id	time_id	channel_id	promo_id	
1		13	524	01/20/98 12:00...	2	999
2		13	2128	04/05/98 12:00...	2	999
3		13	3212	04/05/98 12:00...	2	999
4		13	3375	04/05/98 12:00...	2	999
5		13	5204	04/05/98 12:00...	2	999
6		13	7082	04/05/98 12:00...	2	999

The following commands can be used on the SQL Worksheet to test Autonomous database:

- Select count(*) from dba_tables, dba_source;
- select count(*) from (select * from dba_source, v\$sqltext)
- select a.cust_first_name, count(a.country_id), sum(b.amount_sold) from sh.sales b, sh.customers a, sh.products where a.cust_id = b.cust_id group by a.cust_first_name

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While executing commands, you can change to **Activity** view on the Autonomous Database page, and follow-up the database activity.

