

OCI Fast Track

Your First Journey in Oracle Cloud World



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1. Oracle Cloud: How do we access it ?
2. MFA and Security Access
3. Tenant's and Compartments
4. Tags and Cost Tracking
- 5. Hands On Access and Resources*
6. Network Services
 - Availability Domain,
 - Compartments, VCN, Subnets e Gateway
- 7. Hands On Networking*
8. Computes : VM's, Bare Metal, Shapes and Instance Creation
9. Cost Governance
- 10.Hands On Compute*
- 11.Storage (Object, Block e FileStorage Server)
- 12.Hands On Storage*
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 - Oracle Cloud and Terraform
 - Resource Manager



How do we Access Oracle Public Cloud

Browser First Steps ...

The screenshot shows a web browser window for Oracle Cloud. The title bar has tabs for "My Whitelist Requests" and "Sign In | Oracle Cloud". The address bar shows the URL "cloud.oracle.com/sign-in". The main content is the "Sign In" page with the Oracle Cloud logo. A red callout box on the left says "Your Tenant name goes right Here" pointing to the "Account" input field which contains "gse00014643". A red callout box at the top center says "Choose Interface Language (please choose English)" pointing to the "English" dropdown in the top navigation bar. A red callout box on the right says "Online Cloud Calculator" pointing to the "Estimate" button. The top navigation bar also includes "Contact", "Chat", "Platform", "Infrastructure", "Resources", "Buy", and "Try for Free" buttons.

Your Tenant name
goes right Here

Choose Interface
Language
(please choose English)

Account ?
gse00014643

Next

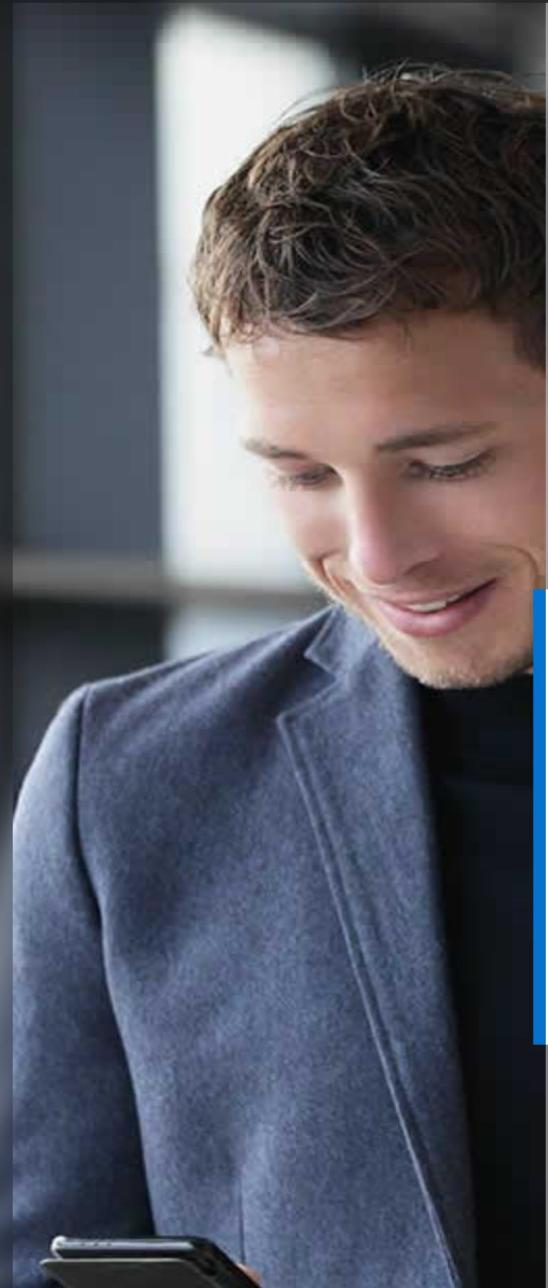
Sign In using Traditional Cloud Account

Need help logging in? [Click here](#)

Not a Customer yet?
[Click here to Sign up](#)

Contact Chat English Platform Infrastructure Resources Estimate Buy Try for Free

Other Bookmarks



gse00014643
Oracle Cloud Account Sign In

User Name

Password

Sign In

[Can't sign in?](#)

Oracle Public Cloud Dashboard

The screenshot shows the Oracle Public Cloud Dashboard. At the top, there's a browser header with tabs for 'Oracle Cloud Infrastructure' and a search bar for 'https://console.us-ashburn-1.oraclecloud.com'. A red arrow points from the top center towards the right side of the dashboard. On the left, a sidebar titled 'ORACLE Cloud' has its icon highlighted with a red box. Below it, the 'Quick Actions' section contains four cards: 'COMPUTE Create a VM instance' (2-6 mins), 'AUTONOMOUS TRANSACTION PROCESSING Create a database' (3-5 mins), 'NETWORKING Create a virtual cloud network' (1-3 mins), and 'OBJECT STORAGE Store data'. The 'Solutions' section features three images: two people looking at a laptop, a person in a server room, and a person at a desk. Below these are sections for 'Jump Start', 'Mission Critical Databases', and 'Resource Management'.

ORACLE Cloud

Core Infrastructure

Compute

Block Storage

Object Storage

File Storage

Networking

Database

Bare Metal, VM, and Exadata

Autonomous Data Warehouse

Autonomous Transaction Processing

Solutions and Platform

Analytics

Resource Manager

Email Delivery

Application Integration

Monitoring

Developer Services

Marketplace

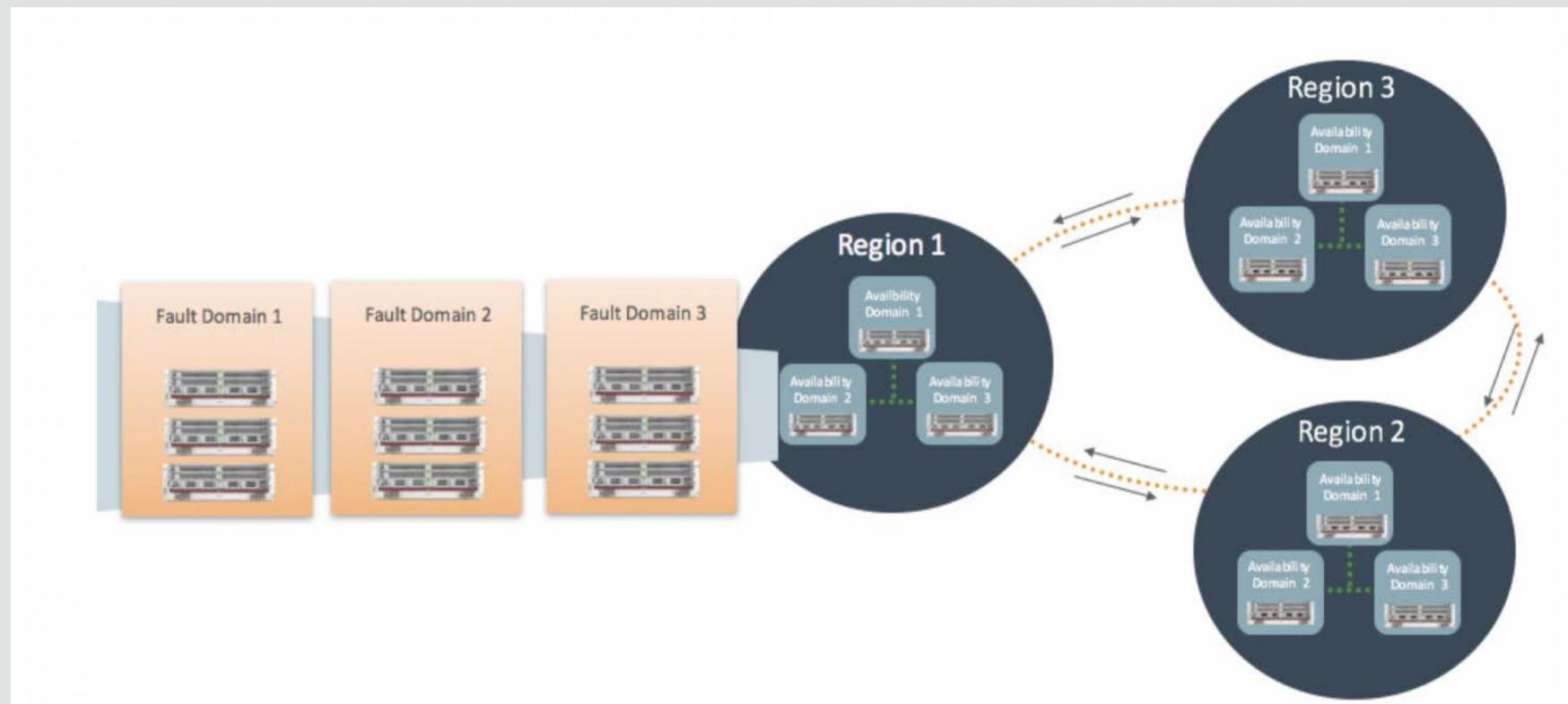
My Services Dashboard

The screenshot shows the 'My Services Dashboard' of the Oracle Cloud My Services Dashboard. It includes a header with a coffee cup icon and a progress bar. The main area has a 'Health' card stating 'All systems operational' with a link to 'View health dashboard'. Below are sections for 'Action Center', 'User Management', 'Billing', and 'What's New'. The 'What's New' section lists several recent announcements:

- 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)
- Streamline solution deployments by using Oracle Cloud Infrastructure (May 21, 2019)

Availability Domains (ADs): Multiple Fault-Decorrelated Independent Data Centers

- Fault-independent availability
- Remote disaster recovery
- Predictable low latency and high speed, encrypted interconnect between ADs
- Fault domain to prevent hardware failure inside a availability domain

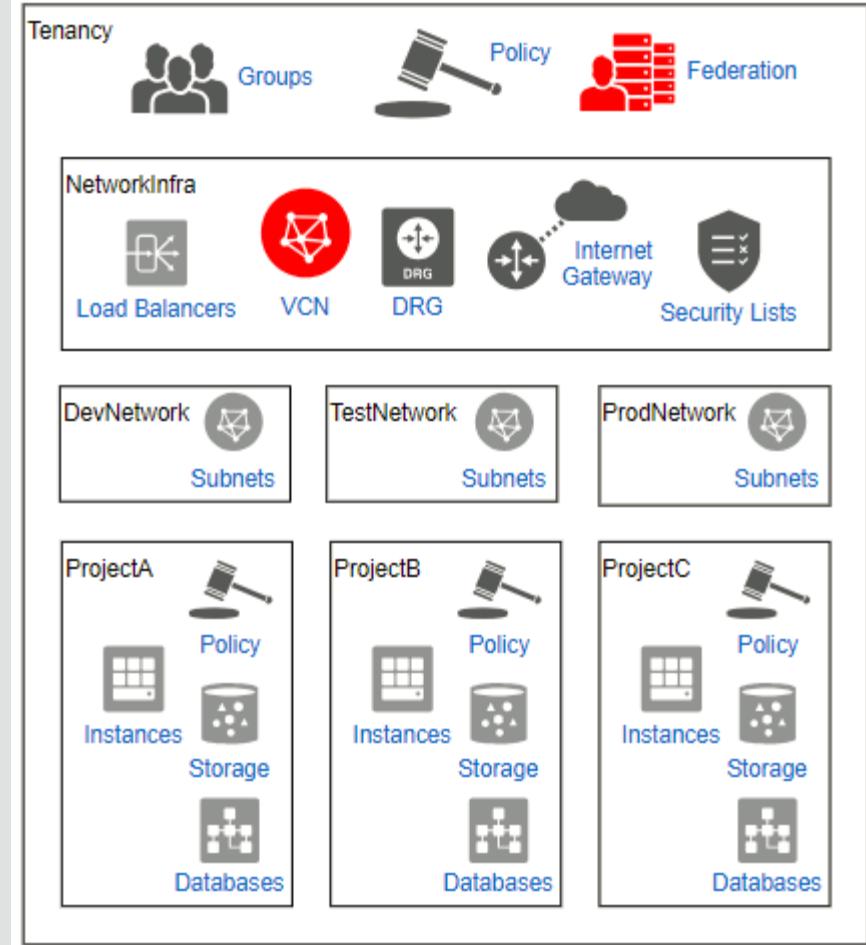


Tenants (Cloud Account) and Compartments



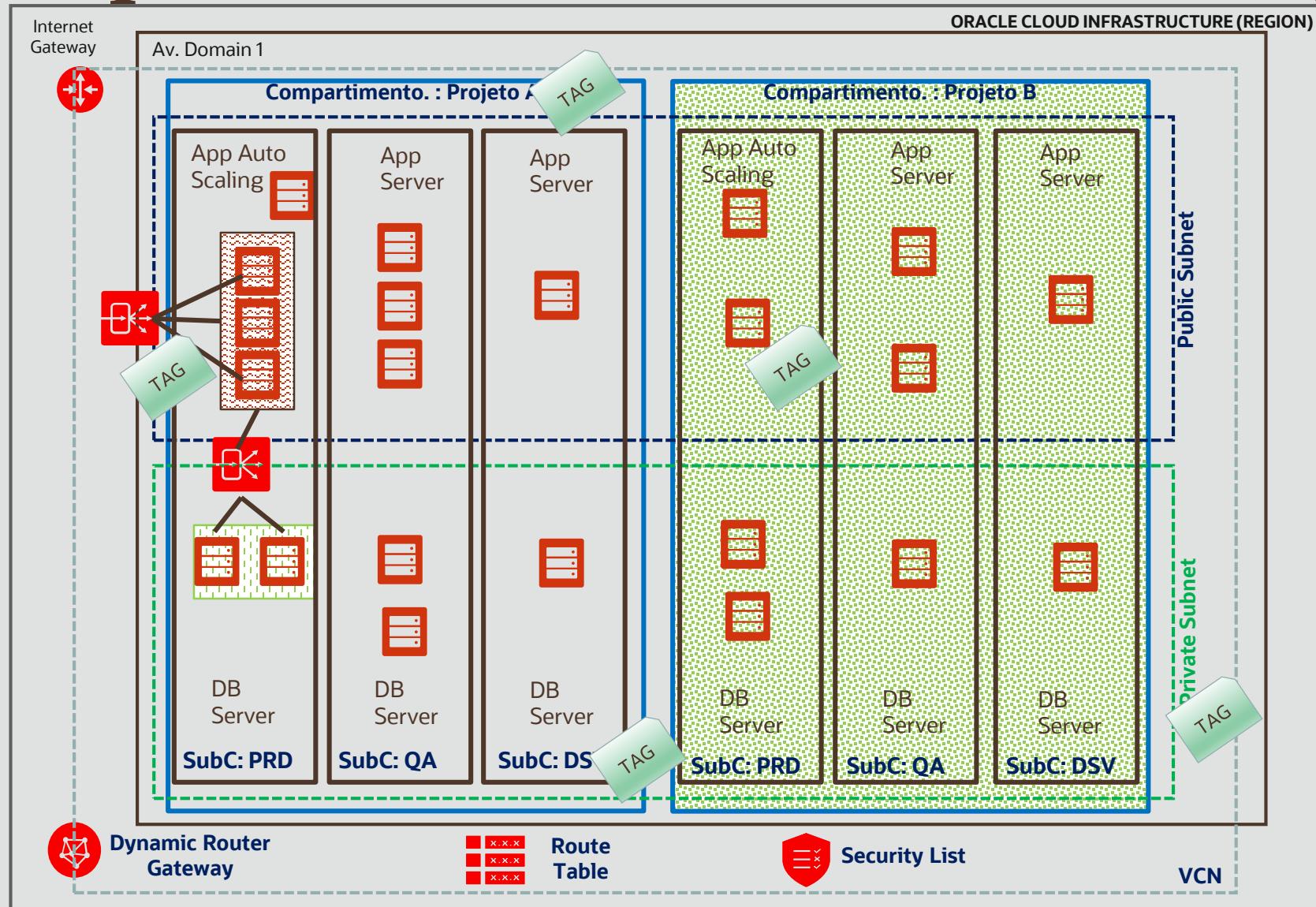
- **Tenancy**
 - Equivalent of an account; tenancy contains all of your OCI resources
 - Provisioned with a single, top-level compartment called the ‘root compartment’; you can create other compartments
- **Compartment**
 - Compartment is a collection of related resources (such as cloud networks, compute instances) that can be accessed only by those Groups that have been given permission by an admin
 - Think of it as a logical container used to organize and isolate related cloud resources; each resource is in exactly one compartment but resources can be connected/shared across compartments
 - Compartments are global and logical; distinct from physical “containers” like Regions and Availability Domains
 - Currently, Compartments can be renamed (but not deleted or moved)

Reference Model: Compartments



- **Compartment: NetworkInfra**
 - Critical network infrastructure centrally managed by network admins
 - Resources: top level VCN, Security Lists, Internet Gateways, DRGs
- **Compartment: Dev, Test, Prod Networks**
 - Modeled as a separate compartment to easily write policy about who can use the network
 - Resources: Subnets, Databases, Storage(if shared)
- **Compartment: Projects**
 - The resources used by a particular team or project; separated for the purposes of distributed management
 - Resources: Compute Instances, Databases, Block Volumes, etc.
 - There will be multiple of these, one per team that needs its own DevOps environment

Compartments What is it, and Why use it ?



More on Compartments

- You can TAG each resource, and control its cost independently
- You can set and control the budget of each compartment
- You can control access and object visibility on each compartment

Managing Compartments

Instances in CAMPELO Compartment

Compute

Instances

Instance Configurations

Instance Pools

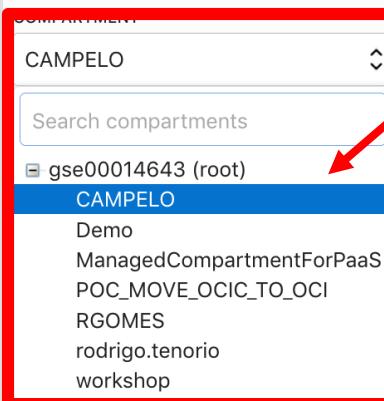
Autoscaling Configurations

Custom Images

Boot Volumes

Boot Volume Backups

List Scope



AVAILABILITY DOMAIN

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

Create Instance

Sort by: Created Date (Desc)

	WRKSP_002	OCID: ...ysi4pq	Show Copy
	WKSP_001	OCID: ...mrizcq	Show Copy

	LNXSRV02	OCID: ...bqdfba	Show Copy
	inst-ovtrx-Inst_Pool_01	OCID: ...	Show Copy

List of Available Compartments and hierarchy

To create new compartments

- 1 – Action Menu from anywhere
- 2 – Identity Menu
- 3 – Compartments

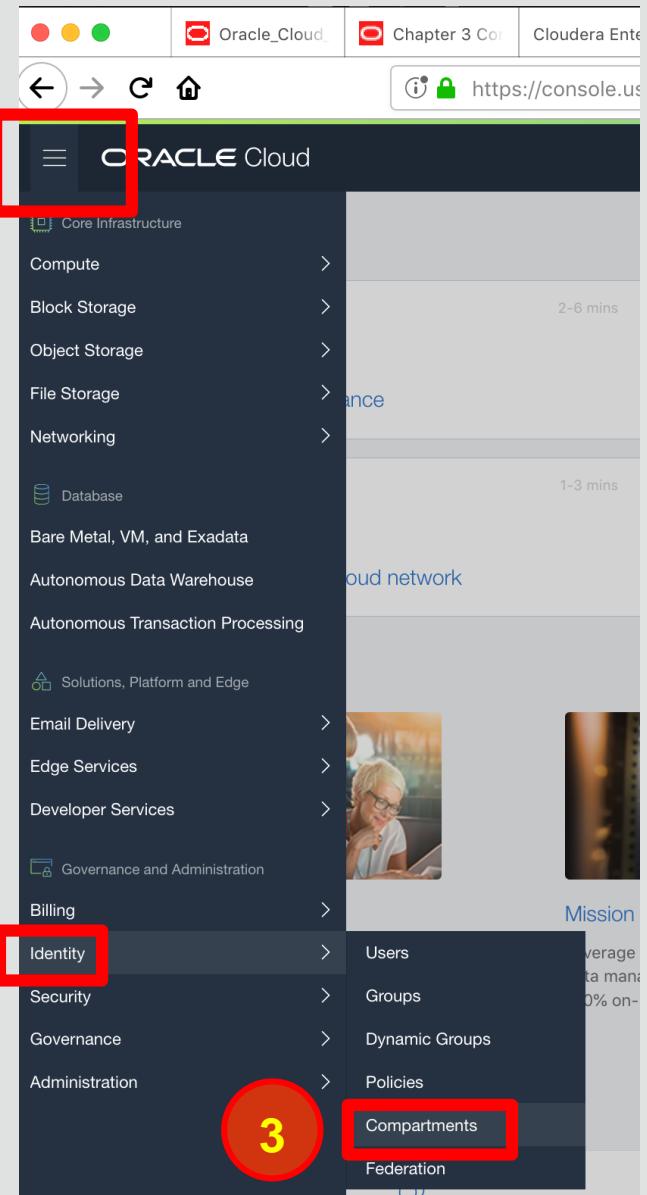
Limits and Restrictions

- Don't create resources on ROOT compartment
- You can create nested compartments (up to 6)
- Up to *50 Compartments per instance

1

2

3



Identity and Security



Authentication

IAM service authenticates a Principal by –

- User name, Password
 - You use the password to sign in to the web console
 - An administrator will provide you with a one-time password when setting up your account
 - At your first log in, you are prompted to reset the password

• API Signing Key

- Required when using the OCI API in conjunction with the SDK/CLI
- Key is an RSA key pair in the PEM format (min 2048 bits)
- In the interfaces, you can copy and paste the PEM public key

• Auth Tokens

- Oracle-generated token strings to authenticate with 3rd party APIs that do not support OCI signature-based authentication (e.g. ADW)



Attacker



OCI Console

Add Public Key [help](#) [cancel](#)

Note: Public Keys must be in the PEM format.

PUBLIC KEY

```
-----BEGIN RSA PUBLIC KEY-----
MIIBCgKCAQEAXTVsd/JTrZiz/w07MfWm3q+xnvdxDXTvG6oPW4f4D60d4q8YUqv
K/nmmfL63Txk7ng5Jqwt96rl4jra1WTm6DvxBuyJR+cSz4kIcc6o/mighMYLiuz
zsRWXpgjxVBpQc/AHsVPJldvAqVbkeLXdP9AeJHczg+Ak5ICmnI+5Hlg/6Ph8j1H
Z9IKpxTdGPQk0n2HERhT8cozqw95KKTvdGM16E19ADCoYzx95SXv8enkVs6SknHj
KmdaJimo3zXy5GqcjpA1jBgJASx+nLGJ0vMmDjTHfoAGw560lhTAX9LJ9Ud670ff
jEvn/jEQqcinf0dsfUGaeWRb1L9G4ESuxQIDAQAB
-----END RSA PUBLIC KEY-----
```

Add

```
begin
  DBMS_CLOUD.create_credential (
    credential_name => 'OBJ_STORE_CRED',
    username => '<userXX>',
    password => '<your Auth Token>'
  );
end;
/
```



Multi Factor Authentication (MFA)



- **What's is?**
 - A security method that verifies a user's identity by requiring multiple credentials
 - MFA requires other additional credentials
- **How?**
 - Things you know (knowledge), such as a password or PIN
 - Things you have (possession), such as a badge or smartphone
 - Things you are (inheritance), indicated through biometrics, like fingerprints or voice recognition
- **Why enable? How does work a typical attack hacker?**

A screenshot of the Oracle Cloud Account Sign In page. The page has a dark header with the text "Oracle Cloud Account Sign In". Below the header is a light-colored input area with fields for "User Name" and "Password". To the right of these fields is a "Sign In" button and a link "Can't sign in?". Further to the right, there is a "Sign in with" section featuring the Oracle SSO logo (a red 'O' with "ORACLE" underneath) and the text "OR".

1. Use a Bruce Force Attack app for discovering some Admin password
2. Create many users named as service user: backup_user, monitor_user and etc
3. Have fun!

Cost Governance



Cost governance strategy

Transparency

- Provide visibility into how the billing system works
- Enable customers to do granular audits of their bills
- Expose errors and corrections

Rich experiences

- Build console experiences for cost analysis, charge-back, budgeting and other cost governance scenarios
- Enable 3rd parties to extend OCI's cost management solutions

Enterprise-grade controls

- Create more flexibility in subscription management
- Allow multiple subscriptions per tenancy
- Separate subscription and account management from infrastructure management

Organizing Scenarios

Department Isolation: I want to isolate different departments from each other, so visibility and access to resources can be compartmentalized.

Sub-Departments: I want departments to be able to self-organize themselves into sub departments and have the same isolation and governance features.

Project Tags: I want to track all resources associated with a particular project, even if that project spans multiple departments.

Robustness: I want to ensure that all resource tracking is applied consistently across my organization.

Ubiquity: I want all my organizing and classification of resources to also be used in other scenarios, such as search and bill itemization.



Cost Analysis Console

-  Governance and Administration
- Billing > **Cost Analysis**
- Identity > Payment Method
- Security > Budgets
- Governance > Usage Report
- Administration > users and groups

Cost Analysis

Free Trial Trial Credits Used RBR\$316.37 / RBR\$1,850.00 | Total Days Used 6 / 30 Upgrade account

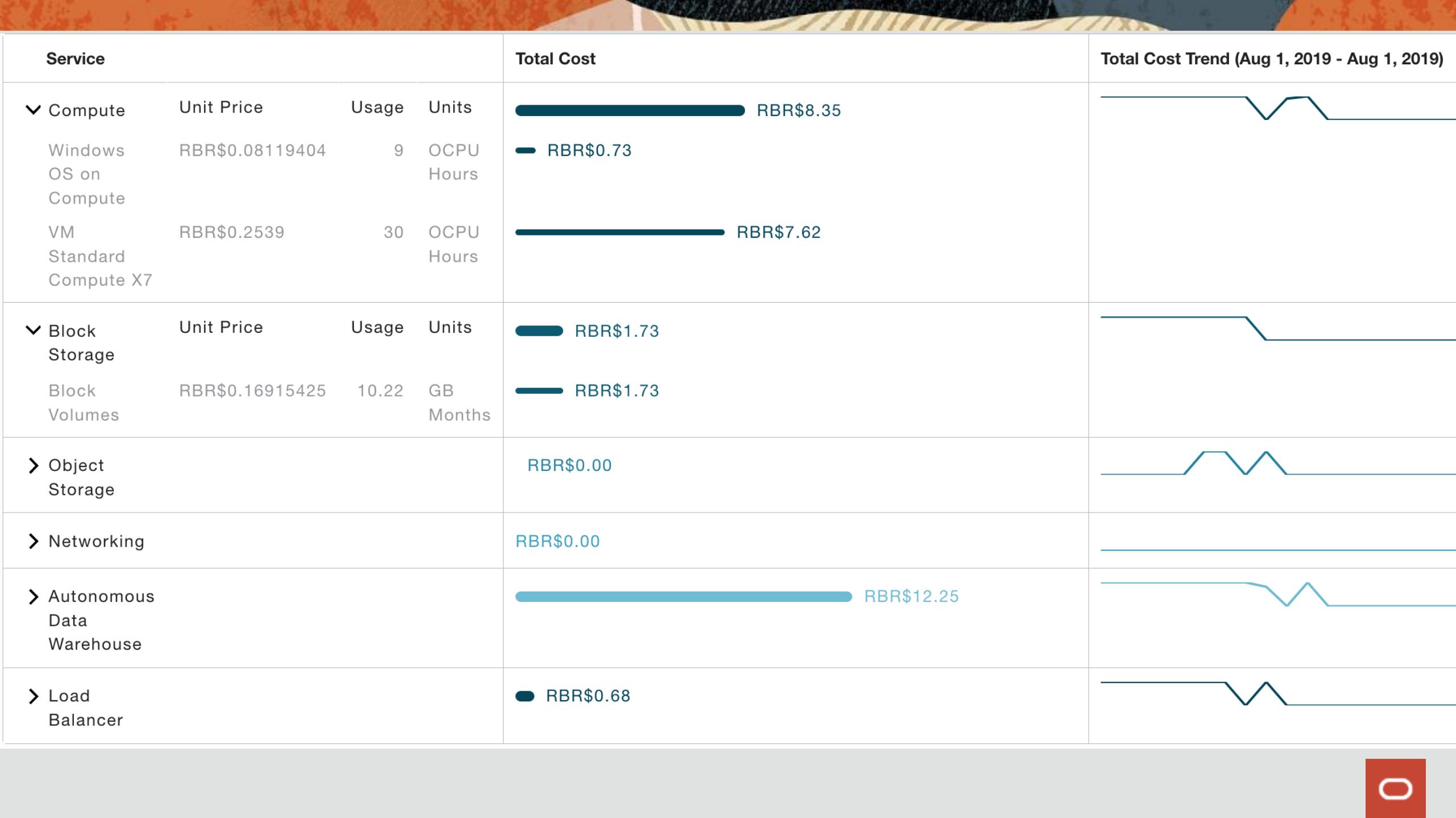
Filters

START DATE	END DATE	COMPARTMENT	TAG KEY	TAG VALUE
Jul 25, 2019 calendar	Aug 1, 2019 calendar	Filter by Compartment dropdown	Filter by Tag dropdown	<input type="text"/> Apply Filters
Jul 25, 2019 - Aug 1, 2019				
Total Usage Charges RBR\$14.27				

Search compartments
mybremail003 (root)
campelo
Compartimento-Trial
ManagedCompartmentForPaaS

SERVIDORES:WINDOWS
SERVIDORES:LINUX
DISCO_BACKUP:BACKUP





Create Budget

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

TARGET

COMPARTMENT COST-TRACKING TAG

NAME

SERVidores

Name can only contain alphanumeric characters, dashes, periods, and underscores.

DESCRIPTION

Budget para ser gasto com servidores

TAG NAMESPACE

SERVidores

TAG KEY

SRVLINUX

VALUE

MONTHLY BUDGET AMOUNT

50

The minimum allowed value is 1; the maximum allowed value is 999,999,999,999.

Budget Alert Rule (optional)

You can set up a budget alert rule now, or add it later. You can set up multiple alerts for the same budget.

THRESHOLD METRIC (i)

ACTUAL SPEND FORECAST SPEND

THRESHOLD TYPE (i)

PERCENTAGE OF BUDGET ABSOLUTE AMOUNT

THRESHOLD %

50

EMAIL RECIPIENTS

raphael.c.campelo@oracle.com

Enter one or more email addresses to receive the alerts. Multiple addresses can be separated by commas.

EMAIL MESSAGE

Atenção ao consumo de recursos

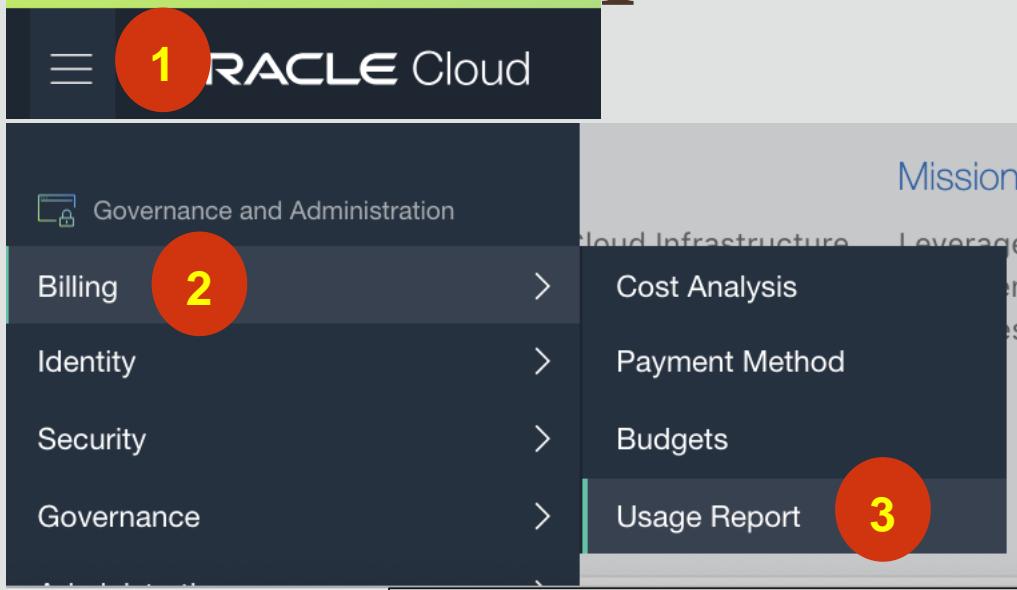
Enter the body of the email message

[Show advanced options](#)

[Create](#)

[Cancel](#)

Usage Reports



The usage report is automatically generated daily, and is stored in an Oracle-owned object storage bucket. It contains one row per each Oracle Cloud Infrastructure resource (such as instance, object storage bucket, VNIC) per hour along with consumption information, metadata, and tags.

Usage reports generally contain 24 hours of usage data, although occasionally a usage report may contain late-arriving data that is older than 24 hours.

Usage Report

Usage reports are CSV files generated daily that show usage data for each resource in your tenancy. The CSV files are stored in an object storage bucket that is

Name	Created
reports/usage-csv/0001000000015934.csv.gz	Wed, 03 Apr 2019 07:26:06 GMT
reports/usage-csv/0001000000015652.csv.gz	Tue, 02 Apr 2019 07:25:24 GMT
reports/usage-csv/0001000000015367.csv.gz	Mon, 01 Apr 2019 07:27:05 GMT
reports/usage-csv/0001000000015084.csv.gz	Sun, 31 Mar 2019 07:31:25 GMT
reports/usage-csv/0001000000014801.csv.gz	Sat, 30 Mar 2019 07:25:51 GMT

Do you Want to Know More on Identity and Access Management ?

Public Documentation

<https://docs.cloud.oracle.com/iaas/Content/Identity/Concepts/overview.htm>

<https://blogs.oracle.com/cloud-infrastructure/tracking-costs-with-oracle-cloud-infrastructure-tagging>

<https://docs.cloud.oracle.com/iaas/Content/Identity/Concepts/taggingoverview.htm>

<https://docs.cloud.oracle.com/iaas/Content/Identity/Tasks/managingcompartments.htm>

Training Videos

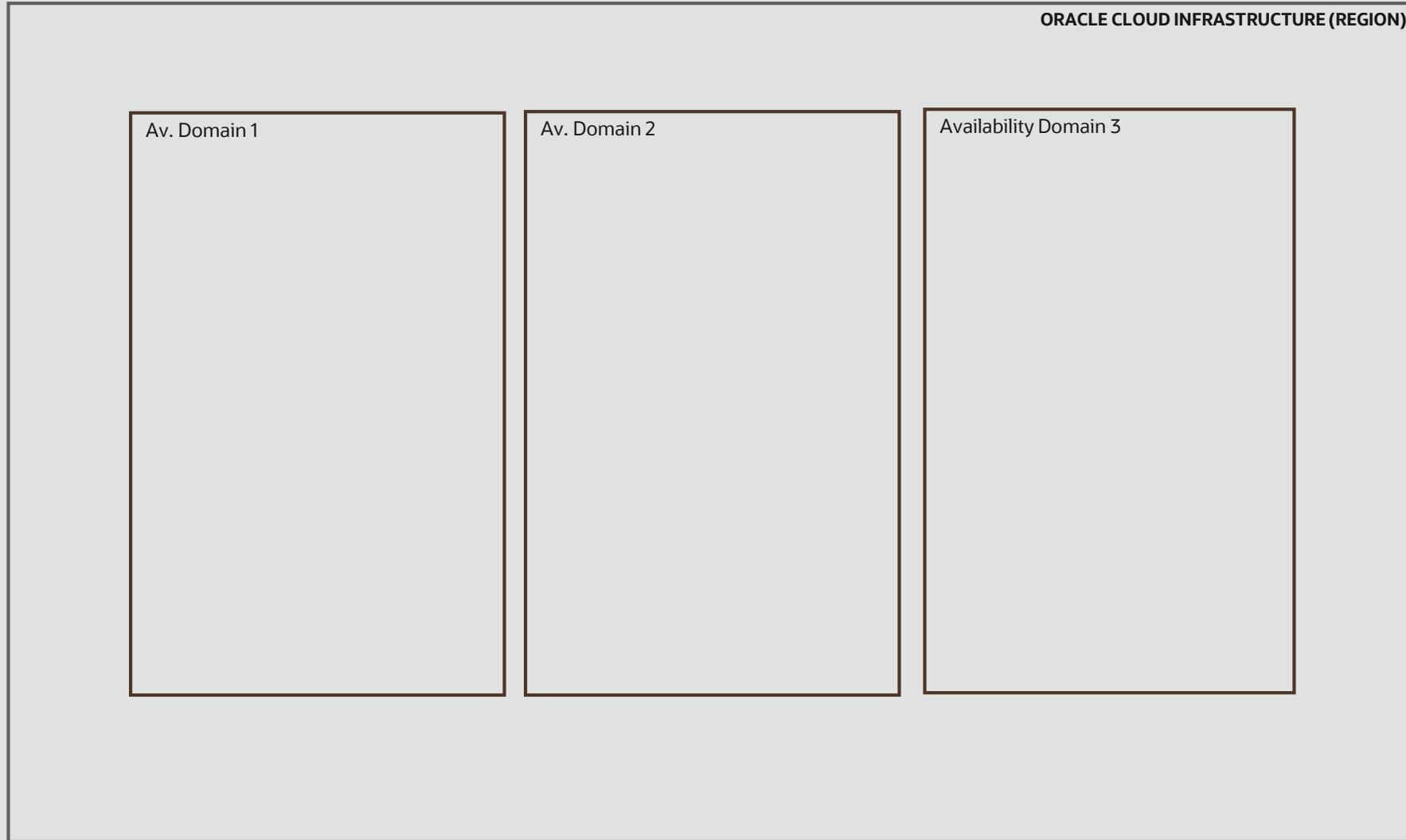
<https://www.youtube.com/watch?v=4WuCsxxuHjM>

DEMO #1

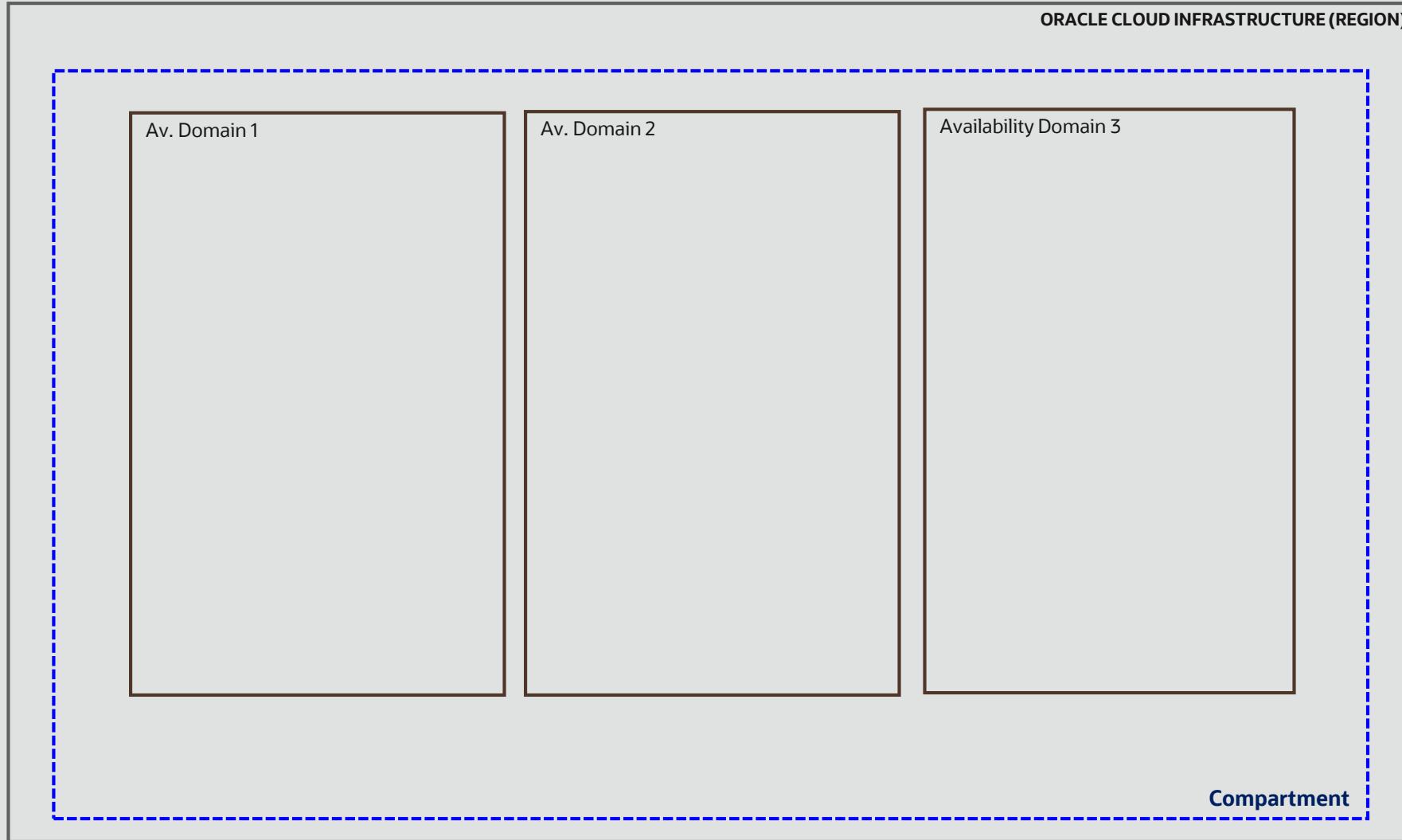
- Access
- Navigation
- Compartments



Oracle Cloud Infrastructure Resource Provisioning



Oracle Cloud Infrastructure Resource Provisioning

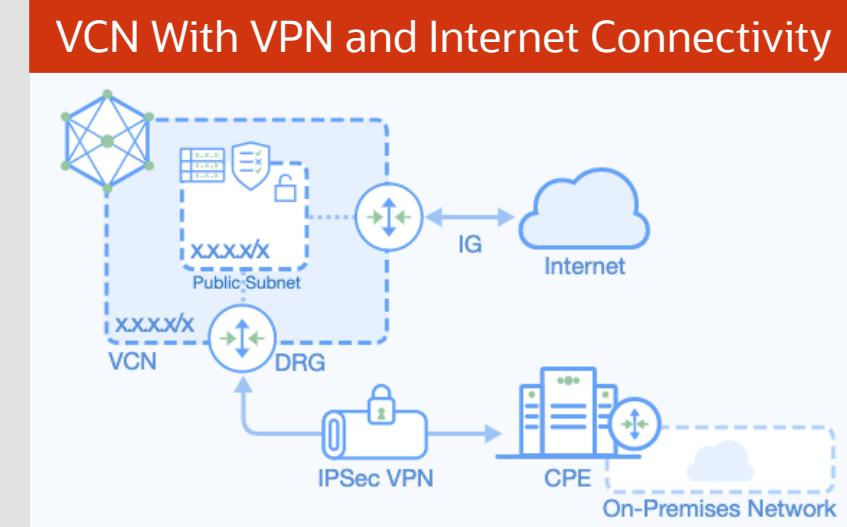
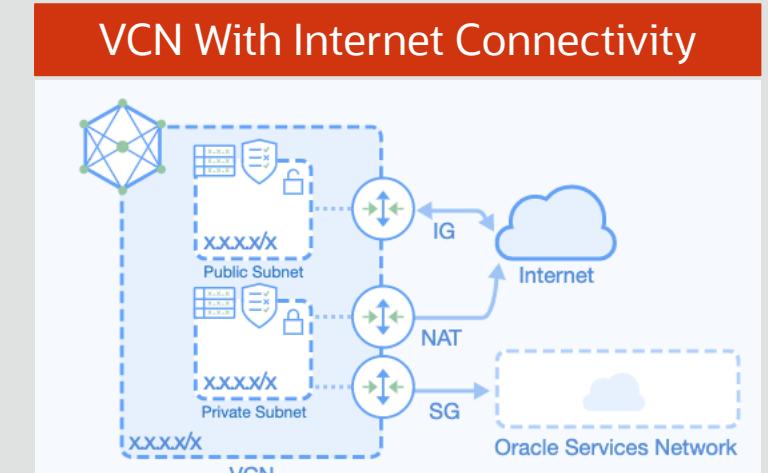


Networking

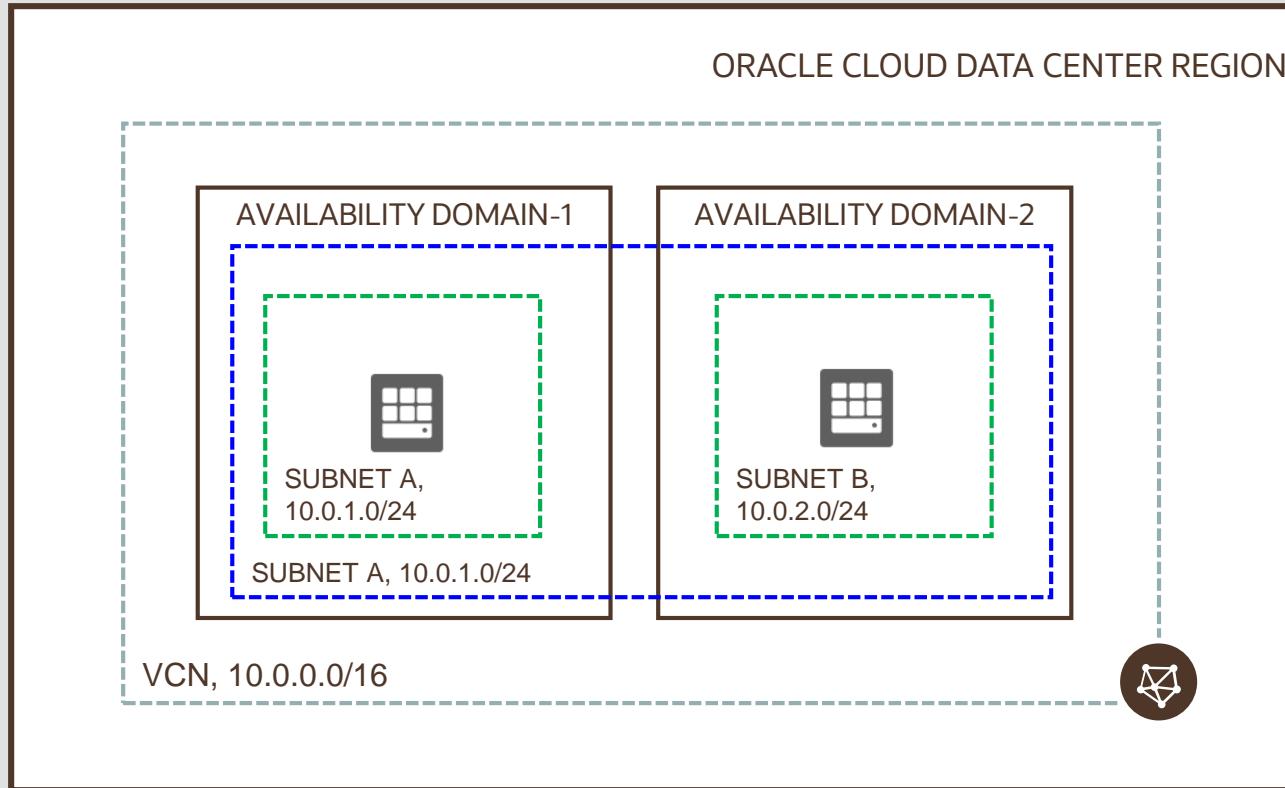
(VCN's, Subnets, etc)

Virtual Cloud Network (VCN)

- A Virtual Cloud Network is a software-defined version of a traditional physical network including subnets, route tables, and gateways on which your instances run
- A VCN covers a single, contiguous IPv4 CIDR block of your choice
- A VCN resides within a single region but can cross multiple Availability Domains
- Oracle recommends using one of the private IP address ranges in [RFC 1918](#) (10.0.0.0/8, 172.16/12, and 192.168/16) for VCN address space. However, you can use a publicly routable range
- Allowable VCN size range is from **/16 to /30** (VCN reserves the first two IP addresses and the last one in each subnet's CIDR)



Subnet



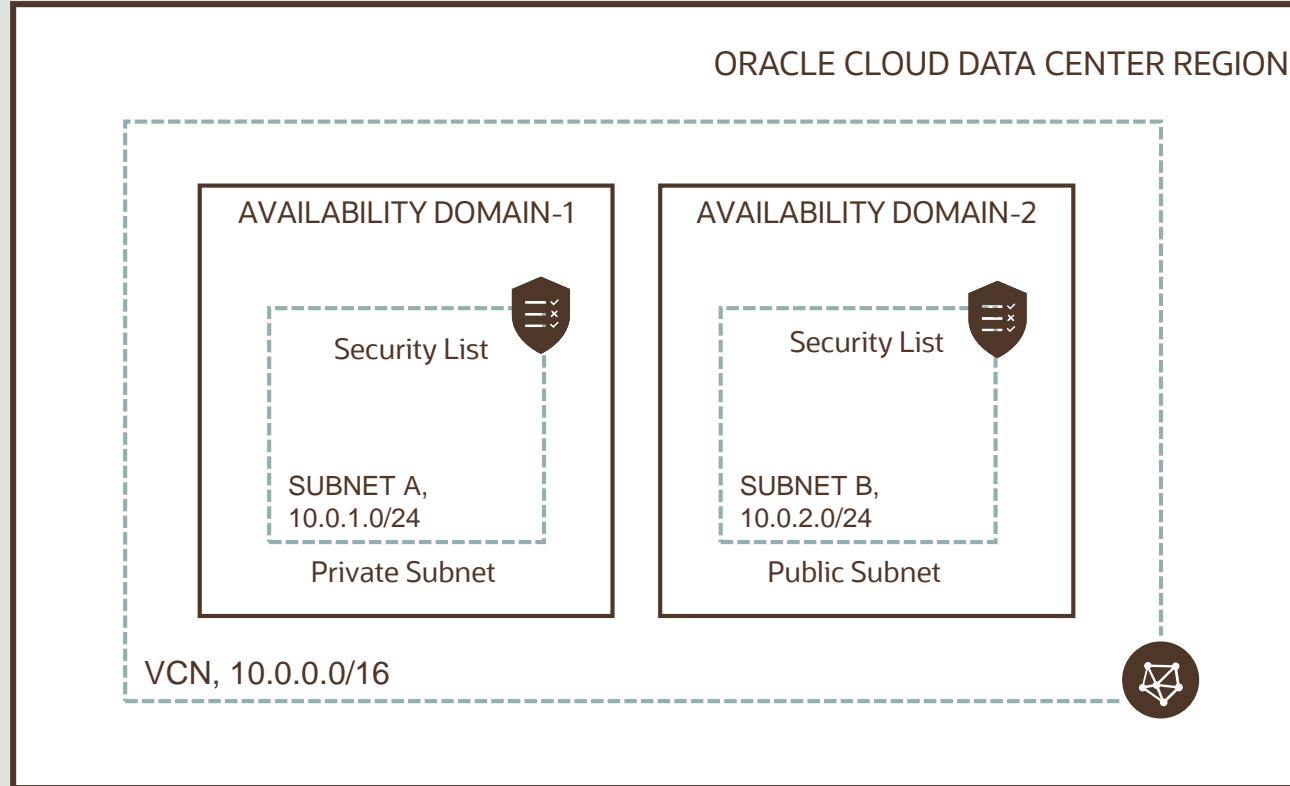
Each VCN network is subdivided into subnets, which can be **Regional**, or **contained within a single Availability Domain (AD)**

- Each subnet has a contiguous range of IPs, described in CIDR notation. Subnet IP ranges may not overlap
- You can have more than one subnet in an AD for a given VCN (**Limit 300 subnet's/AD**)
- Subnets can be designated as either **Public** or **Private**
- Instances draw their internal IP address and network configuration from their subnet

* Network limits : 10 VCN's per region, and 300 Subnets per VCN



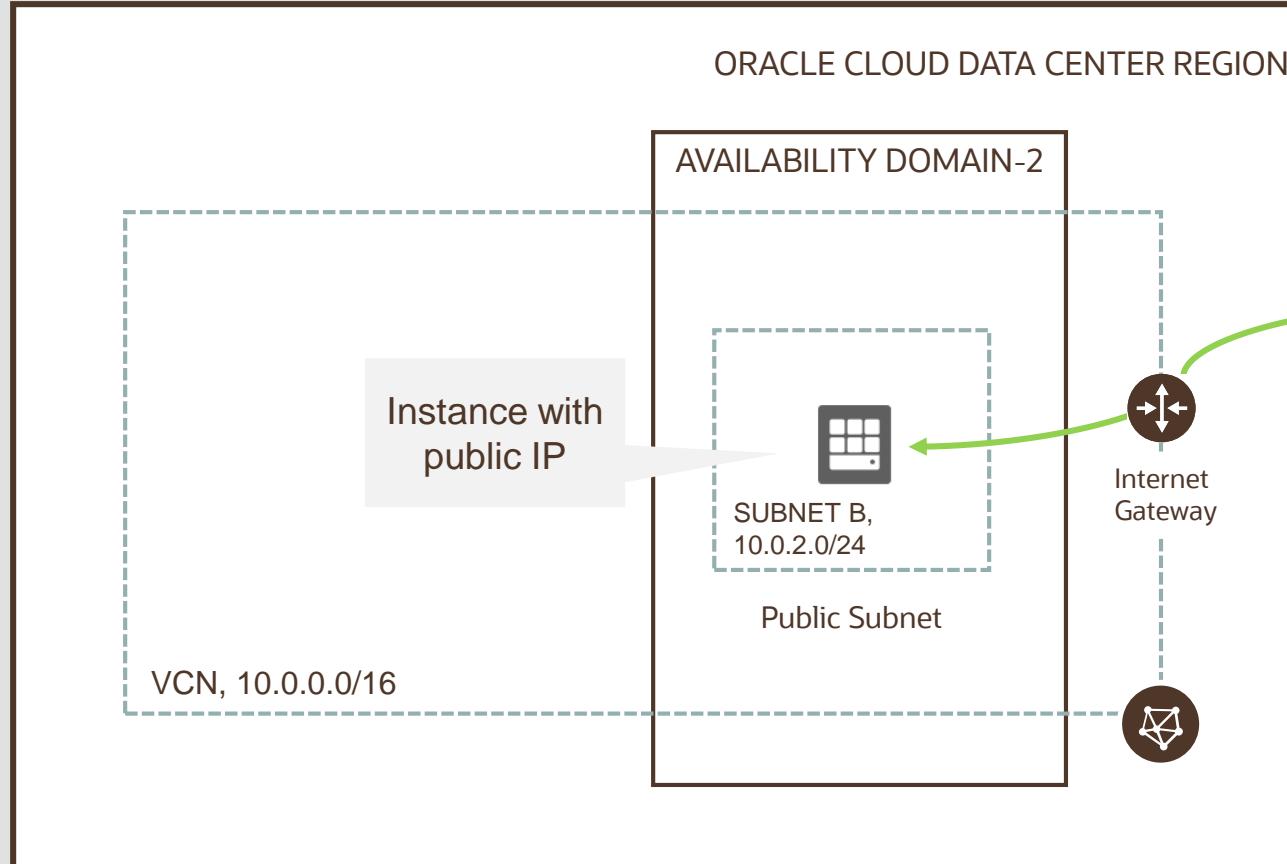
Security Lists



A common set of firewall rules associated with a subnet and applied to all instances launched inside the subnet

- Security lists provide ingress and egress rules that specify the types of traffic allowed in and out of the instances
- You can choose whether a given rule is stateful or stateless

Internet Gateway



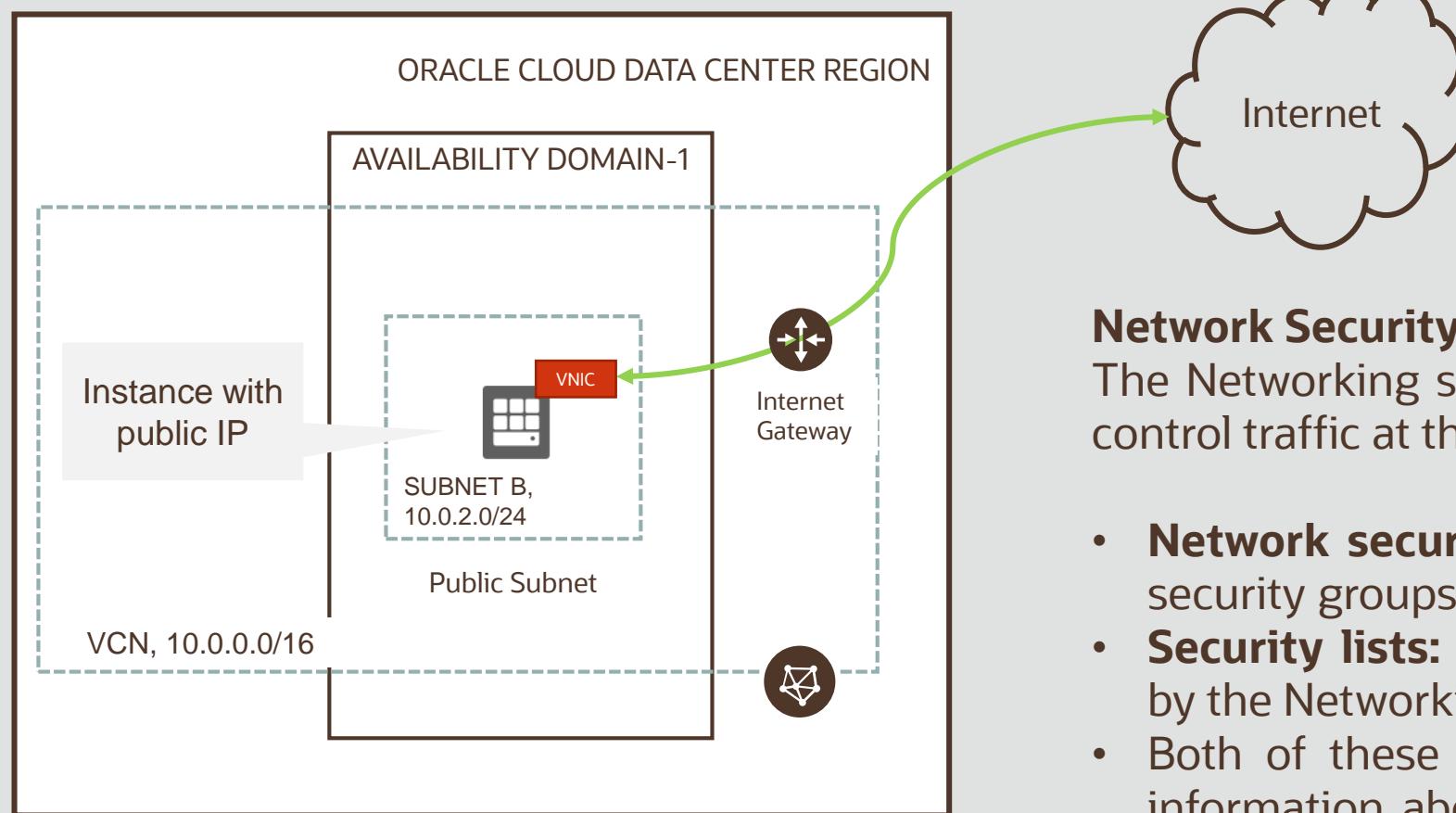
Internet gateway provides a path for network traffic between your VCN and the internet



You can have only one internet gateway for a VCN

After creating an internet gateway, you must add a route for the gateway in the VCN's Route Table to enable traffic flow

Network Security Group



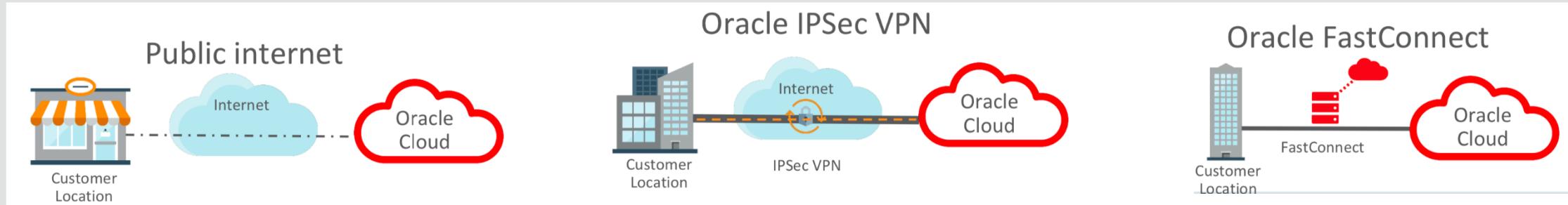
Network Security Groups

The Networking service offers two virtual firewall features to control traffic at the packet level:

- **Network security groups:** Covered in this topic. Network security groups are supported only for [specific services](#).
- **Security lists:** The original type of virtual firewall offered by the Networking service. See [Security Lists](#).
- Both of these features use *security rules*. For important information about how security rules work, and a general comparison of security lists and network security groups, see [Security Rules](#).



Connectivity options



- Reserved IPs
- Ephemeral IPs
- Internet Data out Pricing (first 10TB free)

- IPsec authentication and encryption
- Two main options
 - OCI managed VPN Service (free)
 - Software VPN (running on OCI Compute)

- Private Connection
- Separate from the internet
- Consistent network experience
- Port speeds of 1 Gbps, 10 Gbps
- SLA
- Oracle charges only for port hours consumed and not data transfer

<https://cloud.oracle.com/fastconnect/faq#billing>



Do you Want to Know More on Networking ?

Public Documentation

<https://docs.cloud.oracle.com/iaas/Content/Network/Concepts/overview.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Tasks/managingVCNs.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Tasks/managingIGs.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Concepts/securitylists.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Tasks/managingIPsec.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Tasks/managingDRGs.htm>
<https://docs.cloud.oracle.com/iaas/Content/Network/Concepts/fastconnect.htm>
<https://cloud.oracle.com/fastconnect/faq#billing>

Training Videos

<https://www.youtube.com/watch?v=ndx1kJLHGc>
<https://www.youtube.com/watch?v=etFVCTE6-1c>

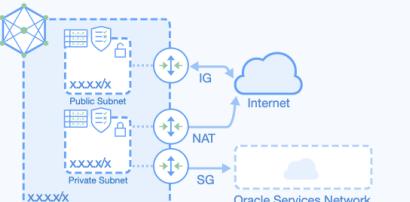
LAB #2

- VCN (Networking Quickstart)
- Subnets
- Security Lists
- 10 Min.

Networking Quickstart

VCN with Internet Connectivity

VCN with VPN Connect and Internet Connectivity



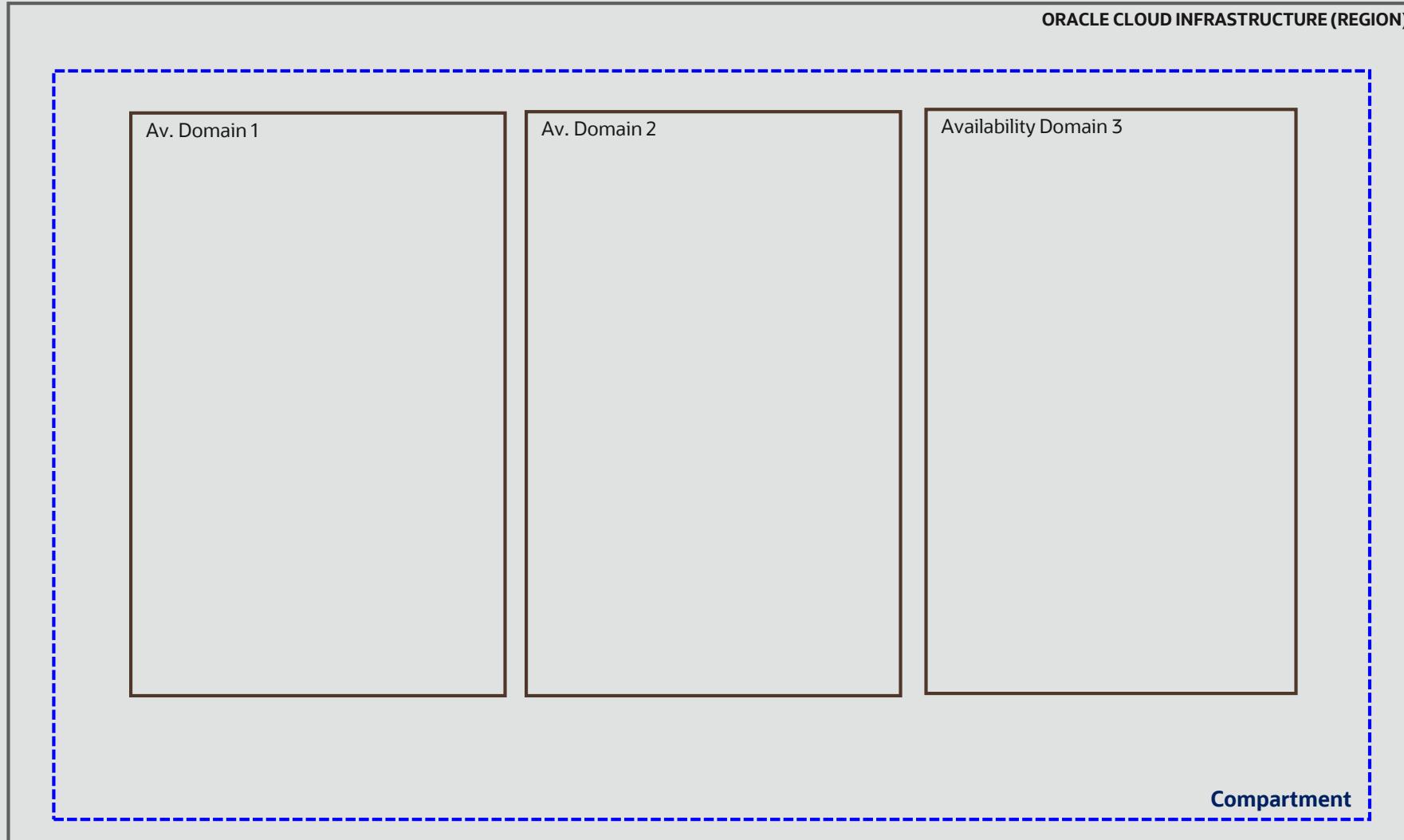
Creates a VCN with a public subnet that can be reached from the internet. Also creates a private subnet that can connect to the internet through a NAT gateway, and also privately connect to the Oracle Services Network.

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

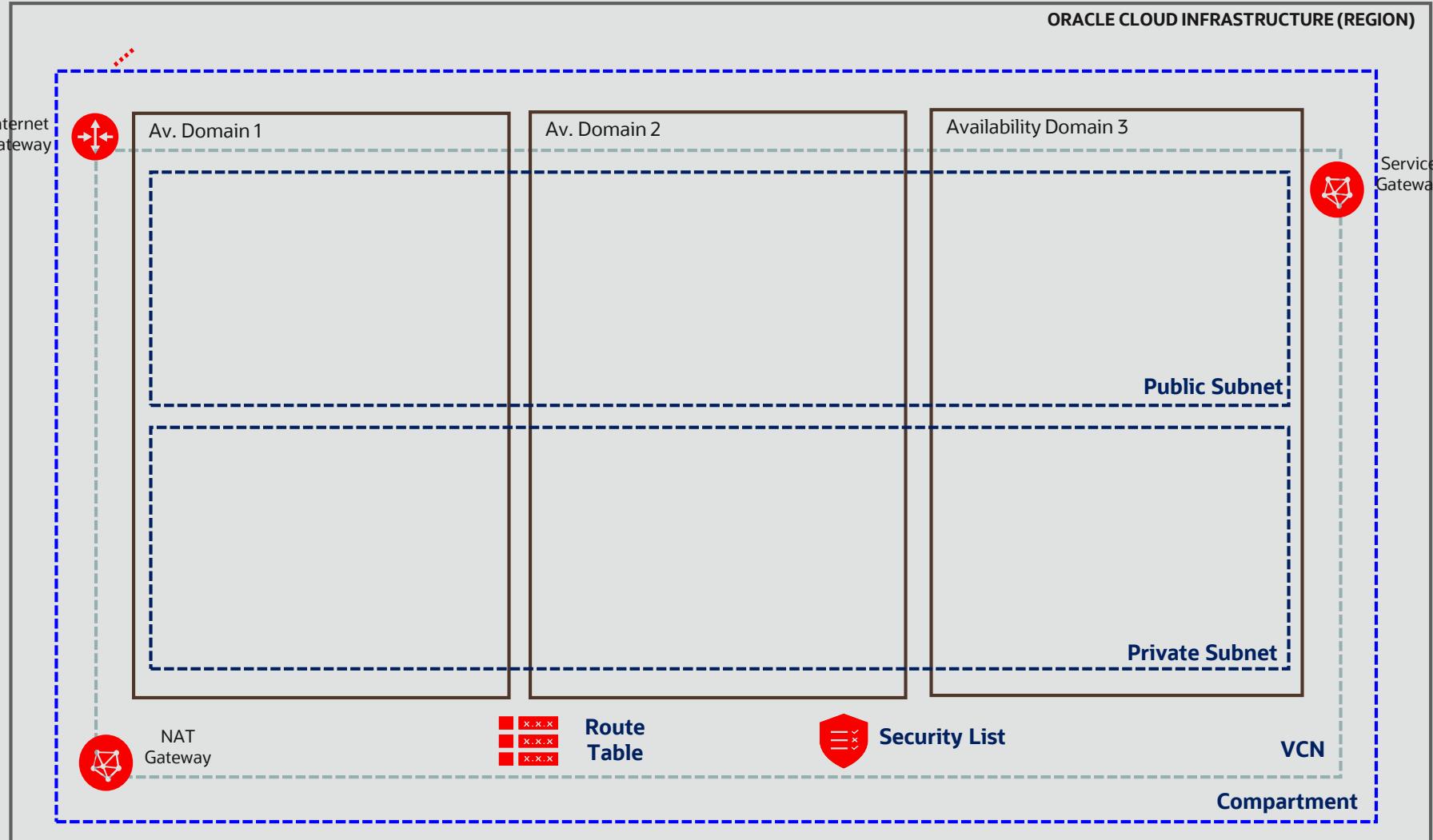
[Start Workflow](#) [Cancel](#)



Oracle Cloud Infrastructure Resource Provisioning



Oracle Cloud Infrastructure Resource Provisioning



Compute Nodes

Compute Instances: Bare Metal & Virtual Machines



Direct Hardware Access –
customers get the full Bare Metal
server

(single-tenant model)

Bare Metal Server



Bare Metal Server



Hypervisor

A hypervisor to virtualize the underlying Bare Metal server into smaller VMs

(multi-tenant model)

```
DEMO_WORKSHOP — opc@wksp-001:~ — ssh -s ssh -i ..../chave_cloud_01 -o ProxyCommand=ssh -i ..../chave_cloud_01 -W ~Dropbox/Oracle/CLOUD/GSE — opc@workshop1:~ — bash ...pc@lnxsr02:~ — ssh -i ..../chave_cloud_01 opc@129.213.111.211 established.  
RSA key fingerprint is SHA256:041gKlrg+LZgweqDVDBeYEC6ieu01lR0HJ1I3emwPDg.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'ocid1.instance.oc1.iad.abuwcljrbyd2ycl5xzqo4becidw3rd4fnr2btq5ito73w6ix' (RSA) to the list of known hosts.  
Last login: Sun Jul 26 10:25:01 UTC 2015 from 129.213.111.211  
[OK] [OK] Stopped target RPC Port Mapper.  
[OK] Stopped target Multi-User System.  
Stopping OpenSSH server daemon...  
Stopping Oracle Cloud Infrastructure agent upda... Reboot Terminate Apply Tag(s) Create i...  
Stopping Self Monitoring and Reporting Technolog... Daemon...  
Stopping System Logging Service...  
Stopping The Apache HTTP Server...  
Stopping LSB: Starts the Spacewalk Daemon...  
Stopping libstoragemgmt plug-in server daemon...  
[OK] Stopped target Timers.  
Stopping Job spooling tools...  
Stopping Install ABRT coredump hook...  
Stopping Set boot volume startup to onboot...  
[OK] Stopped Execute cloud user/final scripts.  
[OK] Stopped target Login Prompts.  
Stopping Getty on tty1:region: iad  
Stopping irqbalance daemon...  
Stopping Serial Getty on ttyS0...  
[OK] Stopped Daily Cleanup of Temporary Directories.  
[OK] Stopped Resets System Activity Logs.  
Stopping Oracle Cloud Infrastructure for management and monitoring...  
Stopping VDO volume services...  
[OK] Stopped Dump dmesg to /var/log/dmesg.  
Stopping ABRT kernel log watcher...  
Stopping Login Service...  
Stopping NTP client/server...  
[OK] Closed LVM2 poll daemon socket. IP Address: 10.0.1.2  
Stopping NFS status monitor for NFSv2/3 locking....  
Stopping RPC bind service...  
instance's traffic is controlled by its firewall rules in addition to the associated Subnet's se...
```

Console Connections

Create Console Connection

CC OCID: ...rs32qa [Show](#) [Copy](#)

Fingerprint: SHA256:JtvNJBAR4u+BKXqlYepDOFg4Wt80eQU6xbDM/OWdmY

ACTIVE

* Serial connections last only 24 hours, after that, you'll have to re-authenticate

OCI Shapes – VM



Shape	OCPUs	VCPUs	Memory (GB)	Local Disk	Network Bandwidth ¹	Max VNICs Total: Linux	Max VNICs Total: Windows	
2.0 GHz Intel® Xeon® Platinum 8167M	VM.Standard2.1	1	2	15	Block Storage only	1 Gbps	2	2
	VM.Standard2.2	2	4	30	Block Storage only	2 Gbps	2	2
	VM.Standard2.4	4	8	60	Block Storage only	4.1 Gbps	4	4
	VM.Standard2.8	8	16	120	Block Storage only	8.2 Gbps	8	8
	VM.Standard2.16	16	32	240	Block Storage only	16.4 Gbps	16	16
	VM.Standard2.24	24	48	320	Block Storage only	24.6 Gbps	24	24
	VM.Standard.E2.1	1	2	8	Block Storage only	700 Mbps	2	2
	VM.Standard.E2.1.Micro	1	2	1	Block Storage only	480 Mbps	1	N/A
	VM.Standard.E2.2	2	4	16	Block Storage only	1.4 Gbps	2	2
	VM.Standard.E2.4	4	8	32	Block Storage only	2.8 Gbps	4	4
	VM.Standard.E2.8	8	16	64	Block Storage only	5.6 Gbps	4	4

* The Future is shapeless ... Freedom for OCPU and memory relationship !

OCI Shapes – Bare Metal



Shape	Instance Type	OCPUs	VCPU	Mem (GB)	Local Disk	Network Bandwidth ¹	Max VNICs Total: Linux	Max VNICS Total: Windows
BM.Standard1.36 ²	Standard compute capacity	36	72	256	Block storage only	10 Gbps	36	1
BM.DenseIO1.36 ²	Dense I/O compute capacity	36	72	512	28.8 TB NVMe (9 drives)	10 Gbps	36	1
BM.Standard.B1.44	X6-based standard compute capacity	44	88	512	Block storage only	25 Gbps	44	None
BM.Standard2.52	X7-based standard compute capacity	52	104	768	Block storage only	2 x 25 Gbps	52	27
BM.DenseIO2.52	X7-based dense I/O compute capacity	52	104	768	51.2 TB NVMe (8 drives)	2 x 25 Gbps	52	27
BM.GPU2.2	X7-based GPU: 2xP100 NVIDIA GPUs	28	56	192	Block storage only	2 x 25 Gbps	28	15
BM.GPU3.8	X7-based GPU: 8xV100 NVIDIA GPUs	52	104	768	Block storage only	2 x 25 Gbps	52	27
BM.Standard.E2.64	E1-based standard compute capacity: AMD CPUs	64	128	512	Block storage only	2 x 25 Gbps	75	76
BM.HPC2.36	X7-based high frequency compute capacity	36	72	384	6.7 TB NVMe (1 drive)	1 x 25 Gbps 1 x 100 Gbps	50	1

1: Network bandwidth is based on expected bandwidth for traffic within a VCN.

2: X5-based shapes availability is limited to monthly universal credit customers existing on or before November 9th, 2018, in the us-phoenix-1, us-ashburn-1, and eu-frankfurt-1 regions.





VM Dense I/O Instances

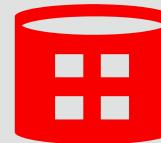
Shape	Instance type	OCPUs	RAM (GB)	Local Disk (TB)	Network Bandwidth	Max vNIC
VM.DenseIO2.8	Dense I/O	8	60	6.4 TB NVMe	8.2 Gbps	8
VM.DenseIO2.16	Dense I/O	16	240	12.8 TB NVMe	16.4 Gbps	16
VM.DenseIO2.24	Dense I/O	24	320	25.6 NVMe	24.6 Gbps	24

GPU

Shape	Instance type	OCPUs	VCPUs	RAM (GB)	Local Disk (TB)	Network Bandwidth	Max vNIC
VM.GPU2.1 (GPU: 1xP100)	GPU	12	24	72	Block Storage only	8 Gbps	12
VM.GPU3.1 (GPU: 1xV100)	GPU	6	12	90	Block Storage only	4 Gbps	6
VM.GPU3.2 (GPU: 2xV100)	GPU	12	24	180	Block Storage only	8 Gbps	12
VM.GPU3.4 (GPU: 4xV100)	GPU	24	48	360	Block Storage only	24.6 Gbps	24



Bare Metal or Virtual Machines
Up to 52 CPU cores (~104 vCPUs)



Up to **51 Terabytes NVMe** local storage
Up to **1 Petabyte** network block storage **per instance**



Oracle Supported Images

A template of a virtual hard drive that determines the operating system and other software for an instance. Images can be **Oracle-provided**, Custom, or **BYOI**.

Oracle provides several pre-built images for Oracle Linux, Microsoft Windows, Ubuntu and CentOS
Prebuild Windows images with SQL Server ready for use.

Image
Oracle Linux
CentOS 7
Ubuntu 16.04 LTS
Windows Server 2012 R2
Windows Server 2008 R2 - VM
Windows Server 2016

Provided Images

BYOI

Image Name	Supported versions
RHEL	4.5, 5.9, 5.11, 6.9, 7.4
CentOS	4.0, 4.8, 5.11, 6.9, 7.x
Oracle Linux	4.5, 4.8, 5.11, 6.2, 6.5, 6.9, 7.4
Ubuntu	12.04, 14.04, 16.04
Windows Server	2008 R2, 2012 and 2016 Stnd, Enterprise, Datacenter

Windows License: PN B88318 (X7), B87674 (X5)

You can create a maximum of **25 custom images per region per root compartment**





Compute Instance Creation Process ...

The screenshot shows the Oracle Cloud interface. The left sidebar has a 'Compute' section highlighted with a red box. The main content area shows a list of instance-related options: Instances, Instance Configurations, Instance Pools, Custom Images, Boot Volumes, and Boot Volume Backups. The 'Instances' option is also highlighted with a red box.

Create Instance

https://console.us-ashburn-1.oraclecloud.com/a/compute/in...

Instances in workshop Compartment

Create Instance

Sort by: Created Date (Desc)

There are no Ins...

AVAILABILITY DOMAIN

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

Compute Instance Creation Process ...



The screenshot shows the Oracle Cloud 'Create Compute Instance' wizard. The left sidebar contains configuration sections: 'Name your instance' (instance-20191213-1629), 'Choose an operating system' (ORACLE LINUX), 'Availability Domain' (AD 1), and 'Instance Type' (Virtual Machine). The main area is divided into three tabs: 'Instance Shape' (selected), 'Configure networking', and 'Boot volume'. The 'Instance Shape' tab shows 'VM.Standard2.1 (Virtual Machine)' with '1 Core OCPU, 15 GB Memory' and a 'Change Shape' button. The 'Configure networking' tab shows 'Virtual cloud network' (CAMPELO) and 'Virtual cloud network' (vcn-trial). The 'Boot volume' tab shows a 'Default boot volume size: 46.6 GB' with options for 'Custom boot volume size (in GB)', 'Use in-transit encryption', and 'Choose a key from Key Management to encrypt'. A note at the bottom says: 'To connect to instances using Oracle Linux, Create a public key and add it to the instance's SSH keys. The image does not already include one, and that you can do this later by connecting to the instance via the Oracle Linux console or the Oracle Linux command line interface. Connecting to an Instance.' The right side shows the 'Compute > Instances > Instance Details' page for 'instance-20191213-1601', which is currently 'RUNNING'. It includes buttons for Start, Stop, Reboot, Move Resource, Apply Tag(s), Actions, and tabs for Instance Information and Tags. The Instance Information section lists Availability Domain: PqLC:US-ASHBURN-AD-2, Fault Domain: FAULT-DOMAIN-3, Region: iad, Shape: VM.Standard2.1, Virtual Cloud Network: vcn-trial, and Maintenance Reboot: -. The Primary VNIC Information section is partially visible.

Compute Instance Creation Process Terminated



☰ ORACLE Cloud us- Search

Compute » Instances » Instance Details

w2ksrv01

Running

Create Custom Image Start Stop Reboot Terminate Apply Tag(s) Create Instance Configuration

Instance Information Tags

Instance Information

Availability Domain: PqLC:US-ASHBURN-AD-1 **Image:** [Windows-Server-2012-R2-Standard-Edition-VM-Gen2-2019.01.09-0](#)

Fault Domain: FAULT-DOMAIN-2 **OCID:** ...3jqvua [Show](#) [Copy](#)

Region: iad **Launched:** Fri, 08 Feb 2019 10:56:15 GMT

Shape: VM.Standard2.1 **Compartment:** gse00014643 (root)/CAMPELO

Username: opc **Virtual Cloud Network:** [VCN_LAB](#)

Initial Password: zR7~JVHng;Fgb [Hide](#) [Copy](#) **Launch Mode:** NATIVE

Maintenance Reboot: -

Primary VNIC Information

Private IP Address: 10.0.0.4 **Internal FQDN:** w2ksrv01... [Show](#) [Copy](#)

Public IP Address: 129.213.50.29 **Subnet:** [Public Subnet PqLC:US-ASHBURN-AD-1](#)

This Instance's traffic is controlled by its firewall rules in addition to the associated [Subnet's Security Lists](#).



Optimized Functions on the Compute Instance Console

Compute » Instances » Instance Details

VM-APACHE

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

Instance Information Tags

Instance Information

Create Custom Image
Create Instance Configuration
Terminate

A screenshot of the Compute Instance Details page for 'VM-APACHE'. The instance status is shown as 'Running'. Below the status are buttons for 'Start', 'Stop', 'Reboot', 'Move Resource', 'Apply Tag(s)', and 'Actions ▾'. The 'Actions ▾' menu is expanded, showing options: 'Create Custom Image', 'Create Instance Configuration', and 'Terminate'. A red arrow points from the 'Move Resource' button on the main page to the 'Move Resource' button in the expanded 'Actions' menu. A green arrow points from the 'Move Resource' button on the main page to the 'Move Resource' button in the 'Change Compartment' dialog.

Change Compartment [cancel](#)

TARGET COMPARTMENT

CAMPELO

gse00014643 (root)/CAMPELO

Any attachments (such as block volumes) will remain in the current compartment.

[Move Resource](#)

Network Security Groups: None [Edit](#)

Create instance

WF IN PROGRESS

WR SUCCEEDED

Resources

- Log Messages (2)
- Error Messages (0)
- Associated Resources (1)

Resources

- Log Messages (3)
- Error Messages (0)
- Associated Resources (1)

Create instance

Compute » Instances » Instance Details » Work Requests » Work Requests Details

Work Requests Information

100% Complete

OCID: ...o4c2qq [Show](#) [Copy](#)

Compartment: gse00014643 (root)/CAMPELO

Accepted: Fri, Jul 12, 2019, 14:38:53 UTC

Started: Fri, Jul 12, 2019, 14:38:54 UTC

Finished: Fri, Jul 12, 2019, 14:40:36 UTC

Log Messages

Message	Timestamp
Powering on virtual machine.	Fri, Jul 12, 2019, 14:39:59 UTC
Provisioning virtual machine.	Fri, Jul 12, 2019, 14:39:14 UTC
Creating VNIC.	Fri, Jul 12, 2019, 14:38:55 UTC

Monitoring (Yes, out of the box, no setup needed)



Compute » Instances » Instance Details »

RUNNING

Resources

Metrics

Attached Block Volumes (3)

Attached VNICs (1)

Boot Volume (1)

Console Connections (0)

8 Metrics

START TIME
2019-03-04 21:12

CPU Utilization ⓘ
Interval 1 minute ▾ Statistic Rate ▾

Network Receive Bytes ⓘ
Interval 1 minute ▾ Statistic Rate ▾

Disk Read I/O ⓘ
Interval 1 minute ▾ Statistic Rate ▾

Disk Read Bytes ⓘ
Interval 1 minute ▾ Statistic Rate ▾

Query 1 (1 metric stream)
NetworksBytesIn[1m]{resourceId = "ocid1.instance.oc1.iad.abuwcljsth0z5gxr3hm6mwdd2twnrbkzwsw3n4rbs52qgs17dk5ezecko2a"}.rate()

Network Transmit Bytes ⓘ
Interval 1 minute ▾ Statistic Rate ▾

close Options ▾

The screenshot shows the Oracle Cloud Infrastructure (OCI) Metrics interface for monitoring an instance. A red box highlights the 'Metrics' tab under 'Resources'. Another red box highlights the 'Network Receive Bytes' chart, which displays data over time (GMT). The chart shows a significant peak around 21:35, reaching approximately 1.8M bytes. Below the chart, a query is shown: 'NetworksBytesIn[1m]{resourceId = "ocid1.instance.oc1.iad.abuwcljsth0z5gxr3hm6mwdd2twnrbkzwsw3n4rbs52qgs17dk5ezecko2a"}.rate()'. Other charts visible include CPU Utilization, Disk Read I/O, and Disk Read Bytes.

ORACLE Cloud

Core Infrastructure

Compute

Block Storage

Object Storage

File Storage

Networking

Database

Bare Metal, VM, and Exadata

Autonomous Data Warehouse

Autonomous Transaction Processing

Solutions, Platform and Edge

Resource Manager

Email Delivery

Edge Services

Developer Services

Marketplace

ORACLE Cloud

Marketplace

All Applications



Oracle Secure Global Desktop

Remotely and securely access applications and data in Oracle Cloud from any browser



GitLab CE Certified by Bitnami

Version Control software from the leading publisher



Fortinet FortiADC Application Delivery Controller

High-Performance Server Load Balancing and Application Delivery



ZeroDown® Software HA for Oracle Cloud

Deploy a simple, High Availability Services solution for Oracle Cloud



Fortinet FortiManager-VM Centralized Security M...

Simplify configuration, automate provisioning, and maintain compliance



Redmine Certified by Bitnami

Bug Tracking software from the leading publisher



Oracle E-Business Suite 12.2.8 Demo Install Image

Oracle E-Business Suite Release 12.2.8 Vision demonstration instance



Fortinet FortiGate-VM Next-Generation Firewall (...)

Comprehensive Security in One, Simplified Solution



Oracle E-Business Suite Cloud Manager

Create, manage and configure Oracle E-Business Suite environments on Oracle Cloud Infrastructure



Qualys Virtual Scanner Appliance

Qualys Virtual Scanner Appliance for Oracle Cloud Infrastructure (OCI)



Altair PBS Professional

Workload Manager and Batch Queueing Software



Check Point CloudGuard IaaS - Security Gateway

Advanced Cloud Security

Do you Want to Know More on Compute Instances ?

Public Documentation

<https://docs.cloud.oracle.com/iaas/Content/Compute/Concepts/computeoverview.htm>

<https://docs.cloud.oracle.com/iaas/Content/Monitoring/Concepts/monitoringoverview.htm>

<https://blogs.oracle.com/cloud-infrastructure/announcing-a-certified-vmware-solution-on-oracle-cloud>

Training Videos

<https://www.youtube.com/watch?v=J5lbXJ9T8EY>

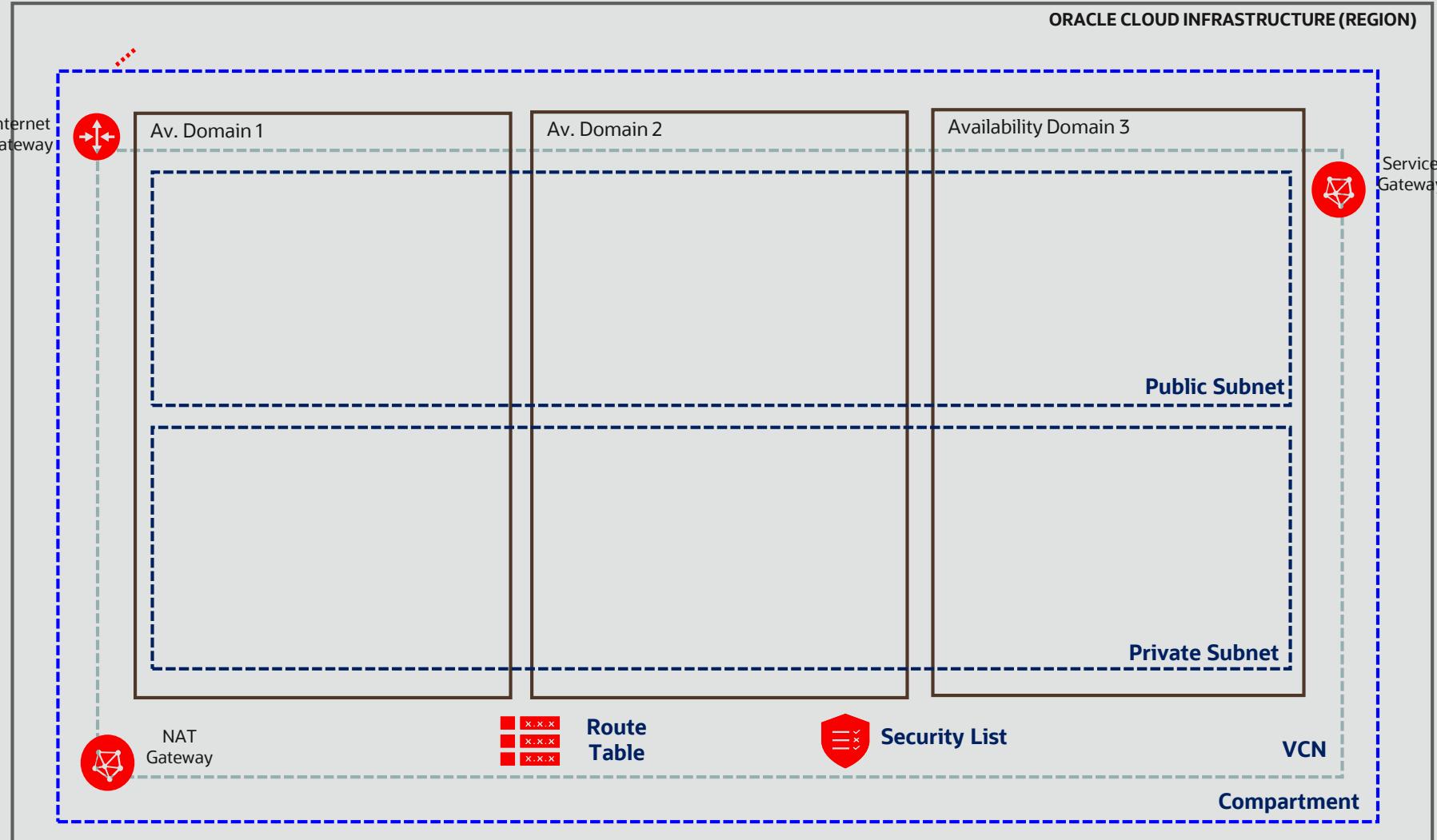
LAB #3

- Create 3 Compute Nodes (VM)
 - Use Shapes VMStandard2.1
 - Choose your own Compartment
 - One on each Availability Domain
 - Request Public IP's
- Linux and Windows
- Connection Test (Access Rules)
- 30 Min.

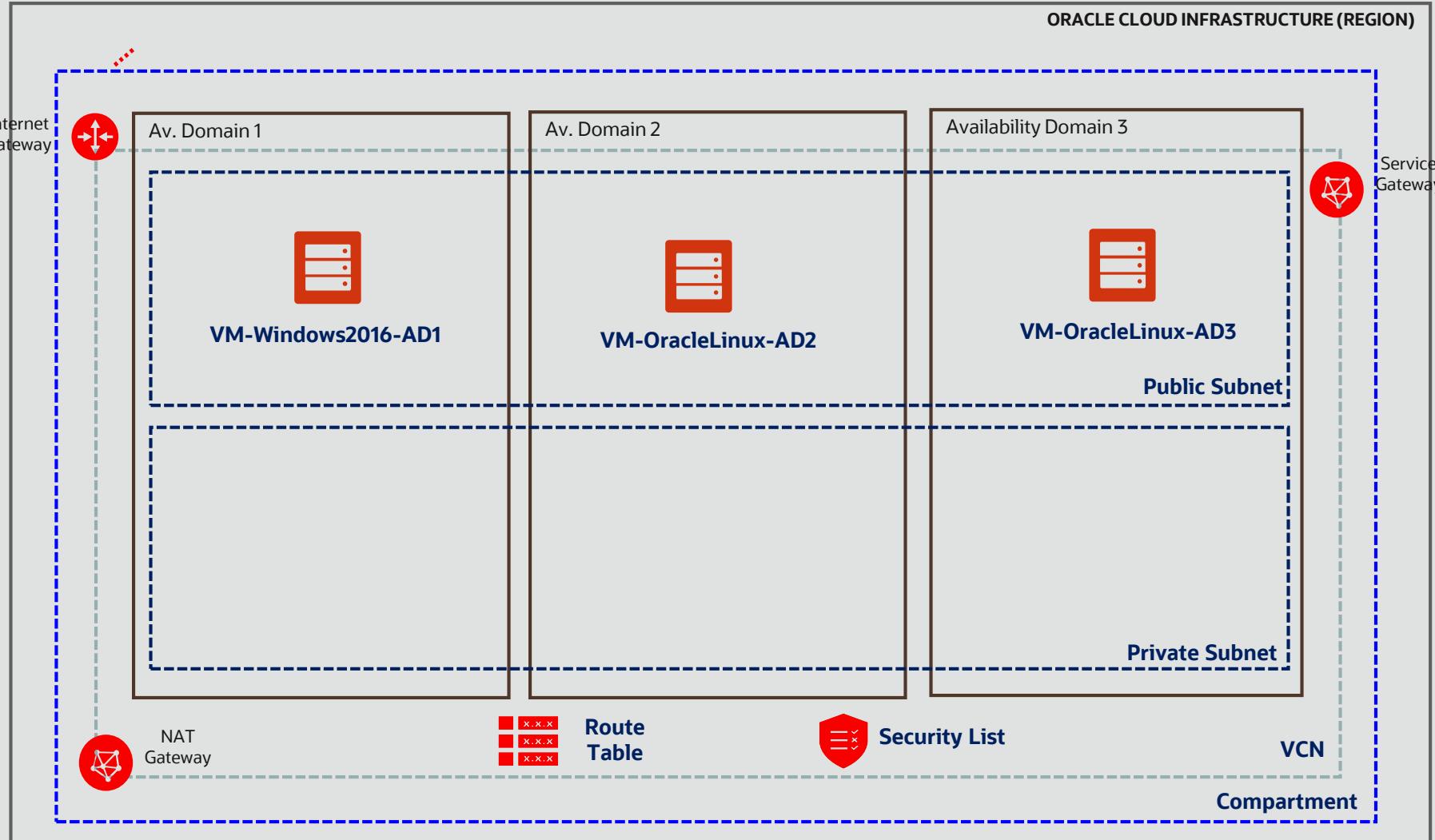
ORacle123456# \$



Oracle Cloud Infrastructure Resource Provisioning



Oracle Cloud Infrastructure Resource Provisioning



Storage

Consistently fast storage performance across workloads

Local NVMe SSD storage

VMs and Bare Metal compute with up to 51 TB local storage, backed by performance SLA

Block Storage

Network NVMe SSD block storage with 60 IOPS/GB; Max 35K IOPS, 600 MB/s per volume; backed by performance SLA

File Storage

Low cost network NVMe SSD file storage with 150 MB/s per TB

Object and Archive Storage

Limitless object storage with S3 and HDFS compatibility

No cost software storage gateway and data transfer services

ANALYTICS, OLTP, HPC,
CONTAINERS, KUBERNETES

ENTERPRISE APPLICATIONS,
DATABASES, GPU, CONTAINERS,
APPLICATION LIFECYCLE

HADOOP, RICH MEDIA,
LOGS, BACKUP,
ARCHIVE

WORKLOADS



nvm
EXPRESS



VM
Dense IO
6.4-25.6 TB
NVMe SSD
1.8M IOPS



Bare metal
Dense IO
51 TB
NVMe SSD
5M IOPS



File Storage
Scales to 8 exabytes
NFS, NLM,
snapshots,
encryption



Block Storage
Up to 32 TB volumes
Up to 1 PB/host
Snapshots, scheduled
backups, clones,
grouped clones,
encryption



Object & Archive
Storage
Limitless capacity
Native & S3 APIs, HDFS,
encryption
10TB max object size



Storage
Gateway

*NFS, at rest and
inflight encryption,
configurable cache*



Data Transfer
Service
*HDD or 150TB
appliance,
encryption*





Object Storage and Archive Storage

Standard Storage Tier (Hot)

- Fast, immediate, and frequent access
- Object Storage Service always serves the most recent copy of the data when retrieved
- Standard buckets can't be downgraded to archive storage
- **Object Lifecycle Management**
 - You can automatically manage the archiving and deletion of objects

Archive Storage Tier (Cold)

- Seldom or rarely accessed data but must be retained and preserved for long periods of time
- Minimum retention requirement for Archive Storage is 90 days
- Objects need to be restored before download
- Time To First Byte (TTFB) : 4 Hours

Create Bucket help cancel

Specify the storage tier for this bucket. Storage tier for a bucket can only be specified during creation.

BUCKET NAME

STORAGE TIER
 STANDARD
 ARCHIVE

Create Bucket

Object Lifecycle Management

<https://docs.cloud.oracle.com/iaas/Content/Object/Tasks/usinglifecyclepolicies.htm>



Volume Performance Unit

Feature of the OCI Block Volume service allows you to dynamically change the volume performance, along with enabling you to pay for the performance characteristics you require independently from the size of your block volumes and boot volumes.

This feature includes the concept of volume performance units (VPUs). You can purchase more VPUs to allocate more resources to a volume, increasing IOPS/GB and throughput per GB.

Performance Level	Usage	VPU	IOPS/GB	Max IOPS/Volume	Throughput/GB	Max Throughput Volume/GB
Lower Cost	Intensive workloads with large sequential I/O	N/A	2	3.000	240	Up to 480
Balanced *	Default setting for new and existing block and boot volumes. It provides a good balance between performance and cost savings for most workloads	10	60	25.000	480	480
Higher Performance	Workloads with the highest I/O requirements, requiring the best possible performance	20	75	35.000	600	480

Block Storage

Volume Creation



1

https://console.us-ashburn-1.oraclecloud.com

ORACLE Cloud

- Core Infrastructure
- Compute >
- Block Storage > **Block Volumes** mins
- Object Storage > Block Volume Backups
- File Storage > Create a database
- Networking >

2

https://console.us-ashburn-1.oraclecloud.com/a/storage/volumes

ORACLE Cloud

Block Storage

Block Volumes **Create Block Volume**

Sort by: Created Date (Desc) ▾

Displaying 2 Block Volumes < Page 1 >

BV	Disco Backup OCID: ...3aukeq Show Copy	Attached Instance: wrksp01 Date Attached: Fri, 01 Feb 2019 21:20:44 GMT Protocol: iscsi Attachment Access: Read/Write	Size: 100.0 GB Availability Domain: PqLC:US-ASHBURN-AD-3 Encryption Key: None Created: Fri, 01 Feb 2019 20:36:04 GMT Backup Policy: - Source Volume:	...
AVAILABLE				

Block Storage

Volume Creation

From 50GB to 32 TB

Don't forget your compartment

Volume Performance/GB

- **Low Cost** : 100 IOPS
- **Balanced**: 3000 IOPS
- **High Perf**: 3750 IOPS

CREATE IN COMPARTMENT

CAMPELO

gse00014643 (root)/CAMPELO

AVAILABILITY DOMAIN

PqLC:US-ASHBURN-AD-1

SIZE (IN GB)

50

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

COMPARTMENT FOR BACKUP POLICIES

CAMPELO

gse00014643 (root)/CAMPELO

BACKUP POLICY *(i)*

Select a Backup Policy

VOLUME PERFORMANCE



Recommended for workloads that are throughput intensive with large sequential I/O, such as big data and streaming, log processing and data warehouses. [Learn more](#)

IOPS: Up to 100 IOPS (2 IOPS/GB)

Throughput: Up to 12 MB/s (240 KB/s/GB)

Block Storage

Attach to Compute



Compute » Instances » Instance Details » Attached Block Volumes

VM-APACHE

[Start](#) [Stop](#) [Reboot](#) [Move Resource](#) [Apply Tag\(s\)](#) [Actions ▾](#)

[Instance Information](#) [Tags](#)

Instance Information

Resources

Metrics

[Attached Block Volumes \(0\)](#)

[Attached VNICs \(1\)](#)

[Boot Volume \(1\)](#)

[Console Connections \(0\)](#)

[Work Requests \(0\)](#)

Attached Block Volumes

[Attach Block Volume](#)

There are no Block Volumes attached to this Instance.

[Attach Block Volume](#)

Block Storage

Attach to Compute



Attach Block Volume

Choose how you want to attach your block volume.

ISCSI
 PARAVIRTUALIZED

ACCESS
 READ/WRITE - NOT SHARED
Select to configure the volume attachment as read-write, not shared, enabling attachment to configuration.
 READ/WRITE - SHARED
Select to configure the volume attachment as read-write, shared, enabling attachment to multiple instances. You must configure a clustered file-system on the volume.
 READ-ONLY
Select to configure the volume attachment as read-only, enabling attachment to multiple instances.

SELECT VOLUME ENTER VOLUME OCID

BLOCK VOLUME COMPARTMENT
CAMPELO
gse00014643 (root)/CAMPELO

BLOCK VOLUME
Select a Block Volume or a Boot Volume

DEVICE PATH *i*
Select a Device Path

✓ Select a Block Volume or a Boot Volume

Block Volume

- bkp_vol_02
- bkp_vol_02_cloned_20190624_145414
- bkp_vol_02_cloned_20190627_134500
- blk_d3
- BLK_PROVA
- blk_vol_01
- blk_vol_01_cloned_20190624_145415
- blk_vol_01_cloned_20190627_134500
- blk_vol_03
- blk_vol_03_cloned_20190624_145414
- blk_vol_03_cloned_20190627_134500
- BLOCKTST
- DSK_BM

Boot Volume

- BMTESTE (Boot Volume)
- inst-7d37f-INST_POOL_APACHE (Boot Volume)
- PROVA_SRV01 (Boot Volume)
- VM-APACHE (Boot Volume)

- /dev/oracleoci/oraclevdb
- /dev/oracleoci/oraclevdc
- /dev/oracleoci/oraclevdd
- /dev/oracleoci/oraclevde

disk must be detected manually

VIRTUALIZED : disk is detected automatically.

In cases, disk must be mounted

Block Storage and Linux Servers



☰ ORACLE Cloud

Storage » Block Volumes » Block Volume Details



BLOCKTST

iSCSI Commands & Information

Detach

Block Volume Information

Tags

BV

Operating System Tasks

- 1 – Format filesystem
- 2 – Mount Point
- 3 – Mount filesystem

iSCSI Commands & Information

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 iscsidadm -m node -o new -T iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489 -p 169.254.2.3:3260  
sudo iscsidadm -m node -o update -T iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489  
sudo iscsidadm -m node -T iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489 -p 169.254.2.3:3260
```

[Copy](#)

DETACH COMMANDS

```
sudo iscsidadm -m node -T iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489 -p 169.254.2.3:3260  
sudo iscsidadm -m node -o delete -T iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489
```

[Copy](#)

IP ADDRESS AND PORT

169.254.2.3:3260

[Copy](#)

VOLUME IQN

iqn.2015-12.com.oracleiaas:5b79bc47-8138-4b65-8142-60c1ef344489

[Copy](#)

Block Storage and Windows Servers



≡ ORACLE Cloud

Storage » Block Volumes » Block Volume Details



BLKWINDOWS

iSCSI Commands & Information

Detach

Block Volume Information

Tags

OCID: ...tzecga [Show](#) [Copy](#)

Size: 100.0 GB [\(i\)](#)

Availability Domain: PqLC:US-ASHBUR

Attachment Status: Ready/Write

Operating System Tasks

- 1 – Map iSCSI device (iSCSI initiator)
- 2 – On Server Manager, format the new disk

<https://docs.cloud.oracle.com/iaas/Content/GS/G/Tasks/addingstorageForWindows.htm>

iSCSI Commands & Information

Use OS tools to log in and enable iSCSI targets to this volume. Failure to run commands will cause instance boot failure.

ATTACH COMMANDS

```
Set-Service -Name msiscsi -StartupType Automatic  
Start-Service msiscsi  
New-IscsiTargetPortal -TargetPortalAddress 169.254.2.2  
Connect-IscsiTarget -NodeAddress iqn.2015-12.com.oracleiaas:12d221fd-c319-441f-a92a-cd99194
```

[Copy](#)

DETACH COMMANDS

Follow the instructions for Disconnecting from a Volume located in the documentation: [Click here](#).

IP ADDRESS AND PORT

169.254.2.2:3260

[Copy](#)

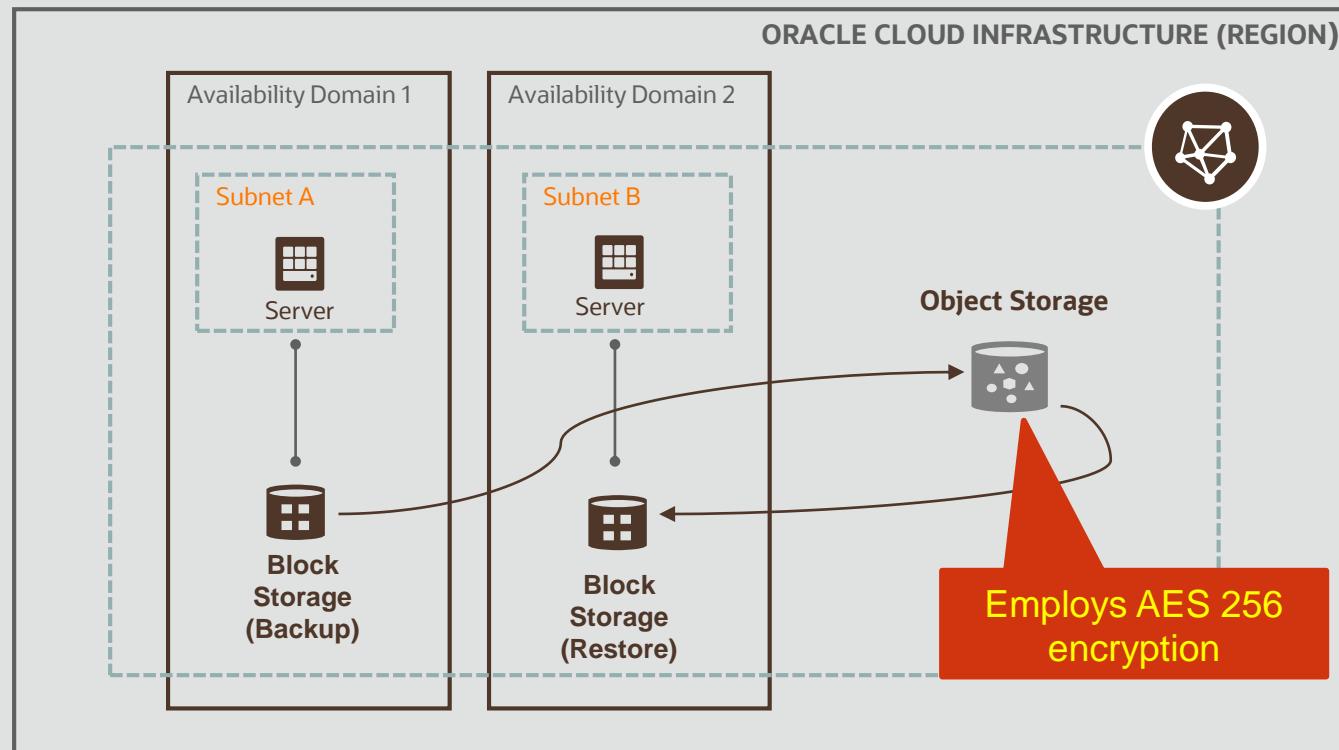
VOLUME IQN

iqn.2015-12.com.oracleiaas:12d221fd-c319-441f-a92a-cd991943dec5

[Copy](#)

Block Storage - Backup and Restoration

- Complete point-in-time complete snapshot copy of your block volumes
- Encrypted and stored in the Object Storage Service, and can be restored as new volumes to any Availability Domain within the same region



RTO <1 minute, regardless of size

RPO ~30 minutes (for 2TB), via snapshot

Encrypted at rest and transit

Throughput : 480 KBPS/GB - up to 320 MBPS

Volumes from 1 GB to 32 TB (1 GB increment)

* Boot Volumes

Storage Evaluation - VPU Testing ...



blk_tst_perf

Edit Resize Change Performance Move Resource Add Tags Terminate

Block Volume Information Tags

Availability Domain: PqLC:US-ASHBURN-AD-1
Compartment: gse00014643 (root)/CAMELPO
OCID: ...yr72oa [Show](#) [Copy](#)
Created: Sat, Dec 14, 2019, 5:10:33 PM UTC

Size: 500 GB ⓘ
Hydrated: true
Backup Policy: None [Assign](#)
Encryption Key: Oracle-managed key
Volume Group: None
Volume Performance: **Balanced** ⓘ
Shared Access: No

```
[root@vm-large ~]# sudo fio --filename=/dev/sdd --direct=1 --rw=randread --bs=4k --ioengine=libaio
porting --name=iops-test-job --eta-newline=1 --readonly
iops-test-job: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B, ioengine=l
...
fio-3.7
Starting 4 processes
Jobs: 4 (f=4): [r(4)][10.0%][r=152MiB/s,w=0KiB/s][r=39.0k,w=0 IOPS][eta 00m:27s]
Jobs: 4 (f=4): [r(4)][16.7%][r=96.4MiB/s,w=0KiB/s][r=24.7k,w=0 IOPS][eta 00m:25s]
Jobs: 4 (f=4): [r(4)][23.3%][r=101MiB/s,w=0KiB/s][r=25.8k,w=0 IOPS][eta 00m:23s]
Jobs: 4 (f=4): [r(4)][30.0%][r=97.9MiB/s,w=0KiB/s][r=25.1k,w=0 IOPS][eta 00m:21s]
iops-test-job: (groupid=0, jobs=4): err= 0: pid=899: Wed Dec 18 18:21:55 2019
  read: IOPS=26.5k, BW=104MiB/s (109MB/s)(3114MiB/30082msec)
    slat (usec): min=2, max=25260, avg=144.66, stdev=387.30
    clat (msec): min=7, max=193, avg=38.46, stdev=16.06
    lat (msec): min=7, max=193, avg=38.61, stdev=16.08
```

Storage Evaluation - VPU Testing ...



blk_tst_perf

[Edit](#) [Resize](#) [Change Performance](#) [Move Resource](#) [Add Tags](#) [Terminate](#)

[Block Volume Information](#) [Tags](#)

Availability Domain: PqLC:US-ASHBURN-AD-1
Compartment: gse00014643 (root)/CAMPELO
OCID: ...yr72oa [Show](#) [Copy](#)
Created: Sat, Dec 14, 2019, 5:10:33 PM UTC

Size: 500 GB [\(i\)](#)
Hydrated: true
Backup Policy: None [Assign](#)
Encryption Key: Oracle-managed key
Volume Group: None
Volume Performance: Higher Performance [\(i\)](#)
Shared Access: No

High Performance

VOLUME PERFORMANCE

Lower Cost Balanced **Higher Performance**

Recommended for the most IO-demanding workloads that require the best possible performance including large databases. [Learn more](#)

IOPS: 35000 IOPS (75 IOPS/GB)
Throughput: 300 MB/s (600 KB/s/GB)

```
[root@vm-large ~]# sudo fio --filename=/dev/sdd --direct=1 --rw=randread --bs=4k --ioengine=libaio
porting --name=iops-test-job --eta-newline=1 --readonly
iops-test-job: (g=0): rw=randread, bs=(R) 4096B-4096B, (W) 4096B-4096B, (T) 4096B-4096B, ioengine=l
...
fio-3.7
Starting 4 processes
Jobs: 4 (f=4): [r(4)][10.0%][r=152MiB/s,w=0KiB/s][r=39.0k,w=0 IOPS][eta 00m:27s]
Jobs: 4 (f=4): [r(4)][16.7%][r=96.4MiB/s,w=0KiB/s][r=24.7k,w=0 IOPS][eta 00m:25s]
Jobs: 4 (f=4): [r(4)][23.3%][r=101MiB/s,w=0KiB/s][r=25.8k,w=0 IOPS][eta 00m:23s]
Jobs: 4 (f=4): [r(4)][30.0%][r=97.9MiB/s,w=0KiB/s][r=25.1k,w=0 IOPS][eta 00m:21s]
iops-test-job: (groupid=0, jobs=4): err= 0: pid=951: Wed Dec 18 18:28:33 2019
  read: IOPS=31.9k, BW=125MiB/s (131MB/s)(3741MiB/30009msec)
    slat (usec): min=2, max=110152, avg=119.29, stdev=736.68
    clat (msec): min=6, max=968, avg=31.95, stdev=33.39
    lat (msec): min=7, max=968, avg=32.07, stdev=33.49
```

Do you Want to Know More on Storage ?

Public Documentation

<https://docs.cloud.oracle.com/iaas/Content/Block/Concepts/overview.htm>

<https://docs.cloud.oracle.com/iaas/Content/Object/Concepts/objectstorageoverview.htm>

<https://docs.cloud.oracle.com/iaas/Content/Block/Tasks/backingupavolume.htm>

Training Videos

<https://www.youtube.com/watch?v=SY9KV4bvnow>

<https://www.youtube.com/watch?v=qX9qbcePPo>

<https://www.youtube.com/watch?v=okOV9TYbCMU>

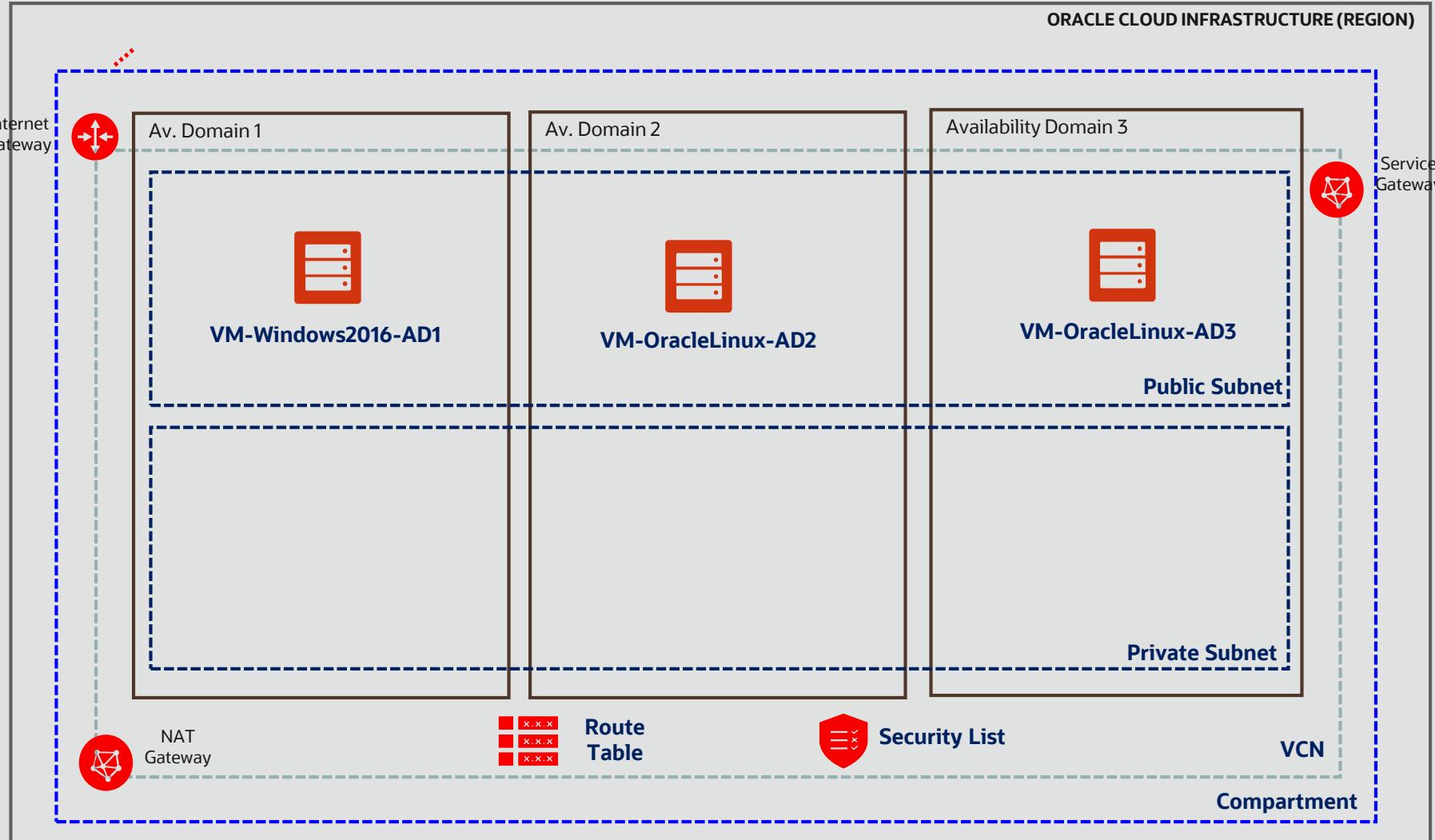
https://www.youtube.com/watch?v=saqNo_iuR70

LAB #4

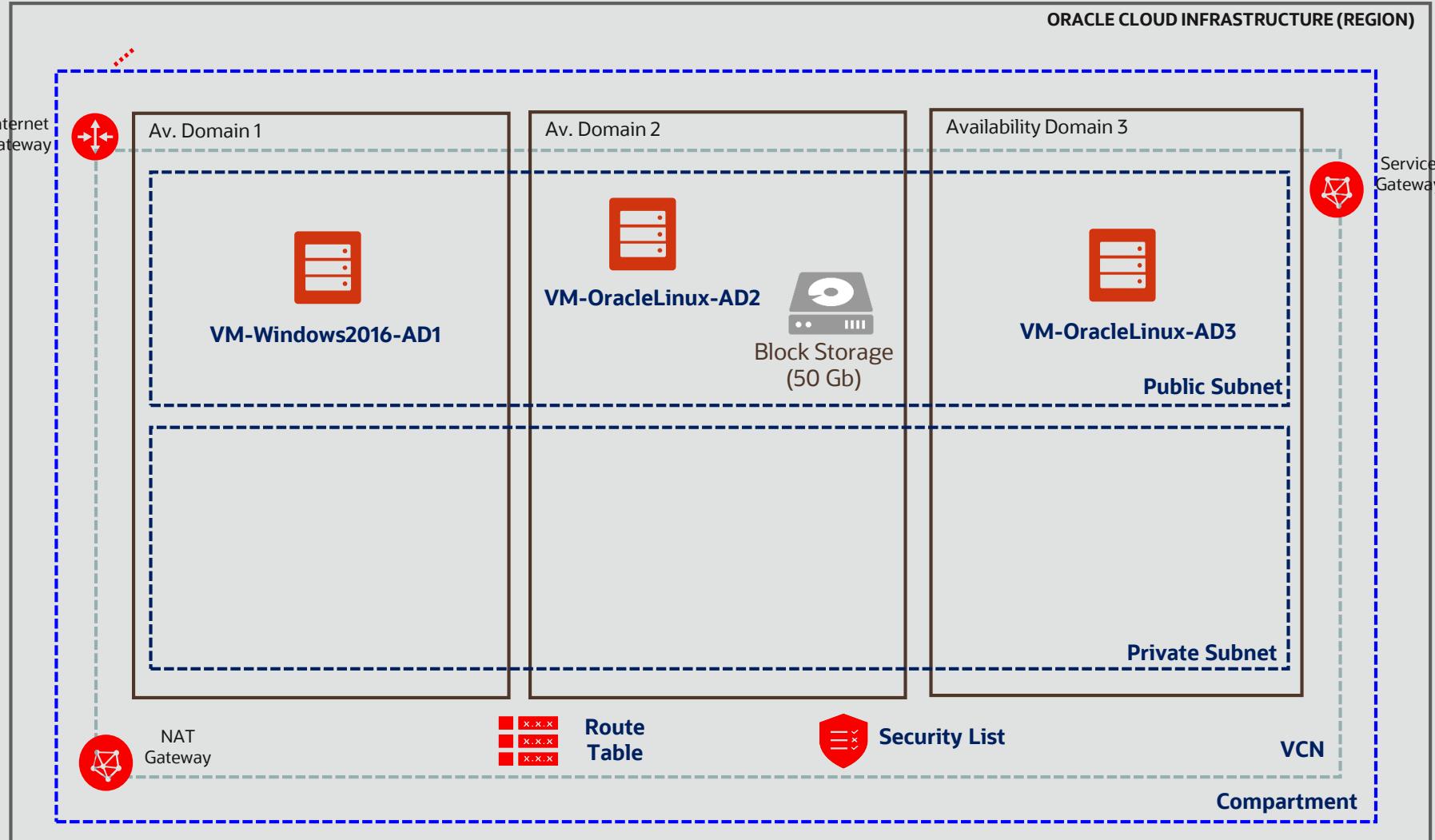
- Block Volume Creation
 - 1 Volumes (50 GB)
- Attach Block Volume to Compute Node



Oracle Cloud Infrastructure Resource Provisioning

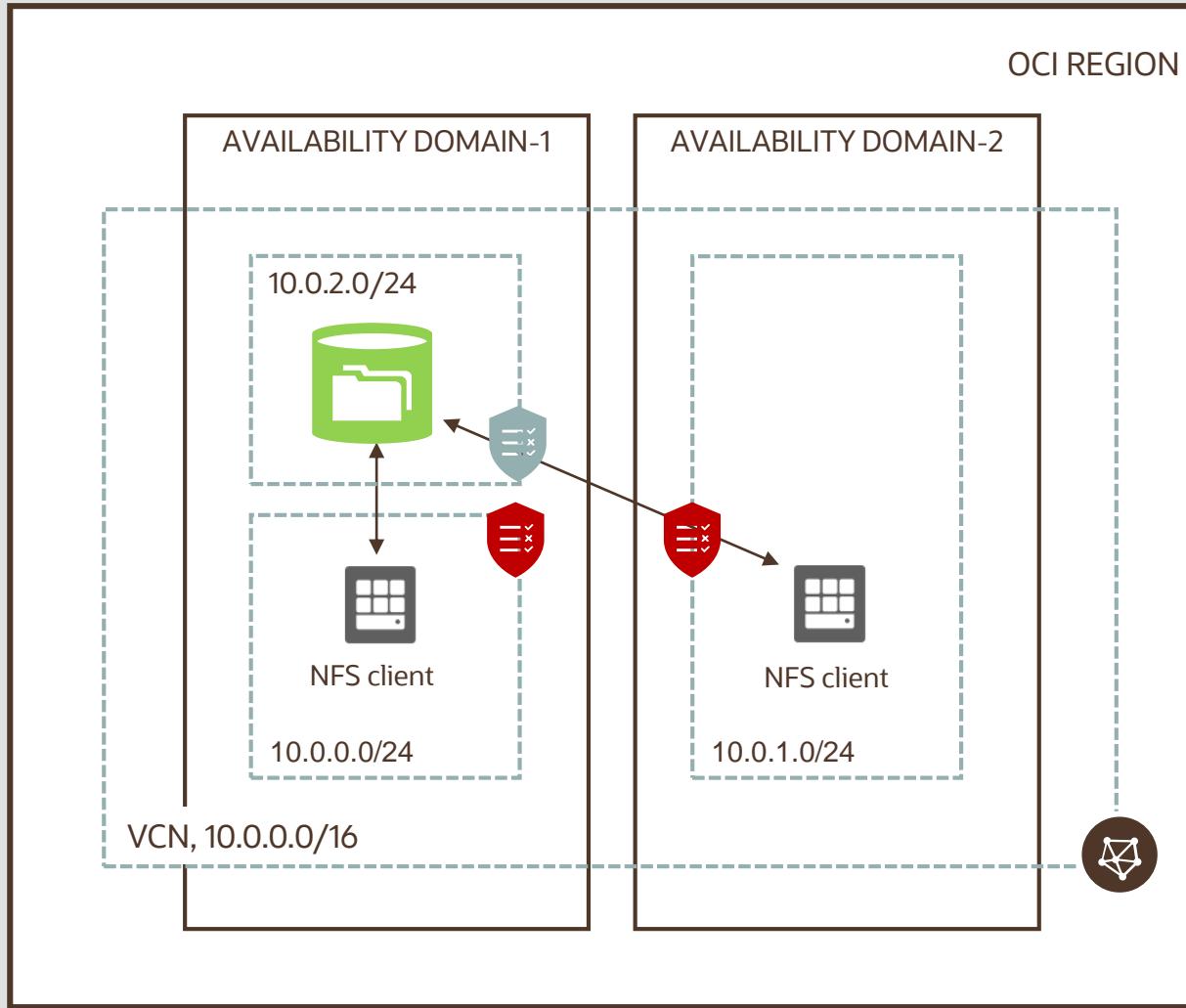


Oracle Cloud Infrastructure Resource Provisioning



File Storage Service

File Storage Service



Main Characteristics

- Supports NFS v.3
- Snapshots capabilities; *10,000 snapshots per file system*
- Security: 128-bit, data-at-rest encryption for all file systems & metadata
- Console management, APIs, CLI, data-path commands, and Terraform
- Create *100 file systems and 2 mount targets per AD per account*
- 8E Allocated Limit

Type	Source CIDR	Protocol	Source Port	Dest Port
Ingress	10.0.0.0/24 ¹	TCP e UDP	All	2048-2050
Ingress	10.0.0.0/24	TCP	All	111
Ingress	10.0.0.0/24	UDP	All	2048
Ingress	10.0.0.0/24	UDP	All	111

File Storage Service - Common Use Cases



Oracle Applications
Lift and Shift



General Purpose
File Systems



Big Data &
Analytics



HPC
Scale Out Apps



Test / Dev
Databases



MicroServices
Containers



Mounting File Storage Service Volumes

Use NFSv3 protocol to mount the FSS volume.

Install nfs-utils (Oracle Linux and CentOS) or nfs-common (Ubuntu) in your Linux system

On the console, click on Mount Targets.

Use the Private IP address information to mount the volume using nfs command:

```
opc@node01:~$ sudo mount <ipaddress>:<path-name> /<mount-point>
```

```
opc@node01:~$ sudo mount 10.0.0.3:/fss-shared /mnt/nfs
```

Storage » File Systems » File System Details

FSS-Storage

ACTIVE

Resources

Mount Targets (1)
Snapshots (2)

Add Mount Target

MT ACTIVE

FSS-Mount
OCID: ...zaaaaa Show Copy
Availability Domain: Akf1:US-ASHBURN-AD-1
Created: Wed, 31 Jan 2018 15:57:11 GMT

Export path: /fss-shared
Availability Domain: Akf1:US-ASHBURN-AD-1
Created: Wed, 31 Jan 2018 15:57:11 GMT

Virtual Cloud Network: Flavio-VCN
Subnet: subnet01
Private IP Address: 192.168.1.12

NOTE: We recommend not to pass mount options to achieve best performance with File Storage Service. This approach leaves it to the client and server to negotiate the window size for Read & Write operations.

Do you Want to Know More on File Storage Service ?

Public Documentation

<https://docs.cloud.oracle.com/iaas/Content/File/Concepts/filestorageoverview.htm>

Training Videos

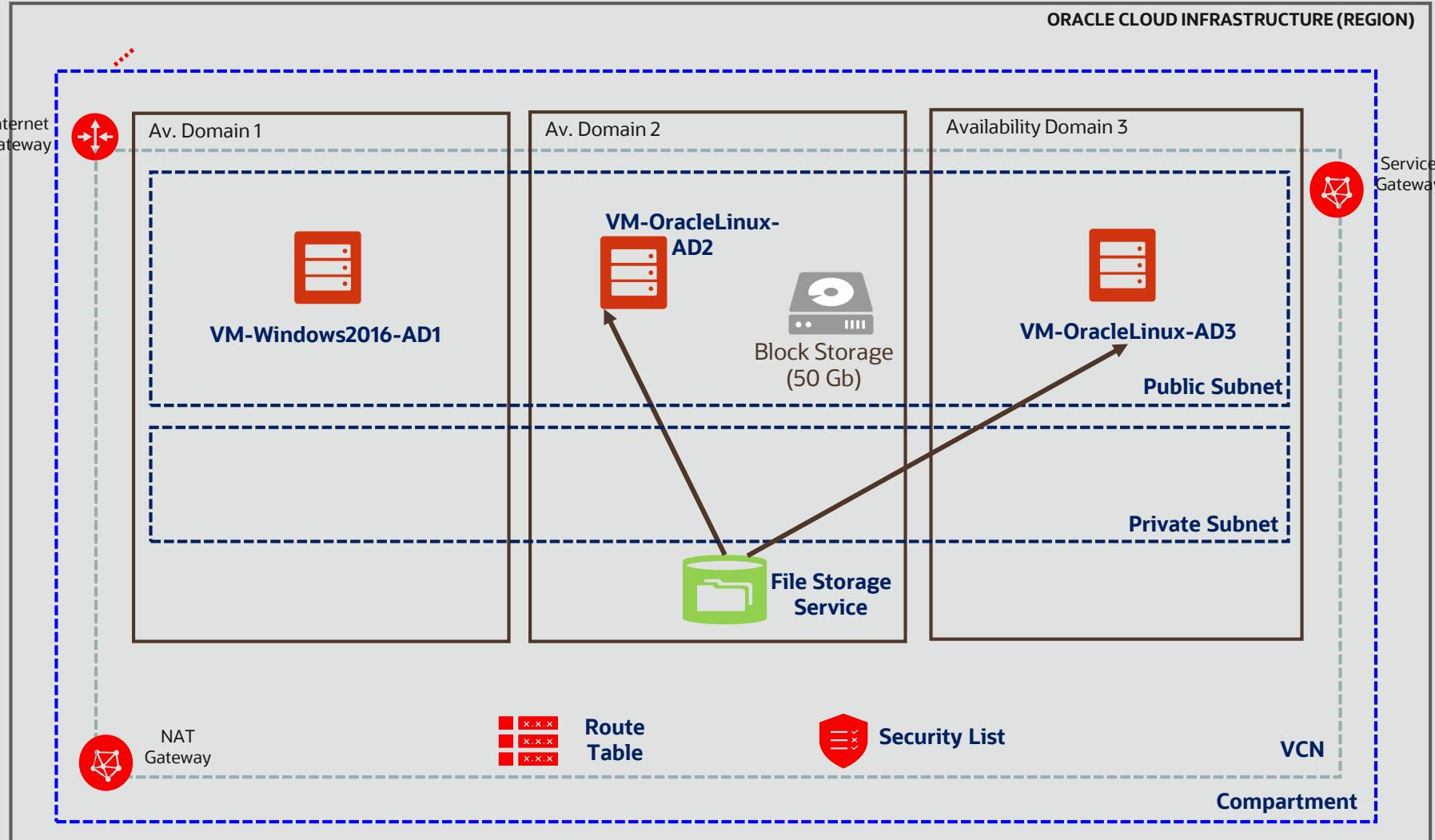
https://www.youtube.com/watch?v=xc_E9pnYX24

LAB #5

- File Storage Service Creation and Configuration
- Mount Shared Area (Linux)
- Access Test

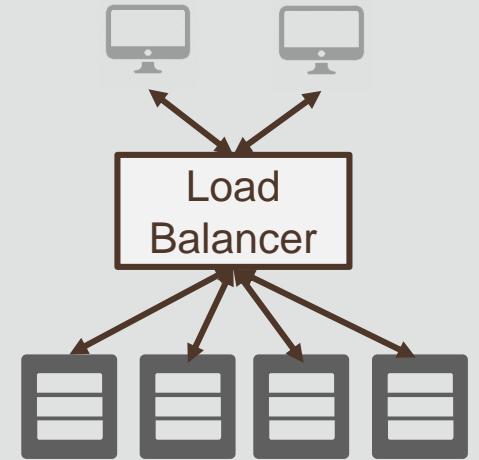


Oracle Cloud Infrastructure Resource Provisioning



Load Balancer

OCI Load Balancing Service



Load Balancer as-a-service, provides scale and HA

Public and Private Load Balancer options

Public Load Balancer service is *regional in scope* and requires 2 Availability Domains

Supported Protocols – TCP, HTTP/1.0, HTTP/1.1, HTTP/2, WebSocket

Supports SSL Termination, End-to-End SSL, SSL Tunneling

Supports advanced features such as session persistence and content based routing

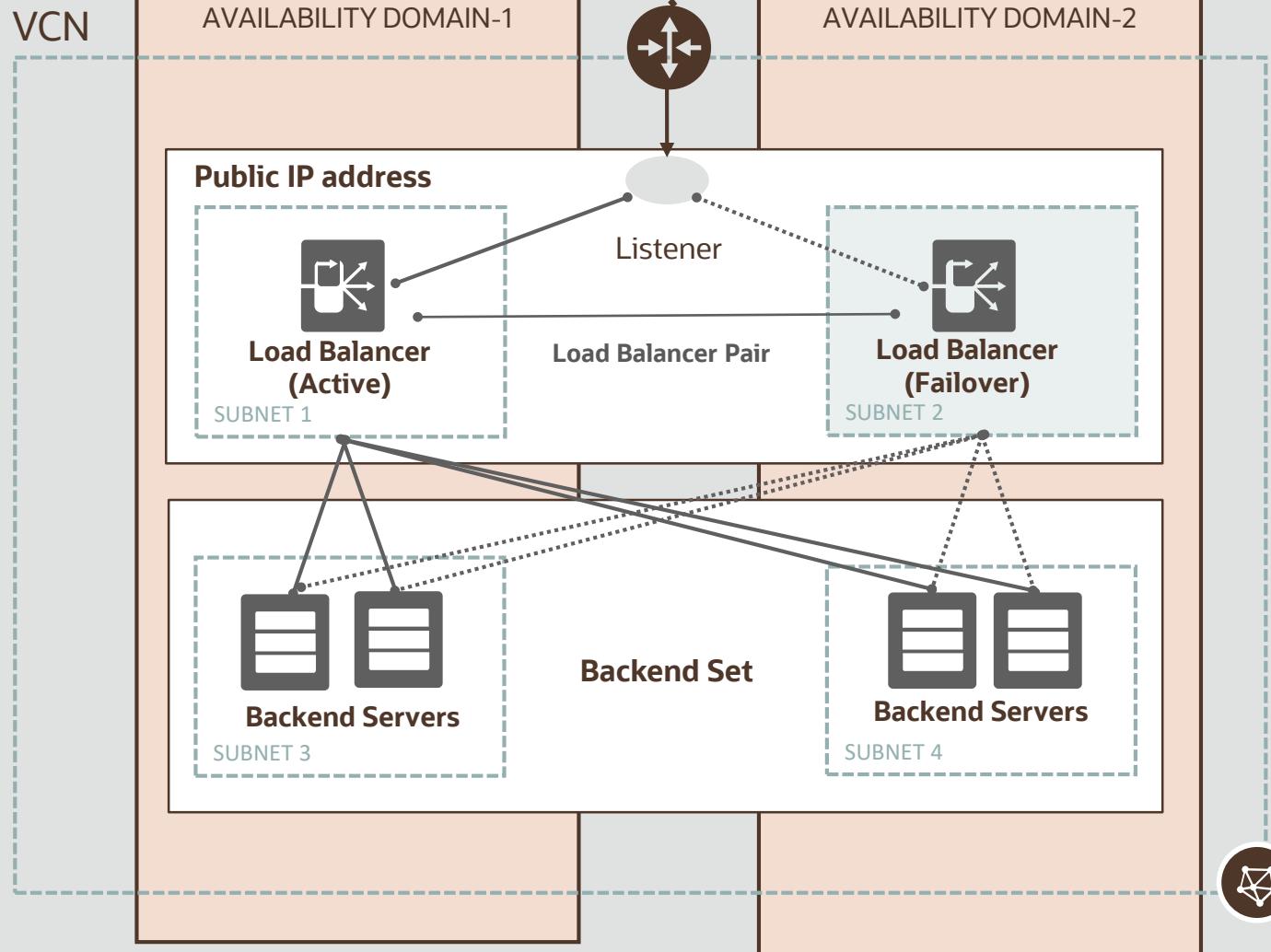
Key differentiators

Private or Public Load Balancer (with Public IP address)

Provisioned bandwidth – **10 Mbps, 100 Mbps, 400 Mbps, 8 Gbps**

Single load balancer for TCP (layer 4) and HTTP (layer 7) traffic

Load Balancer – Public / Private



- **Load Balancing Policy** – tells the load balancer how to distribute incoming traffic to the backend servers
 - round-robin
 - IP hash
 - least connection
- **Backend Server** – application server responsible for generating content in reply to the incoming TCP or HTTP traffic
- **Health Checks** – a test to confirm the availability of backend servers; supports
 - TCP-level
 - HTTP-level health checks
- **Backend Set** – logical entity defined by a list of backend servers, a load balancing policy, and a health check policy
- **Listener** – entity that checks for incoming traffic on the load balancer's IP address

Do you Want to Know More on Load Balancer and Cloud Pricing ?

Oracle Load Balancer

<https://www.youtube.com/watch?v=VsHkP7q22es>

Oracle Cloud Estimator

https://cloud.oracle.com/en_US/cost-estimator

<https://cloud.oracle.com/compute/pricing>

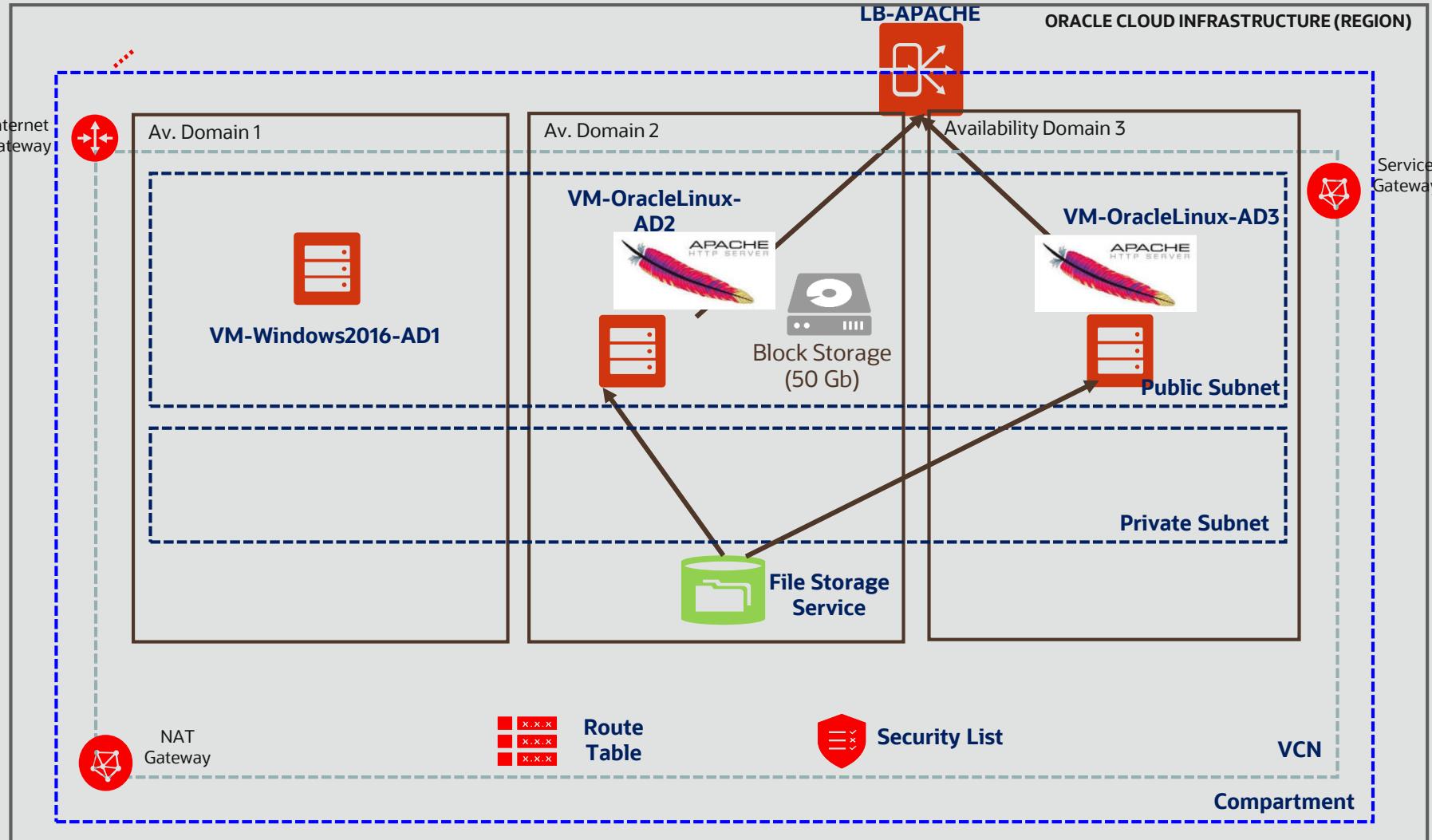
<https://www.youtube.com/watch?v=DsFl6jjaRrY>

DEMO #6

- Install Apache Server
- Security Rules (http: 80)
- Create Load Balance Service



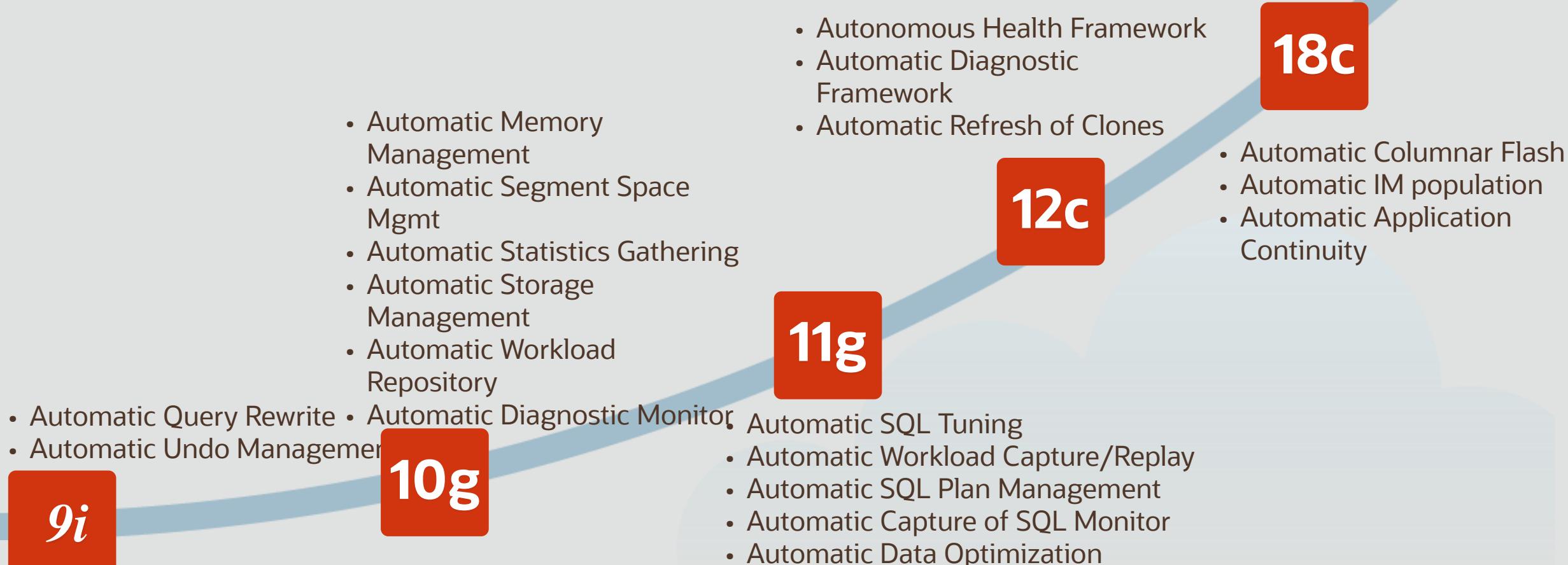
Oracle Cloud Infrastructure Resource Provisioning



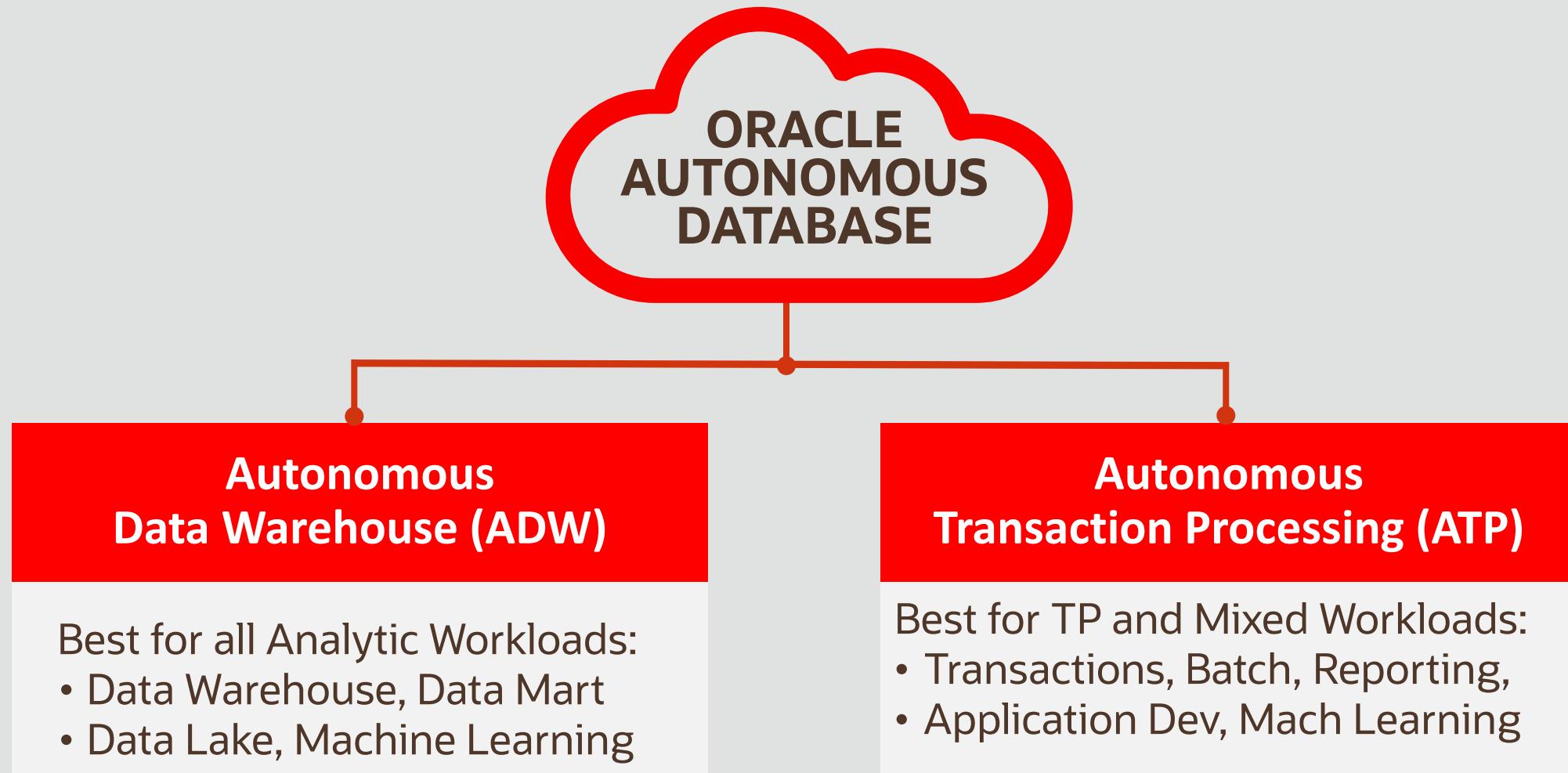
Autonomous Database

Journey to Autonomous Database

Oracle has invested thousands of engineer years **automating and optimizing database**



One Autonomous Database Optimized by Workload



Automatic or Autonomous ?

	Automatic	Autonomous
 Autonomous Car	<p>Examples:</p> <ul style="list-style-type: none">• Cruise control• Emergency stopping• Warnings for lane changes	<p>No need to use the steering wheel or brake. Simply tell the car where you are going.</p>
 Autonomous Database	<p>Examples:</p> <ul style="list-style-type: none">• Automatic storage management• Automatic workload repository• SQL Plan Management	<p>All features automatically implemented Simply tell the database your goals</p>

Automated Management

Oracle automates end-to-end management of data warehouse

Provisioning new database instances

Growing/shrinking storage and/or compute

Patching and upgrades

Backup and restore

Full lifecycle managed using Service Console or API's

The screenshot shows a web-based service console interface for managing Autonomous Data Warehouses. At the top, there is a navigation bar with links for 'Autonomous Data Warehouses' and 'Autonomous Data Warehouse Details'. Below this, the name 'SALES DW' is displayed prominently. To the left of the main content area, there is a large green button with the letters 'ADW' in white, and below it, the word 'AVAILABLE' in smaller text. The main content area is divided into sections: 'Autonomous Data Warehouse Information' (which is currently selected) and 'Tags'. Under 'Information', various details are listed: Display Name: SALES DW, Database Name: SALES DW, Database Version: 18.0.3.3, CPU Core Count: 1, Storage (TB): 1, Created: Mon, 15 Oct 2018 19:28:25 GMT, Compartment: adwc4pm (root), OCID: ...vascwa, License Type: Bring Your Own License, and Lifecycle State: Available. There are also tabs for 'Resources' and 'Backups'. The 'Backups' tab indicates that backups are automatically created daily.

Automated Tuning

“Load and go”

Define tables, load data, run queries

- No tuning required

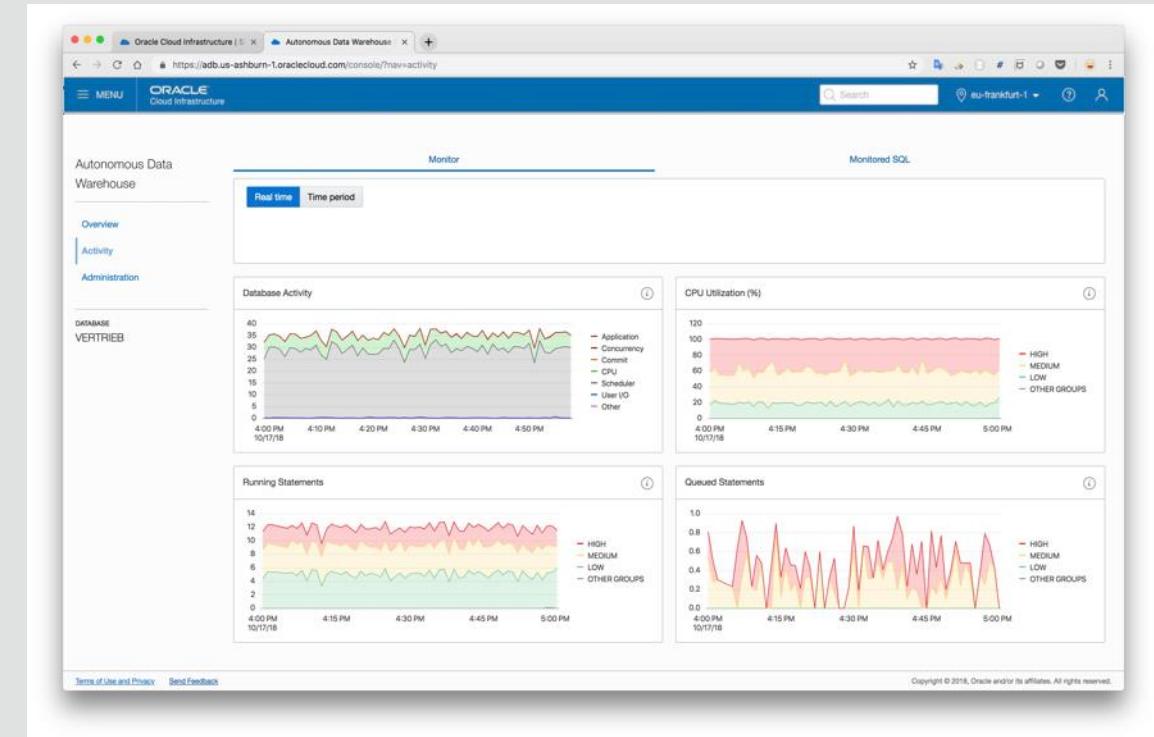
- No special database expertise required

- No need to worry about tablespaces,
partitioning, compression, in-memory,
indexes, parallel execution

Fast performance out of the box with
zero tuning

Simple web-based monitoring console

Built-in resource-management plans



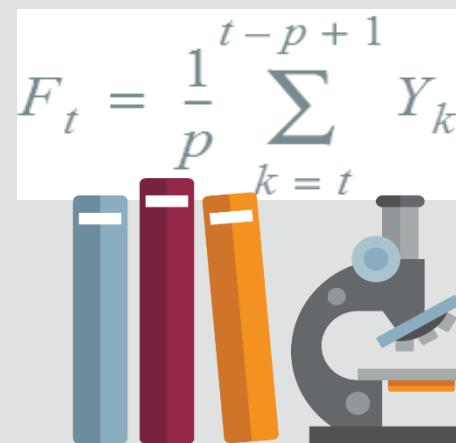
Key Use Cases for Autonomous Data Warehouse

Data Marts / Warehouses



Business Analytics

Sandboxes for Data Scientists



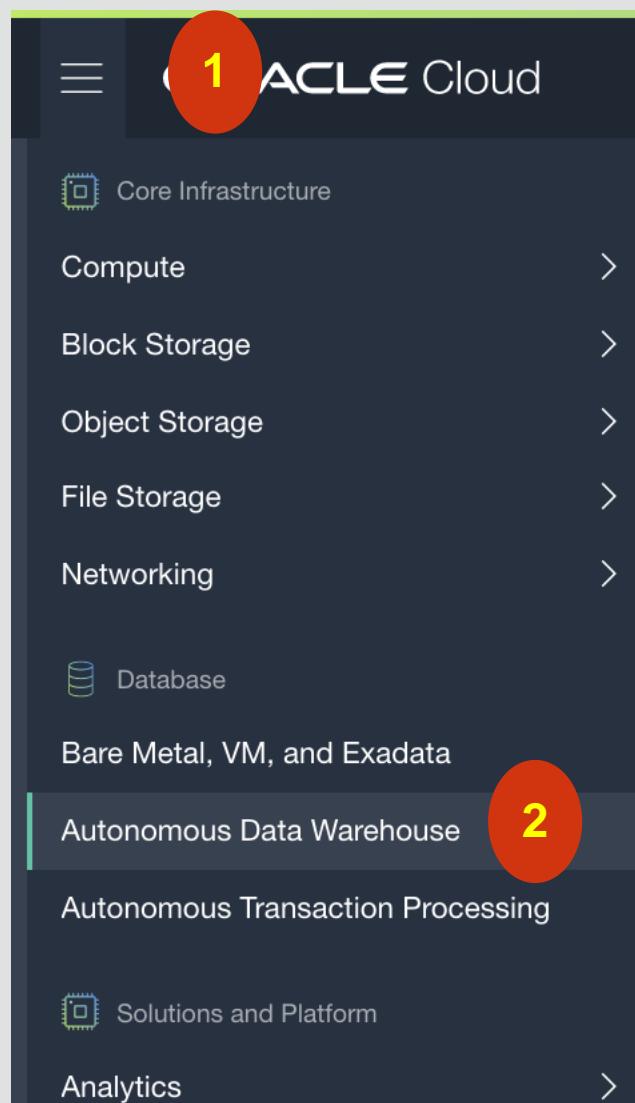
Machine Learning

Data Lakes



Query Across All Data

Autonomous DB Creation Process



ORACLE Cloud

Autonomous Database

Autonomous Database

Autonomous Container Database

Autonomous Exadata Infrastructure

List Scope

COMPARTMENT

CAMPELO

gse00014643 (root)/CAMPELO

Filters

WORKLOAD TYPE

Data Warehouse

STATE

Any state

Create Autonomous Database

Autonomous Databases in Oracle Cloud

Name	Database Name	State

Create Autonomous Database

Provide basic information for the Autonomous Database

Choose a compartment

CAMPELO

gse00014643 (root)/CAMPELO

Display name

ADWFastTrack

Database name

ADWFT

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.

1 – 128 OCPU's

Configure

CPU core count

1

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

Auto scaling

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

Create administrator credentials [\(i\)](#)

Username READ-ONLY

ADMIN

Password

.....

Confirm password

.....

Choose a license type

Bring Your Own Licence

My organization already owns Oracle database software licenses. Bring my existing database software licenses to the database cloud service ([details](#)). 

License Included

Subscribe to new database software licenses a

 [Show Advanced Options](#)

Create Autonomous Database

Overview

Activity

Administration

Activity

Administration

DATABASE

DBWRKSP

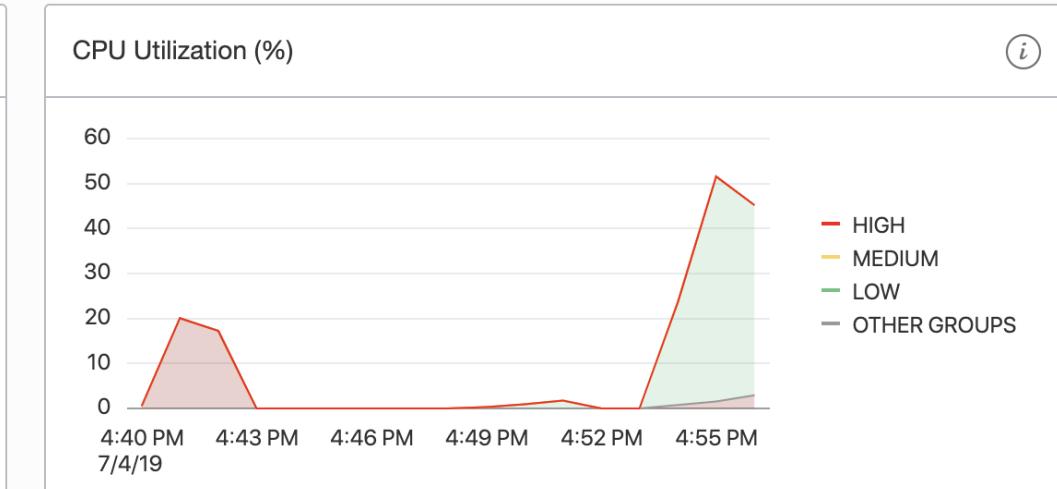
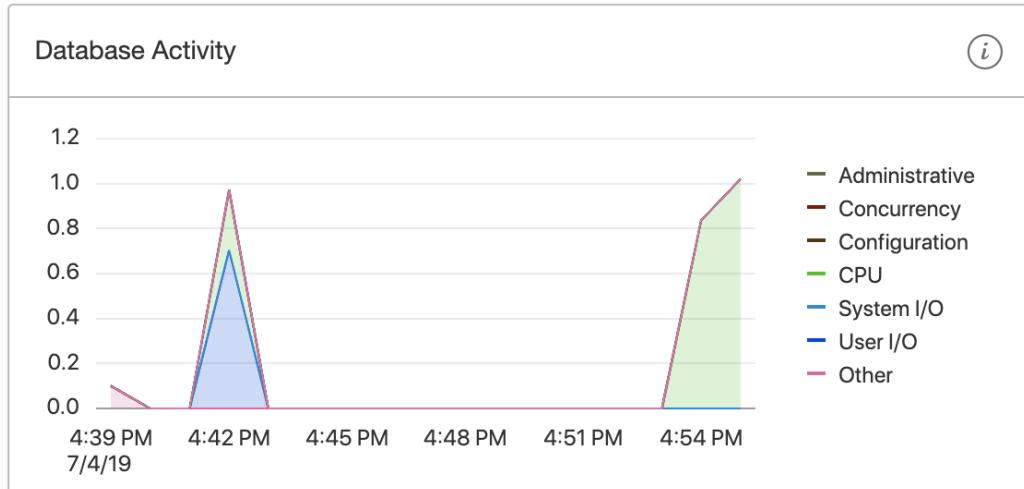
(i) The Monitored SQL tab shows information about current and past monitored SQL statements. See [documentation](#) for more information.

Show details Download report Cancel execution

Auto refresh Off



	STATUS	SQL TEXT	DURATION	STARTED
1	EXECUTING	select * from (select q_.* , row_number() over (order by 1) RN__ from (select count(*)	2.23 min	Thu, 04 Jul 2019



LAB #7

- Create Autonomous Datawarehouse
 - Choose your own Compartment
 - Use only 1 OCPU and 1 TB of storage
 - Choose Autonomous Datawarehouse
- SQL execution test

```
SELECT COUNT(*) FROM (SELECT *  
FROM DBA_SOURCE, DBA_OBJECTS);
```



- 30 Min.

OCI Interfaces

Oracle Cloud Infrastructure

User Interfaces

Web Interface

The screenshot shows the Oracle Cloud Web Interface. At the top, there's a navigation bar with various tabs like 'Using Resources', 'R Graphics', 'Service Requests', 'Oracle Sales', 'Oracle Cloud', 'Block Volume', 'Block Volume', and 'Resizing Com'. Below the navigation is a search bar and a 'US East (Ashburn)' dropdown. The main content area has a 'Quick Actions' section with cards for 'COMPUTE Create a VM Instance', 'AUTONOMOUS TRANSACTION PROCESSING Create a database', 'AUTONOMOUS DATA WAREHOUSE Create a data warehouse', 'NETWORKING Create a virtual cloud network', 'OBJECT STORAGE Store data', and 'NETWORKING SOLUTIONS Create an IPsec VPN connection'. Below this is a 'Solutions' section with four cards: 'Deploy Oracle and third party software from our Marketplace', 'Evaluate the PeopleSoft Validated Solution Architecture', 'Migrate custom applications onto Oracle Cloud', and 'Deploy a three-tier web application using Always Free resources'. On the right side, there's a sidebar titled 'Action Center' with sections for 'User Management', 'Billing' (showing current billing cycle charges of \$0.00), 'Analyze costs', and 'Manage payment method'. A 'What's New' section at the bottom right lists recent updates.

Mobile

The screenshot shows the Oracle Cloud mobile application. It features a top header with the time (14:55) and battery level. Below the header is a world map with location pins. To the right of the map is an 'Action Center' section with a 'User Management' card. Below the map is a section titled 'Enabled Regions' with a list of four regions: 'us-phoenix-1' (off), 'us-ashburn-1' (on), 'eu-frankfurt-1' (off), and 'uk-london-1' (off). There's also a small 'What's New' card at the bottom.

Infra as Code

The screenshot shows the HashiCorp Terraform logo, which consists of a blue stylized 'T' icon followed by the word 'Terraform' in a bold, black, sans-serif font. Below the logo is the tagline 'Write, Plan, and Create Infrastructure as Code' in a smaller, black, sans-serif font.

Command Line

```
Raphaels-MacBook-Pro:GSE raphaelcampelo$ oci iam region list
{CLI para listar as imagens disponíveis :
  "data": [
    {
      "image": "list -c $TENANT --output table --query 'data[*].{"Image Name": $name, "Region": $region}'"
      "key": "FRA",
      "name": "eu-frankfurt-1"
    }
  ],
  "command": "efetuar a tarefa :"
}
  "instance launch --generate-full-command-json-input
  "key": "IAD",
  "name": "us-ashburn-1"
}
  "domain": "list --output table
  "key": "LHR",
  "name": "uk-london-1"
}
  "availability-domain list -c $TENANT --output table --query 'data[*].{
  "key": "PHX", existentes :
  "name": "us-phoenix-1"
}
  "compartment list -c $TENANT --output table --query 'data[*].name' -
  "o nome do Tenant :
  "key": "YYZ",
  "name": "ca-toronto-1"
}
  "get "name": "name": "name": "name"
}
  "1
  "TYPE> <ACTION> <OPTIONS>
}
Raphaels-MacBook-Pro:GSE raphaelcampelo$
```

OCI Management Interfaces

Command Line Interface (oci cli)

The **CLI** is a small footprint tool that you can use on its own or with the Console to complete Oracle Cloud Infrastructure tasks. The **CLI** provides the same core functionality as the Console, plus additional commands. ... The **CLI** is built on Python (version 2.7.5 or 3.5 or later), running on Mac, Windows, or Linux

```
Raphael-MacBook-Pro:GSE raphaelcampelo$ oci iam region list --output table
+-----+
| key | name |
+-----+
| FRA | eu-frankfurt-1 |
| IAD | us-ashburn-1 |
| LHR | uk-london-1 |
| PHX | us-phoenix-1 |
| YYZ | ca-toronto-1 |
+-----+
Raphael-MacBook-Pro:GSE raphaelcampelo$
```

List Available
datacenter names

```
Raphael-MacBook-Pro:GSE raphaelcampelo$ oci iam availability-domain list \
> -c $TENANT --output table --query 'data[*].name'
+-----+
| Column1 |
+-----+
| PqLC:US-ASHBURN-AD-1 |
| PqLC:US-ASHBURN-AD-2 |
| PqLC:US-ASHBURN-AD-3 |
+-----+
```

List Available AD's

```
Raphael-MacBook-Pro:GSE raphaelcampelo$ oci iam region list
{CLI-CLI para listar as imagens disponiveis :
"data": [
    {
        "key": "FRA",
        "name": "eu-frankfurt-1"
    },
    {
        "key": "IAD",
        "name": "us-ashburn-1"
    },
    {
        "key": "LHR",
        "name": "uk-london-1"
    },
    {
        "key": "PHX",
        "name": "us-phoenix-1"
    },
    {
        "key": "YYZ",
        "name": "ca-toronto-1"
    }
]
}
VICE> <TYPE> <ACTION> <OPTIONS>
Raphael-MacBook-Pro:GSE raphaelcampelo$
```

Default output:
JSON

<https://docs.cloud.oracle.com/iaas/Content/API/Concepts/cliconcepts.htm>

Infra as Code and Oracle Cloud

Infra as Code

Why is it so important ?

When we talk about cloud interfaces, the Web interface pop's up as the first natural option.

But if we take a closer look, the Web Interface may not be the fastest, or more powerful way to interact with the cloud environment.



AWS Cloud Formation
JSON Format



Azure Resource Manager
JSON Format



Google Cloud Deployment Manager
JSON Format



OCI Resource Manager
Terraform Native Format



Terraform Deep Integration with Oracle Cloud



Write, Plan, and Create Infrastructure as Code

The screenshot shows the Terraform website's navigation bar with links to Intro, Learn, Docs, Guides, Extend, Enterprise, Download, and GitHub. Below the navigation is a purple header with the Terraform logo and a search bar. The main content area is titled "Terraform OCI Provider Version 3". It includes sections for "New Installation" and "Upgrading from v2", along with a note about employing steps to use the latest OCI provider. On the left, there's a sidebar with links to All Providers, Oracle Cloud Infrastructure Provider, Guides, Best Practices, Frequently Asked Questions, Filters, Managing Default Resources, Object Store Backend, Tagging Resources, Troubleshooting, Upgrading to Version 2, Upgrading to Version 3, Data Sources, and various OCI provider modules like oci_audit_configuration, oci_audit_events, etc.

The screenshot shows the GitHub repository page for "terraform-providers / terraform-provider-oci". The page displays basic repository statistics: 1,708 commits, 16 branches, 75 releases, and 56 contributors. It also shows the license as MPL-2.0. At the bottom, there are buttons for creating new files, uploading files, finding files, and cloning or downloading the repository.

dshelbyo	Merge pull request #713 from terraform-providers/release ...	Latest commit f68fdd5 5 days ago
.github	Renaming "baremetal" provider to "oci" and making region a required f...	2 years ago
docs	support for Traffic Management in DNS	17 days ago
oci	Update test to expect 404	9 days ago

Oracle Cloud Infrastructure – Resource Manager

Resource Manager is a brand new service from Oracle Cloud Infrastructure that automates interactions between OCI and Hashicorp's Terraform.



Write, Plan, and Create Infrastructure as Code

ORACLE Cloud

us-ashburn-1 ▾ 🔍 ? 🌐

Resource Manager » Stacks » Stack Details

RMS

There is a job running on this stack. After this job is complete, you can use the Terraform Actions menu to Plan, Apply, or Destroy the stack.

TF_WORKSHOP

Terraform Actions ▾

Plan
Apply
Destroy

Edit Stack **Delete Stack** **Add Tag(s)**

Stack Information **Tags**

Description: Create Worksho Files using Terraform
OCID: ...sy3waq [Show](#) [Copy](#)
Created: Sun, 03 Mar 2019 20:23:30 GMT

Compartment: gse00014643 (root)/workshop
Terraform Config (.zip): Uploaded [Upload New](#) [Download](#)

Resources

Jobs

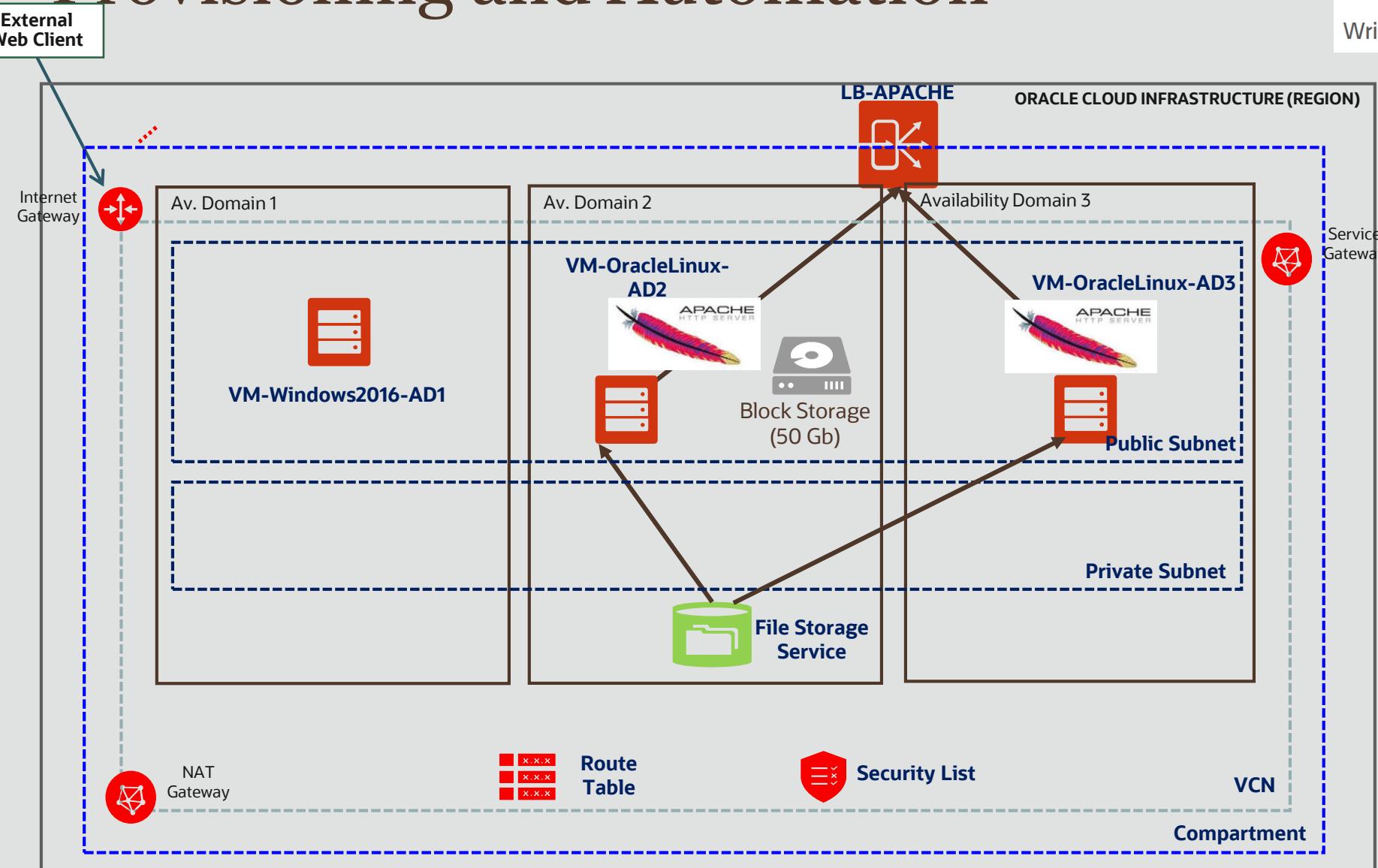
Name	Type	State	Start Time ▾	End Time
TF_PLAN	Plan	● In Progress	Sun, 03 Mar 2019 20:23:59 GMT	-

Showing 1 Jobs < Page 1 >

Terraform Provisioning and Automation



Write, Plan, and Create Infrastructure as Code



Online Calculator

Cost Estimator

Selecting a Payment Plan

 Infrastructure Autonomous Data Management Data Management Application Development Integration Management Content and Experience Analytics Security BYOL Search

Compute

R\$417

R\$417

Utilization

- ▶ Number of Instances / 3 Instance(s)
- ▶ Average Days Usage per Month / 31 day(s)
- ▶ Average Hours Usage per Day / 24 hour(s)

Configuration

Compute - Virtual Machine Standard - X7 (B88514)	R\$0	R\$0
OCPU: 8	0	OCPU Per Hour
Memory: 120GB		
Additional Storage: Up to 1 PB of remote Block Volumes		
▶ Compute - HPC - X7 (B90398)	R\$0	R\$0
▶ Compute - Standard - E2 (B90425) / 1	R\$248	R\$248
▶ Compute - Virtual Machine Dense I/O - X7 (B88516)	R\$0	R\$0
▶ Compute - Virtual Machine GPU Standard - X7 (B88518)	R\$0	R\$0
▶ Virtual Machine Dense I/O - X5 (B88316)	R\$0	R\$0
▶ Virtual Machine Standard - X5 (B88317)	R\$0	R\$0
▶ Windows OS (B88318) / 1 OCPU Per Hour	R\$169	R\$169

Configuration

Load/Save

Save as

Workshop Costs – Intel Xeon Processor

<p>▼  Compute</p> <p>Utilization</p> <ul style="list-style-type: none">▶ Number of Instances / 1 Instance(s)▶ Average Days Usage per Month / 31 day(s)▶ Average Hours Usage per Day / 24 hour(s) <p>Configuration</p> <ul style="list-style-type: none">▶ Virtual Machine Dense I/O - X5 (B88316)▶ Windows OS (B88318)▶ Virtual Machine Standard - X5 (B88317)▶ Compute - Virtual Machine Dense I/O - X7 (B885)◀ Compute - Virtual Machine Standard <p>OCPUs: 8</p> <p>Memory: 120GB</p> <p>Additional Storage: Up to 1 PB of r</p> <ul style="list-style-type: none">▶ Compute - Virtual Machine GPU S▶ Compute - Standard - E2 (B90425)▶ Compute - HPC - X7 (B90398)	<p>R\$528</p> <p>R\$528</p> <p>Monthly Flex</p> <p>R\$59</p> <p>R\$59</p>
<p>▼  Load Balancer</p> <p>Utilization</p> <ul style="list-style-type: none">▶ Number of Instances / 1 Instance(s)▶ Average Days Usage per Month / 31 day(s)▶ Average Hours Usage per Day / 24 hour(s) <p>Configuration</p> <ul style="list-style-type: none">▶ 100 Mbps Load Balancer (B88319) / 1	<p>R\$59</p> <p>R\$59</p>
<p>▼  Storage</p> <p>Configuration</p> <ul style="list-style-type: none">▶ Block Volume Performance Units (VPUs) (B91962) / 1 <p>Performance Units Per Gigabyte Per Month</p> <p>1</p> <ul style="list-style-type: none">▶ Block Volume Storage (B91961) / 100 <p>Gigabyte Storage Capacity Per Month</p> <p>100</p> <ul style="list-style-type: none">▶ Object Storage - Storage (B91628) / 1▶ File Storage (B89057)▶ Object Storage - Requests (B91627)	<p>R\$10</p> <p>R\$10</p>

Configuration Options

Pay As You Go

Monthly Flex



> Compute

> Load Balancer

> Storage

> Compute

R\$248

R\$248



Utilization

- ▶ Number of Instances / 1 Instance(s)
- ▶ Average Days Usage per Month / 31 day(s)
- ▶ Average Hours Usage per Day / 24 hour(s)

Utilization

- ▶ Number of Instances / 1 Instance(s)

- ◀ Average Days Usage per Month / 31 day(s)

Indicate average days usage per month for this service

31-+

- ◀ Average Hours Usage per Day / 24 hour(s)

Indicate average hours usage per day for this service

24-+



Final Thoughts on IaaS ...



Customer's First Impression

It doesn't matter where the infrastructure is coming from, IaaS is always the same

IaaS is commodity, the only difference is the final price

Bare Metal servers, are always the best solution

Oracle Cloud

- ✓ Three different type of x86 processors
- ✓ Five types of Storage Media
- ✓ No Charge for Inbound traffic
- ✓ Flexible Storage Performance
- ✓ VPN provided as Service (Free of Charge)
- ✓ Infra as Code provided as Service
- ✓ High performance on Bare Metal and Dense I/O Shapes
- ✓ VMWare : Extend your VMWare DC with OCI
- ✓ Microsoft Connectivity



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