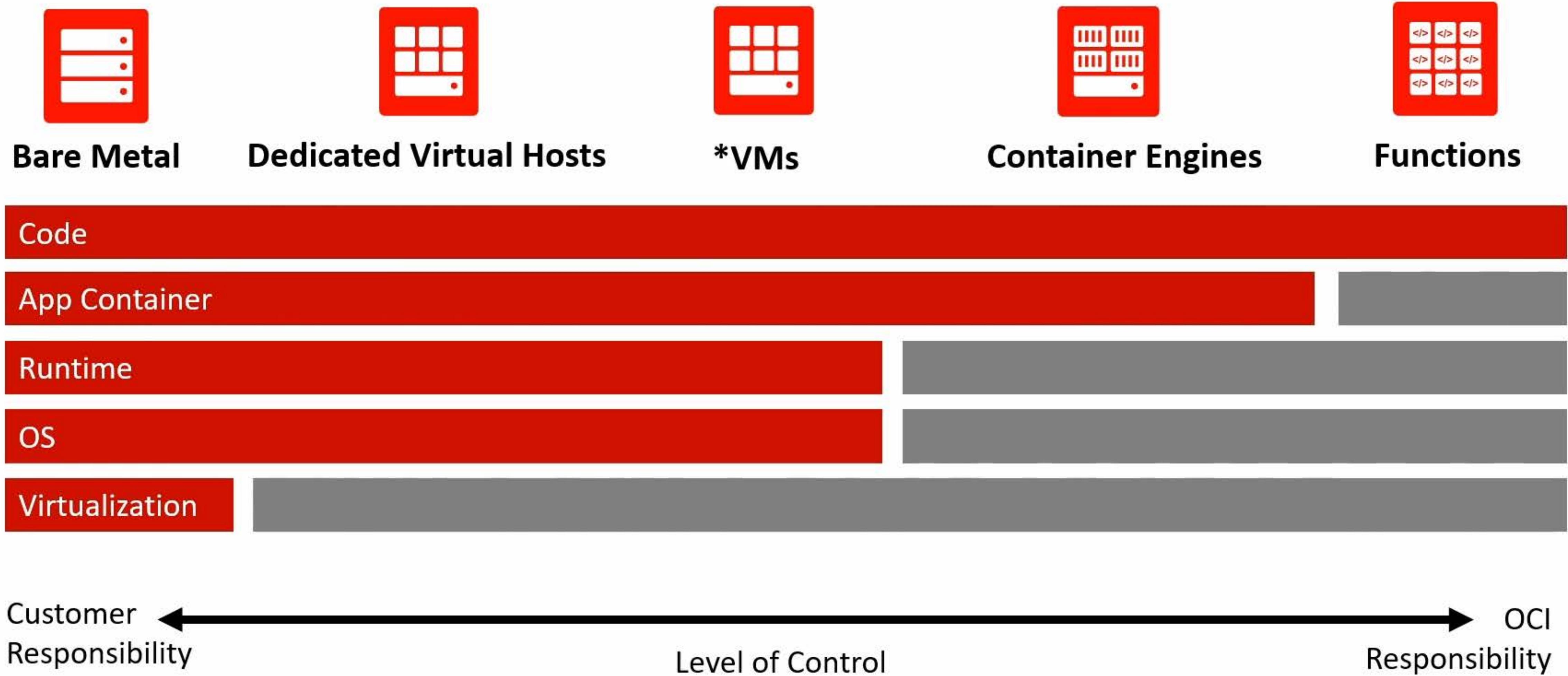
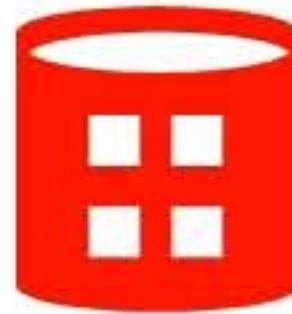


Core Services – Computing Services



VM is short for Virtual Machine

Core Services – Storage Services



Block Volume

Think of it like having a local virtual hard drive where you can choose HDD or SSD



Object Storage

Serverless storage. Upload as many files as you like, scales without worrying about running out of space or data loss.



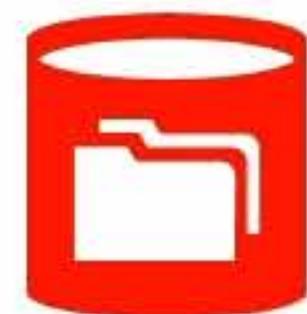
Local NVMe

Non-Volatile-Memory-Express is a Transfer Protocol for SSD that allows the drives to operate very efficiently.



Archive Storage

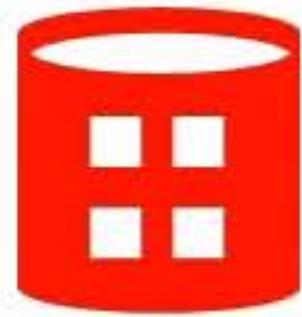
Long-term cold storage. Files you need to keep around for years that you infrequently need to access at a fraction of the storage cost.



File Storage

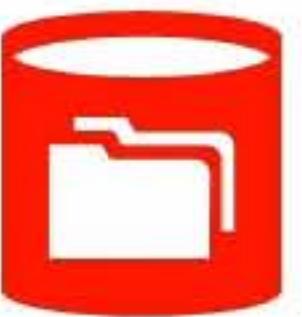
Uses a file system NFSv3 allowing multiple connections to the same storage device at the same time.

Core Services – Storage Services



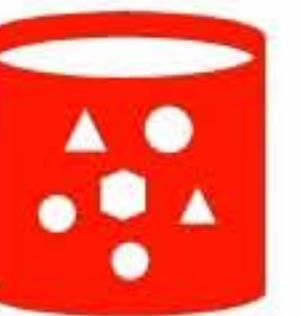
Block Volume

Data is split into evenly split blocks
Directly accessed by the Operation System
Supports only a single write volume



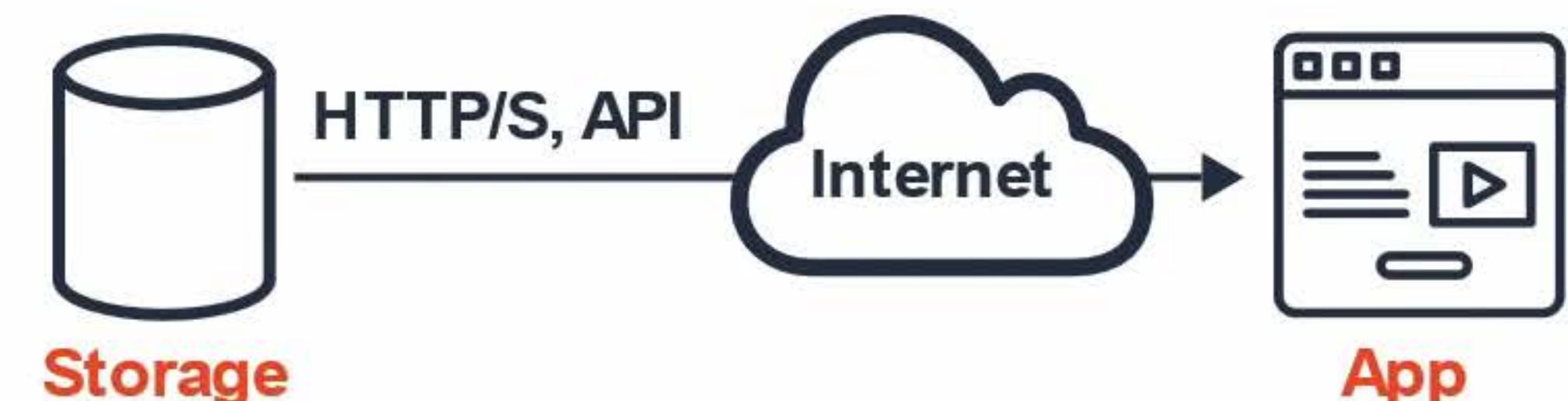
File Storage

File is stored with data and metadata
Multiple connections via a network share
Supports multiple reads, writing locks the file.

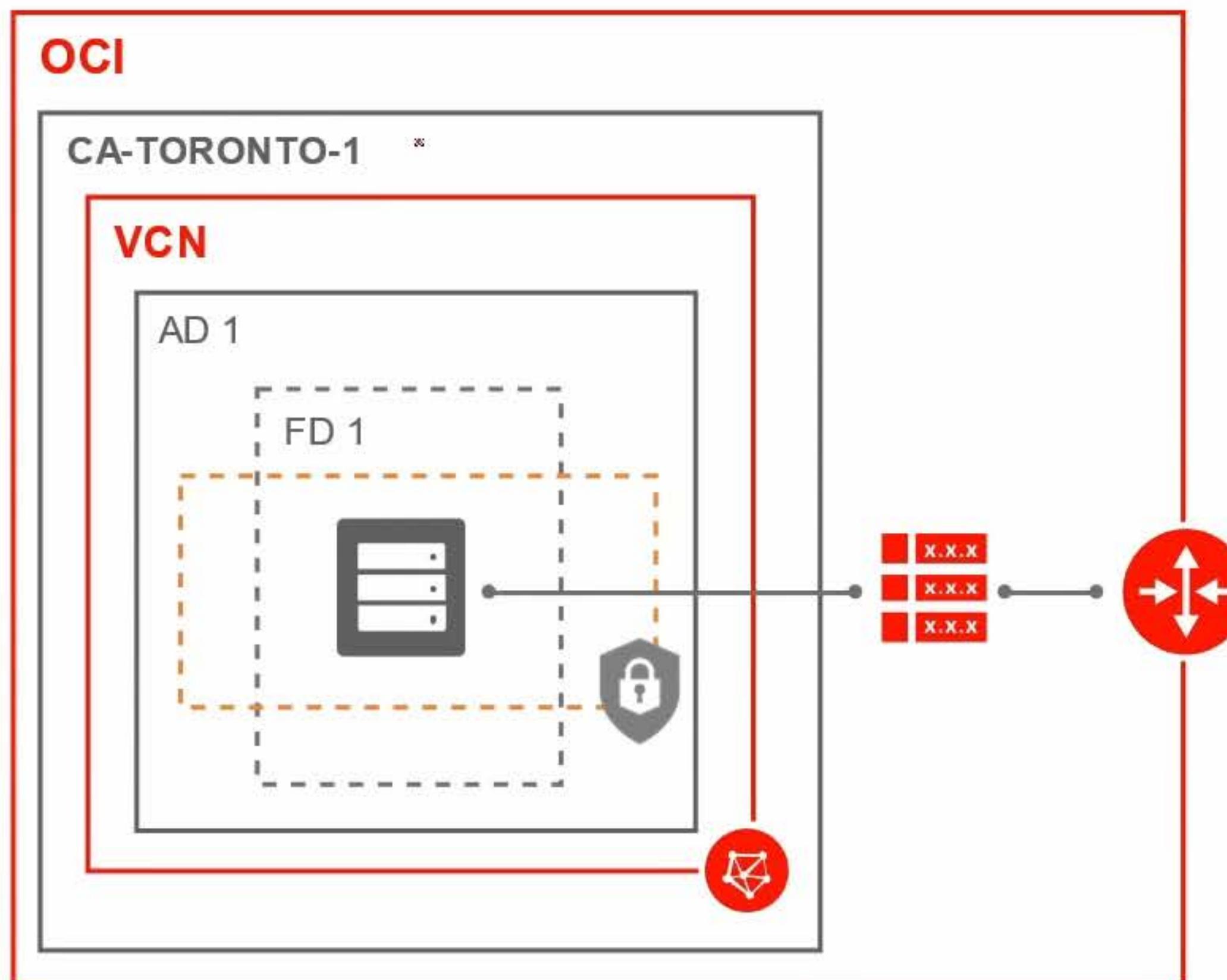


Object Storage

Object is stored with data, metadata and Unique ID
Scales with limited no file limit or storage limit
Supports multiple reads and writes (no locks)



Core Services – Networking Services



Region the geographical location of your network

ADs the datacenter of your AWS resources

FDs a logical grouping of resources in your datacenter

VCN a logically isolated section of the OCI Cloud where you can launch OCI resources

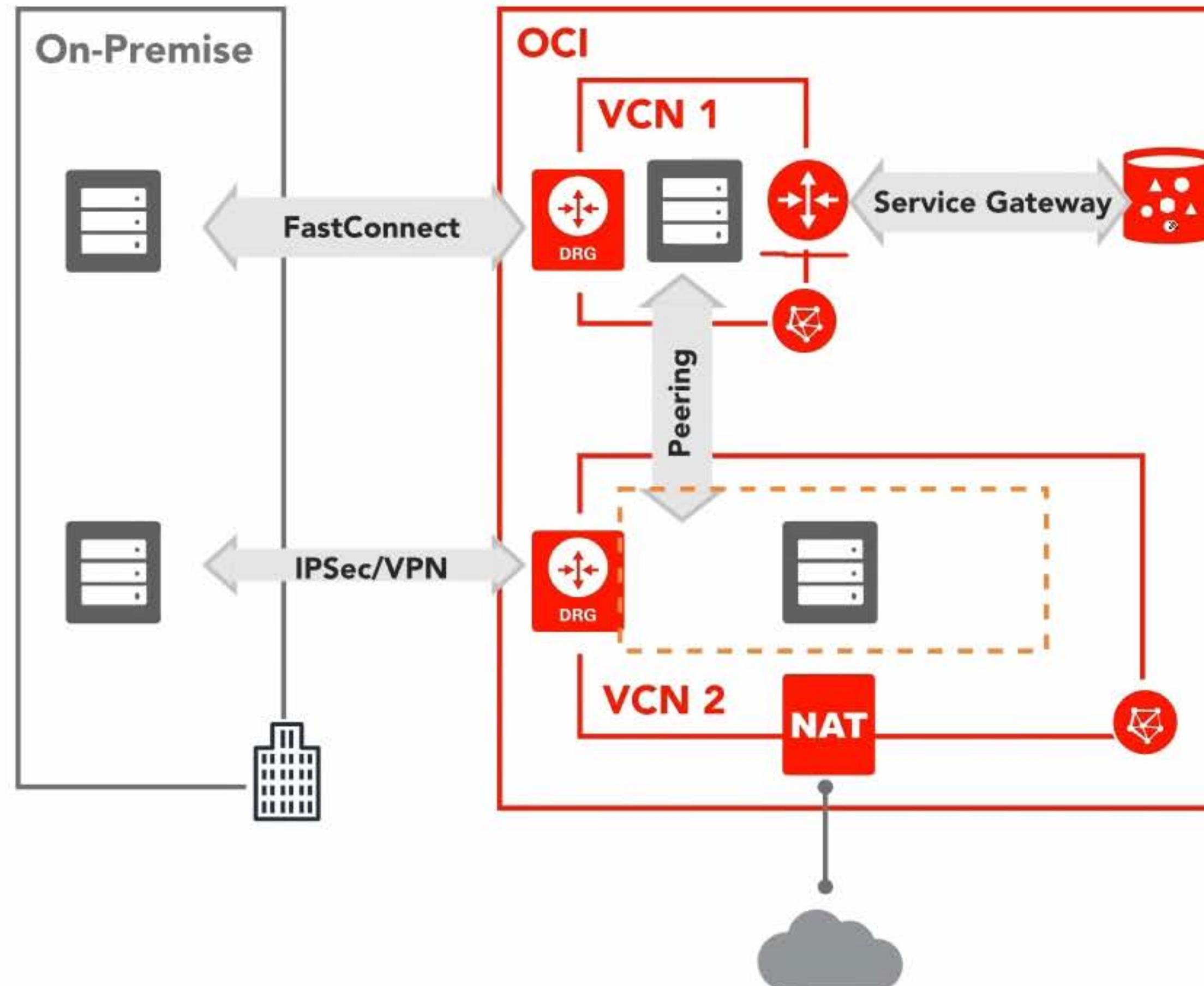
Internet Gateway Enable access to the internet

Subnets a logical partition of an IP network into multiple smaller network segments

Virtual Firewall Options:

- **Security Rules**
- **Network Security Groups (NSGs)**
- **Security Lists**

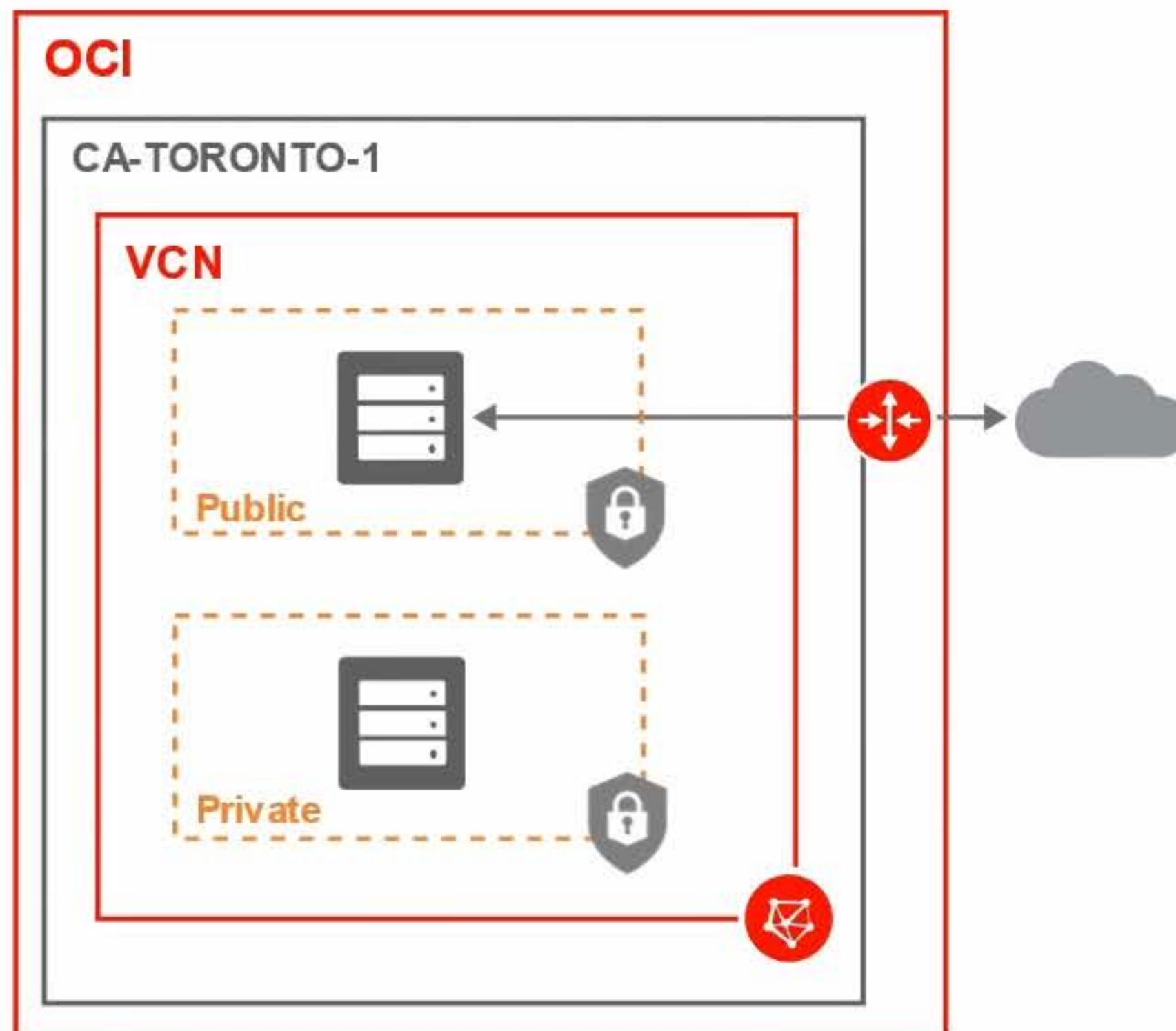
Core Services – Networking Services



Core Services – VCNs and Subnets

Virtual Cloud Network (VCNs) a logically isolated section of the OCI Cloud where you can launch OCI resources. You choose a **range of IPs using CIDR Range**

CIDR Range of **10.0.0.0/16 = 65,536 IP Addresses**



Subnets a logical partition of an IP network into multiple smaller network segments. **You are breaking up your IP range for VCNs** into smaller networks.

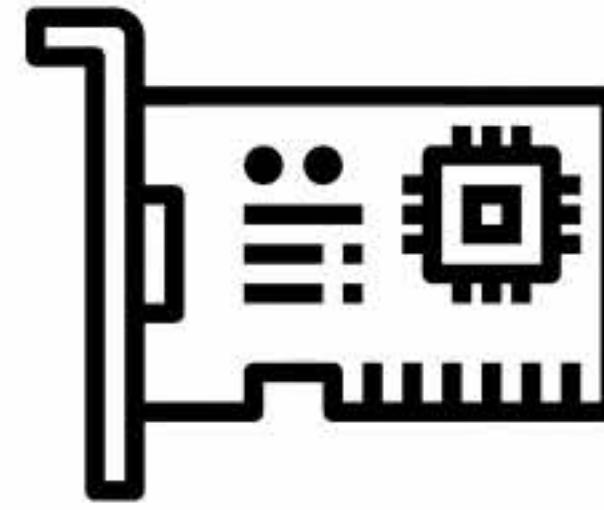
Subnets **need to have a smaller CIDR range than to the VCNs** represent their portion.

eg Subnet CIDR Range 10.0.0.0/24 = 256 IP Addresses

A Public Subnet is one that can reach the internet

A Private Subnet is one that cannot reach the internet

Core Services – VCINs



Virtual Network Interface Cards (VCINs) enables an instance to connect to a **VCN** and determines how the instance connects with endpoints inside and outside the VCN

Without VCIN your Instance (server) would not be able to communicate with the Internet or other network cloud services

Core Services – Virtual Firewall Options



The Networking service offers **two virtual firewall features** that both use **security rules** to control traffic at the packet level. The two features are:

1. Security Lists (SLs)

The original virtual firewall feature from the Networking service.

Security Lists **are associated with subnets** and the security rules apply to VCINs in those subnets

2. Network Security Groups (NSGs)

The new virtual firewall feature designed for application components that have different security postures. **NSGs are supported only for specific services.**

NSGs **are directly associated with VCINs** regardless of what subnet they are in.

Core Services – Database Services

VM DB Systems

Fast Provisioning

VM BM Systems

Fast Performance

Oracle RAC

Highly Available

Exadata DB Systems

Specialized Infrastructure

Autonomous

– Shared / Dedicated

Fully Managed

A Virtual Machine running a managed Oracle Database Instance

Uses Block Storage

A Bare Metal machine running a managed Oracle Database Instance

Uses Fast Local Storage

Oracle Databases **running as a cluster**. Shares the same disk but different instances running on different nodes If a node fails, connection fails over to another node.

Exadata is a pre-configured combination of hardware and software that provides an infrastructure for running Oracle Database

Automatically patches, upgrades and self-healing bad data.

Highly Available by default. Secure by default.

Core Services – DB Systems Database Options

Oracle DB Systems. You choose your **Availability Domain** and **Shape Type**



Select an availability domain

AD-1 uJAJ:US-ASHBURN-AD-1 ✓

AD-2 uJAJ:US-ASHBURN-AD-2

AD-3 uJAJ:US-ASHBURN-AD-3

Select a shape type

Virtual Machine ✓

Bare Metal

Exadata

MySQL DB Systems. You Choose **Availability Domain, Fault Domain, and Shape Type**



SELECT AN AVAILABILITY DOMAIN

AD-1 uJAJ:US-ASHBURN-AD-1 ✓

AD-2 uJAJ:US-ASHBURN-AD-2

AD-3 uJAJ:US-ASHBURN-AD-3

SELECT A FAULT DOMAIN

FAULT-DOMAIN-1

FAULT-DOMAIN-2 ✓

FAULT-DOMAIN-3

Core Services – Autonomous Database Options

OLAP (Reporting, Analytics, Large and Infrequent Queries)

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.

OLTP (General Purpose, Small and Frequently Queries)

Transaction Processing

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



Multi-Tenant, Shared Cost with many customers

Choose a deployment type

Shared Infrastructure

Run Autonomous Database on shared Exadata infrastructure.

Single Tenant, A server only used by you

Dedicated Infrastructure

Run Autonomous Database on dedicated Exadata infrastructure.

Choose a license type

Bring Your Own License (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.

Red arrows highlight the selected options: Data Warehouse (OLAP), Transaction Processing (OLTP), Shared Infrastructure (Multi-Tenant), and License Included (License Type).

Core Services – Oracle NoSQL

Oracle NoSQL Database is a **key/value** store.

- Produce and consume data at high volume and velocity
- Require instantaneous response time to match user expectations
- Developed with continuously evolving data models
- Scale on-demand based on the dynamic workloads

Core Services – Cloud Native Services

Oracle API Gateway

A comprehensive platform for managing, delivering, and securing **Web APIs**

Oracle Streaming

Ingest and store continuous, high-volume data streams and process them in **real-time**.

Oracle Kubernetes Container Engine (OKE)

A managed service to run a **Kubernetes** Cluster

Oracle Registry (OCIR)

A **repository for your docker** containers

Oracle Notifications

A fully managed **publish-subscribe service** for reliable and scalable message delivery.

Oracle Integrations

A service to connect on-premise, third-party to your OCI with premade adapters for easy application integration. Think of it like Zapier.

Billing and Pricing – Pricing Models

Oracle has ways for you to save with their **Universal Credit Pricing**. Also known as **Oracle UC**

On-Demand

Pay As You Go (PAYG)

- No upfront commitment.
- Billed based on hourly consumption
- Pay at the end of the month

Monthly Flex

- Minimum of 12 month commitment
- Minimum of \$1000 per month
- Saving 30%-65%

Bring Your Own License (BYOL)

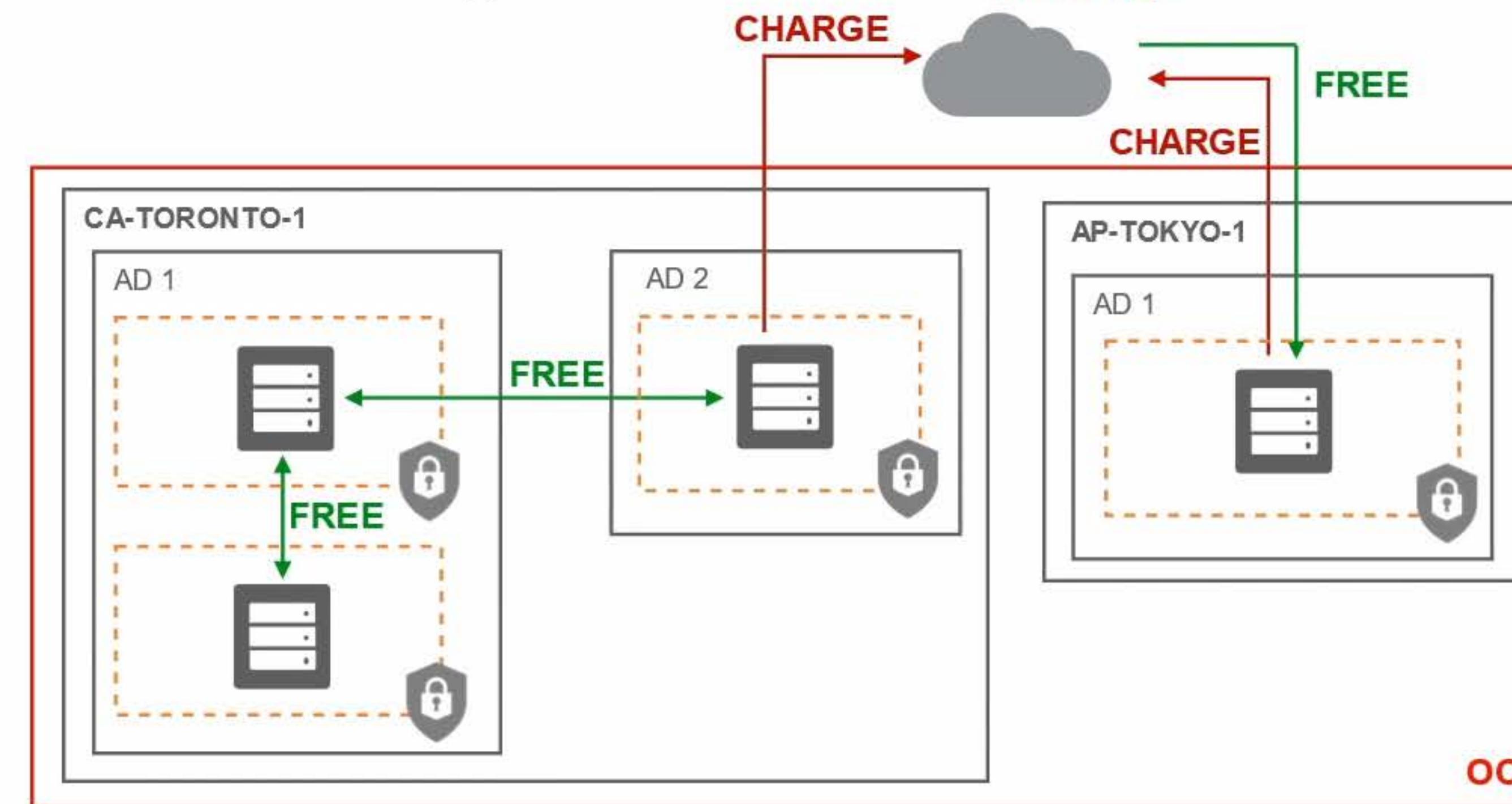
bring your on-premises license entitlement and get license support via their existing on-premises support contract.

All regions have the same pricing

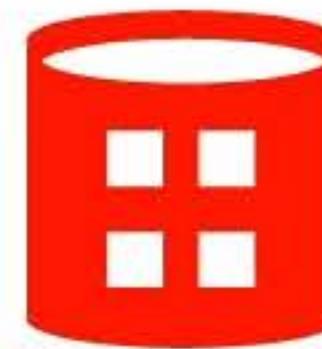
Billing and Pricing – Data Transfer Costs

Data Transfer

- (ingress) Data-in is **free**
- (egress) Data-out **costs money**
- Data transfer within the same Availability Domain is **free**
- Data transfer between Availability Domain's in the same region is **free**
- Data transfer between Regions will result in a **charge** for data leaving the region.



Billing and Pricing – Block Volume Pricing



There are 🤝 two things you need to consider with Block Volume Pricing:

1. Storage Cost

GB Storage Capacity / Month

\$0.0255

2. Performance Cost

Performance Units Per GB / Month

- **0 VPUs** at \$0 for Lower Cost
- **10 VPUs** at \$0.017 for Balanced
- **20 VPUs** at \$0.034 for Higher Performance



Volume Performance Units (VPUs)

Billing and Pricing – Resource Tags

You can **tag resources** such as Compute, Storage and Databases.
Tagging allows us to **filter resources** and **can be used in Cost Analysis** to quickly determine costs.

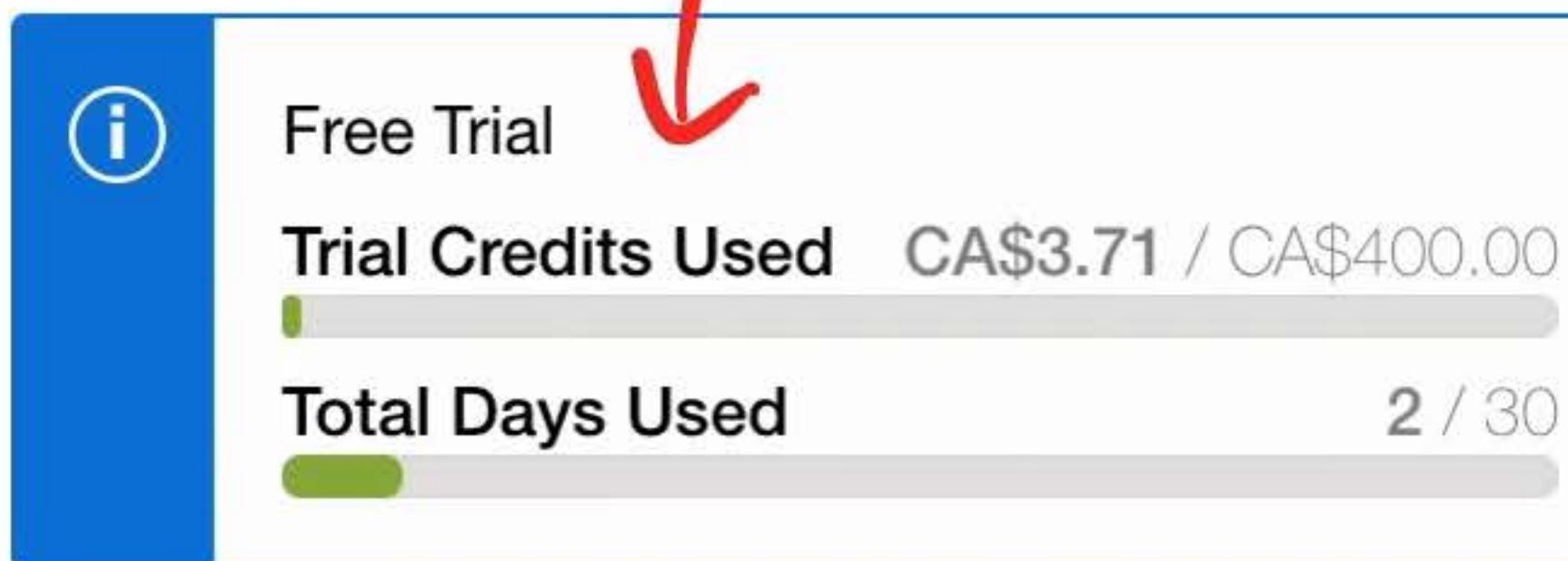
The screenshot shows the AWS Lambda console interface. On the left, a sidebar lists actions: More Actions, Edit Name, Create Custom Image, Create Instance Configuration, Move Resource, Add Tags (which is highlighted with a red arrow), and Terminate. The main area displays a modal dialog titled "Add One Or More Tags To This Resource". The dialog contains a section titled "What is tagging?" with a description and a link to "Learn more about tagging". Below this is a table with columns: TAG NAMESPACE, TAG KEY, and VALUE. A dropdown menu under TAG NAMESPACE shows "None (add a free-form tag)". The TAG KEY is set to "env" and the VALUE is "prod". A blue "Add Tags" button is at the bottom of the dialog. A red arrow points from the "Add Tags" button in the sidebar to the "Add Tags" button in the dialog. The status bar at the bottom right shows "Private IP Address: 10.0.0.2".

Billing and Pricing – Cost Analysis

OCI Cost Analysis will help you visualize your ongoing costs.

You can filter based on **Compartments**, **Tagged Resources** and **Start and End date**.

Keep track of your Free-Tier Credits



Breakdown of service costs

A screenshot of the OCI Cost Analysis interface showing a breakdown of service costs. The table has columns for Service, Total Cost, and a trend graph. A red arrow points to the 'Total Cost' column. The table lists several services with their respective costs and usage details.

Service	Total Cost	Total Cost Trend (Apr 26, 2020 - Apr 28, 2020)
Compute	CA\$3.56	
VM Standard Compute X7	CA\$3.56	
Block Storage	CA\$0.15	
Networking	CA\$0.00	
Monitoring	CA\$0.00	

Billing and Pricing – Usage Reports

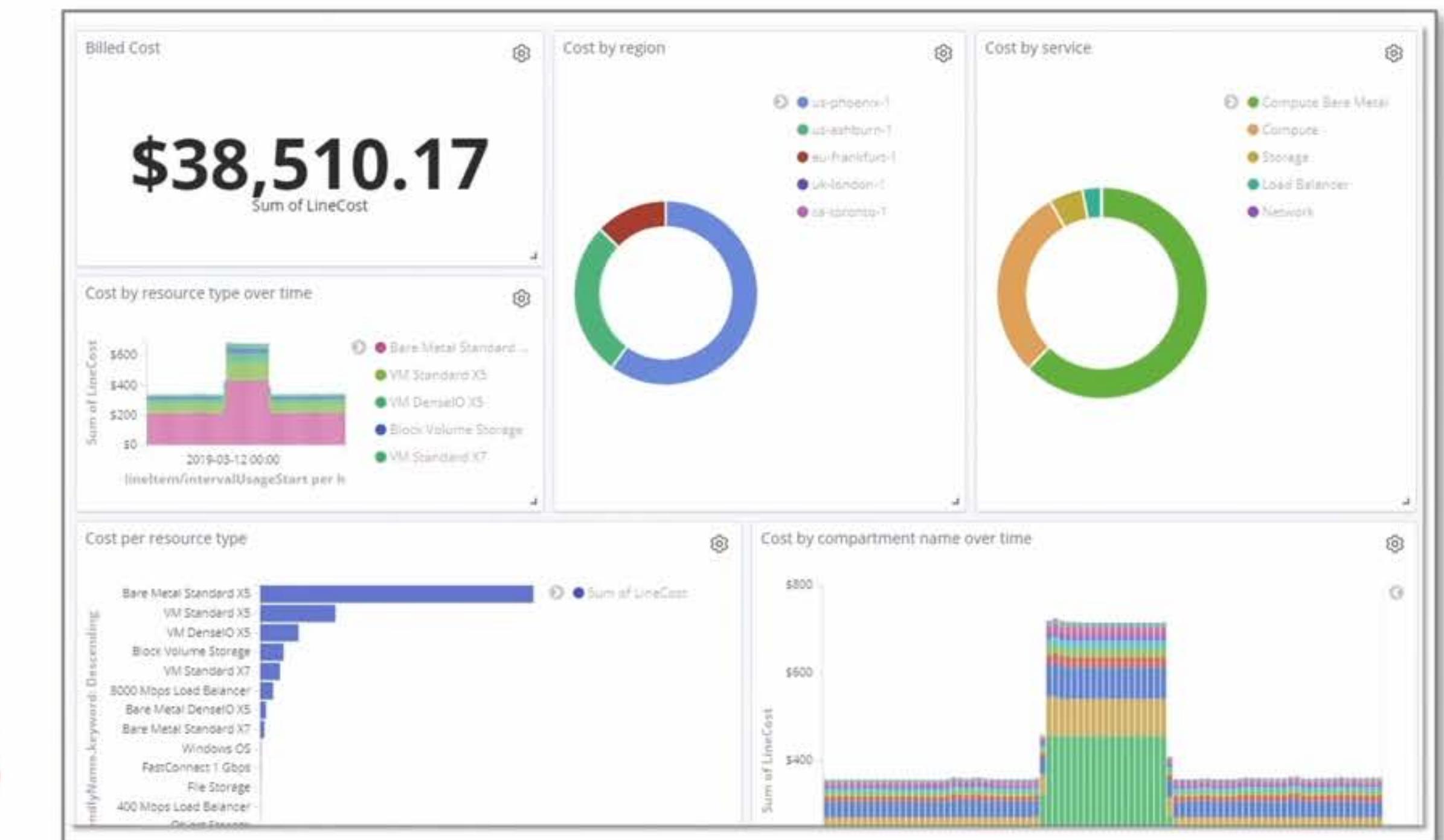
Get a granular view of your spending or find ways to save.

Download a **CSV** or use the **OCI API** to access detailed billing information.

Cost report is automatically generated daily,
and is stored in an Oracle-owned **Object Storage bucket**

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

Example of a Custom Dashboard powered By exported Usage Reports data



Billing and Pricing – Free Tiers

Always Free

- 2 Oracle Autonomous Databases
- 2 OCI Compute VMs and 1/8 OCPU and 1 GB
- 2 Block Volumes 100 GB total
- Object Storage 10 GB
- Archive Storage 10 GB
- 1 Load Balancer
- Data-In (ingress) is free
- Monitoring and Notifications
- OCI Developer – Automate CI/CD workflows

30-Day Free Tier

\$300 credits valid for **30 days**

- Up to eight instances across all available services
- Up to 5TB of storage

Billing and Pricing – 30 Days Free Tier Detailed

Compute	VM or Bare Metal	3,500 hours 1.5 TB storage
Storage	Block or Object Storage	5 TB
Containers	Managed Kubernetes	3,500 hours and 2TB storage
Functions	OCI Functions	112M invokes, 20M GB memory-seconds execution time
Load Balancer	OCI Load Balancer	3,500 hours
Dedicated Private Connection	FastConnect	1,400 hours
Java Development	*Oracle Weblogic Server	1,700 hours, 250 GB storage
Chatbot	Digital Assistant	110,000 requests
Mobile Framework	Mobile Hub	110,00 requests
WISWIG	Visual Builder	4,700 hours
Business Intelligence	Analytics Cloud	4,700 hours
Machine Learning Platform	Data Science	4,700 hours
Secure Enterprise Portal	WebCenter Portal	1,100 hours
Application Integration	OCI Integrations	248 hours
SOA-Based APIs	OCI SOA	1,700 hours

Billing and Pricing – Oracle Marketplace

Oracle Marketplace are **managed** VM Images or Stacks from **third-party vendors** that are **free or paid** that you can launch



RocketChat
The ultimate Open Source communication platform
Type: Image | Price: Free



NVIDIA GPU CLOUD
NVIDIA GPU Cloud Machine Image
NVIDIA GPU Cloud is a GPU-accelerated platform...
Type: Image | Price: Free

PRICE

- Any
- Free
- BYOL
- Paid

- ✓ Any
- Analytics
- Application Development
- Applications Unlimited
- Backup and Recovery
- Big Data
- Blockchain
- Business Applications**
- Cloud Management
- Continuous Integration
- Cross-blockchain integrations
- Data Integration
- Database Management
- Developer Tools
- Enterprise Application Analytics
- High Performance Computing
- Migration
- Networking
- Operating Systems
- Other
- Packaged Application
- SaaS on Oracle Cloud Platform
- Security
- Storage

Billing and Pricing – Oracle SLA

Oracle's Service Level Agreement (SLA) is guarantee of **performance, availability, manageability** of service

Availability SLAs **99.99%** uptime Compute running in One AD Region with
Measurements of Region unavailability
99.95% uptime Compute in Multiple FDs in a Single AD

Category	10% Region unavailability	25% Region unavailability	10% AD unavailability	25% AD unavailability
Compute	99.9%	99.9%	99.95%	99%
Block Volumes	99.9%	99%		

Category	SLA Breach 10%	SLA Breach 25%
Object Storage	99.9%	99%
FastConnect	99.9%	99%

Billing and Pricing – Oracle SLA

Manageability SLAs

Category	SLA Breach 10%	SLA Breach 25%
Compute	99.9%	99%
Block Volumes	99.9%	99%
Database	99.9%	99%

Performance SLAs

Category	SLA Breach 10%	SLA Breach 25%
Compute	99.9%	99%
Block Volumes	99.9%	99%
Database	99.9%	99%

SLA Breach 10% = 99.9%

SLA Breach 25% = 99%

Billing and Pricing – Service Limits

When you sign up for OCI, **a set of service limits is configured for your tenancy.** The service limit is the quota or allowance set on a resource.

eg. your tenancy is allowed a maximum number of compute instances per AD.

These limits are generally established with your Oracle sales representative when you purchase Oracle Cloud Infrastructure. If you did not establish limits with your Oracle sales representative, or, if you signed up through the Oracle Store, default or trial limits are set for your tenancy

These limits may be increased for you automatically based on your Oracle Cloud Infrastructure resource usage and account standing. **You can also request a service limit increase.**

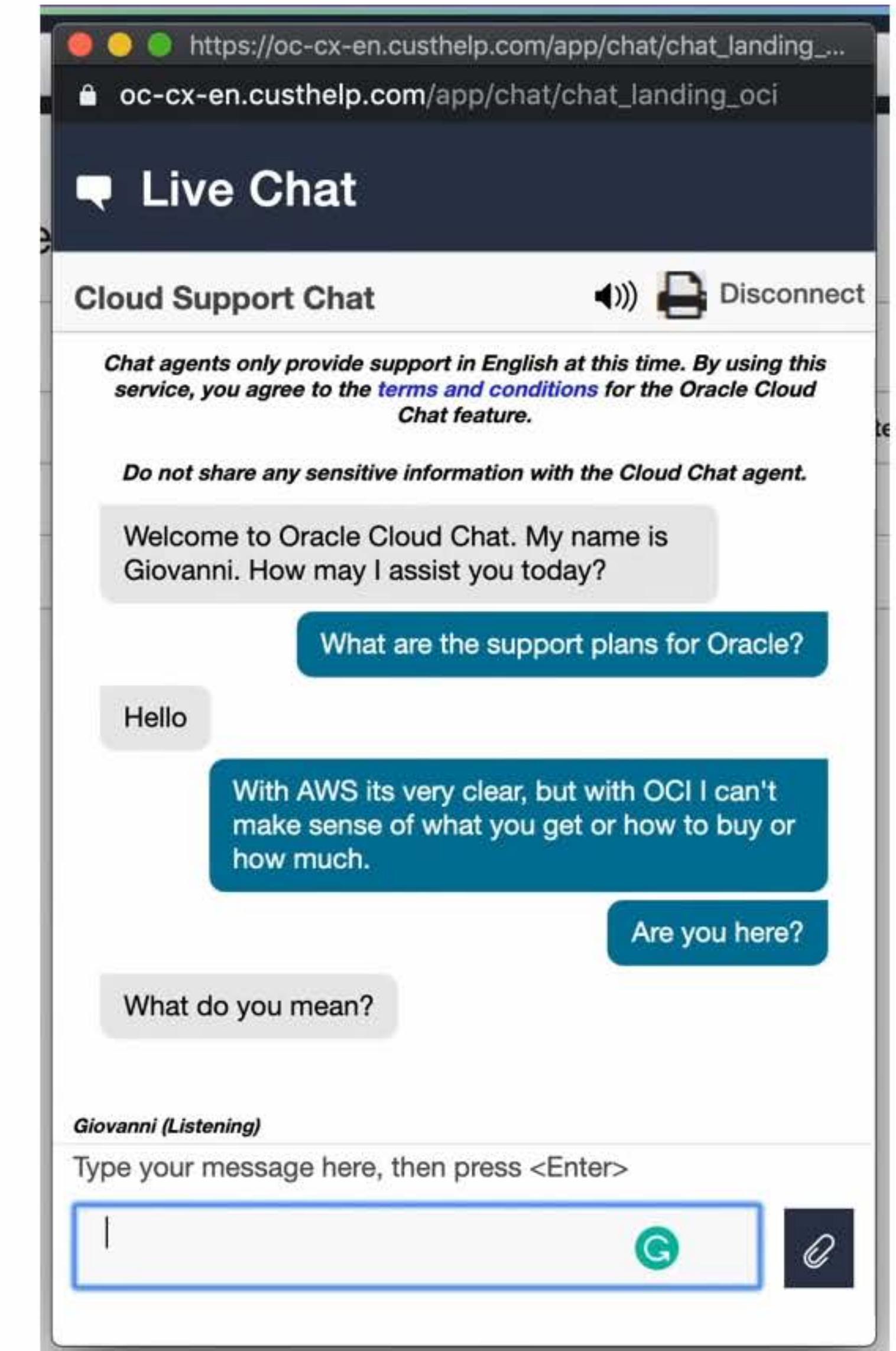
Billing and Pricing – Support

Oracle has a support plan called **Premier Support**

Rapid resolution through **24/7 access to the Oracle knowledgebase, technical support, Auto Service Request (ASR)**, priority service request handling, remote diagnostics, and two-hour onsite hardware service

Oracle has a Live Chat in the Oracle Console.

You have to talk to a sales person to get a quote
The Premier Support pricing is not clear or easily accessible.



OCI Security – Shared Security Model

Customers

Configuration of Managed Services or Third-Party Software

Platforms

Applications

Identity and Access Management (IAM)

Configuration of Virtual Infrastructure and Systems

Operating System

Network

Firewall

Security Configuration of Data

Client-Side Data Encryption

Server-Side Encryption

Networking Traffic Protection

Customer Data

Software

Compute

Storage

Database

Networking

Hardware / Global Infrastructure

Region

Availability Domains

Physical Security

OCI

OCI Security – IAM

Identity and Access Management (IAM) service lets you control who has access to your cloud resources.



Users

An individual employee or system that needs to manage or use your OCI resources.



Groups

A collection of users who all need the same type of access to a set of resources or compartment.



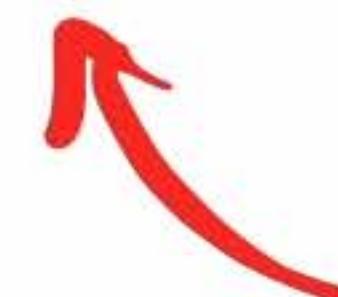
Dynamic Groups

A special type of group that contains resources that match rules that you define



Policies

A language that defines permissions if users, groups, dynamic group or compartments should be allowed access to specific OCI resources in your account.



You just create policies and they are in-effect. You don't assign policies at the creation of Users, Groups or Resources

OCI Security – Common Policies Examples

Allow <subject> to <verb> <resource-type> in <location> where <conditions>

Lets users analyze costs

Allow group BudgetTeam to read usage-reports in tenancy

Let database admins manage DB systems

Allow group DatabaseAdmins to manage database-family in tenancy

Let users download objects from Object Storage buckets

Allow group ObjectReaders to read buckets in compartment AB

OCI Security – Anatomy of a Policy

Allow **<subject>** to **<verb>** **<resource-type>** in **<location>** where **<conditions>**

Everything

- **any-user**

By IAM Group Name or OCID

- **group Developers**
- **group id ocid1.group.oc1...**

By Dynamic Group Name or OCID

- **dynamic-group taggedProd**
- **dynamic-group id ocid1.group.oc1...**

OCI Security – Anatomy of a Policy

Allow <subject> to **<verb>** <resource-type> in <location> where <conditions>



inspect	List resources	Third-Party Auditors
read	Read only	Internal Auditors
use	Read and update (no delete or create)	Developers
manage	Read, create, update and delete	Administrators

OCI Security – Anatomy of a Policy

Allow <subject> to <verb> **<resource-type>** in <location> where <conditions>

Everything! ↘

- **all-resources**

Individual Types

- **buckets**
- **db-nodes**
- **route-tables**
- **mount-tables**
-

Family Types

- **database-family**
- **instance-family**
- **object-family**
- **virtual-network-family**
- **volume-family**
- **cluster-family**
- **dns-family**

OCI Security – Anatomy of a Policy

Allow <subject> to <verb> <resource-type> in <**location**> where <conditions>

Specify Everything

- **tenancy**

A single compartment by its name

- **compartment Development**
- **compartment Production**



A single compartment by its OCID

- **compartment ocid1.group.ocr...**

OCI Security – Anatomy of a Policy

Allow <subject> to <verb> <resource-type> in <location> where <**conditions**>

Match on String

- **where target.group.name = 'Staging'**

Match on Regex

- **where target.group.name = /Customer-*/**

NOT

- **where target.group.name != 'Beta'**

ALL

- **where all {target.group.name == 'Development',target.group.name != 'Production'}**

ANY

- **where any {target.group.name != /ProjectA-*/,target.group.name != /ProjectB-*/}**

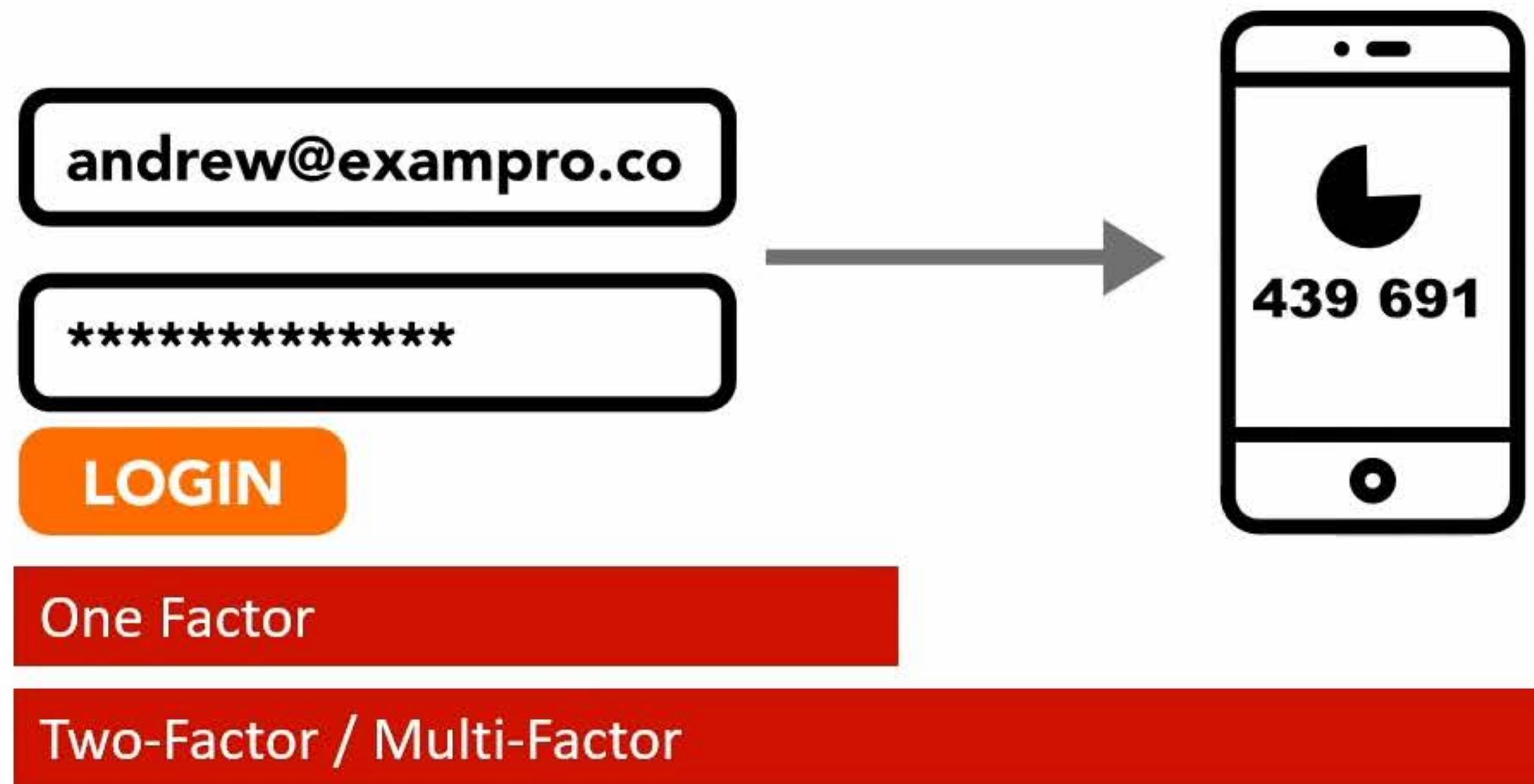
OCI Security – MFA

What is Multi-Factor Authentication (MFA)?

A security control where after you fill in your username/email and password **you have to use a second device** such as a phone to confirm that its you logging in.

MFA **protects** against people who have stolen your password

MFA is an option in most cloud providers and even social media websites such as Facebook.



An Yubi Key is another device you could use to automate Two-Factor

OCI Security – Federation

Federation Identity is the ability to enable users from one domain to securely access data or systems of another domain without the need of a redundant user administrator

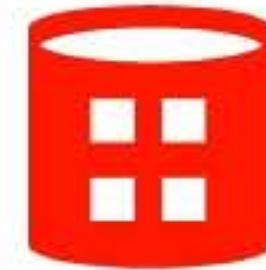
If you were a large company and you purchased multiple commercial and enterprise software products it would be convenient if when an employee logged in the work computer they had access to all these software products

Single Sign On is the technology that enables users to authenticate without the need to login or have separate pair of credentials to third party systems

An Identity Provider (IdP)

A trusted provider of your user identity that lets you authenticate to access other services. Identity Providers could be: Microsoft Active Directory, Okta, Facebook, Amazon, Google, Twitter, Github, LinkedIn or..... **Oracle Identity Cloud Service**

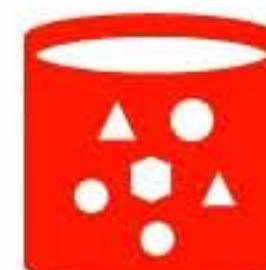
OCI Security – Encryption



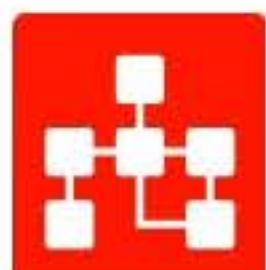
Block Volume



File Storage



Object Storage



Database Service

Encryption-At-Rest

TDE

Encrypted-In-Transit

Data Safe

Bring Your Own Keys (BYOKs)

Database Vault

Private Buckets

- **Transparent Data Encryption (TDE)** is a technology employed by Microsoft, IBM and Oracle to encrypt database files
- **Oracle Data Safe** is a security console that monitors sensitive data such as OCI databases
- **Oracle Database Vault** restricts access to specific areas in an Oracle database from any user, including users who have administrative access

OCI Security – At-Rest and In-Transit

At-Rest Encryption

At-Rest Encryption is **securing data that is not moving**. Encrypting a hard drive would be consider At-Rest Encryption. A key pair would be use to encrypt data and cryptographic algorithm such as **AES 256** might be used.

In-Transit Encryption

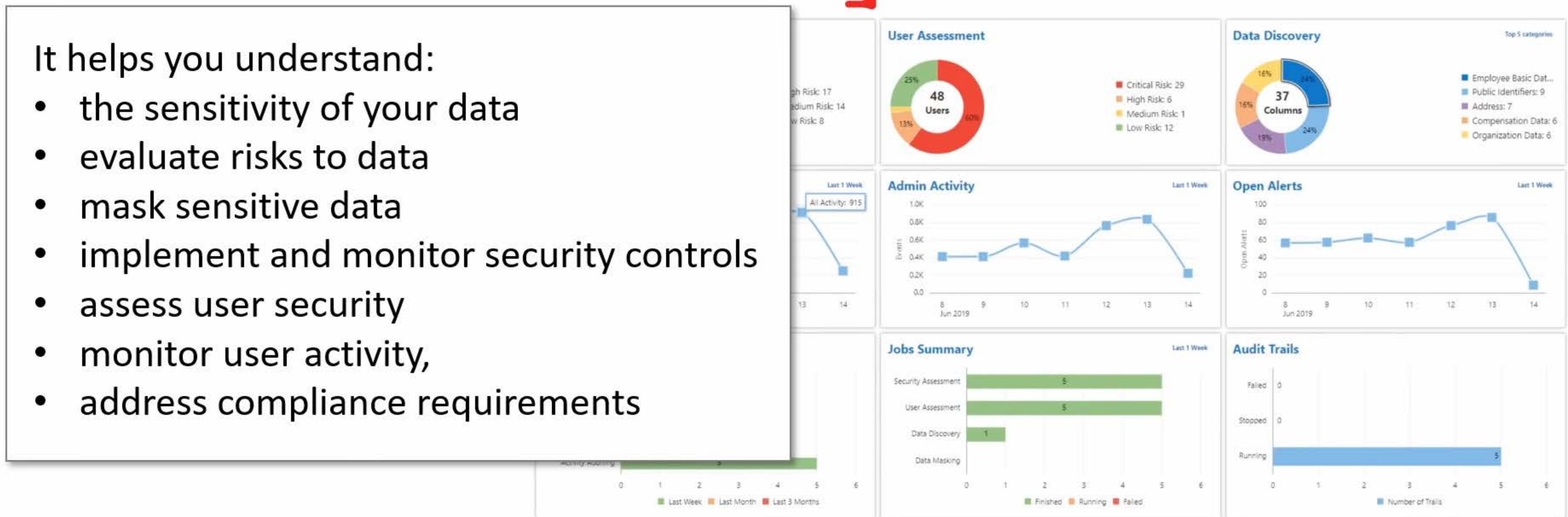
In-Transit Encryption is **ensuring data that is moving from location to another is secure**. An In-Transit Encryption protocol would be **SSL, HTTPS, TLS**

OCI Security – Data Safe

Oracle Data Safe is a **unified control center** for your Oracle Databases.

It helps you understand:

- the sensitivity of your data
- evaluate risks to data
- mask sensitive data
- implement and monitor security controls
- assess user security
- monitor user activity,
- address compliance requirements



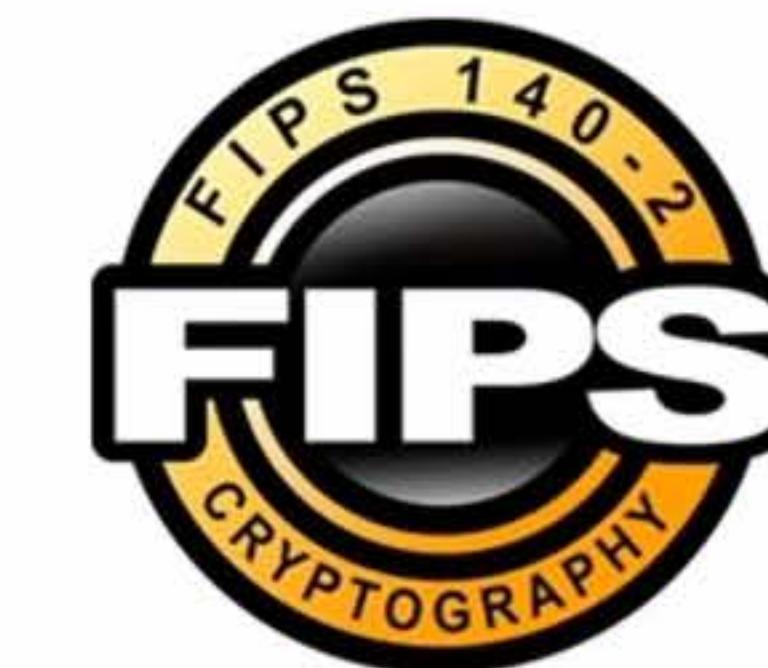
OCI Security – Compliance Programs

Enterprise Companies WILL NOT BUY your software solutions unless its  secure.

How are you going **to meet their security compliance requirements?**

We'll only do business with you if you are...

- **NIST 800-53**
- **PIPEDA Compliant**
- **HIPPA Compliant**
- **FIPS-140-2 Compliant**



OCI Security – OCI Vault

OCI Vault makes it easy for you to
create, control and rotate encryption keys used to encrypt data on OCI



OCI Vault was previously known as **OCI Key Management**

OCI Vault is a **multi-tenant CloudHSM**.

An HSM is a **Hardware Security Module**.
It's a piece of hardware designed to store
encryption keys.



OCI Security – OS Management



OS Management is a service that allows you to **manage updates and patches** for the Virtual Machines (VMs) Operation Systems (OS) running on OCI

Think of it like a **toolbox for your VMs**

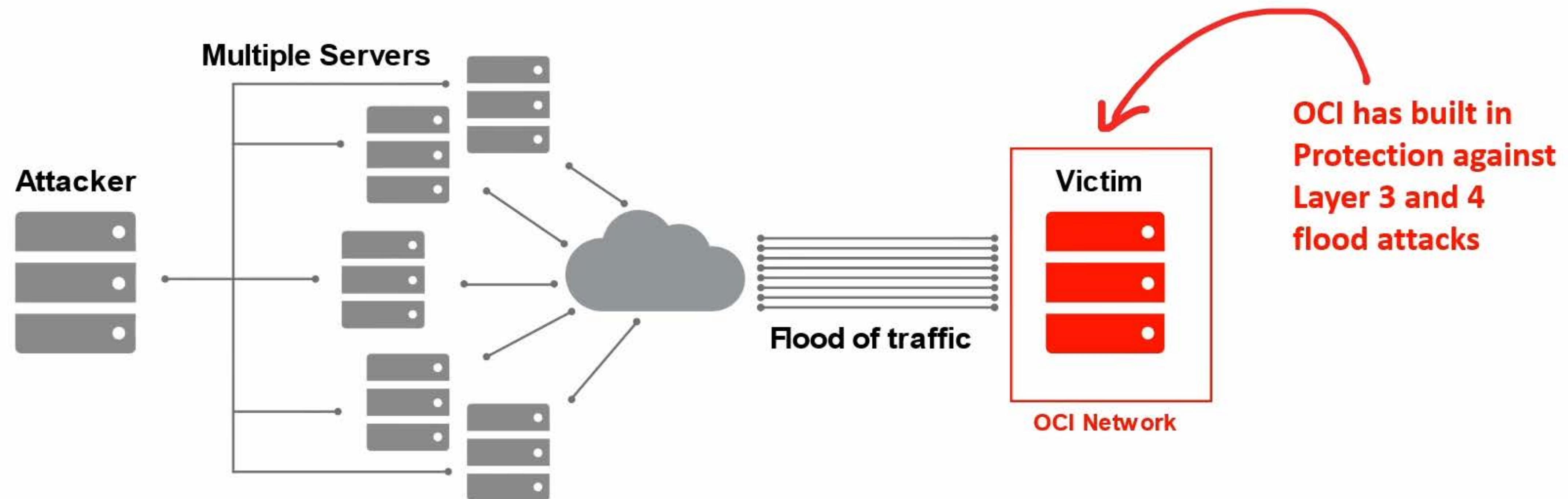
The Features of OS Management

- **Packages** — Searching, Installing or Removing Linux packages
- **CVEs** — a search facility that you can use to check individual CVEs (Common Vulnerabilities and Exposures) to determine the level of exposure in your tenancy.
- **Software Sources** — add and delete software sources to provide packages to instances, and to track the available updates to those packages.
- **Managed Instance Groups** — enable you to group your instances together for updates
- **Scheduled Jobs** — Executes one-time a single job eg. Download application logs
- **Work Requests** — Executes a job based on a schedule eg. Backup these systems files every day
- **Metrics and Alarms** — Create alarms such as when its time to apply a Security Update

OCI Security – DDoS Protection

What is a DDoS Attack?

A malicious attempt to disrupt normal traffic by flooding a website with large amounts of fake traffic.



OCI Security – Web Application Firewall

OCIs Web Application Firewall (WAF) protects your web-applications from **common web exploits. (CWEs)**

OCI WAF will sit between your server and incoming traffic and filter out HTTP/S traffic
Layer7 it decides that is unwanted based on managed or customer configured rules.

Protect web applications from attacks covered in the
OWASP Top 10 most dangerous attacks:



1. Injection
2. Broken Authentication
3. Sensitive data exposure
4. XML External Entities (XXE)
5. Broken Access control
6. Security misconfigurations
7. Cross Site Scripting (XSS)
8. Insecure Deserialization
9. Using Components with known vulnerabilities
10. Insufficient logging and monitoring

