

# Capital vs Operational Expenditure

## Capital Expenditure (CAPEX)

- Buildings
- Vehicles
- Hardware
- Equipment
- Land

## Operational Expenditure (OPEX)

- Products
- Business
- Systems

# The Evolution of Computing – Dedicated

Bare Metal /  
\*Dedicated



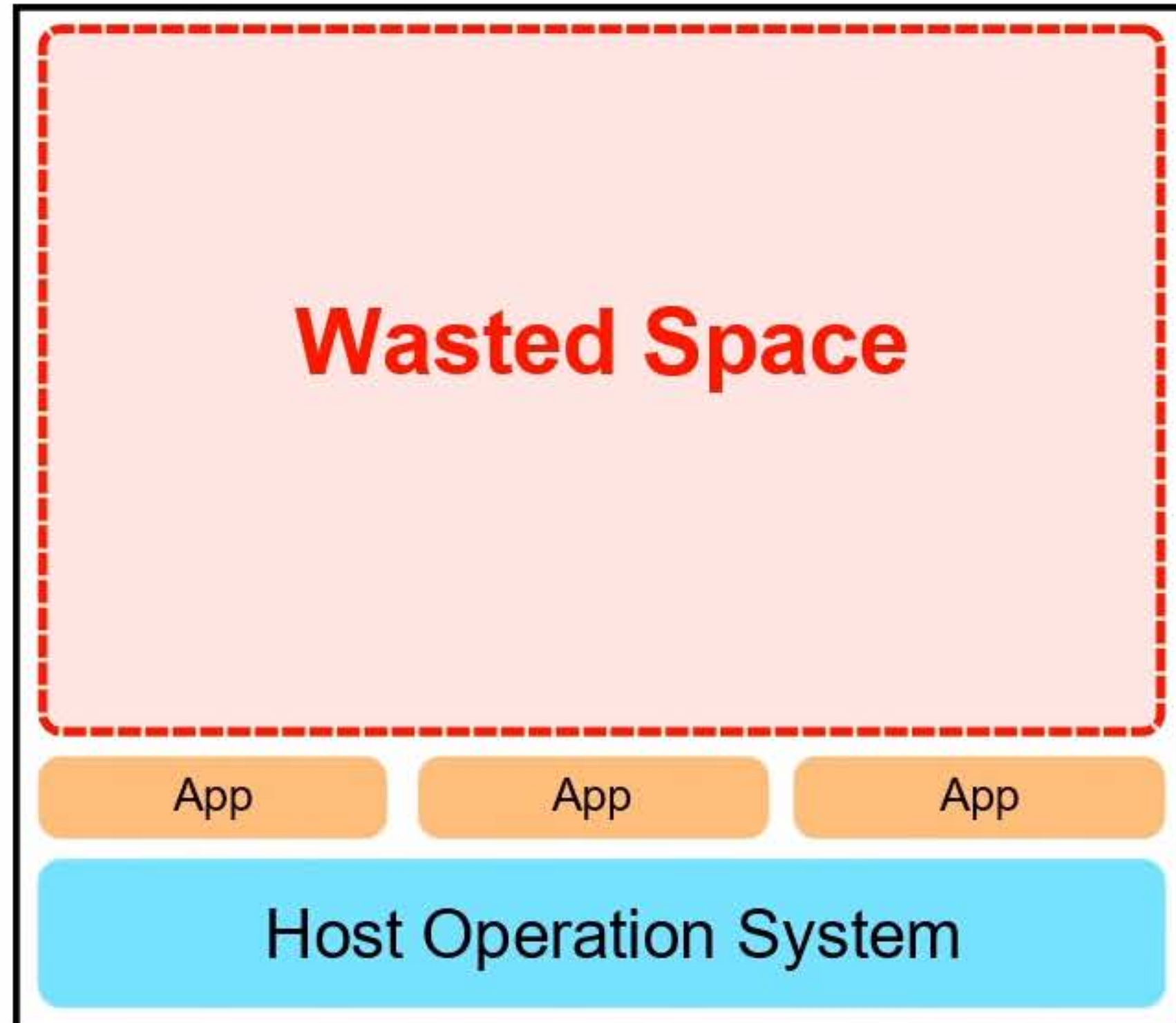
VMs



Containers



Functions



physical server

- A physical server **wholly utilized by a single customer**.
- You have to guess your capacity, you'll overpay for an underutilized server
- Upgrading beyond your capacity will be slow and expensive
- You are limited by your Operating System
- Multiple apps can result in conflicts in resource sharing
- You have a **\*guarantee of security, privacy and full utility of underlying resources**



# The Evolution of Computing – VMs

Bare Metal /  
\*Dedicated



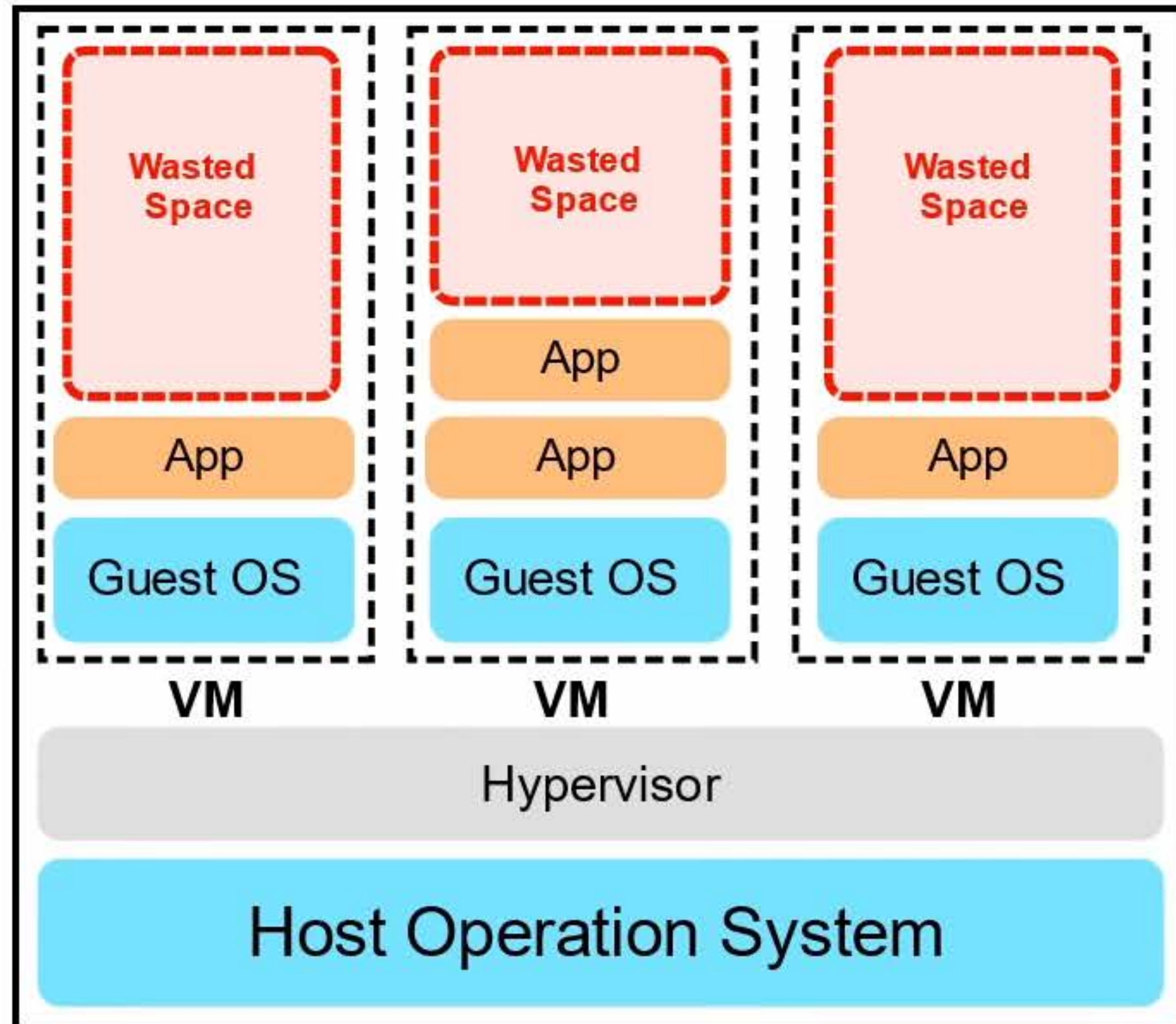
VMs



Containers



Functions



physical server

- You can run **multiple Virtual Machines on one machine.**
- **Hypervisor** is the software layer that lets you the VMs
- A physical server shared by multiple customers
- You are pay for a fraction of the server
- You'll overpay for an underutilized Virtual Machine
- You are limited by your Guest Operating System
- Multiple apps on a single Virtual Machine can result in conflicts in resource sharing



# The Evolution of Computing – Containers

Bare Metal /  
\*Dedicated



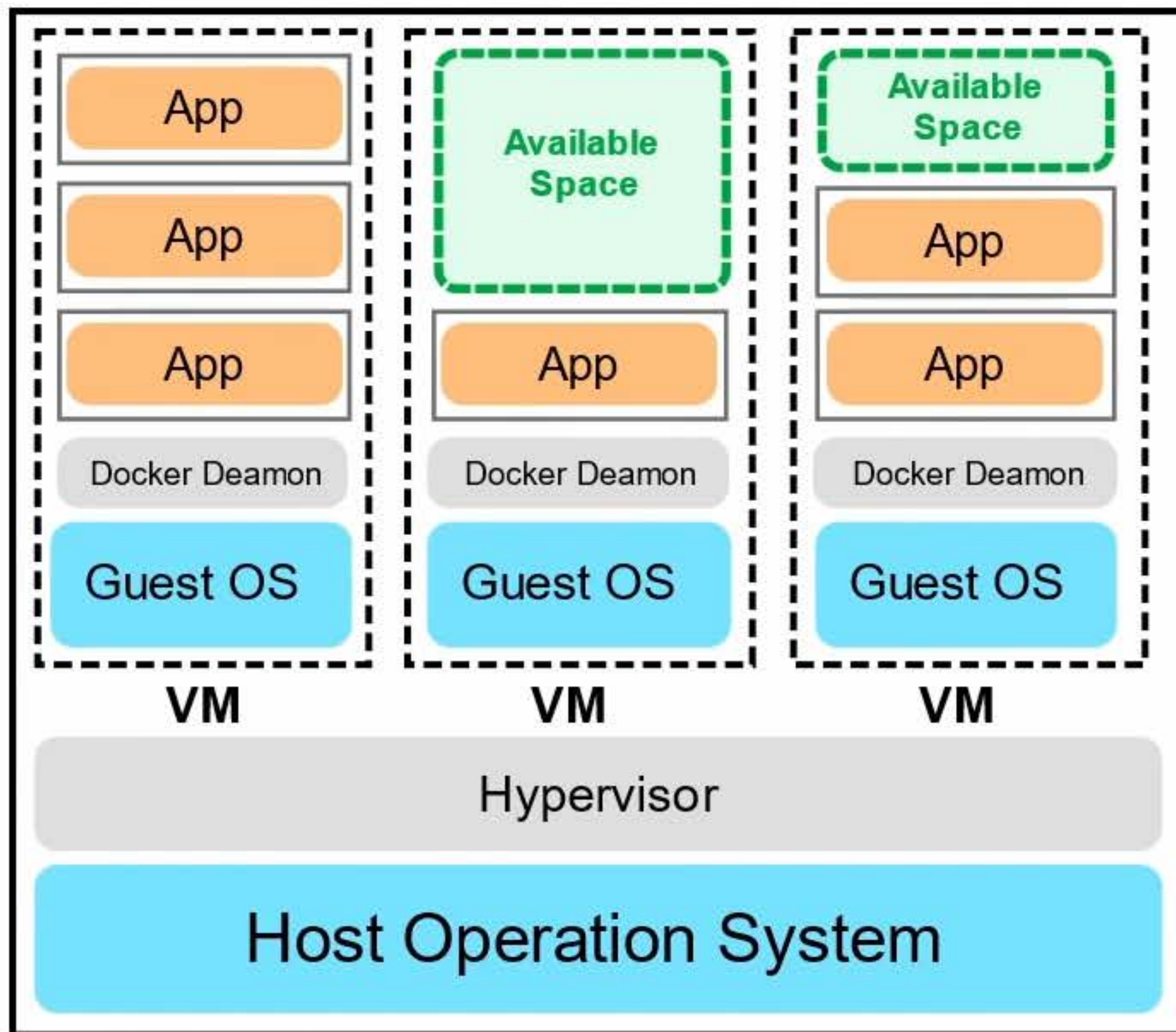
VMs



Containers



Functions



physical server

- Virtual Machine running multiple containers
- **Docker Daemon** is the name of the software layer that lets you run multiple containers.
- You can maximum the utilize the available capacity which is more cost-effective
- Your containers share the same underlying OS so containers are more efficient than multiple VMs
- Multiple apps can run side by side without being limited to the same OS requirements and will not cause conflicts during resource sharing



# The Evolution of Computing – Functions

Bare Metal /  
\*Dedicated



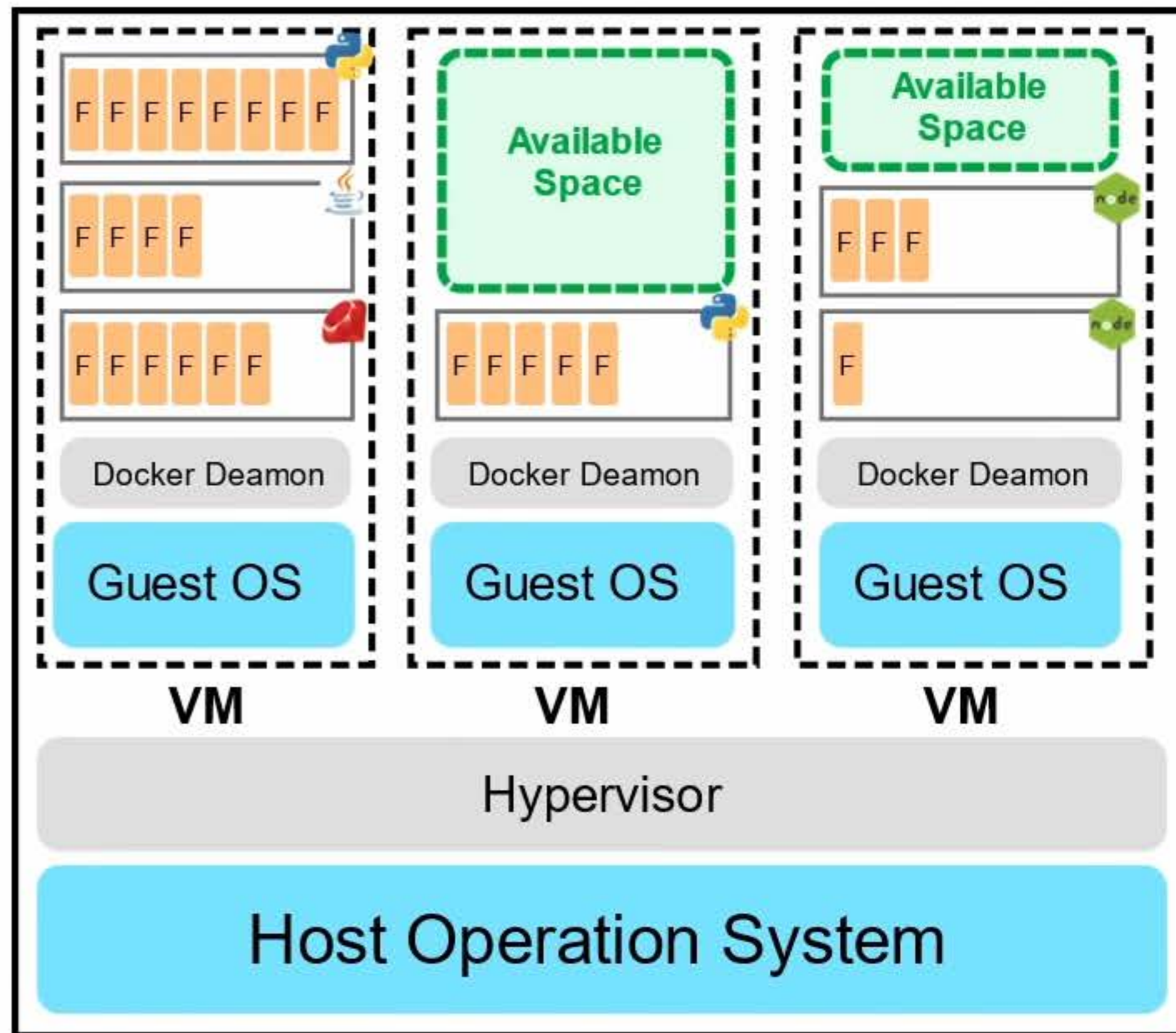
VMs



Containers



Functions



physical server

- A managed VMs running managed containers.
- Known as **Serverless Compute**
- You upload a piece of code choose the amount of memory and duration.
- Only responsible for code and data, nothing else
- Very cost-effective, only pay for the time code is running, VMs only run when there is code to be executed
- Cold Starts is a side-effect of this setup



# OCI Global Infrastructure – Regions

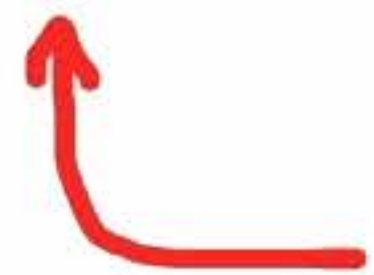
“Localized geographic area”

A **region** is a geographically distinct location that has many datacenters (Availability Domains).

As of the Year 2020 OCI has **21 Regions** and 🚧 15 Planned

There are **3** kinds of Regions

1. **Commercial** Any customer can launch resources in these regions
2. **Government** Only Governments can launch resources in these regions
3. **Azure Connected** Some commercial regions are connected to Azure



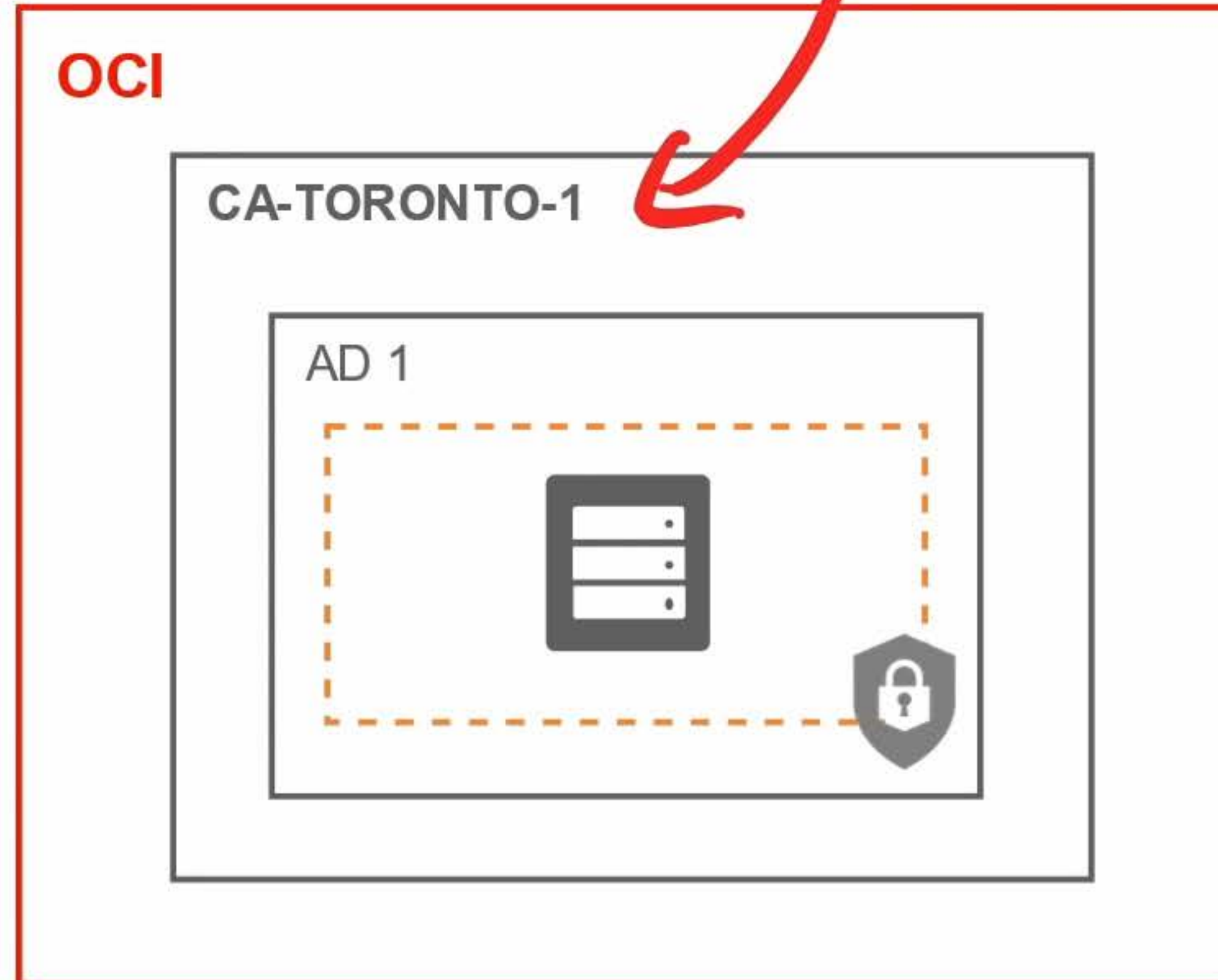
**Another cloud provider that offers  
Similar Cloud Services to OCI and AWS**



# OCI Global Infrastructure – Regions

Regions have an identifier eg.

- ca-toronto-1
- ap-tokyo-1







# OCI Global Infrastructure – ADs

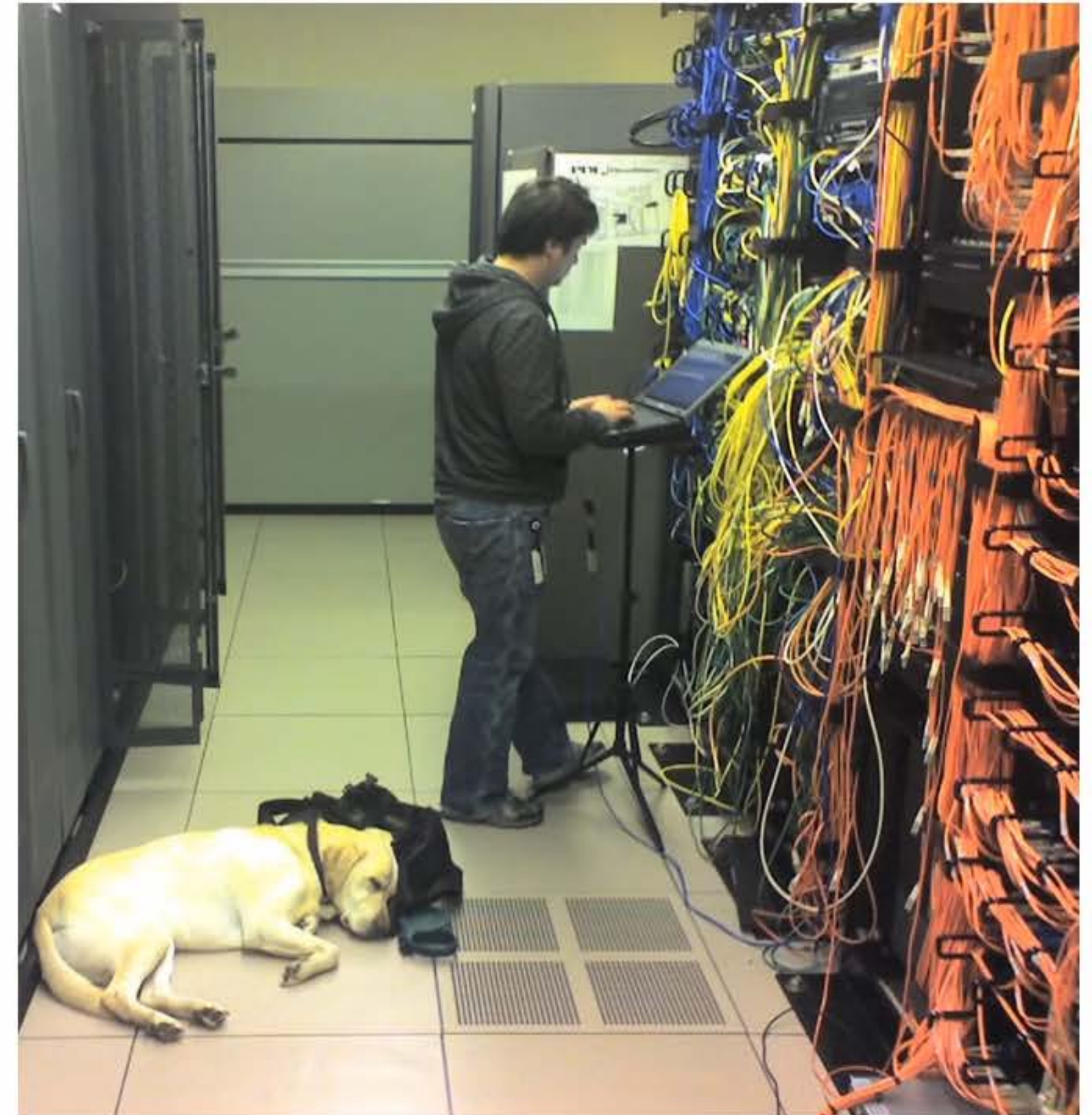
An **Availability Domain** (AD) is what OCI calls a datacenter.

A datacenter is a secured building that contains hundreds of thousands of computers.

A region will **\*generally** contain 3 datacenters

Datacenters within a region will be isolate from each other (so different buildings). But they will be close enough to provide low-latency.

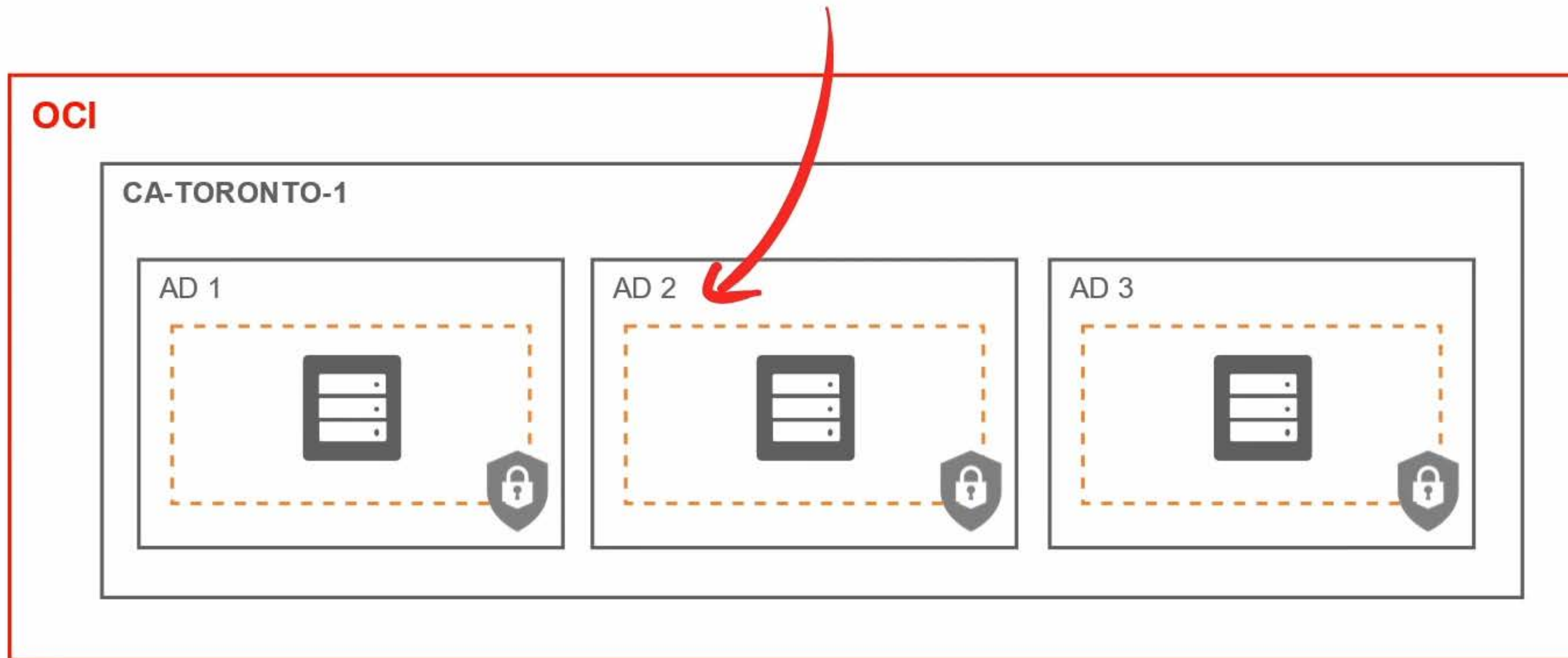
Its common practice to run workloads in at least 3 ADs to ensure services remain available in case one or two datacenters fail. (High Availability)





# OCI Global Infrastructure - ADs

**An Example of 3 ADs in a single Region.**





# OCI Global Infrastructure – One AD Regions

Not all OCI regions have 3 ADs on OCI. It common strategy for cloud providers initially launch a new region with a single datacenter and add more later. (1-5 years)



## One AD Regions

- Australia East (Sydney)
- Australia Southeast (Melbourne)
- Brazil East (Sao Paulo)
- Canada Southeast (Montreal)
- Canada Southeast (Toronto)
- India West (Mumbai)
- Japan Central (Osaka)
- Japan East (Tokyo)
- Netherlands Northwest (Amsterdam)
- Saudi Arabia West (Jeddah)
- South Korea Central (Seoul)
- Switzerland North (Zurich)



## Three ADs Regions

- Germany Central (Frankfurt)
- UK South (London)
- US East (Ashburn)
- US West (Phoenix)

**We said OCI has 21 Regions. The list here is the 16 Commercial regions.**



# OCI Global Infrastructure – FDs

A **Fault Domains** (FD) is what OCI calls a logical datacenter.

**A logical datacenter** is like a virtual/abstract datacenter within a physical datacenters.

An Availability Domain (physical datacenters) contains resources such as infrastructure and hardware and some of those resources are logically grouped together and made accessible to you within the Oracle Console.

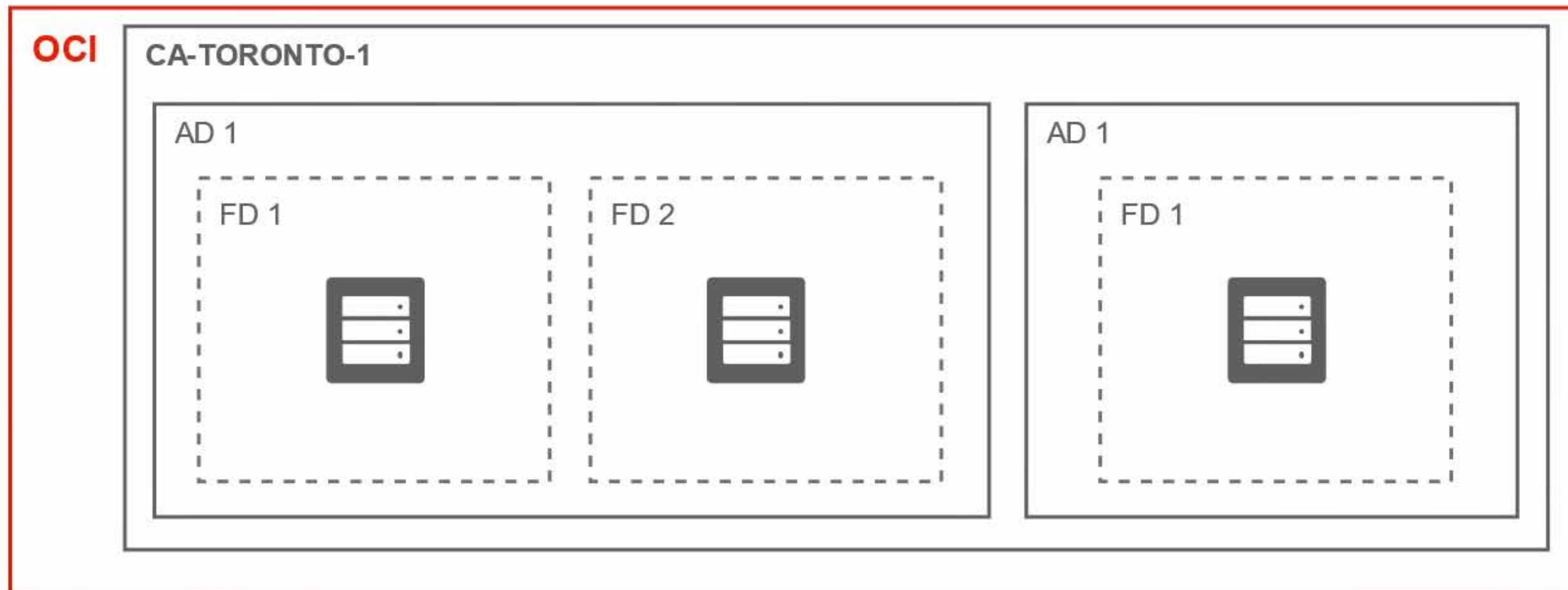
Having an abstraction ontop of a physical datacenters allows the cloud provider to layer in-between logical security controls and monitoring tools and **fault tolerance**.



# OCI Global Infrastructure – FDs

**Fault** is in the name for a reason.

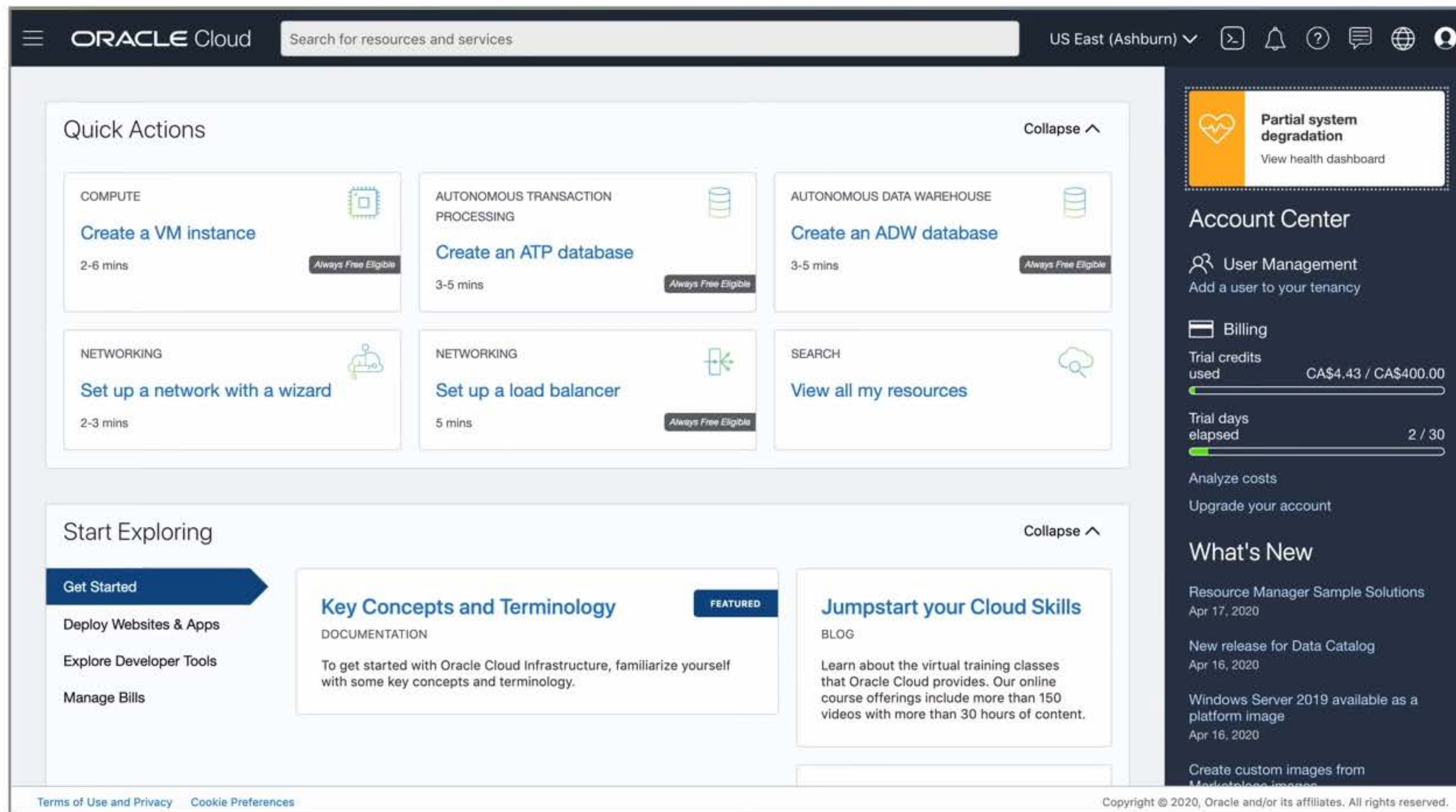
A Fault Domain's primary purpose is to **isolate** groupings of hardware within a datacenter so they don't share a single point of failure.





# OCI Concepts – Console

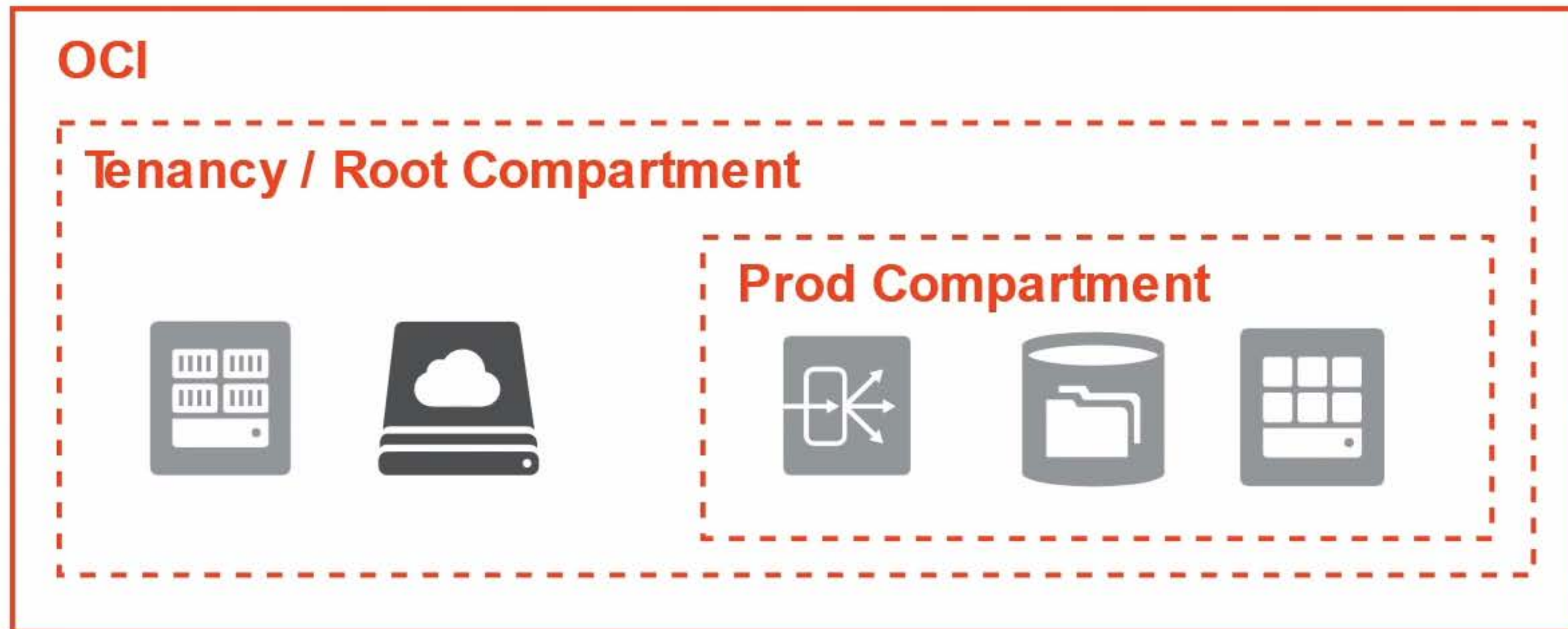
The **Console** is the simple and intuitive **web-based user interface** you can use to **access and manage Oracle Cloud Infrastructure**.





# OCI Concepts – Tenancy

When you sign up for Oracle Cloud Infrastructure, Oracle creates a **tenancy** for your company, which is **a secure and isolated partition within OCI** where you can **create, organize, and administer your cloud resources**.





# OCI Concepts – Compartments

A **Compartment** is a logical collection of related resources that can be accessed only by **certain groups** that have **been given permission** by an administrator.

A resource would be the cloud services provided by OCI  
eg. Instances, VCNs and Block Volumes

Create Compartment					
Name	Status	OCID	Authorized	Subcompartments	Created
<a href="#">bayko (root)</a>	● Active	...uxqgca	Yes	2	-
<a href="#">development</a>	● Active	...g4orrq	Yes	0	Sun, Apr 26, 2020, 17:01:12 UTC
<a href="#">ManagedCompartmentForPaaS</a>	● Active	...bko7nq	Yes	0	Sun, Apr 26, 2020, 13:16:00 UTC
Showing 3 Items < Page 1 >					



# OCI Concepts – Compartments

## Root Compartment

Oracle creates you a tenancy on signup and that is also known as your **root compartment** that holds all of your cloud resources.

- You can nest compartments six levels deep
- You can add or delete components whenever
- Compartments are not region specific so you can group resources cross region.
- Resources can be easily moved to other compartments
- Compartment resources can interact with each other
- You can apply Policies to Compartment to determine user access
- You can associate a compartment to a budget for cost analysis



# OCI Concepts – OCIDs

**Oracle Cloud IDs (OCIDS)** is a **unique ID** assigned by oracle to your cloud resources.  
OCIDs **are used in Policies and OCI API** to reference specific cloud resources.

## Format of OCIDs

ocid1.<RESOURCE TYPE>.<REALM>.[REGION][.FUTURE USE].<UNIQUE ID>

## Tenancy Example

ocid1.tenancy.oc1..aaaaaaaaaba3pv6wkcr4jqae5f44n2b2m2yt2j6rx32uzr4h25vqstifsfdsq

## Instance

ocid1.instance.oc1.phx.abuw4ljrlsfqw6vzzxb43vyyp4pkodawglp3wqxjqofakrwwou52gb6s5a



# OCI Concepts – API, CLI, CloudShell and SDK

**Application Programming Interface (API)** is a way to interact with cloud services programmatically

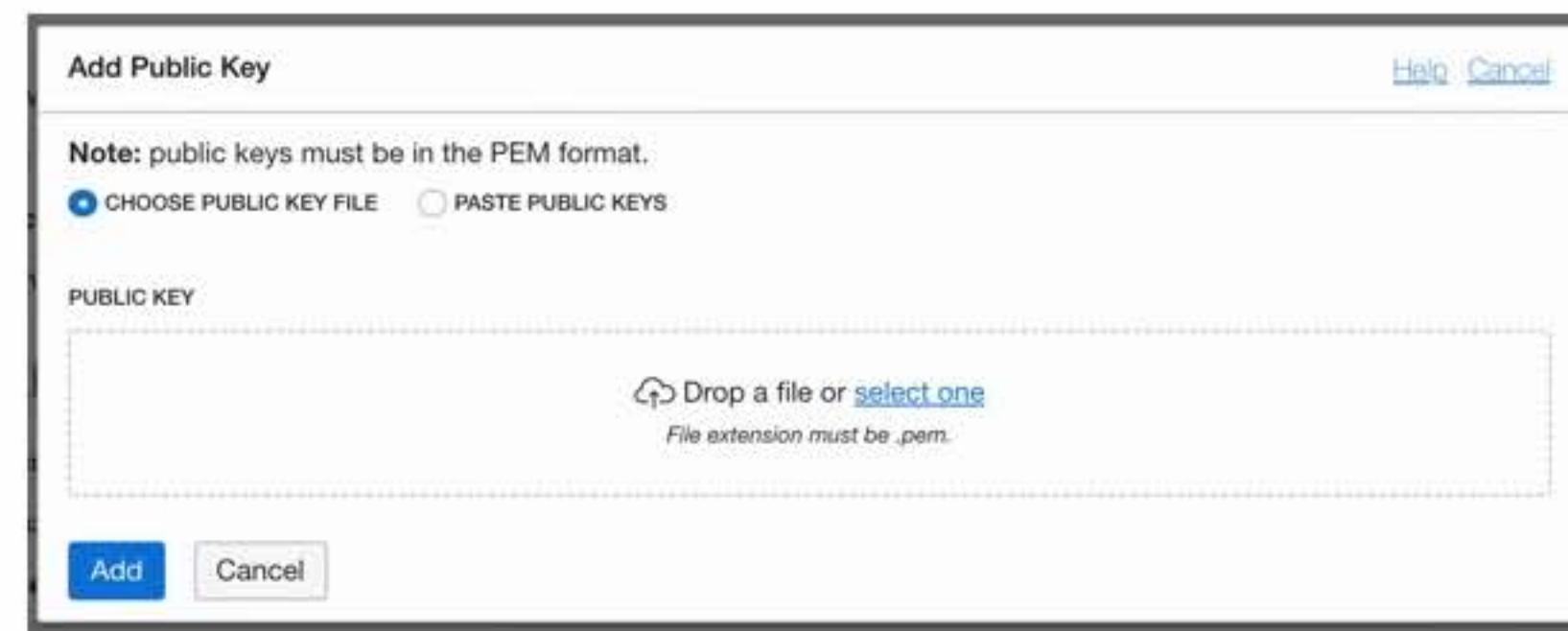
**Command Line Interface (CLI)** Access the API via the Shell Terminal Program

**Cloud Shell** a web browser-based terminal accessible from the Oracle Cloud Console. Cloud Shell is free to use (within monthly tenancy limits), and provides access to a Linux shell, with a pre-authenticated Oracle Cloud Infrastructure CLI

**Software Development Kit (SDK)** is a set of programming libraries available in common languages to interact with Oracle Cloud Services.



You can gain **programmatic access to OCI API** by uploading your on key / pair

A screenshot of the "Add Public Key" dialog box in the Oracle Cloud Console. The dialog has a title bar with "Add Public Key" and "Help" and "Cancel" links. Below the title bar, there is a note: "Note: public keys must be in the PEM format." Below the note, there are two radio buttons: "CHOOSE PUBLIC KEY FILE" (selected) and "PASTE PUBLIC KEYS". Below the radio buttons, there is a section labeled "PUBLIC KEY" with a large dashed border. Inside the dashed border, there is a text input field and a button with a cloud icon and the text "Drop a file or select one". Below the input field, there is a small note: "File extension must be .pem." At the bottom of the dialog, there are two buttons: "Add" and "Cancel".



# Core Services – Computing Services



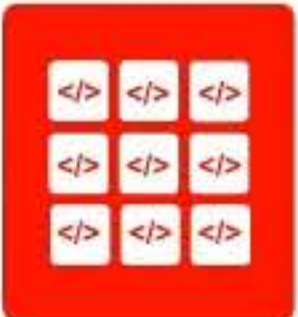
## Virtual Machines

A multi-tenant server running a hypervisor layer. Choose your OS Virtual Image and launch your server. You share the cost with other customers so you save.



## Container Engines

Docker as Service. Allows you to run docker containers on a virtual machine.



## Functions

Serverless compute. You just upload your code, and the cloud provider takes care of the rest. Code is design to run for a short period of time and you choose a managed container with runtime.



## Dedicated Virtual Hosts

A **single-tenant** server that is running a hypervisor layer where you can run multiple Virtual Machines. **You don't share the server with anyone else**, so greater security and performance are guaranteed.



## Bare Metal

A dedicated server **that has no hypervisor layer**. Bare Metal allows you to provide your applications with direct access to the processor and memory resources of the underlying server. This is suited for specialized workloads where hypervisor would hinder performance.