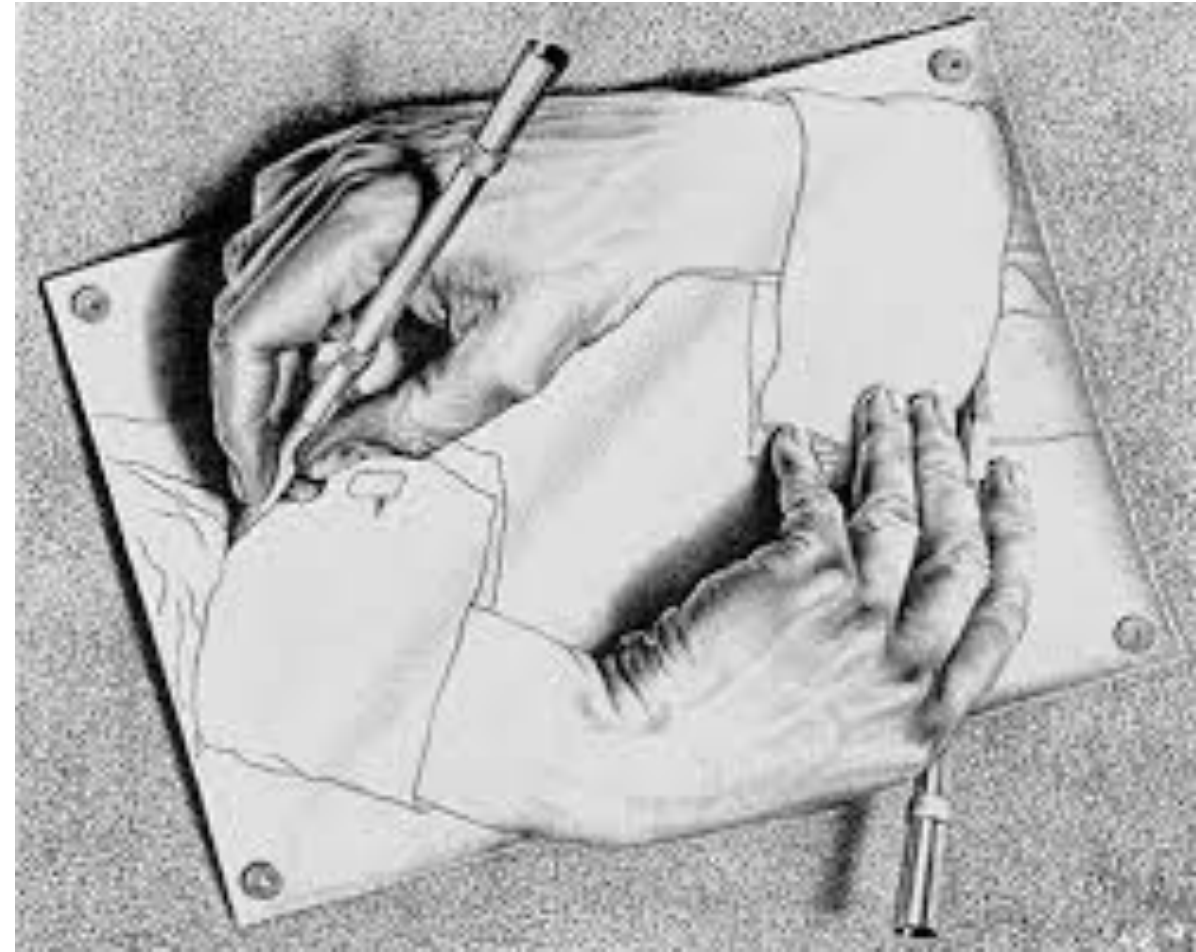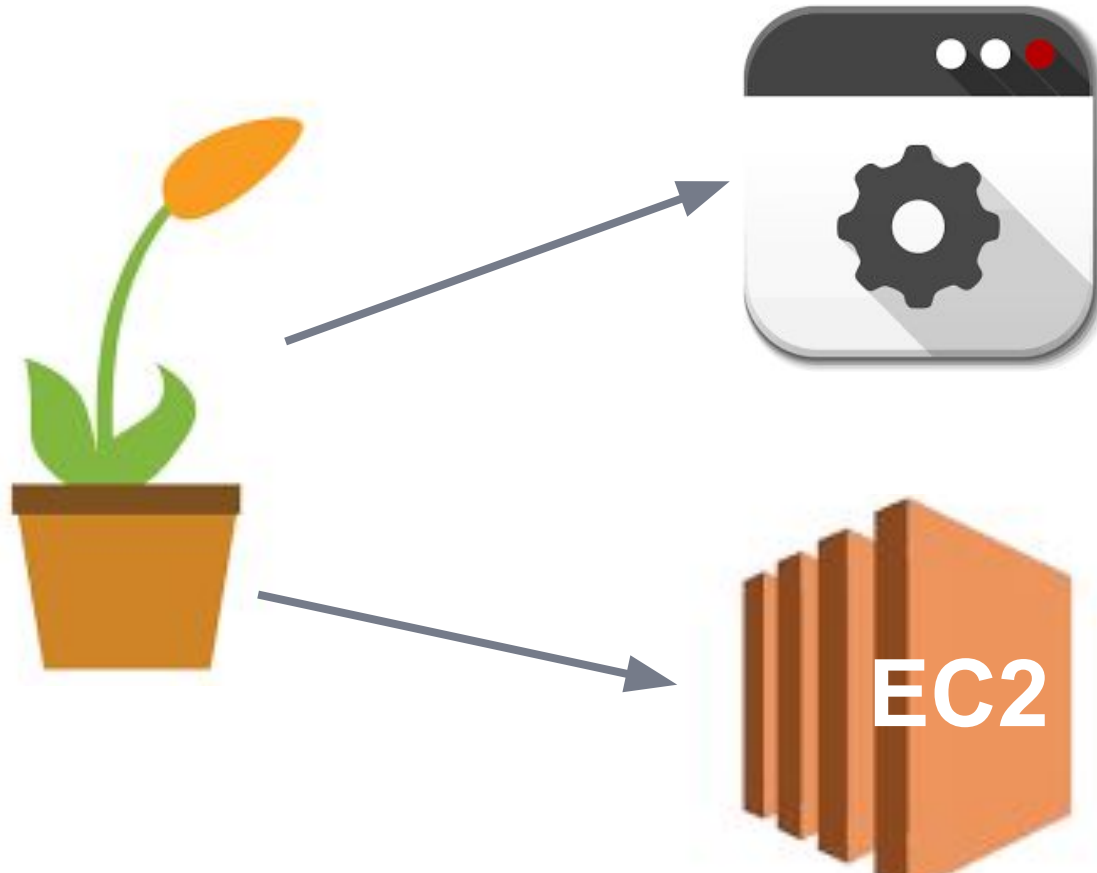# 1 Introduction to EC2

Today's Takeaways

▶ Introduction to EC2

▶ EC2 Instance Types

▶ Creating an EC2 instance

Introduction to EC2

What is EC2?

EC2

- EC2 stands for Elastic Compute Cloud in AWS.

- EC2 is a service that allows you to run application programs in the computing environment.

- EC2 is a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers.

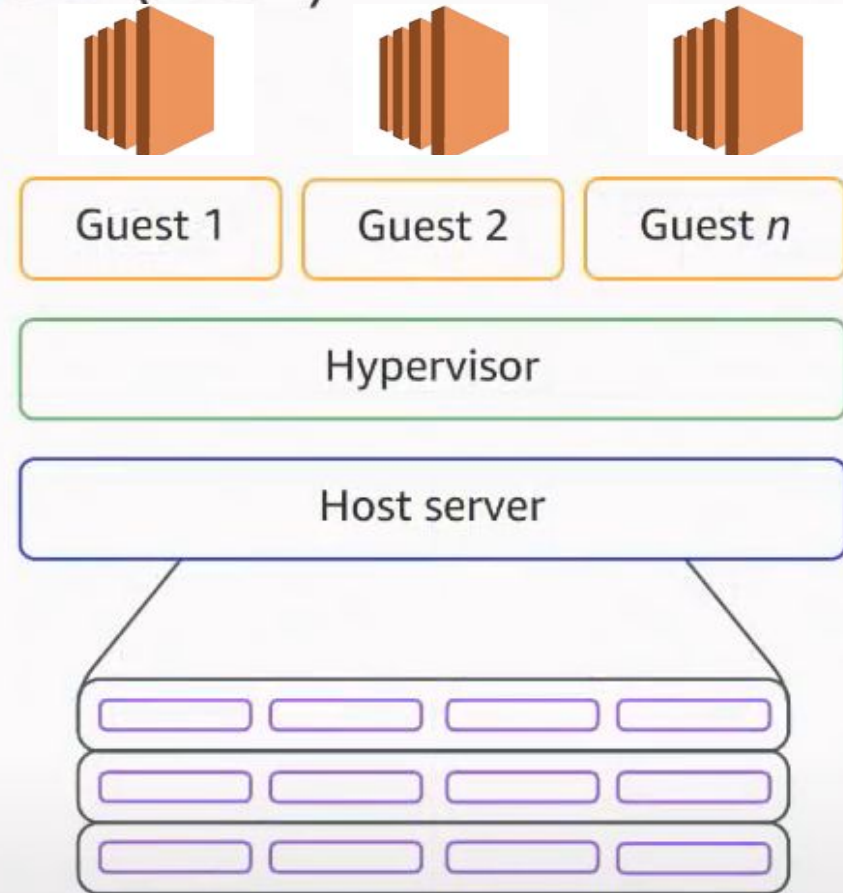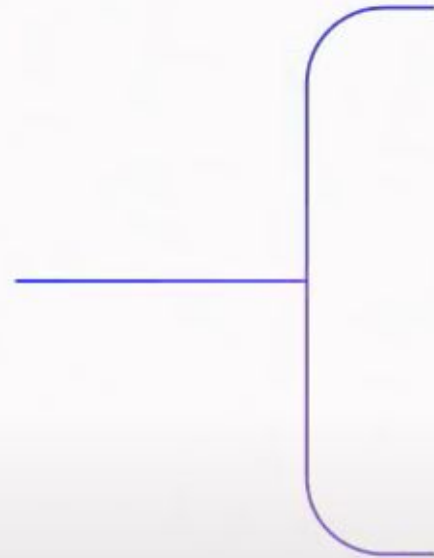# Amazon Elastic Compute Cloud (EC2)
Virtual servers in the cloud

Guest 1

Guest 2

Guest n

Hypervisor

Host server
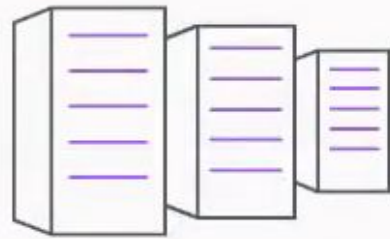
Physical servers in AWS global regions

Introduction to EC2

What is EC2?

- In fact, EC2 is a kind of computer such as your desktop in your home.Components of the EC2 are similar to conventional computer devices.

- Each EC2 component refers to one of the conventional computer parts such as Operation System, Hard Disk and Intel/AMD processors, etc.

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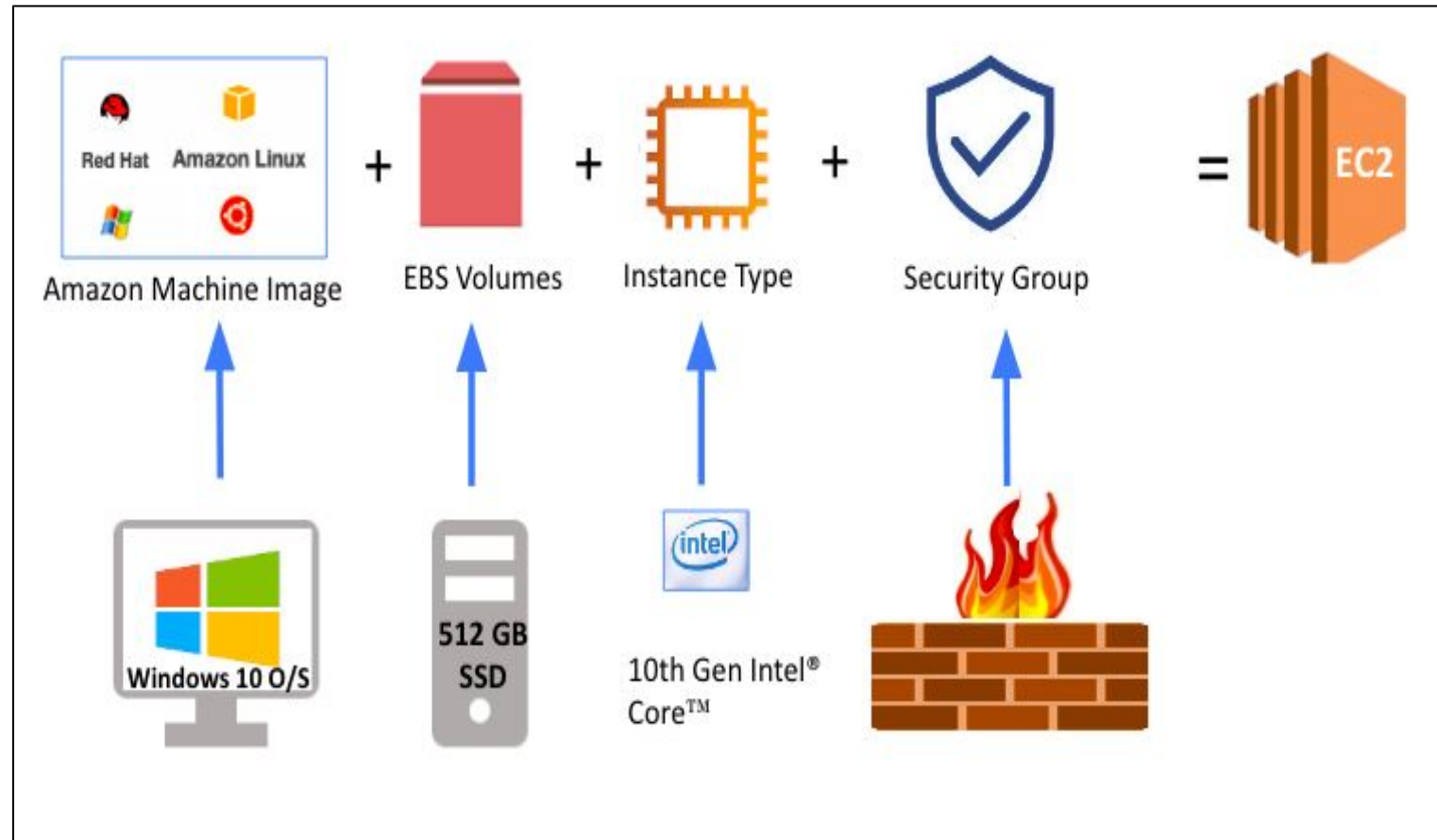
Introduction to EC2

EC2 Features

- Pay as you go,

- Setup and ready to use within 1 minute,

- CPU, Memory and Storage Capacity needs can be arranged within minutes,

- Create, Stop or Terminate instances via EC2 console easily.

2 Types of Instances

EC2 Instances
Types of Instances

Storage CPU Networking Memory

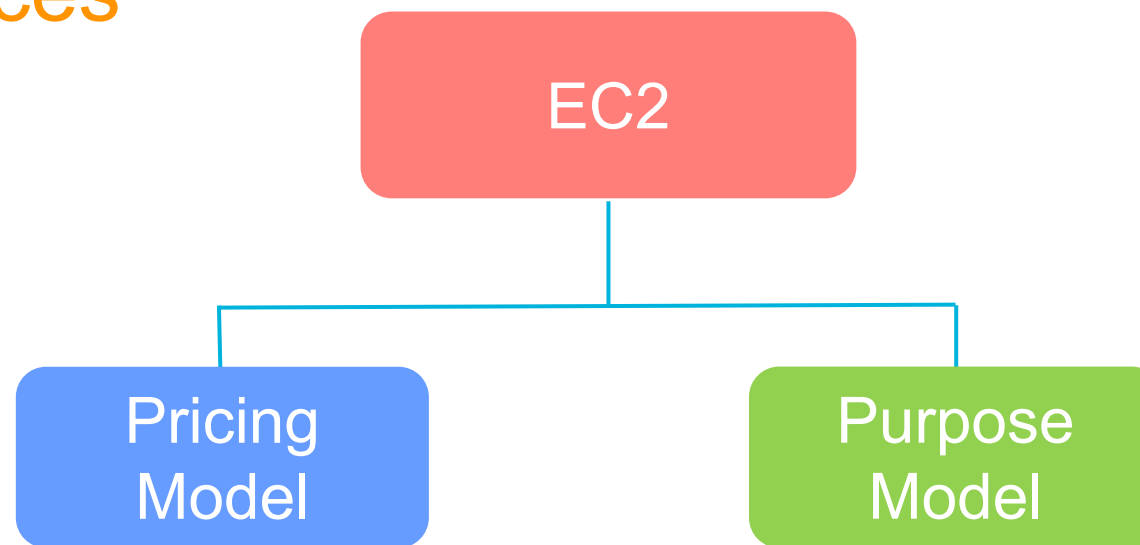**EC2**
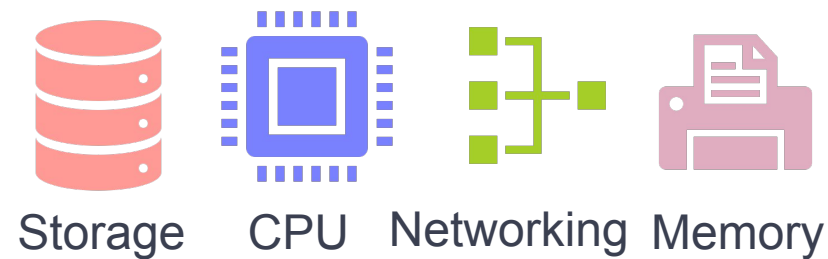
- Amazon EC2 provides a wide selection of instance types optimized to fit different use cases.

- Instance types comprise varying combinations of CPU, memory, storage, and networking capacity

EC2 Instances
Types of Instances

```
                    ┌──────────┐
                    │   EC2    │
                    └────┬─────┘
              ┌──────────┴──────────┐
        ┌───────────┐        ┌───────────┐
        │  Pricing  │        │  Purpose  │
        │   Model   │        │   Model   │
        └───────────┘        └───────────┘
```
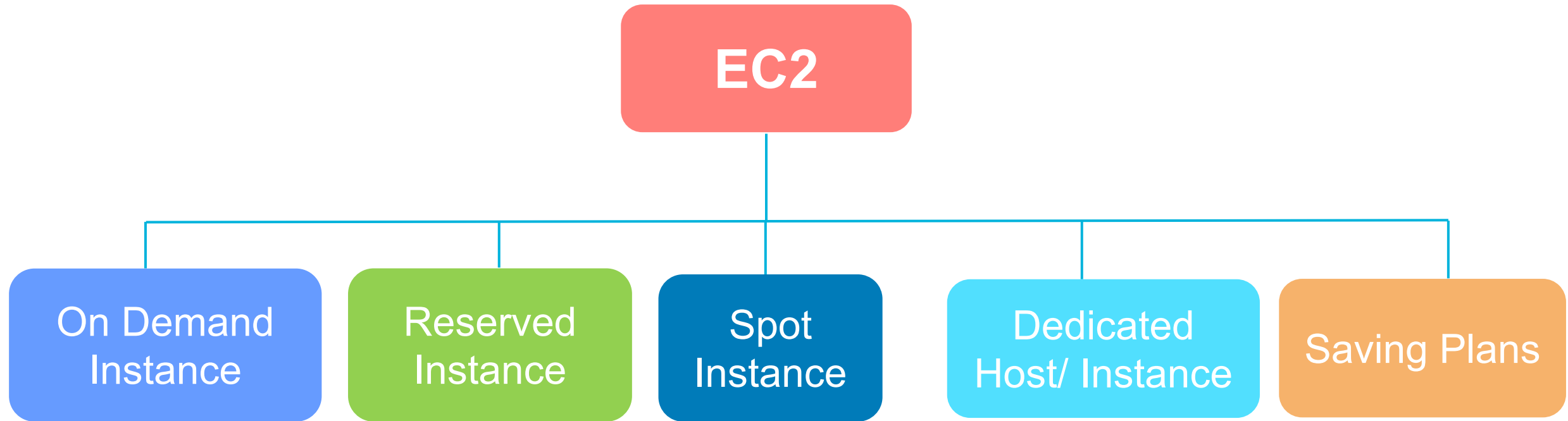
- Instance types are grouped into a variety of families based on target application profiles and pricing options. It is possible to categorize EC2 types under two main perspective :

- These are Pricing Model and Purpose Model.

EC2 Instances

Pricing Model of Instances

```
                        ┌─────────────┐
                        │     EC2     │
                        └──────┬──────┘
      ┌──────────────┬─────────┼─────────────┬──────────────┐
┌──────────┐  ┌──────────┐ ┌──────────┐ ┌──────────────┐ ┌──────────────┐
│On Demand │  │ Reserved │ │   Spot   │ │  Dedicated   │ │ Saving Plans │
│ Instance │  │ Instance │ │ Instance │ │Host/ Instance│ │              │
└──────────┘  └──────────┘ └──────────┘ └──────────────┘ └──────────────┘
```

When we look at the pricing perspective, AWS offers 5 different types of instance pricing.

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EC2 Instances

On Demand Instances

- You pay for compute capacity by the "hour "or the "second"

- No commitments

- No upfront payments

- You can increase or decrease your compute capacity

- Pre-estimated

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EC2 Instances
On Demand Instances

On-Demand instances are recommended for:

- Users that prefer the low cost and flexibility of Amazon EC2 without any up-front payment or long-term commitment

- Applications with short-term, spiky, or unpredictable workloads that cannot be interrupted
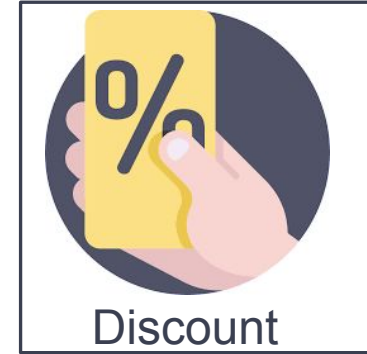
EC2 Instances
On Demand Pricing

- t2.micro in us-east-1 (N.Virginia)
- cost : $ 0.0116/hour

- 25 seconds usage--->>> $ 0.0116 / 60= $ 0.00019 (min 60 seconds)
- 60 seconds usage--->>> $ 0.0116 / 60= $ 0.00019 (min 60 seconds)
- 30 minutes usage--->>> $ 0.0116 / 2= $ 0.0058)
- 1 month usage---->>> $ 0.0116 * 24 *30 = $8.32)

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EC2 Instances
Reserved Instances (RI)

Commitments

Discount

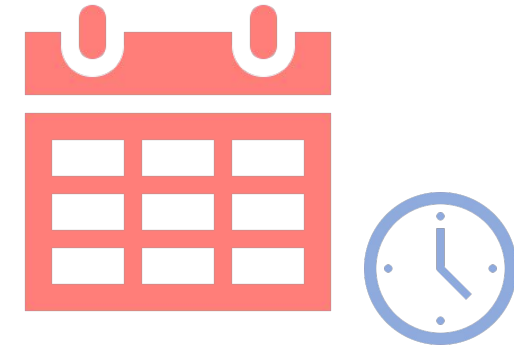CAPACITY RESERVATION

- Reserved Instances provide you with a significant discount (up to 75%) compared to On-Demand instance pricing.

- It is a tariff that takes advantage of the discounted price by giving AWS a 1 or 3-year commitment.

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EC2 Instances
Scheduled Reserved Instances

- It's an Instance model derived from Reserved Instance

- This model is very similar to the Reserved Instance and provides you to make the purchase over 24 hours.

- Thanks to the Scheduled Reserved Instance, you can run an instance only between the hours you reserved in reduced price.

EC2 Instances
Reserved Instances (RI)

Reserved Instances are recommended for:

- Applications with steady state usage

- Applications that may require reserved capacity

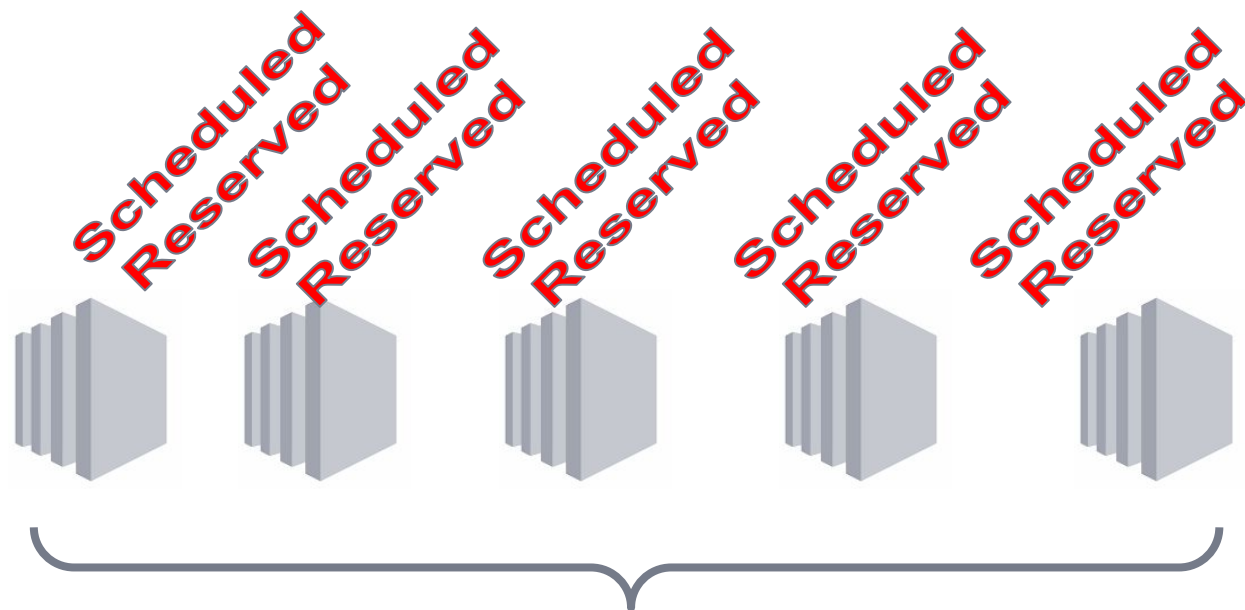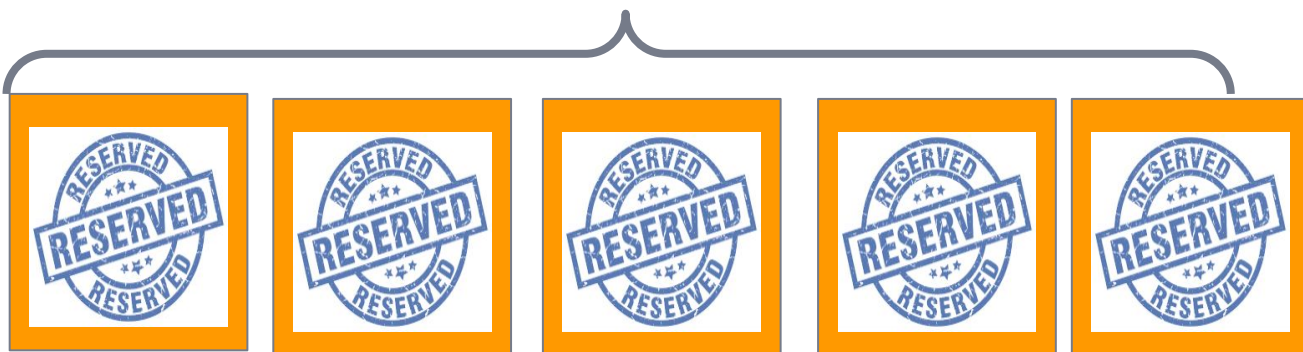- Customers that can commit to using EC2 over a 1 or 3 year term to reduce their total computing costs

EC2 Instances
Example

www.e-commerce

RESERVED INSTANCE: 7/24

Scheduled Reserved

Scheduled Reserved

Scheduled Reserved

Scheduled Reserved

Scheduled Reserved

Scheduled Reserved 08:00 AM - 08:00 PM

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EC2 Instances
Spot Instance

Run   **Shut down**
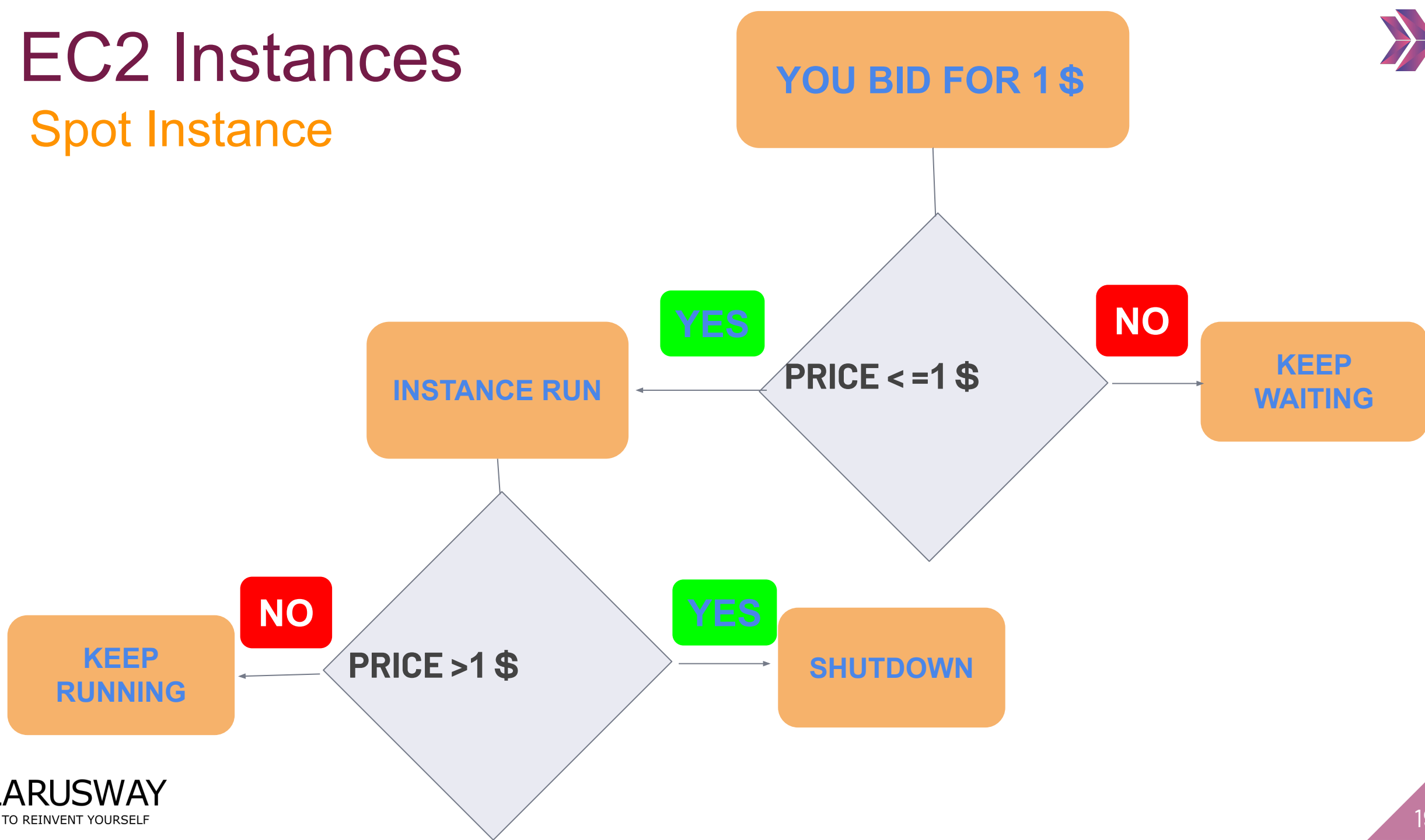
- In Spot Instance, you can enter a purchase order by setting a target price.

- The machine runs when the current price falls below the target price.

- The machine automatically shuts down if the price exceeds that target price.

- You can save up to 90% cost advantage.

EC2 Instances
Spot Instance

YOU BID FOR 1 $

PRICE < =1 $

YES → **INSTANCE RUN**

NO → **KEEP WAITING**

PRICE >1 $

NO → **KEEP RUNNING**

YES → **SHUTDOWN**

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19

EC2 Instances

Spot Instance vs. On Demand Price

45 minutes

Spot Instance

Pay for 45 minutes

???????

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EC2 Instances

Spot Instance

Spot instances are recommended for:

- Applications that have flexible start and end times

- Non-continuity jobs such as testing

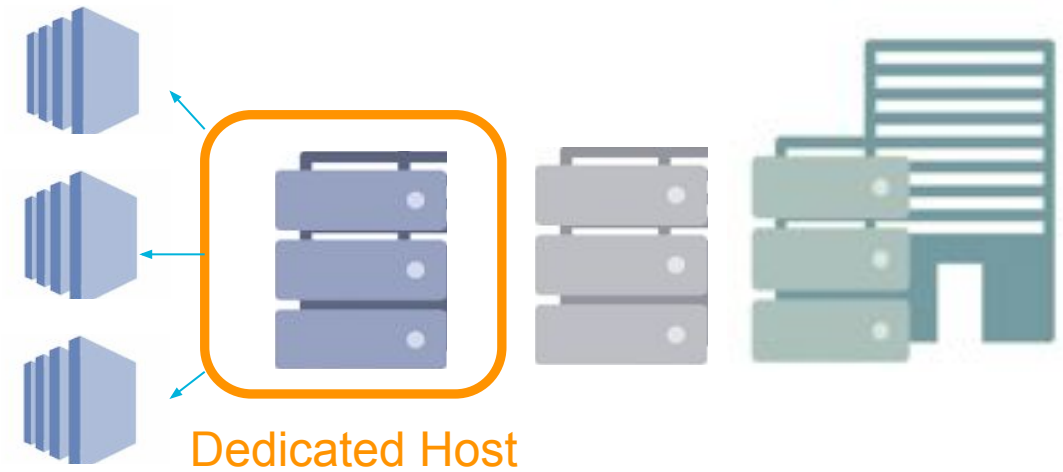# EC2 Instances
Dedicated Host/Instance

A Dedicated Host is a physical server the whole capacity of with EC2 instance is dedicated to your use.

Not only your instances are reserved but also they physically separated from the other servers.

A Dedicated Host consists of Dedicated Instance capacities according to your needs. You may choose to buy a Dedicated Host or only one Dedicated Instance also.

Dedicated Host

EC2 Instances

Saving Plans

ON DEMAND

EC2

5000 HOURS OF USAGE

1500$

SAVING PLAN

EC2

5000 HOURS OF USAGE

1000$

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Spot

Dedicated Host/Instance

On Demand

Reserved

Saving Plan

EC2 Instances
Types of Instances Recap

EC2

Pricing Model

Purpose Model

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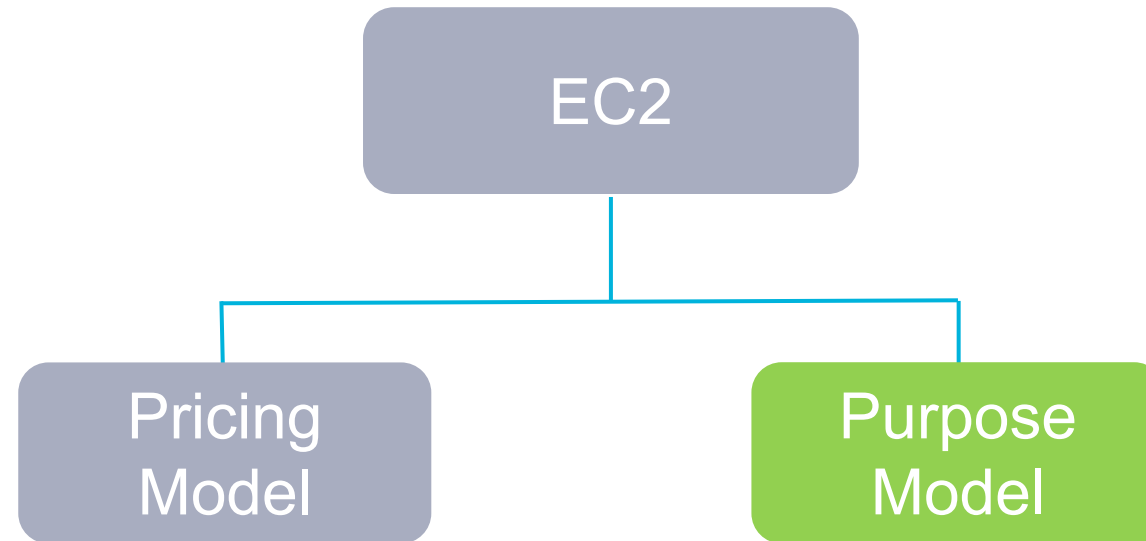
EC2 Instances
Purpose Model

```
                        ┌─────────────────────┐
                        │   Purpose Model     │
                        └─────────────────────┘
```

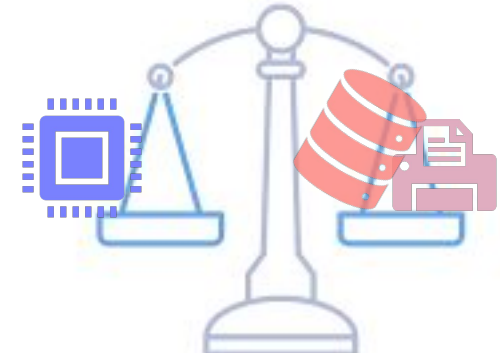| Burstable	General Purpose	Compute Optimized	Memory Optimized	Storage Optimized	Accelerate Computing
T	M	C	R	D	F
	A		X	I	P
			U	H	G
			Z		
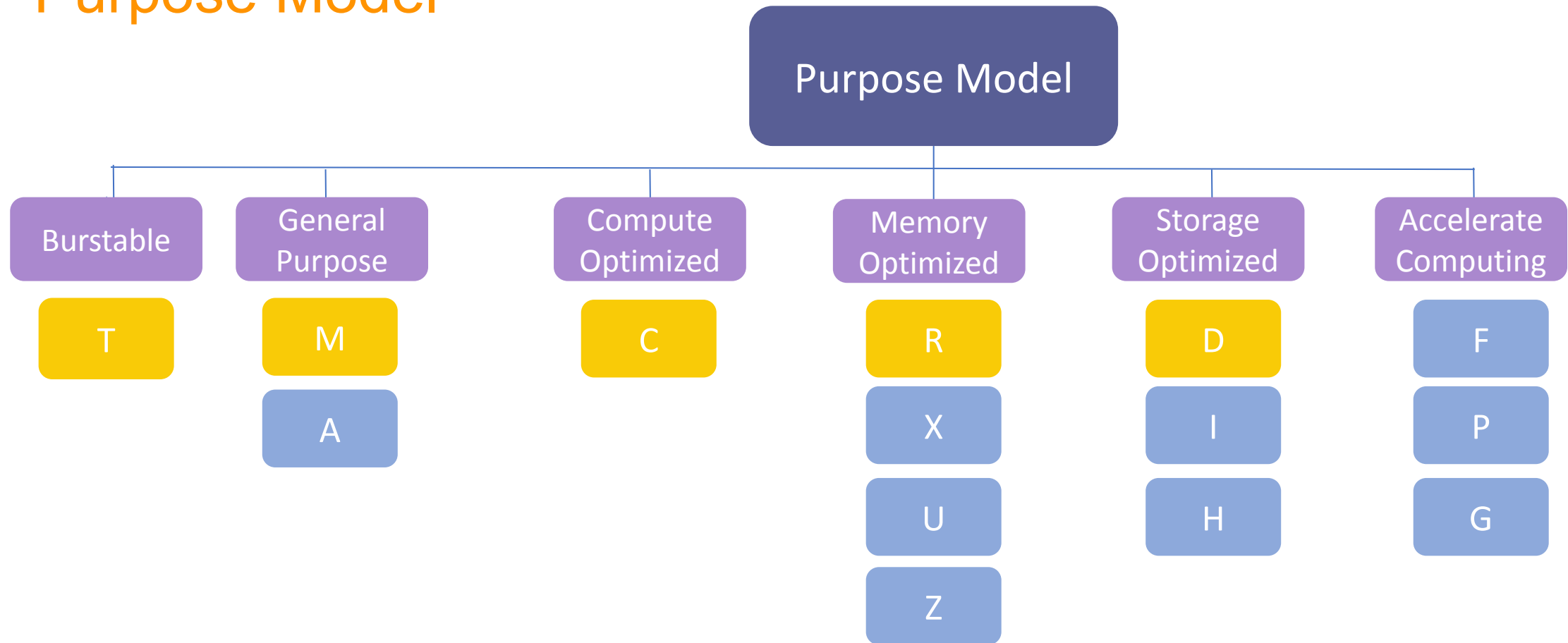
AWS offers 14 different types of virtual machines in 6 categories
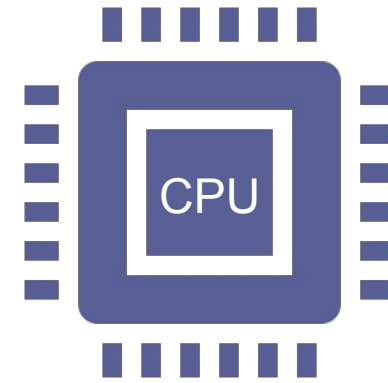
EC2 Instances
General Purpose

General Purpose

- General purpose instances provide a balance of compute, memory and networking resources, and can be used for a variety of diverse workloads.

- There are T, M and A options that we can use for standard and application needs.

- This is the most commonly used instance type and ideal for web servers.

EC2 Instances
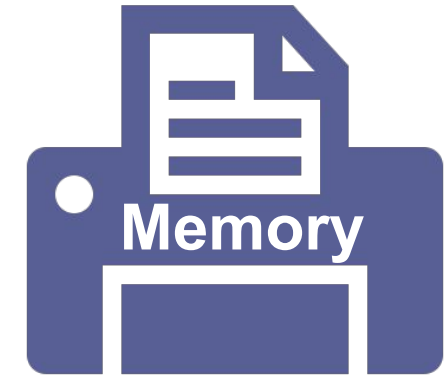## Compute Optimized

- Compute Optimized instances are ideal for compute bound applications that benefit from high performance processors.

- Instances belonging to this family are well suited for batch processing workloads, media transcoding, high performance web servers, dedicated gaming server, etc.

EC2 Instances

Memory Optimized

- Memory optimized instances are used in situations requiring a high-performance database, real-time large data analytics, and high memory usage.

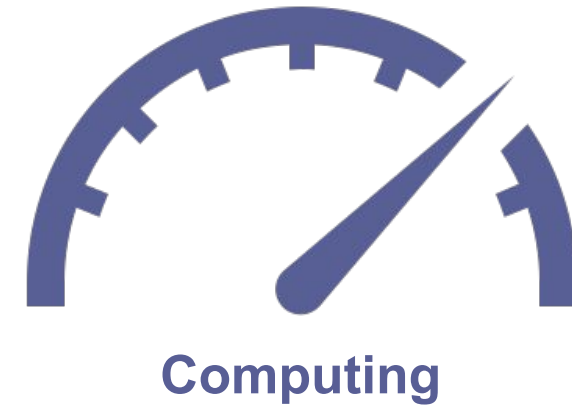- There are R, X, Z and U type instances in this category.

EC2 Instances
Storage Optimized

- Storage optimized instances are designed for workloads that require high, sequential read and write access to very large data sets on local storage.

- It is the best used for the fast disk structures we need in NoSQL databases or data warehouse solutions.

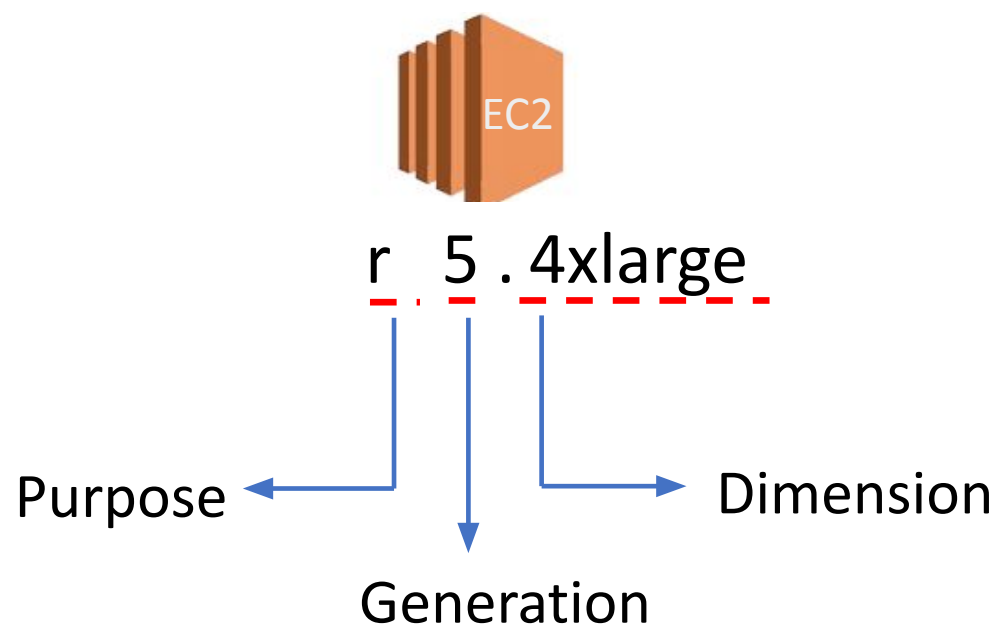- There are D, H and I type of instances in this category.

EC2 Instances

Accelerated Computing

Computing

- Preferred when you need machine learning, deep learning calculation, and analysis.

- There are F, P and G type of instances in this category.

EC2 Instances
Instance Coding

r 5 . 4xlarge

Purpose ← → Dimension

Generation

- R refers to its purpose. It means this EC2 is Memory Optimized instance.

- 5 refers to instance generation. For example, the last generation of the r-family is 5.

- 4xlarge refers to dimension of instance. AWS has built servers of various sizes to suit every need in instance families. For example, the r5-family has 8 different sizes starting from **large to 24xlarge.**

- Not all models have instances in every generation and size.

Introduction to EC2

Let's get our hands dirty!

- Introduction of EC2 console
- Creating an EC2 instance
- Creating an EC2 instance with user data
- Working with Instance Actions

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THANKS!

Any questions?

You can find me at:

- ▸ @osvaldo
- ▸ osvaldo@clarusway.com

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