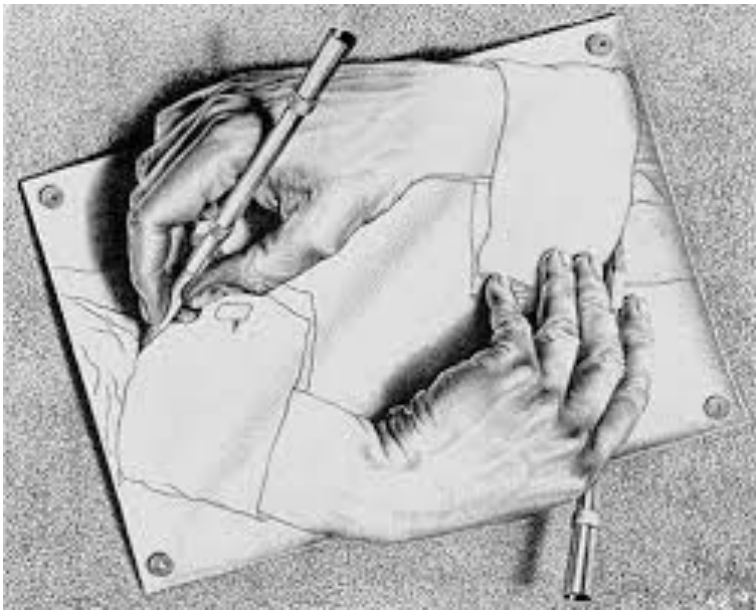
# 1 Introduction to EC2

CLARUSWAY
WAY TO REINVENT YOURSELF

## Today's Takeaways

- Introduction to EC2
- EC2 Instance Types
- Creating an EC2 instance



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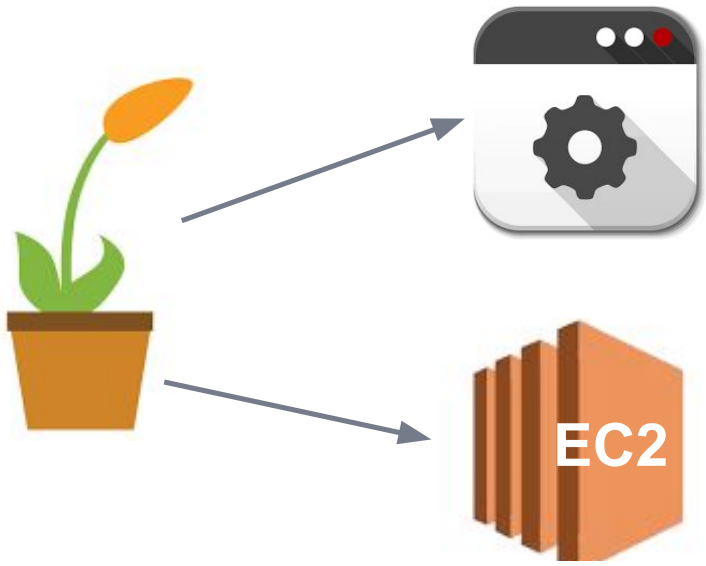
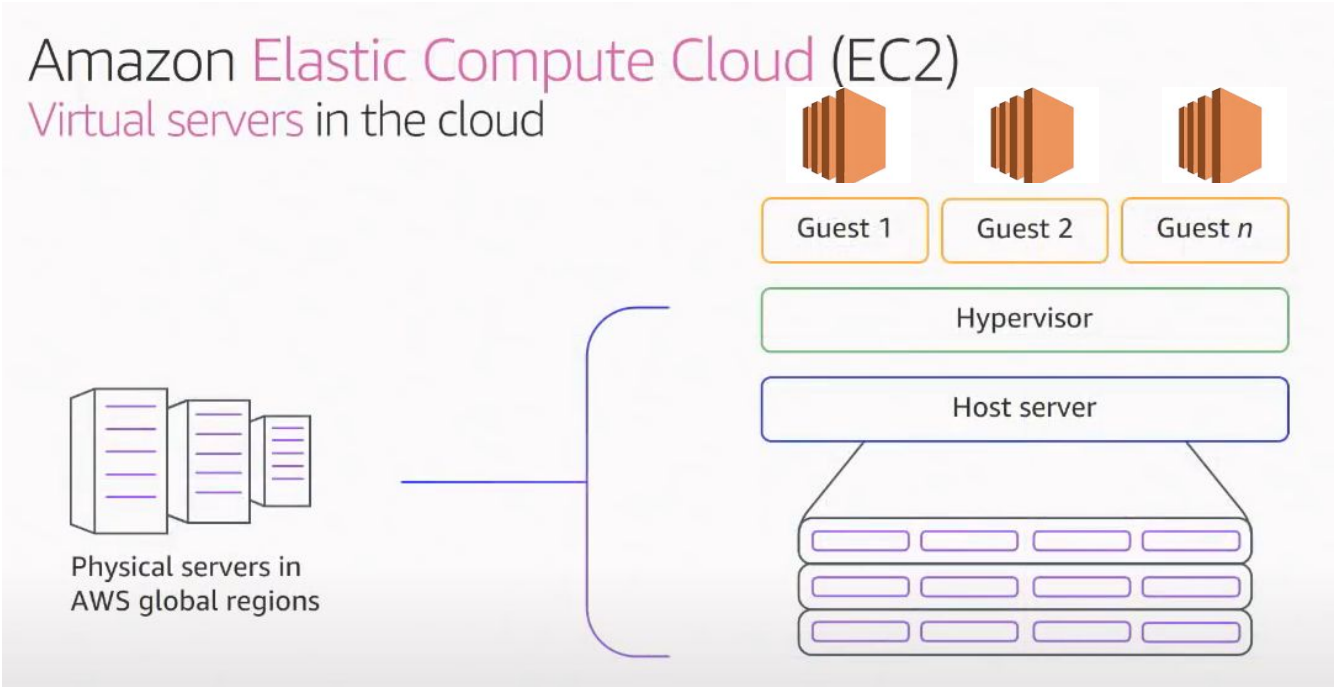
# Introduction to EC2

## What is 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.



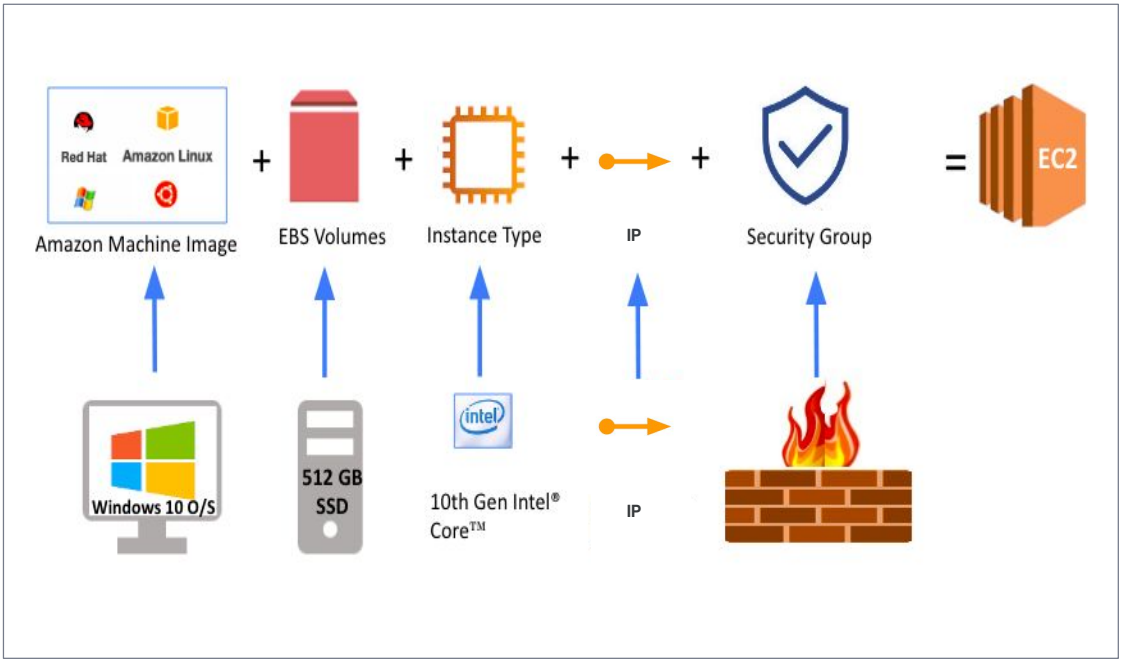


# Introduction to EC2

## 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 Operating System, Hard Disk and Intel/AMD processors, etc.



# Introduction to EC2

## EC2 Features





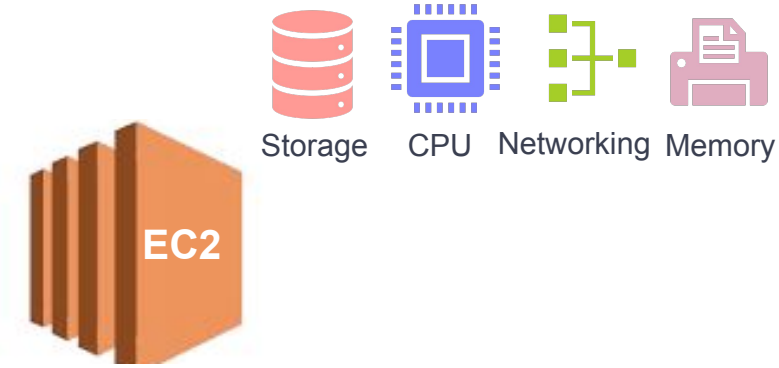
- Pay as you go,
- Setup and ready to use within 1 minute,
- CPU, Memory and Storage Capacity needs can be arranged within minutes,
- Create, Stop or Terminate instances via EC2 console easily.



# 2 Types of Instances

# EC2 Instances

## Types of Instances

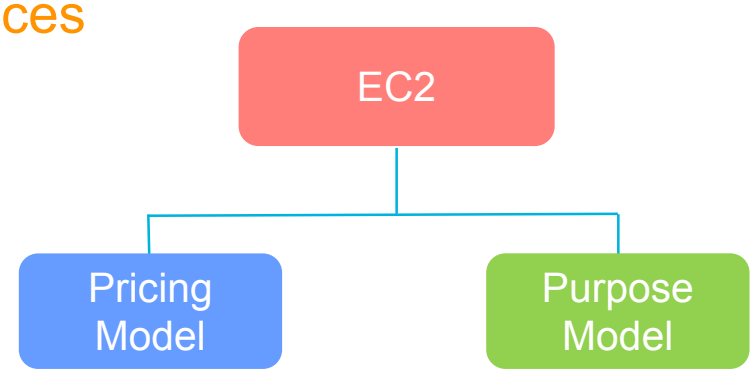



- Amazon EC2 provides a wide selection of instance types optimized to fit different use cases.
- Instance types comprise varying combinations of CPU, memory, storage, and networking capacity



# EC2 Instances

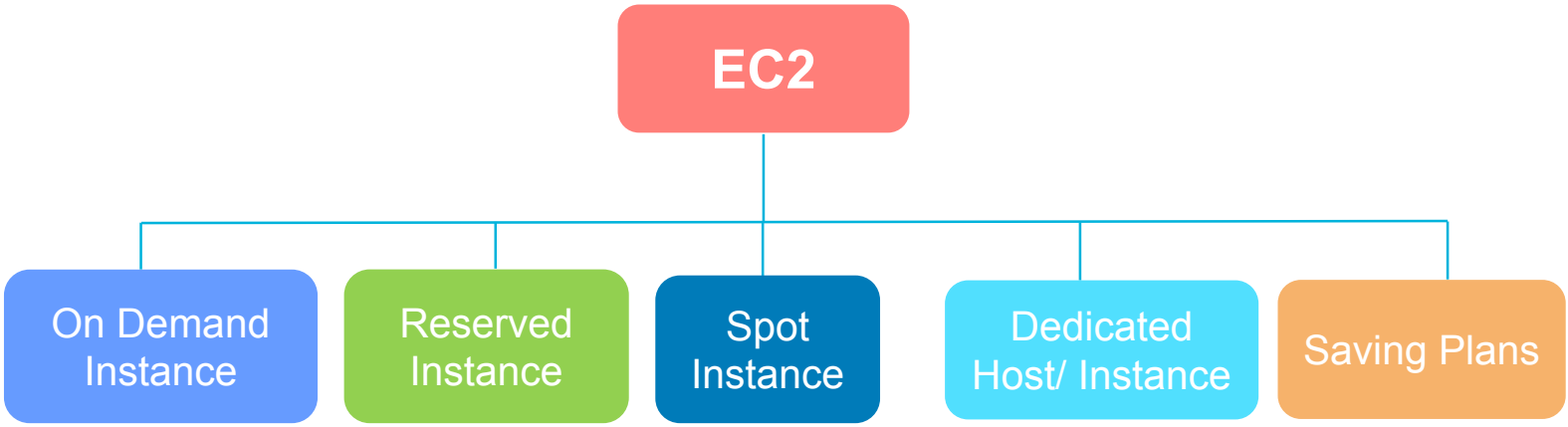
## Types of Instances




- 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




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

* Capacity Reservation

# 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

# 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 = $8.47 )

* Add Pricing of EBS Volume + IPV4 (after February 1, 2024)

# EC2 Instances

## Reserved Instances (RI)




- 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.



# EC2 Instances

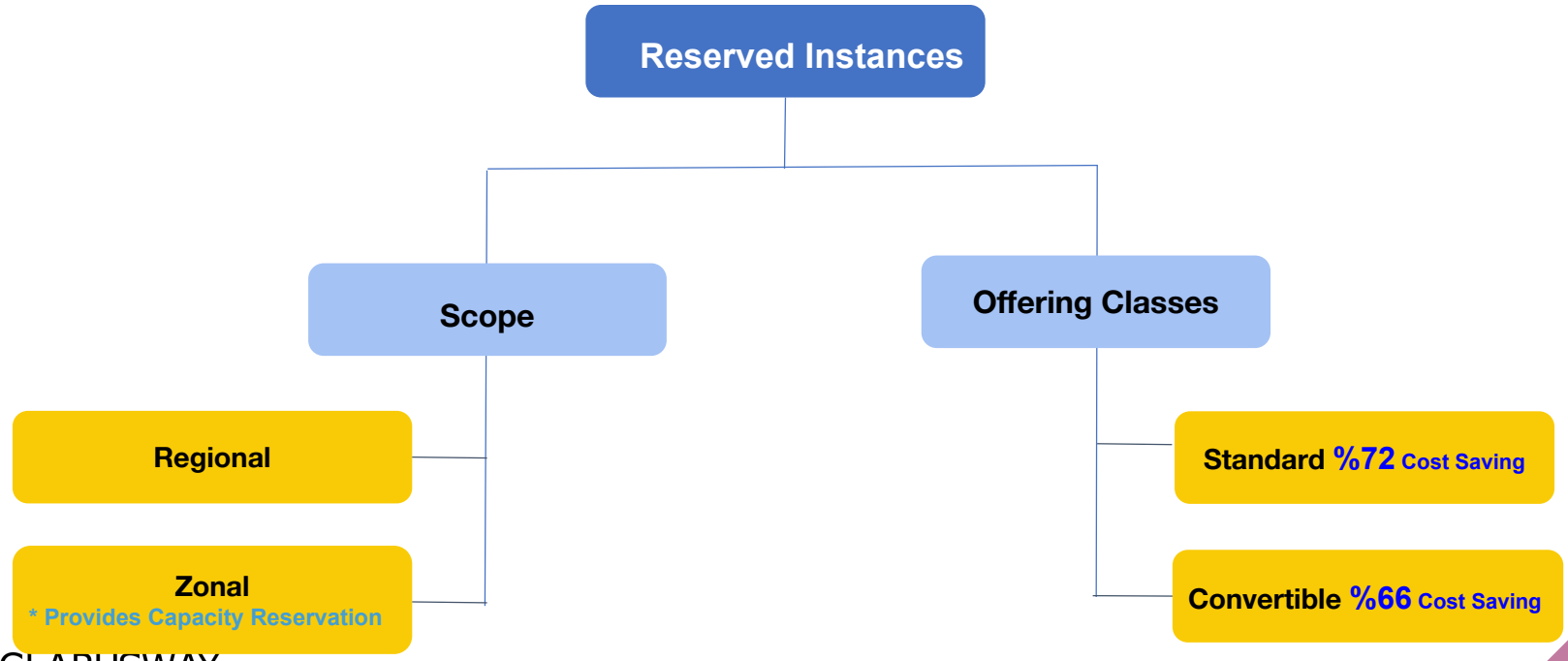
## Reserved Instances (RI)


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

## Reserved Instances (RI)





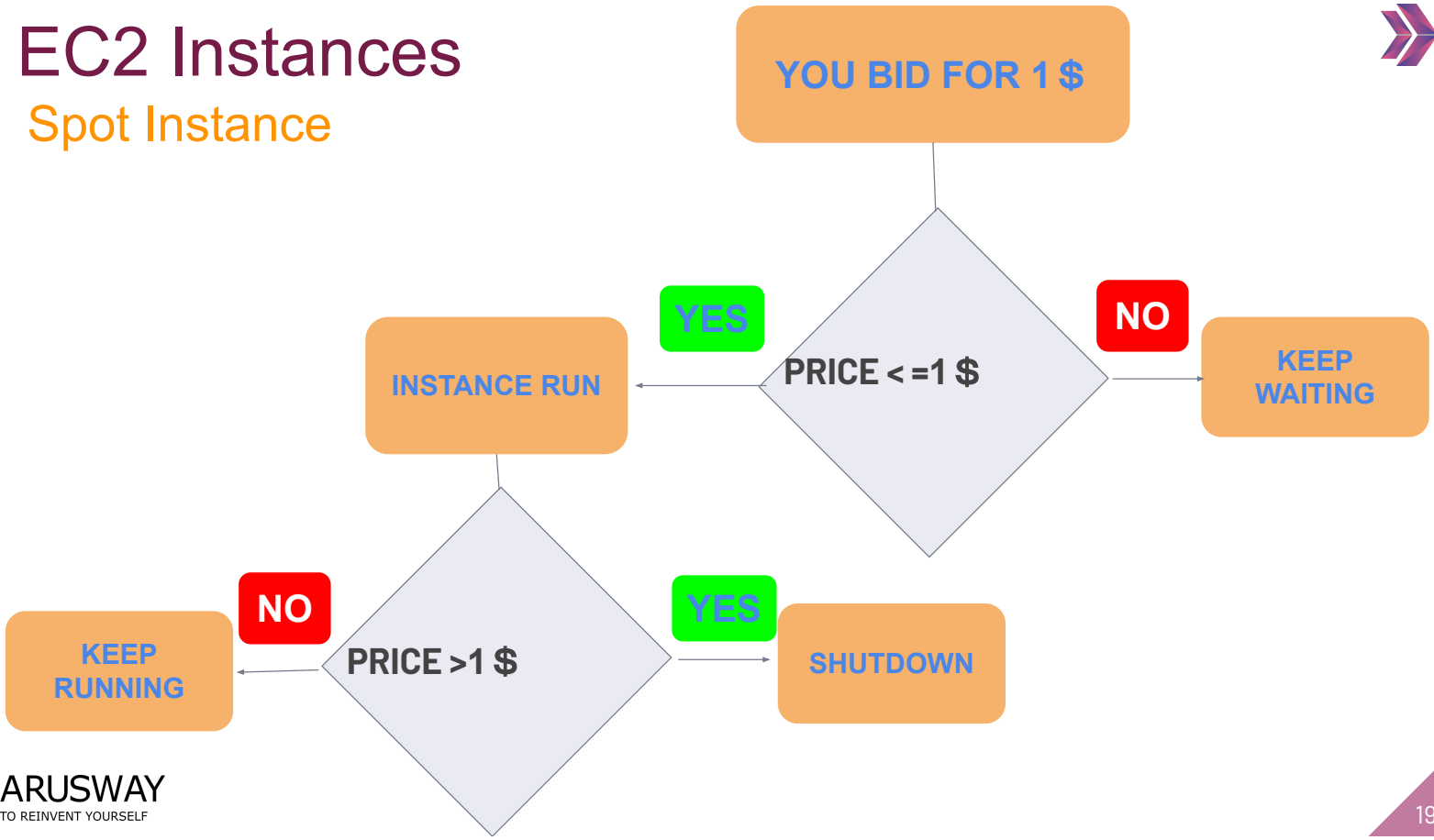

# EC2 Instances

## Spot Instance


- 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






# EC2 Instances

## Spot Instance vs. On Demand Price


Spot Instance

**45 minutes**

**Pay for 45 minutes**

**???????**

# EC2 Instances

## Spot Instance


Spot instances are recommended for:

- Applications that have flexible start and end times
- Non-continuity jobs such as testing

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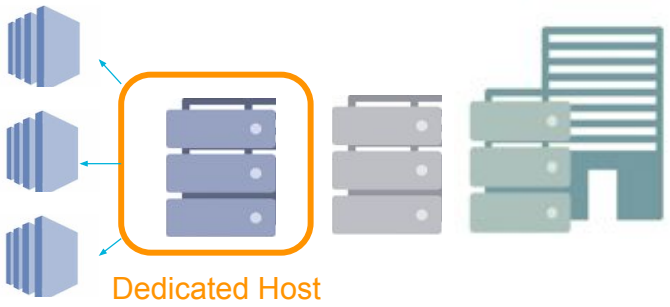
# EC2 Instances

## 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.



# EC2 Instances

## Saving Plans

ON DEMAND


5000 HOURS OF USAGE

1500$

SAVING PLAN


5000 HOURS OF USAGE

1000$



# EC2 Instances

## Saving Plans

**Saving Plans**

**EC2 Instance Savings Plans**

- %72 Cost Saving
- You can change:
  - Size (within the instance family!!)
  - Operating system
  - Tenancy

**Compute Savings Plans**

- %66 Cost Saving
- You can change:
  - Instance family,
  - Size
  - Operating system,
  - Tenancy,
  - Other compute resources: Fargate and Lambda

# EC2 Instances

## Capacity Reservation

| | Capacity Reservations | Zonal Reserved Instances | Regional Reserved Instances | Savings Plans |
|---|---|---|---|---|
| **Term** | No commitment required. Can be created and canceled as needed. | Requires a fixed one-year or three-year commitment | | |
| **Capacity benefit** | Capacity reserved in a specific Availability Zone. | | No capacity reserved. | |
| **Billing discount** | No billing discount. † | Provides a billing discount. | | |
| **Instance Limits** | Your On-Demand Instance limits per Region apply. | Default is 20 per Availability Zone. You can request a limit increase. | Default is 20 per Region. You can request a limit increase. | No limit. |

**While Capacity Reservation enables reserving physical capacity for a specific AWS resource, Reserved Instance and Saving plan allows reserving a specific AWS resource for a certain period at a predetermined price, thereby reducing costs. Both strategies cater to different usage scenarios and requirements.**

# EC2 Instances Recap

**Capacity Reservation**

**Dedicated Host/Instance**

**Spot**

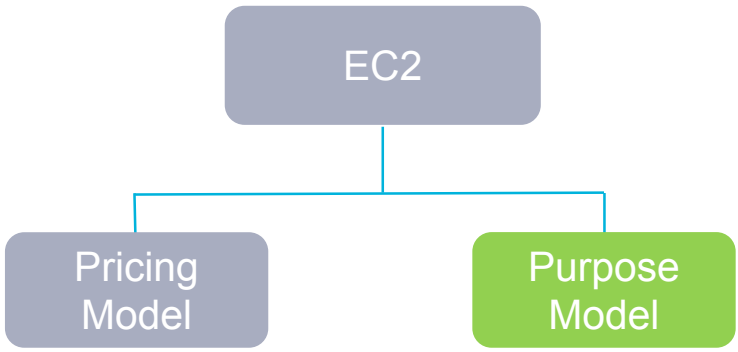

**On Demand**


**Reserved**

**Saving Plan**

# EC2 Instances

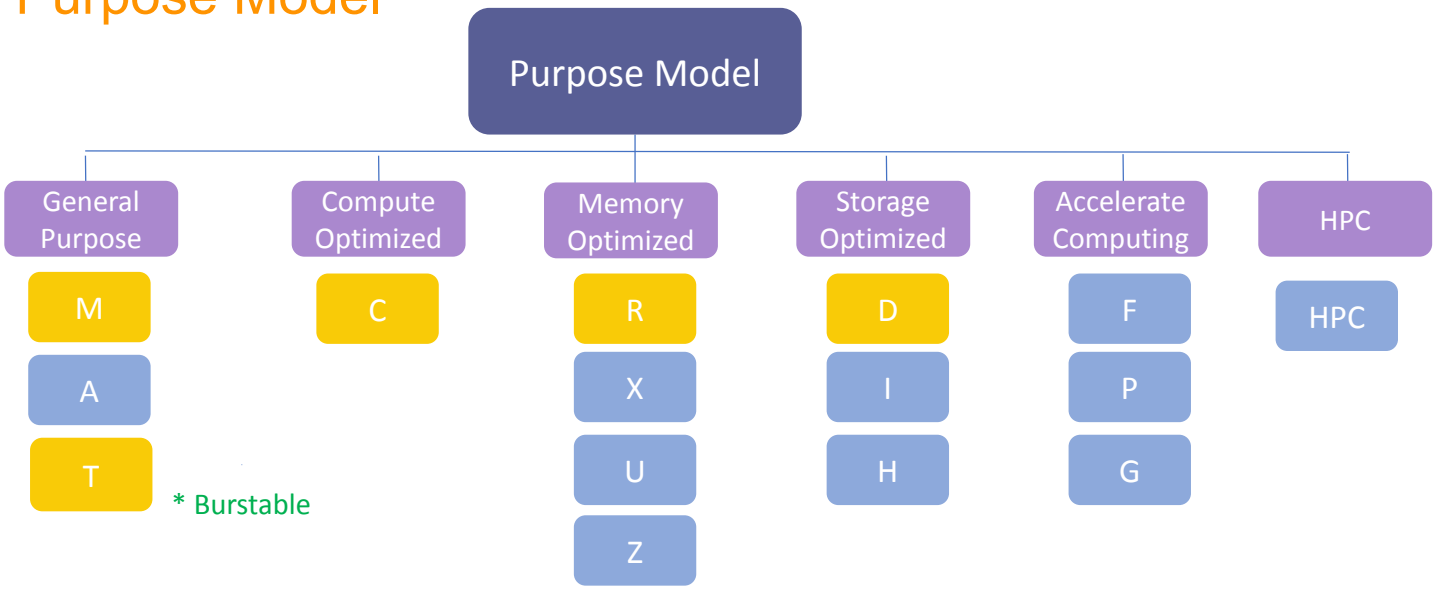
## Types of Instances Recap






# EC2 Instances

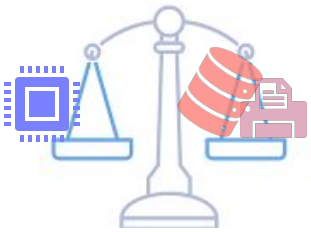
## Purpose Model




AWS offers 15 different types of virtual machines in 6 categories

# EC2 Instances

## General Purpose



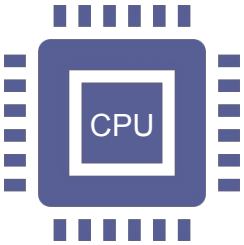
General Purpose

- 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

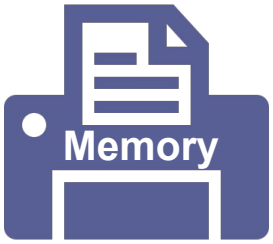
## Compute Optimized




- 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

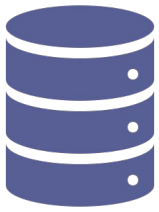



- Memory optimized instances are used in situations requiring a high-performance database, real-time large data analytics, and high memory usage.
- There are R, X, Z and U type instances in this category.



# 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


- Preferred when you need machine learning, deep learning calculation, and analysis.
- There are F, P and G type of instances in this category.



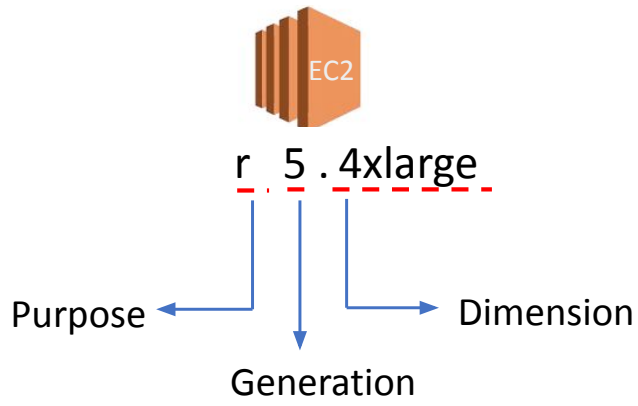
# EC2 Instances

## HPC Optimized

- HPC instances are ideal for applications that benefit from high-performance processors such as large, complex simulations weather forecasting, molecular dynamics and deep learning workloads.

# EC2 Instances

## Instance Coding




- 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.

# EC2 Instances

## Placement Group

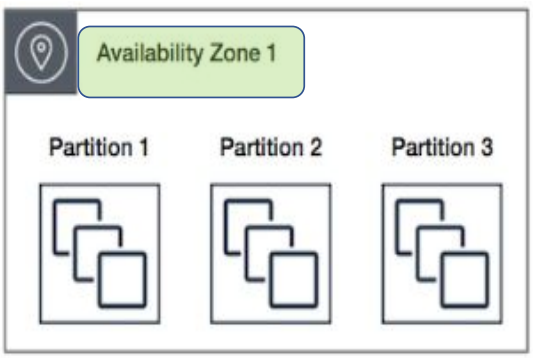
**1 AZ**

Cluster placement


**Exam Tip: low latency& high performance**

**Multiple AZ in Single Region**

Partition placement




**-Hadoop, Cassandra, and Kafka-**
**-Prevent correlated failures**

**Multiple AZ in Single Region**

Spread placement


**High Availability**
**- Prevent simultaneous failure**

# 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



# THANKS!

## Any questions?

You can find me at:

- @osvaldo
- osvaldo@clarusway.com