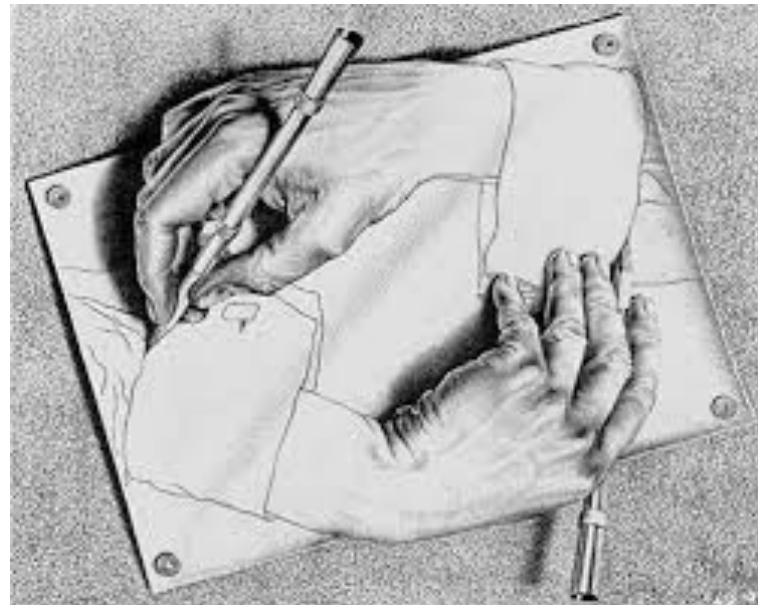# 1 Introduction to EC2

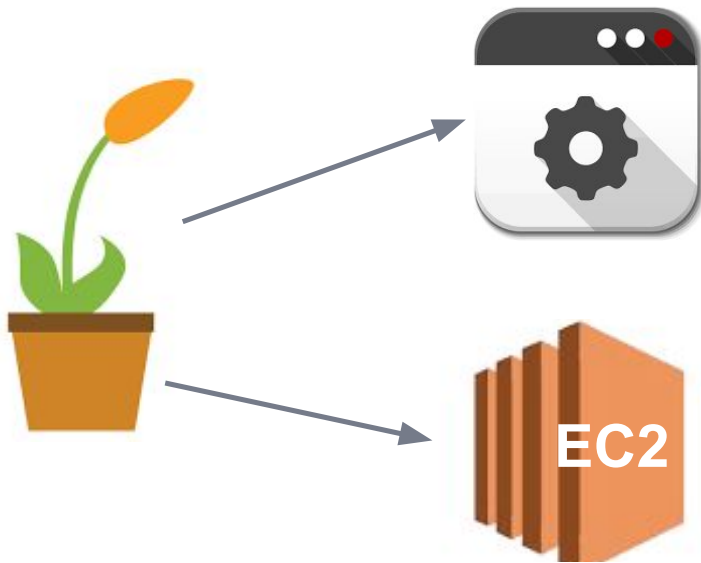# Today's Takeaways

▶ Introduction to EC2

▶ EC2 Instance Types

▶ Creating an EC2 instance

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.
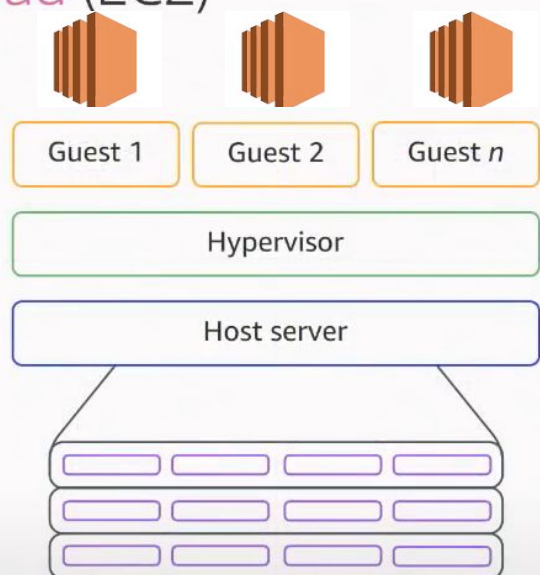
EC2

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.

CLARUSWAY
WAY TO REINVENT YOURSELF
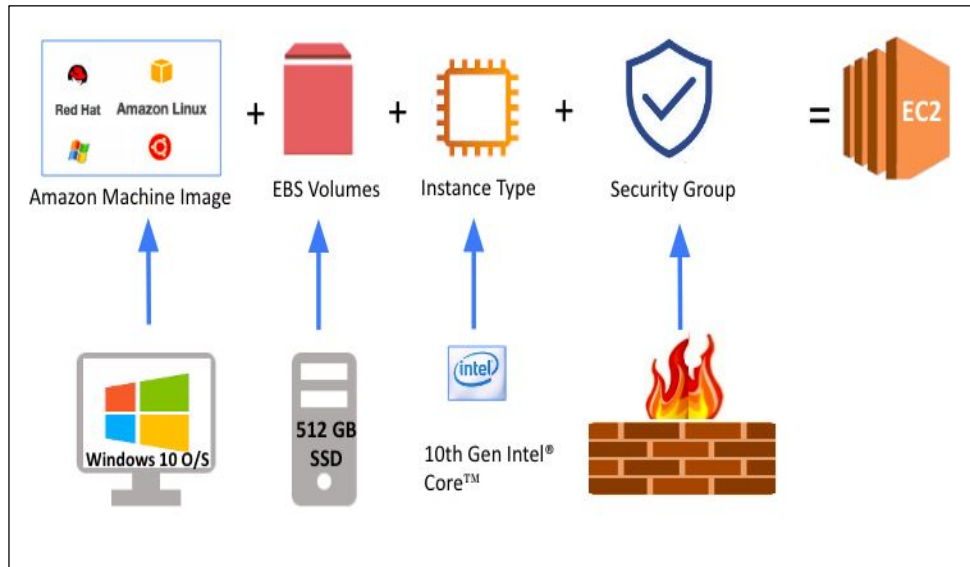
Introduction to EC2
EC2 Features

- 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.

CLARUSWAY
WAY TO REINVENT YOURSELF

2 Types of Instances

EC2 Instances
Types of Instances
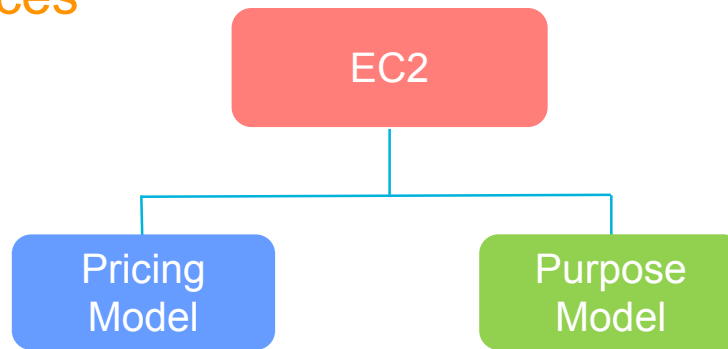
Storage   CPU   Networking   Memory

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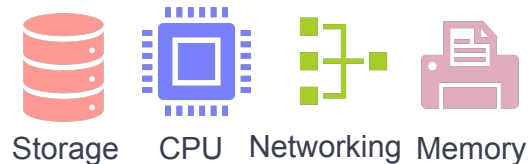
- Amazon EC2 provides a wide selection of instance types optimized to fit different use cases.

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

EC2 Instances
Types of Instances

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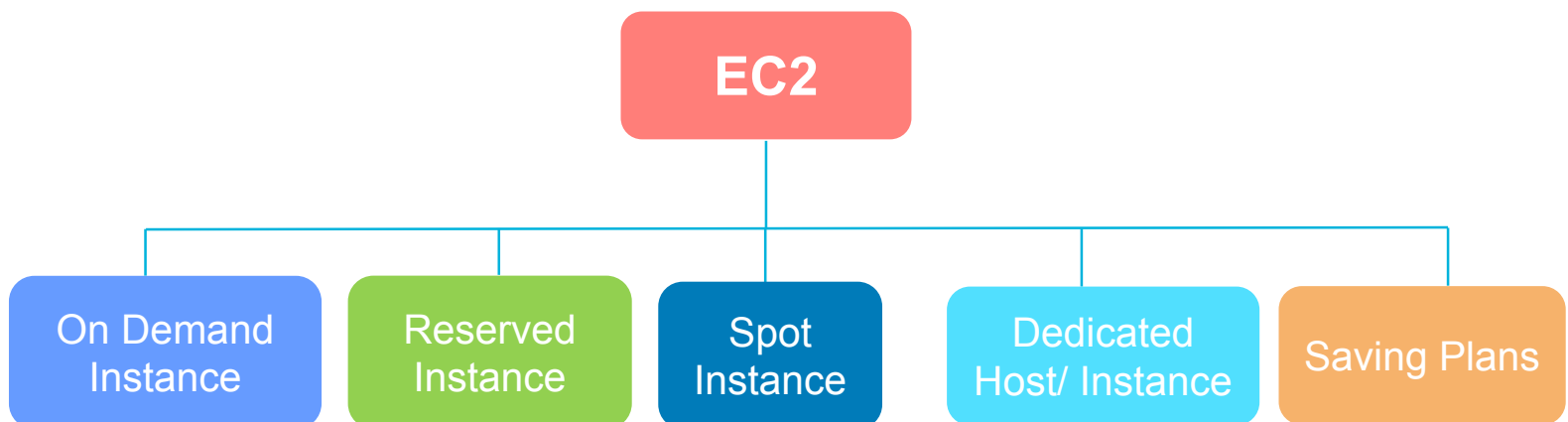
- Instance types are grouped into a variety of families based on target application profiles and pricing options. It is possible to categorize EC2 types under two main perspective :

- These are Pricing Model and Purpose Model.

EC2 Instances
Pricing Model of Instances

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                         │   EC2    │
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   ┌──────────┬──────────┬────┴────┬──────────────┬──────────────┐
┌──┴───┐  ┌───┴────┐  ┌──┴───┐  ┌──┴─────────┐  ┌─┴──────────┐
│On Demand│ │Reserved│ │ Spot │ │ Dedicated  │ │   Saving   │
│Instance │ │Instance│ │Instance│ │Host/Instance│ │   Plans    │
└─────────┘ └────────┘ └──────┘ └────────────┘ └────────────┘
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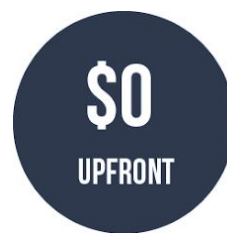
When we look at the pricing perspective, AWS offers 5 different types of instance pricing.

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
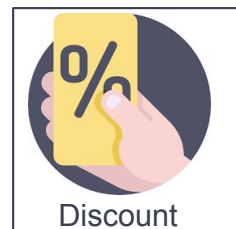
EC2 Instances
On Demand Pricing

- 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 = $8.32   )

EC2 Instances
Reserved Instances (RI)

Commitments

Discount

CAPACITY
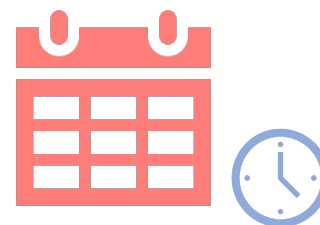RESERVATION

- 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.

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
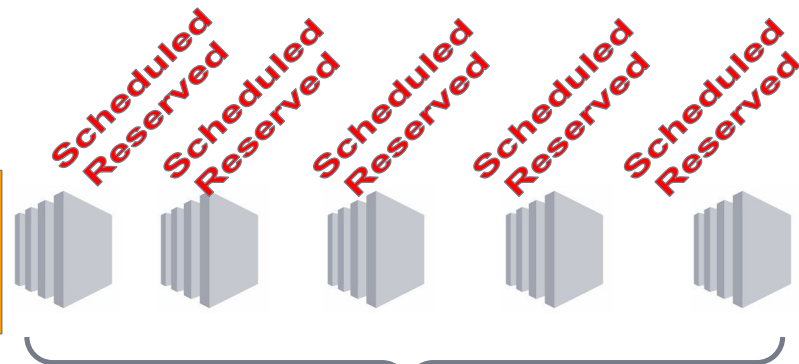
EC2 Instances
Example

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

EC2 Instances
Spot Instance
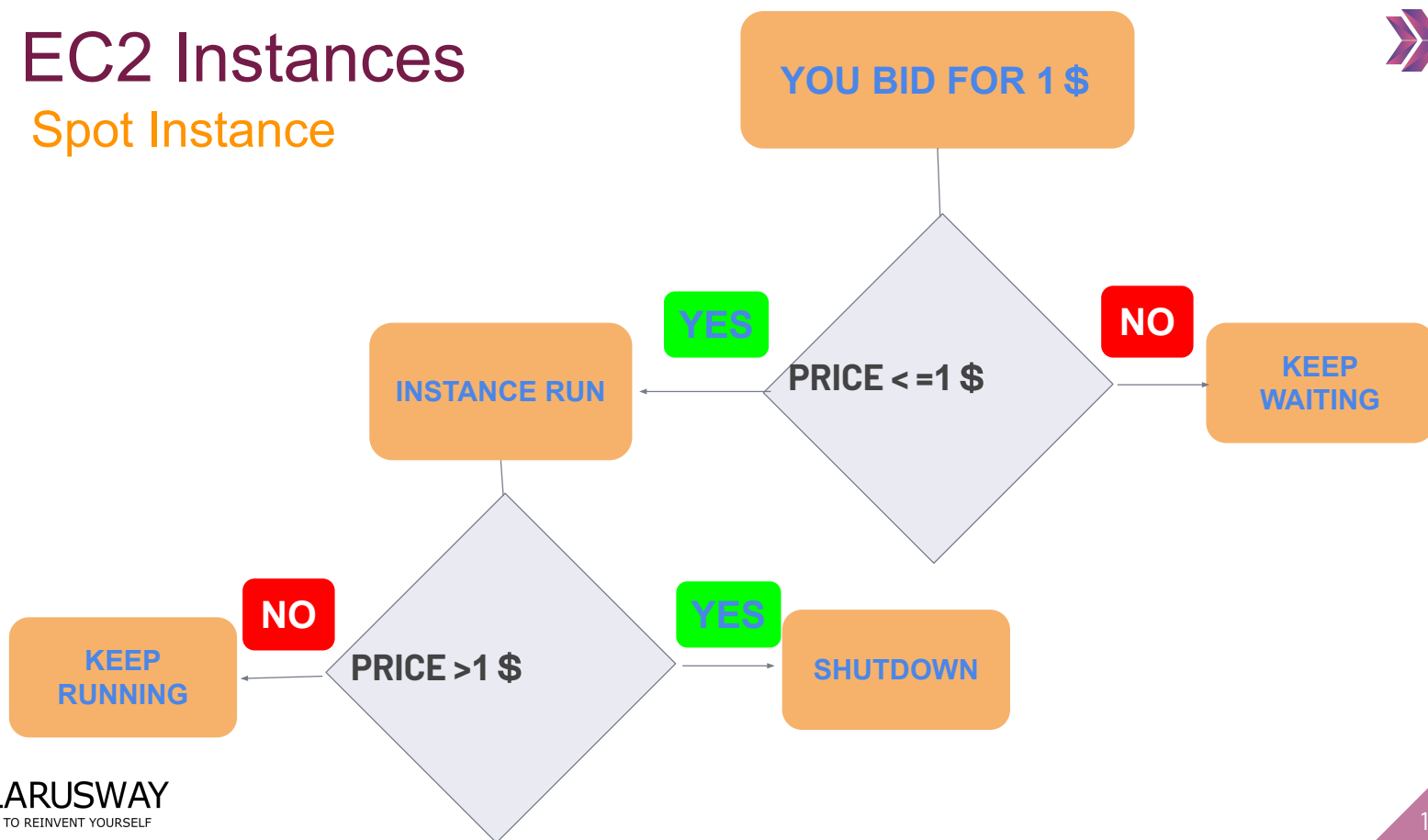
Run   **Shut down**

- 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 $

YES

INSTANCE RUN

PRICE < =1 $

NO

KEEP WAITING

NO

KEEP RUNNING

PRICE >1 $

YES

SHUTDOWN

EC2 Instances
Spot Instance vs. On Demand Price

ON-DEMAND

45 minutes

Spot Instance

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

EC2 Instances
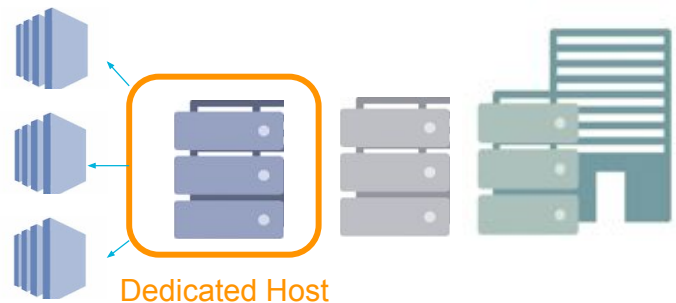## Dedicated Host/Instance

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	SAVING PLAN
EC2	EC2
5000 HOURS OF USAGE	5000 HOURS OF USAGE
1500$	1000$

EC2 Instances Recap

Dedicated
Host/Instance

Spot

On Demand

Reserved

Saving Plan

EC2 Instances
Types of Instances Recap

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                    ┌─────────────┐
                    │     EC2     │
                    └──────┬──────┘
              ┌────────────┴────────────┐
       ┌──────┴──────┐          ┌───────┴──────┐
       │   Pricing   │          │   Purpose    │
       │   Model     │          │   Model      │
       └─────────────┘          └──────────────┘
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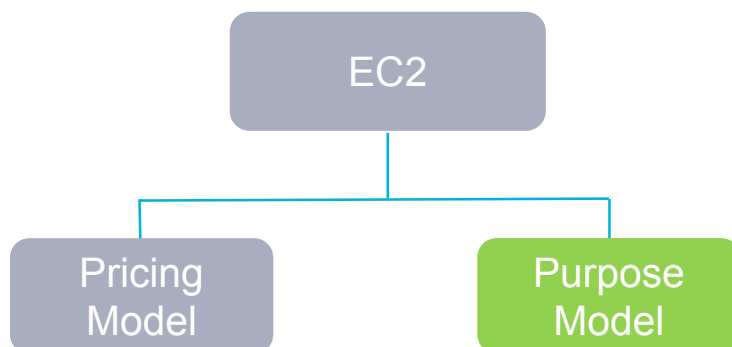
EC2 Instances
Purpose Model

```
                                ┌──────────────────┐
                                │  Purpose Model   │
                                └────────┬─────────┘
  ┌──────────┬──────────┬──────────┬──────────┬──────────┬──────────┐
┌─────────┐ ┌─────────┐ ┌─────────┐ ┌─────────┐ ┌─────────┐ ┌──────────┐
│Burstable│ │ General │ │ Compute │ │ Memory  │ │ Storage │ │Accelerate│
│         │ │ Purpose │ │Optimized│ │Optimized│ │Optimized│ │Computing │
└────┬────┘ └────┬────┘ └────┬────┘ └────┬────┘ └────┬────┘ └────┬─────┘
   ┌─┴─┐      ┌──┴──┐     ┌──┴──┐     ┌──┴──┐     ┌──┴──┐     ┌──┴──┐
   │ T │      │  M  │     │  C  │     │  R  │     │  D  │     │  F  │
   └───┘      └──┬──┘     └─────┘     └──┬──┘     └──┬──┘     └──┬──┘
              ┌──┴──┐                 ┌──┴──┐     ┌──┴──┐     ┌──┴──┐
              │  A  │                 │  X  │     │  I  │     │  P  │
              └─────┘                 └──┬──┘     └──┬──┘     └──┬──┘
                                      ┌──┴──┐     ┌──┴──┐     ┌──┴──┐
                                      │  U  │     │  H  │     │  G  │
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                                      │  Z  │
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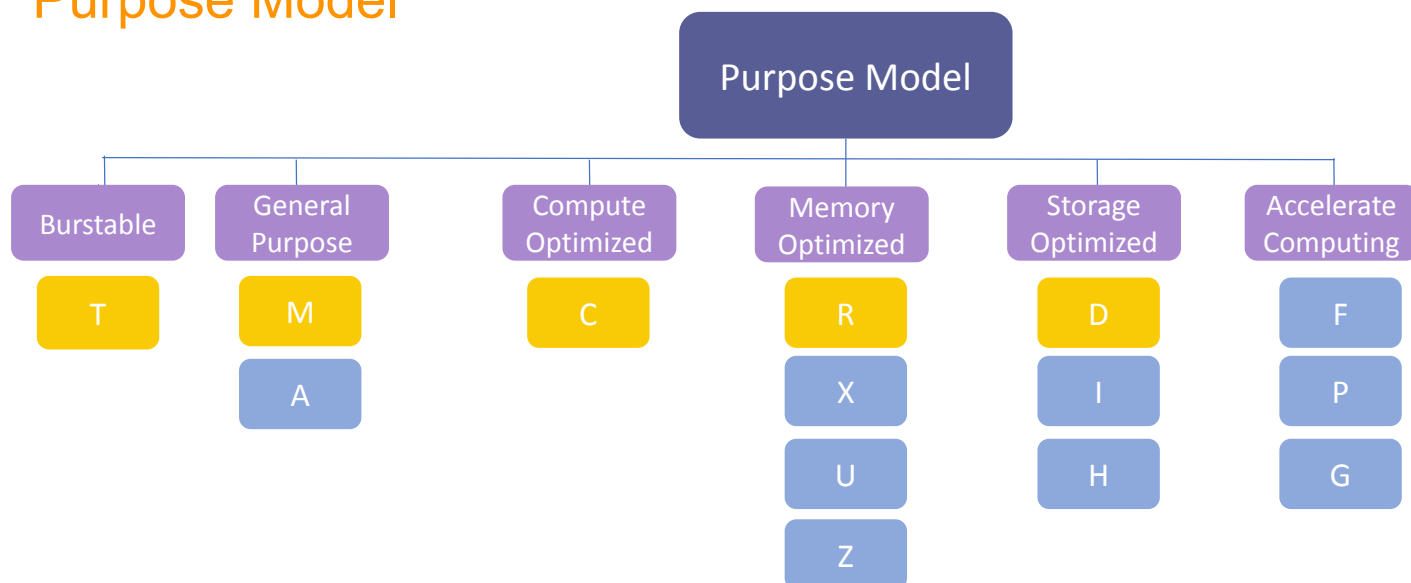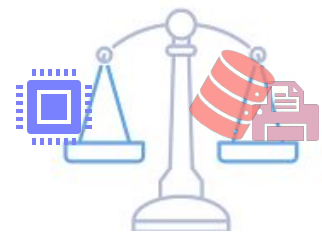
AWS offers 14 different types of virtual machines in 6 categories
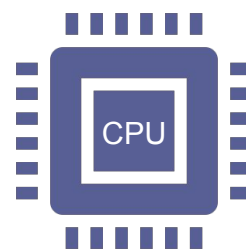
EC2 Instances
General Purpose

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

CPU

- 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.
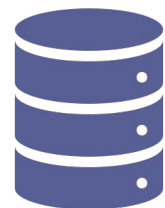
EC2 Instances
Memory Optimized
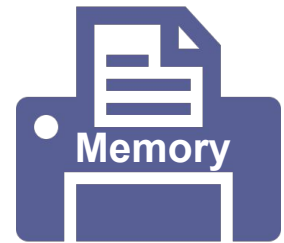
- Memory optimized instances are used in situations requiring a high-performance database, real-time large data analytics, and high memory usage.

- There are R, X, Z and U type instances in this category.
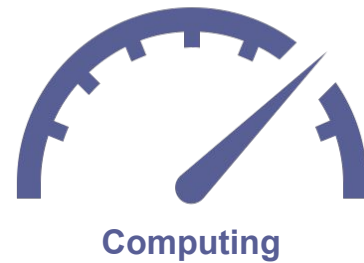
EC2 Instances
Storage Optimized

- 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.

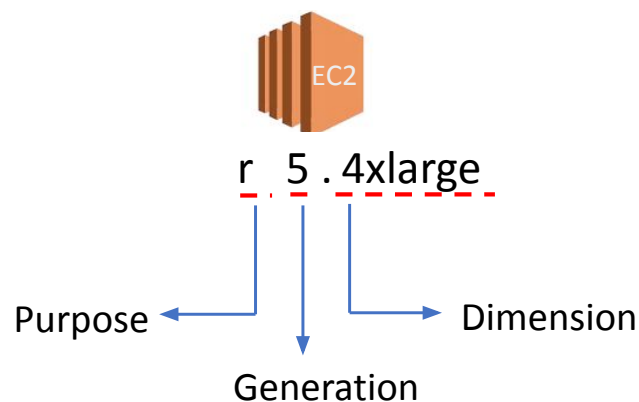- There are D, H and I type of instances in this category.

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.

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:

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‣ osvaldo@clarusway.com

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