# 1 ▸ Introduction to EC2

# Today's Takeaways

▶ Introduction to EC2

▶ EC2 Instance Types

▶ Creating an EC2 instance

▶ Connecting to EC2 via SSH

CLARUSWAY
WAY TO REINVENT YOURSELF

# Introduction to EC2
## What is EC2?



**EC2**
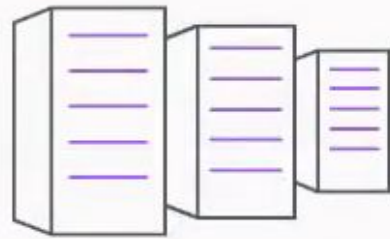
- EC2 stands for Elastic Compute Cloud in AWS.

- 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.
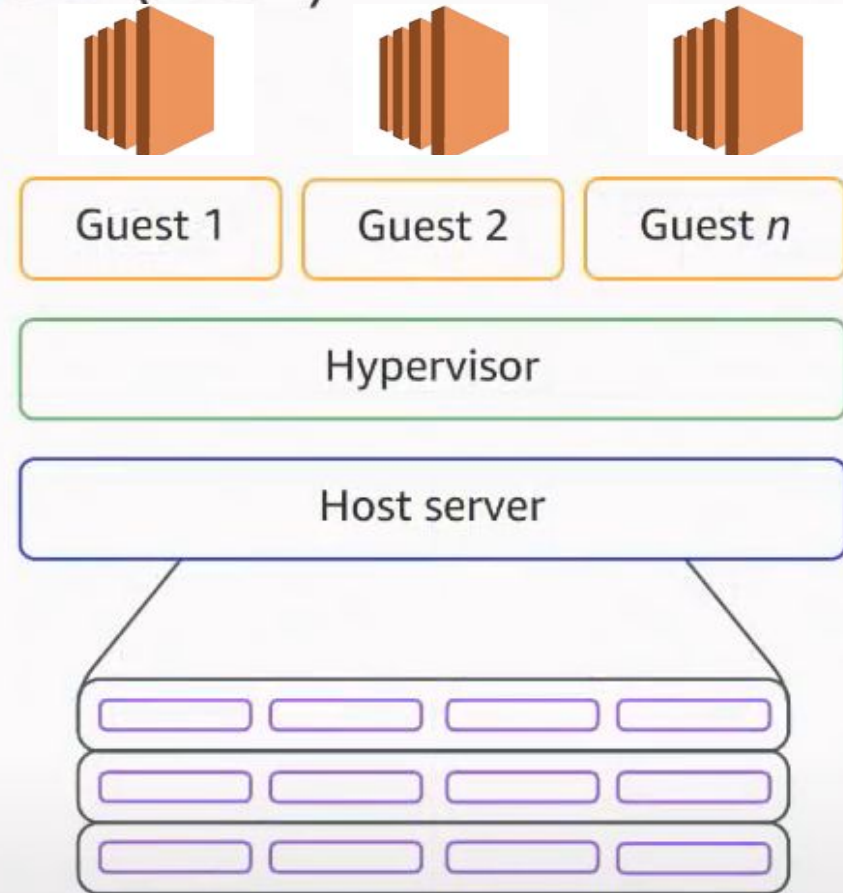
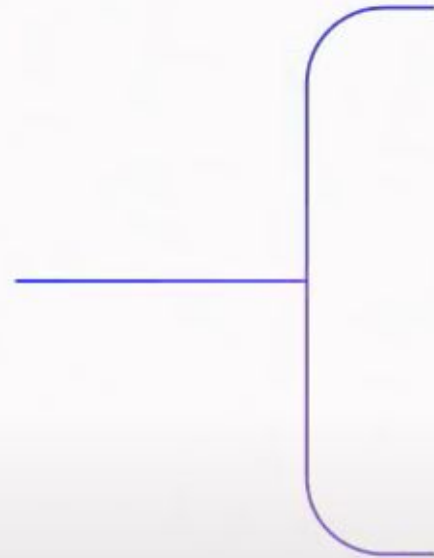CLARUSWAY
WAY TO REINVENT YOURSELF

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

Physical servers in AWS global regions

Guest 1    Guest 2    Guest n

Hypervisor

Host server

CLARUSWAY
WAY TO REINVENT YOURSELF

# 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 processors (CPU), etc.



CLARUSWAY
WAY TO REINVENT YOURSELF
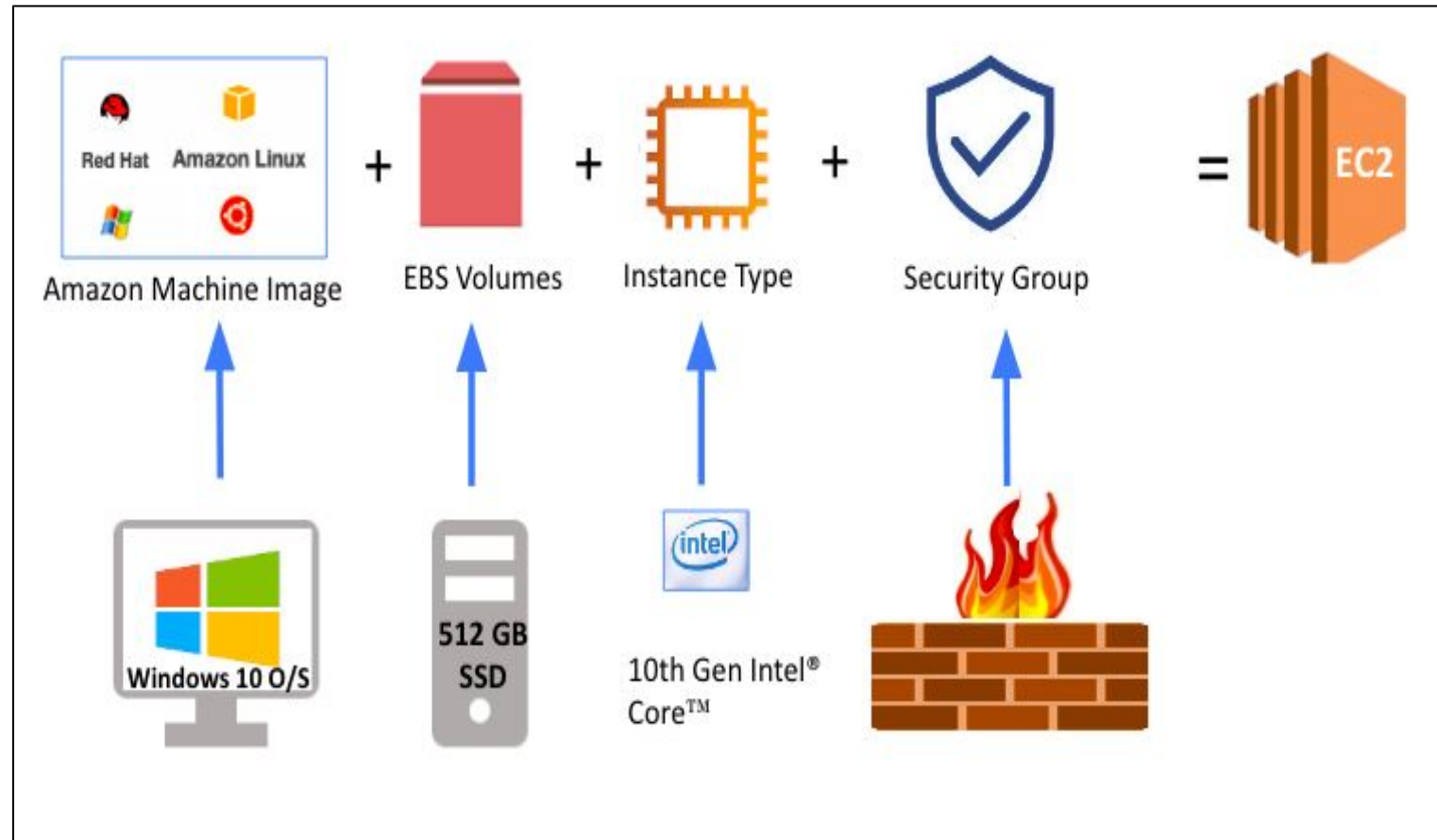
# Introduction to EC2

## 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.
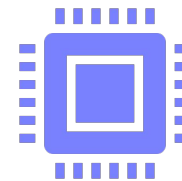
**2**  Types of Instances

# EC2 Instances
## Types of Instances
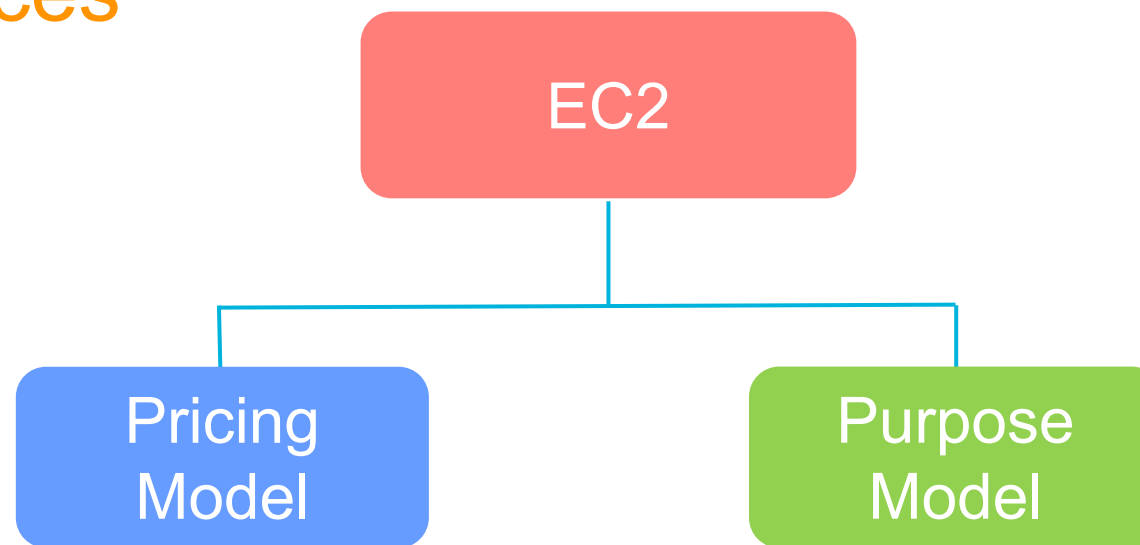
**EC2**

Storage   CPU   Networking   Memory

- 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

CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances
## Types of Instances

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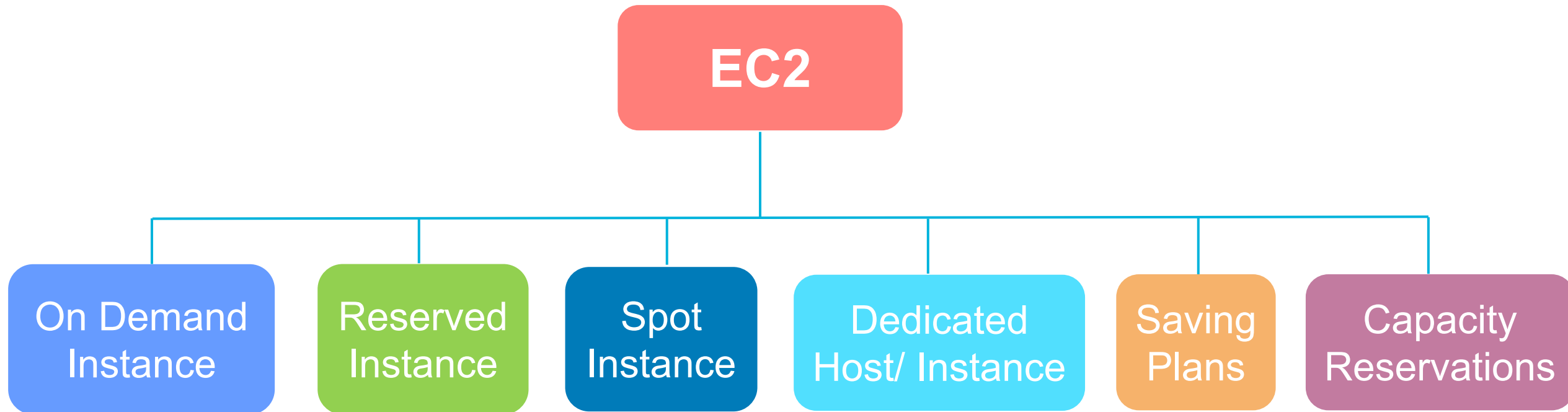
- Instance types are grouped into a variety of families based on target application profiles and pricing options. It is possible to categorize EC2 types under two main perspective :

- These are Pricing Model and Purpose Model.

CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances

Pricing Model of Instances
(Instance Purchasing Options)

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

When we look at the pricing perspective, AWS offers 6 different types of instance pricing.

# EC2 Instances

No
Commitments

$0
UPFRONT
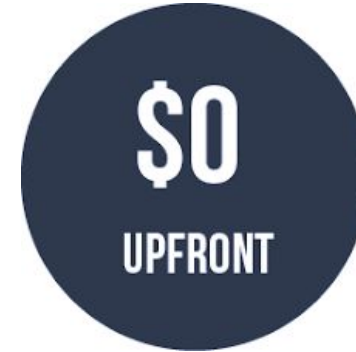
- You pay for compute capacity by the
  - second (Linux, Windows)
  - hour (everything else)

- No commitments

- No upfront payments

- You can increase or decrease your compute capacity

CLARUSWAY
WAY TO REINVENT YOURSELF

# 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                              )

CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances
## Reserved Instances (RI)

**Commitments**

**Discount**

**CAPACITY RESERVATION**

- [Reserved Instances](#) provide you with a significant discount (up to 72%) 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.

- Payment options:

  All Upfront - Partial Upfront - No Upfront

# 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
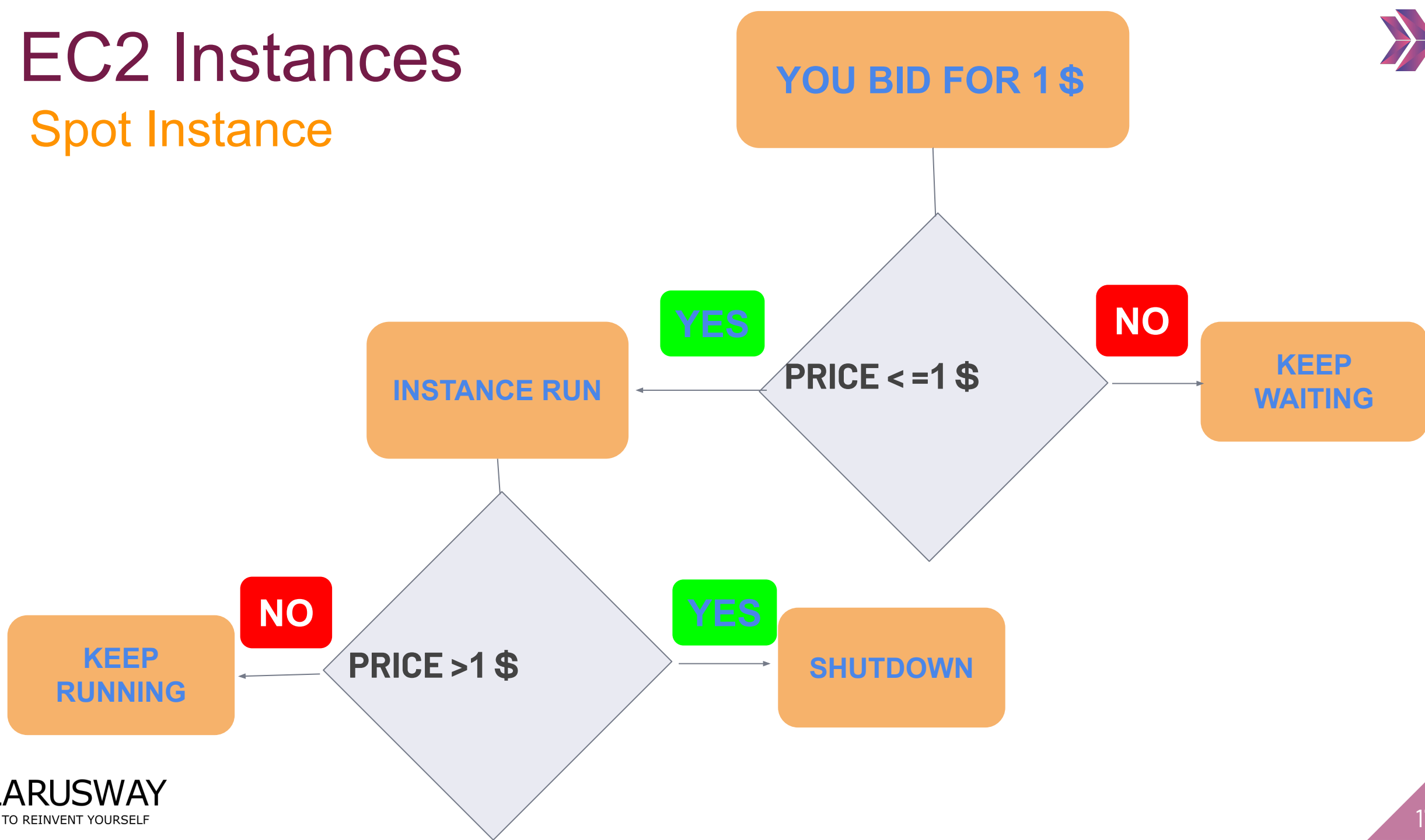
# EC2 Instances
## Spot Instance

**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**

**NO**

**INSTANCE RUN**

**KEEP WAITING**

**PRICE >1 $**

**NO**

**YES**

**KEEP RUNNING**

**SHUTDOWN**

CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances
## Spot Instance



Spot instances are recommended for:

- Applications that have flexible start and end times

- Non-continuity jobs such as testing, data analysis, batch jobs.

CLARUSWAY
WAY TO REINVENT YOURSELF

# 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.
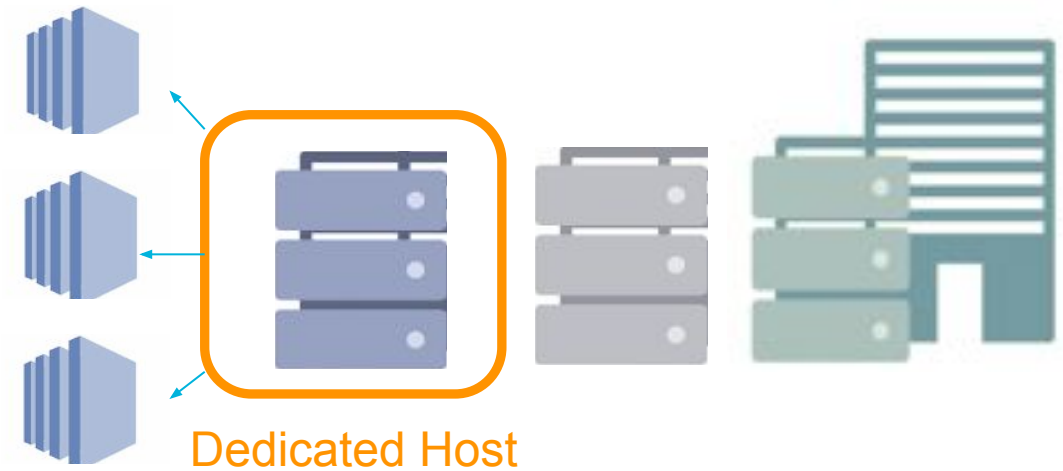


Dedicated Host

[Dedicated Host
vs
Dedicated Instance](#)
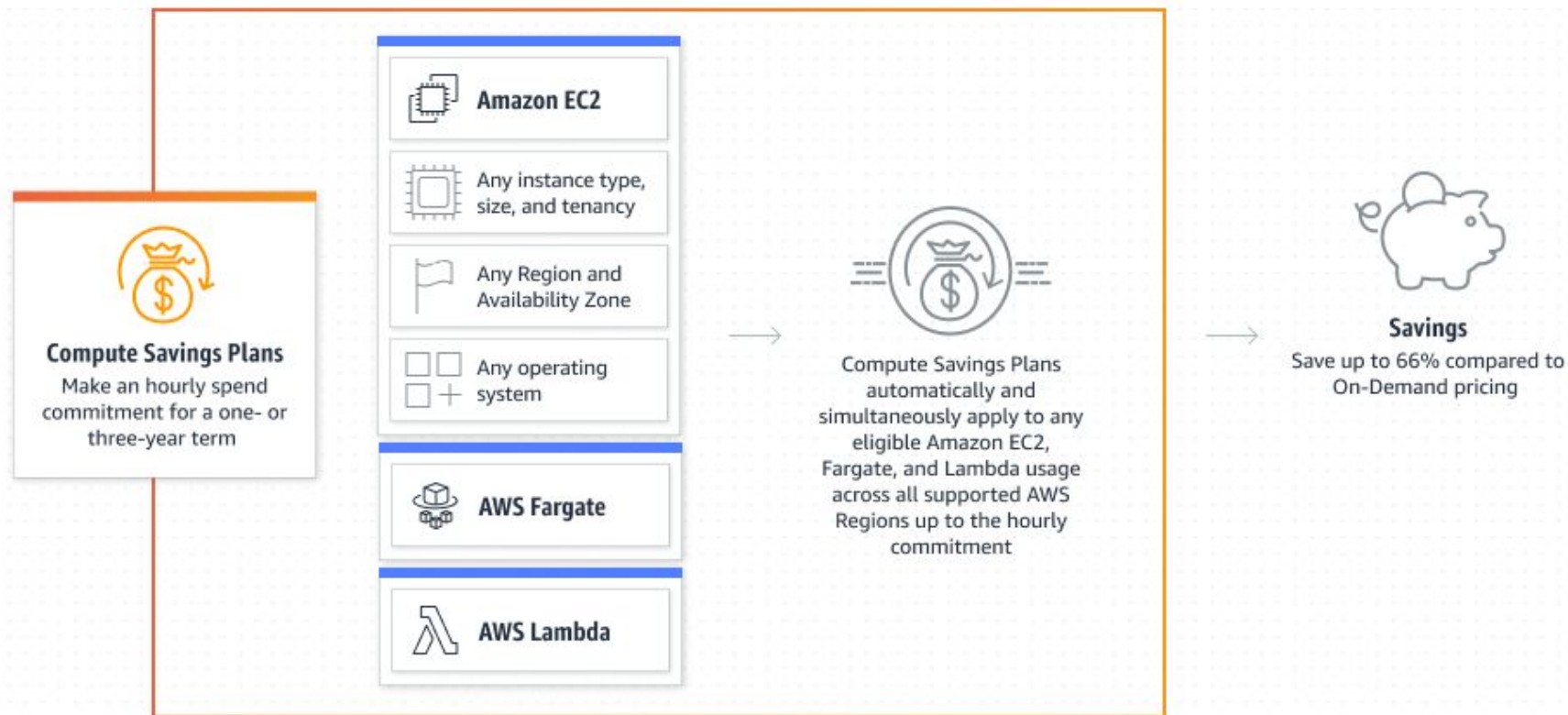
# EC2 Instances
## Saving Plans

- Saving Plans provide a commitment to a consistent amount of usage, in USD per hour, for a term of 1 or 3 years.

- More flexible than RI. Independent from of instance family, size, OS, tenancy, or Region. Applies to AWS Fargate and AWS Lambda.

- Payment options:

  All Upfront - Partial Upfront - No Upfront

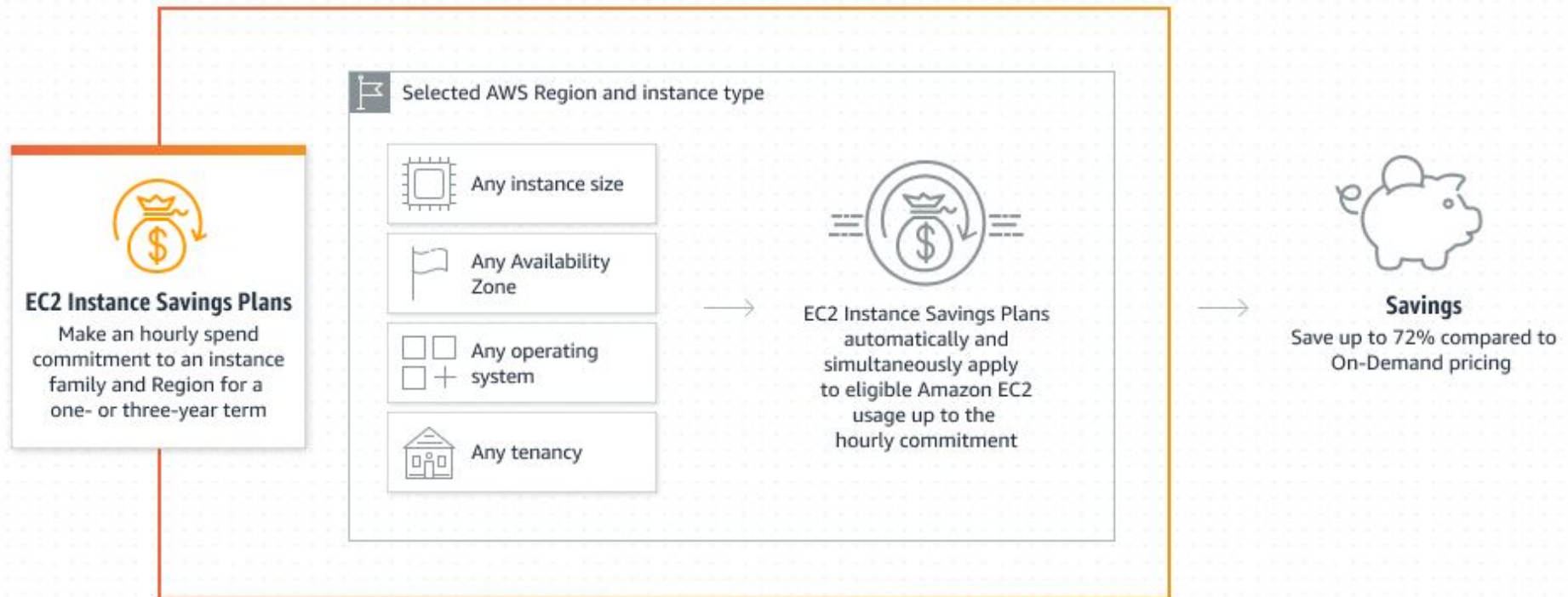# EC2 Instances

## Saving Plans

### Compute Savings Plans



**Compute Savings Plans**
Make an hourly spend commitment for a one- or three-year term

- Amazon EC2
- Any instance type, size, and tenancy
- Any Region and Availability Zone
- Any operating system
- AWS Fargate
- AWS Lambda

Compute Savings Plans automatically and simultaneously apply to any eligible Amazon EC2, Fargate, and Lambda usage across all supported AWS Regions up to the hourly commitment

**Savings**
Save up to 66% compared to On-Demand pricing

# EC2 Instances

## Saving Plans

### EC2 Instance Savings Plans

# EC2 Instances
## Capacity Reservations
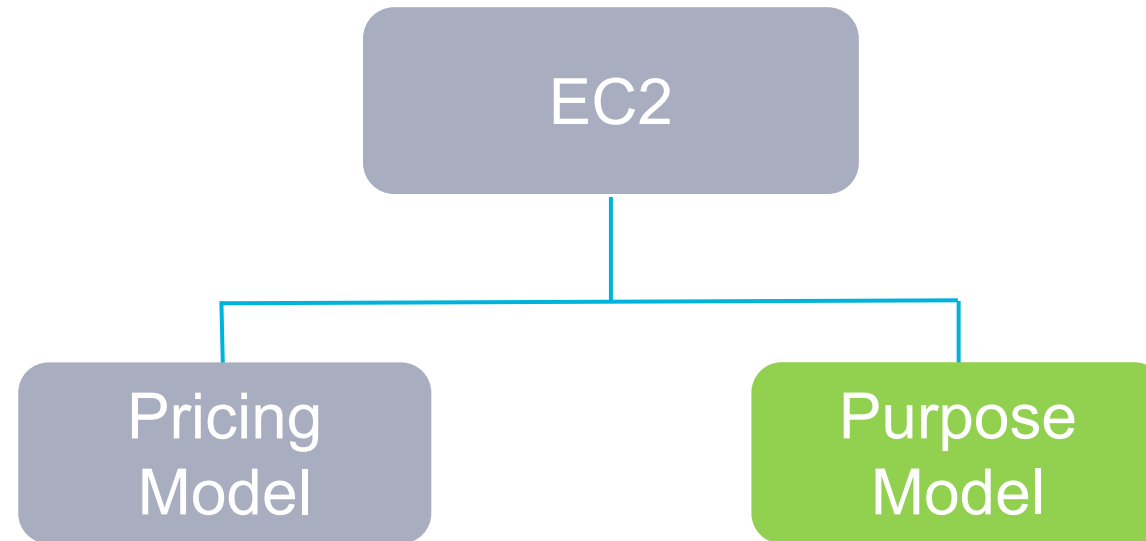


Optional — Commitments

Discount

CAPACITY RESERVATION

- [Capacity Reservations](#) allow you to reserve compute capacity for EC2 instances in a specific AZ. No Discount.

- Ensures that you'll always have access to the Amazon EC2 capacity you've reserved for as long as you need it.

- Types of Capacity Reservations:
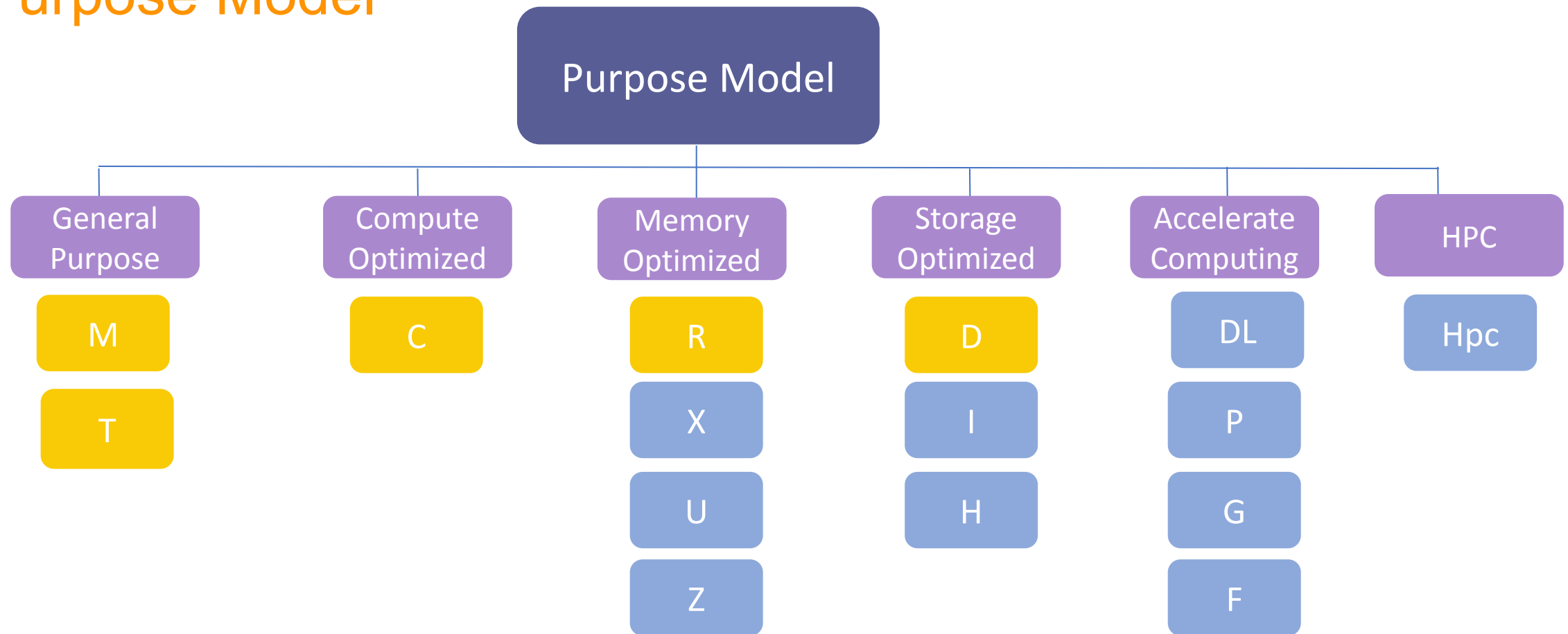
  On-Demand Capacity Reservations - Capacity Blocks for ML

# EC2 Instances

```
           ┌──────────────┐
           │     EC2      │
           └──────┬───────┘
          ┌───────┴────────┐
   ┌──────┴──────┐  ┌──────┴──────┐
   │  Pricing    │  │  Purpose    │
   │  Model      │  │  Model      │
   └─────────────┘  └─────────────┘
```
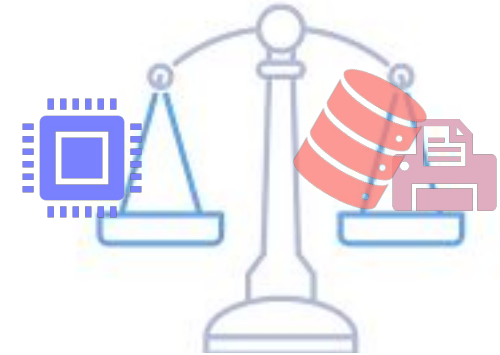
CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances
## Purpose Model



AWS offers different types of virtual machines in different categories.
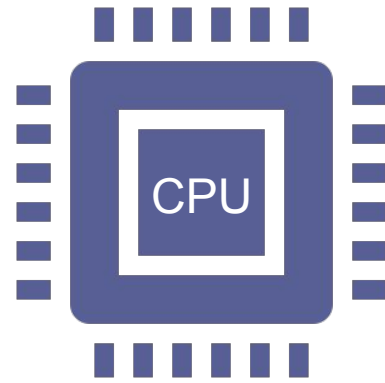
# EC2 Instances
## General Purpose



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 and M 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.

CLARUSWAY
WAY TO REINVENT YOURSELF

# EC2 Instances
## Memory Optimized
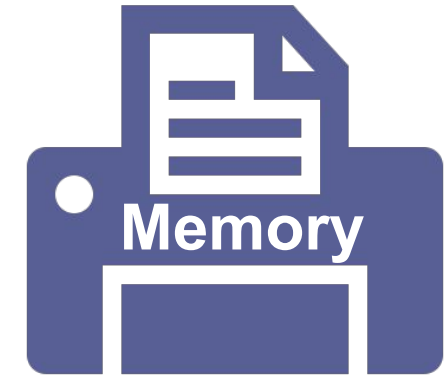


- Memory optimized instances are used in situations requiring a high-performance database, real-time large data analytics, and high memory usage.

- 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.

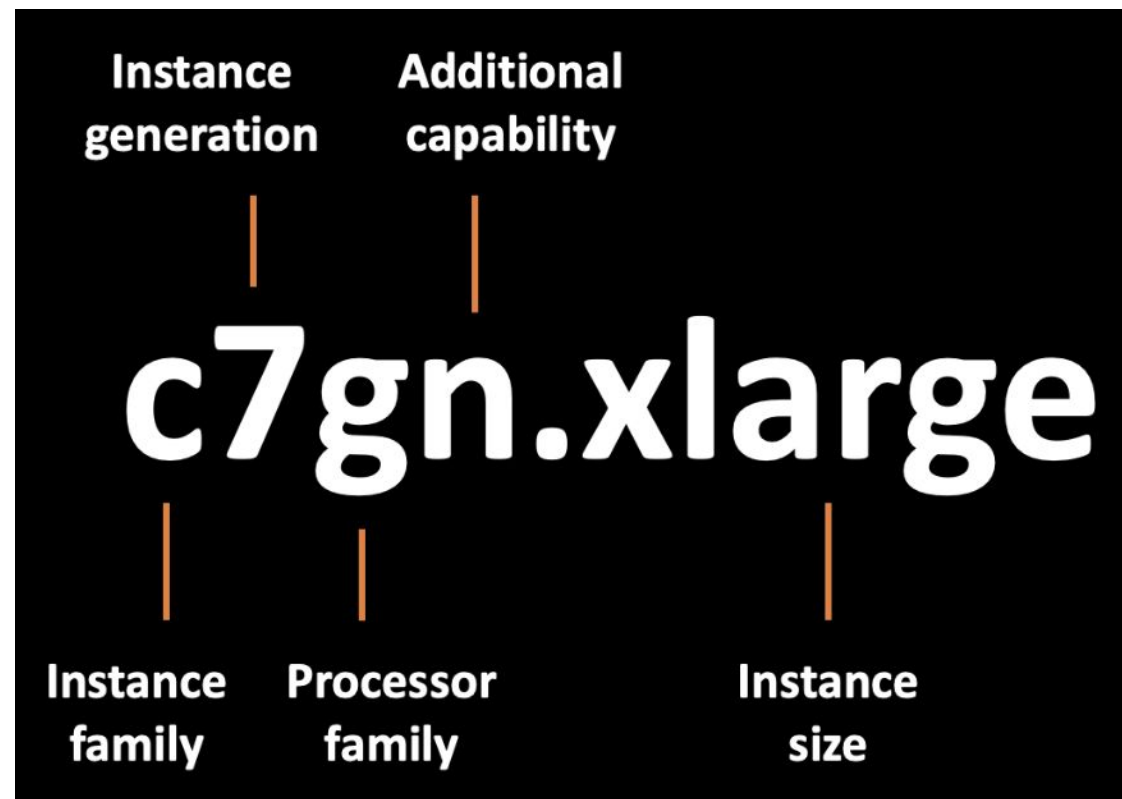- There are D, H and I type of instances in this category.

# EC2 Instances
## Accelerated Computing

**Computing**

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

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

# EC2 Instances
## Naming Conventions



- xlarge 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
- Working with Instance Actions

CLARUSWAY
WAY TO REINVENT YOURSELF

# THANKS!

## Any questions?

You can find me at:

- ▸ @Guile - Instructor
- ▸ guile@clarusway.com

CLARUSWAY
WAY TO REINVENT YOURSELF