## WEEK-2

## CIDR Notation

An important concept that's used in networking on AWS is CIDR, or Classless Inter-Domain Routing. CIDR network addresses are allocated in a virtual private cloud (VPC) and in a subnet by using CIDR notation. A /16 block provides 65,536 IPv4 addresses. A /24 block provides 256 addresses. .

## Amazon Virtual Private Cloud

Amazon Virtual Private Cloud (Amazon VPC) lets you provision a logically isolated section of the AWS Cloud where you can launch AWS resources in a virtual network that you define. You have complete control over your virtual networking environment, including the selection of your own IP address range, the creation of subnets, and the configuration of route tables and network gateways. You can use both IPv4 and IPv6 in your VPC for secure and easy access to resources and applications. You could create up to five non-default VPCs per AWS account per Region. (See below for information about default VPCs.)

## Subnets

A VPC spans all the Availability Zones in the Region. After creating a VPC, you can add one or more subnets in each Availability Zone. When you create a subnet, you specify the CIDR block for the subnet, which is a subset of the VPC CIDR block. Each subnet must reside entirely within one Availability Zone, and it can't span Availability Zones.

Security in a VPC is provided by using Security Groups and Network Access Control Groups. We will talk about AWS Security in a later module.

## Default VPC

In each Region, AWS will provision a default VPC. This VPC has a /16 IPv4 CIDR address block of 172.31.0.0/16. This provides 65,536 private IPv4 addresses. In addition, there will be a /20 subnet that is created for each Availability Zone in the Region, which provides 4,096 addresses per subnet, with a few addresses reserved for AWS usage. The route table that is associated with the default VPC will have a public route, which in turn is associated with a provisioned internet gateway.

You can modify or delete the default VPC if you want to do so.

**Amazon Elastic Block Store (Amazon EBS)** provides persistent block storage volumes for use with Amazon EC2 instances in the AWS Cloud. Each Amazon EBS volume is automatically replicated inside an Availability Zone to protect you from component failure, which offers high availability and durability. Amazon EBS volumes offer the consistent and low-latency performance that you need to run your workloads.

Amazon EBS provides a range of options that allow you to optimize storage performance and cost for your workload. These options are divided into two major categories: SSD-backed storage for transactional workloads, such as databases and boot volumes (performance depends primarily on IOPS), and hard disk drive (HDD)-backed storage for throughput-intensive workloads, such as Map Reduce and log processing (performance depends primarily on MB/s).

The Elastic Volume feature of Amazon EBS allows you to dynamically increase capacity, tune performance, and change the type of live volumes with no downtime or performance impact. This allows you to easily right-size your deployment and adapt to performance changes.

Pricing for Amazon EBS is based on the amount (volume) and type of Amazon EBS volume that you provision. For pricing information, Confirm that you are looking at cost in the correct Region.

**Amazon Simple Storage Service (Amazon S3)** stores data as objects within resources that are called buckets. You can store as many objects as you want within a bucket, and you can write, read, and delete objects in your bucket. Objects can be up to 5 TB in size.

You can control access to both the bucket and the objects (who can create, delete, and retrieve objects in the bucket for example), and view access logs for the bucket and its objects. You can also choose the AWS Region where a bucket is stored to optimize for latency, minimize costs, or address regulatory requirements.

With Amazon S3, you pay only for what you use. There is no minimum fee. Estimate your monthly bill by using the [AWS Simple Monthly Calculator](https://calculator.s3.amazonaws.com/index.html). We charge less where our costs are less, and prices are based on the location of your Amazon S3 bucket.

**Amazon Elastic File System (Amazon EFS)** provides simple, scalable, elastic file storage for use with AWS Cloud services and on-premises resources. It is straightforward to use, and it offers a simple interface that allows you to create and configure file systems quickly and easily.

Amazon EFS is designed to provide massively parallel shared access to thousands of Amazon EC2 instances. This enables your applications to achieve high levels of aggregate throughput and IOPS that scale as a file system grows, with consistent low latencies.

When an Amazon EFS file system is mounted on Amazon EC2 instances, it provides a standard file system interface and file system access semantics, which allows you to seamlessly integrate Amazon EFS with your existing applications and tools. Multiple Amazon EC2 instances can access an Amazon EFS file system at the same time, thus allowing Amazon EFS to provide a common data source for workloads and applications that run on more than one Amazon EC2 instance.