AWS Cloud Practitioner Essentials

EC2 (Elastic Cloud Computing)

- EC2 is nothing but a virtual laptop or computer with

1. Flexible
2. Reliable
3. Scalable

- Here you can dynamically spin up and spin down the instance
- Amazon EC2 Auto Scaling enables you to automatically add or remove Amazon EC2 instances in response to changing application demand.

ELB (Elastic Load Balancing)

- It is automatically scalable with design itself
- For example: If traffic comes from the client automatically scale it and handle the traffic
- Mainly used for directing traffic from the client to server with

1. Highly Perform
2. Cost Effective
3. Highly Available
4. Automatically Scalable

Amazon SQS (Simple Queue Service)

- Loosely Coupled Architecture and more reliable architecture
  (Means a single failure will not cause you cascading failures)
- **Cascading failures** refer to a situation where a failure in one part of a system triggers a series of subsequent failures
- **SQS allows you to send, store and receive messages between two s/w components at any volume**
- Queue is the place to store the request from client if server is down, request will be stored until they are processed

Amazon SNS (Simple Notification Service)

1. Which is the one notifying the information about request to client
2. SNS can deliver messages to an SQS queue
3. Enables the pub/sub messaging model for distributing notifications

Computing Services in AWS

- Comparison between computing with virtual servers (thinking about servers and code) and serverless

computing (thinking only about code).

- AWS Lambda a service that lets you run code without needing to provision or manage servers.
- **Amazon Elastic Container Service (Amazon ECS)** is a highly scalable, high-performance container management system that enables you to run and scale containerized applications on AWS.
- Amazon EKS a fully managed service that you can use to run Kubernetes on AWS.
- AWS Fargate is a serverless compute engine for containers. It works with both Amazon ECS and Amazon EKS.

AWS GLOBAL INFRASTRUCTURE

- **Region:** (Data centers across the world)

    Factors to choose the region:

1. **Compliance (**Major effect in choosing the region based on your rules and regulations)
2. **Proximity** (Choosing the region as per latency (latency is time take for data to be send and received)
3. **Feature Availability** (Choosing the region based on required feature)
4. **Pricing** (selecting the region based on costing)

- **Availability Zones** (A single data center or multiple data centers across a region)
- **Edge Locations** (It is place that **Amazon CloudFront (CDN)** uses to keep a copy of your data closer to customer locations for **low latency**)
- **AWS Outposts**

Ways to interact with AWS services

1. AWS Management Console (Using UI/UX to setup the provisions)
2. AWS CLI (Using Command Line to setup the provisions)
3. AWS SDKs (Using programming Languages to setup or use the services)
4. AWS Elastic Beanstalk (Using configurations and codes to setup the infrastructure of the application)

Networking

1. **VPC - Virtual Private Cloud** (to ensure the security to your cloud services you need VPC)

- VPC defines by IP address range in AWS.

2. **Subnet - Subnetwork** (A subnet is a range of IP addresses in your VPC)
3. **IGW - Internet Gateway** (middleman for internet and VPC)
4. **SG - Security Group** (Virtual firewall for EC2 Instances who check only incoming request because it's stateful)
5. **Network ACL - (Access Control Lists) -** (A Boundary guard who checks in & out request (packets) in the subnet because is stateless.
6. **Packet** - A unit of data of transfer between two subnets.
7. **VPG - Virtual Private Gateway** (The virtual private gateway is the component that allows protected internet traffic to enter into the VPC)
8. **VPN -Virtual Private Network** (VPN is a bodyguard to transfer you request to server with encryption using VPG)

AWS Direct Connect

- It is a service that lets you to establish a dedicated private connection between your data center and a VPC.

Amazon Route 53

- It is a domain name service which convert your website name into Ip address

Amazon Cloud front

- It is **CDN (Content Delivery Network)** It's designed to deliver your content (such as web pages, images, videos, and APIs) to users with low latency and high transfer speeds.

Amazon EBS (Elastic Block Storage)

- An **instance store** provides temporary block-level storage for an Amazon EC2 instance.

- It is a separate storage from the EC2 instance so the data will get backed up when EC2 is stopped or terminated.
- Best for data that requires retention (retention means keep or hold onto something)

Amazon Simple Storage Service (Amazon S3)

1. It is an object-level storage and Its stores data as an object into bucket.
2. **Buckets** - It is a place where you can store your object(data)
3. **Object** - It is nothing but a data which you store into the bucket.
4. **Version Control** - means of keeping multiple variants of an object in the same bucket.

Storage Class od S3

- Storage Class in S3 is a type of storage system you want to store the data based on your own requirements.
- There are 8 categories of storage class:

1. **S3 Standard** - It provides high availability for objects (default)
2. **S3 Intelligent-Tiering** -Automatically moves data between two access tiers (frequent and infrequent) based on access patterns.
3. **S3 Standard-IA (Infrequent Access) -** For data that is less frequently accessed but requires rapid access when needed.
4. **S3 One Zone-IA** - For infrequently accessed data that can be recreated if lost; stored in a single Availability Zone.
5. **S3 Glacier** - Long-term archival storage where retrieval times of minutes to hours are acceptable
6. **S3 Glacier Deep Archive** - For long-term data archiving where retrieval times of hours are acceptable
7. **S3 Outposts** - For workloads that require low-latency access to on-premises applications while still using S3's capabilities.
8. **S3 Reduced Redundancy Storage (RRS)** - This class is being phased out in favor of other classes. It provided lower durability for less critical data

Key features of S3

- Performance - the speed of read and write the data
- Cost Effective - S3 is the very lowest cost for the usage based on the requirements
- Availability - It will available all the time to access the data.
- Durability - this is based on the concept of 99.999999999% (11 9's), for example if you store 100 photos for 100 years, very rare (0.0001%) for data loss.
- Scalability - You can store n number data and the maximum size of a single object into a bucket is 5TB (5,242,880 MB)
- Security - AWS itself has lots of Secuity and S3 has encryptions, ACL and Policies.

How to host a static website in S3

Steps:

1. Create a S3 bucket with enabling static website hosting
2. Add an object (data) like a html page. `index.html` (sample file)
3. After that **Turn off** the Block all public access in the bucket level permissions
4. Give the Bucket policy
   (Sample policy I have given below)

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "PublicReadGetObject",
            "Effect": "Allow",
            "Principal": "*",
            "Action": [
                "s3:GetObject"
```

```
            ],
            "Resource": [
                "arn:aws:s3:::<Bucket-Name>/*"
            ]
        }
    ]
}
```

5. Get the URL from the bucket and paste it on web browser