AWS

Regions🡪 physical location contains availability zones, there r 26 regions around the world , clustered data centers

Availability zones (AZ) 🡪 consists of multiple isolated data centers

Each AZ in 1 region have 100km distance so that it can prevent natural disasters/cyber attacks

Datacenters 🡪 basically a huge computer that stores n processes information, any org that handles its users data must need data centers to store them.

Components:🡪

AMI (Amazon Machine Image) – provides the information required to launch an instance which is virtual server in the cloud.

Instance Type 🡪 when you launch an instance, the instance type that you specify determines the hardware of the host computer used fr your instance.

EBS (Elastic Block Store) 🡪 gives you with flexible, cost effective, easy to use data storage options for your instance

Tag 🡪 label consists of a customer-defined key n optional value that can make it easier to manage, search for n filter resources.

EC2 Instances 🡪 Elastic Compute Cloud is a virtual server that you can launch, configure & manage a/c your needs.

Pay for wt you use

Can be integrated into several other services.

Uses public key cryptography to encrypt, decrypt login info

On Demand 🡪 pay per hr /sec

Reserved 🡪 reserve capacity for discounts.

Spot 🡪 bid your price for unused ec2 capacity

Dedicated hosts 🡪 physical server dedicated for you

EC2 Instance creation

Requirement gathering

Key pairs

Security group

Instance launch

->OS like centos

->size like Ram CPU , Network etc

->storage size like 10gigs

->project

->services/apps running like SSH , Http ,Mysql etc

->environment like Dev,QA,staging,Prod

->login user/owner

Security groups are virtual firewall that controls traffic for 1 or more instances.

Stateful 🡪 stores past n present information

Stateless 🡪 does n’t store past n present information

1 security grp, 1 security grp rule can be connected to multiple instances

1 security grp rule can be connected to multiple instances for incoming and outgoing traffic.

Firewalls are like gatekeepers/guards who has a register which contains info about who is allowed to come inside , who is allowed to go outside

If you stop and restart any ec2 instances, its public address changes but the private address still remains same

If you reboot ec2 instances public IP remains same

If you want your public IP to be static, then Elastic IPs helps

IAM (Identity Access Management):

Manages AWS users and their access to AWS accounts , services.

Ctrls level of access a user can have over an AWS accnt and set users, grant permissions ,allows users to use diff features of an AWS accnt.

IAM is mainly used to manage users, grps, roles, access policies.

Root User accnt we create to sign into aws console , it has all admin rights , access to all parts of accnt.

User created an AWS accnt by default does not have access to any services,so its done with the help of IAM

IAM user created within AWS accnt to allow cotlled access to AWS services/resources.

By default their wont be any permissions, must be assigned using IAM policies.

For example, we can use IAM to enable an EC2 instance to access S3 buckets by requesting fine-grained permissions.

Policies are stored in Json format

AWS EBS(elastic block storage):

A block attached to EC2 instances for additional storage.

Unlike Ec2 instance storage suitable for temporary data, EBS suitable for long term data.

EBS volumes are specific to AZ, can be attached to instances within the same AZ, when creating EBS with EC2 , EBS volumes are created within same AZ as in ECS, however provisioned independently users can choose AZ in which EBS is req

EBS volume Types:

General purpose SSD(solid state drive)(gp2,gp3)—small chunks, most work loads

Provisioned IOPS SSD(io1 and io2) – Large DBs

Throughout Optimized HDD(Hard disk Drive)(st1)

Cold HDD(sc1)Magnetic standard

* fdisk -l lists info about disk partitions on all connected devices
* The mount command in Linux is used to attach a filesystem to the directory structure. This allows you to access and work with the filesystem on a specific device or partition.

mount /dev/sda1 /mnt

**Explanation**:

* + /dev/sda1: The partition or device to mount.
  + /mnt: The directory where the filesystem will be accessible (mount point).
* For permanent mounting mount

Snapshot backup & restore

Elastic Load Balancing:

It is a service provided amazon in which the incoming traffic is efficiently and automatically distributed across a grp of backend servers.

load balancer is a software that distributes network traffic across multiple servers or apps to optimize performance and capacity.

Acts as a proxy b/w users n servers ensures that all servers are used equally n that no single server becomes overloaded.

Types:

Classic LB – traditional form of load balancer used initially.

Not intelligent to support host-based routing or path-based routing

Host-based routing -- when hosting distinct apps across domains/sub-domains

path-based routing – when serving multiple services under a single domain such as APIs n dashboards.

Works b/w transport layer (TCP/SSL) n application layer(HTTP/HTTPS)

Application LB – used for Http-Https traffic routing , works at application layer of the OSI model.

Network LB – works at TCP/SSL, capable of handling millions of requests , used for load-balancing TCP traffic

Gateway LB – provide you the facility to deploy, scale and mange virtual appliances like firewalls

Cloud watch :

Monitoring service provided by AWS to monitor applications performance, health of the application, monitors the resource use etc.

Enables users to collect, track metrics, monitor log files, set alarms n automatically reacts to changes.

Metrics aws cloud watch allows you to record metrics for services such as EBS, EC2, route53 health checks, RDS, amazon S3, cloudfront etc

Events delivers a near real-time stream of system events that describe changes in AWS resources.

Logs:you can use amazon cloud watch logs to monitor, store, access ur log files rom amazon ec2, cloud trail, route53

Alarm monitors cloud-watch metrics for instances.

SNS(simple notification service) webservice that coordinates ,manages the delivery or sending of messages to subscribe endpoints or clients.

EC2 instances🡪create alarm🡪amazon cloud watch🡪 alarm 🡪 alarm triggered🡪SNS

Stress  
to load the CPU! The stress command is used to impose a configurable amount of stress on your system. Here's a breakdown of what your command does:

* -c 4: This option specifies that 4 CPU workers (stressors) should be spawned.
* -t 60: This option sets the time limit for the stress test to 60 seconds.

So, this command will stress your CPU by using 4 cores for 60 seconds. Make sure you have stress installed on your system. If it's not installed, you can usually install it using your package manager.

Amazon Elastic File System:

Serverless, fully elastic file storage service that allows you to share file data without the need for provisioning or managing storage capacity and performance. It is designed to scale on demand to petabytes without disrupting apps, growing n shrinking.

Uses cases:

Secured file sharing

Web hosting

Modernize app development

Machine learning n AI workloads

AutoScaling:

Autoscale group services integrates with cloudwatch n it will monitor ur resources on a particular metric that you have selected like cpu utilization.

If the cpu utilization for example is gng high crossing the threshold, it can adjust the capacity by adding more instances in auto scaling grp.

While we r creating auto scaling grp, we also have to create cloud watch alarms to add/remove the capacity to maintain the performance.

S3 simple storage service:

Storage for the internet, used to store, retrieve any amnt of data at anytime, from anywhere on the web.

Unlimited storage

Data is replicated across multiple facilities

Object-based storage

Stores data as objects within buckets

Bucket has to be unique

Bucket:: logical unit of storage in AWS

Object :: data that you are storing like photos, videos etc

Amazon S3->bucket->folder->object->public access

Storage classes:

S3 standard – general purpose storage of frequently accessed data. Fast access & object replication in multi AZ.

S3 IA—Infrequent Access – long-lived, but less frequently accessed ata, slow access, object replication in multi AZ.

S3 one zone – IA less frequently accessed, slow access, no object replication

S3 Intelligent Tiering automatically moves data to most cost effective tier

S3 glacier low cost storage class for data archiving

S3 glacier deep archive lowest cost storage

🡪S3 charges for storage, requests, tiers, data transfers, region replication

RDS Relatable database service

Amazon relatable

Route 53::