

A region has multiple AZs

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AWS NOTES

- AZ is a physical location made up of one or more data centers.
- ✓ Regions represent different geographical locations and are best to host your applications across multiple regions for disaster recovery.
 - AWS Shield Standard defends against most common, frequently occurring network and transport layer DDoS attacks that target websites or applications.
 - AWS Shield Advanced
 - ↳ Higher level of protection against attacks running on AWS EC2, Elastic Load Balancing, CloudFront, and Route-53 resources.
 - ↳ Expanded DDoS attack protection.
 - Right Principles when designing a cloud based systems.
 - ↳ Always build components that are loosely coupled.
 - ↳ Even if one component fails, the entire system won't.
 - ↳ Assume that everything will fail.
 - ↳ Due to this you will ensure that you take the right measures to build a high availability and fault tolerant system.
 - Amazon RDS is managing your database on cloud, not a database itself. It supports six database types.

Guaranteed
read/write
throughput.

- ↳ Amazon Aurora
- ↳ PostgreSQL
- ↳ MySQL

- ↳ MariaDB
- ↳ Oracle Database
- ↳ SQL Server

- DynamoDB is a fully managed NoSQL database offering provided by AWS. It is now available in most regions for users to consume.
- Elastic MapReduce is a Hadoop Based processing service not a database solution.
- Oracle Database is not a NoSQL solution.
- Elastic Load Balancing (ELB) distributes incoming application traffic across multiple EC2 instances, in multiple availability zones.
 - ↳ Increases the fault tolerance.
- Consolidated billing in AWS Organizations simplifies the payment process by combining the usage and costs of multiple AWS accounts into a single bill.
 - ↳ This makes it easier to manage and track the overall costs of the organization's AWS resources.
- Amazon S3 provides a simple web service interface that you can use to store and retrieve any amount of data, at any time, from anywhere on the web.

- > Individual Amazon S3 objects can range from a minimum of 0 bytes to a maximum of 5TB.
- > A Cost allocation tag is a label that you ~~set~~ or AWS assigns to an AWS resource to help track AWS costs.
- > Cost Explorer is a free tool that you can use to view your costs.
 - ↳ Costs can be viewed as either a cash-based view with unblended costs or as an accrual based view. You can view data for up to the last 12 months, forecast how much you are likely to spend for the next 3 months, and get recommendations for what Reserved instances to purchase.
- > Payment History just allows you to view what payments you've made to AWS previously.
- > Amazon Route 53 provides highly available and scalable Domain Name System (DNS), domain name registration, and health checking web services.
 - ↳ It is designed to give developers and businesses an extremely reliable and cost effective way to route end users to Internet applications by translating names like, for example, `example.com` → `192.0.2.1`.
- > SQS is the AWS managed message queuing service.
- > One can use Amazon Cloud Watch Logs to monitor, store and access your log files from Amazon Elastic Compute Cloud (EC2) instances, AWS CloudTrail and other sources. You can then retrieve

the associated log data from CloudWatch logs.

- AWS CloudTrail is for tracking user activity and API usage.
- S3 is AWS object storage service.

→ AWS Lambda is a compute service that lets you run code without provisioning or managing servers.

↳ It executes your code only when needed and scales automatically, from a few requests per day to thousands per second.

→ Amazon EC2 (Elastic Cloud Compute) provides resizable compute capacity with minimal friction. It provides you with in the cloud. It is designed to make web-scale cloud computing easier for developers.

Complete control of underlying infrastructure. It's simple web service interface allows you to obtain and configure capacity with minimal friction. It provides you with complete control of your computing resources and lets you run on Amazon's proven computing environments. Amazon EC2 reduces the time required to obtain and boot new server instances to minutes, allowing you to quickly scale capacity.

★ SQS, as previously discussed is a message queuing service. It offers reliable, highly-scalable hosted queue for storing messages as they travel between apps or microservices.

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↳ It moves data between distributed application components and helps you decouple these components.

→ The cost of EC2 On-Demand instances is based on,

- location type (AWS Local Zone, AWS Region, AWS Wavelength Zone)
- AMI type (Private & Public AMI's on specific OS)
- Instance type (General Purpose, Compute Optimized, Memory Optimized)

→ AWS VPN

↳ AWS Site-to-Site VPNs enables you to securely connect your on-premises network or branch office site to your Amazon Virtual Private Cloud (VPC). AWS Client VPN enables you to securely connect users to AWS or on-premises networks.

→ AWS Direct Connect

50Mbps - 500Mbps

1Gbps - 10Gbps

↳ It makes it easy to establish a dedicated network connection from your premises to AWS. Using AWS Direct Connect, you can establish private connectivity between AWS and your datacenter, office, or colocation environment, which in many cases can reduce your network costs, increase bandwidth throughput, and provide a more consistent network experience than Internet-based systems connections.

→ AWS VPCs and Subnets let you isolate sections of your AWS cloud environments, but they do not provide a connection to your on-premises infrastructure.

→ AWS Inspector,

↳ It is an automated security assessment service that improves the security and compliance of applications.

deployed on AWS.

↳ It checks for vulnerabilities.

↳ It does not provide cost predictions for migrating or running resources in the cloud.

→ AWS pricing calculator,

↳ to help customers and prospects estimate their costs when using AWS services.

↳ allows users to model their solutions before building them.

↳ Predicts costs effectively.

↳ This tool provides a mechanism to input anticipated resource utilisation and then receive projected monthly cost.

→ AWS trusted Advisor,

↳ provides real-time guidance to help you provision your resources following AWS best practices.

↳ It inspects your AWS environment and then makes recommendations in five categories.

↳ Cost Optimization

↳ Performance

↳ Security

↳ Fault tolerance

↳ Service limits.

↳ Cannot predict costs of migration.

- AWS WAF,
 - ↳ Security service that helps protect web apps from common web exploits that might affect app availability, compromise security, or consume excessive resources.
- Spot Instances,
 - ↳ cheap
 - ↳ flexible start and end times.
 - ↳ Applications that are only feasible at very low compute prices, or users with urgent computing needs for large amounts of additional capacity.
- AWS requires a minimum 1-year term on their contracts for reserved instances.
- For No-Upfront Reserved Instances,
 - ↳ A minimum of 1 year term
 - ↳ successful billing history is needed.
- A policy is a JSON document that specifies what a user can do on AWS.
 - ↳ Actions → what actions are allowed
 - ↳ Resources → which resource you allow the action on.
- A policy is an entity in AWS that, when attached to an identity or resource, defines their permissions.
- A network access control list is an optional layer of security for your VPC that acts as a firewall for controlling traffic in and out of one or more subnets.
- One might setup network ACLs with rules similar to your security groups in order to add an additional layer of security to your VPC.

- Amazon Glacier is an extremely low cost storage service that provides secure, durable and flexible storage for data archival. So Amazon Glacier is used for infrequently accessed data and Data Archives.
- A region is a geographical area divided into Availability Zones. Each region contains at least two Availability Zones.
- 24/7 access to customer support is available in all AWS Support plants.
- AWS Redshift is a fully managed, petabyte-scale data warehouse service in the cloud. You can start with just a few hundred gigabytes of data and scale to a petabyte or more. This enables you to use your data to acquire new insights for your business and customers.
- IAM
 - ↳ IAM users are for granting AWS access to your users.
 - ↳ An IAM role is similar to a user, in that it is an AWS identity associated with permission policies that determine what the identity can and cannot do in AWS. Instead of being associated with one person, a role is intended to be assumable by anyone who needs it including assigning it to an EC2 instance.
 - ↳ An IAM group is a collection of IAM users.
 - ↳ IAM permissions are included in a permission policy, which is then assigned to an IAM role.

→ Amazon Aurora,

↳ It is a fully managed, MySQL and PostgreSQL-compatible, relational database engine. It combines the speed and reliability of high-end commercial databases with the simplicity and cost-effectiveness of open-source databases.

↳ It delivers up to 5 times the throughput of MySQL and up to three times the throughput of PostgreSQL without requiring changes to most of our existing applications.

→ AWS Snowcone,

↳ It is a portable, rugged, and secure device for edge computing and data transfer. You can use a Snowcone device to collect, process, and move data to the AWS Cloud, either offline by shipping the device to AWS, or online by using AWS DataSync.

↳ It is available in two flavors,

↳ Snowcone,

↳ It has 2 vCPUs, 4GB of memory & 8TB of ~~SSD, harddisk (HDD)~~.

↳ Snowcone SSD,

↳ It has 2vCPUs, 4GB of memory & 14TB of solid state drive (SSD).

→ AMAZON S3,

↳ You can store an individual object of 0 to 5TB size. It offers a range of storage ~~de~~ classes designed for different use cases and different pricing.

↳ virtually unlimited amounts of data.

↳ Each object gets a directly accessible URL.

→ Replicated across 3 AZ's.

- # S3 Standard. → Gen ~~Purpose~~ Purpose, frequently Accessed Data.
 - # S3 Intelligent → Tiering for data with unknown/changing Access Pattern
 - # S3 Standard Infrequent Access → J log lived but less
 - # S3 One-Zone Infrequent Access → J frequently accessed data.
 - # S3 Glacier. → long-term archive and digital preservation.
- data** ↗ **cheapest**

could get destroyed → The volume of storage billed per month is based on the average storage used throughout the month (per GB). This includes all objects, data and meta data stored in buckets that you created under your AWS account.

→ No. of buckets or No. of Using encryption does not impact your costings.

→ **Amazon EMR**,

↳ It helps you analyze and process vast amounts of data by distributing the computational work across a cluster of virtual servers running in the AWS Cloud.

↳ The cluster is managed by using Hadoop.

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→ **Amazon RDS**,

↳ RDS is Amazon's service for managed relational Database eg MySQL and Redis. RDS has the ability to create Read Replica which is a duplicate of your primary database that only accepts reads.

↳ A read replica of your RDS database would improve performance.

↳ A read replica makes sense if you have frequently changing or dynamic data.

- > To improve response times for frequently accessed data (read only) you want to implement a caching solution.
- > Amazon ElastiCache provides two different in-memory storage solutions Redis and Memcached.

- * EBS does not have Automatic Backup feature.
- * You can take an EBS snapshot which will backup your data to S3.

- > You backup EBS via EBS snapshot which are stored in S3.
 - > Manually copying your EBS to S3 is not possible.

- > For cost effectiveness, you can either have to choose Spot or Reserved instances.
 - > Regular processing job → Spot
- > AWS CLI → Command line interface. → for working with your AWS resources in the cloud.
- > AWS console → Web Interface to manage your account.
- > AWS SDK → Helps provide Java API's for AWS services including Amazon S3, ECS, DynamoDB, AWS Lambda, etc.
 - > This package includes the AWS Java library, code samples, and documentation you need to start developing.
- > AWS PowerShell → lets you manage your AWS services and resources in the powershell scripting environment.

- > AWS ~~start~~ Accelerator can find the optimal path from the end user to your web-servers. GA are deployed Global within Edgelocations so you can send user traffic to edge location instead of directly to your web app.
- > Amazon SNS (Simple Notification Service) is a web service that enables applications, end-users, and device to instantly send and receive notifications from the cloud.
- > Amazon CloudFront,
 - ↳ employs a global network of edge locations and regional edge cache copies of your content close to your viewers.
 - ↳ It ensures that end-user requests are served by the closest edge location.
- > AWS Auto Scaling,
 - ↳ enables you to configure automatic scaling for the scalable AWS resources for your applications in a matter of minutes.
 - ↳ It uses auto-scaling and ~~auto~~ application auto scaling services to configure scaling policies for your scalable AWS resources.
- > Security Group,
 - ↳ It acts as a virtual firewall for your instance to control inbound and outbound traffic. When you launch an instance in a VPC, you can assign the instance to up to five security groups.
 - ↳ Act ~~as~~ at the instance level.

- Cloudfront also integrates with AWS WAF, a web application firewall that helps protect web applications from common web exploits, and AWS Shield, a managed DDoS protection service that safeguards applications running on AWS.
- A availability zone is an isolated location within an AWS region, whereas, an edge location will deliver cached content to the closest location to reduce redundancy.

→ AWS Beanstalk,

- It makes it even easier for developers to quickly deploy and manage applications in the AWS cloud.
- Developers simply upload their application, and Elastic Beanstalk automatically handles the deployment details of capacity provisioning, load balancing, auto-scaling, and application health monitoring.

→ AMI,

- Amazon Machine Image provides the information required to launch an instance, which is a virtual server on cloud.
- You specify an AMI when you launch an instance, and you can launch as many instances from the AMI as you need.
- You can also launch instances from as many different AMIs as you need.

→ AWS CloudFormation,

- It gives developers and systems administrators an easy way to create and manage a collection of related AWS resources, provisioning & updating them in an orderly and predictable fashion.

→ AWS DMS,

- ↳ AWS Database Migration Service helps you migrate databases to AWS quickly and securely.
- ↳ The source database remains fully operational during the migration, minimizing downtime to applications that rely on the database. The AWS DMS can migrate your data to and from most widely used commercial and open-source databases.

→ Amazon Cloudwatch,

- ↳ It is a monitoring service for AWS cloud resources and the applications you run on AWS.
- ↳ You can use Amazon Cloudwatch to collect and track metrics, collect and monitor log files, set alarms, and automatically react to changes in your AWS resources.
- ↳ It can monitor EC2 instances, Dynamo DB tables, & RDS DB instances, as well as custom metrics generated by your applications and services, and any log files your applications generate.

→ Amazon S3 transfer acceleration,

- ↳ It enables fast, easy, and secure transfers of files over long distances between your client and an S3 bucket.
- ↳ It takes advantage of Amazon Cloudfront's globally distributed edge locations. As the data arrives at an edge location, data is routed to Amazon S3 over an optimized network path.

→ Better Isolated &

Protected against
faults.

→ AWS Multi-AZ,

↳ Amazon RDS Multi-AZ deployments provide enhanced availability and durability for Database (DB) instances, making them a natural fit for production database workloads.

- ↳ When you provision a Multi-AZ DB instance, Amazon RDS automatically creates a primary DB instance and synchronously replicates the data to a standby instance in a different Availability Zone (AZ).
- ↳ Each AZ runs on its own physically distinct, independent infrastructure, and is engineered to be highly available.
- ↳ In case of an infrastructure failure, Amazon RDS performs an automatic failover to the standby, so that you can resume database operations as soon as the failover is complete.

→ Amazon VPC

- ↳ Virtual Private Cloud enables you to launch AWS resources into a virtual network that you've defined.
- ↳ This virtual network closely resembles a traditional network that you'd operate in your own data center, with the benefits of using the scalable infrastructure of AWS.

→ Levels of AWS premium support,

↳ Developer

↳ Business

↳ Enterprise OnRamp

↳ Enterprise

2. Latest AWS Services

- > Amazon Relational Database Service makes it easy to setup, operate, and scale a relational database in the cloud.
- > It provides a cost effective and resizable capacity while automating time-consuming administration tasks such as hardware provisioning, database setup, patching and backups.
- > It frees you to focus on your applications so you can give them the fast performance, high availability, security & compatibility they need.
- > AWS Config
 - > It is a service that enables you to assess, audit, and evaluate the configurations of your AWS resources.
 - > Config continuously monitors and records your AWS resource configurations and allows you to automate the evaluation of recorded configurations against desired configurations.
 - > With Config, you can review changes in configuration and relationships between AWS resources, dive into detailed resource configuration histories, and determine your overall compliance against the configurations specified in your internal guidelines.
 - > This enables you to simplify compliance auditing, security analysis, change management, and operational troubleshooting.