

AWS Analytics :

- Amazon EMR: Easily & cost-effectively process vast amount of data. Utilizes Hadoop framework used for log analysis, financial analysis, extract, translate and loading(ETL) activities.
- Amazon Athena: Interactive query service to analyze data in S3 using standard SQL. It is serverless & we pay for queries only.
- AWS glue: Fully managed pay as you go ETL service that automates steps of data prep for analysis. Transform and move data from various locations.

- Amazon Kinesis: Easy to collect, process and analyze real time streaming data so we can get timely insights and react quickly to them.

AWS Kinesis Video Streams; Kinesis Data Streams; Kinesis Data Firehose; Kinesis Data Analytics.

AWS Monitoring and Logging Service:

- AWS CloudWatch: Monitoring service for AWS cloud resources and applications we run on AWS.

Cloudwatch is for performance monitoring, CloudTrail is for auditing.

It uses AWS SNS to send email.

- AWS CloudTrail: It records activity made on your acc and delivers log files to an S3 bucket. It is for auditing. It is about logging and save a history of API calls for your AWS acc.

AWS Content Delivery and DNS Service:

- AWS Route 53: It is AWS Domain Name Service. It performs:

- Domain registration
- Domain Name Service
- Health check

Routing policies determine how Route 53 DNS responds to queries.

- AWS CloudFront: It is content delivery network that allows us to cache our content at "edge locations". This allows quick content access and security against DDoS attacks.

AWS Storage Services:

- Amazon Simple Storage Service (S3): It is object storage built to store & retrieve any amount of data from anywhere. We can store any type of file in S3.

7 types:

- S3 Standard - S3 Intelligent Tiering
- S3 Standard IA (Infrequent Access)
- S3 One Zone IA
- S3 Glacier Instant Retrieval
- S3 Glacier Flexible Retrieval
- S3 Glacier Deep Archive

- AWS Snowball:

Using this we can transfer hundreds of TB of PB of data between your on-premise data centers and Amazon S3

AWS Snowcone - smallest device

AWS Snowball - Bulk data transfer, edge storage acceleration

AWS Snowmobile - truck

- Amazon Elastic Block Store (EBS): Provides persistent block storage volumes for use with EC2. Automatically replicated within its AZ. It offers consistent and low latency performance. Data persists independently of life of instance.

- More than one EBS can be attached to instance but one EC2 can't attach to more than one instance.

- EBS snapshot: It captures a point-in-time state of an instance. Stored in S3.
- Instance Store Volume: They are high performance local disks that are physically attached to the host computer on which EC2 runs.
- Amazon Elastic File System (EFS):
 - A fully managed service which makes it easy to set up and scale file storage in Cloud.
 - It uses NFS protocol.
 - Can concurrently connect 1 to 1000 of EC2 instances from multiple AZ.

Only available for Linux instances.

- AWS Storage Gateway: It is a hybrid cloud storage service that gives on-premise access to virtually unlimited cloud storage.
- AWS Backup: It offers a centralized backup console, APIs and command line interface for managing backups across AWS services.
- Amazon FSx: It makes it easy & cost effective to launch, run and scale feature such as high performance file systems in Cloud.
 - Support four widely use file system:
 - Windows File Server • Lustre
 - OpenIFS • Netapp OnTap

AWS Global Infra:

Region: It is a physical location in world and is independent.

- AZ: An AZ is composed of one or more data centers.

- Local Zones: It places compute, storage and database and other services closer to end users.

- AWS Wavelength: Enables developers to build app that deliver single digit ms latencies to mobile devices and end users.

It brings services to the edge of 5G network.

- AWS Outpost: It brings native AWS service, infra and operating models to virtually any data centers, no location space on on-premise facility.

- Edge locations: They a Content delivery Network endpoints for CloudFront.

AWS Database Service:

- Amazon Relational Database Service (RDS): Managed service that makes it easy to set up, operate and scale a relational database in cloud.
 - OLTP type database.
 - Highly available, fault tolerant and scalable
 - We can only scale up.
 - Multi AZ : creates a replica in another AZ.

- Amazon DynamoDB: Fully managed NoSQL DB service.
 - SSD-based
 - Data replicated across 3 facilities (AZ) in a region
 - Cross-region replication available.

- Amazon DynamoDB Accelerator (DAx): Fully managed in memory cache makes 10x performance

- Amazon Redshift: Fully managed data warehouse that makes it simple and cost effective to analyze all our data using Standard SQL and existing BI tools.
 - SQL based data warehouse for analytical applications.
 - OLAP uses.
 - keeps 3 copies of data.

- Amazon Elastic Cache: It makes it easy to deploy & run Memcached or Redis protocol-compliant server nodes in cloud.
 - In memory caching.
 - It is a key/value store.

Use Case for diff DB types:

• Database on EC2

- Full control over instance & DB.

• Amazon RDS

- Trad RDB for OLTP
- Data well structured

• Amazon DynamoDB

- Name/ value pair
- Unpredictable data structure
- Req. dynamic scaling.

• Amazon Redshift

- Data warehouse for large volume of data
- Primarily OLAP workloads

• Amazon Neptune

- Build & run graph application.

• Amazon ElastiCache

- Fast temporary storage for small amounts of data.

• S3

- Binary large objects (BLOBs)

• Amazon Neptune : Fully managed DB which makes it easier to build & run graph application

Auto Scaling & Elastic Load Balancing:

• Amazon EC2 Auto Scaling : It is process of launching (scaling out) & eliminating (scaling in) EC2 instances based on traffic demand for our application.

- It provides elasticity & scalability.

- Collection of EC2 instances called Auto scaling group (ASG)

- We can give min no. of instance in ASG.

- Amazon Elastic Load Balancing (ELB):
 - automatically distributes incoming application traffic across multiple targets such as EC2 instances, containers or IP address.
- Types:
- Application Load Balancing: Best for HTTP & HTTPS traffic, operating at layer 7.
- Network Load Balancing: Best for TCP traffic, operating at layer 4.
- Classic LB: basic load balancing at both layer 4 & 7.
- Gateway LB: distributes connections to virtual appliances and scales them up or down.
- AWS Machine Learning Services
 - Aws Rekognition: Add image and video analysis to our application. Processed video stored in S3. Publish completion status using SNS.
 - Aws Transcribe: Speech to text.
 - Aws Translate: Delivers fast, high quality and affordable lang translation.
 - Aws Textract: Automatically extract printed text, handwriting and data from document.

• AWS SageMaker : helps to prepare, build, train and deploy high quality ML models.

• AWS Comprehend : NLP service.

• AWS Lex : conversational AI for chatbot.

• AWS Polly : Turn text to speech

• AWS Forecast : Time series forecasting service.

• AWS DevOps Guru : Cloud operation service for improving application operational performance and availability.

AWS Networking Service :

• Amazon Virtual Private Cloud (VPC) : It is a virtual network dedicated to our AWS account. It is logically isolated from other virtual networks in AWS cloud.

A VPC spans all AZ in a Region.

By default we can create 5 VPC per region.

• Subnets : After creating VPC we can add one or more subnets in each AZ.

• Firewalls :

• NACLs : It provides firewall at subnet lvl.

• Security group : It provides firewall at instance lvl.

Security Gap

- Support allow rules.
- Stateful
- Evaluates all rules
- Instance level

NACLS

- Support allow & deny rules.
- Stateless.
- Process rules in order.
- Subnet level.

- AWS Direct Connect (DX): It is a network service that provides an alt. to using the internet to connect to on-premise sites to AWS.
- Reduce cost • Inc reliability • Inc bandwidth
- Dec latency.

- AWS Global Accelerator: It is a service that improves availability & performance of application with local or global users.

- ~~AWS Compute~~

- Amazon EC2: It is a web service with which you can run virtual servers "instances" in cloud.

Pricing:

- On demand: Good for users that want low cost and flexibility of EC2 without any upfront payment or long term commitment. Applications with short term or unpredictable workload that can't be interrupted.
- Reserved: Applications with steady or predictable state and usage. Scheduled RTs are available to launch within the time window we reserve.
- Spot: Applications that have flexible start/end time. Users with no urgent need for a large amt of "idle" compute capacity.

- Dedicated hosts: Physical servers dedicated just for us. Available as on demand or with dedicated host. ~~→~~ Predictable performance & complete isolation.
Most expensive.
- Dedicated instances: Virtualized instances on hardware just for you. Also uses physically dedicated servers. May share hardware with other non-dedicated instances.
- Savings plan: It is a flexible pricing model that provides savings up to 72%.

• AWS Elastic Container Service (ECS): It provides high scalable and high performance container management service that supports Docker containers and allows you to easily run applications on a managed cluster of ECS instances. ~~It is managed~~.

• Elastic Container registry: It is a managed AWS Docker registry service for storing, managing and developing Docker images.

• AWS Lambda: It is a serverless computing technology that allows us to run code without provisioning or managing servers.

• AWS Lightsail: Virtual servers, storage, database great for people with little cloud experience.

• AWS Elastic Beanstalk: It is fastest and simplest way to get web app up and running. Developers simply upload app code, and service automatically handles all details such as resource provisioning, load balancing, auto scaling and monitoring.

- AWS Batch: Enable developers, scientist and engineers to run hundreds of thousand batch computing jobs easily and efficiently on AWS.
- AWS IAM: It is a web service that helps us securely control access to AWS resources.
- AWS Security Token Service (STS): It is a web service that enables us to use temporary, limited privileged credentials for IAM users or for users that we authenticate.
- AWS Cloud Management Service:
- AWS Organization: It allows us to consolidate multiple AWS acc into an org that we create and centrally manage.
 - Available in 2 feature set:
 - Consolidated Billing: It includes:
 - Paying acc: independent & can't access resources of other acc.
 - linked acc: all linked acc are independent.
- AWS Control Tower: Simplifies the process of creating multi-acc environments.
- AWS Config: It is a fully managed service that provides you with an AWS resource inventory, configuration history, and configuration change notifications to enable security and regulatory compliance.

- AWS Service Catalog: It allows organizations to create and manage catalogs of IT services that are approved for use on AWS.
- AWS System Manager: Manages many AWS resources including EC2, S3, RDS, etc.
- AWS Personal Health Dashboard: It provides alerts and remediations guidance when AWS is experiencing events that may impact you.
- Service Health Dashboard: It publishes up-to-the-min info on service availability.
- AWS Opswork: It is a config management service that provides managed instances of Chef & Puppet.
- AWS Trusted Advisor: It is an online tool that provides you real time guidance to help you provision your resources following AWS best practices.
- AWS Application Integration Services: These services are a family of services that enable decoupled communication b/w applications.

Service	what it does	use case
Simple Queue Services (SQS)	Messaging queue, store forward patterns.	Building distributed decoupled apps.
Simple Notif Service (SNS)	Set up, operate & send notif from clouds.	Send email notif when Cloudwatch is triggered.
Step functions	Out of the box control of AWS service components with visual workflow.	Orders processing workflow.

• Simple Workflow Service (SWF)	Need to support external processes or specialized execution logic.	Human enabled workflow
• Amazon MQ	Message broker service for Apache ActiveMQ and RabbitMQ that supports industry standard API & protocol.	Need a msg queue that supports industry standard API & protocol.

• Additional AWS Services:

- AWS CodeStar: Enables us to quickly develop, build & deploy applications on AWS. It provides a unified user interface enabling us to easily manage our software development activities in one place.
- AWS CodeCommit: Fully managed source control service that hosts secure Git-based repositories.
- AWS CodeBuild: Fully managed continuous integration service that compiles source code, run tests and produce software packages ready to deploy.
- AWS CodeDeploy: Fully managed deployment service that automates software deployment to variety of compute services.
- AWS Code Pipeline: Fully managed continuous delivery service that helps us automate our release pipelines for fast & reliable applications.
- AWS X-Ray: Helps developers analyze and debug production, distributed applications, such as those built using a microservice architecture.

AWS Security Services

- Compliance: AWS Cloud Compliance enables you to understand the robust controls in place at AWS to maintain security and data protection in cloud.
- AWS Artifact: It is your go-to, central resource for compliance related info that matters to you. It provides on demand access to AWS ~~several~~ security & compliance reports and select online Agreements.
- Amazon GuardDuty: It offers threat detection and continuous security monitoring for malicious or unauthorized behavior to help you protect your AWS accounts. Intelligent threat detection.
- AWS WAF: security against SQL injections. It is web application firewall. They are Web ACLs
- AWS Shield: Protection against DDoS. 2 tiers standard & advanced.
- AWS Key Management Service (KMS): It gives centralized control over the encryption keys used to protect our data.
- AWS CloudHSM: It is cloud based hardware security module that enables us to generate and use our own encryption keys on AWS cloud.
- AWS Certificate Manager: It is a service that lets us easily provision, manage and deploy public & private, secure sockets layer / Transport Layer Security (SSL/TSL) certificates for use with AWS services and

your internal connected resources.

- AWS Inspector: It is an automated security assessment service that helps improve the security & compliance of applications deployed on AWS.
- AWS Trusted Advisor: It is online resource that helps to reduce cost, inc performance, and improve security by optimizing our AWS environment.
- Penetration Testing: AWS allows penetration testing.
- AWS Single Sign On (AWS SSO): It is a cloud-based single sign on (SSO) service that makes it easy to centrally manage SSO access to all your AWS accounts and cloud applications.
- Amazon Cognito: It lets you add user sign up, sign in and access control to our web and mobile apps quickly & easily.
- AWS Systems Manager Parameter Store: Provides secure, hierarchical storage for configuration data management and secret management.
- AWS secrets manager: Like parameter store allows native and automatic rotation of keys.