AWS Basics and Services

Basics

Cloud Computing

- Availability of computing services, databases, and storage online.
- Pay as-you-go-pricing: Pay for what you need. It means that you do not need to buy all the services; you only pay for the services that are applicable to your task.
- Benefits: cost saving, scalability, reliability, accessibility, efficiency.

Architecture

- Front-end:
    - Thin client: uses web browser functionalities and lightweight accessibility.
    - Fat client: uses multiple heavyweight functionalities for better user experience.
- Back-end:
    - Storage and computing units.
- Cloud-based delivery and network:
    - Internet: provides global accessibility.
    - Intranet: for internal conversations within the organization.
    - Intercloud: provides interoperability between cloud services.

Types

- **Infrastructure-as-a-Service (IaaS):** It provides virtual computing resources along with control over operating system and applications. It is cost-effective and scalable. Examples: AWS, Microsoft Azure, Digital Ocean etc.
- **Platform-as-a-Service (PaaS):** It offers application development by keeping underlying infrastructure as abstractions. The main focus of developers is on code without having to bother about background operations. Examples: AWS Lambda, Google Cloud, IBM Cloud etc.

- **Software-as-a-Service (SaaS):** It allows software and its functions to be accessed from anywhere. An application is hosted centrally which can be accessed by multiple users across the globe. Examples: Miscrosft 365, Zoom, Slack, Adobe Creative Cloud etc.
- **Function-as-a-Service (FaaS):** It helps in maintenance of services and infrastructure.
- **Desktop-as-a-Service (DaaS):** It provides virtual desktop to the users with access to remote data and application. Examples: Xignite, urban mapping etc.
- **Identity-as-a-Service (IDaaS):** It is used for authentication purpose. It establishes the authenticity of an identity and manages access.

Deployment Models

- **Private Model**: cloud resources dedicated to one organization. All the resources are isolated; it is also known as, internal or corporate cloud. Example: AWS outports service.
- **Public Model**: third-party provides and manages cloud services. Pay-as-you-go services, provides scalability, cost efficiency and high-level security. Example: Amazon E2, Amazon S3, Amazon RDS etc.
- **Hybrid Model**: In this design a company combines their public and private cloud and uses resources from both. Private cloud resources make use of public resources when and as needed. Front-end services are used from public cloud and back-end services are available on private cloud.

Services

EC2 (Elastic Compute Cloud)

- On-demand computing service on AWS cloud platform.
- Allows usage of RAM, ROM, and storage according to the need of the task.
- Highly flexible, cost effective, quick service.

Instance Types

- **General purpose instances**: provides balance of compute, memory and networking resources. Used for application servers, backend servers for enterprise applications.
- **Compute optimized instances**: are used for computation intensive applications that require high-performance processors. Used for web, application and gaming servers.
- **Memory optimized instances**: used for tasks that require a large amount of data for computation.
- **Accelerated computing instances**: used for tasks that require hardware accelerators to perform functions more efficiently like graphics processing and data pattern matching.
- **Storage optimized instances**: used for tasks that require high, sequential read and write access to large datasets on storage like distributed file systems, data warehousing applications etc.

Snow Family

These are a group of devices that transport data in and out of AWS.

Types

Snowcone: secure and a small device. It is composed of 8TB storage, 4GB memory and 2 CPU's.

Snowball:

- ***Snowball edge storage optimized devices***: used for large-scale migrations, has 80TB of HDD storage space and 1TB SSD storage.
- ***Snowball edge compute optimized devices***: used for services that require large-scale computing resources, has 42TBof HDD storage space and 7.68TB SSD storage.

create job(transferring data) → connect to snowball → copy data to snowball →S3(Object storage)

Snowmobile:

It moves large amounts of data to AWS. It can transfer 100 petabytes of data.

Cloudwatch

It is a cloud monitoring and management system. It is web-service that allows you to monitor your resources. It allows you to configure the service to monitor and set alarms based on preferred metrics.

Elastic Transcoder

It is a cloud-based media transcoding device.

Structure

- **Jobs**: are in charge of transcoding, can translate a single file into up to 30 different formats.
- **Pipelines:** are queues to handle transcoding jobs, set a sequence of jobs.
- **Pre-sets:** are templates that provide settings for converting a job.
- **Notifications:** are reminders for status of a processing unit.

Virtual Private Cloud (VPC)

It is a private cloud inside the cloud. It is a logical grouping of servers in a specified network and these servers are isolated from other servers in AWS. It allows controlling of IP address; route tables and gateway to VPC (can't have more than one gateway). It provides better security.

Amazon S3

It is a simple scalable storage that stores all sorts of files, photos, audios, videos etc. It is used in different fields like web applications, big data, machine learning etc. It is used as data storage, backup and recovery, hosting static websites and data archiving.

S3 Bucket

Data is stored in containers called buckets. Each bucket has its policies and configurations which allows the user to set access control. The maximum size of bucket is 5TB and has following elements:

- Key
- Version ID
- Value
- Metadata
- Sub-resources
- Access control information
- Tags

S3 Storage Classes

- **Standard:** It is used for general purpose and is a go-to for frequently used data. It is good for hosting static websites, mobile and gaming applications, building data lakes and data warehouses etc.
- **Standard Infrequent Access:** It is a cost-effective option for less frequent data. It is best suitable for backup and recovery of data. It is highly durable.
- **One-zone Infrequent:** It stores data in one zone and reduces cost by 20%. It is optimal for backing up on-premises data or easily re-creatable data.
- **Intelligent Tiering:** It provides automatic cost optimization. No retrieval charges are applicable. It requires less monitoring.
- **Reduced Redundancy Storage:** It has low durability than other storage classes and is used to store non-essential data.
- **Glacier Instant Retrieval:** It is used to archive data at a low storage cost. It is highly flexible and takes only milliseconds to recover data. The minimum object size should be 128KB.
- **Glacier Flexible Retrieval:** It is used to archive data that needs to be accessed few times in a year, lower cost service than instant retrieval, better for backup and recovery of large datasets.
- **Glacier Deep Archive:** This is used to store large amount of data for a long time at a lower cost compared to on-premises services. It has a feature of object replication. It is a more secured storage, highly durable and requires less time to recover data.

Lambda

It runs code automatically and manages underlying computing resources. It is an event-driven computing service. It performs all the administrative duties once the code is uploaded in the form of zip file. It manages server, operating system, scaling, security etc. It can be used for file processing, web applications, IoT applications, stream processing etc.