Exp.No.	01	Cloud Account Setup and Services Overview	Year/Sem	2/IV
Date	11/03/2025		Branch	BTECH

Aim:

To create an AWS cloud account and explore its various services.

Procedure:

1. Create an AWS Account

○ Go to AWS Official Website. Branch

○ Click on "Create an AWS Account" and enter the required details (email, password, account name).

○ Choose "Personal" or "Business" account type and provide billing information.

○ Complete identity verification using a phone number.

○ Select a support plan (Free Tier recommended for beginners).

○ Log in to the AWS Management Console.

2. Exploring AWS Services

○ Navigate through the AWS Management Console to explore services. CSE

○ Access different categories such as Compute, Storage, Database, Networking, and Security.

○ Experiment with services like EC2 (Elastic Compute Cloud), S3 (Simple Storage Service), and RDS (Relational Database Service) using Free Tier options.

AWS:

Amazon Web Services (AWS) is a cloud computing platform that provides on-demand computing power, storage, and various services for businesses and developers.

Services in AWS:

i)COMPUTE NETWORKING:

AWS provides various compute and networking services to help users build, deploy, and manage applications efficiently. Here are key services under each category:

1. Compute Services:

AWS compute services provide the infrastructure needed to run applications, including virtual machines, container orchestration, and serverless computing.

- **Amazon EC2 (Elastic Compute Cloud):** Scalable virtual servers in the cloud.
- **AWS Lambda:** Serverless computing service that runs code in response to events.

2. Networking Services:

AWS networking services ensure secure, scalable, and reliable communication between resources.

- **Amazon VPC (Virtual Private Cloud):** Isolated network environment for AWS resources.
- **AWS Direct Connect:** Private network connection between AWS and on-premises infrastructure.
- **AWS Transit Gateway:** Connects multiple VPCs and on-premises networks.
- **Amazon Route 53:** Scalable domain name system (DNS) for routing traffic.

ii)STORAGE AND CONTENT DELIVERY:

- **Storage:** AWS offers scalable and durable services like S3, EBS, and EFS for diverse data storage needs.
- **Content Delivery:** AWS CloudFront accelerates content distribution globally by caching data at edge locations, reducing latency.

Amazon S3 (Simple Storage Service):

- This is object storage, ideal for storing and retrieving any amount of data from anywhere.
- It's highly scalable, durable, and versatile, used for various purposes like data lakes, backups, and content storage.

Amazon EBS (Elastic Block Store):

- This provides block-level storage volumes for use with Amazon EC2 instances.
- It's designed for high-performance workloads that require low-latency access to data, like databases and enterprise applications

Content Delivery Acceleration:

- To improve the performance and user experience of web applications and content delivery by reducing latency and increasing transfer speeds.
- To distribute content globally, ensuring that users can access it quickly and reliably from anywhere in the world.

Scalability and Flexibility:

- To offer storage and content delivery solutions that can scale dynamically to meet changing demands.
- To provide a variety of storage options to accommodate different data types and access patterns.

iii Databases:

Amazon Web Services (AWS) provides various **managed database services** to store, manage, and process data efficiently in the cloud. These services are designed for **scalability, security, high availability, and performance** without requiring users to manage the underlying infrastructure manually.

Types of AWS Database Services

1. Relational Databases (SQL-based)

These databases store structured data in tables with predefined

rver, and Oracle.

- Automates backups, patching, and scaling.

- **Amazon Aurora**
  - High-performance relational database compatible with MySQL and PostgreSQL.
  - Faster and more scalable than traditional RDS options.

2. NoSQL Databases

Designed for unstructured or semi-structured data, providing fast read/write operations.

- **Amazon DynamoDB**
  - Serverless, highly scalable key-value and document database.
  - Ideal for applications requiring low-latency access, such as gaming, IoT, and mobile apps.
- **Amazon ElastiCache**
  - In-memory caching for high-speed performance using **Redis** and **Memcached**.
- **Amazon Keyspaces**
  - Managed **Apache Cassandra**-compatible NoSQL database for high availability.

3. Data Warehousing & Analytics

For storing and analyzing large datasets used in business intelligence.

- **Amazon Redshift**
  - Fully managed data warehouse for large-scale analytics.
  - Supports SQL queries and integrates with **AWS Glue** and **Amazon S3** for data processing.

4. Specialized Databases

AWS offers services for unique data models and workloads.

- **Amazon Neptune** – Managed graph database for applications needing relationships between data (e.g., social networks, fraud detection).
- **Amazon Timestream** – Time-series database optimized for IoT and real-time data.
- **Amazon QLDB (Quantum Ledger Database)** – Immutable, cryptographically verifiable ledger database for tracking changes.
- **Amazon Managed Blockchain** – Service to build and manage blockchain networks.

iv Deployment and Management of AWS Databases

AWS provides **fully managed** database services that simplify deployment, scaling, security, and monitoring. These services ensure **high availability, automated backups, and minimal operational overhead** for database administrators.

Deployment of AWS Databases

1. **Choosing the Right AWS Database**
    a. **Amazon RDS** – For relational databases (MySQL, PostgreSQL, SQL Server, Oracle, etc.).
    b. **Amazon DynamoDB** – For NoSQL key-value and document storage.
    c. **Amazon Redshift** – For data warehousing and analytics.
2. **Configuring the Database**
    a. Set database instance type, storage, and security settings.
    b. Choose **Single-AZ** (one region) or **Multi-AZ** (automatic failover for high availability).
    c. Enable automated backups and monitoring.
3. **Deploying the Database**

a. AWS provisions the database, managing resources automatically.
b. A **database endpoint** is provided for applications to connect.

4. **Connecting to the Database**
    a. Use **SQL clients** (MySQL Workbench, pgAdmin) or **AWS SDKs** for DynamoDB.
    b. Example MySQL connection:
    c. mysql -h <your-db-endpoint> -u <username> -p

Management of AWS Databases

1. **Monitoring & Performance Optimization**
    a. **Amazon CloudWatch** – Tracks CPU, memory, connections, and query performance.
    b. **Performance Insights (RDS, Aurora)** – Identifies slow queries and optimizes performance.
    c. **DynamoDB Auto Scaling** – Adjusts capacity dynamically based on workload.
2. **Backup & Disaster Recovery**
    a. **Automated Backups (RDS, Aurora)** – Retains daily backups up to 35 days.
    b. **Point-in-Time Recovery** – Restores data to a specific moment in time.
    c. **Manual Snapshots** – Create long-term backups for compliance and recovery.
3. **Security & Access Control**
    a. **IAM (Identity and Access Management)** – Controls user permissions.
    b. **VPC Security Groups** – Restricts database access to private networks.
    c. **AWS KMS Encryption** – Encrypts data at rest and in transit.
4. **Scaling & High Availability**
    a. **Multi-AZ Deployment (RDS, Aurora)** – Provides automatic failover for reliability.
    b. **Read Replicas** – Distributes database load for improved performance.
    c. **DynamoDB Global Tables** – Ensures worldwide replication for faster access.
5. **Cost Optimization & Cleanup**

a. **AWS Cost Explorer** – Monitors database usage to reduce costs.
b. **Delete Unused Instances** – Prevents unnecessary billing.
c. **Enable Auto Scaling** – Adjusts database resources based on demand.

v)ANALYTICS:

Services refer to a suite of cloud-based tools provided by Amazon Web Services (AWS) for collecting, processing, storing, analyzing, and visualizing data at scale. These services support real-time and batch processing, big data analytics, business intelligence, machine learning, and data warehousing.

1.Data Collection & Ingestion :

AWS Kinesis – Real-time data streaming for processing logs, IoT data, and event streams.

AWS Data Pipeline – Automates data movement between AWS services and on-premises storage.

AWS Glue – Fully managed ETL (Extract, Transform, Load) service to prepare and transform data.

2.Data Warehousing Amazon Redshift:

A fast, scalable cloud data warehouse for analytical queries over structured data.

3.Machine Learning & AI Analytics Amazon SageMaker:

Build, train, and deploy machine learning models. AWS Forecast – Uses ML for time-series forecasting. Amazon Comprehend – NLP (Natural Language Processing) service for text analytics.

4.Data Lakes & Storage Amazon S3:

Scalable object storage used for data lakes and analytics workloads.

vi)MOBILE SERVICES:

AWS (Amazon Web Services) provides a comprehensive suite of mobile services designed to help developers build, deploy, and manage mobile applications.

AWS Amplify:

- This is a set of tools and services that enable front-end web and mobile developers to build scalable full stack applications, powered by AWS.

AWS AppSync:

- This service simplifies application development by enabling you to create flexible APIs using GraphQL.

AWS Device Farm:

- This is an app testing service that allows you to test your Android, iOS, and web apps on a wide range of real devices hosted in the AWS Cloud.

Amazon Location Service:

- This service allows developers to add location functionality to applications, such as maps, points of interest, geocoding, and tracking.

AWS Console Mobile Application:

- This app allows users to monitor and manage a selection of AWS resources from their mobile devices.

PURPOSE OF AWS IN MOBILE SERVICES:

- Simplifying Backend Development.
- Enabling Scalability and Reliability.
- Providing Testing and Quality Assurance.
- Enhancing User Experience.

- Accelerating Development.

vii) APP SERVICES:

AWS offers a very broad range of app services, catering to diverse needs from simple web hosting to complex, distributed applications.

- **Amazon EC2 (Elastic Compute Cloud):**
  - Provides virtual servers (instances) in the cloud.
  - Suitable for a wide variety of applications.

- **AWS App Runner:**
  - A fully managed service that makes it easy to deploy containerized web applications and APIs at scale.
  - Simplifies deployment and management, handling infrastructure automatically.
- **AWS Lambda:**
  - A serverless compute service that lets you run code without provisioning or managing servers.
  - Ideal for event-driven applications and microservices.

Application Integration Services:

- **Amazon API Gateway:**
  - Enables you to create, publish, maintain, monitor, and secure APIs.
  - Crucial for building microservices and exposing backend functionality.
- **Amazon SQS (Simple Queue Service):**
  - A fully managed message queuing service.
  - Used to decouple application components and improve reliability.

- **Amazon SNS (Simple Notification Service):**
  - A fully managed messaging service for pub/sub messaging.
  - Enables you to send notifications to various endpoints.
  - Improves performance and reduces latency for users.

viii)APPLICATION OF AWS:

- **Data Storage and Backup:**

Amazon S3 is widely used for storing various types of data, from website assets to backups and archives.

- **Big Data Analytics:**

AWS provides tools for processing and analyzing large datasets, such as Amazon EMR (Elastic MapReduce) and Amazon Redshift.

- **Internet of Things (IoT):**

AWS IoT services enable devices to connect to the cloud, collect data, and interact with other applications.

- **Artificial Intelligence and Machine Learning:**

AWS offers a range of AI/ML services, such as Amazon SageMaker, for building and deploying machine learning models.

- **Enterprise Applications:**

AWS provides services for running enterprise applications, such as CRM, ERP, and collaboration tools.

Specific AWS Service Applications:

- **Amazon EC2 (Elastic Compute Cloud):**

1) Running web servers, application servers, and other compute-intensive workloads.
2) High performance computing.

- **Amazon S3 (Simple Storage Service):**

1) Storing website content, media files, backups, and data archives.
2) Building data lakes.

- **Amazon RDS (Relational Database Service):**

1) Hosting relational databases for web applications, e-commerce platforms, and other data-driven applications.

Conclusion:

AWS provides a wide range of cloud services that enable businesses and developers to build, deploy, and manage applications efficiently. Exploring AWS services gives hands-on experience in cloud computing, storage, networking, and security.

Result:

Successfully created an AWS account and explored various AWS services.