AMAZON WEB SERVICES (AWS)

- **Introduction to AWS**
  - Amazon web services (AWS) is a comprehensive cloud computing platform.
  - It offers over 200 fully featured services including computing, storage and databases.
  - Available in multiple regions worldwide.
  - Allows business to scale resources up or down.
  - Provides robus security and compliance.

1. AWS DATABASE SERVICES

(i) Amazon RDS

Amazon RDS makes it easy to set up, operate, and scale a relational DB in the cloud with support for multiple database engines.

(•) Use cases :→ web and mobile applications
→ E-commerce platforms
→ customer relationship management (CRM) systems
→ Analytics and business intelligence.

(•) Benefits : → Automated backups & patching → security & compliance
→ scalability and performance

(•) Challenges : → Managing dB performance → controlling costs for large databases.
→ ensuring data security

(ii) Amazon DynamoDB

Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability.

(•) Use cases : → Real-time bidding and gaming → mobile & web applications
→ IOT applications → Content management.

(•) Benefits : → Fully managed with automated scaling
→ Built-in security features
→ Integration with AWS services (Other)

(•) Challenges : → Managing data consistency
→ understanding pricing model

(iii) Amazon Aurora

Amazon Aurora is a MySQL- and PostgreSQL-compatible relational database built for the cloud, combining the performance and availability of high-end commercial databases.

(•) Use cases : → enterprise application → high-performance web and mobile applications
→ SaaS applications → online transaction processing (OLTP)

(•) Challenges : → higher costs for large-scale databases
→ complexity in migrating existing databases
→ Managing database performance

(•) Benefits : → high performance and availability
→ fully managed service
→ scalability and durability.

2. AMAZON ELASTIC COMPUTE CLOUD (Amazon EC2)

Amazon EC2 provides resizable compute capacity in the cloud, allowing users to quickly scale computing resources as needed.

(•) Use cases : → Hosting web applications → Batch processing
→ Running backend servers → Scientific computing

(•) Benefits : → Flexibility to choose instance types → Scalability
→ Pay-as-you-go pricing model

(•) Challenges : → Managing instances → ~~optize~~ optimizing costs
→ Ensuring security configurations.

3. AMAZON SIMPLE STORAGE SERVICE (Amazon S3)

Amazon S3 is an object storage ~~st~~ service that offers industry-leading scalability, data availability, security and performance.

(•) Use cases : → data backup & restore
→ content storage and distribution
→ hosting static websites.

(•) Benefits : → durability and availability → scalability
→ cost effective storage tiers → security and compliance

(•) Challenges : → Managing storage costs → handling large-scale data migration
→ ensuring data security

4. AMAZON VIRTUAL PRIVATE CLOUD (Amazon VPC)

Amazon VPC allows you to provision a logically isolated section of the AWS cloud and where you can launch AWS resources in a virtual network.

(•) Use cases :- → disaster recovery
→ network isolation and security.

(•) Benefits : → complete control over virtual networking
→ flexible network configuration
→ integration with other AWS services

(•) Challenges : → ensuring network security
→ controlling network traffic & costs.

5. AWS IDENTITY AND ACCESS MANAGEMENT (IAM)

AWS IAM enables you to manage access to AWS services and resources securely by creating and managing AWS users and groups and using permissions to allow and deny access to AWS resources.

(•) Use cases : → securing access to AWS resources
→ managing user permissions
→ auditing and compliance

(•) Benefits : → granular access control
→ centralized management of permission
→ enhanced security with MFA.

(•) Challenges : → managing complex permission structures
→ ensuring security best practices
→ handling large scale user and group management.

6. AWS SAGEMAKER

AWS SageMaker is a fully managed service that provides every developer and data scientist with the ability to build, train, and deploy machine learning models quickly.

(•) Use Cases : → predictive analysis
→ image & video analysis
→ natural language processing.

(•) Benefits : → fully managed infrastructure
→ scalable traing & deployment

(•) Challenges : → managing costs for large scale traing jobs.
→ ensuring data privacy & security.

7. AWS LAMBDA

AWS lambda lets you run code without provisioning or managing servers, charging only for the compute time you consume.

(•) Use cases : → Real time file processing
→ building serverless application
→ event-driven architectures

(•) Benefits : → No server management
→ automatic scaling
→ pay-per-use pricing

(•) Challenges → cold start latency
→ limited execution duration
→ managing dependencies & environment variables.

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