Module-7 Databases

In AWS, a database is a managed service that stores, organises, and retrieves structured or unstructured data for applications efficiently and securely.

#1 Relational Database Services

Amazon RDS

Amazon RDS is a fully managed relational database service that automates routine database tasks and improves availability.

Key points:
- Automated patching and backups.
- Built In redundancy with multi-AZ deployment
- Automatic failover in case of failure
- Supports disaster recovery through Snapshots and replication.

→ Managed service that reduces operational burden while ensuring high availability.

Amazon Aurora

Amazon Aurora is a high-performance, cloud-native relational database compatible with MySQL and postgre SQL (and supports Aurora DSQL in ies newer architectures).

- compatible with MySQL and postgreSQL.
- Upto 15 Aurora Replicas across Availability zones.
  - Multi-AZ storage architecture for high durability
  - Integrated with AWS Backup.
  - Faster failover and higher performance than standard RDS engines.

→ Enterprise-grade highly scalable and performance optimized database built for the cloud.

Normal workload — RDS
High Performance + high availability → Aurora
In RDS / Aurora, AWS manages Infrastructure and maintenance while the customer is responsible for data security, access control and configuration.

#2 NOSQL Database Services
Amazon Dynamo DB
→ Non-relation database
→ Data = items = Set of attributes
  → Attribute = name + value
  → Add / remove attribute any time.

Dynamo DB Global Tables

→ Eg. Amazon Prime Day
- Tens of trillions of calls
- 146 million requests / second

NO SQL database is a non-relational database that stores data in flexible formats (like key-value, document or cloumn-based) instead of traditional tables.

Amazon Dynamo DB is a fully managed NOSQL key-value and document database that provides fast performance at any scale.

Dynamo DB Global Tables

Dynamo DB Global Tables automatically replicate your table across multiple Aws Regions for low-latency access and Disaster recovery

NO SQL → flexible Schema
Dynamo DB = Managed NoSQL
Global Tables = Multi-Region replication automatical

#3 In-Memory Caching Services

Data Caching
- Stored in System memory (cache) RAM
- Near-instantaneous access
- Redis OSS, Valkey, Memcached

Amazon Elasticache
- Simplifies deployment, operation & Scaling of in-memory data stores

- Automates key management tasks
- Enhances performance & efficiency
- Offers flexible Scalability
- Reduces operational overhead.

#4 Additional Database Services

AWS Backup - Centralized Service to automate and manage backups across AWS services.

Amazon Document DB - Managed NoSQL document database compatible with MongoDB.

Amazon Neptune - Fully managed graph database for relationship-based data.

AWS Data Migration Service (DMS) - service to migrate database to AWS with minimal downtime.