# 5.Databases

### AWS Relational Database Service (RDS)

* Aurora MySQL
* Aurora PostgreSQL
* Oracle
* SQL Server
* MySQL
* PostgreSQL
* MariaDB
* NoSQL - DynamoDB

All the listed databases are relational SQL databases except DynamoDB. It is called a NoSQL database, but it is better termed a non-relational database.

#### Aurora MySQL

* Relational DB
* Optimized for Online Transaction Processing (OLTP)
* Very fast writes
* MySQL-compatible database system
* Increased performance over MySQL, 5X more speed than MySQL
* Initially 10 GB, scaling in 10 GB increments upto Max 64 TB
* Compute resources - Max 32 CPUs, Max 244 GiBRAM
* 2 DB copies in each AZ, Minimum of 3 AZs

### Types of DBs

#### Flat file databases

* Have one line per record
* Doesn’t contain multiple tables
* Ex: xls

#### Relational databases

* Store portions of the data in designated tables
* Tables are related based on unique identifier

#### NoSQL

* Not based on SQL or relational design theory
* Design supports fast transactions
* DynamoDB is a NoSQL service
* Create
* Query
* Read/write/modify

#### Data Warehouses

* Large, central repository for data
* Data aggregated from one or more sources
* Used for Online Analytical Processing (OLAP), bigdata
* Ex. AWS Redshift

Redshift is a data warehouse database solution. It is optimized for OLAP and is managed by AWS through the RDS service.

### Types DB hosting in AWS

#### EC2 Instance-Based Database Hosting

1.Launch an instance

2.Install the database service

3.Open appropriate ports in security groups

4.Connect to the database

#### AWS Service-Based

With AWS Service-Based databases in the RDS service, you do not need to be concerned with operating system installation and configuration, but you will still need to create the databases, manage security, and perform backup procedures

1.Create the database

2.Connect to the database

### High Availability Solutions

#### Clustering

* Multiple servers (instances)
* One database with replication
* Increases availability
* Automatic failover
* Increased cost

#### Standby Instances

* Multiple servers (instances)
* One database with replication
* Increases recoverability
* No automatic failover
* Reduced costs

#### Multiple AZ Deployment

* Multiple instances
* Multiple AZs
* One region
* Replicated storage
* Increased availability
* Increased performance
* Cost

### Database Security

**RDS databases support Storage encryption**

If someone steals a hard drive for example, they cannot get the data off of that hard drive, because it's encrypted on the hard drive.

Administration access based on IAM.

RDS databases do support encryption; however, it must be enabled during database creation. The only other option is to backup the database and then recover it with encryption. However, database recovery is really the creation of a new database and that is why encryption can be enabled during recovery.

## Labs

### DynamoDB lab



