AWS Databases

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Introduction to Database

What is Database?

A database is an organized collection of data in which we can read and write the information based on the desired format and queries.

It is used to:

- Store data in a specific format
- Create conclusions from stored data
- Get meaningful information

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Introduction to Database

Type of Database?

Relational/SQL

Non-Relational/NoSQL

There are two leading types of Database; **Relational Database –SQL** and **Non-Relational Database-NoSQL**

We call them SQL and NoSQL, referring to whether or not they're written solely in structured query language SQL. SQL stands for **Structured Query Language.**

SQL databases are table based databases whereas **NoSQL** databases can be document based, key-value pairs, graph databases.

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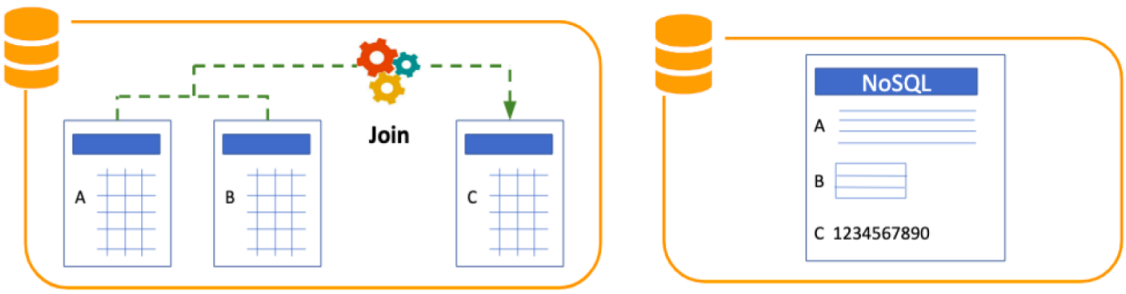
Introduction to Database

Type of Database?

Relational/SQL

Non-Relational/NoSQL



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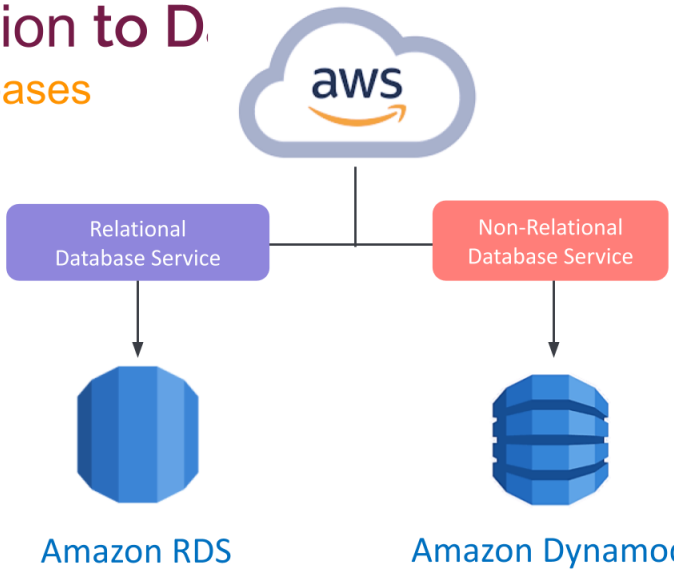
AWS Databases



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Introduction to Database

SQL vs. NoSQL ?

SQL	NoSQL
Relational	Non-Relational
Table-based	Document-based, key-value pairs, graph databases or wide-column stores
Predefined Schema	Dynamic Schema
Vertically Scalable	Horizontally Scalable
Uses SQL	As the name suggest, it doesn't use SQL
Used for complex queries	Used for simple queries
Available for **Join** function	Not available for **Join** function

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RDS

What is RDS?

Amazon RDS

- Amazon RDS is the SQL database option of AWS.
- It is managed by AWS.

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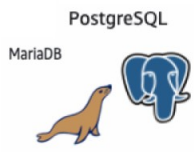
RDS

Basic Components

Amazon RDS



Database Engines

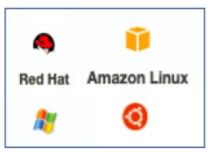
db.t2.micro

DB Instance

Storage Disk

EC2

AMI



Instance Type

t2.micro

Storage Disk/
Root Volume

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RDS
Database Engines

- Amazon RDS offers 6 Relational database engines Oracle, Microsoft SQL Server, MySQL, PostgreSQL, MariaDB, and Amazon Aurora.
- Codes, applications, and tools you already use today with your existing databases are compatible with Amazon RDS without any changes.
- Amazon Aurora is a **MySQL and PostgreSQL-compatible** relational database engine of AWS. It provides up to **five times** better performance than MySQL with the security, availability, and reliability of a commercial database at **one-tenth the cost**.

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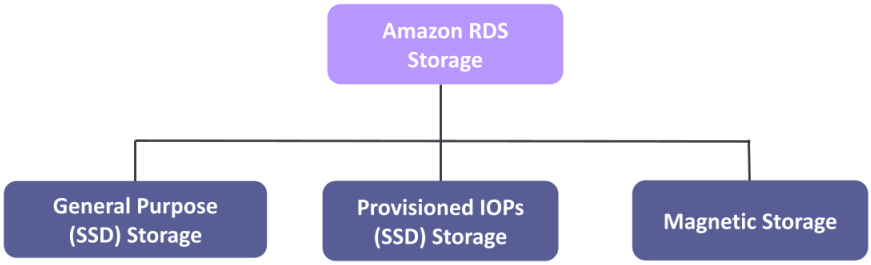
RDS
Database Instance

- RDS offers On-Demand and Reserved Instance options in price category. As for purpose, you can choose Memory Optimized or General Purpose
- Start and Stop status are available just like EC2 virtual machines, However, unlike EC2; DB instance can only remain in "Stop" status for 7 days. You can stop a DB instance for up to seven days. If you don't manually start your DB instance after seven days, your DB instance is automatically started so that it doesn't fall behind any required maintenance updates.

RDS

Instance Storage



Cost-effective **Fast and consistent I/O** **Not recommended**

There is an important factor in the databases as much as CPU and RAM power, which is the value of IOPs of storage

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MySQL Workbench

- MySQL Workbench is a graphical tool for working with MySQL servers and databases.
- It used to modify and monitorize the database.
- It enables developer or data architect to visually design, model, generate, and manage databases.

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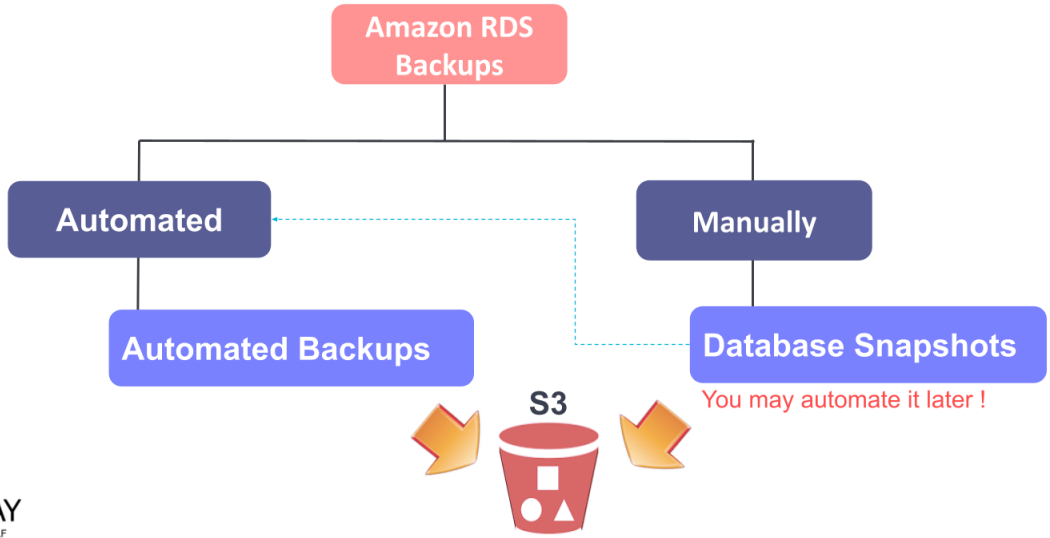
DB Instance Backups



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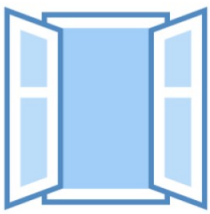
DB Instance Backups



- RDS can take backups of DB instance in time intervals called **Backup Window.** We determine the **Backup Window** while creating a DB instance.
- We can return up to 35 days back thanks to the backup windows.
- In addition to creating a complete copy of the database in automated backups, RDS backs up the **Transaction Log** records on S3 every 5 minutes.
- In the RDS environment, system restores are never made on the existing RDS DB instance. Instead, a new DB instance is created and registered for each occasion

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17

RDS

DB Instance Snapshot

- DB Snapshots are user-initiated backup of your DB instance. You may automate it later
- When the RDS DB instance is deleted, an Automated Backups are deleted along with it
- However, DB Snapshots remain on AWS even if the RDS DB instance is deleted.

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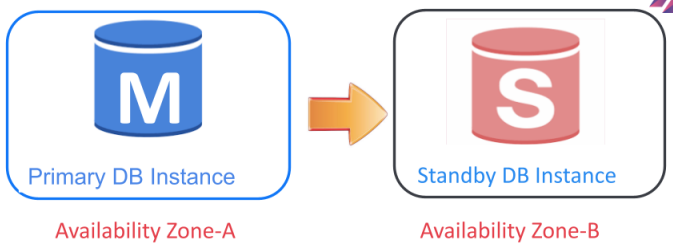
RDS Multi-AZ Deployment



- Creating a replica of the the **Primary Database** in the multiple Availability Zones within the same region is called Multi-AZ Deployment. The second replica database is called **Standby Database**.
- It is used for failover scenario or continuity
- Every information recorded in the primary database is synchronized instantly to the standby database located in the other AZ. Only the **primary database** responds to data queries. The standby database is promoted in failover scenarios.

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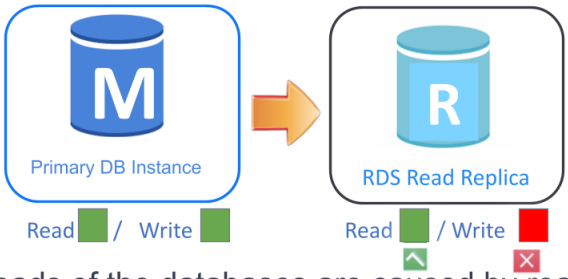
Read Replicas



- Actually, the main workloads of the databases are caused by reads. So we can decrease workload of DB via creating Read Replicas which is used for reading process
- Unlike Multi-AZ, Read Replicas are designed to serve read traffic. You can read from both of them (Primary & Read replica) but write only the source database (Primary Database)
- Unlike Multi-AZ, it helps to improve the performance of the DB.

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20