AWS Databases

Today’s Takeaways

- Introduction to Database
- Amazon RDS
- MySQL Workbench

1 Introduction to Database

Introduction to Database

What is Database?

A database is a systematic or organized collection of related information that is stored in such a way that it can be easily accessed, retrieved, managed, and updated. It is where all data is stored, very much like a library that houses a wide range of books from different genres. Think of data as books.

In a database, you can organize the data in rows and columns in the form of a table. Indexing the data makes it easy to find and retrieve it again as and when required. Many websites on the World Wide Web are managed with the help of databases. To create a database so that the data is accessible to users through only one set of software programs, database handlers are used.

MySQL, SQL Server, MongoDB, Oracle Database, PostgreSQL, Informix, Sybase, etc. are all examples of different databases.

Introduction to Database

Type of Database?

Relational/SQL

A relational database is structured, meaning the data is organized in tables. Many times, the data within these tables have relationships with one another, or dependencies.

Some popular SQL database systems include:

- Oracle
- Microsoft SQL Server
- PostgreSQL
- MySQL
- MariaDB

Non-Relational/NoSQL

A non relational database is document-oriented, meaning, all information gets stored in more of a laundry list order. Within a single construct, or document, you will have all of your data listed out.

Some popular NoSQL databases include:

- Amazon DynamoDB
- MongoDB
- Google Cloud Firestore
- Cassandra
- Redis
- Apache HBase

Introduction to Database

SQL Databases (Relational)

SQL is short for Structured Query Language, basically meaning a very firm way of sorting through data in the form of tables, columns, and rows.

How is data structured in an SQL database?
The table itself would be made up really of one variable or object that we would be looking through. The column would represent the data point itself that needs to be stored and the row is a record of the data points per column.

For example, if you are looking to sort data regarding what the weather is at a certain time of the day during a certain day, it would be structured as the following:

- Table: Weather
- Columns: Days of the Week
- Rows: Time of Day
- Data Points: Degrees Fahrenheit

In this structure, all queries would be related to this table and the structure of the table would allow for easy sorting, filtering, computations, etc.

Tip: What is a Query? In standard English, a query means a request for information. In computer programming, it refers to the same thing, except the information is retrieved from a database.

Introduction to Database

NoSQL Databases (Non-Relational)

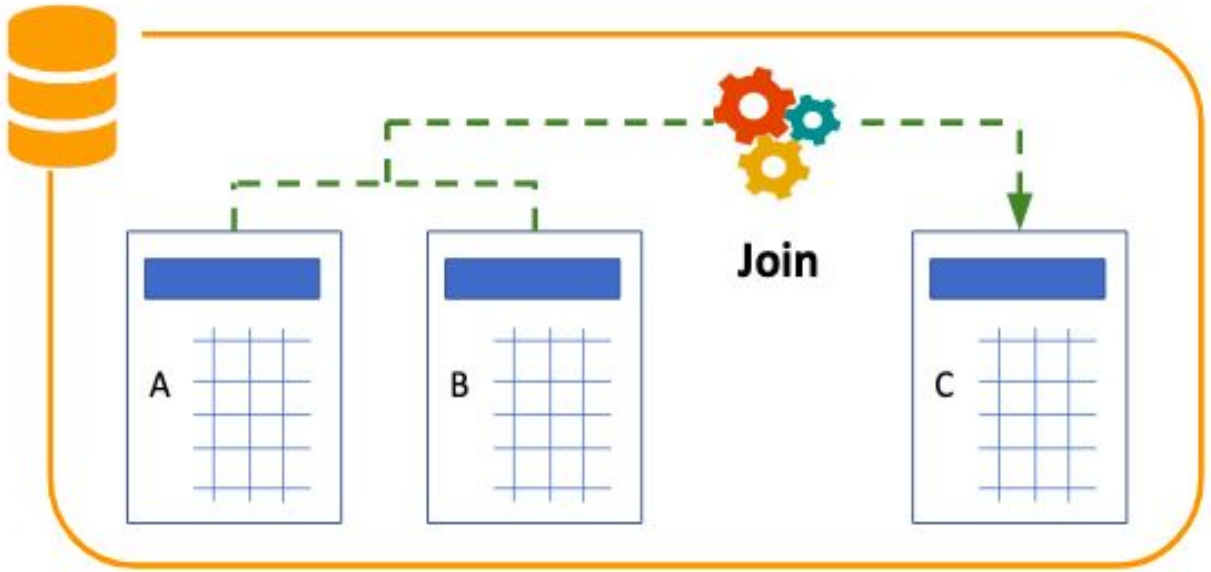
- In contrast to a relational database, a NoSQL database is one that is less structured/confined in format, and thus, allows for more flexibility and adaptability.
- If you are going to be dealing with a dataset that isn't clearly defined, meaning not organized or structured, you likely won't have the luxury of establishing defined tables and relationships amongst the dataset.
- They can possess any kind of data, whether JSON, XML, etc. So, creating and managing data in NoSQL is easy and faster.
- For example, Facebook Messenger uses a NoSQL database, because the information that is being gathered isn't structured enough to be segmented into tables and define relationships between each other.
- With tons of unstructured information, it needs to be held in a non-relational database. Think of the information as being stored on one large word document. Everything is there. As more information gets entered, the document gets longer.

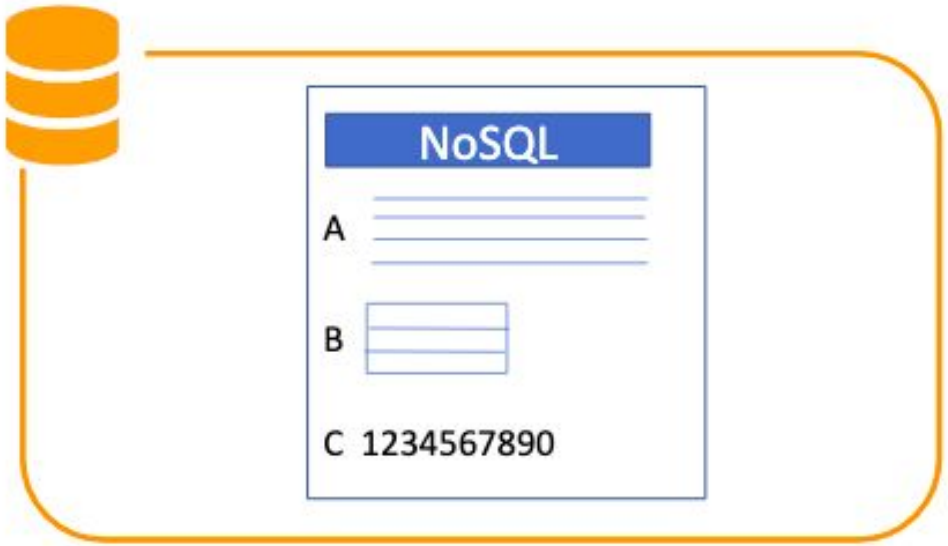
Introduction to Database

Type of Database?

Relational/SQL

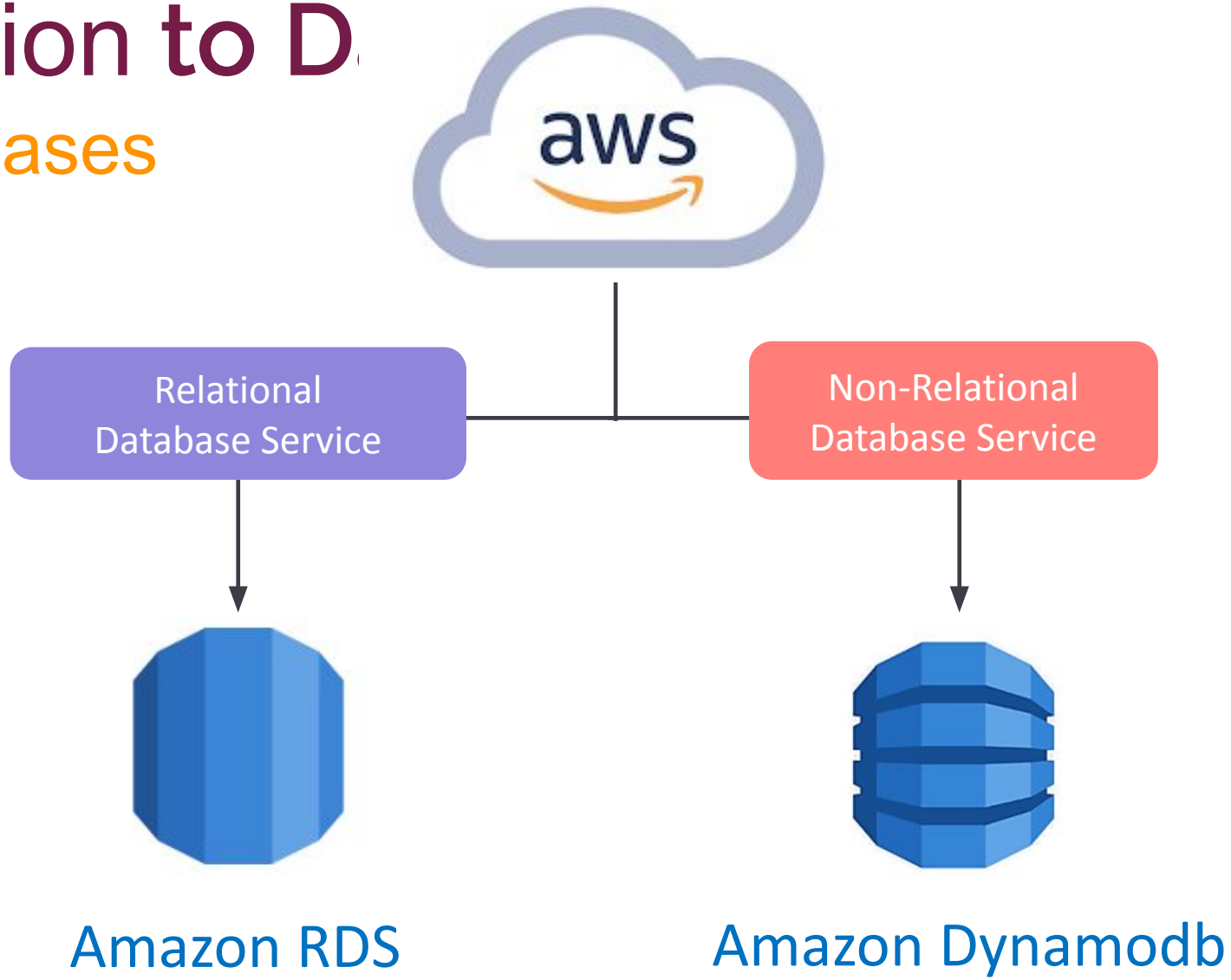
Non-Relational/NoSQL





Introduction to D

AWS Databases



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
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

2 Amazon RDS

RDS

What is RDS?

Amazon RDS

RDS

Basic Components

Amazon RDS

PostgreSQL

MariaDB

Database Engines

db.t2.micro

DB Instance

Storage Disk

EC2

AMI

Instance Type

t2.micro

Storage Disk/
Root Volume

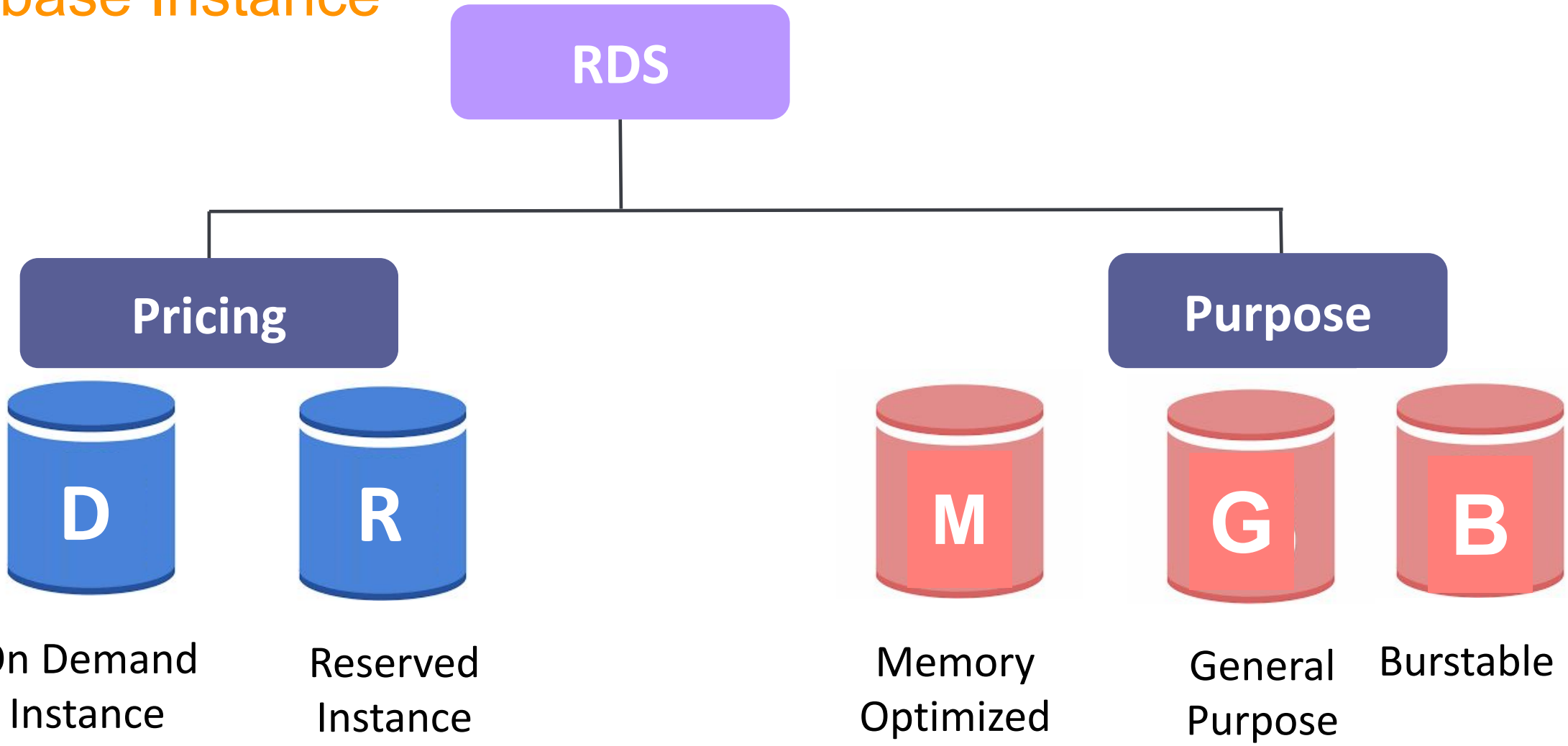
CLARUSWAY
WAY TO REINVENT YOURSELF

RDS

Database Engines

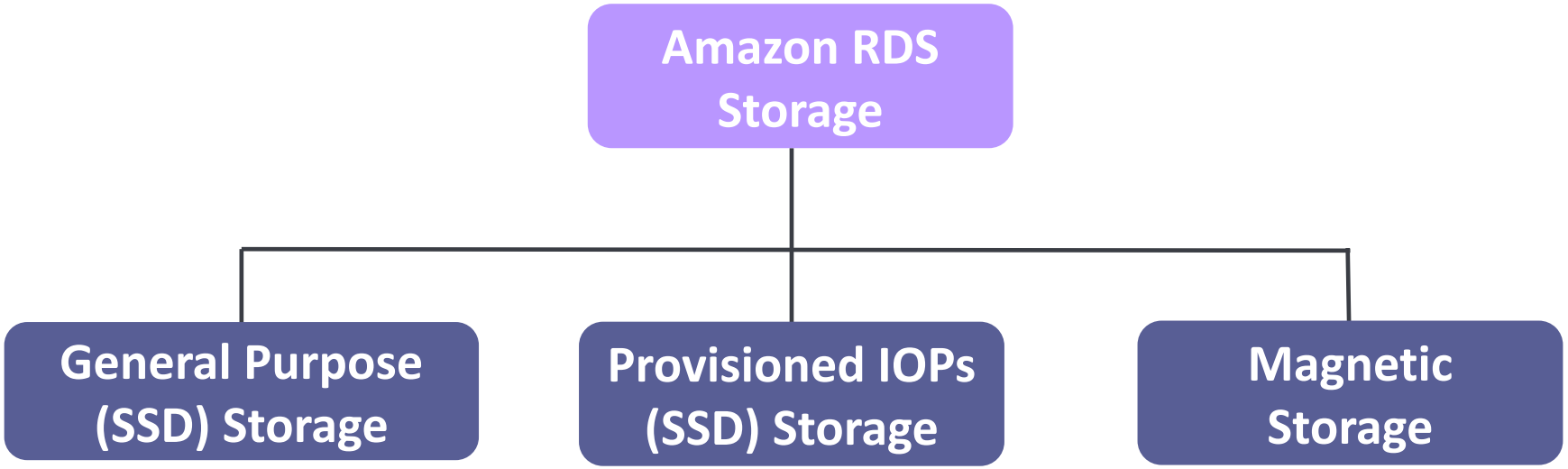
RDS

Database Instance



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

RDS

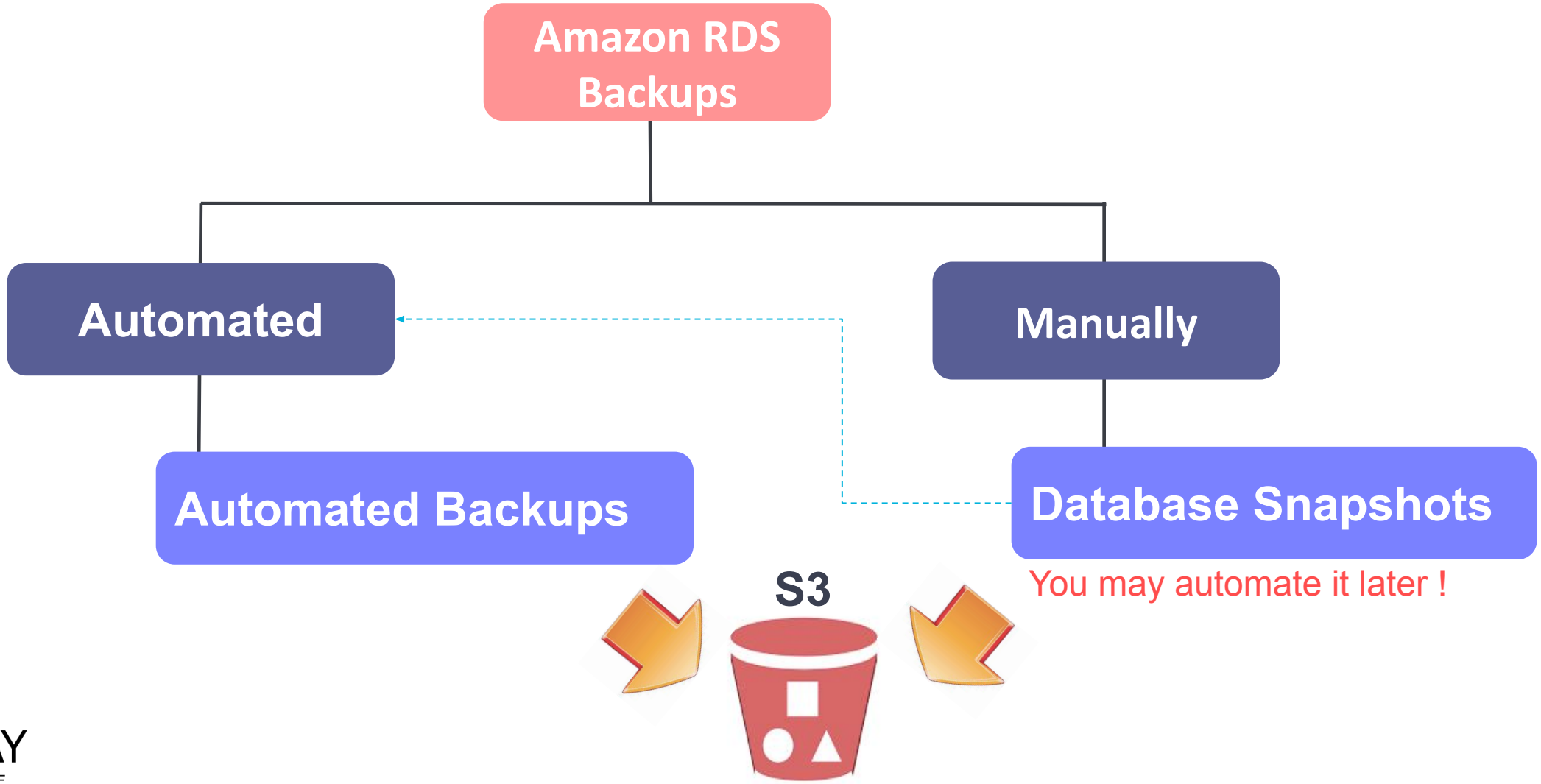
MySQL Workbench

MySQL Workbench = Graphical tool for working with MySQL databases.

mysql workbench is a graphical tool for working with mysql servers and databases. It's used to modify and monitorize the database. It enables developer or data architect to visually design, model, generate, and manage databases. You can make query, drop the table, add data any operation you imagine.

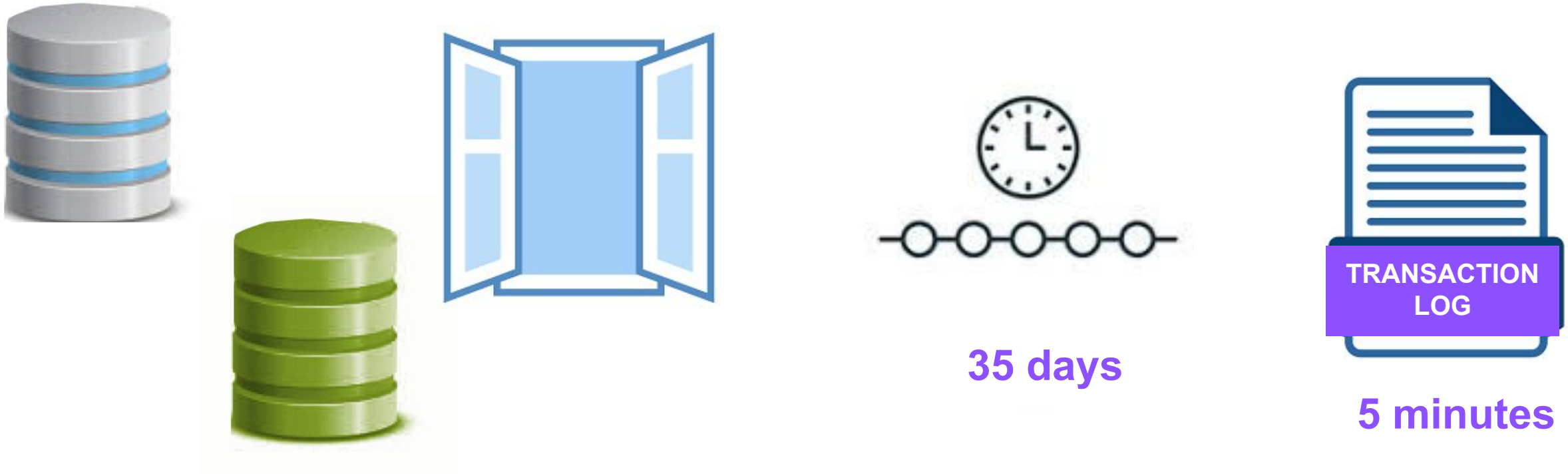
RDS

DB Instance Backups



RDS

DB Instance Automated 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.

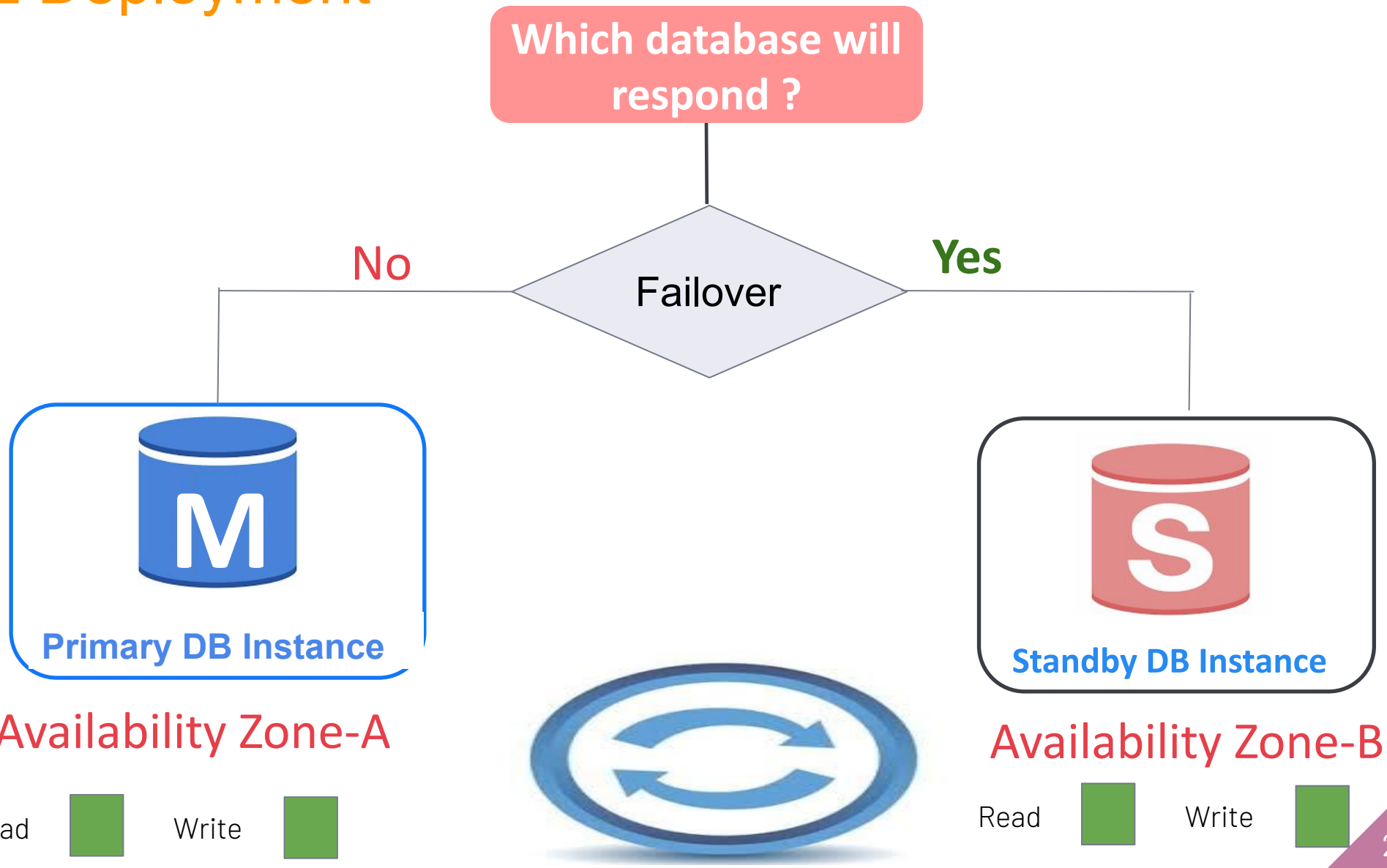
RDS

DB Instance Snapshot

RDS snapshots are user-initiated backup of your db instance. 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.

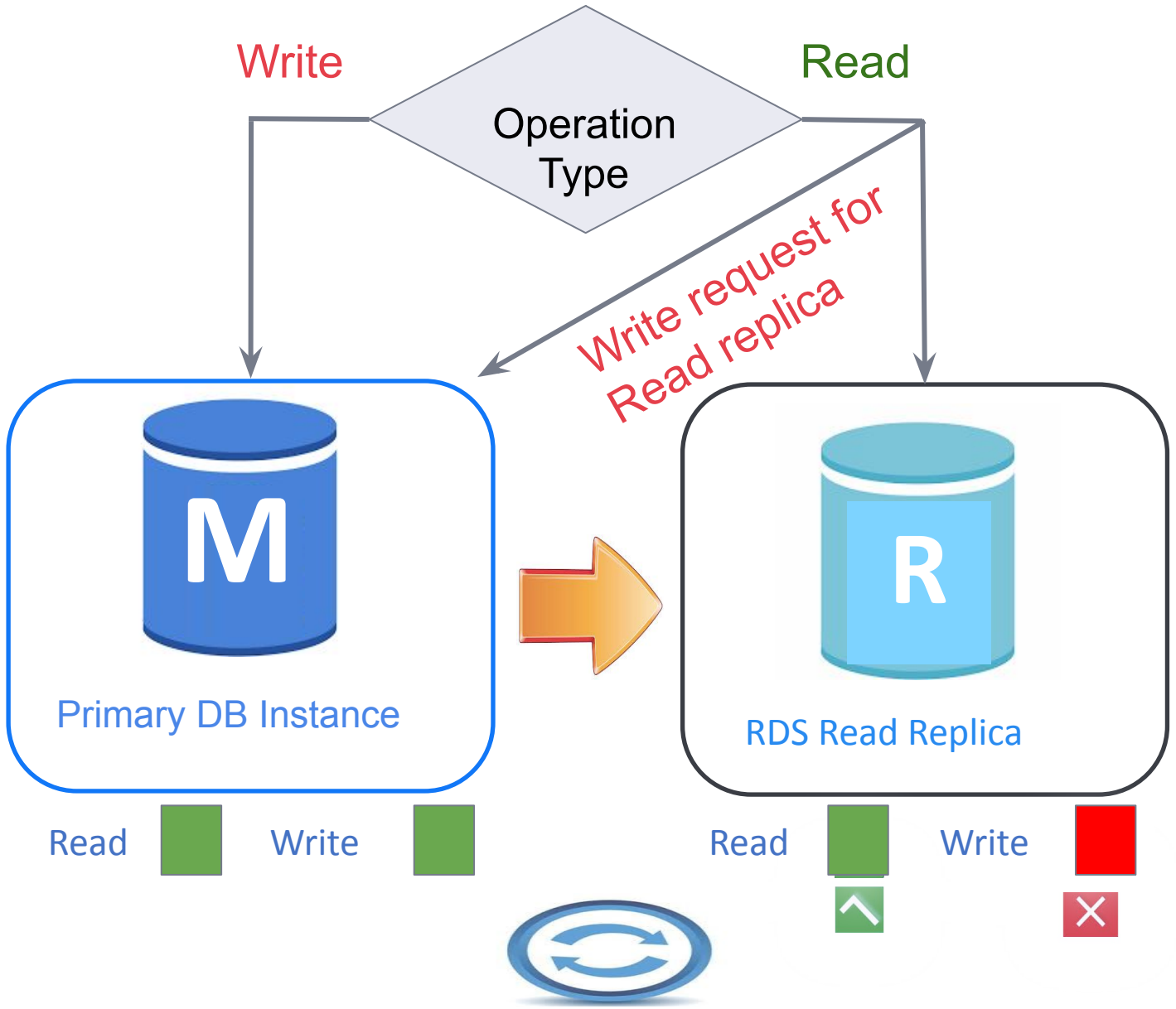
RDS

RDS Multi-AZ Deployment

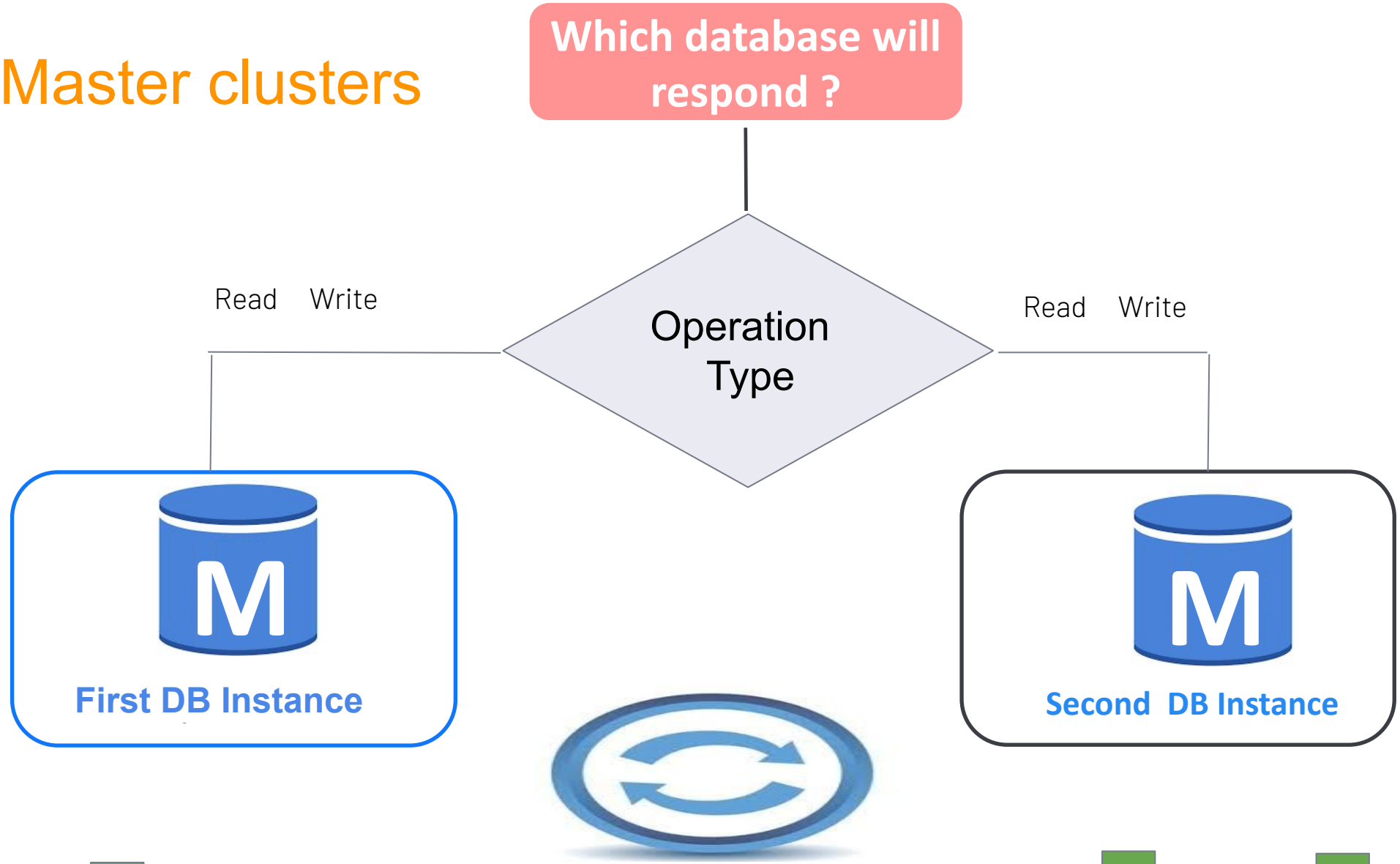


RDS

Read Replicas



Aurora Multi-Master clusters



RDS

Let's get our hands dirty!

- Creating a RDS Instance
- Connecting DB via MySQL Workbench

THANKS!

Any questions?

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