DATE : 06.02.2025

DT/NT : NT

LESSON : AWS

SUBJECT : DYNAMODB-REDSHIFT-ELASTICACHE

BATCH : B 303

AWS-DEVOPS

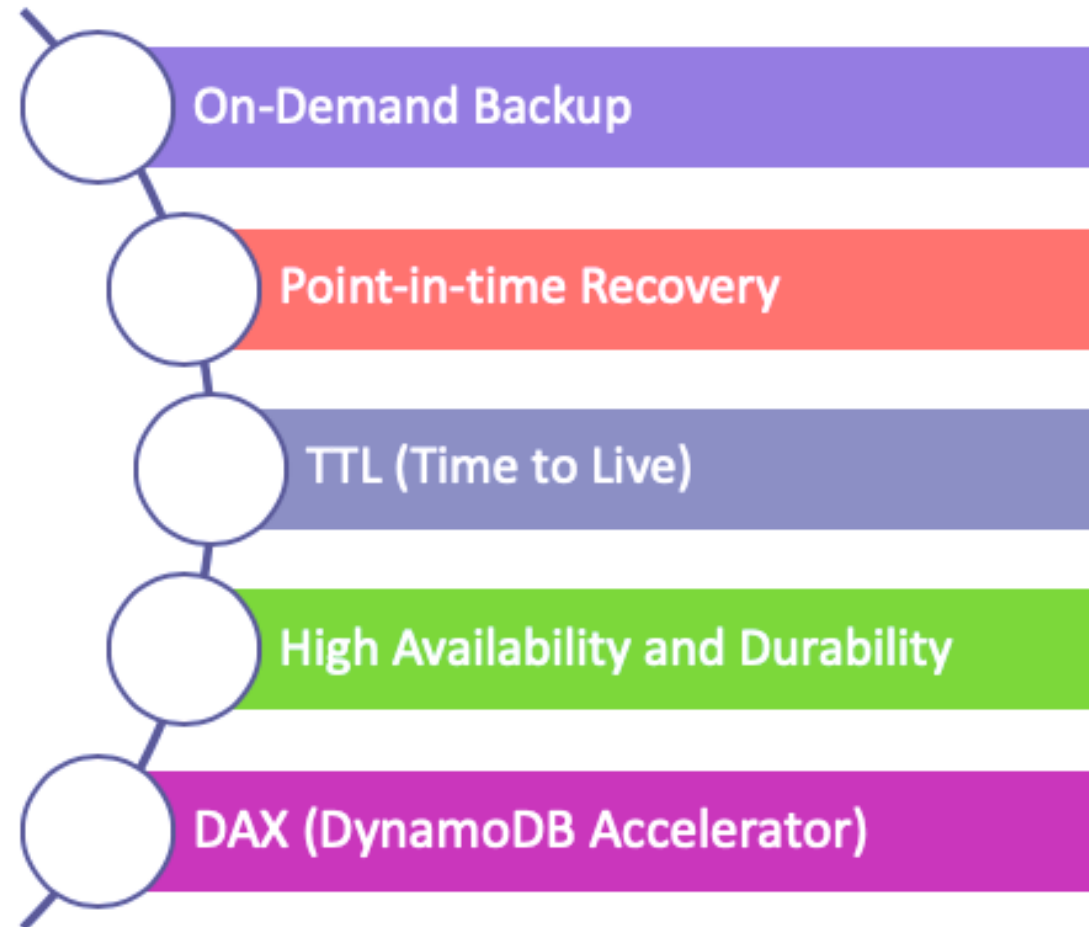techproeducation.com

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# Amazon DynamoDB

# What is DynamoDB?



- Amazon DynamoDB is a **NoSQL database** service
- Supports **key-value** and **document** data models.
- Unlike RDS, you don't need to stick pre-determined schema. Instead of Schema,
- DynamoDB uses **flexible tables**.
- Amazon DynamoDB is a **fully-managed** database.
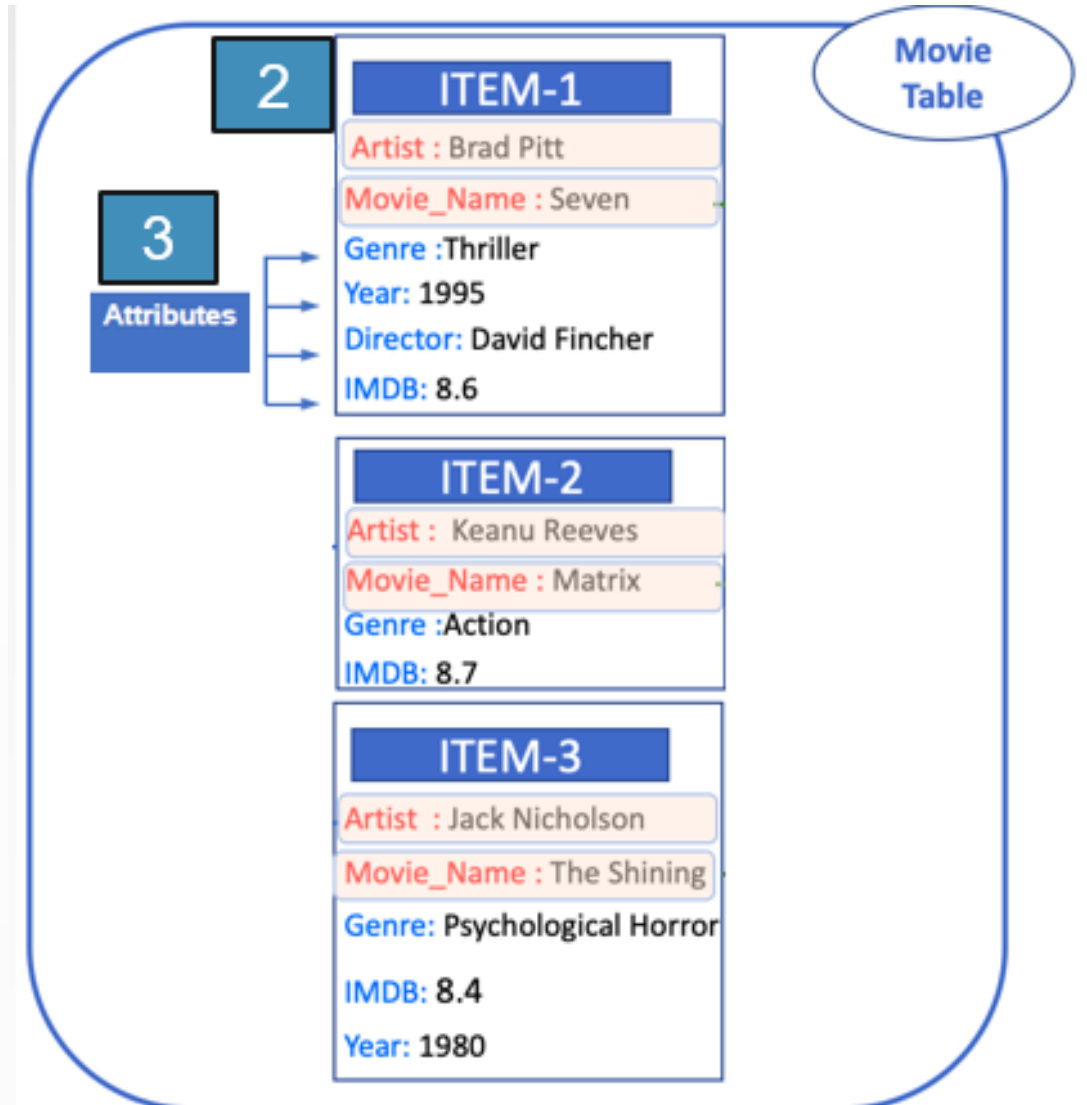- DynamoDB **doesn't have Join function.**

# DynamoDB



- On-Demand Backup
- Point-in-time Recovery
- TTL (Time to Live)
- High Availability and Durability
- DAX (DynamoDB Accelerator)

# Structure of DynamoDB?
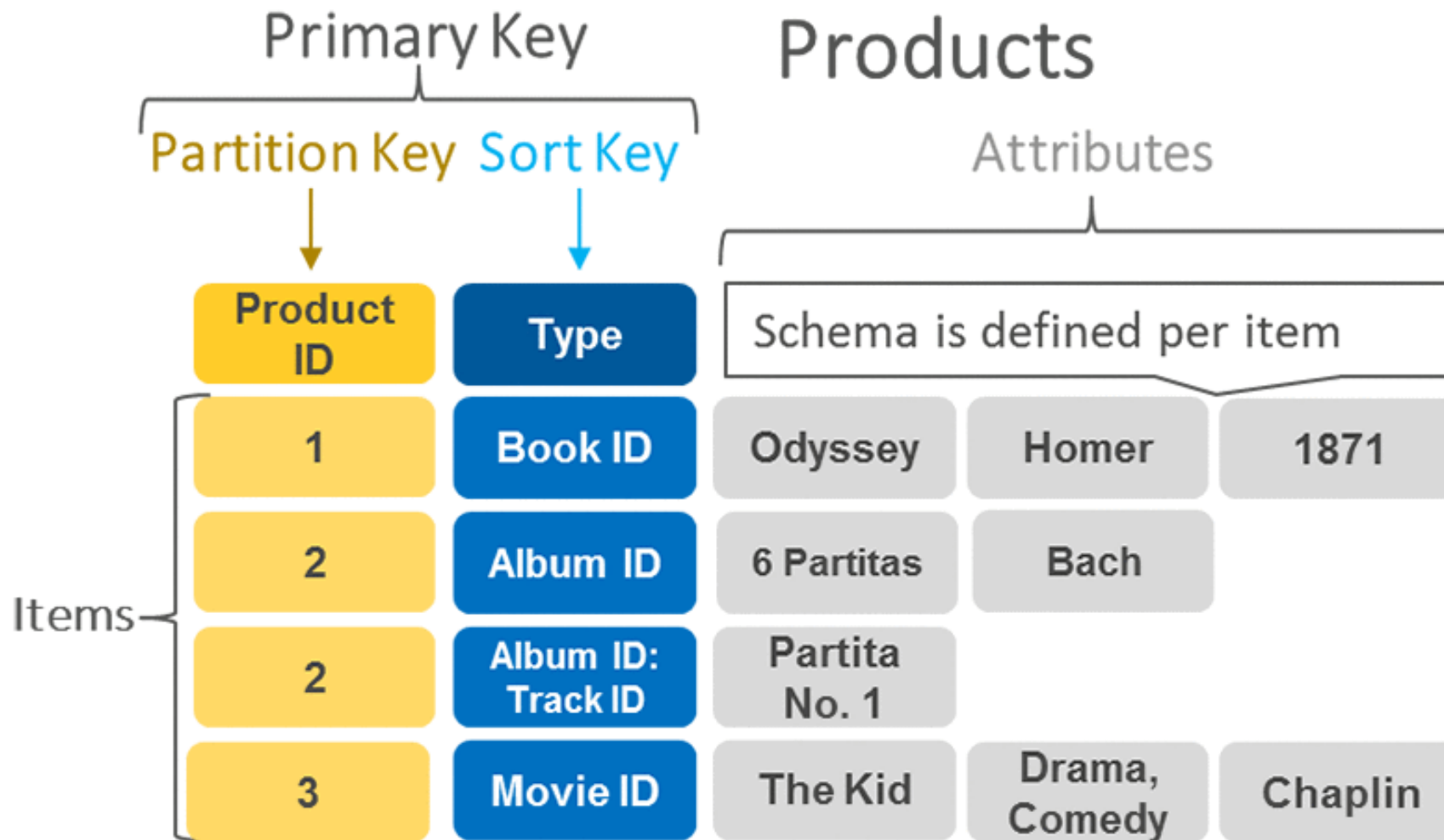
1- Table is a collection of data.

2- Each table consist of items. In the Picture, **item represents a person**.

3- Attributes are specific feature of the items.

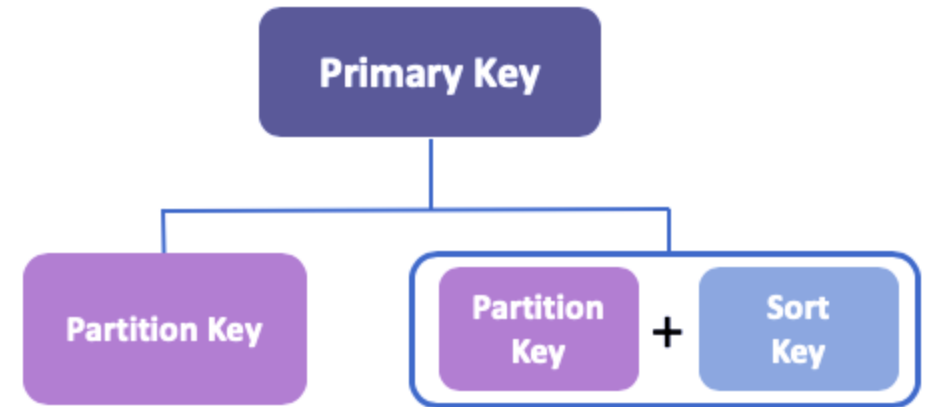Unlike RDS, you can enter different attributes for each people.



Movie Table

**ITEM-1**
Artist : Brad Pitt
Movie_Name : Seven
Genre :Thriller
Year: 1995
Director: David Fincher
IMDB: 8.6

Attributes

**ITEM-2**
Artist : Keanu Reeves
Movie_Name : Matrix
Genre :Action
IMDB: 8.7

**ITEM-3**
Artist : Jack Nicholson
Movie_Name : The Shining
Genre: Psychological Horror
IMDB: 8.4
Year: 1980

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# Structure of DynamoDB?



Primary Key

Partition Key | Sort Key

Products

Attributes

| Product ID | Type | | | |
|------------|------|--|--|--|
| 1 | Book ID | Odyssey | Homer | 1871 |
| 2 | Album ID | 6 Partitas | Bach | |
| 2 | Album ID: Track ID | Partita No. 1 | | |
| 3 | Movie ID | The Kid | Drama, Comedy | Chaplin |

Schema is defined per item
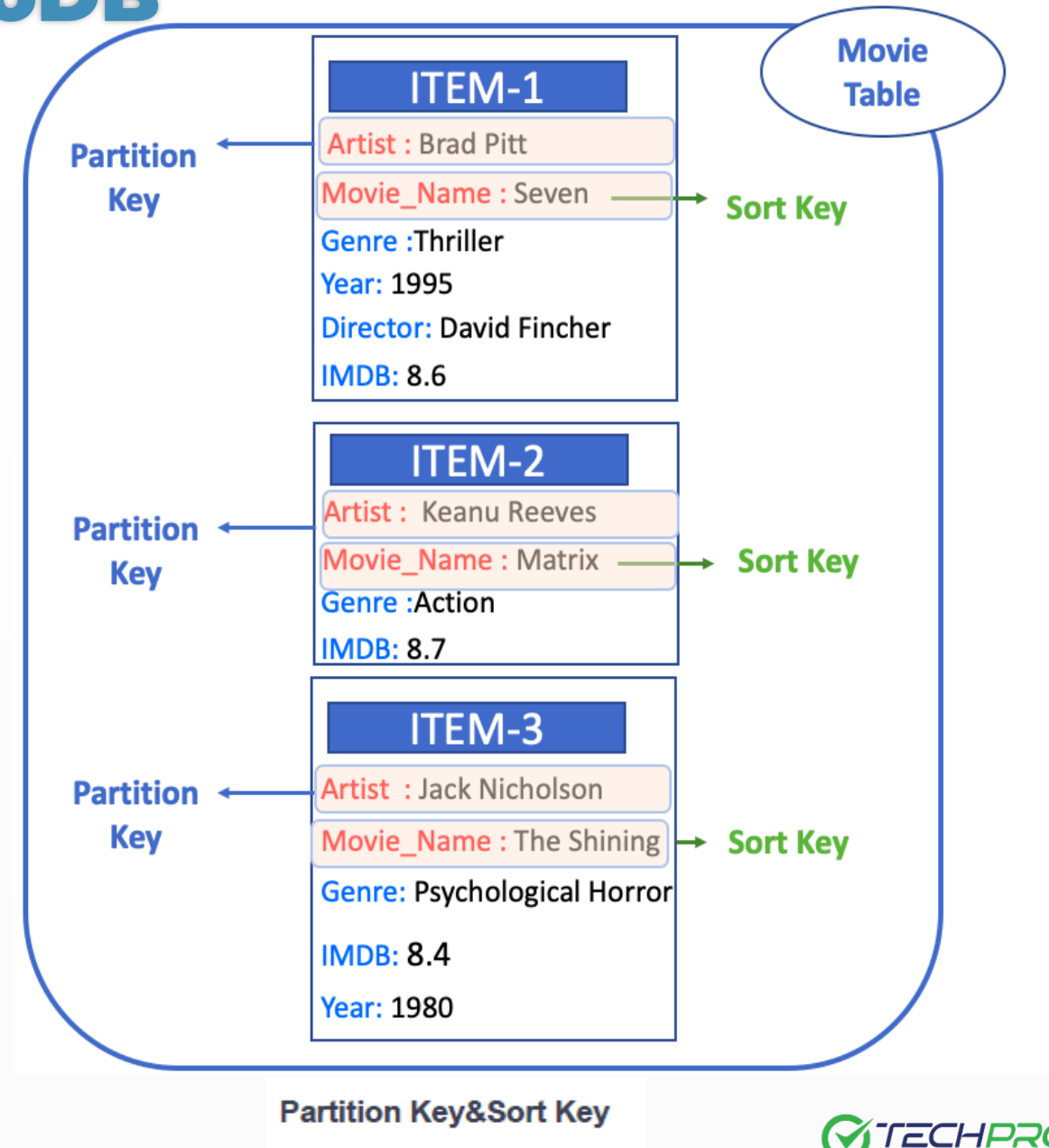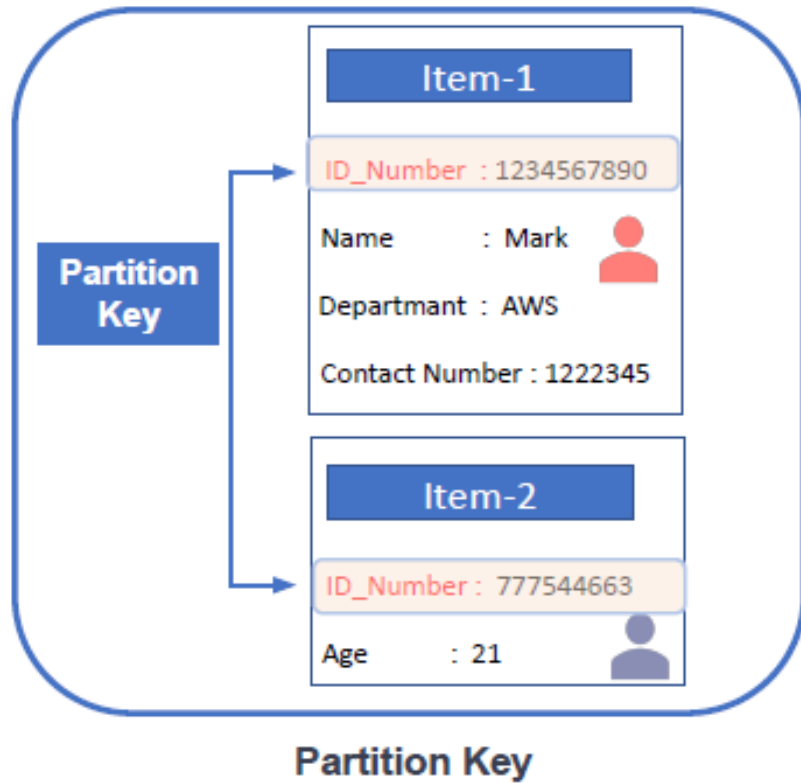
Items

# Structure of DynamoDB



DynamoDB uses **Primary Keys** to **uniquely identify each item** in a table. When you create a table, in addition to the table name, you must specify the primary key of the table.

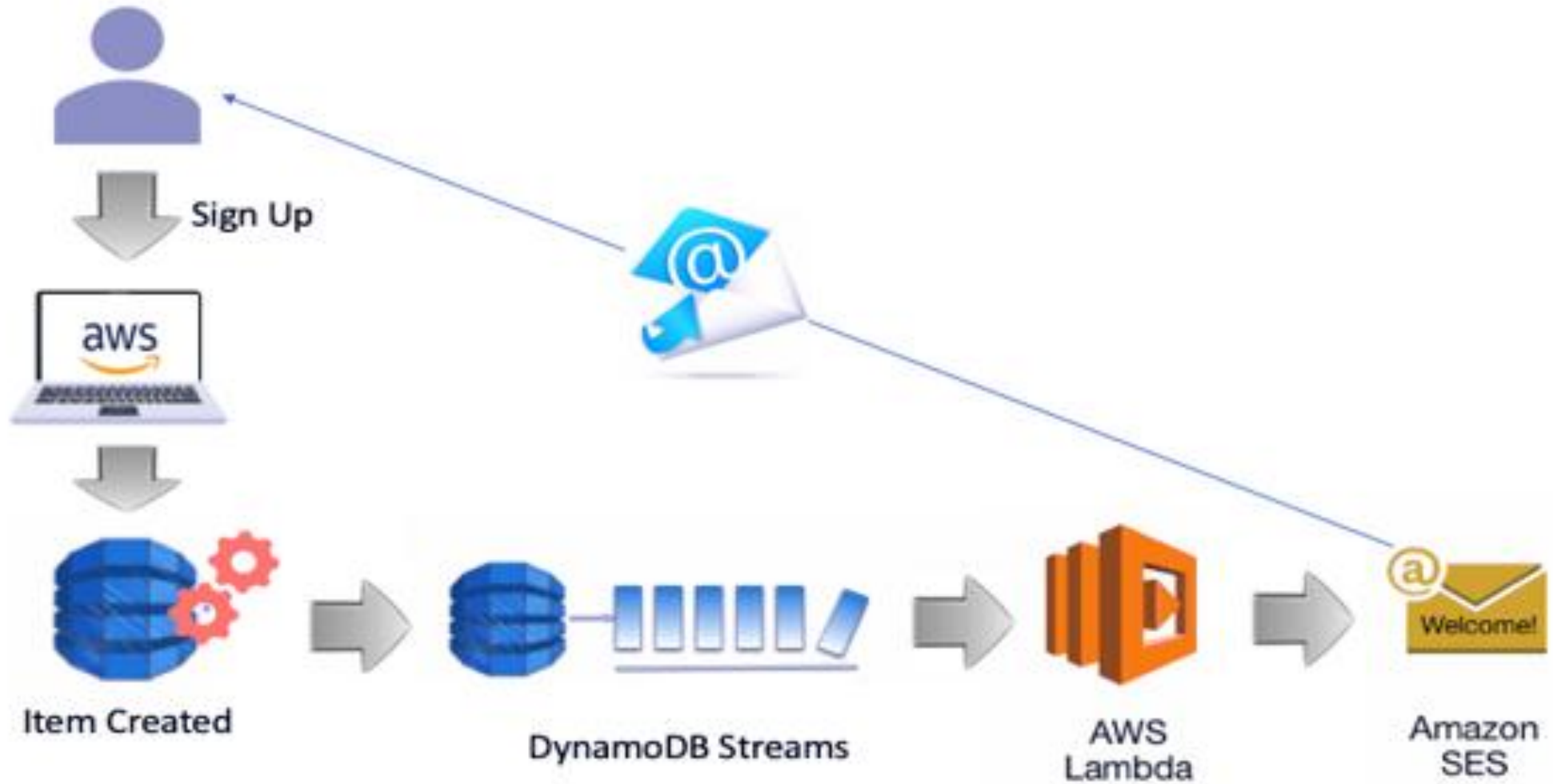The primary key uniquely identifies each item in the table, so that no two items can have the same key.

There are two different kinds of Primary Keys:

**Partition Key** and **Partition Key&Sort Key**.

# Structure of DynamoDB

**Movie Table**

**Partition Key**

**Item-1**

ID_Number : 1234567890

Name : Mark
Departmant : AWS
Contact Number : 1222345

**Item-2**

ID_Number : 777544663

Age : 21

**Partition Key**

## ITEM-1

**Partition Key** ← Artist : Brad Pitt

Movie_Name : Seven → **Sort Key**

Genre :Thriller
Year: 1995
Director: David Fincher
IMDB: 8.6

## ITEM-2

**Partition Key** ← Artist : Keanu Reeves

Movie_Name : Matrix → **Sort Key**

Genre :Action
IMDB: 8.7

## ITEM-3

**Partition Key** ← Artist : Jack Nicholson

Movie_Name : The Shining → **Sort Key**

Genre: Psychological Horror

IMDB: 8.4

Year: 1980

**Partition Key&Sort Key**

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Sign Up

aws
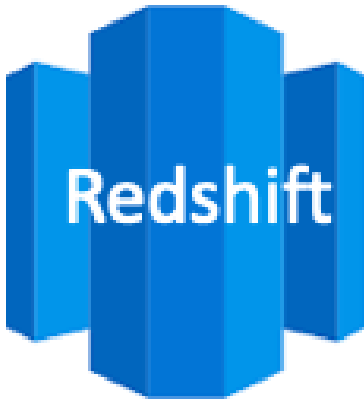
Item Created → DynamoDB Streams → AWS Lambda → Amazon SES

Welcome!

# Redshift



✓ Amazon Redshift is a fully managed, cloud-based, petabyte-scale **data warehouse** service by Amazon Web Services (AWS).

✓ Amazon Redshift is an efficient solution to **collect and store** all your data to **analyze**. It gives you fast querying capabilities over structured data using familiar SQL-based clients and business intelligence (BI) tools.

✓ Amazon Redshift also includes Amazon Redshift Spectrum, allowing you to directly run SQL queries in Amazon S3 data lakes.

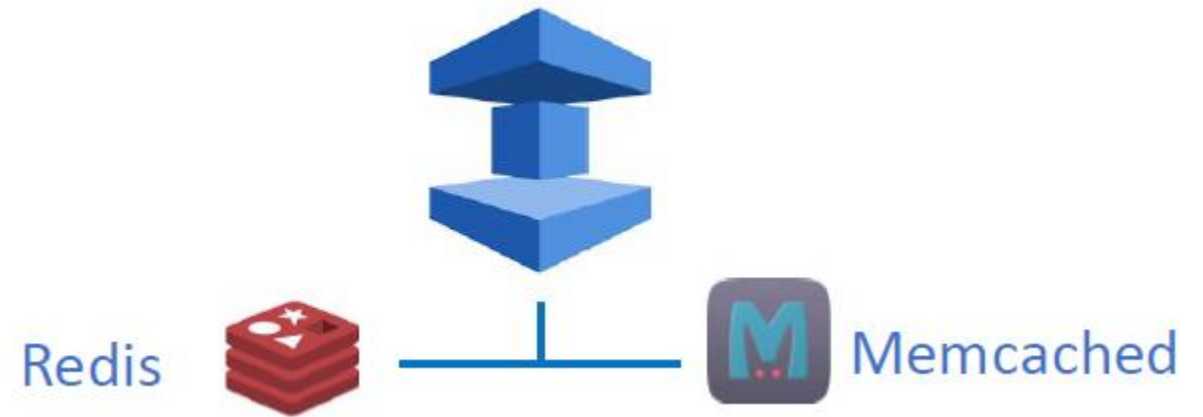# Redshift

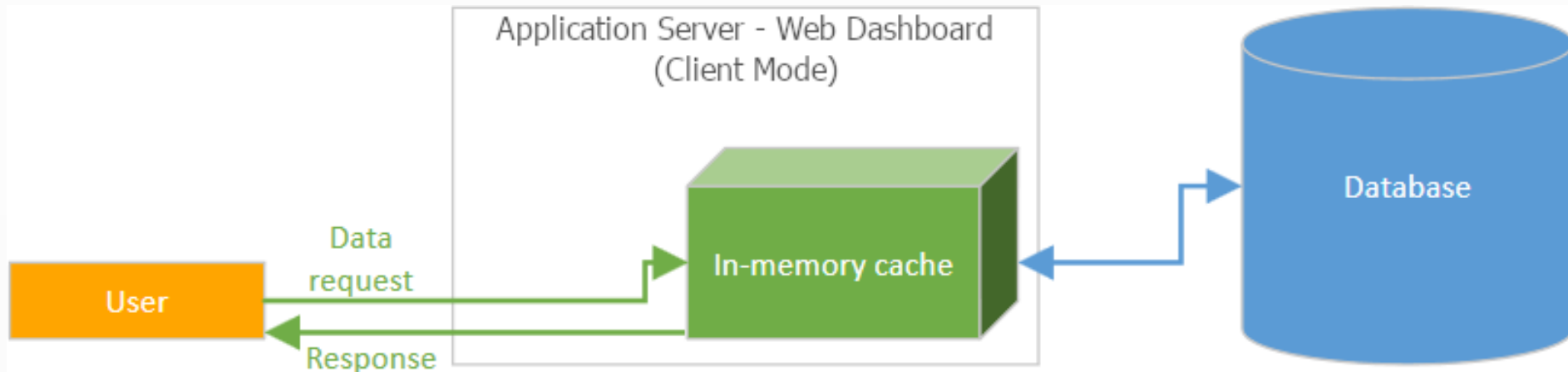| Database | Data Warehouse |
|---|---|
| RDS | Redshift |
| OLTP (Online Transaction Processing) | OLAP (Online Analytical Processing) |
| Used for data storing and managing | Used for data analyzing |

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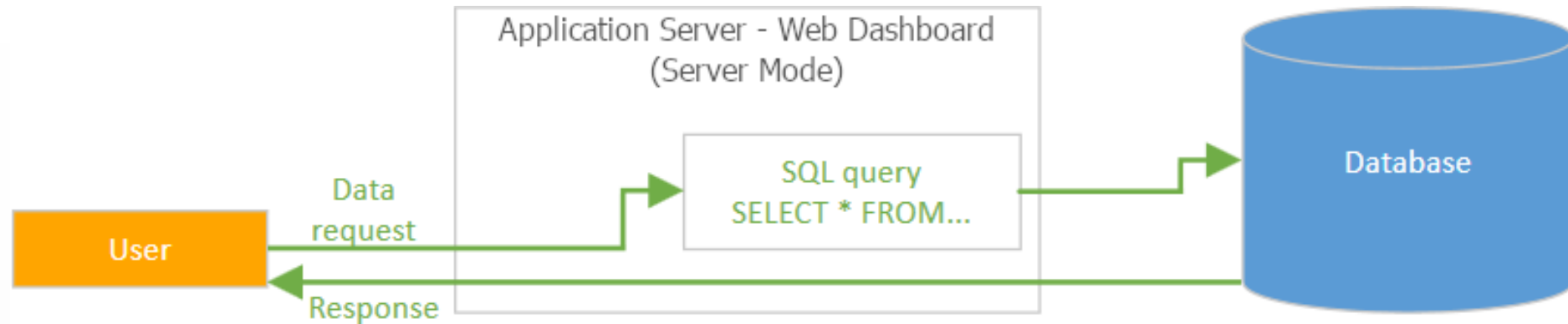
AWS
ElastiCache

# AWS ElastiCache

- ElastiCache is an **In-Memory Cache service of AWS.**
- In-Memory Cache is a **temporary and fast** storage component. These
- components are used to reduce the workload of the main data storage device such as a database.
- AWS offers Redis and Memcached in-memory cache option which are popular in market.

# Elasticache



Application Server - Web Dashboard (Server Mode)

SQL query
SELECT * FROM...

User
Data request
Response
Database

Application Server - Web Dashboard (Client Mode)

In-memory cache

User
Data request
Response
Database

# AWS Elasticache



Before Elasticache

After Elasticache - First Query

After Elasticache - Second Query

# Redis vs Memcached

| Feature | Redis | Memcached |
|---------|-------|-----------|
| **Supported Data Types** | strings, lists, sets, sorted sets, hashes, bit arrays, geospatial, and hyper logs | strings |
| **Memory Management** | Can store the details to disk when the physical memory is fully occupied. | in memory only. Supports saving into drive using an extension extstore |
| **Data Size Limits** | 512 MB (for string values) | 1 MB |
| **Sub-milliseconds latency** | Supports it | Supports it |
| **Data Persistence** | Supports using RDB snapshot and AOF Log persistence policies | Doesn't support it |
| **Cluster Mode (Distributed caching)** | Supports it | doesn't support tit. Can be achieved on the client-side using a *consistent hashing* |
| **Multi-Threading** | Supports very well | Doesn't support multi-threading |
| **Scaling** | Supports horizontal scaling | Supports vertical scaling only (Horizontal scaling from the client side) |
| **Data replication** | Supports data replication out of the box. | Doesn't support |
| **Supported Eviction Policies** | Supports various types of policies https://docs.redislabs.com/latest/rc/concepts/data-eviction-policies/ | Least recently Used (LRU) |
| **Transaction Management** | Supports it | Doesn't support |

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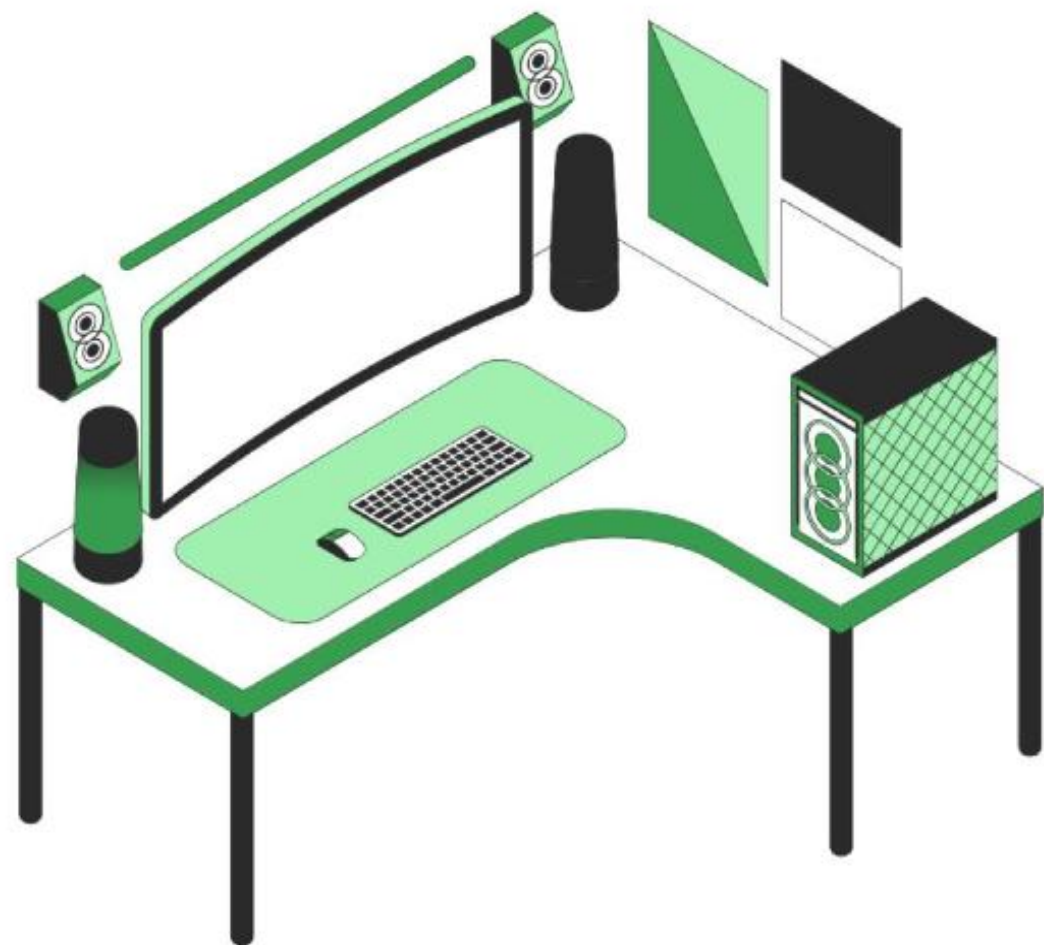
# Do you have any questions?

Send it to us! We hope you learned something new.