# **Day 30 - 5 September 2025**

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### **1. DynamoDB Overview**

* DynamoDB is a fully managed NoSQL database service provided by AWS.
* It supports **key-value** and **document data models**.
* Designed for **high availability** and **low latency** performance at scale.

### **2. Core Concepts**

* **Table** → A collection of items.
* **Item** → A single record in a table (like a row in RDBMS).
* **Attribute** → A field within an item (like a column in RDBMS).
* **Primary Key** → Each table must have a primary key (can be:
  + Partition Key (Hash Key)
  + Composite Key (Partition Key + Sort Key))

### **3. DynamoDB Local**

* Used for local testing and development without an AWS account.
* Runs using a local server (e.g., port 8000 or 8001).
* Allows developers to practice CRUD operations before deploying on AWS.

### **4. AWS SDK (Java)**

* Provides APIs to connect Java applications to DynamoDB.
* Requires dependencies:
  + software.amazon.awssdk:dynamodb (for DynamoDB APIs)
  + com.fasterxml.jackson.core:jackson-databind (for JSON parsing)

### **5. CRUD Operations**

* **Create Table** → Define table name, key schema, attributes, and provisioned throughput.
* **Insert (PutItem)** → Add records to a table.
* **Read (Scan / GetItem)** → Retrieve items from a table.
* **Update** → Modify existing attributes in an item.
* **Delete** → Remove an item or an entire table.

### **6. Provisioned Throughput**

* Controls the number of reads/writes per second.
* Configured with **Read Capacity Units (RCU)** and **Write Capacity Units (WCU)**.

### **7. ACID Properties in DynamoDB**

* **Atomicity, Consistency, Isolation, Durability** are supported through transactions.
* Ensures reliable operations even at scale.

### **8. CAP Theorem in Context**

* **Consistency, Availability, Partition Tolerance** cannot all be achieved fully at once.
* DynamoDB favors **availability** and **partition tolerance** while still offering strong/ eventual consistency options.