AWS DynamoDB Mastery Course

From Beginner to Advanced – Learn to Build Scalable, High-Performance NoSQL Applications

Course Overview

This course is designed to take you from a DynamoDB beginner to an advanced user, covering core concepts, best practices, and real-world use cases. You'll learn how to design efficient data models, optimize performance, and integrate DynamoDB with other AWS services.

Prerequisites

- Basic understanding of databases (SQL or NoSQL)
- Familiarity with AWS fundamentals (helpful but not required)
- Willingness to work with hands-on labs

Course Outline

Module 1: Introduction to DynamoDB

✅ What is DynamoDB?

- Overview of NoSQL databases
- Key features of DynamoDB (scalability, performance, serverless)
- Use cases (e-commerce, gaming, IoT, serverless apps)

✅ DynamoDB vs. Traditional Databases

- Comparison with RDBMS (MySQL, PostgreSQL)
- When to use DynamoDB vs. other AWS databases (RDS, Aurora)

✅ DynamoDB Pricing & Limits

- Read/write capacity modes (Provisioned vs. On-Demand)

- Storage costs, requests pricing, and free tier

Module 2: Core Concepts & Data Modeling

✅ Tables, Items, and Attributes

- Primary keys (Partition Key vs. Composite Key)
- Data types (String, Number, Binary, List, Map, Set)

✅ Basic Operations (CRUD)

- PutItem, GetItem, UpdateItem, DeleteItem
- Batch operations (BatchGetItem, BatchWriteItem)

✅ Querying & Scanning

- Differences between Query and Scan
- Filtering & pagination

✅ Indexes (GSI & LSI)

- Global Secondary Indexes (GSI) vs. Local Secondary Indexes (LSI)
- When to use indexes for performance optimization

Module 3: Advanced DynamoDB Features

✅ Transactions in DynamoDB

- ACID compliance in NoSQL
- TransactWriteItems & TransactGetItems

✅ Time-to-Live (TTL) for Automatic Expiry

- Automatically deleting expired items

✅ DynamoDB Streams & Triggers

- Capturing changes in real-time
- Integrating with AWS Lambda

✅ **PartiQL for SQL-like Queries**

- Running SQL-like queries on DynamoDB

Module 4: Performance Optimization

✅ **Capacity Planning & Scaling**

- Understanding RCUs & WCUs
- Auto-scaling best practices

✅ **Partitioning & Hot Keys**

- Avoiding hot partitions
- Sharding techniques

✅ **Caching with DAX (DynamoDB Accelerator)**

- Reducing read latency with DAX

Module 5: Security & Monitoring

✅ **IAM Policies for DynamoDB**

- Fine-grained access control

✅ **Encryption (At-Rest & In-Transit)**

- AWS KMS integration

✅ **Monitoring with CloudWatch**

- Metrics & alarms for DynamoDB

✅ **Backup & Restore**

- Point-in-time recovery (PITR)
- On-demand backups

Module 6: Real-World Applications & Integrations

✅ **Serverless Apps with DynamoDB + Lambda**

- Building REST APIs with API Gateway & DynamoDB

✅ **DynamoDB in Microservices**

- Event-driven architectures

✅ **Data Migration Strategies**

- Importing/exporting data (AWS DMS, S3, CSV)

✅ **Multi-Region Replication (Global Tables)**

- Setting up globally distributed apps

Hands-On Labs & Projects

- 🔹 **Lab 1:** Create a DynamoDB Table & Perform CRUD Operations
- 🔹 **Lab 2:** Implement GSI for Efficient Queries
- 🔹 **Lab 3:** Build a Serverless API (API Gateway + Lambda + DynamoDB)
- 🔹 **Lab 4:** Set Up DynamoDB Streams for Real-Time Processing
- 🔹 **Final Project:** Design a Scalable E-Commerce Cart System

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Who Should Take This Course?

✔ Developers building serverless applications

✔ Database administrators transitioning to NoSQL

✔ Cloud architects optimizing AWS workloads

✔ DevOps engineers managing scalable databases

Certification & Next Steps

After completing this course, you'll be ready for:

- **AWS Certified Developer - Associate**
- **AWS Certified Solutions Architect - Associate**
- **Building real-world apps with DynamoDB**

Would you like me to tailor this course further (e.g., more hands-on exercises, specific use cases)?