

AWS DynamoDB: The Complete Guide with 18+ Demos

Master serverless NoSQL with AWS DynamoDB and build production-ready Node.js REST APIs for web and mobile apps.

DevOps Instructor: Daniel Brooks • 5 sections • 53 lessons • 16.25h total

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About this course

DynamoDB powers some of the most demanding applications on the planet, yet many developers struggle with data modeling, key design, and integrating it cleanly with their backends. If you have ever wondered how to structure tables for fast, predictable queries or how to wire DynamoDB into a real REST API, this course clears up the confusion.

You will work through more than 18 hands-on demos spanning a task manager API, an e-commerce cart, IoT data pipelines, and a real-time chat store. Each module pairs video lessons with step-by-step code walkthroughs using Node.js, Express, and AWS SDK v3. By the end, you will know how to design tables, build and secure APIs, handle streams and transactions, manage costs, and deploy serverless architectures that actually scale.

Course curriculum

Introduction to AWS DynamoDB

- **What DynamoDB Is and Why It Dominates Serverless Backends (12m)**
A clear overview of DynamoDB as a managed NoSQL service in 2026. You will see how it fits into modern architectures and where it outperforms relational databases.
- **DynamoDB vs. Traditional Databases: Practical Differences (15m)**
Side-by-side comparison with PostgreSQL and MongoDB. Covers latency profiles, scaling behavior, and when DynamoDB is the better choice.
- **Setting Up Your AWS Account, IAM User, and CLI (18m)**
Step-by-step guide to creating an AWS account, configuring IAM with least-privilege policies, and installing the AWS CLI on your machine.
- **Walking Through the DynamoDB Console (10m)**
A guided tour of the DynamoDB dashboard in the AWS Management Console. Learn where tables, metrics, and settings live.
- **Creating Your First DynamoDB Table from the Console (14m)**
Hands-on walkthrough of table creation. You will choose a partition key, set capacity mode, and configure basic table settings.
- **Inserting and Reading Items in the Console (12m)**
Create, view, and filter items using the built-in data explorer. Covers attribute types, item limits, and quick reads.
- **Updating and Deleting Items with the Console (10m)**
Modify existing attributes and remove items. Includes a look at how DynamoDB handles missing attributes and null values.
- **Hands-On Demo 1: Building a Contact List Table End to End (20m)**
Combine everything from this section into a single project. Create a contacts table, insert sample data, query by name, and clean up.

Core Concepts and Data Modeling

- **DynamoDB Data Types Explained with Examples (14m)**
Deep look at String, Number, Binary, Boolean, Null, List, Map, and Set types. You will learn when to pick each one.
- **Tables, Items, and Attributes: The DynamoDB Mental Model (12m)**
How DynamoDB stores data at the physical level. Understanding partitions, item size limits, and attribute naming costs.
- **Partition Key Design: Choosing a Key That Scales (18m)**
The most important decision in DynamoDB. Covers high-cardinality keys, hot partitions, and strategies for even distribution.
- **Sort Key Strategies for Flexible Access Patterns (16m)**
Use composite sort keys for time-series, hierarchical data, and range queries. Includes real examples from production systems.

- **Hands-On Demo 2: Designing a Multi-Attribute User Table (20m)**
Model a user table with partition and sort keys. Practice inserting items with different attribute combinations and querying them.
- **Global Secondary Indexes (GSI): Querying by Alternate Keys (22m)**
Full explanation of GSIs with projection types, throughput considerations, and eventual consistency tradeoffs.
- **Hands-On Demo 3: Creating a GSI and Running Queries Against It (18m)**
Add a GSI to the user table from Demo 2. Query by email, filter results, and observe how projection settings affect returned data.
- **Local Secondary Indexes (LSI): Sort Flexibility Within a Partition (16m)**
When LSIs make sense, their limitations compared to GSIs, and how they share throughput with the base table.
- **Hands-On Demo 4: Building an LSI for Sort-Heavy Queries (18m)**
Create an LSI on an orders table. Query orders by date within a customer partition and compare results with GSI queries.
- **On-Demand vs. Provisioned Capacity: Making the Right Call (14m)**
Cost analysis, auto-scaling settings, and burst capacity. You will learn which mode fits predictable vs. spiky workloads.
- **Hands-On Demo 5: Capacity Mode Comparison Under Load (22m)**
Simulate traffic with a simple script. Switch between on-demand and provisioned modes and watch how DynamoDB responds.

Building REST APIs with Node.js and DynamoDB

- **Setting Up a Node.js and Express Project from Scratch (15m)**
Initialize a project, install Express, and structure folders for routes, controllers, and services. Ready for DynamoDB integration.
- **Installing and Configuring AWS SDK v3 for DynamoDB (12m)**
Install the DynamoDB client packages from SDK v3. Configure credentials, region, and connection settings in a reusable module.
- **Hands-On Demo 6: Spinning Up a Basic Express Server (14m)**
Create a working Express app with health-check endpoints, environment config, and nodemon for local development.
- **PutItem and GetItem Operations in Node.js (16m)**
Write service functions that insert and retrieve items. Covers marshalling, unmarshalling, and handling SDK responses.
- **Query and Scan Operations in Node.js (18m)**
Use the Query command with key condition expressions. Compare it with Scan and understand when each one is appropriate.
- **Hands-On Demo 7: Full CRUD API for a Task Manager App (25m)**
Build POST, GET, PUT, and DELETE endpoints. Connect each route to DynamoDB operations and test with Postman or curl.

- **Input Validation with Joi and Express Middleware (14m)**
Add request body validation using Joi schemas. Create reusable middleware that rejects bad input before it reaches DynamoDB.
- **Error Handling Patterns for DynamoDB-Backed APIs (16m)**
Catch DynamoDB-specific errors like `ConditionalCheckFailedException`. Return consistent JSON error responses to clients.
- **Hands-On Demo 8: Hardening the Task Manager API (22m)**
Add validation middleware, error handlers, and structured logging to the task manager. Test edge cases and bad requests.

Advanced Features and Optimization

- **DynamoDB Streams: Capturing Every Data Change (18m)**
Enable streams on a table and understand the four view types. Learn how downstream consumers react to inserts, updates, and deletes.
- **Hands-On Demo 9: Processing Stream Events with AWS Lambda (22m)**
Attach a Lambda function to a DynamoDB stream. Parse event records, filter by operation type, and log meaningful data.
- **Transactions: Atomic Multi-Item Writes and Reads (20m)**
Use `TransactWriteItems` and `TransactGetItems` for all-or-nothing operations. Covers limits, conflict handling, and idempotency.
- **Hands-On Demo 10: Building an E-Commerce Order Transaction (22m)**
Create a transaction that decrements stock and creates an order record in one call. Handle insufficient stock errors gracefully.
- **Conditional Expressions for Data Integrity (16m)**
Write condition expressions that prevent overwrites, enforce existence checks, and guard against race conditions.
- **Hands-On Demo 11: Implementing Optimistic Locking (18m)**
Add a version attribute to items. Use conditional writes to prevent lost updates when two clients modify the same record.
- **Query vs. Scan: Performance Implications and Best Practices (14m)**
Why scans are expensive and slow. Techniques to replace scans with queries using better key design and index usage.
- **Pagination Patterns for Large Result Sets (16m)**
Handle `LastEvaluatedKey`, implement cursor-based pagination in your API, and manage consistent reads across pages.
- **Hands-On Demo 12: Building Paginated API Endpoints (20m)**
Add pagination to the task manager API. Return next-cursor tokens, support page sizes, and test with large datasets.
- **IAM Policies and Fine-Grained Access Control (18m)**
Write IAM policies that restrict access by table, partition key, or attribute. Covers policy variables and condition keys.

- **Encryption at Rest and in Transit (14m)**
Understand AWS-managed keys vs. customer-managed KMS keys. Enable encryption and verify data protection in transit.
- **Cost Monitoring and CloudWatch Alarm Setup (16m)**
Read DynamoDB CloudWatch metrics like ConsumedReadCapacityUnits and ThrottledRequests. Set alarms before costs spike.

Real-World Applications and Hands-On Projects

- **API Gateway and Lambda Integration Architecture (18m)**
How API Gateway, Lambda, and DynamoDB connect in a serverless stack. Covers request flow, cold starts, and deployment basics.
- **Hands-On Demo 13: Serverless User Registration and Login System (28m)**
Build a user management API with password hashing, email lookups via GSI, and token-based authentication using Lambda.
- **Hands-On Demo 14: E-Commerce Shopping Cart Service (30m)**
Model cart items with composite keys, handle quantity updates, merge guest and authenticated carts, and clear after checkout.
- **Hands-On Demo 15: IoT Sensor Data Ingestion Pipeline (25m)**
Store time-series sensor readings with device ID as partition key and timestamp as sort key. Batch write for throughput.
- **Hands-On Demo 16: Real-Time Chat Message Store (28m)**
Design a messages table for chat rooms. Implement recent-message queries, pagination for history, and DynamoDB Streams for notifications.
- **Hands-On Demo 17: Session Management for Web Applications (22m)**
Store user sessions with TTL-based expiration. Handle concurrent session limits and invalidate sessions on logout.
- **Hands-On Demo 18: Content Management System Backend (30m)**
Model posts, tags, and author relationships. Support queries by author, by tag, and by publication status using GSIs.
- **Hands-On Demo 19: Analytics Dashboard Data Layer (25m)**
Aggregate daily metrics using atomic counters. Query date ranges for charts and implement efficient rollup patterns.
- **Case Study: Scaling a Social Media Backend in 2026 (22m)**
Walk through a real architecture that handles millions of posts and feed reads. Covers partition strategy, caching, and GSI design.
- **Single-Table Design: One Table to Rule Them All (24m)**
Why experienced DynamoDB users pack multiple entity types into one table. Covers overloaded keys, access pattern mapping, and tradeoffs.
- **Hands-On Demo 20: Implementing Single-Table Design (28m)**
Build a single-table design for a university system with students, courses, and enrollments. Write all access patterns on one table.

- **Future-Proofing Your DynamoDB Architecture (18m)**

Design for change. How to add new access patterns, migrate data with zero downtime, and avoid common scaling traps.

- **Course Wrap-Up: Production Checklist and Where to Go Next (14m)**

A concise checklist covering monitoring, backup, on-call runbooks, and recommended resources for continued DynamoDB learning.

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