AWS Lambda Mastery: From Zero to Serverless Pro

A Complete Course on AWS Lambda, API Gateway, DynamoDB & Event-Driven Architectures

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Course Overview

This course teaches **AWS Lambda** from basics to advanced patterns, covering **event-driven architectures, performance tuning, security, and real-world serverless applications**.

Module 1: Lambda Fundamentals

1.1 Introduction to Serverless

✅ What is AWS Lambda?

✅ Benefits over traditional servers (cost, scaling, maintenance)

✅ Use cases: APIs, event processing, automation

1.2 Creating Your First Lambda Function

📌 AWS Console vs. AWS CLI vs. Infrastructure as Code (SAM/CDK)

📌 Supported runtimes (Python, Node.js, Java, Go, .NET, Ruby)

📌 Basic `handler` function structure

Hands-on Lab:

- Deploy a **"Hello World" Lambda** using the AWS Console

Module 2: Lambda Triggers & Integrations

2.1 Event Sources

📌 **API Gateway** (REST/HTTP APIs)

📌 **S3 Events** (File uploads)

📌 **DynamoDB Streams** (Real-time DB changes)

📌 **SQS & SNS** (Message queues & pub/sub)

2.2 Building Serverless APIs

📌 REST API with **API Gateway + Lambda**

📌 WebSocket API for real-time apps

Hands-on Lab:

◆ Build a **CRUD API** (Lambda + API Gateway + DynamoDB)

Module 3: Advanced Lambda Concepts

3.1 Performance Optimization

⚡ **Cold Starts** – How to reduce them

⚡ **Memory & Timeout** tuning

⚡ **Provisioned Concurrency**

3.2 Security & Permissions

🔐 **IAM Roles & Least Privilege**

🔐 **VPC Lambda Functions** (Private subnets)

🔐 **Secrets Management** (AWS Secrets Manager)

3.3 Monitoring & Debugging

📊 **CloudWatch Logs & Metrics**

📊 **AWS X-Ray for Tracing**

📊 **Error Handling & Retries**

Hands-on Lab:

◆ Optimize a Lambda function for **low latency**

Module 4: Real-World Lambda Projects

4.1 Project 1: Serverless Image Processing

🖼️ **S3 Trigger → Lambda → Thumbnail Generation**

🖼️ **Rekognition for AI-based tagging**

4.2 Project 2: Event-Driven Data Pipeline

📡 **Kinesis → Lambda → DynamoDB**

📡 **Error handling with DLQs (Dead Letter Queues)**

4.3 Project 3: Serverless Authentication

🔑 **Cognito → Lambda Custom Auth Flow**

🔑 **JWT Validation & API Security**

Bonus: Lambda Best Practices & Beyond

✅ **When NOT to use Lambda** (Long-running tasks)

✅ **Lambda vs. Containers (ECS/Fargate)**

✅ **Migrating from EC2 to Lambda**

Course Format

🎥 **Video Tutorials**

🛠️ **Hands-On Coding Exercises**

📚 **GitHub Repos with Sample Code**

🎯 **Final Project: Build a Full Serverless App**

Who Should Take This Course?

☑ **Developers** transitioning to serverless

☑ **DevOps Engineers** automating workflows

☑ **Cloud Architects** designing event-driven systems

Prerequisites

✔ Basic programming (Python/Node.js preferred)

✔ AWS Free Tier account

Want More Depth?

I can expand on:

◆ **Step-by-Step Deployment Guides**

◆ **SAM (Serverless Application Model) Deep Dive**

◆ **Cost Optimization Strategies**

Let me know what you'd like to explore next! 🚀