ADEPT
LEARN

Developing Serverless Solutions on AWS

Course Duration: 24 Hours (3 Days)

Overview

The Developing Serverless Solutions on AWS course is designed for developers and IT professionals looking to leverage AWS to build and deploy Serverless applications. Through various modules, students will explore best practices for modern serverless application development, delve into Event-driven architectures, and understand the integration of services such as Amazon API Gateway, Amazon Event Bridge, AWS Lambda, and Amazon Cognito. Learners will gain hands-on experience with Serverless deployment frameworks like AWS SAM, and tackle advanced topics like Authentication, Authorization, and Application security. The course provides an in-depth look at Managing application scale and implementing CI/CD pipelines for Serverless architectures. By the end of the course, participants will be equipped with the knowledge to build efficient, secure, and scalable serverless solutions on AWS, utilizing tools and services to maximize their application's potential.

Audience Profile

This AWS Serverless Solutions course is designed for IT professionals looking to leverage AWS for modern, serverless application development.

- Cloud Developers and Engineers
- Solutions Architects
- DevOps Engineers
- Full Stack Developers interested in serverless architecture
- IT Project Managers overseeing cloud-based projects
- Software Engineers transitioning to serverless application development
- System Integrators working with AWS infrastructure
- Technical Leads managing serverless application teams
- Cloud Consultants advising on AWS serverless solutions
- Application Developers designing event-driven systems
- Cloud Technical Trainers
- Software Architects exploring serverless design patterns
- Innovation Officers seeking to modernize application infrastructure

Course Syllabus

Day 1

Module 0: Introduction

- Overview of the application you will build
- Accessing course resources (Student Guide, Lab Guide, and Online Course Supplement)

Module 1: Thinking Serverless

- Best practices for building modern serverless applications
- Event-driven design principles
- AWS services that support event-driven serverless applications

Module 2: API-Driven Development and Synchronous Event Sources

- Characteristics of standard request/response API-based web applications
- Understanding how Amazon API Gateway fits into serverless applications
- Try-it-out Exercise: Set up an HTTP API endpoint integrated with a Lambda function
- High-level comparison of API types (REST/HTTP, WebSocket, GraphQL)

Module 3: Introduction to Authentication, Authorization, and Access Control

- Authentication vs. Authorization
- Options for authenticating APIs using API Gateway
- Using Amazon Cognito in serverless applications
- Amazon Cognito User Pools vs. Federated Identities

Module 4: Serverless Deployment Frameworks

- Overview of imperative vs. declarative programming for Infrastructure as Code
- Comparison of CloudFormation, AWS CDK, Amplify, and AWS SAM frameworks
- Features of AWS SAM and the AWS SAM CLI for local emulation and testing

Module 5: Using Amazon Event Bridge and Amazon SNS to Decouple Components

- Development considerations when using asynchronous event sources
- Features and use cases of Amazon Event Bridge
- Try-it-out Exercise: Build a custom Event Bridge bus and rule

- Comparison of Amazon SNS vs. Event Bridge use cases
- Try-it-out Exercise: Configure an Amazon SNS topic with filtering

Module 6: Event-Driven Development Using Queues and Streams

- Development considerations when using polling event sources to trigger Lambda functions
- Differences between queues and streams as event sources for Lambda
- Choosing the right configuration for Amazon SQS or Amazon Kinesis Data Streams as an event source for Lambda
- Try-it-out Exercise: Configure an Amazon SQS queue with a dead-letter queue as a Lambda event source

Hands-On Labs

- Lab 1: Deploying a Simple Serverless Application
- Lab 2: Message Fan-Out with Amazon EventBridge

Day 2

Module 7: Writing Good Lambda Functions

- How the Lambda lifecycle influences your function code
- Best practices for writing efficient Lambda functions
- Configuring a function (code, versions, and aliases)
- Try-it-out Exercise: Configure and test a Lambda function
- Handling errors in Lambda functions
- Managing partial failures with queues and streams

Module 8: Step Functions for Orchestration

- Using AWS Step Functions in serverless architectures
- Try-it-out Exercise: Step Functions states
- The callback pattern in Step Functions
- Standard vs. Express Workflows
- Step Functions direct integrations
- Try-it-out Exercise: Troubleshooting a Standard Step Functions workflow

Module 9: Observability and Monitoring

- The three pillars of observability
- Using Amazon CloudWatch Logs and Logs Insights
- Best practices for writing effective log files
- Try-it-out Exercise: Interpreting logs
- Using AWS X-Ray for observability
- Try-it-out Exercise: Enable X-Ray and analyze traces
- CloudWatch metrics and embedded metrics format
- Try-it-out Exercise: Configuring metrics and alarms
- Try-it-out Exercise: Using ServiceLens for observability

Hands-On Labs

- Lab 3: Workflow Orchestration Using AWS Step Functions
- Lab 4: Observability and Monitoring

Day 3

Module 10: Serverless Application Security

- Security best practices for serverless applications
- Applying security at all layers
- Securing APIs with API Gateway
- Protecting Lambda functions and application security
- Securing data in serverless data stores
- Auditing and traceability for compliance

Module 11: Handling Scale in Serverless Applications

- Scaling considerations for serverless applications
- Managing scale using API Gateway
- Lambda concurrency and scaling strategies
- Understanding how different event sources scale with Lambda

Module 12: Automating the Deployment Pipeline

- The importance of CI/CD in serverless applications

- Key tools in a serverless deployment pipeline
- AWS SAM features for serverless deployments
- Best practices for automation
- Course Wrap-Up

Hands-On Labs

- Lab 5: Securing Serverless Applications
- Lab 6: Serverless CI/CD on AWS