

Amazon API Gateway: Design, Secure, and Deploy APIs

Course Duration: 12 Hours

Course code: API Gateway

1. Course Overview

This course offers an in-depth exploration of Amazon API Gateway, a fully managed service that simplifies the process of creating, publishing, maintaining, monitoring, and securing APIs at any scale. Participants will delve into advanced features such as Message Transformation, Request Validation, Authentication and Authorization, Message Caching, Usage Plans, Message Throttling, REST Integrations, Observability, WebSocket APIs, and fine-grained access control. Through hands-on exercises and real-world scenarios, attendees will acquire the skills necessary to design and manage robust APIs, ensuring optimal performance and security.

2. What you'll learn?

By the end of this course, participants will be able to:

- Design and deploy APIs using Amazon API Gateway, leveraging both RESTful and WebSocket protocols.
- Implement Message Transformation to modify request and response payloads effectively.
- Configure Request Validation to ensure data integrity and adherence to API schemas.
- Apply Authentication and Authorization mechanisms, including integration with AWS Identity and Access Management (IAM) and Amazon Cognito.
- Utilize Message Caching to enhance API performance and reduce backend load.
- Set up Usage Plans and Throttling to manage API consumption and protect resources.

- Integrate API Gateway with various backend services, including AWS Lambda and HTTP endpoints.
- Monitor and observe APIs using built-in tools for logging and metrics.
- Implement fine-grained access control to secure APIs at a granular level.

3. Target Audience

- API Developers
- Cloud Architects
- DevOps Engineers
- Security Professionals

4. Pre-Requisites

- Basic understanding of AWS services and cloud computing concepts.
- Familiarity with RESTful API principles and HTTP protocols.
- Experience with AWS IAM roles and policies (recommended but not mandatory)

5. Course content

Module 1: Introduction to Amazon API Gateway

- Overview of Amazon API Gateway and its core functionalities.
- Benefits of using API Gateway for API management.
- Understanding RESTful and WebSocket APIs.
- Setting up your AWS environment for API Gateway.
- Hands-on Lab: Creating a simple REST API using API Gateway.

Module 2: Message Transformation and Request Validation

- Understanding the need for message transformation in APIs.
- Implementing mapping templates for transforming requests and responses.

- Configuring request validation to enforce schema compliance.
- Hands-on Lab: Setting up message transformation and request validation for an API.

Module 3: Authentication and Authorization

- Exploring authentication and authorization mechanisms in API Gateway.
- Integrating with AWS IAM for securing APIs.
- Leveraging Amazon Cognito for user authentication and fine-grained access control.
- Hands-on Lab: Implementing IAM-based and Cognito-based authorization for APIs.

Module 4: Message Caching and Performance Optimization

- Benefits of caching in API performance.
- Configuring and managing API Gateway caching.
- Strategies for optimizing API performance and reducing latency.
- Hands-on Lab: Enabling and configuring caching for an API endpoint.

Module 5: Usage Plans and Throttling

- Understanding usage plans and their importance.
- Setting up API keys and associating them with usage plans.
- Configuring throttling and quota limits to manage API consumption.
- Hands-on Lab: Creating usage plans and implementing throttling for APIs.

Module 6: API Gateway REST Integrations

- Integrating API Gateway with AWS Lambda functions.
- Connecting to HTTP endpoints and other AWS services.
- Understanding integration types: proxy vs. non-proxy integrations.
- Hands-on Lab: Setting up REST integrations with various backend services.

Module 7: Observability in API Gateway

- Importance of monitoring and logging in API management.
- Utilizing CloudWatch for API Gateway metrics and logs.
- Setting up alarms and dashboards for real-time monitoring.
- Debugging failed executions with AWS X-Ray traces.
- Hands-on Lab: Configuring observability features for API Gateway.

Module 8: Working with WebSocket APIs

- Introduction to WebSocket APIs and real-time communication.
- Setting up WebSocket APIs using API Gateway.
- Managing connections and messages in WebSocket APIs.
- Hands-on Lab: Building a pizza ordering application using WebSocket APIs.

Module 9: Fine-Grained Access Control

- Understanding the need for fine-grained access control in APIs.
- Implementing resource policies and method-level authorization.
- Using IAM policies and Cognito authorizers.