ASP.NET Core Web API with Azure API Management (.NET 9)

Duration: 5 Days (8 Hours/Day)

Audience:

- .NET Developers
- Software Engineers
- Full-Stack Developers
- Technical Leads
- Developers moving to Azure

Prerequisites:

- Basic C# knowledge
- Familiarity with Visual Studio
- SQL fundamentals
- Basic understanding of HTTP concepts

Day 1: Building Your First APIs

Module 1: Introduction to Web APIs

- What is an API?
- REST principles
- HTTP methods and status codes
- JSON and serialization
- Minimal APIs vs Controller APIs
- ASP.NET Core Web API architecture

Lab

Build a simple Product API.

Module 2: Controllers and Routing

- Creating controllers
- Attribute routing
- Model binding
- Action results
- Dependency Injection basics
- Configuration and appsettings.json
- Logging with ILogger

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Create Product CRUD operations.

Module 3: Validation and Error Handling

- Data annotations
- Model validation
- Global exception handling
- Middleware basics
- ProblemDetails responses

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Implement centralized exception handling.

Day 2: Working with Data and Security

Module 4: Entity Framework Core

- DbContext and DbSet
- Code First approach
- Migrations
- Relationships
- LINQ queries
- Async operations

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Build Customer and Order APIs.

Module 5: Authentication and Authorization

- Authentication vs Authorization
- JWT authentication
- Role-based authorization
- Policy-based authorization
- Protecting endpoints

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Secure APIs using JWT.

Module 6: API Documentation and Testing

- Swagger/OpenAPI
- Testing with Postman
- API versioning basics

- Unit testing overview
- Integration testing concepts

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Document and test APIs.

Day 3: Building Better APIs

Module 7: API Design Best Practices

- DTOs
- AutoMapper basics
- Pagination
- Filtering and sorting
- Search functionality
- API naming conventions

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Implement paging and filtering.

Module 8: Performance and Caching

- Why caching matters
- In-memory caching
- Output caching
- Introduction to Azure Managed Redis
- Compression middleware

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Cache product responses.

Module 9: Deploying APIs to Azure

- Azure App Service overview
- Publishing from Visual Studio
- Configuration in Azure
- Environment variables
- Monitoring basics

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Deploy Web API to Azure App Service.

Day 4: Azure API Management

Module 10: Introduction to Azure API Management

- Why API gateways are needed
- APIM architecture
- Products and subscriptions
- Developer portal
- API versions and revisions

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Create an APIM instance.

Module 11: Importing and Publishing APIs

- Import OpenAPI definitions
- Backend configuration

- Testing APIs through APIM
- Managing subscriptions

Lab

Publish Product API to APIM.

Module 12: APIM Policies

- Rate limiting
- CORS policies
- Header transformation
- JWT validation
- Mock responses

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Apply basic APIM policies.

Day 5: Enterprise Integration and DevOps

Module 13: Messaging and Background Processing

- Hosted services
- Background workers
- Introduction to Azure Service Bus
- Queues vs Topics
- Event-driven architecture concepts

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Send order notifications through Service Bus.

Module 14: Monitoring and Security

- Application Insights basics
- Health checks
- Logging and diagnostics
- Azure Key Vault introduction
- Managed Identity concepts
- OWASP API security overview

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Store secrets in Key Vault.

Module 15: CI/CD and Containerization

- Git workflow
- Azure DevOps overview
- Basic CI/CD pipeline
- Docker fundamentals
- Containerizing ASP.NET Core APIs
- Azure Container Registry overview

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Build and deploy a Dockerized API.