KOENIG step forward

Microsoft Solutions Partner
Microsoft Cloud Training Services

KOENIG SOLUTIONS · COURSE OUTLINE

Microservices with .NET and ASP.NET Core (Microsoft)

Create independently deployable, highly scalable, and resilient services using the free and open-source .NET platform.

4 Days	14	40	34
DURATION	MODULES	TOPICS	HANDS-ON EXERCISES

COURSE OVERVIEW

This course covers microservices architecture concepts, comparing them with monolithic designs, and introduces .NET Core 6 as a development platform. It addresses microservices design principles, including domain-driven design, bounded contexts, service boundaries, and data consistency, before moving into building microservices with .NET Core 6 using MVC and Entity Framework Core. It then examines communication patterns between microservices, RESTful APIs, and API versioning, followed by decomposing monolithic applications and deploying microservices with Docker and Kubernetes. The course concludes with cloud-native ASP.NET Core practices such as resiliency, instrumentation, feature flags, managed data stores, API gateways, and deployment with GitHub Actions.

WHO THIS COURSE IS FOR

- **Software Developers**
- **Solution Architects**
- **Cloud Engineers**
- **Backend Developers**
- **.NET Developers**
- **DevOps Engineers**

PREREQUISITES

- Familiarity with command-line based applications.
- Basic understanding of application and system architecture
- Familiarity with basic Docker concepts and Azure Development.
- Azure free subscription is required
- Experience writing C# at the beginner level

LEARNING OBJECTIVES

What You Will Learn

- Explain microservices architecture versus monolithic designs
- Apply domain-driven design principles to define service boundaries
- Build microservices using .NET Core 6, MVC, and Entity Framework Core
- Implement RESTful API communication patterns between microservices
- Analyse a monolithic application to identify decomposition boundaries
- Deploy microservices to Kubernetes using containers and orchestration
- Implement resiliency and instrumentation in ASP.NET Core microservices
- Configure API gateways and CI/CD pipelines with GitHub Actions

COURSE SYLLABUS

14 Modules, 40 Topics

01

Introduction to Microservices

In this module you will learn the basic concepts and principles of microservices architecture, which is a modern way of designing and developing software applications as a collection of loosely coupled, independent, and scalable services.

TOPICS

What are microservices? · Microservices vs monolithic architecture · Advantages and disadvantages of microservices · Overview of .NET Core 6

02

Designing Microservices Architecture

In this module, you will learn about the principles of microservices design. You will also learn about domain-driven design (DDD) and bounded contexts, which are essential for identifying and modeling the domains and subdomains of your application. You will also learn how to define service boundaries and interfaces, which are the contracts between your services and their consumers. You will also learn how to deal with data consistency and transactions across microservices, which are challenging due to the distributed nature of microservices

TOPICS

- Principles of microservices design
- Domain-driven design (DDD) and bounded contexts
- Service boundaries and interfaces
- Data consistency and transactions

03

Building Microservices with .NET Core 6

Building Microservices with .NET Core 6 is a module that aims to teach the practical skills and techniques of developing microservices using .NET Core 6.

TOPICS

- Setting up a new .NET Core 6 project
- Implementing the service layer with MVC
- Using Entity Framework Core to connect to a database
- Testing individual microservices

04

Communication between Microservices

In this module, you will learn about the communication patterns between microservices, such as synchronous and asynchronous, request-response and event-driven, and point-to-point and publish-subscribe. You will also learn about RESTful APIs and HTTP requests, which are the most common ways of implementing synchronous communication between microservices. You will also learn how to use the HttpClient class in .NET Core, which is a modern and efficient way of sending and receiving HTTP requests in C#. You will also learn how to version and document your APIs, which are important for maintaining compatibility and usability of your microservices.

TOPICS

Communication patterns between microservices · RESTful APIs and HTTP requests · Using the HttpClient class in .NET Core · Versioning and documentation of APIs

05

2 Exercises

Overview of Microservice with .NET

Microservice applications are composed of small, independently versioned, and scalable customer-focused services that communicate with each other over standard protocols with well-defined interfaces. Each microservice typically encapsulates simple business logic, which you can scale out or in, test, deploy, and manage independently. Smaller teams develop a microservice based on a customer scenario and use any technologies that they want to use. This module will teach you how to build your first microservice with .NET.

TOPICS

Introduction · What are microservices?

06

2 Exercises

Decompose a Monolithic Application into a Microservices Architecture

Improve development agility, deployment, fault tolerance, and scalability by modernizing your application with a microservices architecture.

TOPICS

- Introduction
- Monolithic and microservice architectures
- Performance constraints of a monolithic application
- Analyze an application and identify decomposition boundaries

07

4 Exercises

Deploy a .NET Microservice to Kubernetes

Microservice applications are composed of small, independently versioned, and scalable customer-focused services. Microservices applications deployed in containers make it possible to scale out apps, and respond to increased demand by deploying more container instances, and to scale back if demand is decreasing. In complex solutions of many microservices the process of deploying, updating, monitoring, and removing containers introduces challenges. This module explains some of those challenges and shows how Kubernetes can help.

TOPICS

Introduction · What are orchestrators?

08

4 Exercises

Create and Deploy a Cloud-Native ASP.NET Core Microservice

Create and deploy an ASP.NET Core microservice to AKS.

TOPICS

Introduction · Review the solution architecture · Review the coupon service design

09

4 Exercises

Implement Resiliency in a Cloud-Native ASP.NET Core Microservice

Learn how to make your cloud-native ASP.NET Core microservices app fault-tolerant with minimal impact on the user.

TOPICS

Introduction · Review resiliency concepts

10

4 Exercises

Instrument a Cloud-Native ASP.NET Core Microservice

Learn how to instrument your cloud-native ASP.NET Core microservices app to diagnose problems and monitor performance.

TOPICS

Introduction · Review logging and monitoring concepts

11

3 Exercises

Implement Feature Flags in a Cloud-Native ASP.NET Core Microservices App

Implement a feature flag in your cloud-native ASP.NET Core microservices app to enable or disable a feature in real time.

TOPICS

Introduction · Review app configuration concepts

12

4 Exercises

Use Managed Data Stores in a Cloud-Native ASP.NET Core Microservices App

Modify a cloud-native ASP.NET Core microservices app to use managed data stores in Azure.

TOPICS

Introduction · Review managed data stores in Azure

13

3 Exercises

Understand API Gateways in a Cloud-Native ASP.NET Core Microservices App

TOPICS

- Introduction
- Understand API gateways and Backends for Frontends
- Implement a new Backend for Frontend
- Understand Kubernetes ingress controller concepts

14

4 Exercises

Deploy a Cloud-Native ASP.NET Core Microservice with GitHub Actions

Use a GitHub Actions CI/CD pipeline to build a container image and deploy it to Azure Kubernetes Service (AKS).

TOPICS

Introduction

HANDS-ON EXERCISES

Practise What You Learn

#	MODULE	ACTIVITY
05	**Overview of Microservice with .NET**	■ Build a Dockerfile for your microservice ■ Create a Docker Compose file
06	**Decompose a Monolithic Application into a Microservices Architecture**	■ Deploy a monolithic application on App Service ■ Refactor a service within the monolith as a microservice
07	**Deploy a .NET Microservice to Kubernetes**	■ Push a microservice image to Docker Hub ■ Deploy a microservice container to Kubernetes ■ Scale a container instance in Kubernetes ■ Prove microservice resilience in Kubernetes
08	**Create and Deploy a Cloud-Native ASP.NET Core Microservice**	■ Deploy the application ■ Verify the deployment ■ Add the coupon service ■ Build and deploy the changes
09	**Implement Resiliency in a Cloud-Native ASP.NET Core Microservice**	■ Set up the environment ■ Verify deployment and test the app ■ Implement code-based resiliency ■ Implement infrastructure-based resiliency
10	**Instrument a Cloud-Native ASP.NET Core Microservice**	■ Set up the environment ■ Implement Application Insights ■ Monitor Application Insights ■ Implement Azure Monitor for Containers
11	**Implement Feature Flags in a Cloud-Native ASP.NET Core Microservices App**	■ Set up the environment ■ Implement the Feature Management library ■ Implement the Azure App Configuration service
12	**Use Managed Data Stores in a Cloud-Native ASP.NET Core Microservices App**	■ Set up the environment ■ Verify deployment and test the app ■ Implement Azure Cache for Redis ■ Implement Azure Cosmos DB
13	**Understand API Gateways in a Cloud-Native ASP.NET Core Microservices App**	■ Set up the environment ■ Verify deployment and test the app ■ Implement a load balancer with Azure Application Gateway

#	MODULE	ACTIVITY
14	**Deploy a Cloud-Native ASP.NET Core Microservice with GitHub Actions**	■ Set up the environment ■ Configure GitHub Actions permissions and secrets ■ Create a GitHub action to build a container image ■ Create a GitHub action to deploy to AKS

WHAT IS INCLUDED

Everything You Need to Succeed

- Koenig course material for every module
- Delivery by certified instructors and subject matter experts
- Hands-on exercises throughout the course
- Course completion certificate from Koenig

ABOUT KOENIG

Who We Are

Established in 1993, Koenig Solutions is a globally recognised training provider with 35+ technology partnerships, 5,000+ training programmes and a network of certified instructors and subject matter experts, supporting individuals and enterprise teams worldwide.

FLEXIBLE DELIVERY

Learn the Way That Suits You

Classroom Training | Live Online Classes (ILO) | Fly-Me-A-Trainer (FMAT) | Flexi (Self-Paced) | 1-on-1 Training

Ready to Get Started?

Talk to a learning advisor about schedules, group training and customised delivery.

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