Module 14

Hosting and Deployment

Module Overview

- On-Premises Hosting and Deployment
- Deployment to Microsoft Azure
- Microsoft Azure Fundamentals

Lesson 1: On-Premises Hosting and Deployment

- Web Servers
- Hosting ASP.NET Core Application
- Deploying to IIS
- File Providers

Web Servers

- Setting up the server is an important part of an ASP.NET Core MVC application and requires you to make important decisions

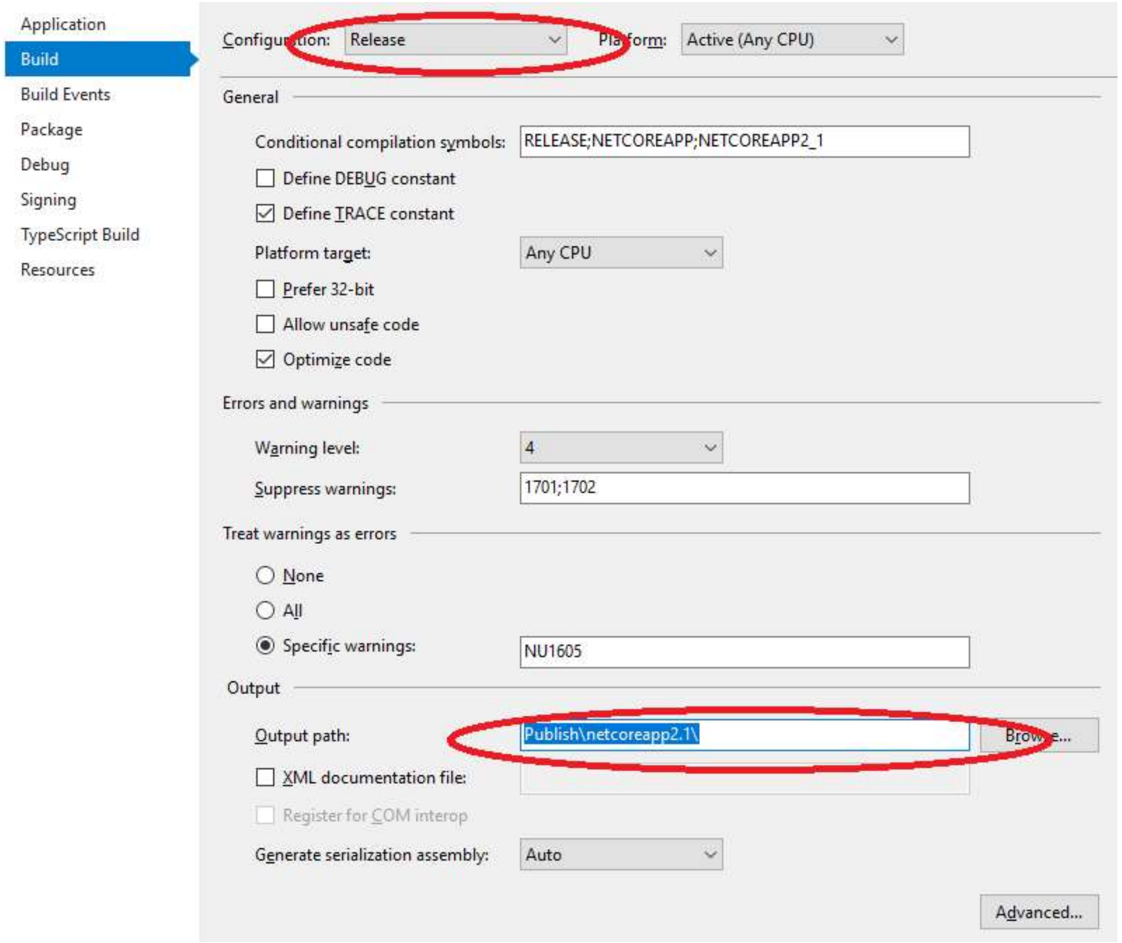
- By choosing Kestrel, you get:
  - A lightweight server that is fast
  - The ability to use reverse proxy
  - Cross-platform support

- By choosing HTTP.sys you get:
  - A robust framework with many prebuilt options
  - Windows-based authentication
  - Direct file transfer from the server

Hosting ASP.NET Core Application

- For hosting ASP.NET Core MVC applications, you need to decide:
- What configurations are needed as part of the publishing process
- The server infrastructure to use to host your application
- Whether to use a reverse proxy as part of your application
- Whether load balancing functionality is required

Setting Output Path for a Project



Configuration: Release Platform: Active (Any CPU)

General

Conditional compilation symbols: RELEASE;NETCOREAPP;NETCOREAPP2_1

□ Define DEBUG constant

☑ Define TRACE constant

Platform target: Any CPU

□ Prefer 32-bit

□ Allow unsafe code

☑ Optimize code

Errors and warnings

Warning level: 4

Suppress warnings: 1701;1702

Treat warnings as errors

○ None

○ All

● Specific warnings: NU1605

Output

Output path: Publish\netcoreapp2.1\

□ XML documentation file:

□ Register for COM interop

Generate serialization assembly: Auto

Deploying to IIS

- Deploying an application requires a large investment at the start
- It becomes considerably easier on updates
- The first set up requires several steps:
- Update the ASP.NET Core application to work with IIS
- Set up IIS
- Create the IIS Web Site
- Deploy the application
- After the first deployment you can directly perform the deployment

File Providers

- **File Providers** allow us to interact with actual files in the project structure:
- **PhysicalFileProvider** interacts with files that are physically present in the project structure
- **ManifestEmbeddedFileProvider** interacts with files which are embedded within the application itself, allowing for added security at the cost of being unchangeable at run time
- **CompositeFileProvider** allows us to combine two or more providers and use them all with a single interface

Lesson 2: Deployment to Microsoft Azure

- What is Microsoft Azure?
- Benefits of Hosting in Microsoft Azure
- Deploying Web Application on Microsoft Azure
- Demonstration: How to Deploy a Web Application to Microsoft Azure
- Azure Deployment Strategy
- Debugging a Microsoft Azure Application

What is Microsoft Azure?

Cloud Service that makes computing resources available on demand and over the internet

Infrastructure-as-a-Service

- Compute resources available on demand
- Resources include:
  - Virtual machines
  - Persistent disks
  - Networking
  - Containers
- Scale up and down as per demand
- Pay only for what you use

Platform-as-a-Service

- Complete environment (OS, webservers and other necessary software) available on demand
- Provides auto-scaling, maintenance and monitoring of systems
- Ease of deployment
- Suitable for micro-services based architecture

Benefits of Hosting in Microsoft Azure

Benefits of Azure:

- **Efficiency**
  With PaaS, deploying and scaling application is very easy. This leads to efficient use or resources.
- **Elasticity**
  Ability to scale up to thousands of machines
- **Security**
  Common compliances and certifications in place. Also provides DDoS protection, threat protection, and information protection.
- **Cost**
  Pay as you use model means no up-front investment needed and hence more cost-effective.
- **Developer Tools**
  A wide variety of tools available for building and deploying your application automatically.

Deploying Web Application on Microsoft Azure

Azure App Service

- PaaS from Microsoft Azure, provides a managed platform to deploy and host your applications
- Offers auto-scaling, high availability, and load balancing
- Provides App Insights to monitor application performance
- Applications are hosted on Microsoft’s global infrastructure
- App Service is ISO, SCO, and PCI complaint
- App Service provides easy integration to other Azure services such as Storage, Active Directory etc.
- Integrates with various tools for continuous deployment

Demonstration: How to Deploy a Web Application to Microsoft Azure

- In this demonstration, you will learn how to:
- Deploy your application to Microsoft Azure App Service.
- Check the details of the deployed application in Azure Portal.

Azure Deployment Strategy

- Traditional Deployment Options
- FTP, CLI, Visual Studio – simple, but nor suitable for production grade applications
  - Require downtime and it is not easy to rollback in case of problems
- Deployment Slots
  - Provides additional environments similar to production environments
  - Applications can be deployed to these for testing or staging
  - Allows traffic routing for a percentage of the incoming traffic to one of the deployment slots to perform A/B testing
  - On successful testing, slots can be swapped
- Resource Templates
  - Ability to define resources needed for an application as a template
  - Re-create the entire stack from this template

Debugging a Microsoft Azure Application

Application Insights – ability to monitor applications running in App Service.

- Metrics – such as CPU usage, memory consumption, page views, performance of events etc
- Live Stream – ability to see key metrics in a streaming fashion.
- Analysis from Visual Studio
- Remote Debugging – ability to debug live applications from Visual Studio
- Server Explorer – Ability to manage Azure Services from Visual Studio

Lesson 3: Microsoft Azure Fundamentals

- Microsoft Azure Storage
- Demonstration: How to Upload an Image to Microsoft Azure Blob Storage
- Microsoft Azure SQL
- Design a Distributed Application by Using Microsoft Azure
- Design a Caching Strategy
- Security in Microsoft Azure

Microsoft Azure Storage

- Managed service providing storage that is highly available, secure, durable, scalable, and redundant.
- Type of storage :
  - **Azure Blob storage -** object-based storage; can be used to store image files, audio and video clips.
  - **Azure File Share -** fully managed file shares in the cloud
  - **Azure Queue storage -** service for storing large numbers of messages
  - **Azure Table storage -** service that stores structured NoSQL data in the cloud

Demonstration: How to Upload an Image to Microsoft Azure Blob Storage

- In this demonstration, you will learn how to:
- Create a storage account from the Azure Portal.
- Create a container from the Azure Portal.
- Upload an image from the Azure Portal.
- Connect to storage account from an application.
- Create a container from an application.
- Upload an image from a web application.

Microsoft Azure SQL

- Azure SQL Database – a fully managed SQL database
- Infrastructure management taken care of by Azure
- Scalability – Allows for dynamic scalability, i.e. increase/decrease infrastructure configuration without a downtime
- Availability – provides automatic backups, replication and failure detection
- Security and Compliance – provides data encryption at rest and in transit. Provides access control and tools to protect sensitive data.
- Intelligent insights and monitoring – provides automatic performance monitoring and tuning.

Design a Distributed Application by Using Microsoft Azure

- Distributed applications – ability to auto scale.
- Need for centralized session management
- Session-affinity
- Redis based session management.
- Need for asynchronous communication between components for easy scalability
- Azure Service Bus – integrated message broker
- WebJobs – ability to perform background tasks
- Azure Functions – run small functions on the cloud.
- Hybrid applications – run on Azure and on-premise datacenters
- Azure Stack – run Azure Services on datacenters in any location

Design a Caching Strategy

- Azure Cache for Redis
  - Redis cache as a service
  - Globally available, hence suitable for distributed applications
  - Useful for caching data within an application – session data, data that needs to be fetched from a database, etc.
- Azure CDN – Content Delivery Network
  - Global caching for static content such as html files, images etc.
  - Files are cached in edge servers across the globe
  - Files are served from closest location to consumers, thus improving performance

Security in Microsoft Azure

- Azure Key Vault – a secure store for keys and secrets
- All information within a vault is encrypted and stored.
- Useful to securely store application configuration information such as connection strings, passwords etc.
- Application access to Key Vault is through authentication by Azure Active Directory.
- Key Vault is backed by HSM.

Lab: Hosting and Deployment

- Exercise 1: Deploying a Web Application to Microsoft Azure
- Exercise 2: Upload an Image to Azure Blob Storage

Lab Review

- What are the advantages of deploying to Azure?
- When would you use Azure Blob storage?

Module Review and Takeaways

- Review Question
- Best Practice
- Common Issues and Troubleshooting Tips

Course Evaluation

- Your evaluation of this course will help Microsoft understand the quality of your learning experience.
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