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Course Outline

20487-Developing Windows Azure and Web Services

Duration: 5 days (30 hours)

Target Audience:

This course is intended for both novice and experienced .NET developers who have a minimum of six months programming experience, and want to learn how to develop services and deploy them to hybrid environments.

Prerequisites:

Before attending this course, students must have:

- Experience with C# programming, and concepts such as Lambda expressions, LINQ, and anonymous types.
- Understanding the concepts of n-tier applications.
- Experience with querying and manipulating data with ADO.NET.
- Knowledge of XML data structures.

Topics Covered:

- Module 1: Overview of service and cloud technologies
  - Key Components of Distributed Applications
  - Data and Data Access Technologies
  - Service Technologies
  - Cloud Computing
  - Exploring Blue Yonder Airlines' Travel Companion Application
    - Lab : Exploring the work environment
      - Create a Windows Azure SQL Database
      - Create an Entity Data Model
      - Create an ASP.NET Web API service
      - Deploy a web application to Windows Azure

  After completing this module, students will be able to:
    - Describe the overall architecture of distributed applications.
    - Describe the data platform technologies supported by Microsoft.
    - Describe the different approaches and technologies used for developing services.
    - Describe cloud computing concepts and the Windows Azure ecosystem.
- Module 2: Querying and manipulating data using Entity Framework
  - ADO.NET overview
  - Creating an entity data model
  - Querying data
  - Manipulating data

- Lab : Creating a data access layer using Entity Framework
  - Explore the data model and integration test projects
  - Create a data model
  - Query and manipulate data

After completing this module, students will be able to:

- Describe how to use ADO.NET to query and manipulate data.
- Create entity data models using the different design approaches of Entity Framework.
- Query a database using various Entity Framework techniques.
- Manipulate data by using Entity Framework.

➢ Module 3: Creating and consuming ASP.NET Web API services

- What are HTTP services?
- Creating an ASP.NET Web API service
- Handling HTTP requests and responses
- Hosting and consuming ASP.NET Web API services
  - Lab : Creating the travel reservation ASP.NET Web API service
    - Create an ASP.NET Web API service
    - Consume an ASP.NET Web API service

After completing this module, students will be able to:

- Describe the HTTP protocol and how it is used with REST.
- Create a basic ASP.NET Web API service by using routing, controllers, and actions.
- Convert HTTP request content to .NET objects and convert return values to responses.
- Host and consume ASP.NET Web API services in various server and client scenarios.

➢ Module 4: Extending and securing ASP.NET Web API services

- The ASP.NET Web API request pipeline
- The ASP.NET Web API response pipeline
- Creating OData services
- Implementing Security in ASP.NET Web API services
- Injecting dependencies into controllers
  - Lab : Extending Travel Companion’s ASP.NET Web API services
    - Create a dependency resolver for repositories
    - Add a new media type for RSS requests
    - Add OData capabilities to the flight schedule service
    - Apply validation rules in the booking service
    - Secure the communication between client and server

After completing this module, students will be able to:

- Describe how messages flow through the ASP.NET Web API request processing pipeline.
- Describe how messages flow through the ASP.NET Web API response processing pipeline.
- Create ASP.NET Web API OData services.
- Implement security in ASP.NET Web API services.
- Create a dependency resolver that injects dependencies into ASP.NET Web API controllers.

- Module 5: Creating WCF services
  - Advantages of creating services with WCF
  - Creating and implementing a contract
  - Configuring and hosting WCF services
  - Consuming WCF services
    - Lab : Creating and consuming the WCF booking service
      - Create the WCF booking service
      - Configure and host the WCF service
      - Consume the WCF service from the ASP.NET Web API booking service

  After completing this module, students will be able to:
    - Describe why and when to use WCF to create services.
    - Implement a service using contracts.
    - Host a WCF service with endpoint configuration in code and configuration file.
    - Consume a WCF services from .NET clients.
- Module 6: Designing and extending WCF services
  - Applying design principles to service contracts
  - Handling distributed transactions
  - WCF pipeline architecture
  - Extending the WCF pipeline
    - Lab : Designing and extending WCF services
    - Create a custom error handler runtime component
      - Add support for distributed transactions to the WCF booking service
      - Use asynchronous WCF client calls

  After completing this module, students will be able to:
    - Create service contracts that support service design principles.
    - Create services that support distributed transactions.
    - Describe the architecture of the WCF pipeline and how to control it with behaviors.
    - Extend WCF with runtime components and extensible objects.
- Module 7: Implementing Security in WCF services
  - Transport security
  - Message security
  - Configuring service authentication and authorization
    - Lab : Securing a WCF service
      - Secure the WCF service
      - Configure the ASP.NET Web API booking service for secured communication

  After completing this module, students will be able to:
    - Configure a service for transport security.
    - Configure a service for message security.
    - Authenticate and authorize users.
- Module 8: Windows Azure Service Bus
  - Windows Azure Service Bus Relays
  - Windows Azure Service Bus Queues

- Windows Azure Service Bus Topics
    - Lab : Windows Azure Service Bus
        - Use a service bus relay for the WCF booking service
        - Publish booking updates to clients using Windows Azure Service Bus Topics

After completing this module, students will be able to:

- Connect hybrid environments with Windows Azure Service Bus Relays.
- Use brokered messaging with Windows Azure Service Bus queues.
- Use subscription-based messaging with Windows Azure Service Bus topics.

➢ Module 9: Hosting services

- Hosting services on-premises
- Hosting services in Windows Azure
    - Lab : Hosting Services
        - Host the WCF booking service in IIS
        - Host the ASP.NET Web API services in a Windows Azure Web role
        - Host the booking management service in a Windows Azure Web Site

After completing this module, students will be able to:

- Describe the common on-premises hosting environments.
- Host a service in Windows Azure hosting environments.

➢ Module 10: Deploying Services

- Web Deployment with Visual Studio
- Creating and deploying Web Application packages
- Command-line tools for web deployment packages
- Deploying to Windows Azure
- Continuous delivery with TFS and GIT
- Best practices for production deployment
    - Lab : Deploying services
        - Deploying an updated service to Windows Azure
        - Updating a Windows Azure Web Site with Web Deploy
        - Exporting and importing an IIS deployment package

After completing this module, students will be able to:

- Deploy services from Visual Studio.
- Deploy services by using web deployment packages.
- Deploy services using command-line tools.
- Deploy services to Windows Azure environments.
- Ensure that Windows Azure deployments are up-to-date with continuous delivery.

➢ Module 11: Windows Azure Storage

- Introduction to Windows Azure storage
- Windows Azure Blob Storage
- Windows Azure Table Storage
- Windows Azure Queue Storage
- Restricting access to Windows Azure Storage

- Lab : Windows Azure Storage
  - Storing content in Windows Azure storage
  - Accessing Windows Azure storage
  - Creating shared access signatures for blobs

After completing this module, students will be able to:

- Describe the reasons for using Windows Azure storage.
- Use blobs for storing resources.
- Use tables for storing structured, non-relational data.
- Use queues for sending and receiving messages asynchronously.
- Configure access level and shared access signatures for Windows Azure Storage services.

➢ Module 12: Monitoring and diagnostics

- Performing diagnostics using tracing
- Configuring service diagnostics
- Monitoring IIS
- Monitoring services using Windows Azure diagnostics
- Debugging using IntelliTrace
- Collecting Windows Azure metrics
  - Lab : Monitoring and Diagnostics
    - Configuring WCF tracing and message logging
    - Configuring Windows Azure diagnostics

After completing this module, students will be able to:

- Write diagnostics trace messages.
- Configure and monitor service diagnostic information.
- Monitor IIS-hosted services.
- Monitor Windows Azure applications using Windows Azure diagnostics.
- Debug services with IntelliTrace.
- Collect Windows Azure metrics.

➢ Module 13: Identity management and access control

- Claim-based identity concepts
- Access Control Service
- Configuring services to use federated identities
- Handling federated identities in the client side
  - Lab : Identity management and access control
    - Configure Windows Azure ACS
    - Integrate ACS with the ASP.NET Web API
    - Examine the authentication procedure in the client application

After completing this module, students will be able to:

- Describe claim-based identity concepts.
- Describe the Access Control Service and its purpose.
- Configure a service to require federated identities.
- Configure a service client with federated identity

- Module 14: Scaling Services
  - Introduction to scalability
  - Load balancing
  - Scaling on-premises services with distributed cache
  - Windows Azure caching
  - Caveats of scaling services
  - Scaling globally
    - Lab : Scalability
      - Use Windows Azure Caching
      - Support federated security in a scaled environment

  After completing this module, students will be able to:

    - Describe the reasons and techniques for scaling services.
    - Describe how load balancing can be used with on-premises and Windows Azure environments.
    - Integrate a distributed cache mechanism into a service by using Windows Server AppFabric Cache.
    - Describe the distributed cache solutions offered by Windows Azure.
    - Understand the caveats of scaling out services and how to resolve them.
    - Scale Windows Azure solutions outside of the data center.