

## Course 20487B:

# Developing Windows Azure and Web Services

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### Course Details

#### Course Outline

#### Module 1: Overview of service and cloud technologies

This module provides an overview of service and cloud technologies using the Microsoft .NET Framework and the Windows Azure cloud.

#### Lessons

- Key Components of Distributed Applications
- Data and Data Access Technologies
- Service Technologies
- Cloud Computing
- Exploring the Blue Yonder Airlines' Travel Companion Application

#### Lab : Exploring the work environment

- Creating a Windows Azure SQL Database
- Creating an Entity Data model
- Managing the Entity Framework Model with an ASP.NET Web API Project
- Deploying a web application to Windows Azure

After completing this module, students will be able to:

- Describe the key components of distributed applications.
- Describe data and data access technologies.
- Explain service technologies.
- Describe the features and functionalities of cloud computing.
- Describe the architecture and working of the Blue Yonder Airlines Travel Companion application.

#### Module 2: Querying and Manipulating Data Using Entity Framework

This module Describes the Entity Framework data model, and how to create, read, update, and

delete data.

#### Lessons

- ADO.NET Overview
- Creating an Entity Data Model
- Querying Data
- Manipulating Data

Lab : Creating a Data Access Layer by Using Entity Framework

- Creating a Data Model
- Querying and Manipulating Data

After completing this module, students will be able to:

- Explain basic objects in ADO.NET and asynchronous operations.
- Create an Entity Framework data model.
- Query data by using Entity Framework.
- Insert, delete, and update entities by using Entity Framework.

#### Module 3: Creating and Consuming ASP.NET Web API Services

This module describes HTTP-based services that are developed, hosted, and consumed by using ASP.NET Web API.

#### Lessons

- 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

- Creating an ASP.NET Web API Service
- Consuming an ASP.NET Web API Service

After completing this module, students will be able to:

- Design services by using the HTTP protocol.
- Create services by using ASP.NET Web API.
- Use the `HttpRequestMessage/HttpResponseMessage` classes to control HTTP messages.
- Host and consume ASP.NET Web API services.

## Module 4: Extending and Securing ASP.NET Web API Services

This module describes in detail the ASP.NET Web API architecture and how you can extend and secure ASP.NET Web API services.

### Lessons

- The ASP.NET Web API 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

- Creating a Dependency Resolver for Repositories
- Adding a New Media Type for RSS Requests
- Adding OData Capabilities to the Flight Schedule Service
- Applying Validation Rules in the Booking Service
- Secure the communication between client and server

After completing this module, students will be able to:

- Extend the ASP.NET Web API request and response pipeline.
- Create OData services using ASP.NET Web API.
- Secure ASP.NET Web API.
- Inject dependencies into ASP.NET Web API controllers.

## Module 5: Creating WCF Services

This module introduces Windows Communication Foundation (WCF) and describes how to create, host, and consume a WCF service.

### Lessons

- 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

- Creating the WCF Booking Service
- Configuring and Hosting the WCF Service

- Consuming 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.
- Define a service contract and implement it.
- Host and configure a WCF service.
- Consume a WCF service from a client application.

## Module 6: Hosting Services

This module describes how to host web services both on-premises and in Windows Azure. It explains various components of Windows Azure Cloud Services: Web Role, Worker Role, and Windows Azure Web Sites.

### Lessons

- Hosting Services On-Premises
- Hosting Services in Windows Azure

### Lab : Hosting Services

- Hosting the WCF Services in IIS
- Host the ASP.NET Web API Services in a Windows Azure Web Role
- Host the Flights Management Web Application in a Windows Azure Web Site

After completing this module, students will be able to:

- Host services on-premises by using Windows services and IIS
- Host services in the Windows Azure cloud environment by using Windows Azure Cloud Services and Web Sites

## Module 7: Windows Azure Service Bus

This module describes web-scale messaging patterns, and the infrastructures provided by Windows Azure Service Bus.

### Lessons

- What Are 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 Flight Updates to Clients by Using Windows Azure Service Bus Queues

After completing this module, students will be able to:

- Describe the purpose and functionality of relayed and buffered messaging.
- Provision, configure, and use the service bus queues.
- Enhance the effectiveness of queue-based communications using topics, subscriptions and filters.

## Module 8: Deploying Services

This module describes different techniques for deploying web applications.

### Lessons

- Web Deployment with Visual Studio 2012
- Creating and Deploying Web Application Packages
- Command-Line Tools for Web Deploy
- Deploying Web and Service Applications to Windows Azure
- Continuous Delivery with TFS and Git
- Best Practices for Production Deployment

### Lab : Deploying Services

- Deploying an Updated Service to Windows Azure
- Exporting and importing an IIS deployment package

After completing this module, students will be able to:

- Deploy web applications with Visual Studio.
- Create and deploy web applications by using IIS Manager.
- Deploy web applications by using the command line.
- Deploy web applications to Windows Azure environments.
- Use continuous delivery with TFS and Git.
- Apply best practices for deploying web applications on-premises and to Windows Azure.

## Module 9: Windows Azure Storage

This module Describes Windows Azure Storage, the services it provides, and the best way to use these services.

### Lessons

- 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
- Storing Content in Windows Azure Table Storage
- Creating Shared Access Signatures for Blobs

After completing this module, students will be able to:

- Describe the architecture of Windows Azure Storage.
- Implement Blob Storage in your applications.
- Use Table Storage in your applications
- Describe how to use Windows Azure Queues as a communication mechanism between different parts of your application
- Control access to your storage items.

Module 10: Monitoring and Diagnostics

This module describes how to perform monitoring and diagnostics in Windows Azure services.

Lessons

- Performing Diagnostics by Using Tracing
- Configuring Service Diagnostics
- Monitoring Services Using Windows Azure Diagnostics
- 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:

- Perform tracing in the .NET Framework with the System.Diagnostics namespace.
- Configure and explore web service and IIS tracing.
- Monitor services by using Windows Azure Diagnostics.
- View and collect Windows Azure metrics in the management portal.

## Module 11: Identity Management and Access Control

This module describes the basic principles of modern identity handling and demonstrates how to use infrastructures such as Windows Azure Access Control Service (ACS) to implement authentication and authorization with claims-based identity in Windows Communication Foundation (WCF).

### Lessons

- Claims-based Identity Concepts
- Using the Windows Azure Access Control Service
- Configuring Services to Use Federated Identities
- Handling Federated Identities on the Client Side

### Lab : Identity Management and Access Control

- Configuring Windows Azure ACS
- Integrating ACS with the ASP.NET Web API Project
- Deploying the Web Application to Windows Azure and Configure the Client App

After completing this module, students will be able to:

- Describe the basic principles of claims-based identity.
- Create a Security Token Service (STS) by using Windows Azure ACS.
- Configure WCF to use federated identity.
- Consume a WCF service that uses federated identities.

## Module 12: Scaling Services

This module describes the ways in which you can ensure services can handle increasing workloads and user demand.

### Lessons

- 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

After completing this module, students will be able to:

- Explain the need for scalability.
- Describe how to use load balancing for scaling services.
- Describe how to use distributed caching for on-premises as well as Windows Azure services.
- Describe how to use Windows Azure caching.
- Describe how to deal with common challenges and issues that appear when services need to scale.
- Describe how to scale services globally.

### Module 13: Appendix A: Designing and Extending WCF Services

This module covers designing Windows Communication Foundation (WCF) service contracts, creating services that support distributed transactions, and extending the WCF pipeline with custom runtime components and custom behaviors.

#### Lessons

- Applying Design Principles to Service Contracts
- Handling Distributed Transactions
- 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

After completing this module, students will be able to:

- Design and create services and clients to use different kinds of message patterns.
- Configure a service to support distributed transactions.
- Extend the WCF pipeline with runtime components, custom behaviors, and extensible objects.

### Module 14: Appendix B: Implementing Security in WCF Services

This module deals with the various considerations you have to take into account when designing a secure web service, such as encryption, input validation, authentication, and authorization, and the techniques to use while applying these considerations to services developed with WCF.

#### Lessons

- Introduction to Web Services Security
- Transport Security



- Message Security
- Configuring Service Authentication and Authorization

Lab : Securing a WCF Service

- Securing the WCF Service
- Using authorization rules to validate the client's requests
- Configure the ASP.NET web API booking service for secured communication

After completing this module, students will be able to:

- Describe web application security.
  - Configure a service for transport security.
  - Configure a service for message security.
  - Implement and configure authentication and authorization logic.
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