HPE Digital Learner MSFT Azure Web Applications (Introduction) Content Pack

HPE Content Pack number	CP013
Content Pack length	23 Hours
Content Pack category	Category 2
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This self-paced eLearning Content Pack represents a comprehensive training series for those individuals that are transforming to a cloud architect and/or developer role as part of their organization's hybrid cloud strategy to transform existing and/or legacy web applications to a cloud operational model that includes utilizing Microsoft Azure public cloud.

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Audience

• Administrators looking to gain skills to administer public cloud services hosted on Microsoft Azure

• DevOps, software developers and system administrators who need to work with distributed Azure apps

Content Pack objectives

This Content Pack provides the information necessary to plan, design and implement Microsoft Azure Web Applications. This training represents a comprehensive and detailed set of courses that are spread across a subset of critical technology areas required to successfully plan, design, implement and/or transition web applications to a typical Microsoft Azure public cloud environment. Areas of focus contained within this training include introduction to Azure, Azure networks, storage, publishing and caching, web services, Azure Entity Framework, IIS, WCF services, security, distributed apps, subscription messages and troubleshooting, advanced deployment, diagnostics, debugging, access control and scalability. This training will enable the student to transition to the cloud web development role and will also assist with the path to Microsoft Certification.

*Realize Technology Value with Training, IDC Infographic 2037, Sponsored by HPE, October 2017

Detailed Content Pack outline

Microsoft Azure: Introduction

Virtual machines and storage are the primary building blocks of the Azure cloud offering. This course covers an overview of Azure features, VM creation and how to build them into clouds, the different cloud service models supported on Azure and an overview of structured and unstructured data storage.

- Describe Microsoft Azure

- Access the Software Developer Kit from Microsoft Azure

- Sign up for an Azure account

- Configure basic Azure portal options

- Describe the Azure Store

- Describe SQL Azure

- Describe Windows Azure AppFabric

- Use Windows Azure and Microsoft Visual Studio to set up a test environment so that features, such as accessing local storage, can be simulated in a cloud-like manner

- Enable remote access to the system to set it up

- Configure the VHD files and create and attach new storage drives

- Create an Azure virtual machine

- Create images by using Microsoft Azure virtual machines

- Create availability sets by using Microsoft Azure virtual machines

- Configure virtual machines in load balancing sets using Microsoft Azure

- Describe the execution models available in Microsoft Azure

- Describe the network models available in Microsoft Azure

- Describe the storage models available in Microsoft Azure

- Describe the web site models available in Microsoft Azure

- Describe the use of Binary Large Objects, or blobs, in Microsoft Azure Storage

- Describe the use of tables in Microsoft Azure Storage

- Connect to a SQL Azure Database using SQL Server Management Studio

- Describe the SQL Azure Architecture

- Describe the SQL Azure security model

Microsoft Azure: Networks and Storage

Azure has sophisticated capabilities for segmenting clouds into virtual networks. These networks can be accessed securely by using VPNs for encryption and authentication. This course covers virtual network creation, VPN access to Azure networks, using PowerShell on remote machines, and additional topics on storage, both structured and unstructured.

- Describe Microsoft Azure virtual networks

- Configure basic virtual networks on Microsoft Azure

- Export and import virtual network configuration on Microsoft Azure

- Assign a virtual machine to a virtual network in Microsoft Azure

- Describe VPN options in Microsoft Azure virtual networks

- Configure client systems to connect to a virtual network via a Point-to-Site VPN

- Configure client systems to connect to a virtual network via a Site-to-Site VPN

- Create and implement root certificates to validate the identity of the server

- Implement client certificates for authenticating client connections when establishing VPN connectivity

- Create Site-to-Site VPN access to virtual networks

- Describe the relevance of PowerShell in Windows Azure

- Configure the Azure environment to support PowerShell management

- Access systems residing in the cloud by using PowerShell on a local system

- Create a storage account and configure storage options

- Use the Storage Explorer utility to access and manage a storage account

- Access cloud storage from a local installation of Visual Studio

- Create blob files in Azure Storage Explorer and Microsoft Visual Studio

- Set up private access to blob files

- Create public access blob files

- Compare SQL Server and SQL Azure

- Create and configure basic tables in Microsoft Azure

- Populate tables in Microsoft Azure

- Customize and query tables in Microsoft Azure

- Describe database sync groups in Microsoft Azure

- Create database sync groups in Microsoft Azure

- Configure database sync groups in Microsoft Azure

Microsoft Azure: Publishing and Caching

One of the primary purposes of cloud services is content publishing. The availability aspect of public cloud computing makes it ideally suited to the task. Caching is implemented in Microsoft Azure to improve performance which is sometimes seen as the weakness of public cloud offerings. This course covers caching and web publishing. It also covers Microsoft Azure Traffic Manager and hosted Active Directory. Finally, it covers alerts for monitoring cloud systems and backup.

- Create a cache in Microsoft Azure
- Describe caches in Microsoft Azure
- Describe cache configuration options in Microsoft Azure
- Monitor cache values in Microsoft Azure
- Set up a website on Microsoft Azure
- Monitor a Microsoft Azure web site
- Configure web site scaling to upgrade or downgrade sites
- Publish an FTP site on Microsoft Azure
- Configure web sites to support WebMatrix publishing
- Enable web site content publishing on Microsoft Azure
- Upscale and downscale the resources that have been allocated to a site on Microsoft Azure
- Describe Microsoft Azure Traffic Manager features and policies
- Distribute client access across multiple instances using Microsoft Azure Traffic Manager

- Configure Microsoft Azure Traffic Manager failover mode
- Configure Microsoft Azure Traffic Manager performance mode
- Configure Microsoft Azure Traffic Manager round robin mode
- Describe Windows Azure cloud-based security
- Describe the concepts and benefits of Microsoft Azure cloud-based Active Directory services
- Set up a Microsoft Azure Active Directory
- Create an administrative account on Microsoft Azure Active Directory
- Configure password synchronization in Microsoft Azure Active Directory
- Integrate Windows Azure applications with Active Directory synchronization
- Manage users and groups in Microsoft Azure Active Directory
- Set up alerts in Microsoft Azure
- Create and upload a custom certificate for secure access to backup vaults in Microsoft Azure
- Install the Microsoft Azure backup agent

Introduction to Web Services

Web services provide a cloud environment for building distributed apps. In this course, you will be introduced to distributed apps, how data can be accessed, and how services work. You will also prepare for exam 70-487.

- Describe and define the characteristics of a distributed application and the reasons for creating them
- Describe the types of computing strategies that can be used to host a service in the cloud
- Recognize and list the advantages and benefits of cloud computing
- Identify the computing strategies and features provided by the Microsoft Azure cloud computing solution
- Distinguish between the different cloud service components offered by Azure
- Describe the technologies and storage strategies that can be used to store and access data
- Compare the features and functionality of the ASP. NET Web API to WCF
- Identify the data access features provided in the .NET Framework
- Describe the low-level ADO.NET data access API in the .NET framework

- Create and configure a data provider programmatically
- Describe HTTP and how it facilitates a simple request and response for message handling
- Identify the parts of a URI and the action verbs that can make up an HTTP transaction
- Work with the HTTP header and media types for the Content-Type header
- Describe how the Representational State Transfer (REST) architecture works
- Describe how WCF can be used to create HTTP services
- Recognize the differences between ADO.NET, Entity, WCF services, and Azure services
- Describe the differences and uses for ADO.NET, ASP.NET Web API, WCF, and the Azure platform

Introduction to the Entity Framework

Entity Framework is an object relational mapper (ORM) and uses an object-oriented representation for data. This course introduces Entity and the operations it provides to make working with data easier and prepares you for exam 70-487.

- Describe the need for object relational mappers and the development approaches including database first, model first and code first
- Create and configure a DBContext and query the database using the DBContext class
- Use Data Annotations to manually map classes to database schema objects
- Describe the Entity methods for mapping an OOP environment to database tables
- Use the Fluent API to map classes to tables
- Work with data model schema definition languages to model data
- Define LINQ and how it interacts with SQL and Entity

- Use LINQ to Entities to query a database
- Perform a query against a database using Entity SQL
- Execute SQL statements directly using Entity and return objects or scalar values
- Perform Create, Read, Update and Delete operations using Entity
- Use Change Tracking with Entity to monitor if an object has changed
- Use Transactions and the TransactionScope class to group operations

IIS and Web Services

When developing a distributed app that must be run locally, IIS is available and can be configured to scale and run web services. In this course, you will learn about IIS and how to create a web service as you prepare for exam 70-487.

- Recognize the benefits and core capabilities of IIS
- Install and configure IIS for hosting web apps
- Create and host an ASP.NET web app
- Use OWIN to create and host a simple web app
- Configure and use logs to troubleshoot problems with IIS
- Use performance counters to troubleshoot IIS at the worker and application levels
- Distinguish between synchronous and asynchronous operations
- Perform synchronous operations using ADO.NET basic objects and readers
- Perform an asynchronous operation with ADO.NET

- Use asynchronous operations with Entity Framework
- Design and describe a Web API service and how routing works
- Create routing rules and use the Routing Tables
- Create a controller using Action methods
- Bind parameters to Request Messages in a Controller
- Use SignalR to implement WebSockets to create a realtime web app
- Manage IIS, troubleshoot IIS and create a web service

Consuming Services, Using the ASP.NET Pipeline and Using OData Services

Many web services use ASP.NET to handle data and handle CRUD operations by using OData. In this course you will learn about ASP.NET, the ASP.NET Pipeline and the OData protocol.

- Use JavaScript to synchronously and asynchronously request XML or JSON content
- Use the HttpClient to consume a web service from within a .NET client
- Work with request batching to reduce network traffic
- Recognize where exceptions can occur in a request and handle them gracefully
- Describe how to secure a Web Service using HTTPS and authentication
- Use authentication credentials to secure a Web Service
- Decouple components from dependencies and use dependency injection
- Use the ASP.NET Web API Dependency Resolver interface to provide instances of needed controllers

- Describe how to customize or extend the ASP.NET Web API Pipeline
- Use the DelegatingHandler class to create a handler
- Add filters to an ASP.NET Web API to extend a pipeline
- Create an ASP.NET Web API Asynchronous Action to improve scalability when doing I/O heavy operations
- Use Pipeline filters to extend authorization and authentication
- Describe the OData service
- Create an OData queryable action using a Query String option
- Extend the OData action using a Model, Controller, and Route
- Consume an OData service using the tools built into Visual Studio or programmatically with LINQ
- Consume and create advanced services, manipulating the ASP.NET Pipeline and using OData services

WCF Services

The Windows Communication Foundation (WCF) Data Services is a SOAP based data communication framework. In this course, you will be introduced to WCF Services including how to create and consume them

- Describe the features and advantages of using WCF Services
- Describe the benefits of SOAP and its usage of XML
- Identify how SOAP and HTTP can be used for data transfer within a web service
- Install and configure IIS for running web services
- Configure IIS to host a simple WCF Service
- Use IIS to self-host an ASP.NET Web API Service
- Describe how WCF Services can be hosted and the components of a WCF Service
- Create a WCF Service using SOAP and configure the ServiceContract
- Define how the service is exposed to clients, including the Address, Bindings and Contracts

- Handle exceptions within a WCF Service and SOAP request
- Use a service proxy with Visual Studio to consume a WCF Service a design-time
- Use a service proxy with ChannelFactory to consume a WCF Service at run-time
- Create a Windows Services project to run a WCF Service through Windows Services
- Create an installer for a WCF Service to be hosted by Windows Services
- Install and uninstall WCF Services from the Windows Service console or command line
- Host WCF Services on IIS or with Windows Services

WCF Transactions, Pipelines and Extensibility

WCF has a lot of power and flexibility. You will learn about transactions, the WCF pipeline, and how to extend WCF in this course. You will also prepare for exam 70-487.

- Describe distributed transactions, their scope, and the two-phase commit protocol
- Configure contracts and bindings to support transactions
- Add transaction support to a WCF Service
- Use a distributed transaction from a client
- Describe the architecture and responsibilities of the channel stack
- Define the responsibilities and scope of the WCF dispatchers
- Identify and describe the custom runtime components
- Create a custom operation invoker
- Describe the four custom behaviors and their scopes

- Create a custom operation behavior
- Attach custom behaviors to a WCF Service by using custom attributes
- Use the WCF messaging pipeline to handle errors and provide diagnostic information
- Describe the WCF extensibility mechanism using the extensible object pattern
- Create a WCF extension using the IExtension interface
- Use a WCF extension in a WCF Service
- Configure WCF service message compression and encoding options
- Create a one-way WCF service contract
- Configure websocket bindings for a WCF Service
- Use and describe the WCF pipeline and distributed transactions

Security and WCF Streams

WCF, similar to any web service, must be secured. In this course, you will learn about WCF security, transport security and message security. Additionally, you will be introduced to client authentication and authorization.

- Use WCF stream operations to handle both requests and provide responses
- Work with the WCF duplex messaging pattern to create a duplex service
- Create a service using asynchronous service operations
- Describe the aspects of building secure applications
- Describe the aspects of security that the WCF framework provides and those that must still be addressed in development
- Describe how to use a secured channel to convey data securely between a client and a service
- Configure a service and client to securely transport data including configuring IIS to use HTTPS
- Work with transport security to consume a secure WCF service

- Describe the benefits and limitations of using WCF message security
- Configure the bindings for a service to support message security
- Configure a client to consume a service secured with message security
- Use message credentials and transport security to secure communications
- Describe how to authenticate clients and use role-based authorization
- Authenticate clients using a username and password
- Create a custom username and password validator
- Use role-based permissions to grant and deny access
- Use transport and message security to protect communications and use client authentication and authorization to provide access to services

Azure Services

Azure has some builtin functionality that can be very powerful when creating scalable distributed apps. In this course, you will learn about the Azure SDK and emulators, the Azure Service Bus and Service Bus queues.

- Install and configure the Azure SDK and emulator
- Describe the Azure Cloud Service roles and environment
- Host a web app in Azure
- Compare the features and benefits of self-hosting versus hosting on Azure
- Describe the Azure Service Bus, namespaces and the Service Bus relay
- Describe the request-response relay pattern
- Create a relay endpoint using a Service Bus namespace
- Use NuGet to install the WCF bindings to support using the WCF service in a relay

- Create an Azure WCF Relay sender and a WCF Relay receiver
- Describe Azure Service Bus queues and brokering
- Set up an Azure Service Bus queue
- Create a new Azure Service queue using C#
- Use duplicate detection to prevent messages being sent more than once
- Send a message using the QueueClient class
- Receive a message using the QueueClient class
- Use sessions to group messages and assign dedicated receivers
- Describe the Azure Service Bus queues and how they can be used for message handling

Azure Storage

Azure Storage is a powerful feature that has been created for data storage. It has three built-in storage services to handle almost any kind of data. In this course, you will learn about Azure Storage, Table Storage and Storage Queues.

- Describe the three Azure Storage services
- Create and configure an Azure Storage account
- Describe how Azure Storage containers store Binary Large Objects (blobs)
- Create and delete block and page based containers
- Read and write data to block blob storage containers
- Read and write data to page blob storage containers
- Manipulate blobs and the data stored in blob containers
- Use retry policies to handle failed network transactions
- Compare Azure Table storage to traditional relational databases

- Create and delete tables in Azure Table storage
- Create an Entity structure in .NET
- Query data and perform CRUD operations on an Azure Storage table
- Compare Azure queues to Service Bus queues
- Create and delete Azure queues using .NET
- Send messages to an Azure queue
- Retrieve messages from an Azure queue using Peek messages
- Describe the storage methods and features provided on the Azure cloud

Azure Subscription Messages, Security and Troubleshooting

Subscription message handling, claims-based identity, security and troubleshooting are all aspects of using Azure for hosting web services. In this course, you will learn how to secure and debug Azure and the built-in message handling.

- Describe the Azure Service Bus Subscription-based messaging and Service Bus Topics
- Create a Windows Azure Service Bus Topic for subscriptions
- Manage messages using filters
- Send a message to a Subscription Topic
- Receive a message for a topic using the SubscriptionClient class
- Work with claims-based identity management in distributed systems
- Describe the purpose of the Windows Identity Foundation (WIF) .NET Framework
- Implement claims-based identity management using .NET
- Configure Access Levels for blob containers

- Describe Shared Access Signatures for granting short-term access to resources
- Create and use a Shared Access Signature
- Describe the types of data you can collect from Azure diagnostics and how it can be collected
- Enable and monitor the App Suspend with ASP.NET
- Enable logging and track performance of Azure Storage requests
- Configure and use diagnostics for Azure in Visual Studio
- Collect and view collect diagnostic information with Visual Studio
- Secure and troubleshoot Azure

Advanced Deployment

Deploying a web app to a cluster of servers or to Azure requires careful planning and execution. In this course, you will learn about deployment management for IIS and Azure, and you will prepare for exam 70-487.

- Describe the benefits and principles of continuous delivery
- Configure continuous delivery using Team Foundation Service and Git
- Configure web deployment parameters using web config files
- Use Shared Assemblies to reduce startup time of multiple hosted services
- Configure Share Assembly bindings between MVC 4 and MVC 5
- Describe how the rolling upgrade works for upgrading domains on Azure
- Use the Visual Studio Web Deployment options to deploy web apps

- Create an IIS Web Deployment package
- Use IIS Manager to import and deploy an IIS Web Deployment package
- Deploy web apps using the command line tool MSDeploy
- Deploy web apps using PowerShell
- Deploy a web or service application to Azure
- Deploy a web app to Windows Azure Web Sites (WAWS)
- Configure WCF endpoints for secure deployment on Azure using HTTPS
- Create and use a staging environment on Azure for testing
- Deploying and managing deployments on the Azure cloud

Azure Diagnostics, Debugging and Access Control Service

Azure provides a large set of tools to diagnose and debug issues. This course covers how to troubleshoot and debug on Azure, and how to run diagnostics. This course will also cover the Azure ACS and content tested in exam 70-487.

- Use the Trace system diagnostics with .NET
- Use the enhanced tracing provided by TraceSource
- Use a Trace Listener to store and route messages to a handler
- Use a Trace Writer in an ASP.NET web app
- Enable and use WCF diagnostics and performance counters
- Use IntelliTrace in Azure to get detailed information on an application's flow
- Configure and collect Azure Metrics for Azure cloud services
- View and interpret monitoring metrics for websites

- Configure and view metrics for Azure Storage services
- Describe the Windows Azure Access Control Service (ACS)
- Use identity management in ACS to manage access to the Service Bus
- Describe active and passive federation
- Use active federation to call HTTP-based web services
- Configure ACS for a Service Bus endpoint
- Use tracing and diagnostics information to troubleshoot and debug services on Azure

Azure Scalability

Azure can help build scalable distributed web apps. In this course, you will learn about Azure scalability features, caching mechanisms, and how they are used to create distributed web apps. You will also prepare for exam 70-487.

- Define the purpose and reasons for creating systems that can scale
- Describe the components and architectural challenges that come with scaling out a system
- Describe the types of load balancing and how they can be operated
- Scale out a web app to multiple systems in Azure
- Describe caching options available in Azure
- Create Redis database service in Azure Portal
- Use the Azure Access Control for a Redis Cache
- Assign configuration settings to a Redis cache in Azure

- Configure Redis Cache in web.config of a .NET application
- Describe the benefits and reasons for distributed caching
- Define what Content Delivery Networks (CDN) are used for and when they should be used
- Describe the features and offerings of the Windows Server AppFabric Cache
- Define the AppFabric Cache components
- Use the AppFabric Cache API programmatically
- Describe scalability and caching as they apply to Windows and Azure Web Apps and Services

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