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Microsoft Azure Training Course Brochure

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Microsoft Azure Training Course Brochure

Designing and Implementing a Microsoft Azure AI Solution

Course Code MAI102
Duration 4 days

Overview
Gain the necessary knowledge for designing Azure AI solution by building a customer support chat Bot using artificial intelligence from the Microsoft Azure platform including language understanding and pre-built AI functionality in the Azure Cognitive Services.

Audience
This course is aimed at Cloud Solution Architects, Azure artificial intelligence designers, and AI developers.

Learning Objectives
By actively participating in this course, you will learn about the following:

- Planning and managing an Azure Cognitive Services solution.
- Implementing Computer Vision solutions.
- Implementing natural language processing solutions.
- Implementing knowledge mining solutions.
- Implementing conversational AI solutions.

Pre-Requisites

Successful Azure AI Engineers start this role with professional experience with cloud technologies, and experience with software development kits.

Specifically:
- Implementing solutions in C# or Python
- Application development in the cloud
- Understanding Azure storage technologies

Course Contents

Module 1: Introducing Azure Cognitive Services
The delegate will learn about the available Cognitive Services on Microsoft Azure and their role in architecting AI solutions.

Lessons
- Overview of Azure Cognitive Services
- Creating a Cognitive Service on the Azure Portal
- Access and Test a Cognitive Service

Module 2: Creating Bots
The delegate will learn about the Microsoft Bot Framework and Bot Services.

Lessons
- Introducing the Bot Service
- Creating a Basic Chat Bot
- Testing with the Bot Emulator

Module 3: Enhancing Bots with QnA Maker
The delegate will learn about the QnA Maker and how to integrate Bots and QnA Maker to build up a useful knowledge base for user interactions.

Lessons
- Introducing QnA Maker
- Implement a Knowledge Base with QnA Maker
- Integrate QnA with a Bot

Module 4: Learn How to Create Language Understanding Functionality with LUIS
The delegate will learn about Language Understanding with Intents and Utterances (LUIS) and how to create intents and utterances to support a natural language processing solution.

Lessons
- Introducing Language Understanding
- Create a new LUIS Service
- Build LUIS

Module 5: Enhancing Your Bots with LUIS
The delegate will learn about integrating LUIS with a Bot to better understand the users' intentions when interacting with the Bot.

Lessons
- Overview of language understanding for AI applications
- Integrate LUIS and Bot to create an AI-based solution

Module 6: Integrate Cognitive Services with Bots and Agents
The delegate will learn about integrating Bots and Agents with Azure Cognitive Services for advanced features such as sentiment analysis, image and text analysis, and OCR and object detection.

Lessons
- Understand Cognitive Services for Bot Interactions
- Perform Sentiment Analysis for your Bot with Text Analytics
- Detect Language in a Bot with the Language Cognitive Services
- Integrate Computer Vision with Bots

Exam Details
This course leads to the AI-102 Designing and Implementing a Microsoft Azure AI Solution (beta) exam, which will earn you the Microsoft Certified: Azure AI Engineer Associate certification.

Microsoft Azure AI Fundamentals

Course Code MAI900
Duration 1 day

Overview

This course introduces fundamentals concepts related to artificial intelligence (AI), and the services in Microsoft Azure that can be used to create AI solutions. The course is not designed to teach students to become professional data scientists or software developers, but rather to build awareness of common AI workloads and the ability to identify Azure services to support them.

The course is designed as a blended learning experience that combines instructor-led training with online materials on the Microsoft Learn platform (https://azure.com/learn). The hands-on exercises in the course are based on Learn modules, and students are encouraged to use the content on Learn as reference materials to reinforce what they learn in the class and to explore topics in more depth.

Audience

The Azure AI Fundamentals course is designed for anyone interested in learning about the types of solution artificial intelligence (AI) makes possible, and the services on Microsoft Azure that you can use to create them. You don't need to have any experience of using Microsoft Azure before taking this course, but a basic level of familiarity with computer technology and the Internet is assumed. Some of the concepts covered in the course require a basic understanding of mathematics, such as the ability to interpret charts. The course includes hands-on activities that involve working with data and running code, so a knowledge of fundamental programming principles will be helpful.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Describe Artificial Intelligence workloads and considerations
- Describe fundamental principles of machine learning on Azure
- Describe features of computer vision workloads on Azure
- Describe features of Natural Language Processing (NLP) workloads on Azure
- Describe features of conversational AI workloads on Azure

Pre-Requisites

Familiarity with computers and using a web browser.

Course Contents

Module 1: Introduction to AI
In this module, you'll learn about common uses of artificial intelligence (AI), and the different types of workload associated with AI. You'll then explore considerations and principles for responsible AI development.

- Artificial Intelligence in Azure
- Responsible AI

After completing this module, you will be able to
- Describe Artificial Intelligence workloads and considerations

Module 2: Machine Learning
Machine learning is the foundation for modern AI solutions. In this module, you'll learn about some fundamental machine learning concepts, and how to use the Azure Machine Learning service to create and publish machine learning models.

- Introduction to Machine Learning
- Azure Machine Learning

After completing this module, you will be able to
- Describe fundamental principles of machine learning on Azure

Module 3: Computer Vision
Computer vision is the area of AI that deals with understanding the world visually, through images, video files, and cameras. In this module you'll explore multiple computer vision techniques and services.

- Computer Vision Concepts
- Computer Vision in Azure

After completing this module, you will be able to
- Describe features of computer vision workloads on Azure

Module 4: Natural Language Processing
This module describes scenarios for AI solutions that can process written and spoken language. You'll learn about Azure services that can be used to build solutions that analyze text, recognize and synthesize speech, translate between languages, and interpret commands.

After completing this module, you will be able to
- Describe features of Natural Language Processing (NLP) workloads on Azure

Module 5: Conversational AI
Conversational AI enables users to engage in a dialog with an AI agent, or *bot*, through communication channels such as email, webchat interfaces, social media, and others. This module describes some basic principles for working with bots and gives you an opportunity to create a bot that can respond intelligently to user questions.

- Conversational AI Concepts
- Conversational AI in Azure

After completing this module, you will be able to
- Describe features of conversational AI workloads on Azure

Exam Details
This course is recommended as preparation for the exam AI-900: Microsoft Azure AI Fundamentals.

Automating Administration with PowerShell

Course Code MAZ040
Duration 5 days

Overview

This course provides students with the fundamental knowledge and skills to use PowerShell for administering and automating administration of Windows servers. This course provides students the skills to identify and build the command they require to perform a specific task. In addition, students learn how to build scripts to accomplish advanced tasks such as automating repetitive tasks and generating reports.

This course provides prerequisite skills supporting a broad range of Microsoft products, including Windows Server, Windows Client, Microsoft Azure, and Microsoft 365. In keeping with that goal, this course will not focus on any one of those products, although Windows Server, which is the common platform for all of those products, will serve as the example for the techniques this course teaches.

Audience

This course is intended for IT Professionals who are already experienced in general Windows Server, Windows client, Azure, and Microsoft 365 administration, and who want to learn more about using Windows PowerShell for administration. No prior experience with any version of PowerShell or any scripting language is assumed. This course is also suitable for IT Professionals already experienced in server administration, including Microsoft Exchange Server, Microsoft SharePoint Server, and Microsoft SQL Server.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Describe the functionality of Windows PowerShell and use it to run and find basic commands.
- Identify and run cmdlets for local system administration.
- Work with the Windows PowerShell pipeline.
- Use PSProviders and PSDrives to work with other forms of storage.
- Query system information by using WMI and CIM.
- Work with variables, arrays, and hash tables.
- Create basic scripts in Windows PowerShell.
- Administer remote computers with Windows PowerShell.
- Manage Azure resources with PowerShell.
- Manage Microsoft 365 services with PowerShell.
- Use background jobs and scheduled jobs.

Pre-Requisites

- Experience with Windows networking technologies and implementation.
- Experience with Windows Server administration, maintenance, and troubleshooting.

Course Contents

Module 1: Getting Started with Windows PowerShell
This module will introduce you to Windows PowerShell and provide an overview of the product's functionality. The module explains how to open and configure Windows PowerShell. It also explains how to run commands and use the built-in Help system in Windows PowerShell.

- Windows PowerShell overview
- Understand Windows PowerShell command syntax
- Find commands and get help in Windows PowerShell

Lab : Configuring Windows PowerShell, and finding and running commands
- Configuring the Windows PowerShell console application
- Configuring the Windows PowerShell ISE application
- Finding and running Windows PowerShell commands
- Using About files

After completing module 1, students will be able to:
- Describe key features of Windows PowerShell, and open and configure it.
- Discover, learn, and run Windows PowerShell commands.
- Find Windows PowerShell commands for performing specific tasks.

Module 2: Windows PowerShell for Local Systems Administration
This module introduces you to the different types of cmdlets commonly used for system administration. While you can search for cmdlets each time you need to accomplish a task, it is more efficient to have at least a basic understanding of these cmdlets. This module also explains how to manage Windows 10 by using PowerShell.

- Active Directory Domain Services administration cmdlets
- Network configuration cmdlets
- Server administration cmdlets
- Windows PowerShell in Windows 10

Lab : Performing local system administration with PowerShell
- Creating and managing Active Directory objects
- Configuring network settings on Windows Server
- Creating a website

After completing module 2, students will be able to:
- Identify and use cmdlets for AD DS administration.
- Identify and use cmdlets for network configuration.
- Identify and use cmdlets for server administration tasks.
- Manage Windows 10 using PowerShell

Module 3: Working with the Windows PowerShell Pipeline
This module introduces the pipeline feature of Windows PowerShell. The pipeline feature is included in several command-line shells such as the command prompt in the Windows operating system. However, the pipeline feature in Windows PowerShell provides more complex, flexible, and capable functionalities compared to other shells. This module provides you with the skills and knowledge that will help you use Windows PowerShell more effectively and efficiently.

- Understand the pipeline
- Select, sort, and measure objects
- Filter objects out of the pipeline
- Enumerate objects in the pipeline
- Send and pass pipeline data as output

Lab : Using PowerShell pipeline
- Selecting, sorting, and displaying data
- Filtering objects
- Enumerating objects
- Converting objects

After completing module 3, students will be able to:
- Describe the purpose of the Windows PowerShell pipeline.
- Select, sort, and measure objects in the pipeline.
- Filter objects out of the pipeline.
- Enumerate objects in the pipeline.
- Send output consisting of pipeline data.

Module 4: Using PSProviders and PSDrives
This module introduces the PSProviders and PSDrives adapters. A PSProvider is basically a Windows PowerShell adapter makes some form of storage resemble a hard drive. A PSDrive is an actual connection to a form of storage. You can use these two technologies to work with various forms of storage by using the same commands and techniques that you use to manage the file system.

- Using PSProviders
- Using PSDrives

Lab : Using PSProviders and PSDrives with PowerShell
- Creating files and folders on a remote computer
- Creating a registry key for your future scripts
- Create a new Active Directory group

After completing module 4, students will be able to:
- Use PSProviders.
- Use PSDrives.

Module 5: Querying Management Information by using CIM and WMI
This module introduces you to two parallel technologies: Windows Management Instrumentation (WMI) and Common Information Model (CIM). Both these technologies provide local and remote access to a repository of management information including access to robust information available from the operating system, computer hardware, and installed software.

- Understand CIM and WMI
- Query data by using CIM and WMI
- Make changes by using CIM and WMI

Lab : Querying information by using WMI and CIM
- Querying information by using WMI
- Querying information by using CIM
- Invoking methods

After completing module 5, students will be able to:
- Differentiate between CIM and WMI.
- Query management information by using CIM and WMI.
- Invoke methods by using CIM and WMI.

Module 6: Working with Variables, Arrays and Hash Tables
Variables are an essential component of scripts. You can use variables to accomplish complex tasks that you can't complete by using a single command. This module explains how to work with variables, arrays, and hash tables as steps in learning how to create Windows PowerShell scripts.

- Use variables
- Manipulate variables
- Manipulate arrays and hash tables

Lab : Using variables, arrays, and hash tables in PowerShell
- Working with variable types
- Using arrays
- Using hash tables

After completing module 6, students will be able to:
- Assign a value to variables.
- Describe how to manipulate variables.
- Describe how to manipulate arrays and hash tables.

Module 7: Windows PowerShell Scripting
This module explains how to package a Windows PowerShell command in a script. Scripts allow you to perform repetitive tasks and more complex tasks than cannot be accomplished in a single command.
Introduction to scripting with Windows PowerShell

- Script constructs
- Import data from files
- Accept user input
- Troubleshooting and error handling
- Functions and modules

Lab : Using scripts with PowerShell
- Signing a script
- Processing an array with a ForEach loop
- Processing items by using If statements
- Creating users based on a CSV file
- Querying disk information from remote computers
- Updating the script to use alternate credentials

After completing module 7, students will be able to:
- Run a Windows PowerShell script.
- Use Windows PowerShell scripting constructs.
- Import data from a file.
- Accept user input for a script.
- Implement error handling for a script.
- Explain functions and modules.

Module 8: Administering Remote Computers with Windows PowerShell
This module introduces you to the Windows PowerShell remoting technology that enables you to connect to one or more remote computers and instruct them to run commands on your behalf.

- Use basic Windows PowerShell remoting
- Use advanced Windows PowerShell remoting techniques
- Use PSSessions

Lab : Performing remote administration with PowerShell
- Enabling remoting on the local computer
- Performing one-to-one remoting
- Performing one-to-many remoting
- Using implicit remoting

After completing module 8, students will be able to:
- Describe remoting architecture and security.
- Use advanced Windows PowerShell remoting techniques.
- Create and manage persistent remoting sessions.

Module 9: Managing Azure Resources with PowerShell
This module provides information about installing the necessary modules for cloud services management. It explains how to use PowerShell commands to perform some simple administrative tasks on cloud resources such as Azure virtual machines (VMs), Azure storage accounts, and Azure subscriptions. This module also describes how to use the Azure Cloud Shell environment to perform PowerShell-based or Bash-based administration directly from the Azure portal.

- Azure PowerShell
- Introduce Azure Cloud Shell
- Manage Azure VMs with PowerShell
- Manage storage and subscriptions

Lab : Azure resource management with PowerShell
- Activating the Azure subscription and installing the PowerShell Az module
- Using Azure Cloud Shell
- Managing Azure resources with Azure PowerShell

After completing module 9, students will be able to:
- Describe, install, and use the Azure PowerShell environment
- Describe and use Azure Cloud Shell.
- Manage Azure VMs with PowerShell.
- Manage Azure storage accounts and subscriptions with Azure PowerShell.

Module 10: Managing Microsoft 365 services with PowerShell
This module describes how to use PowerShell to manage Microsoft 365 user accounts, licenses, and groups, Exchange Online, SharePoint Online, and Microsoft Teams.

- Manage Microsoft 365 user accounts, licenses, and groups with PowerShell
- Manage Exchange Online with PowerShell
- Manage SharePoint Online with PowerShell
- Manage Microsoft Teams with PowerShell

Lab : Managing Microsoft 365 with PowerShell
- Managing users and groups in Azure AD
- Managing Exchange Online
- Managing SharePoint
- Managing Microsoft Teams

After completing module 10, students will be able to:
- Use PowerShell to manage users, groups, and licenses in Azure AD
- Manage Exchange Online with PowerShell.
- Manage SharePoint Online with PowerShell.
- Manage Microsoft Teams with PowerShell.

Module 11: Using Background Jobs and Scheduled Jobs
This module describes how to use background jobs and scheduled jobs. It also explains how to create scheduled jobs and retrieve job results.

- Use background jobs
- Use scheduled jobs

Lab : Jobs management with PowerShell
- Starting and managing jobs
- Creating a scheduled job

After completing module 11, students will be able to:
- Create and manage background jobs.
- Create and manage scheduled jobs.

Exam Details
There is no exam directly relating to this course.

Microsoft Azure Administrator

Course Code MAZ104
Duration 4 days

Overview

This course teaches IT Professionals how to manage their Azure subscriptions, secure identities, administer the infrastructure, configure virtual networking, connect Azure and on-premises sites, manage network traffic, implement storage solutions, create and scale virtual machines, implement web apps and containers, back up and share data, and monitor your solution.

Audience

This course is for Azure Administrators. The Azure Administrator implements, manages, and monitors identity, governance, storage, compute, and virtual networks in a cloud environment. The Azure Administrator will provision, size, monitor, and adjust resources as appropriate.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Managing Azure identities and governance.
- Implementing and managing storage.
- Deploying and managing Azure compute resources.
- Configuring and managing virtual networking.
- Monitoring and backing up Azure resources.

Pre-Requisites

- Understanding of on-premises virtualization technologies, including: VMs, virtual networking, and virtual hard disks.
- Understanding of network configurations, including TCP/IP, Domain Name System (DNS), virtual private networks (VPNs), firewalls, and encryption technologies.
- Understanding of Active Directory concepts, including users, groups, and role-based access control.
- Understanding of resilience and disaster recovery, including backup and restore operations.

Course Contents

Module 1: Identity
In this module, you will learn how to secure identities with Azure Active Directory and implement users and groups.

Lessons
- Azure Active Directory
- Users and Groups

Lab: Manage Azure Active Directory Identities
- After completing this module, delegates will be able to:
- Secure and manage identities with Azure Active Directory.
- Implement and manage users and groups.

Module 2: Governance and Compliance
In this module, you will learn about managing your subscriptions and accounts, implementing Azure policies, and using Role-Based Access Control.

Lessons
- Subscriptions and Accounts
- Azure Policy
- Role-based Access Control (RBAC)

Labs
- Manage Subscriptions and RBAC
- Manage Governance via Azure Policy

After completing this module, delegates will be able to:
- Implement and manage Azure subscriptions and accounts.
- Implement Azure Policy, including custom policies.
- Use RBAC to assign permissions.

Module 3: Azure Administration
In this module, you will learn about the tools an Azure Administrator uses to manage their infrastructure. This includes the Azure Portal, Cloud Shell, Azure PowerShell, CLI, and Resource Manager Templates. This module includes:

Lessons
- Azure Resource Manager
- Azure Portal and Cloud Shell
- Azure PowerShell and CLI
- ARM Templates

Labs
- Manage Azure resources by Using the Azure Portal
- Manage Azure resources by Using ARM Templates
- Manage Azure resources by Using Azure PowerShell (optional)
- Manage Azure resources by Using Azure CLI (optional)

After completing this module, delegates will be able to:
- Leverage Azure Resource Manager to organize resources.
- Use the Azure Portal and Cloud Shell.
- Use Azure PowerShell and CLI.
- Use ARM Templates to deploy resources.

Module 4: Virtual Networking
In this module, you will learn about basic virtual networking concepts like virtual networks and subnetting, IP addressing, network security groups, Azure Firewall, and Azure DNS.

Lessons
- Virtual Networks
- IP Addressing
- Network Security groups
- Azure Firewall
- Azure DNS

Lab: Implement Virtual Networking

After completing this module, delegates will be able to:
- Implement virtual networks and subnets.
- Configure public and private IP addressing.
- Configure network security groups.
- Configure Azure Firewall.
- Configure private and public DNS zones.

Module 5: Intersite Connectivity
In this module, you will learn about intersite connectivity features including VNet Peering, Virtual Network Gateways, and Site-to-Site Connections.

Lessons
- VNet Peering
- VPN Gateway Connections
- ExpressRoute and Virtual WAN

Lab: Implement Intersite Connectivity

After completing this module, delegates will be able to:
- Configure VNet Peering.
- Configure VPN gateways.
- Choose the appropriate intersite connectivity solution.

Module 6: Network Traffic Management
In this module, you will learn about network traffic strategies including network routing and service endpoints, Azure Load Balancer, and Azure Application Gateway.

Lessons
- Network Routing and Endpoints
- Azure Load Balancer
- Azure Application Gateway

Lab: Implement Traffic Management

After completing this module, delegates will be able to:
- Configure network routing including custom routes and service endpoints.
- Configure an Azure Load Balancer.
- Configure and Azure Application Gateway.

Module 7: Azure Storage
In this module, you will learn about basic storage features including storage accounts, blob storage, Azure files and File Sync, storage security, and storage tools.

Lessons
- Storage Accounts
- Blob Storage
- Storage Security
- Azure Files and File Sync
- Managing Storage

Lab: Manage Azure storage

After completing this module, delegates will be able to:
- Create Azure storage accounts.
- Configure blob containers.
- Secure Azure storage.
- Configure Azure files shares and file sync.
- Manage storage with tools such as Storage Explorer.

Module 8: Azure Virtual Machines
In this module, you will learn about Azure virtual machines including planning, creating, availability and extensions.

Lessons
- Virtual Machine Planning
- Creating Virtual Machines
- Virtual Machine Availability
- Virtual Machine Extensions

Lab: Manage virtual machines

After completing this module, delegates will be able to:
- Plan for virtual machine implementations.
- Create virtual machines.
- Configure virtual machine availability, including scale sets.
- Use virtual machine extensions.

Module 9: Serverless Computing
In this module, you will learn how to administer serverless computing features like Azure App Service, Azure Container Instances, and Kubernetes.

Lessons
- Azure App Service Plans
- Azure App Service
- Container Services
- Azure Kubernetes Service

Labs
- Implement Web Apps
- Implement Azure Container Instances
- Implement Azure Kubernetes Service

After completing this module, delegates will be able to:
- Create an app service plan.
- Create a web app.
- Implement Azure Container Instances.
- Implement Azure Kubernetes Service.

Module 10: Data Protection
In this module, you will learn about backing up files and folders, and virtual machine backups.

Lessons
- File and Folder Backups
- Virtual Machine Backups

Lab: Implement Data Protection

After completing this module, delegates will be able to:
- Backup and restore file and folders.
- Backup and restore virtual machines.

Module 11: Monitoring
In this module, you will learn about monitoring your Azure infrastructure including Azure Monitor, alerting, and log analytics.

Lessons
- Azure Monitor
- Azure Alerts
- Log Analytics
- Network Watcher

Lab: Implement Monitoring

After completing this module, delegates will be able to:
- Use Azure Monitor.
- Create Azure alerts.
- Query using Log Analytics.
- Use Network Watcher.

Exam Details
This course leads to the AZ-104 Microsoft Azure Administrator exam, which will earn you the Microsoft Certified: Azure Administrator Associate certification.

Planning & Administering Microsoft Azure for SAP Workloads

Course Code MAZ120
Duration 4 days

Overview

This course teaches IT Professionals experienced in SAP solutions how to leverage Azure resources that include deployment and configuration of virtual machines, virtual networks, storage accounts, and Azure AD that includes implementing and managing hybrid identities. Students of this course will learn through concepts, scenarios, procedures, and hands-on labs how to best plan and implement migration and operation of an SAP solution on Azure. Your will receive guidance on subscriptions, create and scale virtual machines, implement storage solutions, configure virtual networking, back up and share data, connect Azure and on-premises sites, manage network traffic, implement Azure Active Directory, secure identities, and monitor your solution.

Audience

This course is for Azure Administrators who migrate and manage SAP solutions on Azure. Azure Administrators manage the cloud services that span storage, networking, and compute cloud capabilities, with a deep understanding of each service across the full IT lifecycle. They take end-user requests for new cloud applications and make recommendations on services to use for optimal performance and scale, as well as provision, size, monitor and adjust as appropriate. This role requires communicating and coordinating with vendors. Azure Administrators use the Azure Portal and as they become more proficient, they use PowerShell and the Command Line Interface.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Migrate and manage SAP applications (SAP HANA, S/4HANA, SAP NetWeaver) on Azure
- Leverage Azure Portal, Cloud Shell, Azure PowerShell, CLI, Resource Manager, and Resource Manager Te
- Use intersite connectivity features including VNet Peering, VNet-to-VNet connections, Site-to-Site C
- Work with Azure Active Directory (AD), Azure AD Connect, and Azure AD Join, and Azure AD Identity Pro

Pre-Requisites

- Administrators and architects of Azure solutions for SAP should possess solid knowledge of SAP Applications, SAP HANA, S/4HANA, SAP NetWeaver, SAP BW, OS Servers for SAP Applications and Databases.
- Prior to taking this course, it is recommended that students have taken the Microsoft Azure Administrator (MAZ-104) training, as well as SAP HANA and Linux training.

Course Contents

Module 1: Introduction
Contains an overview of the SAP and Microsoft partnership.

Module 2: Foundations of SAP on Azure
Contains brief lessons on:

- Azure Compute
- Azure Storage
- Azure Networking
- SAP HANA on Azure (Large Instances)
- Identity services
- Governance and manageability
- Backup and data protection services
- Resiliency and increased availability services
- Migration Services

Module 3: SAP Certified Offerings on Azure
Contains lessons on:

- General prerequisites (SAP support in public cloud environments)
- Deployment options of SAP solutions on Azure
- SAP product-specific support on Azure
- Operating System support for SAP on Azure
- Storage support for SAP on Azure
- Networking support for SAP on Azure
- Database support for SAP on Azure
- High availability and disaster recovery support for SAP on Azure
- Monitoring requirements for SAP on Azure

Lab: Online Lab: Implementing Linux clustering on Azure VMs
Lab: Online Lab: Implementing Windows clustering on Azure VMs

Module 4: SAP on Azure Reference Architecture
Contains lessons on:

- SAP NetWeaver with AnyDB on Azure VMs
- SAP S4 HANA on Azure VMs
- SAP HANA on Azure (Large Instances)

Module 5: Planning for Implementing SAP Solutions on Azure
Contains lessons on:

- Azure VM compute, network, and storage considerations
- Azure VM high availability and disaster recovery
- Azure VM backup considerations
- Azure VM monitoring considerations
- Azure VM security considerations
- Azure VM authentication and access control considerations
- SAP HANA on Azure (Large Instances) compute, network, and storage
- SAP HANA on Azure (Large Instances) HA and DR considerations
- SAP HANA on Azure (Large Instances) backup considerations
- SAP HANA on Azure (Large Instances) security

Module 6: Planning for Migrating SAP Workloads to Azure
Contains lessons on:

- Strategies for migrating SAP systems to Microsoft Azure
- SAP workload planning and deployment checklist

Module 7: Implementing Azure VM-based SAP Solutions
Contains lessons on:

- Azure VM deployment methodologies
- Single-instance implementations (2-tier or 3-tier)
- Implementing HA SAP NetWeaver with AnyDB on Azure VMs
- Implementing HA SAP HANA on Azure VMs
- Configure the Azure Enhanced Monitoring Extension for SAP
- Implementing AD and Azure AD-based authentication

Module 8: Module 8-Deploying HANA Large Instances (HLI)
Contains a lesson on:

- Implementing HANA Large Instances

Module 9: Migrating SAP Workloads to Azure
Contains lessons on:

- Migration options
- DMO Methodology
- Cloud migration options
- Very Large Database Migration to Azure

Lab: Online Lab-Implement SAP architecture on Azure VMs running Linux
Lab: Online Lab-Implement SAP architecture on Azure VMs running Windows

Module 10: Maintaining SAP on Azure
Contains lessons on:

- Remote management
- Performing backups and restores
- Networking changes
- OS and workload updates
- Vertical and horizontal scaling
- Disaster Recovery

Module 11: Monitoring and Troubleshooting SAP on Azure
Contains lessons on:

- Monitoring Azure VMs
- Monitoring SAP HANA on Azure (Large Instances)
- Integrating SAP solutions with Microsoft cloud services

Exam Details

This course helps you to prepare for exam AZ-120

Configuring and Operating Azure Virtual Desktop

Course Code MAZ140
Duration 4 days

Overview

This course teaches Azure administrators how to plan, deliver, and manage virtual desktop experiences and remote apps, for any device, on Azure. Students will learn through a mix of demonstrations and hands-on lab experiences deploying virtual desktop experiences and apps on Windows Virtual Desktop and optimizing them to run in multi-session virtual environments.

Audience

Students for AZ-140: Configuring and Operating Windows Virtual Desktop on Microsoft Azure are interested in delivering applications on Windows Virtual Desktop and optimizing them to run in multi-session virtual environments. As a Windows Virtual Desktop administrator, you will closely with the Azure Administrators and Architects, along with Microsoft 365 Administrators. Windows Virtual Desktop administrator responsibilities include planning, deploying, packaging, updating, and maintaining the Azure Windows Virtual Desktop infrastructure. They also create session host images, implement and manage FSLogix, monitor Windows Virtual Desktop performance, and automate Windows Virtual Desktop management tasks.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Select an appropriate licensing model for Windows Virtual Desktop
- Implement networking for Windows Virtual Desktop
- Manage Windows Virtual Desktop session hosts by using Azure Bastion
- Configure storage for FSLogix components
- Create and manage session host images
- Implement Azure roles and role-based access control (RBAC) for Windows Virtual Desktop
- Configure user Windows Virtual Desktop experience settings
- Install and configure apps on a session host
- Implement business continuity and disaster recovery
- Monitor and manage Windows Virtual Desktop performance

Pre-Requisites

There are no specific pre-requisites for this course.

Course Contents

Module 1: Plan a Windows Virtual Desktop Architecture
In this module, you will learn how to assess existing physical and virtual desktop environments, plan and configure name resolution for Active Directory (AD) and Azure Active Directory Domain Services (Azure AD DS), and plan for Windows Virtual Desktop client deployments.

Lessons M1
- Windows Virtual Desktop Architecture
- Design the WVD architecture
- Design for user identities and profiles

Lab: Prepare for deployment of Azure Windows Virtual Desktop (Azure AD DS)
Lab: Prepare for deployment of Azure Windows Virtual Desktop (AD DS)

After completing module 1, students will be able to:
- Understand Windows Virtual Desktop Components
- Understand personal and pooled desktops
- Recommend an operating system for a WVD implementation
- Plan a host pools architecture

Module 2: Implement a WVD Infrastructure
In this module, you will learn how to manage connectivity to the internet and on-premises networks, create a host pool by using the Azure portal, deploy host pools and hosts by using Azure Resource Manager templates, apply OS and application updates to a running WVD host, and create a master image.

Lessons M2
- Implement and manage networking for WVD
- Implement and manage storage for WVD
- Create and configure host pools and session hosts
- Create and manage session host image

Lab: Create and configure host pools and session hosts (Azure AD DS)
Lab: Deploy host pools and session hosts by using the Azure portal (AD DS)
Lab: Implement and manage storage for WVD (Azure AD DS)
Lab: Deploy host pools and hosts by using Azure Resource Manager templates
Lab: Deploy and manage host pools and hosts by using PowerShell

After completing module 2, students will be able to:
- Implement Azure virtual network connectivity
- Manage connectivity to the internet and on-premises networks
- Understanding Windows Virtual Desktop network connectivity
- Configure WVD session hosts using Azure Bastion
- Configure storage for FSLogix components
- Configure disks and file shares
- Modify a session host image
- Create and use a Shared Image Gallery (SIG)

Module 3: Manage Access and Security
In this module, you will learn how to plan and implement Azure roles and RBAC for WVD, implement Conditional Access policies for connections, plan and implement MFA, and manage security by using Azure Security Center.

Lessons M3
- Manage access
- Manage security

Lab: Configure Conditional Access policies for connections to WVD (AD DS)

After completing module 3, students will be able to:
- Manage local roles, groups and rights assignment on WVD session hosts.
- Configure user restrictions by using AD group policies and Azure AD policies
- Understand Conditional Access policy components
- Prepare for Azure Active Directory (Azure AD)-based Conditional Access for Windows Virtual Desktop
- Implement Azure AD-based Conditional Access for Windows Virtual Desktop

Module 4: Manage User Environments and Apps
In this module, you will learn how to plan for FSLogix, install FSLogix, configure Cloud Cache, deploy an application as a RemoteApp, and implement and manage OneDrive for Business for a multi-session environment.

Lessons M4
- Implement and manage FSLogix
- Configure user experience settings
- Install and configure apps on a session host

Lab: Windows Virtual Desktop profile management (Azure AD DS)
Lab: Windows Virtual Desktop profile management (AD DS)
Lab: Windows Virtual Desktop application packaging (AD DS)

After completing module 4, students will be able to:
- Configure Profile Containers
- Configure Azure Files to store profile containers for WVD in an AAD DS environment
- Implement FSLogix based profiles for Windows Virtual Desktop in Azure AD DS environment
- Implement FSLogix based profiles for Windows Virtual Desktop
- Prepare for and create MSIX app packages
- Implement MSIX app attach container for Windows Virtual Desktop in AD DS environment

Module 5: Monitor and Maintain a WVD Infrastructure
In this module, you will learn how to plan and implement a disaster recovery plan for WVD, configure automation for WVD, implement autoscaling in host pools, and optimize session host capacity and performance.

Lessons M5
- Plan and implement business continuity and disaster recovery
- Automate WVD management tasks
- Monitor and manage performance and health

Lab: Implement autoscaling in host pools (AD DS)

After completing module 5, students will be able to:
- Plan and implement a disaster recovery plan for WVD
- Configure automation for WVD
- Monitor WVD by using Azure Monitor
- Customize Azure Workbooks for WVD monitoring
- Configure autoscaling of Windows Virtual Desktop session hosts
- Verify autoscaling of Windows Virtual Desktop session host

Exam Details
This course is preparation for the Microsoft Exam AZ-140.

Developing Solutions for Microsoft Azure

Course Code MAZ204
Duration 5 days

Overview

This course teaches developers how to create end-to-end solutions in Microsoft Azure. Delegates will learn how to implement Azure compute solutions, create Azure Functions, implement and manage web apps, develop solutions utilizing Azure storage, implement authentication and authorization, and secure their solutions by using KeyVault and Managed Identities. Delegates will also learn how to connect to and consume Azure services and third-party services and include event- and message-based models in their solutions. The course also covers monitoring, troubleshooting, and optimizing Azure solutions.

Audience

Delegates in this course are interested in Azure development or in passing the Microsoft Azure Developer Associate certification exam.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Developing Azure compute solutions.
- Developing for Azure storage.
- Implementing Azure security.
- Monitoring, troubleshooting, and optimizing Azure solutions.
- Connecting to and consuming Azure services and third-party services.

Pre-Requisites

Delegates should have 1-2 years' professional development experience and experience with Microsoft Azure. They must be able to program in an Azure Supported Language.

Course Contents

Module 1: Creating Azure App Service Web Apps
Delegates will learn how to build a web application on the Azure App Service platform. They will learn how the platform functions and how to create, configure, scale, secure, and deploy to the App Service platform.

Lessons
- Azure App Service core concepts
- Creating an Azure App Service Web App
- Configuring and Monitoring App Service apps
- Scaling App Service apps
- Azure App Service staging environments

Module 2: Implement Azure functions
This module covers creating Functions apps, and how to integrate triggers and inputs/outputs into the app.

Lessons
- Azure Functions overview
- Developing Azure Functions
- Implement Durable Functions

Module 3: Develop solutions that use blob storage
Delegates will learn how Azure Blob storage works, how to manage data through the hot/cold/archive blob storage lifecycle, and how to use the Azure Blob storage client library to manage data and metadata.

Lessons
- Azure Blob storage core concepts
- Managing the Azure Blob storage lifecycle
- Working with Azure Blob storage

Module 4: Develop solutions that use Cosmos DB storage
Delegates will learn how Cosmos DB is structured and how data consistency is managed. Delegates will also learn how to create Cosmos DB accounts and create databases, containers, and items by using a mix of the Azure Portal and the .NET SDK.

Lessons
- Azure Cosmos DB overview
- Azure Cosmos DB data structure
- Working with Azure Cosmos DB resources and data

Module 5: Implement IaaS solutions
This module instructs delegates on how to use create VMs and container images to use in their solutions. It covers creating VMs, using ARM templates to automate resource deployment, create and manage Docker images, publishing an image to the Azure Container Registry, and running a container in Azure Container Instances.

Lessons
- Provisioning VMs in Azure
- Create and deploy ARM templates
- Create container images for solutions
- Publish a container image to Azure Container Registry
- Create and run container images in Azure Container Instances

Module 6: Implement user authentication and authorization
Delegates will learn how to leverage the Microsoft Identity Platform v2.0 to manage authentication and access to resources. Delegates will also learn how to use the Microsoft Authentication Library and Microsoft Graph to authenticate a user and retrieve information stored in Azure, and how and when to use Shared Access Signatures.

Lessons
- Microsoft Identity Platform v2.0
- Authentication using the Microsoft Authentication Library
- Using Microsoft Graph
- Authorizing data operations in Azure Storage

Module 7: Implement secure cloud solutions
This module covers how to secure the information (keys, secrets, certificates) an application uses to access resources. It also covers securing application configuration information.

Lessons
- Manage keys, secrets, and certificates by using the KeyVault API
- Implement Managed Identities for Azure resources
- Secure app configuration data by using Azure App Configuration

Module 8: Implement API Management
Delegates will learn how to publish APIs, create policies to manage information shared through the API, and to manage access to their APIs by using the Azure API Management service.

Lessons
- API Management overview
- Defining policies for APIs
- Securing your APIs

Module 9: Develop App Service Logic Apps
This module teaches delegates how to use Azure Logic Apps to schedule, automate, and orchestrate tasks, business processes, workflows, and services across enterprises or organizations.

Lessons
- Azure Logic Apps overview
- Creating custom connectors for Logic Apps

Module 10: Develop event-based solutions
Delegates will learn how to build applications with event-based architectures.

Lessons
- Implement solutions that use Azure Event Grid
- Implement solutions that use Azure Event Hubs
- Implement solutions that use Azure Notification Hubs

Module 11: Develop message-based solutions
Delegates will learn how to build applications with message-based architectures.

Lessons
- Implement solutions that use Azure Service Bus
- Implement solutions that use Azure Queue Storage queues

Module 12: Monitor and optimize Azure solutions
This module teaches delegates how to instrument their code for telemetry and how to analyze and troubleshoot their apps.

Lessons
- Overview of monitoring in Azure
- Instrument an app for monitoring
- Analyzing and troubleshooting apps
- Implement code that handles transient faults

Module 13: Integrate caching and content delivery within solutions
Delegates will learn how to use different caching services to improve the performance of their apps.

Lessons
- Develop for Azure Cache for Redis
- Develop for storage on CDNs

Exam Details
This course leads to the AZ-204 Developing Solutions for Microsoft Azure exam, which will earn you the Microsoft Certified: Azure Developer Associate certification.

Designing Microsoft Azure Infrastructure Solutions

Course Code MAZ305
Duration 4 days

Overview

This course teaches Azure Solution Architects how to design infrastructure solutions. Course topics cover governance, compute, application architecture, storage, data integration, authentication, networks, business continuity, and migrations. The course combines lecture with case studies to demonstrate basic architect design principles.

Audience

Successful students have experience and knowledge in IT operations, including networking, virtualization, identity, security, business continuity, disaster recovery, data platforms, and governance. Students also have experience designing and architecting solutions.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Design a governance solution.
- Design a compute solution.
- Design an application architecture

Pre-Requisites

Before attending this course, students must have previous experience deploying or administering Azure resources and conceptual knowledge of:

- Azure Active Directory
- Azure compute technologies such as VMs, containers and serverless solutions
- Azure virtual networking to include load balancers
- Azure Storage technologies (unstructured and databases)
- General application design concepts such as messaging and high availability

Recommended prerequisites: MAZ104 – Microsoft Azure Administrator

Course Contents

Module 1: Design compute and application solutions
In this module you will learn about governance, compute, and application architectures.

Lessons of Module 1
- Design for governance
- Design for compute solutions
- Design for application architectures

Lab: Case studies of Module 1
- Design a governance solution.
- Design a compute solution.
- Design an application architecture.

Module 2: Design storage solutions
In this module, you will learn about non-relational storage, relational storage, and data integration solutions.

Lessons of Module 2
- Design a non-relational storage solution.
- Design a relational storage solution.
- Design a data integration solution.

Lab: Case studies of Module 2
- Design non-relational storage solutions.
- Design relational storage solutions.
- Design a data integration solution.

Module 3: Design networking and access solutions
In this module you will learn about authentication and authorization, identity and access for applications, and networking solutions.

Lessons of Module 3
- Design authentication and authorization solutions
- Design networking solutions

Lab: Case studies of Module 3
- Design authentication and authorization solutions.
- Design network solutions.

Module 4: Design business continuity solutions

Lessons of Module 4
- Design for backup and disaster recovery
- Design monitoring solutions
- Design for migrations

Lab: Case studies of Module 4
- Design backup and disaster recovery.
- Design monitoring solutions.
- Design for migrations

Exam Details
This course leads to the Microsoft Exam AZ-305

Microsoft Azure DevOps Engineer - Bootcamp

Course Code MAZ400
Duration 5 days

Overview

This course provides the knowledge and skills to design and implement DevOps processes and practices. Delegates will learn how to plan for DevOps, use source control, scale Git for an enterprise, consolidate artifacts, design a dependency management strategy, manage secrets, implement continuous integration, implement a container build strategy, design a release strategy, set up a release management workflow, implement a deployment pattern, and optimize feedback mechanisms.

Audience

Delegates in this course are interested in implementing DevOps processes or in passing the Microsoft Azure DevOps Solutions certification exam.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Planning for the transformation with shared goals and timelines.
- Selecting a project and identifying project metrics and KPIs.
- Creating a team and agile organization structure.
- Describing the benefits of using Source Control.
- Migrating from TFVC to Git.
- Scaling Git for Enterprise DevOps.
- Recommending artifact management tools and practices.
- Abstract common packages to enable sharing and reuse.
- Migrating and consolidating artifacts.
- Migrating and integrating source control measures.
- Managing application config and secrets.
- Developing a project quality strategy.
- Planning for secure development practices and compliance rules.
- Implementing and managing build infrastructure.
- Explaining why continuous integration matters.
- Implementing continuous integration using Azure DevOps.
- Managing code quality including: technical debt, SonarCloud, and other tooling solutions.
- Managing security policies with open source, OWASP, and WhiteSource Bolt.
- Implementing a container strategy including how containers are different from virtual machines and how microservices use containers.
- Implementing containers using Docker.
- Inspecting open source software packages for security and license compliance to align with corporate standards.
- Configuring build pipeline to access package security and license rating.
- Configuring secure access to package feeds.
- Inspecting codebase to identify code dependencies that can be converted to packages.
- Identifying and recommending standardized package types and versions across the solution.
- Refactoring existing build pipelines to implement version strategy that publishes packages.
- Managing security and compliance.
- Differentiating between a release and a deployment.

- Defining the components of a release pipeline.
- Explaining things to consider when designing your release strategy.
- Classifying a release versus a release process and outlining how to control the quality of both.
- Describing the principle of release gates and how to deal with release notes and documentation.
- Explaining deployment patterns, both in the traditional sense and in the modern sense.
- Choosing a release management tool.
- Explaining the terminology used in Azure DevOps and other Release Management Tooling.
- Describing what a Build and Release task is, what it can do, and some available deployment tasks.
- Classifying an Agent, Agent Queue, and Agent Pool.
- Explaining why you sometimes need multiple release jobs in one release pipeline.
- Differentiating between multi-agent and multi-configuration release job.
- Using release variables and stage variables in your release pipeline.
- Deploying to an environment securely using a service connection.
- Embedding testing in the pipeline.
- Listing the different ways to inspect the health of your pipeline and release by using alerts, service hooks, and reports.
- Creating a release gate.
- Describing deployment patterns.
- Implementing Blue Green Deployment.
- Implementing Canary Release.
- Implementing Progressive Exposure Deployment.
- Configuring crash report integration for client applications.
- Developing monitoring and status dashboards.
- Implementing routing for client application crash report data.
- Implementing tools to track system usage, feature usage, and flow.
- Integrating and configuring ticketing systems with development team's work management.
- Implementing a mobile DevOps strategy.
- Applying infrastructure and configuration as code principles.
- Deploying and managing infrastructure using Microsoft automation technologies such as ARM templates, PowerShell, and Azure CLI.
- Describing deployment models and services that are available with Azure.
- Deploying and configuring a Managed Kubernetes cluster.
- Deploying and configuring infrastructure using 3rd party tools and services with Azure, such as Chef, Puppet, Ansible, SaltStack, and Terraform.
- Defining an infrastructure and configuration strategy and appropriate toolset for a release pipeline and application infrastructure.
- Implementing compliance and security in your application infrastructure.
- Designing practices to measure end-user satisfaction.
- Designing processes to capture and analyze user feedback from external sources.
- Designing routing for client application crash report data.
- Recommending monitoring tools and technologies.
- Recommending system and feature usage tracking tools.
- Analyzing alerts to establish a baseline.
- Analyzing telemetry to establish a baseline.
- Performing live site reviews and capturing feedback for system outages.
- Performing ongoing tuning to reduce meaningless or non-actionable alerts.

Pre-Requisites

Fundamental knowledge about Azure, version control, Agile software development, and core software development principles. It would be helpful to have experience in an organization that delivers software.

Course Contents

Module 1: Planning for DevOps

- Transformation Planning
- Project Selection
- Team Structures
- Migrating to Azure DevOps

Lab: Agile Planning and Portfolio Management with Azure Boards

After completing this module, delegates will be able to:

- Plan for the transformation with shared goals and timelines.
- Select a project and identify project metrics and KPIs.
- Create a team and agile organizational structure.
- Design a tool integration strategy.
- Design a license management strategy (e.g. VSTS users).
- Design a strategy for end-to-end traceability from work items to working software.
- Design an authentication and access strategy.
- Design a strategy for integrating on-premises and cloud resources.

Module 2: Getting started with Source Control

- What is Source Control
- Benefits of Source Control
- Types of Source Control Systems
- Introduction to Azure Repos
- Introduction to GitHub
- Migrating from Team Foundation Version Control (TFVC) to Git in Azure Repos
- Authenticating to Git in Azure Repos

Lab: Version Controlling with Git

After completing this module, delegates will be able to:

- Describe the benefits of using Source Control.
- Describe Azure Repos and GitHub.
- Migrate from TFVC to Git.

Module 3: Scaling Git for enterprise DevOps

- How to Structure your Git Repo
- Git Branching Workflows
- Collaborating with Pull Requests in Azure Repos
- Why care about GitHooks
- Fostering Inner Source

Lab: Code Review with Pull Requests

After completing this module, delegates will be able to:

- Explain how to structure Git repos.
- Describe Git branching workflows.
- Leverage pull requests for collaboration and code reviews.
- Leverage Git hooks for automation.
- Use git to foster inner source across the organization.

Module 4: Consolidating Artifacts & Designing a Dependency Management Strategy

- Packaging Dependencies
- Package Management
- Migrating and Consolidating Artifacts

Lab: Updating Packages

After completing this module, delegates will be able to:

- Recommend artifact management tools and practices.
- Abstract common packages to enable sharing and reuse.
- Migrate and consolidate artifacts.
- Migrate and integrate source control measures.

Module 5: Implementing Continuous Integration with Azure Pipelines

- The concept of pipelines in DevOps
- Azure Pipelines
- Evaluate use of Hosted vs Private Agents
- Agent Pools
- Pipelines and Concurrency
- Azure DevOps and Open Source Projects (Public Projects)
- Azure Pipelines YAML vs Visual Designer
- Continuous Integration Overview
- Implementing a Build Strategy
- Integration with Azure Pipelines
- Integrate External Source Control with Azure Pipelines
- Set Up Private Agents
- Analyze and Integrate Docker Multi-Stage Builds

Labs

- Enabling Continuous Integration with Azure Pipelines
- Integrating External Source Control with Azure Pipelines

After completing this module, delegates will be able to:

- Implement and manage build infrastructure.
- Explain why continuous integration matters.
- Implement continuous integration using Azure DevOps.

Module 6: Managing Application Config and Secrets

- Introduction to Security
- Implement secure and compliant development process
- Rethinking application config data
- Manage secrets, tokens, and certificates
- Implement tools for managing security and compliance in a pipeline

Lab: Integrating Azure Key Vault with Azure DevOps

After completing this module, delegates will be able to:

- Manage application config and secrets.
- Implement tools for managing security and compliance in pipeline.

Module 7: Managing Code Quality and Security Policies

- Managing Code Quality
- Managing Security Policies

Lab: Managing Technical Debt with Azure DevOps and SonarCloud

After completing this module, delegates will be able to:

- Manage code quality including: technical debt SonarCloud, and other tooling solutions.
- Manage security policies with open source and OWASP.

Module 8: Implementing a Container Build Strategy

- Implementing a Container Build Strategy

Lab: Modernizing Existing ASP.NET Apps with Azure

After completing this module, delegates will be able to:

- Implement a container strategy including how containers are different from virtual machines and how microservices use containers.
- Implement containers using Docker.

Module 9: Manage Artifact versioning, security & compliance

- Package security
- Open source software
- Integrating license and vulnerability scans
- Implement a versioning strategy

Lab: Manage Open Source Security and License with WhiteSource

After completing this module, delegates will be able to:

- Inspect open source software packages for security and license compliance to align with corporate standards.
- Configure build pipeline to access package security and license rating.
- Configure secure access to package feeds.
- Inspect codebase to identify code dependencies that can be converted to packages.
- Identify and recommend standardized package types and versions across the solution.
- Refactor existing build pipelines to implement version strategy that publishes packages.
- Manage security and compliance.

Module 10: Design a Release Strategy

- Introduction to Continuous Delivery
- Release strategy recommendations
- Building a High-Quality Release pipeline
- Choosing a deployment pattern
- Choosing the right release management tool

After completing this module, delegates will be able to:

- Differentiate between a release and a deployment.
- Define the components of a release pipeline.
- Explain things to consider when designing your release strategy.
- Classify a release versus a release process and outline how to control the quality of both.
- Describe the principle of release gates and how to deal with release notes and documentation.
- Explain deployment patterns, both in the traditional sense and in the modern sense.
- Choose a release management tool.

Module 11: Set up a Release Management Workflow

- Create a Release Pipeline
- Provision and Configure Environments
- Manage and Modularize Tasks and Templates
- Integrate Secrets with the release pipeline
- Configure Automated Integration and Functional Test Automation
- Automate Inspection of Health

Labs

- Configuring Pipelines as Code with YAML
- Setting up secrets in the pipeline with Azure Key vault
- Setting up and Running Functional Tests
- Using Azure Monitor as release gate
- Creating a release Dashboard

After completing this module, delegates will be able to:

- Explain the terminology used in Azure DevOps and other Release Management Tooling.
- Describe what a Build and Release task is, what it can do, and some available deployment tasks.
- Classify an Agent, Agent Queue, and Agent Pool.
- Explain why you sometimes need multiple release jobs in one release pipeline.
- Differentiate between multi-agent and multi-configuration release job.
- Use release variables and stage variables in your release pipeline.
- Deploy to an environment securely using a service connection.
- Embed testing in the pipeline.
- List the different ways to inspect the health of your pipeline and release by using alerts, service hooks, and reports.
- Create a release gate.

Module 12: Implement an appropriate deployment pattern

- Introduction to Deployment Patterns
- Implement Blue Green Deployment
- Feature Toggles
- Canary Releases
- Dark Launching
- AB Testing
- Progressive Exposure Deployment

Lab: Feature Flag Management with Launch Darkly and Azure DevOps

After completing this module, delegates will be able to:

- Describe deployment patterns.
- Implement Blue Green Deployment.
- Implement Canary Release.
- Implement Progressive Exposure Deployment.

Module 13: Implement process for routing system feedback to development teams

- Implement Tools to Track System Usage, Feature Usage, and Flow
- Implement Routing for Mobile Application Crash Report Data
- Develop Monitoring and Status Dashboards
- Integrate and Configure Ticketing Systems

Lab: Monitoring Application Performance

After completing this module, delegates will be able to:

- Configure crash report integration for client applications.
- Develop monitoring and status dashboards.
- Implement routing for client application crash report data.
- Implement tools to track system usage, feature usage, and flow.
- Integrate and configure ticketing systems with development team's work management.

Module 14: Infrastructure and Configuration Azure Tools

- Infrastructure as Code and Configuration Management
- Create Azure Resources using ARM Templates
- Create Azure Resources using Azure CLI
- Create Azure Resources by using Azure PowerShell
- Desired State Configuration (DSC)
- Azure Automation with DevOps
- Additional Automation Tools

Lab: Azure Deployments using Resource Manager Templates

After completing this module, delegates will be able to:

- Apply infrastructure and configuration as code principles.
- Deploy and manage infrastructure using Microsoft automation technologies such as ARM templates, PowerShell, and Azure CLI.

Module 15: Azure Deployment Models and Services

- Deployment Modules and Options
- Azure Infrastructure-as-a-Service (IaaS) Services
- Azure Platform-as-a-Service (PaaS) services
- Serverless and HPC Computer Services
- Azure Service Fabric

Lab: Deploying a Dockerized Java app to Azure Web App for Containers

After completing this module, delegates will be able to:

- Describe deployment models and services that are available with Azure.

Module 16: Create and Manage Kubernetes Service Infrastructure

- Azure Kubernetes Service

Lab: Deploying a multi-container application to Azure Kubernetes Service

After completing this module, delegates will be able to:

- Deploy and configure a Managed Kubernetes cluster.

Module 17: Third Party Infrastructure as Code Tools available with Azure

- Chef
- Puppet
- Ansible
- Terraform

Labs

- Infrastructure as Code
- Automating Your Infrastructure Deployments in the Cloud with Terraform and Azure Pipelines

After completing this module, delegates will be able to:

- Deploy and configure infrastructure using 3rd party tools and services with Azure, such as Chef, Puppet, Ansible, and Terraform.

Module 18: Implement Compliance and Security in your Infrastructure

- Security and Compliance Principles with DevOps
- Azure security Center

Lab: Implement Security and Compliance in an Azure DevOps Pipeline

After completing this module, delegates will be able to:

- Define an infrastructure and configuration strategy and appropriate toolset for a release pipeline and application infrastructure.
- Implement compliance and security in your application infrastructure.

Module 19: Recommend and design system feedback mechanisms

- The inner loop
- Continuous Experimentation mindset
- Design practices to measure end-user satisfaction
- Design processes to capture and analyze user feedback
- Design process to automate application analytics

Lab: Integration between Azure DevOps and Teams

After completing this module, delegates will be able to:

- Design practices to measure end-user satisfaction.
- Design processes to capture and analyze user feedback from external sources.
- Design routing for client application crash report data.
- Recommend monitoring tools and technologies.
- Recommend system and feature usage tracking tools.

Module 20: Optimize feedback mechanisms

- Site Reliability Engineering
- Analyze telemetry to establish a baseline
- Perform ongoing tuning to reduce meaningless or non-actionable alerts
- Analyze alerts to establish a baseline
- Blameless Retrospectives and a Just Culture

After completing this module, delegates will be able to:

- Analyze alerts to establish a baseline.
- Analyze telemetry to establish a baseline.
- Perform live site reviews and capture feedback for system outages.
- Perform ongoing tuning to reduce meaningless or non-actionable alerts.

Exam Details

This course leads to the AZ-400 Designing and Implementing Microsoft DevOps Solutions exam, which will earn you the Microsoft Certified: DevOps Engineer Expert certification.

Microsoft Azure Security Technologies

Course Code MAZ500
Duration 4 days

Overview

This course provides IT Security Professionals with the knowledge and skills needed to implement security controls, maintain an organization's security posture, and identify and remediate security vulnerabilities. This course includes security for identity and access, platform protection, data and applications, and security operations.

Audience

This course is for Azure Security Engineers who are planning to take the associated certification exam, or who are performing security tasks in their day-to-day job. This course would also be helpful to an engineer that wants to specialize in providing security for Azure-based digital platforms and play an integral role in protecting an organization's data.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Implementing enterprise governance strategies including role-based access control, Azure policies, and resource locks.
- Implementing an Azure AD infrastructure including users, groups, and multi-factor authentication.
- Implementing Azure AD Identity Protection including risk policies, conditional access, and access reviews.
- Implementing Azure AD Privileged Identity Management including Azure AD roles and Azure resources.
- Implementing Azure AD Connect including authentication methods and on-premises directory synchronization.
- Implementing perimeter security strategies including Azure Firewall.
- Implementing network security strategies including Network Security Groups and Application Security Groups.
- Implementing host security strategies including endpoint protection, remote access management, update management, and disk encryption.
- Implementing container security strategies including Azure Container Instances, Azure Container Registry, and Azure Kubernetes.
- Implementing Azure Key Vault including certificates, keys, and secretes.
- Implementing application security strategies including app registration, managed identities, and service endpoints.
- Implementing storage security strategies including shared access signatures, blob retention policies, and Azure Files authentication.
- Implementing database security strategies including authentication, data classification, dynamic data masking, and always encrypted.
- Implementing Azure Monitor including connected sources, log analytics, and alerts.
- Implementing Azure Security Center including policies, recommendations, and just in time virtual machine access.
- Implementing Azure Sentinel including workbooks, incidents, and playbooks.

Pre-Requisites

Successful learners will have prior knowledge and understanding of:

- Security best practices and industry security requirements such as defense in depth, least privileged access, role-based access control, multi-factor authentication, shared responsibility, and zero trust model.
- Be familiar with security protocols such as Virtual Private Networks (VPN), Internet Security Protocol (IPSec), Secure Socket Layer (SSL), disk and data encryption methods.
- Have some experience deploying Azure workloads. This course does not cover the basics of Azure administration, instead the course content builds on that knowledge by adding security specific information.
- Have experience with Windows and Linux operating systems and scripting languages. Course labs may use PowerShell and the CLI.

Course Contents

Module 1: Manage Identity and Access

This module covers Azure Active Directory, Azure Identity Protection, Enterprise Governance, Azure AD PIM, and Hybrid Identity.

Lessons

- Azure Active Directory
- Azure Identity Protection
- Enterprise Governance
- Azure AD Privileged Identity Management
- Hybrid Identity

Labs

- Role-Based Access Control
- Azure Policy
- Resource Manager Locks
- MFA, Conditional Access and AAD Identity Protection
- Azure AD Privileged Identity Management
- Implement Directory Synchronization

After completing this module, delegates will be able to:

- Implement enterprise governance strategies including role-based access control, Azure policies, and resource locks.
- Implement an Azure AD infrastructure including users, groups, and multi-factor authentication.
- Implement Azure AD Identity Protection including risk policies, conditional access, and access reviews.
- Implement Azure AD Privileged Identity Management including Azure AD roles and Azure resources.
- Implement Azure AD Connect including authentication methods and on-premises directory synchronization.

Module 2: Implement Platform Protection
This module covers perimeter, network, host, and container security.

Lessons
- Perimeter Security
- Network Security
- Host Security
- Container Security

Labs
- Network Security Groups and Application Security Groups
- Azure Firewall
- Configuring and Securing ACR and AKS

After completing this module, delegates will be able to:
- Implement perimeter security strategies including Azure Firewall.
- Implement network security strategies including Network Security Groups and Application Security Groups.
- Implement host security strategies including endpoint protection, remote access management, update management, and disk encryption.
- Implement container security strategies including Azure Container Instances, Azure Container Registry, and Azure Kubernetes.

Module 3: Secure Data and Applications
This module covers Azure Key Vault, application security, storage security, and SQL database security.

Lessons
- Azure Key Vault
- Application Security
- Storage Security
- SQL Database Security

Labs
- Key Vault (Implementing Secure Data by setting up Always Encrypted)
- Securing Azure SQL Database
- Service Endpoints and Securing Storage

After completing this module, delegates will be able to:
- Implement Azure Key Vault including certificates, keys, and secretes.
- Implement application security strategies including app registration, managed identities, and service endpoints.
- Implement storage security strategies including shared access signatures, blob retention policies, and Azure Files authentication.
- Implement database security strategies including authentication, data classification, dynamic data masking, and always encrypted.

Module 4: Manage Security Operations
This module covers Azure Monitor, Azure Security Center, and Azure Sentinel.

Lessons
- Azure Monitor
- Azure Security Center
- Azure Sentinel

Labs
- Azure Monitor
- Azure Security Center
- Azure Sentinel

After completing this module, delegates will be able to:
- Implement Azure Monitor including connected sources, log analytics, and alerts.
- Implement Azure Security Center including policies, recommendations, and just in time virtual machine access.
- Implement Azure Sentinel including workbooks, incidents, and playbooks.

Exam Details
This course leads to the AZ-500 exam, which will earn you the Microsoft Azure Security Engineer Associate certification.

Designing and Implementing Microsoft Azure Networking Solutions

Course Code	MAZ700
Duration	3 days

Overview

This course teaches Network Engineers how to design, implement, and maintain Azure networking solutions. This course covers the process of designing, implementing, and managing core Azure networking infrastructure, Hybrid Networking connections, load balancing traffic, network routing, private access to Azure services, network security and monitoring. Learn how to design and implement a secure, reliable, network infrastructure in Azure and how to establish hybrid connectivity, routing, private access to Azure services, and monitoring in Azure.

Audience

This course is aimed at Network Engineers looking to specialize in Azure networking solutions. An Azure Network engineer designs and implements core Azure networking infrastructure, hybrid networking connections, load balance traffic, network routing, private access to Azure services, network security and monitoring. The azure network engineer will manage networking solutions for optimal performance, resiliency, scale, and security.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Understanding of on-premises virtualization technologies, including: VMs, virtual networking, and virtual hard disks.
- Understanding of network configurations, including TCP/IP, Domain Name System (DNS), virtual private networks (VPNs), firewalls, and encryption technologies.
- Understanding of software defined networking.
- Understanding hybrid network connectivity methods, such as VPN.
- Understanding resilience and disaster recovery, including high availability and restore operations

Pre-Requisites

Successful Azure Network Engineers start this role with experience in enterprise networking, on-premises or cloud infrastructure and network security.

Course Contents

Module 1: Azure Virtual Networks
In this module you will learn how to design and implement fundamental Azure Networking resources such as virtual networks, public and private IPs, DNS, virtual network peering, routing, and Azure Virtual NAT.

- Azure Virtual Networks
- Public IP Services
- Public and Private DNS
- Cross-VNet connectivity
- Virtual Network Routing
- Azure virtual Network NAT

Lab 1: Design and implement a Virtual Network in Azure
Lab 2: Configure DNS settings in Azure
Lab 3: Connect Virtual Networks with Peering

After completing module 1, students will be able to:
- Implement virtual networks
- Configure public IP services
- Configure private and public DNS zones
- Design and implement cross-VNET connectivity
- Implement virtual network routing
- Design and implement an Azure Virtual Network NAT

Module 2: Design and Implement Hybrid Networking
In this module you will learn how to design and implement hybrid networking solutions such as Site-to-Site VPN connections, Point-to-Site VPN connections, Azure Virtual WAN and Virtual WAN hubs.

- Site-to-site VPN connection
- Point-to-Site VP connections
- Azure Virtual WAN

Lab 4: Create and configure a local gateway
- Create and configure a virtual network gateway
- Create a Virtual WAN by using Azure Portal
- Design and implement a site-to-site VPN connection
- Design and implement a point-to-site VPN connection
- Design and implement authentication
- Design and implement Azure Virtual WAN Resources

Module 3: Design and Implement Azure ExpressRoute
In this module you will learn how to design and implement Azure ExpressRoute, ExpressRoute Global Reach, ExpressRoute FastPath and ExpressRoute Peering options.

- ExpressRoute
- ExpressRoute Direct
- ExpressRoute FastPath
- ExpressRoute Peering

Lab 5: Create and configure ExpressRoute
- Design and implement Expressroute
- Design and implement Expressroute Direct
- Design and implement Expressroute FastPath

Module 4: Load Balancing non-HTTP(S) Traffic in Azure
In this module you will learn how to design and implement load balancing solutions for non-HTTP(S) traffic in Azure with Azure Load balancer and Traffic Manager.

- Content Delivery and Load Balancing
- Azure Load balancer
- Azure Traffic Manager
- Azure Monitor
- Network Watcher

Lab 6: Create and configure a public load balancer to load balance VMs using the Azure portal
Lab:7 Create a Traffic Manager Profile using the Azure portal
Lab 8: Create, view, and manage metric alerts in Azure Monitor

- Design and implement Azure Load Balancers
- Design and implement Azure Traffic Manager
- Monitor Networks with Azure Monitor
- Use Network Watcher

Module 5: Load Balancing HTTP(S) Traffic in Azure
In this module you will learn how to design and implement load balancing solutions for HTTP(S) traffic in Azure with Azure Application gateway and Azure Front Door.

- Azure Application Gateway
- Azure Front Door

Lab 9: Create a Front Door for a highly available web application using the Azure portal
Lab 10: Create and Configure an Application Gateway

- Design and implement Azure Application Gateway
- Implement Azure Front Door

Module 6: Design and Implement Network Security
In this module you will learn to design and imponent network security solutions such as Azure DDoS, Azure Firewalls, Network Security Groups, and Web Application Firewall.

- Azure DDoS Protection
- Azure Firewall
- Network Security Groups
- Web Application Firewall on Azure Front Door

Lab 11: Create a Virtual Network with DDoS protection plan
Lab 12: Deploy and Configure Azure Firewall
Lab 13: Create a Web Application Firewall policy on Azure Front Door

- Configure and monitor an Azure DDoS protection plan
- implement and manage Azure Firewall
- Implement network security groups
- Implement a web application firewall (WAF) on Azure Front Door

Module 7: Design and Implement Private Access to Azure Services
In this module you will learn to design and implement private access to Azure Services with Azure Private Link, and virtual network service endpoints.

- Define Azure Private Link and private endpoints
- Design and Configure Private Endpoints
- Integrate a Private Link with DNS and on-premises clients
- Create, configure, and provide access to Service Endpoints
- Configure VNET integration for App Service

Lab 14: restrict network access to PaaS resources with virtual network service endpoints
Lab 15: create an Azure private endpoint

- Define the difference between Private Link Service and private endpoints
- Design and configure private endpoints
- Explain virtual network service endpoints
- Design and configure access to service endpoints
- Integrate Private Link with DNS
- Integrate your App Service with Azure virtual networks

Exam Details

This course helps you prepare for the Microsoft Exam AZ-700

Microsoft Azure Fundamentals (2-day)

Course Code MAZ900
Duration 2 days

Overview

This 2-day course is identical to the 1-day MAZ900-01 course. However, this course lasts two days because of the hands-on parts. This course will prepare students for the same exam AZ-900.

This course will provide foundational level knowledge of cloud services and how those services are provided with Microsoft Azure. The course can be taken as an optional first step in learning about cloud services and Microsoft Azure, before taking further Microsoft Azure or Microsoft cloud services courses.

The course will cover general cloud computing concepts as well as general cloud computing models and services such as Public, Private and Hybrid cloud and Infrastructure-as-a-Service (IaaS), Platform-as-a-Service(PaaS) and Software-as-a-Service (SaaS).

It will also cover some core Azure services and solutions, as well as key Azure pillar services concerning security, privacy, compliance and trust. It will finally cover pricing and support services available with Azure.

Audience

This course is suitable for program managers and technical sales, with a general IT background. These delegates want to learn about our offerings, see how components are implemented, and ask questions about products and features. This course will help prepare someone for the AZ-900 exam.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Understand general cloud computing concepts
- Understand core services available with Microsoft Azure
- Understand security, privacy, compliance and trust with Microsoft Azure
- Understand pricing and support models available with Microsoft

Pre-Requisites

There are no pre-requisites for taking this course. Technical IT experience is not required however some general IT knowledge or experience would be beneficial.

Course Contents

Module 1: Cloud Concepts
In this module you will learn basic cloud concepts.

- Learning Objectives
- Why Cloud Services?
- Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS)
- Public, Private, and Hybrid cloud models

After completing module 1, students will be able:

- Understand general cloud computing concepts

Module 2: Core Azure Services
In this module you will learn the basics core services available with Microsoft Azure.

- Core Azure architectural components
- Core Azure Services and Products
- Azure Solutions
- Azure management tools

After completing module 2, students will be able:

- Understand core services available with Microsoft Azure

Module 3: Security, Privacy, Compliance and Trust
In this module, you learn about security, privacy, compliance, and trust with Microsoft Azure.

- Securing network connectivity in Azure
- Core Azure Identity services
- Security tools and features
- Azure governance methodologies
- Monitoring and Reporting in Azure
- Privacy, Compliance and Data Protection standards in Azure

After completing module 3, students will be able:

- Understand security, privacy, compliance and trust with Microsoft Azure

Module 4: Azure Pricing and Support
In this module, you will focus on pricing and support models available with Microsoft.

- Azure subscriptions
- Planning and managing costs
- Support options available with Azure
- Service lifecycle in Azure

After completing module 4, students will be able:

- Understand pricing and support models available with Microsoft

Exam Details

This course leads to the AZ-900 Microsoft Azure Fundamentals exam, which will earn you the Microsoft Certified: Azure Fundamentals certification.

Microsoft Azure Fundamentals (1-day)

Course Code MAZ900-01
Duration 1 day

Overview

This one-day course will provide foundational level knowledge on Azure concepts; core Azure services; core solutions and management tools; general security and network security; governance, privacy, and compliance features; Azure cost management and service level agreements.

Note: This course does not provide an Azure pass or time for delegates to participate in hands-on labs. If you are interested in a more interactive hands-on lab experience, consider our MAZ900: Microsoft Azure Fundamentals (2-day) course, which includes trainer-directed hands-on labs. The content for both courses align to the AZ-900 exam objective domain.

Audience

The audience for this course should be people involved in selling or buying cloud products, or people that have never seen cloud before. This isn't a technical course and has no, official, hands-on exercises.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Understand general cloud computing concepts
- Understand core services available with Microsoft Azure
- Understand security, privacy, compliance and trust with Microsoft Azure
- Understand pricing and support models available with Microsoft

Pre-Requisites

There are no pre-requisites for taking this course. Technical IT experience is not required however some general IT knowledge or experience would be beneficial.

Course Contents

Module 1: Cloud Concepts
In this module you will learn basic cloud concepts.

Lessons for module 1
- Learning Objectives
- Why Cloud Services?
- Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS)
- Public, Private, and Hybrid cloud models

After completing module 1, students will be able:
- Understand general cloud computing concepts

Module 2: Core Azure Services
In this module you will learn the basics core services available with Microsoft Azure.

Lessons for module 2
- Core Azure architectural components
- Core Azure Services and Products
- Azure Solutions
- Azure management tools

After completing module 2, students will be able:
- Understand core services available with Microsoft Azure

Module 3: Security, Privacy, Compliance and Trust
In this module, you learn about security, privacy, compliance, and trust with Microsoft Azure.

Lessons for module 3
- Securing network connectivity in Azure
- Core Azure Identity services
- Security tools and features
- Azure governance methodologies
- Monitoring and Reporting in Azure
- Privacy, Compliance and Data Protection standards in Azure

After completing module 3, students will be able:
- Understand security, privacy, compliance and trust with Microsoft Azure

Module 4: Azure Pricing and Support
In this module, you will focus on pricing and support models available with Microsoft.

Lessons for module 4
- Azure subscriptions
- Planning and managing costs
- Support options available with Azure
- Service lifecycle in Azure

After completing module 4, students will be able:
- Understand pricing and support models available with Microsoft

Exam Details
This course leads to the AZ-900 Microsoft Azure Fundamentals exam, which will earn you the Microsoft Certified: Azure Fundamentals certification.

Designing and Implementing a Data Science Solution on Azure

Course Code	MDP100
Duration	3 days

Overview

Learn how to operate machine learning solutions at cloud scale using Azure Machine Learning. This course teaches you to leverage your existing knowledge of Python and machine learning to manage data ingestion and preparation, model training and deployment, and machine learning solution monitoring in Microsoft Azure.

Audience

This course is designed for data scientists with existing knowledge of Python and machine learning frameworks like Scikit-Learn, PyTorch, and Tensorflow, who want to build and operate machine learning solutions in the cloud.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Setting up an Azure Machine Learning workspace.
- Running experiments and train models.
- Optimizing and manage models.
- Deploying and consuming models.

Pre-Requisites

Successful Azure Data Scientists start this role with a fundamental knowledge of cloud computing concepts, and experience in general data science and machine learning tools and techniques.

Specifically:

- Creating cloud resources in Microsoft Azure.
- Using Python to explore and visualize data.
- Training and validating machine learning models using common frameworks like Scikit-Learn, PyTorch, and TensorFlow.
- Working with containers

Course Contents

Module 1: Getting Started with Azure Machine Learning
In this module, you will learn how to provision an Azure Machine Learning workspace and use it to manage machine learning assets such as data, compute, model training code, logged metrics, and trained models. You will learn how to use the web-based Azure Machine Learning studio interface as well as the Azure Machine Learning SDK and developer tools like Visual Studio Code and Jupyter Notebooks to work with the assets in your workspace.

Lessons
- Introduction to Azure Machine Learning
- Working with Azure Machine Learning

Lab: Create an Azure Machine Learning Workspace

After completing this module, you will be able to:
- Provision an Azure Machine Learning workspace.
- Use tools and code to work with Azure Machine Learning.

Module 2: No-Code Machine Learning
This module introduces the Automated Machine Learning and Designer visual tools, which you can use to train, evaluate, and deploy machine learning models without writing any code.

Lessons
- Automated Machine Learning
- Azure Machine Learning Designer

Labs
- Use Automated Machine Learning
- Use Azure Machine Learning Designer

After completing this module, you will be able to:
- Use automated machine learning to train a machine learning model.
- Use Azure Machine Learning designer to train a model.

Module 3: Running Experiments and Training Models
In this module, you will get started with experiments that encapsulate data processing and model training code and use them to train machine learning models.

Lessons
- Introduction to Experiments
- Training and Registering Models

Labs
- Run Experiments
- Train Models

After completing this module, you will be able to:
- Run code-based experiments in an Azure Machine Learning workspace.
- Train and register machine learning models.

Module 4: Working with Data
Data is a fundamental element in any machine learning workload, so in this module, you will learn how to create and manage datastores and datasets in an Azure Machine Learning workspace, and how to use them in model training experiments.

Lessons
- Working with Datastores
- Working with Datasets

Lab: Work with Data

After completing this module, you will be able to:
- Create and use datastores.
- Create and use datasets.

Module 5: Working with Compute
One of the key benefits of the cloud is the ability to leverage compute resources on demand and use them to scale machine learning processes to an extent that would be infeasible on your own hardware. In this module, you'll learn how to manage experiment environments that ensure consistent runtime consistency for experiments, and how to create and use compute targets for experiment runs.

Lessons
- Working with Environments
- Working with Compute Targets

Lab: Work with Compute

After completing this module, you will be able to:
- Create and use environments.
- Create and use compute targets.

Module 6: Orchestrating Operations with Pipelines
Now that you understand the basics of running workloads as experiments that leverage data assets and compute resources, it's time to learn how to orchestrate these workloads as pipelines of connected steps. Pipelines are key to implementing an effective Machine Learning Operationalization (ML Ops) solution in Azure, so you'll explore how to define and run them in this module.

Lessons
- Introduction to Pipelines
- Publishing and Running Pipelines

Lab: Create a Pipeline

After completing this module, you will be able to:
- Create pipelines to automate machine learning workflows.
- Publish and run pipeline services.

Module 7: Deploying and Consuming Models
Models are designed to help decision making through predictions, so they're only useful when deployed and available for an application to consume. In this module learn how to deploy models for real-time inferencing, and for batch inferencing.

Lessons
- Real-time Inferencing
- Batch Inferencing
- Continuous Integration and Delivery

Labs
- Create a Real-time Inferencing Service
- Create a Batch Inferencing Service

After completing this module, you will be able to:
- Publish a model as a real-time inference service.
- Publish a model as a batch inference service.
- Describe techniques to implement continuous integration and delivery.

Module 8: Training Optimal Models
By this stage of the course, you've learned the end-to-end process for training, deploying, and consuming machine learning models; but how do you ensure your model produces the best predictive outputs for your data? In this module, you'll explore how you can use hyperparameter tuning and automated machine learning to take advantage of cloud-scale compute and find the best model for your data.

Lessons
- Hyperparameter Tuning
- Automated Machine Learning

Labs
- Tune Hyperparameters
- Use Automated Machine Learning from the SDK

After completing this module, you will be able to:
- Optimize hyperparameters for model training.
- Use automated machine learning to find the optimal model for your data.

Module 9: Responsible Machine Learning
Data scientists have a duty to ensure they analyze data and train machine learning models responsibly, respecting individual privacy, mitigating bias, and ensuring transparency. This module explores some considerations and techniques for applying responsible machine learning principles.

Lessons
- Differential Privacy
- Model Interpretability
- Fairness

Labs
- Explore Differential privacy
- Interpret Models
- Detect and Mitigate Unfairness

After completing this module, you will be able to:
- Apply differential privacy to data analysis
- Use explainers to interpret machine learning models
- Evaluate models for fairness

Module 10: Monitoring Models
After a model has been deployed, it's important to understand how the model is being used in production, and to detect any degradation in its effectiveness due to data drift. This module describes techniques for monitoring models and their data.

Lessons
- Monitoring Models with Application Insights
- Monitoring Data Drift

Labs
- Monitor a Model with Application Insights
- Monitor Data Drift

After completing this module, you will be able to:
- Use Application Insights to monitor a published model.
- Monitor data drift.

Exam Details
This course leads to the DP-100 Designing and Implementing a Data Science Solution on Azure exam, which will earn you the Microsoft Certified: Azure Data Science Associate certification.

Data Engineering on Microsoft Azure

Course Code	MDP203
Duration	4 days

Overview

In this course, the student will learn about the data engineering patterns and practices as it pertains to working with batch and real-time analytical solutions using Azure data platform technologies. Students will begin by understanding the core compute and storage technologies that are used to build an analytical solution. They will then explore how to design an analytical serving layers and focus on data engineering considerations for working with source files. The students will learn how to interactively explore data stored in files in a data lake.

They will learn the various ingestion techniques that can be used to load data using the Apache Spark capability found in Azure Synapse Analytics or Azure Databricks, or how to ingest using Azure Data Factory or Azure Synapse pipelines. The students will also learn the various ways they can transform the data using the same technologies that is used to ingest data. The student will spend time on the course learning how to monitor and analyze the performance of analytical system so that they can optimize the performance of data loads, or queries that are issued against the systems. They will understand the importance of implementing security to ensure that the data is protected at rest or in transit. The student will then show how the data in an analytical system can be used to create dashboards or build predictive models in Azure Synapse Analytics.

Audience

The primary audience for this course is data professionals, data architects, and business intelligence professionals who want to learn about data engineering and building analytical solutions using data platform technologies that exist on Microsoft Azure. The secondary audience for this course data analysts and data scientists who work with analytical solutions built on Microsoft Azure.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Explore compute and storage options for data engineering workloads in Azure
- Design and Implement the serving layer
- Understand data engineering considerations
- Run interactive queries using serverless SQL pools
- Explore, transform, and load data into the Data Warehouse using Apache Spark
- Perform data Exploration and Transformation in Azure Databricks
- Ingest and load Data into the Data Warehouse
- Transform Data with Azure Data Factory or Azure Synapse Pipelines
- Integrate Data from Notebooks with Azure Data Factory or Azure Synapse Pipelines
- Optimize Query Performance with Dedicated SQL Pools in Azure Synapse
- Analyze and Optimize Data Warehouse Storage
- Support Hybrid Transactional Analytical Processing (HTAP) with Azure Synapse Link
- Perform end-to-end security with Azure Synapse Analytics
- Perform real-time Stream Processing with Stream Analytics
- Create a Stream Processing Solution with Event Hubs and Azure Databricks
- Build reports using Power BI integration with Azure Synpase Analytics
- Perform Integrated Machine Learning Processes in Azure Synapse Analytics

Pre-Requisites

Successful students start this course with knowledge of cloud computing and core data concepts and professional experience with data solutions.

Recommended prerequisites:

- M-DP900 - Microsoft Azure Data Fundamentals
- M-AZ900 - Microsoft Azure Fundamentals (Includes Labs)

Course Contents

Module 1: Explore Compute and Storage Options for Data Engineering Workloads

This module provides an overview of the Azure compute and storage technology options that are available to data engineers building analytical workloads. This module teaches ways to structure the data lake, and to optimize the files for exploration, streaming, and batch workloads. The student will learn how to organize the data lake into levels of data refinement as they transform files through batch and stream processing. Then they will learn how to create indexes on their datasets, such as CSV, JSON, and Parquet files, and use them for potential query and workload acceleration.

Lessons M1

- Introduction to Azure Synapse Analytics
- Describe Azure Databricks
- Introduction to Azure Data Lake storage
- Describe Delta Lake architecture
- Work with data streams by using Azure Stream Analytics

Lab 1: Explore compute and storage options for data engineering workloads

- Combine streaming and batch processing with a single pipeline
- Organize the data lake into levels of file transformation
- Index data lake storage for query and workload acceleration

After completing module 1, students will be able to:

- Describe Azure Synapse Analytics
- Describe Azure Databricks
- Describe Azure Data Lake storage
- Describe Delta Lake architecture
- Describe Azure Stream Analytics

Module 2: Design and Implement the Serving Layer
This module teaches how to design and implement data stores in a modern data warehouse to optimize analytical workloads. The student will learn how to design a multidimensional schema to store fact and dimension data. Then the student will learn how to populate slowly changing dimensions through incremental data loading from Azure Data Factory.

Lessons M2
- Design a multidimensional schema to optimize analytical workloads
- Code-free transformation at scale with Azure Data Factory
- Populate slowly changing dimensions in Azure Synapse Analytics pipelines

Lab 2: Designing and Implementing the Serving Layer
- Design a star schema for analytical workloads
- Populate slowly changing dimensions with Azure Data Factory and mapping data flows

After completing module 2, students will be able to:
- Design a star schema for analytical workloads
- Populate a slowly changing dimensions with Azure Data Factory and mapping data flows

Module 3: Data Engineering Considerations for Source Files
This module explores data engineering considerations that are common when loading data into a modern data warehouse analytical from files stored in an Azure Data Lake and understanding the security consideration associated with storing files stored in the data lake.

Lessons M3
- Design a Modern Data Warehouse using Azure Synapse Analytics
- Secure a data warehouse in Azure Synapse Analytics

Lab 3: Data engineering considerations
- Managing files in an Azure data lake
- Securing files stored in an Azure data lake

After completing module 3, students will be able to:
- Design a Modern Data Warehouse using Azure Synapse Analytics
- Secure a data warehouse in Azure Synapse Analytics

Module 4: Run Interactive Queries using Azure Synapse Analytics Serverless SQL Pools
In this module, students will learn how to work with files stored in the data lake and external file sources, through T-SQL statements executed by a serverless SQL pool in Azure Synapse Analytics. Students will query Parquet files stored in a data lake, as well as CSV files stored in an external data store. Next, they will create Azure Active Directory security groups and enforce access to files in the data lake through Role-Based Access Control (RBAC) and Access Control Lists (ACLs).

Lessons M4

- Explore Azure Synapse serverless SQL pools capabilities
- Query data in the lake using Azure Synapse serverless SQL pools
- Create metadata objects in Azure Synapse serverless SQL pools
- Secure data and manage users in Azure Synapse serverless SQL pools

Lab 4: Run interactive queries using serverless SQL pools

- Query Parquet data with serverless SQL pools
- Create external tables for Parquet and CSV files
- Create views with serverless SQL pools
- Secure access to data in a data lake when using serverless SQL pools
- Configure data lake security using Role-Based Access Control (RBAC) and Access Control List

After completing module 4, students will be able to:

- Understand Azure Synapse serverless SQL pools capabilities
- Query data in the lake using Azure Synapse serverless SQL pools
- Create metadata objects in Azure Synapse serverless SQL pools
- Secure data and manage users in Azure Synapse serverless SQL pools

Module 5: Explore, Transform, and Load Data into the Data Warehouse using Apache Spark
This module teaches how to explore data stored in a data lake, transform the data, and load data into a relational data store. The student will explore Parquet and JSON files and use techniques to query and transform JSON files with hierarchical structures. Then the student will use Apache Spark to load data into the data warehouse and join Parquet data in the data lake with data in the dedicated SQL pool.

Lessons M5

- Understand big data engineering with Apache Spark in Azure Synapse Analytics
- Ingest data with Apache Spark notebooks in Azure Synapse Analytics
- Transform data with DataFrames in Apache Spark Pools in Azure Synapse Analytics
- Integrate SQL and Apache Spark pools in Azure Synapse Analytics

Lab 5: Explore, transform, and load data into the Data Warehouse using Apache Spark

- Perform Data Exploration in Synapse Studio
- Ingest data with Spark notebooks in Azure Synapse Analytics
- Transform data with DataFrames in Spark pools in Azure Synapse Analytics
- Integrate SQL and Spark pools in Azure Synapse Analytics

After completing module 5, students will be able to:

- Describe big data engineering with Apache Spark in Azure Synapse Analytics
- Ingest data with Apache Spark notebooks in Azure Synapse Analytics
- Transform data with DataFrames in Apache Spark Pools in Azure Synapse Analytics
- Integrate SQL and Apache Spark pools in Azure Synapse Analytics

Module 6: Data Exploration and Transformation in Azure Databricks
This module teaches how to use various Apache Spark DataFrame methods to explore and transform data in Azure Databricks. The student will learn how to perform standard DataFrame methods to explore and transform data. They will also learn how to perform more advanced tasks, such as removing duplicate data, manipulate date/time values, rename columns, and aggregate data.

Lessons M6
- Describe Azure Databricks
- Read and write data in Azure Databricks
- Work with DataFrames in Azure Databricks
- Work with DataFrames advanced methods in Azure Databricks

Lab 6: Data Exploration and Transformation in Azure Databricks
- Use DataFrames in Azure Databricks to explore and filter data
- Cache a DataFrame for faster subsequent queries
- Remove duplicate data
- Manipulate date/time values
- Remove and rename DataFrame columns
- Aggregate data stored in a DataFrame

After completing module 6, students will be able to:
- Describe Azure Databricks
- Read and write data in Azure Databricks
- Work with DataFrames in Azure Databricks
- Work with DataFrames advanced methods in Azure Databricks

Module 7: Ingest and Load Data into the Data Warehouse
This module teaches students how to ingest data into the data warehouse through T-SQL scripts and Synapse Analytics integration pipelines. The student will learn how to load data into Synapse dedicated SQL pools with PolyBase and COPY using T-SQL. The student will also learn how to use workload management along with a Copy activity in a Azure Synapse pipeline for petabyte-scale data ingestion.

Lessons M7
- Use data loading best practices in Azure Synapse Analytics
- Petabyte-scale ingestion with Azure Data Factory

Lab 7: Ingest and load Data into the Data Warehouse
- Perform petabyte-scale ingestion with Azure Synapse Pipelines
- Import data with PolyBase and COPY using T-SQL
- Use data loading best practices in Azure Synapse Analytics

After completing module 7, students will be able to:
- Use data loading best practices in Azure Synapse Analytics
- Petabyte-scale ingestion with Azure Data Factory

Module 8: Transform Data with Azure Data Factory or Azure Synapse Pipelines
This module teaches students how to build data integration pipelines to ingest from multiple data sources, transform data using mapping data flows, and perform data movement into one or more data sinks.

Lessons M8
- Data integration with Azure Data Factory or Azure Synapse Pipelines
- Code-free transformation at scale with Azure Data Factory or Azure Synapse Pipelines

Lab 8: Transform Data with Azure Data Factory or Azure Synapse Pipelines
- Execute code-free transformations at scale with Azure Synapse Pipelines
- Create data pipeline to import poorly formatted CSV files
- Create Mapping Data Flows

After completing module 8, students will be able to:
- Perform data integration with Azure Data Factory
- Perform code-free transformation at scale with Azure Data Factory

Module 9: Orchestrate Data Movement and Transformation in Azure Synapse Pipelines
In this module, you will learn how to create linked services, and orchestrate data movement and transformation using notebooks in Azure Synapse Pipelines.

Lessons M9
- Orchestrate data movement and transformation in Azure Data Factory

Lab 9: Orchestrate data movement and transformation in Azure Synapse Pipelines
- Integrate Data from Notebooks with Azure Data Factory or Azure Synapse Pipelines

After completing module 9, students will be able to:
- Orchestrate data movement and transformation in Azure Synapse Pipelines

Module 10: Optimize Query Performance with Dedicated SQL Pools in Azure Synapse
In this module, students will learn strategies to optimize data storage and processing when using dedicated SQL pools in Azure Synapse Analytics. The student will know how to use developer features, such as windowing and HyperLog functions, use data loading best practices, and optimize and improve query performance.

Lessons M10
- Optimize data warehouse query performance in Azure Synapse Analytics
- Understand data warehouse developer features of Azure Synapse Analytics

Lab 10: Optimize Query Performance with Dedicated SQL Pools in Azure Synapse
- Understand developer features of Azure Synapse Analytics
- Optimize data warehouse query performance in Azure Synapse Analytics
- Improve query performance

After completing module 10, students will be able to:
- Optimize data warehouse query performance in Azure Synapse Analytics
- Understand data warehouse developer features of Azure Synapse Analytics

Module 11: Analyze and Optimize Data Warehouse Storage
In this module, students will learn how to analyze then optimize the data storage of the Azure Synapse dedicated SQL pools. The student will know techniques to understand table space usage and column store storage details. Next the student will know how to compare storage requirements between identical tables that use different data types. Finally, the student will observe the impact materialized views have when executed in place of complex queries and learn how to avoid extensive logging by optimizing delete operations.

Lessons M11
- Analyze and optimize data warehouse storage in Azure Synapse Analytics

Lab 11: Analyze and Optimize Data Warehouse Storage
- Check for skewed data and space usage
- Understand column store storage details
- Study the impact of materialized views
- Explore rules for minimally logged operations

After completing module 11, students will be able to:
- Analyze and optimize data warehouse storage in Azure Synapse Analytics

Module 12: Support Hybrid Transactional Analytical Processing (HTAP) with Azure Synapse Link
In this module, students will learn how Azure Synapse Link enables seamless connectivity of an Azure Cosmos DB account to a Synapse workspace. The student will understand how to enable and configure Synapse link, then how to query the Azure Cosmos DB analytical store using Apache Spark and SQL serverless.

Lessons M12
Design hybrid transactional and analytical processing using Azure Synapse Analytics
- Configure Azure Synapse Link with Azure Cosmos DB
- Query Azure Cosmos DB with Apache Spark pools
- Query Azure Cosmos DB with serverless SQL pools

Lab 12: Support Hybrid Transactional Analytical Processing (HTAP) with Azure Synapse Link
- Configure Azure Synapse Link with Azure Cosmos DB
- Query Azure Cosmos DB with Apache Spark for Synapse Analytics
- Query Azure Cosmos DB with serverless SQL pool for Azure Synapse Analytics

After completing module 12, students will be able to:
- Design hybrid transactional and analytical processing using Azure Synapse Analytics
- Configure Azure Synapse Link with Azure Cosmos DB
- Query Azure Cosmos DB with Apache Spark for Azure Synapse Analytics
- Query Azure Cosmos DB with SQL serverless for Azure Synapse Analytics

Module 13: End-to-end Security with Azure Synapse Analytics
In this module, students will learn how to secure a Synapse Analytics workspace and its supporting infrastructure. The student will observe the SQL Active Directory Admin, manage IP firewall rules, manage secrets with Azure Key Vault and access those secrets through a Key Vault linked service and pipeline activities. The student will understand how to implement column-level security, row-level security, and dynamic data masking when using dedicated SQL pools.

Lessons M13
- Secure a data warehouse in Azure Synapse Analytics
- Configure and manage secrets in Azure Key Vault
- Implement compliance controls for sensitive data

Lab 13: End-to-end security with Azure Synapse Analytics
- Secure Azure Synapse Analytics supporting infrastructure
- Secure the Azure Synapse Analytics workspace and managed services
- Secure Azure Synapse Analytics workspace data

After completing module 13, students will be able to:
- Secure a data warehouse in Azure Synapse Analytics
- Configure and manage secrets in Azure Key Vault
- Implement compliance controls for sensitive data

Module 14: Real-time Stream Processing with Stream Analytics
In this module, students will learn how to process streaming data with Azure Stream Analytics. The student will ingest vehicle telemetry data into Event Hubs, then process that data in real time, using various windowing functions in Azure Stream Analytics. They will output the data to Azure Synapse Analytics. Finally, the student will learn how to scale the Stream Analytics job to increase throughput.

Lessons M14
- Enable reliable messaging for Big Data applications using Azure Event Hubs
- Work with data streams by using Azure Stream Analytics
- Ingest data streams with Azure Stream Analytics

Lab 14: Real-time Stream Processing with Stream Analytics
- Use Stream Analytics to process real-time data from Event Hubs
- Use Stream Analytics windowing functions to build aggregates and output to Synapse Analytics
- Scale the Azure Stream Analytics job to increase throughput through partitioning
- Repartition the stream input to optimize parallelization

After completing module 14, students will be able to:
- Enable reliable messaging for Big Data applications using Azure Event Hubs
- Work with data streams by using Azure Stream Analytics
- Ingest data streams with Azure Stream Analytics

Module 15: Create a Stream Processing Solution with Event Hubs and Azure Databricks
In this module, students will learn how to ingest and process streaming data at scale with Event Hubs and Spark Structured Streaming in Azure Databricks. The student will learn the key features and uses of Structured Streaming. The student will implement sliding windows to aggregate over chunks of data and apply watermarking to remove stale data. Finally, the student will connect to Event Hubs to read and write streams.

Lessons M15

- Process streaming data with Azure Databricks structured streaming

Lab 15: Create a Stream Processing Solution with Event Hubs and Azure Databricks

- Explore key features and uses of Structured Streaming
- Stream data from a file and write it out to a distributed file system
- Use sliding windows to aggregate over chunks of data rather than all data
- Apply watermarking to remove stale data
- Connect to Event Hubs read and write streams

After completing module 15, students will be able to:

- Process streaming data with Azure Databricks structured streaming

Module 16: Build Reports using Power BI Integration with Azure Synpase Analytics
In this module, the student will learn how to integrate Power BI with their Synapse workspace to build reports in Power BI. The student will create a new data source and Power BI report in Synapse Studio. Then the student will learn how to improve query performance with materialized views and result-set caching. Finally, the student will explore the data lake with serverless SQL pools and create visualizations against that data in Power BI.

Lessons M16

- Create reports with Power BI using its integration with Azure Synapse Analytics

Lab 16: Build reports using Power BI integration with Azure Synpase Analytics

- Integrate an Azure Synapse workspace and Power BI
- Optimize integration with Power BI
- Improve query performance with materialized views and result-set caching
- Visualize data with SQL serverless and create a Power BI report

After completing module 16, students will be able to:

- Create reports with Power BI using its integration with Azure Synapse Analytics

Module 17: Perform Integrated Machine Learning Processes in Azure Synapse Analytics
This module explores the integrated, end-to-end Azure Machine Learning and Azure Cognitive Services experience in Azure Synapse Analytics. You will learn how to connect an Azure Synapse Analytics workspace to an Azure Machine Learning workspace using a Linked Service and then trigger an Automated ML experiment that uses data from a Spark table. You will also learn how to use trained models from Azure Machine Learning or Azure Cognitive Services to enrich data in a SQL pool table and then serve prediction results using Power BI.

Lessons M17

- Use the integrated machine learning process in Azure Synapse Analytics

Lab 17: Perform Integrated Machine Learning Processes in Azure Synapse Analytics

- Create an Azure Machine Learning linked service
- Trigger an Auto ML experiment using data from a Spark table
- Enrich data using trained models
- Serve prediction results using Power BI

After completing module 17, students will be able to:

- Use the integrated machine learning process in Azure Synapse Analytics

Exam Details

There is no exam relating directly to this course.

Administering Relational Databases on Microsoft Azure

Course Code MDP300
Duration 4 days

Overview

This course provides delegates with the knowledge and skills to administer a SQL Server database infrastructure for cloud, on-premises and hybrid relational databases and who work with the Microsoft PaaS relational database offerings. Additionally, it will be of use to individuals who develop applications that deliver content from SQL-based relational databases.

Audience

The audience for this course is data professionals managing data and databases who want to learn about administering the data platform technologies that are available on Microsoft Azure. This course is also valuable for data architects and application developers who need to understand what technologies are available for the data platform with Azure and how to work with those technologies through applications.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Planning, deploying and configuring Azure SQL offerings.
- Monitoring database performance and tuning a database and queries for optimum performance.
- Planning and configuring a High Availability Solution.

Pre-Requisites

Successful Azure Database Administrators start this role with professional experience in database management and technical knowledge of cloud technologies.

Specifically:

- Working with, maintaining, and developing with SQL Server.
- Experience with Azure, such as deploying and managing resources.

Course Contents

Module 1: The Role of the Azure Database Administrator
This module explores the role of a database administrator in the world of Azure. It also provides some foundational information relevant to the overall content. This includes a review of the various SQL Server-based options (SQL Server in a VM, Managed Instances, and Azure SQL Database.) Delegates will learn why compatibility level is a crucial concept when working with SQL databases in Azure. Delegates are also introduced to other database platforms available on Azure in addition to those based on SQL Server, in particular PostgreSQL and MySQL.

Lessons
- Azure Data Platform Roles
- Azure Database Platforms and Options
- SQL Server Compatibility Levels
- Azure Preview Features

Lab: Using the Azure Portal and SQL Server Management Studio
- Provision a SQL Server on an Azure Virtual Machine
- Connect to SQL Server and Restore a Backup

After completing this module, delegates will:
- Understand the role of Azure Database Administrator as it fits in with other data platform roles.
- Be able to describe the key differences between the SQL Server-based database op.
- Be able to describe the difference between versions and compatibility levels.
- Know how to enable and disable preview features.

Module 2: Plan and Implement Data Platform Resources
This module introduces methods for deploying data platform resources in Azure. You will learn about options for both upgrading and migrating existing SQL databases to Azure. You will learn how to set up Azure resources to host SQL Server on a Virtual Machine, a Managed Instance, Azure SQL Database and either PostgreSQL or MySQL. You will learn how to determine which options are best based on specific requirements including the High Availability and Disaster Recovery (HADR) needs. They will learn to calculate resource requirements and create templates for their deployments.

Lessons
- Deploying SQL Server using IaaS
- Deploying SQL Server using PaaS
- Deploying Open Source Database Solutions on Azure

Lab: Deploying Azure SQL Database
- Deploy a VM using an ARM template
- Configure resources needed prior to creating a database
- Deploy an Azure SQL Database
- Register the Azure SQL Database instance in Azure Data Studio and validate connectivity
- Deploy PostgreSQL or MySQL using a client tool to validate connectivity

After completing this module, delegates will be able to:
- Deploy resources using manual methods.
- Recommend an appropriate database offering based on requirements.
- Configure database resources.
- Evaluate and implement a strategy for moving a database to Azure.

Module 3: Implement a Secure Environment
This module explores the practices of securing your SQL Server Database as well as an Azure SQL database. This includes a review of the various SQL Server-based options as well as the various Azure options for securing Azure SQL Database as well as the databases with reside within Azure SQL Database. . Delegates will lean why security is crucial when working with databases. . Delegates are also introduced to other database platforms available on Azure in addition to those based on SQL Server, in particular, Azure Database for MariaDB/MySQL/PostgreSQL.

Lessons
- Configure Database Authentication
- Configure Database Authorization
- Implement Security for Data at Rest
- Implement Security for Data in Transit
- Implement Compliance Controls for Sensitive Data

Lab: Implement a Secure Environment
- Configure a server-based firewall rule using the Azure Portal
- Authorize Access to Azure SQL Database with Azure Active Directory
- Enable Advanced Data Security and Data Classification
- Manage access to database objects

After completing this module, delegates will be able to:
- Understand the differences between Windows, SQL Server and Azure Active Directory Authentication.
- Describe and configure both data-at-rest encryption solutions as well as data-in-transit encryption.
- Implement a data sensitivity solution.

Module 4: Monitor and Optimize Operational Resources
This module will teach you about resource optimization for your databases created using either IaaS or PaaS services. The module also covers monitoring server and hardware resources. It will familiarize you with the various tools available for monitoring performance and establishing a baseline. You will learn how to interpret performance metrics for the most critical resources. You will also learn how to troubleshoot database performance using Azure SQL Database Intelligent Insights.

Lessons
- Baselines and Performance Monitoring
- Major Causes of Performance Issues
- Configuring Resources for Optimal Performance
- User Database Configuration
- Performance-related Maintenance Tasks

Lab: Monitor and Optimize Resources
- Isolate CPU Problems
- Use Query Store observe blocking problems
- Detect and correct fragmentation issues

After completing this module, delegates will be able to:
- Monitor activity and compare to a baseline.
- Define maintenance tasks related to performance.
- Identify major causes of performance problems.
- Configure resources for optimal performance.
- Configure a user database for optimal performance.

Module 5: Optimize Query Performance
Query execution plans are potentially the most important aspect of database performance. Improving bad plans is certainly an area where a small amount of effort can bring huge improvements. While hardware issues can limit query performance, improving hardware usually yields performance improvements in the 10-20% range, at most. More commonly database administrators encounter queries that are not optimized, have stale or missing statistics, have missing indexes, or poor database design choices that lead to the database engine doing more work than is necessary to return results for a given query. Improving the plans can sometimes yield performance improvements in the 100-200% range or even more, meaning that after improving a plan with better indexes or statistics, a query could run twice or three times as fast! This module provides details on how to analyze individual query performance and determine where improvements can be made.

Lessons
- Understanding SQL Server Query Plans
- Explore Performance-based Database Design
- Evaluate Performance Improvements

Lab: Query Performance Troubleshooting
- Identify issues with database design AdventureWorks2017
- Isolate problem areas in poorly performing queries in AdventureWorks2017
- Use Query Store to detect and handle regression in AdventureWorks2017
- Use query hints to impact performance in AdventureWorks2017

After completing this module, delegates will be able to:
- Analyze query plans and identify problem areas.
- Evaluate potential query improvements.
- Review table and index design.
- Determine whether query or design changes have had a positive effect.

Module 6: Automation of Tasks
A common goal for database administrators in many environments is to automate as many of their repetitive tasks. This can be as simple as using scripting to automate a backup process, and as complex as building a fully automated alerting system. This module provides details of automating tasks to simplify the DBA's job. Methods include scheduling tasks for regular maintenance jobs, as well as multi-instance administration and configuration of notifications for task success or failure or non-completion.

Lessons
- Setting up Automatic Deployment
- Defining Scheduled Tasks
- Configuring Extended Events
- Managing Azure PaaS resources Using Automated Methods

Lab: Automating Tasks
- Deploy an Azure template from a Quickstart template on GitHub
- Configure notifications based on performance metrics
- Deploy an Azure Automation Runbook (or elastic job) to rebuild indexes on an Azure SQL Database

After completing this module, delegates will be able to:
- Deploy resources using automated deployment scripts.
- Create scheduled tasks.
- Create notifications and alerts.
- Configure automation for PaaS services.

Module 7: Plan and Implement a High Availability and Disaster Recovery Environment
Data must be available when the business needs it. That means the solutions hosting the data must be designed with availability and recoverability in mind. Suppose you work for a company that sells widgets both in stores and online. Your main application uses a highly transactional database for orders. What would happen if the server or platform hosting the transactional database had a problem that made it unavailable or inaccessible for some reason? What impact would it have on the business? If the right solution is put in place, the database would come online in a reasonable timeframe with minimal effort, thus allowing business to continue with little-to-no impact. This module and its associated lab cover configuring, testing, and managing a solution for high availability and disaster recovery (HADR) in Azure, for both Infrastructure-as-a-Service (IaaS) and Platform-as-a-Service (PaaS) deployments. This module will not only cover basic requirements, but also the various options available to achieve HADR.

Lessons

- High Availability and Disaster Recovery Strategies
- IaaS Platform and Database Tools for HADR
- PaaS Platform and Database Tools for HADR
- Database Backup and Recovery

Lab: Plan and Implement a High Availability and Disaster Recovery Environment

- Create an Always On Availability Group
- Enable Geo-Replication for Azure SQL Database
- Backup to URL and Restore from URL

After completing this module, delegates will understand:

- The difference between recovery time and recovery point objectives.
- The available HADR options for both IaaS and PaaS.
- The considerations for planning and configuring HADR solutions including how backup and restore.
- The factors that comprise a HADR strategy.
- How to configure a high availability solution via a hands-on lab.

Exam Details

This course leads to the DP-300 Administering Relational Databases on Microsoft Azure exam, which will earn you the Microsoft Certified: Azure Database Administrator Associate certification.

Microsoft Azure Data Fundamentals

Course Code MDP900
Duration 1 day

Overview

In this course, delegates will learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Microsoft Azure. Delegates will identify and describe core data concepts such as relational, non-relational, big data, and analytics, and explore how this technology is implemented with Microsoft Azure. They will explore the roles, tasks, and responsibilities in the world of data. The delegates will explore relational data offerings, provisioning and deploying relational databases, and querying relational data through cloud data solutions with Microsoft Azure. They will explore non-relational data offerings, provisioning and deploying non-relational databases, and non-relational data stores with Microsoft Azure. Delegates will explore the processing options available for building data analytics solutions in Azure. They will explore Azure Synapse Analytics, Azure Databricks, and Azure HDInsight. Delegates will learn what Power BI is, including its building blocks and how they work together.

Audience

The audience for this course is individuals who want to learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Microsoft Azure.

Learning Objectives

By actively participating in this course, you will learn about the following:

- Describing core data concepts in Azure.
- Explaining concepts of relational data in Azure.
- Explaining concepts of non-relational data in Azure.
- Identifying components of a modern data warehouse in Azure.

Pre-Requisites

Prerequisite certification is not required before taking this course. Successful Azure Data Fundamentals delegates start with some basic awareness of computing and Internet concepts, and an interest in extracting insights from data.

Specifically:

- Experience using a web browser, such as Microsoft Edge.
- Familiarity with basic data-related concepts, such as working with tables of data in a spreadsheet and visualizing data using charts.
- A willingness to learn through hands-on exploration.

Course Contents

Module 1: Explore core data concepts
Delegates will learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Microsoft Azure. Delegates will identify and describe core data concepts such as relational, non-relational, big data, and analytics, and explore how this technology is implemented with Azure. Delegates will explore the roles, tasks, and responsibilities in the world of data.

Lessons
- Explore core data concepts
- Explore roles and responsibilities in the world of data
- Describe concepts of relational data
- Explore concepts of non-relational data
- Explore concepts of data analytics

After completing this module, delegates will be able to:
- Show foundational knowledge of cloud data services within Azure.
- Identify and describe core data concepts such as relational, non-relational, big data, and analytics.
- Explain how this technology is implemented with Azure.

Module 2: Explore relational data in Azure
Delegates will learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Microsoft Azure. Delegates will explore relational data offerings, provisioning and deploying relational databases, and querying relational data through cloud data solutions with Azure.

Lessons
- Explore relational data services in Azure
- Explore provisioning and deploying relational database services in Azure
- Query relational data in Azure

After completing this module, delegates will be able to:
- Describe relational data services on Azure.
- Explain provisioning and deploying relational databases on Azure.
- Query relational data through cloud data solutions in Azure.

Module 3: Explore non-relational data in Azure
Delegates will learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Azure. Delegates will explore non-relational data services, provisioning and deploying non-relational databases, and non-relational data stores with Microsoft Azure.

Lessons
- Explore non-relational data services in Azure
- Explore provisioning and deploying non-relational data services on Azure
- Manage non-relational data stores in Azure

After completing this module, delegates will be able to:
- Describe non-relational data services on Azure.
- Explain provisioning and deploying non-relational databases on Azure.
- Describe non-relational data stores on Azure.

Module 4: Explore modern data warehouse analytics in Azure
Delegates will learn the fundamentals of database concepts in a cloud environment, get basic skilling in cloud data services, and build their foundational knowledge of cloud data services within Azure. Delegates will explore the processing options available for building data analytics solutions in Azure. Delegates will explore Azure Synapse Analytics, Azure Databricks, and Azure HDInsight. Delegates will learn what Power BI is, including its building blocks and how they work together.

Lessons
- Examine components of a modern data warehouse
- Explore data ingestion in Azure
- Explore data storage and processing in Azure
- Get started building with Power BI

After completing this module, delegates will be able to:
- Describe processing options available for building data analytics solutions in Azure.
- Describe Azure Synapse Analytics, Azure Databricks, and Azure HDInsight.
- Explain what Microsoft Power BI is, including its building blocks and how they work together.

Exam Details
This course leads to the DP-900 Microsoft Azure Data Fundamentals exam, which will earn you the Microsoft Certified: Azure Data Fundamentals certification.