



Microsoft Azure

Azure Cloud Computing Overview

Learning Objective

- ◆ Understanding Cloud Computing and Azure

Topics Covered

- ☐ What is Cloud Computing
- ☐ Service Model of Cloud
- ☐ Types of Cloud
- ☐ Azure Fundamentals
- ☐ Azure Certifications
- ☐ Azure Regions and Services
- ☐ Azure Domain and Services
- ☐ Azure Subscriptions

Azure Virtual Machine in Compute Domain

Learning Objective

- ◆ Design a compute strategy
 - Design a compute provisioning strategy
 - Design a secure compute strategy
 - Determine appropriate compute technologies
 - Design an Azure HPC environment
 - Identify compute requirements

- Recommend management tools for compute
- ❖ **Create and configure a VM for Windows and Linux**
 - Configure high availability
 - Configure monitoring
 - Configure networking
 - Configure storage
 - Configure virtual machine size
 - Implement dedicated hosts
 - Deploy and configure scale sets
- ❖ **Implement solutions that use virtual machines (VM)**
 - Provision VMs
 - Create Azure Resource Manager templates
 - Configure Azure Disk Encryption for VMs
 - Implement Azure Backup for VMs
- ❖ **Automate deployment of VMs**
 - Modify Azure Resource Manager template
 - Configure location of new VMs
 - Configure VHD template
 - Deploy from template
 - Save a deployment as an Azure Resource Manager template
 - Deploy Windows and Linux VMs

Topics Covered:

- ☐ Launching VM Instance and Connect
 - ☐ Windows Instance
 - ☐ Linux Instance
- ☐ VM Types
 - ☐ General Purpose
 - ☐ Compute Optimise
 - ☐ Memory Optimise
 - ☐ Storage Optimise
 - ☐ GPU Optimise
- ☐ VM Instance Pricing Options
 - ☐ On-Demand
 - ☐ Spot
 - ☐ Reserved
- ☐ Types of Images to Launch Virtual Machine Instance

- ☐ Azure Published
- ☐ Azure Marketplace
- ☐ Creating from existing Instance
- ☐ Azure Shared Image Gallery
- ☐ Azure Service Limits and Support Plans
- ☐ Summary of Virtual Machine Services
- ☐ Exam Essentials

Hand-on Lab:

- ☐ Launch Virtual Machine Instance (Windows) with Standard SSD Storage, Connect to Windows Instance with Remote Desktop Protocol, and make Web Server.
- ☐ Launch Virtual Machine Instance (Linux) with Standard SSD Storage, Connect to Linux instance with Secure Shell via Putty software and make Web Server.
- ☐ Create Custom Image using existing Windows Instance to Launch a new Pre-configured Windows Web Server.
- ☐ Create Custom Image using existing Linux Instance to Launch a new Pre-configured Linux Web Server.

Azure Storage Service

Learning Objective

- ❖ **Design a storage strategy**
 - Design a storage provisioning strategy
 - Design storage access strategy
 - Identify storage requirements
 - Recommend a storage solution
 - Recommend storage management tools
- ❖ **Create and configure storage accounts**
 - Configure network access to the storage account
 - Create and configure storage account
 - Generate shared access signature
 - Implement Azure AD authentication for storage

- **Install and use Azure Storage Explorer**
- **Manage access keys**
- **Monitor activity log by using Azure Monitor logs**
- **Implement Azure storage replication**
- **Implement Azure storage account failover**

Topics Covered

- ☐ Understanding Cloud Storage
- ☐ Advantages of Cloud Storage
- ☐ Understanding Terminologies of Cloud Storage
 - ☐ Physical Hard Disk
 - ☐ Virtual Hard Disk
 - ☐ Virtual Hard Disk
 - ☐ HDD/SSD
 - ☐ IOPS
 - ☐ Disk I/O
 - ☐ Storage Memory in GiB, MiB, KiB
- ☐ Azure Storage Accounts
 - ☐ Managed Disks
 - ☐ Unmanaged Disks
- ☐ Hard Disk Snapshots
- ☐ Azure Storage Services
 - ☐ Block Blob
 - ☐ Blob
 - ☐ File
 - ☐ Table
 - ☐ Queue
- ☐ Azure Storage Types
 - ☐ Standard
 - ☐ Premium
- ☐ Azure Storage Redundancy
 - ☐ Local Redundant
 - ☐ Zone Redundant
 - ☐ Geo-Redundant
 - ☐ Read-Access Geo-Redundant
- ☐ Summary of Cloud Storage
- ☐ Exam Essentials

Hands-On

- ☐ Launch Windows Virtual Machine Instance with Unmanaged Virtual Hard Disk (Default Size).
- ☐ Create a Virtual Hard Disk in Local Computer and upload the VHD to Storage Account
- ☐ Implement RAID Configuration in Windows for Data and Application Backup using Disk Management.
- ☐ Create a File Share in Azure Files and Mount the File Share in Azure VMs.

Azure Virtual Network and Security

Learning Objective

❖ Design a networking strategy

- Design a network provisioning strategy
- Design a network security strategy
- Determine appropriate network connectivity technologies
- Identify networking requirements
- Recommend network management tools
- Recommend network security solutions

❖ Implement and manage virtual networking

- Configure private IP addressing
- Configure public IP addresses
- Create and configure network routes
- Create and configure network interface
- Create and configure subnets
- Create and configure virtual network
- Create and configure Network Security Groups and Application Security Groups

❖ Create connectivity between virtual networks

- Create and configure Vnet peering
- Create and configure Vnet to Vnet connections
- Verify virtual network connectivity
- Create virtual network gateway

❖ Implement application load balancing

- Configure Application Gateway

- **Configure Azure Front Door service**
- **Configure Azure Traffic Manager**
- ❖ **Integrate on premises network with Azure virtual network**
 - **Create and configure Azure VPN Gateway**
 - **Create and configure site to site VPN**
 - **Configure ExpressRoute**
 - **Configure Virtual WAN verify on premises connectivity**
 - **Troubleshoot on premises connectivity with Azure**

Topics Covered

- ☐ Basics of Networking
- ☐ Virtual Networks
- ☐ Subnets
- ☐ Route Tables
- ☐ Network Security Groups
- ☐ Public IP and NICs
- ☐ Virtual Private Gateway,
- ☐ Local Network Gateway
- ☐ V-Net Peering
- ☐ Azure Direct Connect
- ☐ Summary
- ☐ Exam Essentials

Hands-On

- ☐ Create Virtual Network, Public Subnets and Route Table and Launch Virtual Machine Instance.
- ☐ Create Virtual Network Public and Private Subnets, Route table and Launch Virtual Machine instance Windows in Public and Linux in Private.
- ☐ Create Nat Gateway and allow internet access to Private Subnet.
- ☐ Create two different Virtual Networks in different regions and use Virtual Network Peering Connection to Connect.
- ☐ Build Network and Instance Security Between Instances using Security Group and Network ACL
- ☐ Create Customer and VPN Gateway to describe VPN Connection.

Azure CDN Profiles

Learning Objective

- ◆ Understanding Content Delivery Network for Videos and media files.

Topics Covered

- ☐ Content Delivery Network
- ☐ Azure Edge Locations
- ☐ Distributions
- ☐ CDN Profiles
- ☐ Summary
- ☐ Exam Essentials

Hands-On

- ☐ Create Blob Storage, and Container. Upload videos to distribute to all edge locations
- ☐ Create distribution in CDN Profile to distribute videos to all edge locations.

Azure Management Tools

Learning Objective

- ◆ **Analyze resource utilization and consumption**
 - Configure diagnostic settings on resources
 - Create baseline for resources
 - Create and test alerts
 - Analyze alerts across subscription
 - Analyze metrics across subscription
 - Create action groups
 - Monitor for unused resources
 - Monitor spend
 - Report on spend
 - Utilize Log Search query functions
 - View alerts in Azure Monitor logs
 - Visualize diagnostics data using Azure Monitor Workbooks

Topics Covered

- ☐ Azure Monitor
- ☐ Azure alerts
- ☐ Cost Management
- ☐ Event Managements
- ☐ Azure VM Extensions
- ☐ VM Boot Diagnostics
- ☐ PowerShell and Powershell Scripts
- ☐ Summary
- ☐ Exam Essentials

Hands-on

- ☐ Monitor Virtual Machine instance with Detailed Monitoring
- ☐ Monitor Virtual Network
- ☐ Audit event using Event Management
- ☐ Create Azure Alert Subscribe Email to get Notifications
- ☐ Run Powershell Script to Build Azure Resource.

Load Balancing and Auto Scaling of Virtual Machines

Learning Objective

- ◆ Use load balancing in the creation of highly available systems.
- ◆ Learn scaling Applications/Systems with AutoScaling and its use in Building Fault Tolerant Networks.
- ◆ **Create web apps by using PaaS**
 - Create an Azure app service Web App
 - Create documentation for the API
 - Create an App Service Web App for Containers
 - Create an App Service background task by using WebJobs
 - Enable diagnostics logging

Topics Covered

- ☐ Fault Domain
- ☐ Update Domain
- ☐ Availability Sets
- ☐ Load Balancers Types
 - ☐ Application
 - ☐ Network
- ☐ Load Balancer Configuration
 - ☐ Service Health Check
 - ☐ Launch Configurations
- ☐ Scaling Groups
 - ☐ Scaling Policies
- ☐ VM Scale Sets
- ☐ Building Fault Tolerant and Highly Available Applications
- ☐ Summary of Auto Scaling and Load Balancers
- ☐ Exam Essentials

Hands-On

- ☐ Create Availability Sets to build High Availability
- ☐ Attach a load balancer to Virtual Network and Launching VMs
- ☐ Create VM Scale sets to build AutoScaling.

Azure Identity and Access Management

Learning Objective

- ❖ **Understanding IAM in Azure**
- ❖ **Manage Azure Active Directory**
 - **Add custom domains**
 - **Configure Azure AD Identity Protection**
 - **Configure Azure AD Join**
 - **Configure self-service password reset**
 - **Implement conditional access policies manage multiple directories**
 - **Perform an access review**
- ❖ **Implement and manage hybrid identities**
 - **Install and configure Azure AD Connect**

- Configure federation
- Configure single sign-on
- Manage and troubleshoot Azure AD Connect
- Troubleshoot password sync and writeback
- ❖ **Implement multi factor authentication**
 - Configure user accounts for MFA
 - Configure fraud alerts
 - Configure bypass options
 - Configure trusted IPs
 - Configure verification methods
- ❖ **Manage role-based access control**
 - Create a custom role
 - Configure access to Azure resources by assigning roles
 - Configure management access to Azure
 - Troubleshoot RBAC
 - Implement Azure Policies
 - Assign RBAC Roles

Topics Covered

- ☐ IAM Principles
- ☐ Understanding Azure Active Directory
- ☐ Creating Users
- ☐ Creating Groups
- ☐ Create RBAC to Set Permissions to Users
- ☐ Summary
- ☐ Exam Essentials

Hands-On

- ☐ Create Users in Azure Active Directory
- ☐ Assign RBAC access to a Specific Resource Group.

Database Services, Backup and Migration

Learning Objective

- ◆ Understanding Azure Database services and their use case.
- ❖ **Develop solutions that use a relational database**

- Provision and configure relational databases
- Configure elastic pools for Azure SQL Database
- Implement Azure SQL Database managed instances
- Create, read, update, and delete data tables by using code
- ❖ **Understanding Site Recovery Services Vault**
- ❖ **Optimize consumption strategy**
 - Optimize App service costs
 - Optimize Compute costs
 - Optimize Identity costs
 - Optimize Network costs
 - Optimize Storage costs

Topics Covered

- ☐ Azure Databases
- ☐ Create and Manage MS SQL Databases
- ☐ Site Recovery Services Vault

Hands-On

- ☐ Create MySql Database.
- ☐ Taking Backup of VM
- ☐ Migrating Hyper-V Virtual Machines from On-Premises to Azure.



Microsoft Azure DevOps Solutions

Explore Azure App Service

Learning Objective

- ❖ Azure App Service key components and value.
- ❖ Azure App Service manages authentication and authorization.
- ❖ Methods to control inbound and outbound traffic to webapp
- ❖ Deploy an app-to-App Service using Azure CLI commands.

Topics Covered

- Azure App Service plans
- Deploy to App Service
- Authentication and authorization in App Service
- App Service networking features

Configure web app settings

Learning Objective

- ❖ Application settings that are bound to deployment slots.
- ❖ Options for installing SSL/TLS certificates.
- ❖ Enable diagnostic logging for app to aid in monitoring and debugging.
- ❖ virtual app to directory mappings.

Topics Covered

- Application settings
- General settings
- Path mappings
- Diagnostic logging
- Configure security certificates

Scale apps in Azure App Service

Learning Objective

- ❖ Identify scenarios for which autoscaling is an appropriate solution.
- ❖ Create autoscaling rules for a web app.
- ❖ Monitor the effects of autoscaling.

Topics Covered

- Examine auto scale factors
- Identify auto scale factors
- Enable auto scale in App Service
- Explore auto scale best practices

Explore Azure App Service deployment slots

Learning Objective

- ❖ Describe the benefits of using deployment slots.
- ❖ Understand how slot swapping operates in App Service.
- ❖ Perform manual swaps and enable auto swap.
- ❖ Route traffic manually and automatically.

Topics Covered

- Explore staging environments
- slot swapping
- deployment slots
- Route traffic in App Services

Implement Azure Functions

Learning Objective

- ❖ Introduction to Azure Functions
- ❖ Comparison of Azure Functions with Logic Apps
- ❖ Scaling Azure Functions

Topics Covered

- Functional differences between Azure Functions and Logic Apps
- Azure Hosting plan options
- How Azure functions scale meet to Business needs

Develop Azure Functions

Learning Objective

- ❖ Azure Functions Development
- ❖ Function App
- ❖ Connect functions to Azure services
- ❖ Explore Task hubs

Topics Covered

- The key components of a function and how they are structured
- Connect a function to services in Azure
- Create a function by using Visual studio code the Azure Functions core Tools
- Explore durable orchestrations

Develop Solutions that use Blob storage

Learning Objective

- ❖ Explore Azure Blob Storage
- ❖ Manage the Azure Blob Storage lifecycle
- ❖ Work with Azure Blob storage

Topics Covered

- Azure Blob storage resource types
- Azure Storage security features
- Discover Blob storage lifecycle policies
- Azure Blob storage client library
- Set and retrieve properties and metadata for Blob resources by using REST

Implement infrastructure as a service solution

Learning Objective

- ❖ The Design considerations for creating virtual machine to support the app needs
- ❖ How to create an Azure VM by using the Azure CLI
- ❖ How to create and deploy Azure Resource Manager (ARM) Templates
- ❖ How to choose the correct deployment mode for our solution
- ❖ How to manage container images in Azure Container Registry
- ❖ How to run Container images in Azure Container Instances

Topics Covered

- Provision virtual machines in Azure
- Compare virtual machine availability options
- Explore Azure Resource Manager
- Benefits of using ARM Templates
- Introduction to Azure Container Registry
- Build and manage container with tasks
- Deploy a container instance by using the Azure CLI
- Set environment variables in container instances
- Mount file share in Azure Container Instances

Get Started on a DevOps transformation journey

Learning Objective

- ❖ A Tour of Azure DevOps Services
- ❖ Software Development Roles
- ❖ Clients and Tools

Topics Covered

- Introduction to DevOps
- Choose the right project

- Describe team structures
- Migrate to DevOps
- Introduce to Source Control
- Describe types of Source Control System
- Work with Azure Repos and GitHub

Work with Git for enterprise DevOps

Learning Objective

- ❖ What is Git and GitHub?
- ❖ What is Version Control System?

Topics Covered

- Structure of Git Repo
- Manage Git branches and workflows
- Collaborate with pull requests in Azure Repos
- Explore Git hooks
- Plan foster inner source
- Manage Git Repositories

Implement Continuous Integration with Azure Pipelines and Github Actions

Learning Objective

- ❖ Pipelines Basics
- ❖ Ecosystem and Integration
- ❖ Build Apps

Topics Covered

- Explore Azure Pipelines
- Manage Azure Pipelines agents and pools
- Describe Pipelines and Concurrency
- Explore Continuous Integration
- Implement a Pipeline strategy
- Integrate with Azure Pipelines
- Introduction to Github Actions
- Learn Continuous Integration with Github Actions

Design and implement a release strategy

Learning Objective

- ❖ Deploy Apps to Environments
- ❖ Run Pipeline Tests
- ❖ Pipeline Tasks

Topics Covered

- Introduction to continuous delivery
- Explore release strategy recommendations
- Build a high-quality release Pipeline
- Introduction to deployment patterns
- Implement blue-green deployment and feature toggles
- Implement canary releases and dark launching
- Implement A/B testing and progressive exposure deployment

Implement a secure continuous deployment using Azure Pipelines

Learning Objective

- ❖ Configure Security and Settings
- ❖ Data Protection
- ❖ Scoped Permissions
- ❖ Secure GitHub Integrations

Topics Covered

- Create a release Pipeline
- Configure and Provision environments
- Manage and modularize tasks and templates
- Automate inspection of health
- Introduction to security development process
- Manage application configuration data
- Integrate with identity management systems
- Implement application configuration

Manage Infrastructure as code using Azure Desired State Configuration and Third-Party Tools

Learning Objective



Topics Covered

- Explore infrastructure as code and Configuration Management
- Create Azure Resource using Azure Resource Manager Templates
- Create Azure Resources by using Azure CLI
- Explore Azure Automation with DevOps
- Implement Desired State Configuration
- Introduction to Chef and Puppet

- Implement Ansible
- Implement Terraform

Design and implement a dependency management Strategy

Learning Objective

- ❖ Migrate from different Pipelines(Classic, Jenkins, etc)
- ❖ Package Tasks
- ❖ Package authoring best practices

Topics Covered

- Explore package dependencies
- Understand package management
- Migrate consolidating and secure artifacts
- Implement a versioning strategy

Kubernetes

Learning Objective

- ❖ Containerization Concepts
- ❖ Orchestration Process
- ❖ Implementation and Deploy CI/CD Pipelines to Kubernetes

Topics Covered

- Design a Container build strategy
- Implement Docker multi-stage builds
- Implement Azure Kubernetes Services
- Explore Kubernetes Tooling
- Integrate Azure Kubernetes Services with Pipelines
- Introduction to Azure Security Center
- Implement Open-Source software