



DevOps with Azure

DevOps Foundation

Learning Objective

- ❖ Understanding of DevOps

Topics Covered

- What is DevOps?
- Why DevOps?
- Evolution of Software Methodologies
- Dev Challenges v/s DevOps Solution
- Ops Challenges v/s DevOps Solution
- Stages Of DevOps Lifecycle
 - Continuous Development
 - Continuous Testing
 - Continuous Integration
 - Continuous Deployment
 - Continuous Monitoring
- The Various DevOps Tools

Getting started with Linux

Learning Objective

- ❖ **Understanding Linux Basics**

Topics Covered

- What is Linux and Open Source
- Linux distributions
- Understanding Shell
- Understanding basic commands in Linux
- Understanding absolute and relative path
- Creating files and directory using CLI
- Understanding linux command and using options for linux commands
- Getting help for using commands
- Matching file with shell expansion (Globbing)

VCS with Git

Learning Objective

- ❖ **Understanding Git & GitHub (Managing Source Code and What is Version Control System(VCS)?**

Topics Covered

- Why VCS?
- VCS tools
- Distributed VCS
- What is Git & Why Git?
- Features Of Git
- Git Workflow
- Git Configurations
- Creating Git Repository

- ❑ Syncing Repositories
- ❑ Adding Origin
- ❑ Pushing changes
- ❑ Pulling changes
- ❑ Clone operation
- ❑ Perform, Review & Commit Changes
- ❑ Stacking Unfinished Changes
- ❑ Move, Rename & Delete Operations
- ❑ Tagging Versions In Repository

Automation and Testing

Learning Objective

- ❖ Understanding what and why automation

Topics Covered

- ❑ Automated Testing and Test Driven Development
- ❑ Integrated Development Environments
- ❑ Test Driven Development Approach
- ❑ Behavior Driven Development
- ❑ Integration Testing and Mocking
- ❑ Software Integration Tools
- ❑ Code Quality Principles
- ❑ Code Quality Tools
- ❑ Continuous Code Quality

Continuous Integration with Jenkins

Learning Objective

- ❖ Understanding Integration with Jenkins

Topics Covered

- Challenges before Continuous Integration
- What is Continuous Integration?
- Benefits of Continuous Integration
- Tools of Continuous Integration
- Introduction to Jenkins
- Configuring Jenkins
- Build Setup in Jenkins
- Jenkins Dashboard
- Creating jobs in Jenkins
- Configuring Security in Jenkins
- Plugin Management in Jenkins
- Notification System
- Jenkins Best Practices

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.