Microsoft Azure

Working with Azure Virtual Machines

Designing solutions for virtual machines

- Virtual machine series and sizes
- Available VM series and sizes
- Availability Sets
- Fault domains and update domains
- Managed Disks

Creating highly available virtual machines

- From the Azure Portal
- From PowerShell & Azure CLI

VM Scale Sets

- Creating a VM Scale Set from the Azure Portal
- Creating a VM Scale Set from Azure PowerShell & Azure CLI
- Accessing your VM Scale Sets
- VM Scale Set templates

Disaster recovery

- Backup and recovery
- Replication

Administration

- Identify Workloads That Can And Cannot Be Deployed
- Create VMs
- Connect to a Windows/Linux VM
- PowerShell Basics – Create a Virtual Machine
- "VM Workloads" Resources
- ARM Templates and Automation

Working with ARM Templates

Concepts

- What is Resource Manager?
- Resource Provider & Types
- Resource Manager & Classic Deployment
- Subscription Governance
- Organizing resources with management groups
- Create & deploy ARM Template
- IDE: using VS Code to Create the ARM Template

Deploy Templates using

- Portal
- PowerShell
- Azure CLI

Availability and Load Balancing

- Configure Multiple ARM VMs in an Availability Set for Redundancy
- Configure Each Application Tier Into Separate Availability Sets
- Combine the Load Balancer with Availability Sets

Configuring Compute-Intensive Applications

High-performance compute virtual machines

- Microsoft HPC Pack
- Cloud-native HPC solutions
- Hybrid HPC architecture
- Azure Batch
- Creating an Azure Batch service
- Stateless components
- Containers on Azure Batch

Robust Networking Implementations

Azure Virtual Network

- IP addresses
  - Public IP address
  - Private IP address
  - Creating a public IP address

- DNS
- Creating a VNet with two subnets

Azure Load Balancer

- Probes

Connectivity

- Azure Traffic Manager
- Azure Application Gateway
- Azure VPN
- Site-to-site VPN
- VNet-to-VNet VPN
- Point-to-site VPN
- ExpressRoute

Security Strategies

- DMZ
- Network Security Groups
- User Defined Routes
- Virtual network service tunneling

- Web Application Firewall

Administration

- Deploy a VM into a Virtual Network
- Configure External and Internal Load Balancing
- Implement Application Gateway
- Design Subnets
- Configure Static, Public, and Private IP Addresses
- Set Up Network Security Groups (NSGs), DNS at the Virtual Network Level
- User Defined Routes (UDRs)
- Firewall Rules
- Modify Network Configuration
- Modify a Subnet
- Import and Export a Network Configuration
- Multi-Site or Hybrid Network
- Choose the Between ExpressRoute, Site-to-site, and Point-to-site
- Choose the Appropriate Gateway
- Identify Supported Devices and Software VPN Solutions

Storage Solutions

Azure Storage and Replication

- Storage account types
  - General-purpose v1 (GPv1)
  - Blob storage
  - General-purpose v2 (GPv2)

- Storage replication types
  - Locally Redundant Storage
  - Zone Redundant Storage
  - Geo-redundant Storage

Azure Blob Storage

- Access tiers: Hot, Cool, Archive

Other Storage Services

- Azure Table Storage
- Azure Queue Storage
- Azure File Storage
- Azure Disk Storage
- STORSIMPLE
- Cosmos DB Storage
- Azure Search
- Azure SQL Database
- Azure Database for MySQL/PostgreSQL

Administration

- VM storage
- Configure Disk Caching
- Plan Storage Capacity
- Encrypt Disks

- Azure Storage Blobs and Azure Files
- Azure SQL Databases

Securing your Resources

Identity and Access Management

- Azure Active Directory
- Microsoft Graph
- Azure AD Connect
- Multi-Factor Authentication

Secure your Data

- Azure Key Vault
- Azure Storage Service Encryption
- Azure Disk Encryption
- Azure SQL Database Security
- Azure Active Directory Managed Service Identity

Life Cycle of Machine Learning Model Development

- Data Extraction
- Data Cleansing & Transformations
- Data Preparations
- Model Selection
- Train, Test, Validate, Deploy, and Tune/Rebuild the Model

Governance and Policies

- Azure Role-Based Access Control
- Azure Resource Policies
- Azure AD Privileged Identity Management
- Azure Security Center

Implementing Messaging Solutions

- Azure Queue Storage
- Azure Service Bus
- Azure Event Grid
- Notification Hubs
- Designing an effective messaging architecture

Application Monitoring and Alerting Strategies

- Azure Log Analytics
- Azure Monitor
- Application Insights
- Azure Service Health
- Azure Advisor
- Azure Network Watcher

Designing an Operations Automation Strategy

- Azure PowerShell
- Desired State Configuration
- Azure Automation

Deploy Azure Web Apps

- Overview
- Deployment Slots
- Scaling Web Apps
- Traffic Manager

DevOps

CI/CD by Azure

- Git
- Jenkins
- Maven
- Jfrog
- SonarQube

Configuration Management

- Vagrant
- Ansible

Containerization

- Docker
- Kubernetes

Infrastructure Automation

- Terraform

Monitoring

- Elastic search
- Kibana
- Log stash
- Nagios

Linux Essentials

- History, OS Types, Flavors, Structure
- File system
- Linux Commands
- User & Group Administration
- SSH and Multi-User Management

Shell Scripting

- Variables, Operators, Conditions, Loops, Functions

Virtualization

- Introduction
- Server, Desktop, Application Virtualization

Web Servers

- Apache Webserver
- Tomcat Application Server

DevOps Tools

Git

- Version Control System
- Git Basics, Configuration, Branching, Merging, Stashing

Automate Build Process

- Maven Basics
- Dependencies, Plugins, Goals

Jenkins

- Installation, Configuration, Plugin Management, Job Creation

Continuous Testing and Integration

- Adding steps to Freestyle Project
- Creating a Pipeline job to execute Maven