



MCSA: Windows Server 2016

Course 20740C: Installation, Storage, and Compute with Windows Server 2016

Course Outline

Module 1: Installing, upgrading, and migrating servers and workloads

This module describes the new features of Windows Server 2016, and explains how to prepare for and install Nano Server and Server Core. This module also describes how to plan a server upgrade and migration strategy, and explains how to perform a migration of server roles and workloads within and across domains. Finally, this module explains how to choose an activation model based on your environment characteristics.

Lessons

- Introducing Windows Server 2016
- Preparing and installing Server Core
- Preparing for upgrades and migrations
- Migrating server roles and workloads
- Windows Server activation models

Lab: Installing and configuring Server Core

- Installing Server Core
- Completing post-installation tasks on Windows Server 2016 Core
- Performing remote management

After completing this module, students will be able to:

- Describe the new features of Windows Server 2016.
- Prepare for and install Server Core.
- Plan a server upgrade and migration strategy.
- Perform a migration of server roles and workloads within a domain and across domains.
- Choose an appropriate activation model.

Module 2: Configuring local storage

This module explains how to manage disks and volumes in Windows Server 2016.

Lessons

- Managing disks in Windows Server
- Managing volumes in Windows Server

Lab: Configuring local storage

- Creating and managing volumes
- Resizing volumes
- Managing virtual hard disks

After completing this module, students will be able to:

- Manage disks in Windows Server.
- Manage volumes in Windows Server.

Module 3: Implementing enterprise storage solutions

This module discusses direct-attached storage (DAS), network-attached storage (NAS), and storage area networks (SANs). It also explains the purpose of Microsoft Internet Storage Name Service (iSNS) Server, data center bridging (DCB), and Multipath I/O (MPIO). Additionally, this module



compares Fibre Channel, Internet Small Computer System Interface (iSCSI), and Fibre Channel over Ethernet (FCoE), and describes how to configure sharing in Windows Server 2016.

Lessons

- Overview of DAS, NAS, and SANs
- Comparing Fibre Channel, iSCSI, and Fibre Channel over Ethernet
- Understanding iSNS, DCB, and MPIO
- Configuring sharing in Windows Server 2016

Lab: Planning and configuring storage technologies and components

- Planning storage requirements
- Configuring iSCSI storage
- Configuring and managing the share infrastructure

After completing this module, students will be able to:

- Describe DAS, NAS, and SANs.
- Compare Fibre Channel, iSCSI, and FCoE.
- Explain the use of iSNS, DCB, and MPIO.
- Configure sharing in Windows Server.

Module 4: Implementing Storage Spaces and Data Deduplication

This module explains how to implement and manage Storage Spaces. This module also explains how to implement Data Deduplication.

Lessons

- Implementing Storage Spaces
- Managing Storage Spaces
- Implementing Data Deduplication

Lab: Implementing Storage Spaces

- Creating a Storage Space

Lab: Implementing Data Deduplication

- Installing Data Deduplication
- Configuring Data Deduplication

After completing this module, students will be able to:

- Describe and implement the Storage Spaces feature in the context of enterprise storage needs.
- Manage and maintain Storage Spaces.
- Describe and implement Data Deduplication.

Module 5: Installing and configuring Hyper-V and virtual machines

This module provides an overview of Hyper-V and virtualization. It explains how to install Hyper-V, and how to configure storage and networking on Hyper-V host servers. Additionally, it explains how to configure and manage Hyper-V virtual machines.

Lessons

- Overview of Hyper-V
- Installing Hyper-V
- Configuring storage on Hyper-V host servers
- Configuring networking on Hyper-V host servers
- Configuring Hyper-V virtual machines
- Managing virtual machines

Lab: Installing and configuring Hyper-V

- Verify installation of the Hyper-V server role
- Configuring Hyper-V networks
- Creating and configuring virtual machines



- Enable nested virtualization for a virtual machine

After completing this module, students will be able to:

- Describe Hyper-V and virtualization.
- Install Hyper-V.
- Configure storage on Hyper-V host servers.
- Configure networking on Hyper-V host servers.
- Configure Hyper-V virtual machines.
- Manage Hyper-V virtual machines.

Module 6: Deploying and managing Windows and Hyper-V containers

This module provides an overview of containers in Windows Server 2016. Additionally, this module explains how to deploy Windows Server and Hyper-V containers. It also explains how to install, configure, and manage containers by using Docker.

Lessons

- Overview of containers in Windows Server 2016
- Deploying Windows Server and Hyper-V containers
- Installing, configuring, and managing containers by using Docker

Lab: Installing and configuring containers

- Installing and configuring Windows Server containers by using Windows PowerShell
- Installing and configuring Windows Server containers by using Docker

After completing this module, students will be able to:

- Describe containers in Windows Server 2016.
- Explain how to deploy containers.
- Explain how to install, configure, and manage containers using Docker.

Module 7: Overview of high availability and disaster recovery This module provides an overview of high availability and high availability with failover clustering in Windows Server 2016. It further explains how to plan high availability and disaster recovery solutions with Hyper-V virtual machines. Additionally, this module explains how to back up and restore the Windows Server 2016 operating system and data by using Windows Server Backup.

Lessons

- Defining levels of availability
- Planning high availability and disaster recovery solutions with Hyper-V virtual machines
- Backing up and restoring by using Windows Server Backup
- High availability with failover clustering in Windows Server 2016

Lab: Planning and implementing a high availability and disaster recovery solution

- Determining the appropriate high availability and disaster recovery solution
- Implementing storage migration
- Configuring Hyper-V replicas

After completing this module, students will be able to:

- Define levels of availability.
- Plan high availability and disaster recovery solutions with Hyper-V virtual machines.
- Backup and restore data by using Windows Server Backup.
- Describe high availability with failover clustering in Windows Server 2016.

Module 8: Implementing failover clustering

This module explains how to plan for failover clustering. It also explains how to create, manage, and troubleshoot a failover cluster.

Lessons

- Planning a failover cluster
- Creating and configuring a new failover cluster



- Maintaining a failover cluster
- Troubleshooting a failover cluster
- Implementing site high availability with stretch clustering

Lab: Implementing failover clustering

- Creating a failover cluster
- Verifying quorum settings and adding a node

Lab: Managing a failover cluster

- Evicting a node and verifying quorum settings
- Changing the quorum from disk witness to file-share witness, and defining node voting
- Verifying high availability

After completing this module, students will be able to:

- Plan for a failover-clustering implementation.
- Create and configure a failover cluster.
- Maintain a failover cluster.
- Troubleshoot a failover cluster.
- Implement high availability and stretch clustering for a site.

Module 9: Implementing failover clustering with Windows Server 2016 Hyper-V

This module describes how Hyper-V integrates with failover clustering. It also explains how to

implement Hyper-V virtual machines (VMs) in failover clusters.

Lessons

- Overview of the integration of Hyper-V Server 2016 with failover clustering
- Implementing Hyper-V VMs on failover clusters
- Key features for VMs in a clustered environment

Lab: Implementing failover clustering with Windows Server 2016 Hyper-V

- Configure iSCSI storage
- Configuring a failover cluster for Hyper-V
- Configuring a highly available VM

After completing this module, students will be able to:

- Describe how Hyper-V integrates with failover clustering.
- Implement Hyper-V VMs on failover clusters.
- Describe the key features for VMs in a clustered environment.

Module 10: Implementing Network Load Balancing T

his module provides an overview of NLB clusters. It also explains how to plan and configure an NLB cluster implementation.

Lessons

- Overview of NLB
- Configuring an NLB cluster
- Planning an NLB implementation

Lab: Implementing NLB

- Implementing a Network Load Balancing (NLB) cluster
- Configuring and managing the NLB cluster
- Validating high availability for the NLB cluster

After completing this module, students will be able to:

- Describe NLB.
- Configure an NLB cluster.
- Explain how to plan an NLB implementation.

Module 11: Creating and managing deployment images

This module provides an overview of the Windows Server 2016 image deployment process. It also explains how to



create and manage deployment images by using the Microsoft Deployment Toolkit (MDT). Additionally, it describes different workloads in the virtual machine environment.

Lessons

- Introduction to deployment images
- Creating and managing deployment images by using MDT
- Virtual machine environments for different workloads

Lab: Using MDT to deploy Windows Server 2016

- Configuring MDT
- Creating and deploying an image

After completing this module, students will be able to:

- Describe the Windows Server 2016 image deployment process.
- Create and manage deployment images by using MDT.
- Describe the different workloads in the virtual machine environment.

Module 12: Managing, monitoring, and maintaining virtual machine installations

This module provides an overview on Windows Server Update Services (WSUS) and the requirements to implement WSUS. It explains how to manage the update process with WSUS. Additionally, this module provides an overview of Windows PowerShell Desired State Configuration (DSC) and Windows Server 2016 monitoring tools. Finally, this module describes how to use Performance Monitor, and how to manage event logs.

Lessons

- WSUS overview and deployment options
- Update management process with WSUS
- Overview of Windows PowerShell DSC
- Overview of Windows Server 2016 monitoring tools
- Using Performance Monitor
- Monitoring event logs

Lab: Implementing WSUS and deploying updates

- Implementing WSUS
- Configuring update settings
- Approving and deploying an update by using WSUS

Lab: Monitoring and troubleshooting Windows Server 2016

- Establishing a performance baseline
- Identifying the source of a performance problem
- Viewing and configuring centralized event logs

After completing this module, students will be able to:

- Describe the purpose of WSUS and the requirements to implement WSUS.
- Manage the update process with WSUS.
- Describe the purpose and benefits of Windows PowerShell DSC.
- Describe the monitoring tools available in Windows Server 2016.
- Use Performance Monitor.
- Manage event logs.



Course 20741B: Networking with Windows Server 2016

Course Outline

Module 1: Planning and implementing an IPv4 network This module also explains how to use fundamental networking tools and techniques to configure and troubleshoot IPv4-based networks.

Lessons

- Planning IPv4 addressing
- Configuring an IPv4 host
- Managing and troubleshooting IPv4 network connectivity

Lab: Planning an IPv4 network

- Planning the IPv4 address assignments

Lab: Implementing and troubleshooting an IPv4 network

- Verifying IPv4
- Troubleshooting IPv4

After completing this module, students will be able to:

- Plan IPv4 addressing.
- Configure an IPv4 host.
- Manage and troubleshoot IPv4 network connectivity

Module 2: Implementing DHCP

This module explains how to plan and implement DHCP to support the IPv4 infrastructure.

Lessons

- Overview of the DHCP server role
- Deploying DHCP
- Managing and troubleshooting DHCP

Lab: Implementing DHCP

- Planning a DHCP server implementation
- Implementing the DHCP configuration
- Validating the DHCP implementation

After completing this module, students will be able to:

- Explain the DHCP server role.
- Deploy DHCP.
- Manage and troubleshoot DHCP.

Module 3: Implementing IPv6 This module explains how to implement IPv6, and how to integrate IPv6 and IPv4 networks.

Lessons

- Overview of IPv6 addressing
- Configuring an IPv6 host



- Implementing IPv6 and IPv4 coexistence
- Transitioning from IPv4 to IPv6

Lab: Configuring and evaluating IPv6 transition technologies

- Reviewing the default IPv6 configuration
- Implementing DHCPv6
- Configuring network integration by using ISATAP
- Configuring native IPv6 connectivity
- Configuring 6to4 connectivity

After completing this module, students will be able to:

- Describe the features and benefits of IPv6.
- Configure an IPv6 host.
- Implement the coexistence between IPv4 and IPv6 networks.
- Transition from an IPv4 network to an IPv6 network.

Module 4: Implementing DNS

This module explains how to install, configure, and troubleshoot DNS within the organization's network.

Lessons

- Implementing DNS servers
- Configuring zones in DNS
- Configuring name resolution between DNS zones
- Configuring DNS integration with Active Directory Domain Services (AD DS)
- Configuring advanced DNS settings

Lab: Planning and implementing name resolution by using DNS

- Planning DNS name resolution
- Implementing DNS servers and zones

Lab: Integrating DNS with Active Directory

- Integrating DNS with Active Directory

Lab: Configuring advanced DNS settings

- Configuring DNS policies
- Validating the DNS implementation
- Troubleshooting DNS

After completing this module, students will be able to:

- Implement DNS servers.
- Configure zones in DNS.
- Configure name resolution between DNS zones.
- Configure DNS integration with AD DS.
- Configure advanced DNS settings

Module 5: Implementing and managing IPAM

This module explains how to implement and manage the IPAM feature in Windows Server 2016. This module also explains how to use IPAM to manage services such as DHCP and DNS.

Lessons

- Overview of IPAM
- Deploying IPAM



- Managing IP address spaces by using IPAM

Lab: Implementing IPAM

- Installing the IPAM Server feature
- Provisioning the IPAM Server
- Managing IP address spaces by using IPAM After completing this module, students will be able to:
 - Describe the IPAM functionality and components.
 - Deploy IPAM.
 - Manage IP address spaces by using IPAM.

Module 6: Remote access in Windows Server 2016 This module explains how to plan for remote access in Windows Server 2016 and how to implement Web Application Proxy.

Lessons

- Overview of remote access
- Implementing the Web Application Proxy

Lab: Implementing Web Application Proxy

- Implementing Web Application Proxy
- Validating the Web Application Proxy deployment

After completing this module, students will be able to:

- Describe remote access.
- Implement Web Application Proxy.

Module 7: Implementing DirectAccess

This module explains how to implement and manage Direct Access in Windows Server 2016.

Lessons

- Overview of Direct Access
- Implementing DirectAccess by using the Getting Started Wizard
- Implementing and managing an advanced Direct Access infrastructure

Lab: Implementing DirectAccess by using the Getting Started Wizard

- Verifying readiness for a Direct Access deployment
- Configuring Direct Access
- Validating the Direct Access deployment

Lab: Deploying an advanced Direct Access solution

- Preparing the environment for Direct Access
- Implementing the advanced Direct Access infrastructure
- Validating the Direct Access deployment

After completing this module, students will be able to:

- Explain Direct Access and how it works.
- Implement Direct Access by using the Getting Started Wizard.
- Implement and manage an advanced Direct Access infrastructure.

Module 8: Implementing VPNs

This module explains how to implement and manage remote access in Windows Server 2016 by using VPNs.

Lessons

- Planning VPNs
- Implementing VPNs

Lab: Implementing VPN

- Implementing V



- Validating the VPN deployment
 - Troubleshooting VPN access

After completing this module, students will be able to:

- Plan a VPN solution.
- Implement VPNs.

Module 9: Implementing networking for branch offices

This module explains how to implement network services for branch offices.

Lessons

- Networking features and considerations for branch offices
- Implementing Distributed File System (DFS) for branch offices
- Implementing BranchCache for branch offices

Lab: Implementing DFS for branch offices

- Implementing DFS
- Validating the deployment

Lab: Implementing BranchCache

- Implementing BranchCache
- Validating the deployment

After completing this module, students will be able to:

- Describe the networking features and considerations for branch offices.
- Implement DFS for branch offices.
- Implement BranchCache for branch offices.

Module 10: Configuring advanced networking features

This module explains how to implement an advanced networking infrastructure.

Lessons

- Overview of high performance networking features
- Configuring advanced Microsoft Hyper-V networking features

Lab: Configuring advanced Hyper-V networking features

- Creating and using Hyper-V virtual switches
- Configuring and using the advanced features of a virtual switch

After completing this module, students will be able to:

- Describe the high performance networking enhancements in Windows Server 2016.
- Configure the advanced Microsoft Hyper-V networking features.

Module 11: Implementing Software Defined Networking

This module explains how to implement SDN.

Lessons

- Overview of SDN.
- Implementing network virtualization
- Implementing Network Controller

Lab: Deploying Network Controller

- Preparing to deploy Network Controller
- Deploying Network Controller

After completing this module, students will be able to:

- Describe SDN.
- Implement network virtualization
- Implement Network Controller.



Course 20742B: Identity with Windows Server 2016

Course Outline

Module 1: Installing and configuring domain controllers

This module describes the features of AD DS and how to install domain controllers (DCs). It also covers the considerations for deploying DCs.

Lessons

- Overview of AD DS
- Overview of AD DS domain controllers
- Deploying a domain controller

Lab: Deploying and administering AD DS

- Deploying AD DS
- Deploying domain controllers by performing domain controller cloning
- Administering AD DS

After completing this module, students will be able to:

- Describe AD DS and its main components.
- Describe the purpose and roles of domain controllers.
- Describe the considerations for deploying domain controllers.

Module 2: Managing objects in AD DS

This module describes how to use various techniques to manage objects in AD DS. This includes creating and configuring user, group, and computer objects.

Lessons

- Managing user accounts
- Managing groups in AD DS
- Managing computer objects in AD DS
- Using Windows PowerShell for AD DS administration
- Implementing and managing OUs

Lab: Managing AD DS objects

- Creating and managing groups in AD DS
- Creating and configuring user accounts in AD DS
- Managing computer objects in AD DS

Lab: Administering AD DS

- Delegate administration for OUs
- Creating and modifying AD DS objects with Windows PowerShell

After completing this module, students will be able to:

- Manage user accounts in AD DS.
- Manage groups in AD DS.
- Manage computer objects in AD DS.
- Use Windows PowerShell for AD DS administration.
- Implement and manage OUs
- Administer AD DS.



Module 3: Advanced AD DS infrastructure management

This module describes how to plan and implement an AD DS deployment that includes multiple domains and forests. The module provides an overview of the components in an advanced AD DS deployment, the process of implementing a distributed AD DS environment, and the procedure for configuring AD DS trusts

Lessons

- Overview of advanced AD DS deployments
- Deploying a distributed AD DS environment
- Configuring AD DS trusts

Lab: Domain and trust management in AD DS

- Implementing forest trusts
- Implementing child domains in AD DS

After completing this module, students will be able to:

- Describe the components of an advanced AD DS deployment.
- Deploy a distributed AD DS environment.
- Configure AD DS trusts.

Module 4: Implementing and administering AD DS sites and replication

This module describes how to plan and implement an AD DS deployment that includes multiple locations. The module explains how replication works in a Windows Server 2016 AD DS environment.

Lessons

- Overview of AD DS replication
- Configuring AD DS sites
- Configuring and monitoring AD DS replication

Lab: Implementing AD DS sites and replication

- Modifying the default site
- Creating additional sites and subnets
- Configuring AD DS replication
- Monitoring and troubleshooting AD DS replication

After completing this module, students will be able to:

- Describe how AD DS replication works.
- Configure AD DS sites to help optimize authentication and replication traffic.
- Configure and monitor AD DS replication.

Module 5: Implementing Group Policy

This module describes how to implement a GPO infrastructure. The module provides an overview of the components and technologies that compose the Group Policy framework.

Lessons

- Introducing Group Policy
- Implementing and administering GPOs
- Group Policy scope and Group Policy processing
- Troubleshooting the application of GPOs

Lab: Implementing a Group Policy infrastructure

- Creating and configuring GPOs
- Managing GPO scope



Lab: Troubleshooting Group Policy infrastructure

- Verify GPO application
- Troubleshooting GPOs

After completing this module, students will be able to:

- Explain what Group Policy is.
- Implement and administer GPOs.
- Describe Group Policy scope and Group Policy processing.
- Troubleshoot GPO application.

Module 6: Managing user settings with Group Policy

This module describes how to configure Group Policy settings and Group Policy preferences. This includes implementing administrative templates, configuring folder redirection and scripts, and configuring Group Policy preferences.

Lessons

- Implementing administrative templates
- Configuring Folder Redirection, software installation, and scripts
- Configuring Group Policy preferences

Lab: Managing user settings with GPOs

- Using administrative templates to manage user settings
- Implement settings by using Group Policy preferences
- Configuring Folder Redirection
- Planning Group Policy (optional)

After completing this module, students will be able to:

- Implement administrative templates.
- Configure Folder Redirection, software installation, and scripts.
- Configure Group Policy preferences.

Module 7: Securing Active Directory Domain Services

This module describes how to configure domain controller security, account security, password security, and Group Managed Service Accounts (gMSA).

Lessons

- Securing domain controllers
- Implementing account security
- Implementing audit authentication
- Configuring managed service accounts

Lab: Securing AD DS

- Implementing security policies for accounts, passwords, and administrative groups
- Deploying and configuring an RODC
- Creating and associating a group MSA

After completing this module, students will be able to:

- Secure domain controllers.
- Implement account security.
- Implement audit authentication.
- Configure managed service accounts (MSAs).



Module 8: Deploying and managing AD CS

This module describes how to implement an AD CS deployment. This includes deploying, administering, and troubleshooting CAs.

Lessons

- Deploying CAs
- Administering CAs
- Troubleshooting and maintaining CAs

Lab: Deploying and configuring a two-tier CA hierarchy

- Deploying an offline root CA
- Deploying an enterprise subordinate CA

After completing this module, students will be able to:

- Deploy CAs.
- Administer CAs.
- Troubleshoot and maintain CAs.

Module 9: Deploying and managing certificates

This module describes how to deploy and manage certificates in an AD DS environment. This involves deploying and managing certificate templates, managing certificate revocation and recovery, using certificates in a business environment, and implementing smart cards.

Lessons

- Deploying and managing certificate templates
- Managing certificate deployment, revocation, and recovery
- Using certificates in a business environment
- Implementing and managing smart cards

Lab: Deploying and using certificates

- Configuring certificate templates
- Enrolling and using certificates
- Configuring and implementing key recovery

After completing this module, students will be able to:

- Deploy and manage certificate templates.
- Manage certificates deployment, revocation, and recovery.
- Use certificates in a business environment.
- Implement and manage smart cards

Module 10: Implementing and administering AD FS

This module describes AD FS and how to configure AD FS in a single-organization scenario and in a partner-organization scenario.

Lessons

- Overview of AD FS
- AD FS requirements and planning
- Deploying and configuring AD FS
- Web Application Proxy Overview

Lab: Implementing AD FS

- Configuring AD FS prerequisites
- Installing and configuring AD FS
- Configuring an internal application for AD
- Configuring AD FS for federated business partners



After completing this module, students will be able to:

- Describe AD FS.
- Explain how to deploy AD FS.
- Explain how to implement AD FS for a single organization.
- Explain how to extend AD FS to external clients.
- Implement single sign-on (SSO) to support online services.

Module 11: Implementing and administering AD RMS

This module describes how to implement an AD RMS deployment. The module provides an overview of AD RMS, explains how to deploy and manage an AD RMS infrastructure, and explains how to configure AD RMS content protection.

Lessons

- Overview of AD RMS
- Deploying and managing an AD RMS infrastructure
- Configuring AD RMS content protection

Lab: Implementing an AD RMS infrastructure

- Installing and configuring AD RMS
- Configuring AD RMS templates
- Using AD RMS on clients

After completing this module, students will be able to:

- Describe AD RMS.
- Deploy and manage an AD RMS infrastructure.
- Configure AD RMS content protection.

Module 12: Implementing AD DS synchronization with Microsoft Azure AD

This module describes how to plan and configure directory syncing between Microsoft Azure Active Directory (Azure AD) and on-premises AD DS. The module describes various sync scenarios, such as Azure AD sync, AD FS and Azure AD, and Azure AD Connect.

Lessons

- Planning and preparing for directory synchronization
- Implementing directory synchronization by using Azure AD Connect
- Managing identities with directory synchronization

Lab: Configuring directory synchronization

- Preparing for directory synchronization
- Configuring directory synchronization
- Managing Active Directory users and groups and monitoring directory synchronization

After completing this module, students will be able to:

- Plan and prepare for directory synchronization.
- Implement directory synchronization by using Microsoft Azure Active Directory Connect (Azure AD Connect).
- Manage identities with directory synchronization.

Module 13: Monitoring, managing, and recovering AD DS This module describes how to monitor, manage, and maintain AD DS to help achieve high availability of AD DS.

Lessons

- Monitoring AD DS
- Managing the Active Directory database
- Active Directory backup and recovery options for AD DS and other identity and access solutions



Lab: Recovering objects in AD DS

- Backing up and restoring AD DS
- Recovering objects in AD DS

After completing this module, students will be able to:

- Monitor AD DS.
- Manage the Active Directory database.
- Describe the backup and recovery options for AD DS and other identity access solutions.