

# Windows Server Essentials

Concatenated courseware based on courses 20740WV, 20741WV, and 20742WV

## About this course

A unique concatenation of Windows Server topics examines the services and features of Microsoft Windows Server from 2012 to 2022. This course is designed to help learners evolve from on-premises novice to successful intermediate administrator. Learn Windows Server installation as well as storage and compute services, and who need to understand the scenarios, requirements, and storage and compute options that are available and applicable to Windows Server.

Then tackle more core and advanced features required to administrate networks and infrastructure, including IP, DHCP, and DNS protocols and remote access.

Additionally, this course examines how to deploy other Active Directory server roles, such as Active Directory Federation Services (AD FS) and Active Directory Certificate Services (AD CS), and how to connect AD DS with Azure Active Directory (Azure AD).

By completing this course, you'll achieve the following knowledge and skills to:

- Prepare and install Windows Server with Desktop Experience and as a Server Core installation and plan a server upgrade and migration strategy.
- Describe the various storage options, including partition table formats, basic and dynamic disks, file systems, virtual hard disks, and drive hardware, and explain how to manage disks and volumes.
- Describe enterprise storage solutions and select the appropriate solution for a given situation.
- Implement and manage Storage Spaces and Data Deduplication.
- Install and configure Microsoft Hyper-V.
- Deploy, configure, and manage Windows and Hyper-V containers.
- Describe the high availability and disaster recovery technologies in Windows Server.
- Plan, create, and manage a failover cluster.
- Implement failover clustering for Hyper-V virtual machines.
- Create and manage deployment images.
- Manage, monitor, and maintain virtual machine installations.
- Plan and implement IPv4, IPv6, and Dynamic Host Configuration Protocol (DHCP).
- Implement name resolution with Domain Name System (DNS).

- Plan and implement remote access, and networking for branch offices.
- Configure advanced networking features.
- Install and configure domain controllers.
- Manage objects in AD DS by using graphical tools and Windows PowerShell and implement AD DS in complex environments.
- Implement AD DS sites and configure and manage replication.
- Implement and manage Group Policy Objects (GPOs) and manage user settings by using GPOs.
- Secure AD DS and user accounts.
- Implement and manage a certification authority (CA) hierarchy with AD CS.
- Deploy and manage certificates.
- Implement and administer AD FS).
- Implement synchronization between AD DS and Azure AD.
- Monitor, troubleshoot, and establish business continuity for AD DS services.

## Target audience

This course is intended for learners who have some experience working with Windows Server, and who are looking for a singular course that covers Windows Server from installation, storage, and compute technologies to more sophisticated server features.

Attendees of this course typically are learners who have some knowledge about, and experience with, Windows Server identity services, and who want to gain additional insight into Windows Server identity and access technologies.

## Recommended prerequisites

Before attending this course, students must have:

- A basic understanding of networking fundamentals.
- An awareness and understanding of security best practices.
- A basic understanding of virtualization
- An understanding of basic AD DS concepts.
- Basic knowledge of server hardware.
- Experience supporting and configuring Windows client operating systems such as Windows 10 or later.

Additionally, students would benefit from having some previous Windows Server operating system experience, such as experience as a Windows Server systems administrator.

# Course outline

## Module 1 Introducing Windows Server

### Topics

- Introducing Windows Server
- Configuring Windows Server
- Configuring and Customizing the Start Menu, Desktop, Taskbar, and Notification Settings
- Using Windows Server Settings
- Using Control Panel
- Using Server Manager
- Using Computer Management
- Networking with Windows Server
- Exploring IPv4 and IPv6 Protocols
- Using the Default Gateway
- Understanding Name Resolution
- Configuring IP Settings and Name Resolution Settings
- Introducing Windows PowerShell

## Module 2 Windows Server installation and initial configuration

### Topics

- Selecting a suitable Windows Server edition
- Hardware requirements for Windows Server
- Overview of installation options
- What is Windows Server Core?
- Installing Server Core and Server with Desktop Experience
- Post-installation configuration settings
- Using sconfig tool to administer Server Core
- In-place upgrade vs. server migration
- In-place upgrade scenarios
- Windows Server licensing and activation

- Windows Server Servicing channels
- Overview of the least-privilege administration concept
- What is Windows Server Admin Center?
- Server Manager overview (topic in Lesson 7)
- Remote Server Administration Tools (RSAT) overview
- Managing Windows servers remotely

## **Lab 1 Installing and configuring Windows Server**

- Exercise 1: Installing Windows Server with Desktop Experience
- Exercise 2: Completing post-installation tasks on Windows Server
- Exercise 3: Performing remote management

# **Module 3 Configuring drives and storage for Windows Server**

## **Topics**

- Windows Server storage options overview
- Selecting a partition table format
- Selecting a disk type
- Selecting a file system
- Resilient File System (ReFS) overview and scenarios of usage
- Using .vhd and .vhdx file types in Windows Server
- What are disk volumes?
- Options for managing volumes
- Extending and shrinking a volume
- What is RAID?
- RAID levels supported in Windows Server

## **Lab 2 Configuring drives and storage**

- Exercise 1: Creating and managing volumes
- Exercise 2: Resizing volumes
- Exercise 3: Managing virtual hard disks

# Module 4 Configuring sharing and permissions in Windows Server

## Topics

- What is SMB protocol?
- Configuring SMB shares in Windows Server
- NTFS vs Share Permissions
- Basic and advanced NTFS permissions overview
- Configuring security permissions and permission inheritance
- What is effective access?
- Configuring file and folder auditing
- NFS sharing overview
- Configuring printer sharing
- Best practices for configuring permissions and sharing

## Lab 3 Configuring sharing and permissions in Windows Server

- Exercise 1: Configure shares
- Exercise 2: Configure basic and advanced permissions
- Exercise 3: Configuring auditing and reviewing effective access

# Module 5 Hyper-V overview

## Topics

- What is Hyper-V?
- What is a virtual machine?
- Supported host and guest operating systems for Hyper-V
- Prerequisites and requirements for installing Hyper-V
- Storage options and considerations in Hyper-V
- Options for storing virtual hard disks
- Hyper-V networking overview and configuration
- Virtual machines configuration and generation versions
- Virtual machine settings overview
- Creating and managing virtual machines
- Virtual machine checkpoints overview

- How to make Hyper-V highly available?

## **Lab 4 Installing and configuring Hyper-V and virtual machines**

- Exercise 1: Installing and verifying installation of the Hyper-V server role
- Exercise 2: Configuring Hyper-V networks
- Exercise 3: Creating and configuring virtual machines

## **Module 6 Implementing and managing DHCP in Windows Server**

### **Topics**

- What is IPv4 and how does it work?
- Configuring IPv4 settings on Windows computers
- Overview of IPv6
- What is DHCP and how does it work?
- How are addresses leased and renewed?
- Installing, authorizing, and configuring DHCP server
- Creating and configuring DHCP scope and scope options
- Options for DHCP high availability
- Troubleshooting DHCP and IP address assignment

## **Lab 5 Implementing IP addressing on IPv4**

- Exercise 1: Configure Ipv4 and verify IPv4 communication
- Exercise 2: Troubleshoot IPv4
- Exercise 3: Implement the DHCP configuration

## **Module 7 Implementing and managing DNS in Windows Server**

### **Topics**

- Overview of the DNS name-resolution process
- Recursive and iterative queries overview
- DNS components
- DNS zones and records overview

- Configuring DNS options on clients
- Creating DNS zones and records in Windows Server DNS
- DNS caching, forwarding and root hints
- How DNS integrates with AD DS?
- DNS zone replication overview
- How to secure DNS service and name resolution process?
- Troubleshooting and testing DNS and name resolution basics

## **Lab 6 Implementing name resolution based on DNS in Windows Server**

- Exercise 1: Implementing DNS
- Exercise 2: Configuring DNS settings
- Exercise 3: Configuring integration between DNS and AD DS

## **Module 8 Implementing VPN in Windows Server**

### **Topics**

- What is VPN and when do you need to use it?
- What are point-to-site and site-to-site VPNs?
- Tunneling options in VPNs on Windows Server
- Authentication protocols for VPN on Windows Server
- Configuring VPN Server on Windows Server RAS
- Configuring VPN Profiles
- What is Always on VPN?

### **Lab 7 Implementing VPN on Windows Server**

- Exercise 1: Implementing VPN Server
- Exercise 2: Establishing VPN connection from client

## **Module 9 Deploying AD DS on Windows Server**

### **Topics**

- Active Directory Domain Services (AD DS) Overview

- What is an AD DS forest?
- What is an AD DS domain?
- What are OUs?
- What is the AD DS schema?
- Overview of AD DS administration tools in Windows Server
- What is a domain controller?
- What are global catalog servers?
- Overview of SRV records for AD DS
- How does the AD DS sign-in process work?
- Overview of operations masters in AD DS
- Installing a domain controller from Server Manager
- Upgrading a domain controller
- Installing a domain controller from media
- Cloning domain controllers
- Best practices for domain-controller virtualization

## **Lab 8 Deploying and administering AD DS**

- Exercise 1: Deploying AD DS
- Exercise 2: Administering AD DS

# **Module 10 Managing AD DS objects**

## **Topics**

- What are AD DS objects?
- Creating and managing user accounts and their attributes
- Disable and delete user accounts
- Perform bulk operations on user objects
- Using PowerShell to manage AD DS objects
- User account templates overview
- Security and distribution groups overview
- Group scopes
- Implementing group management
- Delegate management of groups in AD DS
- Restricted groups overview
- Default groups overview
- Special identities overview



- Creating and managing computer objects in AD DS
- Joining a computer to a domain and establishing a secure channel with AD DS
- Creating and managing OU objects in AD DS
- Delegating control over OUs in AD DS

## **Lab 9 Managing objects in AD DS**

- Exercise 1: Creating and managing user accounts by using GUI tools
- Exercise 2: Creating and managing groups
- Exercise 3: Managing computer accounts
- Exercise 4: Using Windows PowerShell to manage AD DS objects
- Exercise 5: Delegate administration for OUs

# **Module 11 Advanced AD DS infrastructure management**

## **Topics**

- Overview of domain and forest boundaries
- Implementation of multiple domains and multiple forests
- Manage objects in complex AD DS deployments
- AD DS domain and forest functional levels
- Deploying new AD DS domains
- Considerations for implementing complex AD DS environments
- Overview of AD DS trust types
- How do trusts work in a forest?
- How do trusts work between forests?
- Configuring advanced AD DS trust settings

## **Lab 10 Configuring AD DS infrastructure**

- Exercise 1: Configuring forest trust in AD DS
- Exercise 2: Managing domain and forest trust relationships in AD DS

# **Module 12 AD DS sites and replication**

## **Topics**

- What are AD DS partitions?
- AD DS replication overview

- What are AD DS sites and why do we need sites?
- How AD DS replication works within a site?
- Resolving replication conflicts
- How is replication topology generated?
- How SYSVOL replication works?
- How replication works between sites?
- What is the intersite topology generator (ISTG)?
- How domain-joined computers locate domain controllers in a multi-site environment?
- What are AD DS site links?
- What is site link bridging?
- Managing and troubleshooting site link replication

## **Lab 11 Implementing AD DS sites and replication**

- Exercise 1: Creating new AD DS sites
- Exercise 2: Configuring AD DS site and replication settings

## **Module 13 Securing AD DS**

### **Topics**

- What security risks can affect domain controllers and AD DS?
- Modify security settings of domain controllers
- Implement secure authentication in AD DS
- Secure physical access to domain controllers
- What are read-only domain controllers (RODCs) and when do you need to use them?
- Deploying and configuring an RODC
- Configuring RODC local administration
- Account security in Windows Server
- Understand password policies, account lockout policies, and Kerberos authentication policies
- Protecting critical groups in AD DS
- Fine-grained password and lockout policies overview
- Create and manage Password Settings Objects (PSOs)
- Enhance password authentication with Windows Hello
- Account logon and logon events
- Configuring audit policies in AD DS

## Lab 12 Securing AD DS environment

- Exercise 1: Implementing security policies for accounts, passwords, and administrative groups
- Exercise 2: Deploying and configuring an RODC

## Module 14 Monitor, manage and recover AD DS

### Topics

- Understanding performance and bottlenecks
- Monitoring tools in Windows Server
- Use Performance Monitor to monitor AD DS
- Active Directory database overview
- Use Ntdsutil.exe to manage the Active Directory database
- Active Directory snapshots overview
- Understand object deletion and recovery
- Undelete objects without the recycle bin
- Enable the Active Directory recycle bin
- Configure the Active Directory recycle bin
- General backup and recovery tools and procedures for AD DS

## Lab 13 Recovering objects in AD DS

- Exercise 1: Backing up and restoring AD DS
- Exercise 2: Recovering objects in AD DS

## Module 15 Implement Group Policy

### Topics

- What is Group Policy and what are the benefits of Group Policy?
- What are Group Policy Objects (GPOs)?
- Managing GPO scope and inheritance
- What are the Group Policy Client service and client-side extensions?
- Implementing domain-based GPOs
- GPO storage and replication overview
- Common GPO management tasks

- What is Group Policy delegation?
- Link GPOs to containers
- Understand Group Policy processing, inheritance, and precedence
- Implement security filtering and WMI filtering
- Enable and disable GPOs and GPO nodes
- What is the Resultant Set of Policy (RsoP)?

## **Lab 14 Implementing Group Policy infrastructure**

- Exercise 1: Creating and configuring GPOs
- Exercise 2: Managing GPO scope
- Exercise 3: Verifying GPO application
- Exercise 4: Troubleshooting GPOs

# **Module 16 Manage User Settings with Group Policy**

## **Topics**

- What are administrative templates for Group Policy?
- What are security templates?
- Managing user environment and settings with Group Policy
- What is Folder Redirection?
- Settings for configuring Folder Redirection and folder security
- Managing software deployments with Group Policy
- Group Policy settings for applying scripts
- What are Group Policy preferences?
- Compare Group Policy preferences with settings
- Troubleshooting Group Policy application

## **Lab 15 Managing user settings with Group Policy**

- Exercise 1: Using administrative templates to manage user settings
- Exercise 2: Implementing settings by using Group Policy preferences
- Exercise 3: Configuring Folder Redirection

## Module 17 Deploy and manage AD CS

### Topics

- What is the Active Directory Certificate Services role?
- Options for implementing Certificate Authority (CA) hierarchies in Windows Server
- Standalone vs. enterprise CAs
- Considerations for deploying a root CA
- Considerations for deploying a subordinate CA
- Managing CAs and CA properties
- Configuring CA security and administration
- Security roles for CA administration
- Configuring CA policy and exit modules
- Configuring CDP and AIA locations
- Monitoring CA operations
- Troubleshooting CAs
- Renewing a CA certificate
- How to move a root CA to another computer

### Lab 16 Deploying and managing AD CS infrastructure

- Exercise 1: Deploying an offline root CA
- Exercise 2: Deploying an enterprise subordinate CA

## Module 18 Deploying and managing certificates in Windows Server

### Topics

- What is the Active Directory Certificate Services role?
- Options for implementing Certificate Authority (CA) hierarchies in Windows Server
- Standalone vs. enterprise CAs
- Considerations for deploying a root CA
- Considerations for deploying a subordinate CA
- Managing CAs and CA properties
- Configuring CA security and administration
- Security roles for CA administration
- Configuring CA policy and exit modules

- Configuring CDP and AIA locations
- Monitoring CA operations
- Troubleshooting CAs
- Renewing a CA certificate
- How to move a root CA to another computer

## **Lab 17 Deploying and using certificates**

- Exercise 1: Deploying an offline root CA
- Exercise 2: Deploying an enterprise subordinate CA