MCSE MCSA MCSA Guide to Installation Storage and Compute with Microsoft Windows Server 2016 Exam 70-740 1st edition Tomsho Solutions Manual

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Chapter 1 Solutions

Review Questions

1. Which of the following best defines a computer used as a server?
   a. Computer hardware that includes fast disk drives and a lot of memory
   b. A computer with OS software that has a web browser and Client for Microsoft Networks
   c. A computer with OS software that includes directory services and domain name services
   d. A computer with Linux installed

REFERENCES: Server: Hardware or Software?

2. Which of the following best describes a Windows client OS?
   a. Supports up to 64 processors
   b. Includes fault-tolerance features, such as RAID-5 and clustering
   c. Supports network connections based on the number of purchased licenses
   d. Supports a limited number of signed-in network users

REFERENCES: Server Operating Systems Versus Desktop Operating Systems

3. Which of the following is a service supported by Windows 10? (Choose all that apply.)
   a. File and Printer Sharing
   b. Active Directory
   c. Hyper-V
   d. Distributed File System

REFERENCES: Server Operating Systems Versus Desktop Operating Systems

4. Which server feature provides fault tolerance?
   a. FTP
   b. failover clustering
   c. DNS
   d. Internet Printing Protocol

REFERENCES: Windows Server 2016 Roles and Features

5. Which Windows Server core technology can you use to install, configure, and remove server roles and features?
   a. AD DS
   b. NTFS
   c. Microsoft Management Console
   d. Server Manager

REFERENCES: Windows Server 2016 Core Technologies

6. With which Windows Server core technology do you use snap-ins?
   a. AD DS
   b. NTFS
   c. Microsoft Management Console

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d. Server Manager

REFERENCES: Microsoft Management Console

7. You are signed in to a server name Mktg-Srv1 that is a part of the Marketing workgroup. What kind of server are you signed in to?

   a. Domain controller

   b. Member server

   c. Standalone server

   d. Cluster server

REFERENCES: Windows Networking Concepts

8. The IT department sent out a memo stating that it will start delivering desktop computer interfaces through the IT data center via a web browser interface. What technology is the IT department using?

   a. Public cloud computing

   b. Server clustering

   c. Directory server

   d. Virtual desktop infrastructure

REFERENCES: Hyper-V and Cloud Computing

9. Which component of a network connection specifies the rules and format of communication between network devices?

   a. Network protocol

   b. Network interface card

   c. Network client

   d. Device driver

REFERENCES: Windows Networking Components

10. Which type of networking component is File and Printer Sharing for Microsoft Networks?

    a. Network protocol

    b. Server software

    c. Client software

    d. Device driver

REFERENCES: Windows Networking Components

11. What feature of Windows Server 2016 allows you to run command on a virtual machine directly from the host server?

    a. PowerShell Direct

    b. Windows containers

    c. Nano Server

    d. Nested virtualization

REFERENCES: PowerShell

12. You're a consultant for a small business with four computer users. The company's main reason for networking is to share the Internet connection, two printers, and several documents. Keeping costs down is a major consideration, and users should be able to manage their own shared resources. Which networking model best meets the needs of this business?

    a. Domain

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b. Workgroup

c. Management

d. Client/Server

REFERENCES: Windows Networking Concepts

13. Which networking component includes a device driver?

a. Network server software

b. Network client software

c. Network protocol

d. Network interface

REFERENCES: Windows Networking Components

14. If you want to share files on your computer with other Windows computers, what should you have installed and enabled on your computer?

a. Client for Microsoft Networks

b. File and Printer Sharing for Microsoft Networks

c. Active Directory

d. Domain Name System

REFERENCES: Windows Server 2016 Roles and Features

15. If you want to make a computer a domain controller, which of the following should you install?

a. Client for Microsoft Networks

b. File and Printer Sharing for Microsoft Networks

c. Active Directory

d. Domain Name System

REFERENCES: Windows Networking Concepts

16. Which new feature in Windows Server 2016 is not a full-fledged server but is targeted at specific use cases such as a DNS server or web server?

a. PowerShell Direct

b. Windows containers

c. Nano Server

d. Nested virtualization

REFERENCES: Nano Server

17. Which of the following is the common framework in which most Windows Server 2016 administrative tools run?

a. Windows Management Center

b. Microsoft Management Console

c. Server Configuration Manager

d. Windows Configuration Manager

REFERENCES: Microsoft Management Console

18. You have been asked to advise a business on how best to set up its Windows network. Eight workstations are running Windows 10. The business recently acquired a new contract that requires running a network application on a server. A secure and reliable environment is critical to run this application, and security management should be centralized. There are enough funds

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in the budget for new hardware and software, if necessary. Which Windows networking model should you advise this business to use?

a. Windows domain using Active Directory

b. Windows workgroup using Active Directory

c. Peer-to-peer network using File and Printer Sharing

d. Peer-to-peer network using Active Directory

REFERENCES: Windows Networking Concepts

19. Which new feature in Windows Server 2016 isolates applications and shares the host OS kernel?

a. PowerShell Direct

b. Windows containers

c. Nano Server

d. Nested virtualization

REFERENCES: Windows Containers

20. Which of the following roles should you install if you want to create and manage virtual machines?

a. Network Policy and Access Services

b. Server Manager

c. Hyper-V

d. DHCP Server

REFERENCES: Hyper-V and Cloud Computing

Case Projects

Case Project 1-1: Recommending a Network Model

In this scenario, you want to manage client computer and user policies and have centrally managed logon and security so the domain model should be chosen. You will need to install the Active Directory Domain Services role to make at least one domain controller.

Case Project 1-2: Preserving Disk Space

The file format should be NTFS, and disk quotas should be enabled on the data volume to restrict the amount of space users' files can occupy on a volume.

Case Project 1-3: Explaining Cloud Computing

Cloud computing is a collection of technologies for abstracting the details of how applications, storage, network, and other computing resources are delivered to users. One goal of cloud computing is to abstract the details of how things get done so that people can get on with their work. It allows users to focus on their work instead of getting caught up in how the technology works. Cloud computing is a good solution when users are accessing data and applications from remote and mobile devices because the computing occurs on servers in the data center via virtualization technology. For now, there's no need to set up cloud computing at CSM Tech Publishing because the applications are used while on site, but it should be kept in mind for the future.

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Chapter 1

Introducing Windows Server 2016

At a Glance

Instructor's Manual Table of Contents

- Overview
- Objectives
- Teaching Tips
- Quick Quizzes
- Class Discussion Topics
- Additional Projects
- Additional Resources
- Key Terms

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Lecture Notes

Overview

This chapter discusses the roles a server operating system plays in a computer network and the many features in Windows Server 2016 designed to perform these roles. This chapter introduces students to core features such as NTFS, Active Directory, and Hyper-V while other chapters or other books in the MCSA series will cover them in more detail. New features in Windows Server 2016 are briefly explored, most of which are front and center in the Microsoft MCSA certification exams. All of these new features will be covered in detail in other chapters.

Chapter Objectives

After reading this chapter and completing the exercises, the student will be able to:

- Explain the role a server operating system has in a network
- Describe Windows Server 2016 roles and features
- Explain the core technologies of Windows Server 2016
- Summarize the new features of Windows Server 2016

Teaching Tips

The Role of a Server Operating System

1. Explain to students the role of a server in a business environment, and describe how it assists with business operations.

Server: Hardware or Software?

1. Explain the difference between hardware and software, and detail how the software installed on top of hardware determines its function as a server.
2. Point out that many types of devices can host networking services and, likewise, devices can be configured to host desktop applications in addition to networking services.

Server Operating Systems Versus Desktop Operating Systems

1. Emphasize how Windows Server 2016 prioritizes server functions over GUI tasks, and list some of the network services available on Server 2016:
    a. File and Printer Sharing
    b. Web Server

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c. Routing and Remote Access Services (RRAS)
d. Domain Name System (DNS)
e. Dynamic Host Configuration Protocol (DHCP)
f. File Transfer Protocol (FTP) Server
g. Active Directory
h. Distributed File System (DFS)
i. Hyper-V
j. Fax Server

2. Compare the services supported by Windows Server 2016 to the services supported by Windows 101. Note some of the increased reliability features available in the Server version of Windows in comparison to the desktop version.

Teaching Tip	The difference between what is considered a client vs. a server ultimately comes down to software installed on an operating system. Windows 10 can act as a server for some types of services, and Windows Server 2016 may function as a client in some circumstances.

Windows Server 2016 Roles and Features

1. Explain that a server role is a function or service that a server performs, whereas role services add functions to the main role.
2. Server features can be explained as functions that can be added to enhance or support an installed role.

Windows Server 2016 Core Technologies

1. List some of the technologies upon which the Windows Server 2016 is built:
   a. Server Manager
   b. New Technology File System (NTFS)
   c. Active Directory
   d. Microsoft Management Console (MMC)
   e. Disk Management
   f. File and printer sharing
   g. Windows networking
   h. PowerShell
   i. Hyper-V and cloud computing
   j. Storage spaces

Server Manager

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1. Explain how the Server Manager is used to provide a single interface for installing, configuring, and removing server roles and features, as well as ascertain server status and configuration.
2. Demonstrate to students how to navigate inside of the Server Manager. Students should be familiar with how to open administrative tools from within the Server Manager, as well as how to add additional servers to the Server Manager window.

NT File System (NTFS)

1. Introduce students to the New Technology File System (NTFS) and its main functions.
2. Compare the NTFS file system to FAT/FAT32, and note some of the limitations of NTFS's predecessor.
3. Stress the importance of the capability within NTFS to utilize file / folder permissions for different users and groups.

Microsoft Management Console

1. Teach students about the Microsoft Management Console, which serves as a common framework that consolidates administrative tools into a single GUI window through the use of snap-ins.
2. Show students some of the prebuilt MMCs and snap-ins available for use within the MMC.

Disk Management

1. Demonstrate to students how the Disk Management snap-in or the File and Storage Services role can be utilized to monitor and set up disks on a server.
2. Note that these tools can be used to create redundant disk configurations, such as RAID1 / RAID5 volumes.
3. The File and Storage Services provides the ability to create storage pools in Windows Server 2016.

Teaching Tip	RAID configurations that are created inside of an operating system make use of software RAID, which typically has reduced performance when compared to hardware RAID.

File and Printer Sharing

1. Point out that the most common reason for building and installing a server is to enable file, printer, and resource sharing.

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2. Make students aware of the advanced features provided by Windows Server 2016 for the explicit purpose of file, printer, and resource sharing, such as the Distributed File System, shadow copies, and disk quotas.

Windows Networking Concepts

1. Define the two network security models: workgroup and domain.
    a. Workgroup model: consists of a small collection of computers that share resources amongst each other. A server that participates in a workgroup is known as a stand-alone server.
    b. Domain model: a group of computers that share common management. One must be designated as a domain controller.
        i. Define a domain controller as a Windows server that has Active Directory installed and controls user access to domain resources.
        ii. Note that a member server is a server in the management scope of a domain but does not have Active Directory installed.

Windows Networking Components

1. Explain to students that a network connection consists of a collection of networking components, such as network interface, network protocol, and network client and server software.
    a. NIC: Note that a network interface consists of the network interface card (NIC) hardware and the device driver software. Use Figure 1-6 to demonstrate how to gather information on a network interface.
    b. Network protocol: educate students on how a network protocol outlines the rules and format of communication between network devices. Explain that TCP/IPv4 and TCP/IPv6 are both examples of network protocols.
    c. Network Client and Server Software: Define a network client as the software that sends requests to a server to access resources, whereas a network server is the software that responds to requests for shared network resources.

Active Directory Domain Services

1. Explain that the Active Directory Domain Services (AD DS) role installs Active Directory and makes a Windows Server 2016 computer into a domain controller.
2. Students should understand that Active Directory's main purpose is to handle authentication and authorization for users / computers on a network.

Quick Quiz 1

1. True or False: A computer with Windows Server 2016 installed cannot be used for common desktop applications.
   Answer: False

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2. What service is used to centralize authorization and authentication on a Windows network?
   A. Active Directory
   B. DNS
   C. DHCP
   D. NTFS
   Answer: A

3. TCP/IPv4 and TCP/IPv6 are both examples of _____, which specify the rules and format of communication between network devices.
   A. Network applications
   B. Network servers
   C. Network clients
   D. Network protocols
   Answer: D

4. The interface tool used to manage Windows Server 2016 is _____.
   Answer: Microsoft Management Console (MMC)

5. A Windows Network configured as a domain requires that at least one server is designated as a _____.
   A. Standalone server
   B. Domain controller
   C. Member server
   D. Workgroup server
   Answer: B

PowerShell

1. Introduce the PowerShell command-line interactive scripting environment, which can be used like a command prompt.
2. Note that PowerShell uses "cmdlets" for local and remote management, and that new cmdlets can be created for use within PowerShell.
3. Discuss the different versions of PowerShell that have been released over the years, starting with version 1.0 in 2006, up to the current version 5.0 available in Windows Server 2016.
4. Provide students with an overview of the PowerShell syntax, utilizing Figure 1-8. Define parameter and variable.

Teaching Tip	More information about the history and use of PowerShell in Windows can be found here: http://en.wikipedia.org/wiki/Powershell

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Hyper-V and Cloud Computing

1. Introduce terminology and definitions pertaining to Hyper-V, cloud computing, and virtualization:
    a. Cloud computing (show Figure 1-9).
    b. Virtualization
        i. Virtual machine
        ii. Guest OS
        iii. Host computer
        iv. Virtualization software
        v. Hypervisor
        vi. Hyper-V
2. Distinguish the public cloud from the private cloud.
3. Introduce virtual desktop infrastructure.

Storage Spaces

1. Storage spaces should be discussed as a tool that uses virtual drives to fully utilize local storage on a server by combining storage from different types of disks into a single storage unit.
2. Describe how thin provisioning can be used to expand storage and only use physical storage when it is actually needed.

New Features in Windows Server 2016

1. Introduce several of the features that make Window Server 2016 an even more robust operating system:
    a. Nano Server
    b. Windows containers
    c. Storage Spaces Direct
    d. Storage Replica
    e. PowerShell Direct
    f. Nested Virtualization

Nano Server

1. Provide students with information on Nano Server, a targeted-use server intended for virtual installations. Describe some of the purposes it can serve.
2. Display the Nano Server Recovery Console in Figure 1-20.

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Windows Containers

1. Present the concepts of containers in Windows and highlight the benefits of security and portability.

Storage Spaces Direct

1. Review the purpose and benefits of Storage Spaces, and note that Storage Spaces Direct expands the functionality to multiple servers on a network.

Storage Replica

1. Describe Storage Replica, which enables block-level data replication to occur automatically between datacenters, regardless of the distance.

PowerShell Direct

1. Highlight the addition of PowerShell Direct to the virtualization scene. It enables management of virtual machines directly from a PowerShell prompt running on the Hyper-V host.

Nested Virtualization

1. Point out the savings possible with nested virtualization used for training and test environments.

Quick Quiz 2

1. Examples of a _____ cloud are OneDrive, Office 365, Google Apps, and DropBox.
   Answer: Public

2. A new feature in Windows Server 2016 that expands the use of virtual disks to enlarge volumes is _____.
   Answer: Storage Spaces

3. PowerShell uses _____, which can perform various tasks such as display the date, or advanced tasks such as managing Active Directory.
   Answer: cmdlets

4. Software emulates hardware so that multiple operating systems can run on one server in _____.
   A. Nano Server networking
   B. HyperVision

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C. Virtualization
D. PowerShell

Answer: C

5. True or False: Microsoft Server 2016 includes Nano Server, a tiny device that will revolutionize datacenters by replacing larger, bulkier hardware.
   Answer: False

Class Discussion Topics

1. Start a class discussion on the future of datacenters—and IT staffing--following the expansion of virtualization and cloud computing.

2. Get students to discuss the use of PowerShell vs. MMC.

Additional Projects

1. Task students with testing some of the more basic PowerShell cmdlets. If possible, have students go through a basic PowerShell tutorial to get them acquainted with the utility.

2. Get students to experiment using the MMCs included in Windows for managing various aspects of the operating system.

Additional Resources

1. Microsoft page providing details about networking in Windows Server 2016: https://docs.microsoft.com/en-us/windows-server/networking/networking

2. Cmdlets and function modules included with PowerShell are compiled and presented at this MSDN site: https://msdn.microsoft.com/en-us/powershell/scripting/core-powershell/core-modules/windows-powershell-5.0

Key Terms

- **Active Directory** The Windows directory service that enables administrators to create and manage users and groups, set network-wide user and computer policies, manage security, and organize network resources.
- **cloud computing** A collection of technologies for abstracting the details of how applications, storage, network, and other computing resources are delivered to users.

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- **compute host** A server that provides processing, storage, networking, and memory resources needed to run an application, usually as a virtual machine and often as a cluster member.
- **domain controller** A Windows server that has Active Directory installed and is responsible for allowing client computers access to domain resources.
- **guest OS** The operating system running in a virtual machine installed on a host computer. *See* virtual machine (VM).
- **host computer** The physical computer on which virtualization software is installed and virtual machines run.
- **hypervisor** The virtualization software component that creates and monitors the virtual hardware environment, which allows multiple virtual machines to share physical hardware resources.
- **member server** A Windows server that's in the management scope of a Windows domain but doesn't have Active Directory installed.
- **nested virtualization** The ability to run a virtual machine on a virtual machine.
- **network client** The part of the OS that sends requests to a server to access network resources.
- **network connection** The network interface, network protocol, and network client and server software working together on a Windows computer.
- **network interface** The network interface card and the device driver software working together.
- **network protocol** Software that specifies the rules and format of communication between devices on a network.
- **network server software** The part of the OS that receives requests for shared network resources and makes these resources available to a network client.
- **NT File System (NTFS)** A file system used on Windows OSs that supports compression, encryption, and file and folder permissions.
- **parameter** An input to a command or PowerShell cmdlet.
- **PowerShell** A command-line interactive scripting environment that provides the commands needed for most management tasks in a Windows Server 2016 environment.
- **private cloud** A cloud computing service provided by a company's internal IT department. *See* cloud computing.
- **public cloud** A cloud computing service provided by a third party. *See* cloud computing.
- **role services** Services that can be installed in Server Manager to add functions to the main role. *See also* server role.
- **server features** Components you can install that provide functions to enhance or support an installed role or add a standalone feature.
- **server operating system** OS designed to emphasize network access performance and run background processes rather than desktop applications.
- **server role** A major function or service that a server performs.
- **standalone server** A Windows server that isn't a domain controller or a member of a domain.
- **thin provisioning** A method of allocating disk space for a virtual disk in which the physical disk space is not allocated for a volume until it's actually needed.
- **variable** A temporary storage location that holds values, whether numeric, strings, or objects.

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- **virtual desktop infrastructure (VDI)** A sector of private cloud computing whereby users access their desktops through a private cloud; the OS and applications run on servers in a corporate data center rather than on the local computer.
- **virtual machine (VM)** The virtual environment that emulates a physical computer's hardware and BIOS.
- **virtualization** A technology that uses software to emulate multiple hardware environments, allowing multiple operating systems to run on the same physical server simultaneously.
- **virtualization software** The software for creating and managing virtual machines and creating the virtual environment in which a guest OS is installed.
- **Windows domain** A group of Windows computers that share common management and are subject to rules and policies that an administrator defines.
- **Windows workgroup** A small collection of Windows computers whose users typically have something in common, such as the need to share files or printers with each other. No computer has authority or control over another. Logons, security, and resource sharing are decentralized. Also called a peer-to-peer network.

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