



## *Lesson Plans*

### **Windows Server 2008 Server Administrator**

(Exam 70-646)

Version 2.1

# Table of Contents

Course Overview .....	2
Section 1.1: Windows Server 2008.....	4
Section 1.2: Deployment.....	5
Section 1.3: Windows Deployment Services (WDS) .....	6
Section 2.1: DNS .....	7
Section 2.2: DHCP.....	8
Section 2.3: WINS .....	9
Section 2.4: Routing and Remote Access .....	10
Section 2.5: RADIUS.....	11
Section 2.6: Network Access Protection.....	12
Section 2.7: Windows Firewall.....	13
Section 3.1: File Services.....	14
Section 3.2: Storage .....	15
Section 3.3: DFS .....	16
Section 3.4: FSRM.....	17
Section 3.5: Offline Files and Indexing .....	18
Section 3.6: Encryption.....	19
Section 3.7: Print Services .....	20
Section 4.1: Terminal Services .....	21
Section 4.2: TS RemoteApp .....	22
Section 4.3: TS Session Broker .....	23
Section 4.4: TS Gateway.....	24
Section 5.1: Application Server .....	25
Section 5.2: Hyper-V .....	26
Section 6.1: Active Directory .....	27
Section 6.2: RODC .....	28
Section 6.3: Certificate Services.....	29
Section 6.4: Group Policy .....	30
Section 6.5: Software Distribution.....	32
Section 6.6: Password Policies .....	33
Section 7.1: WSUS .....	34
Section 7.2: Server Performance.....	35
Section 7.3: Event Logs .....	36
Section 7.4: Server Management .....	37
Section 7.5: Auditing .....	38
Section 7.6: Administrative Delegation.....	39
Section 7.7: GPO Troubleshooting.....	40
Section 8.1: Backup and Restore .....	41
Section 8.2: Active Directory Recovery .....	42
Section 8.3: Network Load Balancing (NLB) .....	43
Section 8.4: Failover Clustering .....	44
Practice Exams.....	45

## **Course Overview**

This course prepares students for Exam 70-646: PRO: Windows Server 2008, Server Administrator. It focuses on the management tasks of an administrator within the infrastructure of servers for an organization.

### **Module 1 – Deployment**

This module discusses deployment of Windows 2008 by taking advantage of the modular design of Windows Server 2008 for services by installing only the needed roles. Students will learn how to select the correct edition of Windows Server 2008 by comparing the needs of the organization to the features and hardware supported by each edition. They will learn aspects of installation, licensing, and activation including using WDS to deploy a Windows 2008 operating system to multiple computers at the same time through imaging.

### **Module 2 – Network Infrastructure**

In this module students will learn strategies for managing and maintaining the network infrastructure by incorporating DNS, DHCP, WINS, Routing and Remote Access, RADIUS, Network Access Protection and Windows Firewall.

### **Module 3 – File and Print**

This module covers management of network file and print services. Students will learn how to control access to folders and files, plan and configure storage for a storage unit, configure DFS, restrict the amount and type of data stored on a server, configure offline file options, ensure data integrity using encryption tools, and install print services to manage network printers.

### **Module 4 – Terminal Services**

In Module 4 students will learn the basics of setting up remote clients to run applications remotely on the terminal server or to access the desktop of the server. Students will learn how to configure TS RemoteAPP, TS Session Broker, and TS Gateway.

### **Module 5 – Application Server**

Module 5 teaches the students how to add support for running server-based applications by using the Application Server role and add support for a Windows 2008 virtualization solution by using Hyper-V.

### **Module 6 – Active Directory**

Module 6 discusses installing Active Directory roles to manage services for the Active Directory environment. Students will learn about improving security with RODC, creating a CA hierarchy with Certificate Services, implementing strategies for group policy execution, software distribution, and setting password policies.

## **Module 7 – Management**

In Module 7 students will learn tools that can be used to monitor and manage the network. Students will learn about controlling patch management, monitoring and allocating resources, monitoring and logging events, managing servers, tracking the success or failure of system events, delegating administrative tasks to other users, and verifying and analyzing group policy settings.

## **Module 8 – Disaster Recovery and Availability**

This module discusses tools and strategies to address disaster recovery and availability. Server backup and restore are some of the most important tasks a system administrator must plan for. Strategies for restoring lost Active Directory data are also presented, as well as using Network Load Balancing to provide optimal resource utilization and Failover Clustering to increase the availability and fault tolerance of network servers.

## **Practice Exams**

In Practice Exams students will have the opportunity to test themselves and verify that they understand the concepts and are ready to take the certification test.

## **Section 1.1: Windows Server 2008**

### **Summary**

In this section the students will learn how the modular design of the Windows Server 2008 allows services to be provided by installing and grouping portions of the operating system. They will learn how roles, role services, and features can be added to compliment functionality. Server editions are chosen for the features they support compared to the needs of the organization. Two types of installation options are available; a full installation and a Server Core installation. Server Core is a minimal installation option providing a low-maintenance version of Windows Server 2008 with very limited GUI support.

Students will learn how to:

- View server roles and services on a Server Core installation.
- Add server roles to a Server Core installation.
- Manage services on a Server Core installation.

### **Windows Server 2008 Administrator Objectives**

- 101. Plan server installations and upgrades.

### **Lecture Focus Questions:**

- What server roles require the Enterprise or Datacenter editions of Windows Server 2008?
- What are the main differences between the Enterprise and Datacenter editions?
- How many virtual instances are allowed on each Windows Server 2008 edition?
- What server roles can run on a Web server edition of Windows Server 2008?
- What is the difference between a full installation of Windows Server 2008 and a Server Core installation?
- When can you upgrade from a Server Core installation?

### **Time**

About 35 minutes

## Section 1.2: Deployment

### Summary

This section discusses the elements that need to be considered when planning a deployment of Windows Server 2008:

- Hardware requirements
- Prerequisites
- Partitions
- Disaster recovery solution
- Edition required
- Installation methods
- Installation options (full or server core)
- Upgrade vs. Clean Install
- Licensing and activation.

Students will learn how to:

- Use the Windows System Image Manager (Windows SIM) to create and edit answer files.

### Windows Server 2008 Administrator Objectives

- 101. Plan server installations and upgrades.
- 102. Plan for automated server deployment.

### Lecture Focus Questions:

- What are the differences between Multiple Activation Key (MAK) and Key Management Services (KMS)?
- What benefits come from using a response file during installation?
- What is the default file name for the unattended answer file?
- Which Windows Server 2003 editions can be upgraded to Windows Server 2008 Enterprise edition?
- Which Windows editions cannot be upgraded?
- How can you move from a 32-bit installation to a 64-bit installation?
- What should you do if an upgrade fails without completing?

### Time

About 35 minutes

## **Section 1.3: Windows Deployment Services (WDS)**

### **Summary**

This section explores using WDS to deploy Windows operating systems to client and server computers through imaging. WDS allows a network administrator to save time and effort by customizing one operating system and deploying it to multiple computers at the same time.

Students will learn how to:

- Install the Windows Deployment Services (WDS) role.
- Configure WDS multicast transmissions.
- Create install, boot, capture, and discover images.
- Configure WDS server settings.

### **Windows Server 2008 Administrator Objectives**

- 102. Plan for automated server deployment.

### **Lecture Focus Questions:**

- Which operating systems can be deployed with Windows Deployment Services (WDS)?
- When would you use a discover boot image?
- How many install images do you need to deploy Windows Server 2008 to computers that will install the Standard, Enterprise, and Datacenter editions? How many images would you need if you were deploying both 32-bit and 64-bit operating systems?
- What type of boot image can you use to deploy a 64-bit install image?
- How does deploying images for Windows XP differ from deploying images for Windows Vista?
- What is the difference between static and dynamic discovery with a boot image?
- What are the advantages of prestaging computer accounts when using WDS?
- How does multicasting differ from unicasting? How does auto-cast differ from scheduled-casting?

### **Time**

About 45 minutes

## **Section 2.1: DNS**

### **Summary**

This section discusses goals and methods for designing a DNS namespace solution, configuration options, and new DNS features that can be used to manage and maintain the Windows Server 2008 environment.

Students will learn how to:

- Delegate DNS domains.
- Configure forwarding and conditional forwarding.
- Create stub zones.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.

### **Lecture Focus Questions:**

- In which situation should you use different internal and external domain names?
- Which DNS zone has a read-only copy of the zone database?
- What are the differences between a forwarder and conditional forwarder?
- What is the name of a root zone?
- When should you use the HOSTS file for DNS name resolution?
- Which file is used before querying a DNS server?
- Which protocol allows computers to resolve names without the use of a DNS server or broadcasts?

### **Time**

About 55 minutes

### **Lab/Activity**

- Delegate Domains
- Create a Delegated Zone
- Configure a Stub Zone

## Section 2.2: DHCP

### Summary

In this section students will learn strategies to provide DHCP for multiple subnets. Also discussed are *superscopes* used to combine multiple scopes into a single logical scope and *split scopes* which provide fault tolerance and improve DHCP performance by configuring two DHCP servers to service each subnet.

Students will learn how to:

- Configure split scopes on multiple DHCP servers.

### Windows Server 2008 Administrator Objectives

- 103. Plan infrastructure services server roles.

### Lecture Focus Questions:

- What is the difference between placing a DHCP server on each subnet and using a multihomed server?
- What is the disadvantage of BOOTP forwarding?
- How many DHCP relay agents should be placed on a single subnet?
- When should you use a superscope?
- How is the preferred DHCP server selected?

### Time

About 10 minutes

### Lab/Activity

- Add a DHCP Server for Fault Tolerance

## **Section 2.3: WINS**

### **Summary**

This section examines using Windows Internet Name Service (WINS) to provide NetBIOS names to IP address resolution. Older versions of Windows used NetBIOS names as the network naming standard. Newer versions of Windows use DNS names to identify network hosts. This section provides strategies for moving away from the NetBIOS names and transitioning to a DNS-only environment.

Students will learn how to:

- Configure the GlobalNames zone to provide single-label name resolution.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.

### **Lecture Focus Questions:**

- When can you use the GlobalNames zone to replace a WINS server?
- When should you not use a GlobalNames zone to replace a WINS server?
- What type of records do you create in the GlobalNames zone?
- How can you extend the GlobalNames zone across multiple forests?
- Which strategies can you use to provide single-label name resolution for IPv6 hosts?
- What is the disadvantage of using the HOSTS file in large networks?

### **Time**

About 15 minutes

## Section 2.4: Routing and Remote Access

### Summary

In this section students will learn how to configure solutions that will allow a remote client to connect to a remote access server. Three VPN protocols supported by Windows Server 2008 and Vista are presented; Point-to-Point Tunneling Protocol (PPTP), Layer Two Tunneling Protocol (L2TP), and Secure Socket Tunneling Protocol (SSTP).

Students will learn how to:

- Add the Routing and Remote Access role services.
- Configure a remote access server to allow VPN connections.
- Customize the ports used by a VPN server.
- Control remote access by configuring network access policies.

### Windows Server 2008 Administrator Objectives

- 103. Plan infrastructure services server roles.
- 303. Monitor and maintain security and policies.

### Lecture Focus Questions:

- Which role service must you add to allow remote clients to access the private network, and not just the resources on the remote access server?
- What are the ways that you can configure a remote access client to get an address for the remote access connection?
- Which role service do you add to configure network policies on a server?
- What role do network policies play when you configure the remote access server?
- How do network policy constraints differ from conditions? When would you use the same setting in a constraint instead of a condition?
- Why does the policy application order affect whether or not clients can connect to a remote access server?
- What advantages does using SSTP have over using either PPTP or L2TP for a VPN connection?
- What ports must you open in a firewall to allow SSTP?

### Time

About 30 minutes

### Lab/Activity

- Add Role Services for Remote Access
- Configure a VPN Server for SSTP

## **Section 2.5: RADIUS**

### **Summary**

This section discusses using a Remote Authentication Dial-In Service (RADIUS) server to consolidate network policies of multiple network access servers. This allows authentication requests to be passed from the network access servers to the RADIUS server to authenticate remote access clients from multiple servers. In addition to authentication, a RADIUS server can also provide centralized logging (accounting) and the administrator can identify which types of events to log.

Students will learn how to:

- Configure a RADIUS server to authenticate users on remote access servers.
- Configure a RADIUS client for authentication and accounting.

### **Windows Server 2008 Administrator Objectives**

- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- When using a RADIUS solution, where are network access policies configured?
- What is the difference between a RADIUS client and a remote access client?
- Why would you implement a RADIUS proxy?
- What is the difference between a RADIUS client and a RADIUS proxy?
- What is the difference between a connection request policy and a network access policy?
- How does the RADIUS proxy use the remote RADIUS server group when processing authentication requests?
- What are the three types of RADIUS accounting events, and which event records actual logon requests by remote users?
- How many types of logging can be enabled at the same time on a RADIUS server?

### **Time**

About 30 minutes

### **Lab/Activity**

- Configure a RADIUS Server
- Configure a RADIUS Client

## **Section 2.6: Network Access Protection**

### **Summary**

In this section students will learn about using Network Access Protection (NAP) to regulate network access or communication based on a computer's compliance with health requirement policies and how to provide access to updates to allow computers to become compliant.

Students will learn how to:

- Add roles and role services to support NAP.
- Configure a DHCP server and enforcement point for NAP.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.
- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- What functions are performed by the System Health Validator (SHV)?
- What does the enforcement server do with State of Health information?
- How do remediation servers and auto-remediation help clients become compliant?
- What server role service do you add to configure a server as an enforcement point for NAP?
- How do you define the quarantine network when using 802.1x enforcement?
- Which enforcement method uses a Health Registration Authority (HRA)?
- What type of communication occurs in the boundary network when using IPsec enforcement?

### **Time**

About 25 minutes

### **Lab/Activity**

- Add Role Services for NAP

## **Section 2.7: Windows Firewall**

### **Summary**

This section examines using Windows Firewall to provide real-time protection from unwanted access by blocking or allowing specific network traffic. The basic firewall can be used to control inbound traffic and the advanced firewall can be used to control both inbound and outbound traffic.

Students will learn how to:

- Create a firewall isolation rule.

### **Windows Server 2008 Administrator Objectives**

- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- When must you use the Advanced Firewall instead of the Basic Firewall?
- By default, which type of traffic is allowed through the firewall?
- What is the difference between domain isolation and server isolation?
- Which type of isolation configuration restricts communication to computers that are members of a specific group?

### **Time**

About 10 minutes

## Section 3.1: File Services

### Summary

In this section students will explore the role services that can be chosen when adding the File Services role to manage network file sharing. They will learn how share permissions and NTFS permissions work together to control access to folders and files.

Students will learn how to:

- Install the appropriate File Services role services.
- Implement combined share and NTFS permission strategies.

### Windows Server 2008 Administrator Objectives

- 105. Plan file and print server roles.
- 402. Provision data.

### Lecture Focus Questions:

- When would you install the Services for Network File System (NFS) role service? When is the NFS protocol used instead of the SMB protocol?
- What share settings can only be configured through the Share and Storage Management console?
- How does access-based enumeration work with NTFS permissions to restrict access to files and folders in shared folders?
- What are the differences and similarities between NTFS permissions and share permissions?
- What strategy can you use to combine NTFS and share permissions?

### Time

About 45 minutes

### Lab/Activity

- Add Role Services for File Services
- Configure NTFS and Share Permissions 1
- Configure NTFS and Share Permissions 2

## Section 3.2: Storage

### Summary

This section discusses network storage strategies; Direct Attached Storage (DAS), Storage Area Network (SAN) and Network Attached Storage (NAS). Directly attached storage on a server is configured and assigned a drive letter. A storage area network uses a Logical Unit Number (LUN) on the server to identify a storage area on the storage device.

Students will learn how to:

- Plan and configure storage for a storage unit.
- Manage server storage using Disk Management and Storage Manager.

### Windows Server 2008 Administrator Objectives

- 105. Plan file and print server roles.
- 501. Plan storage.

### Lecture Focus Questions:

- What are the differences between Storage Area Network (SAN) and Network Attached Storage (NAS)?
- What methods are used to create the SAN fabric?
- What advantages does iSCSI have over Fibre Channel? What disadvantages does it have?
- Which types of disk configurations provide fault tolerance?
- What is the minimum number of disks required for a RAID-1 (mirrored) configuration? RAID-5?
- How much overhead is there with a RAID-5 implementation with 4 disks? Which disk configuration methods have no overhead?
- What is the advantage of using Multipath I/O (MPIO)? What hardware is required for this type of configuration?
- What is the difference between round robin load balancing and weighted paths load balancing?

### Time

About 25 minutes

## Section 3.3: DFS

### Summary

This section examines using Distributed File System (DFS) to logically organize shared folders on multiple servers into a single logical folder hierarchy. Replication can be used to keep folder contents synchronized. Students will become familiar with two types of replication methods; File Replication Service (FRS) and DFS replication.

Students will learn how to:

- Create a DFS namespace with folders and targets.
- Add role services as required to support DFS and the appropriate replication method.
- Configure DFS replication of folder targets.

### Windows Server 2008 Administrator Objectives

- 105. Plan file and print server roles.

### Lecture Focus Questions:

- What is the difference between the namespace root and a folder within DFS?
- If you have multiple namespace servers, which namespace type should you implement?
- Which namespace type and mode would you choose to support access-based enumeration?
- If you have a single namespace server and that server fails, what happens to client access for folders within the DFS structure? Why?
- What are the advantages of using DFS replication over FRS replication?
- What operating system versions support DFS replication?
- Which replication topology requires each server to replicate with each other?
- How do you configure FRS replication on servers running Windows Server 2008?

### Time

About 60 minutes

### Lab/Activity

- Create a DFS Structure
- Add Role Services for Replication

## **Section 3.4: FSRM**

### **Summary**

In this section students will learn about using File Server Resource Manager (FSRM) to manage and maintain the type and amount of data stored on a file server. Creating quotas on volumes or folders allows you to restrict the amount of space used. Two types of quotas can be set; hard and soft quotas. File screens are used to restrict the type of files that can be saved to a specified location.

Students will learn to:

- Create quotas and quota templates.
- Configure file screens with file groups and file screen exceptions.

### **Windows Server 2008 Administrator Objectives**

- 105. Plan file and print server roles.

### **Lecture Focus Questions:**

- How does a soft quota differ from a hard quota?
- How do quota templates facilitate quota management?
- What is the difference between a quota and a file screen?
- How is an active file screen more restrictive than a passive file screen?
- What are the primary differences between disk quotas and quotas implemented through FSRM?

### **Time**

About 25 minutes

## **Section 3.5: Offline Files and Indexing**

### **Summary**

This section examines the process of using offline files to work with documents in shared folders even when you are not connected to the network. Two indexing technologies are available to improve the speed and efficiency of searching for content stored on the server; Windows Search Service and Indexing Service.

Students will learn how to:

- Configure caching options for offline files, including automatic caching of files and caching of applications.
- Configure offline availability on the client.
- Add role services for indexing.

### **Windows Server 2008 Administrator Objectives**

- 105. Plan file and print server roles.
- 402. Provision data.

### **Lecture Focus Questions:**

- How does the offline files feature ease file management for mobile users?
- What happens to NTFS permissions on cached copies of files?
- How does synchronization affect files?
- What steps can you take to reconcile synchronization conflicts?
- Which types of content are indexed by Windows Search Service?
- On which volumes and folders should Windows Search Service be enabled?
- What will you need to do if you want to use both the Windows Search Service and the Indexing Service?

### **Time**

About 25 minutes

## **Section 3.6: Encryption**

### **Summary**

In this section students will learn how to ensure integrity of data by using encryption tools; Encrypting File System (EFS) and BitLocker.

Students will learn how to:

- Encrypt or decrypt a file or folder.
- Add authorized users to allow encrypted file access.
- Prepare a computer for BitLocker.
- Enable BitLocker on a Windows Server 2008 or Vista computer.

### **Windows Server 2008 Administrator Objectives**

- 101. Plan server installations and upgrades.
- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- Which permissions allow you to encrypt a file or folder?
- Who can copy or move encrypted files or folders?
- What is the result of moving an encrypted file to a non-NTFS partition?
- Which encryption feature will encrypt system files?
- What functions are performed by the Trusted Platform Module (TPM)? What BitLocker features are only available when using a TPM?
- When should you disable Bitlocker versus decrypt volumes using BitLocker?
- How do you enter the recovery key if the computer enters recovery mode?

### **Time**

About 35 minutes

## **Section 3.7: Print Services**

### **Summary**

This section discusses installing the Print Services role to share, manage, and monitor, and maintain network printers.

Students will learn how to:

- Add the Print Services role with required role services.
- Use Group Policy objects to deploy printers to computer and user accounts.

### **Windows Server 2008 Administrator Objectives**

- 105. Plan file and print server roles.

### **Lecture Focus Questions:**

- When would you add the LPD Service? When would you need the LPR Port Monitor feature?
- What is the difference between the Manage Documents permission and the Print permission?
- Under which circumstances would you configure a printer to use multiple print devices? When would you configure multiple printers for a single print device?
- What is the difference between listing a printer in Active Directory and deploying a printer with Group Policy?
- How do client computers get printer drivers?

### **Time**

About 40 minutes

### **Lab/Activity**

- Add Print Role services
- Deploy Printers with Group Policy

## Section 4.1: Terminal Services

### Summary

This section provides information about using Terminal Services to allow remote clients to run applications remotely on the terminal server or to access the desktop of the server.

Students will learn how to:

- Add the Terminal Services role and role services.
- Configure the Terminal Server role service.
- Configure Windows System Resource Manager for allocating resources to terminal server sessions.

### Windows Server 2008 Administrator Objectives

- 401. Provision applications.

### Lecture Focus Questions:

- How does the Remote Desktop Protocol (RDP) work to show the contents of a remote desktop?
- Which role service enables access through the Internet past most firewalls?
- What is the difference between a per-user license and a per-device license? When would a per-device license be a better choice?
- What client requirements are required to connect to a terminal server through a Web browser?
- What ports are used by TS Web Access?
- You want to enable TS Web Access on three terminal servers. On which servers should you install the TS Web Access role service?
- What is the difference between the equal per user profile and the equal per session profile? How can a user overcome the restrictions enforced by the equal per session profile?

### Time

About 25 minutes

### Lab/Activity

- Add TS Role Services

## **Section 4.2: TS RemoteApp**

### **Summary**

In this section students will learn how to use TS RemoteApp to launch a program on a terminal server using the server's hardware resources. On the client side it will appear that the program is running directly within a window on the client desktop.

Students will learn how to:

- Make applications available through TS RemoteApp.
- Create .rdp and .msi files for TS RemoteApp applications.

### **Windows Server 2008 Administrator Objectives**

- 401. Provision applications.

### **Lecture Focus Questions:**

- How does a user access applications through TS RemoteApp?
- How does TS RemoteApp improve security of terminal servers?
- How many sessions are used if a user launches three applications on the same terminal server using TS RemoteApp?
- How do you add TS RemoteApp support to a terminal server?
- What are the three ways you can use to make applications visible to terminal server clients? Which method requires no configuration on the client computer?

### **Time**

About 20 minutes

### **Lab/Activity**

- Configure Remote Applications

## **Section 4.3: TS Session Broker**

### **Summary**

This section covers using TS Session Broker to provide load balancing and fault tolerance for a terminal server farm.

Students will learn how to:

- Configure Terminal Services to use a session broker.

### **Windows Server 2008 Administrator Objectives**

- 401. Provision applications.

### **Lecture Focus Questions:**

- What advantage does using TS Session Broker have over using network load balancing?
- Why might you still use network load balancing when implementing the TS Session Broker?
- How can you unevenly distribute client sessions in a Terminal Services server farm?
- Which version of Remote Desktop is required on the clients?

### **Time**

About 10 minutes

## Section 4.4: TS Gateway

### Summary

This section discusses using TS Gateway to provide secure and encrypted access to terminal server resources on a private network. Users with Remote Desktop client and an Internet connection can connect to computers on an internal network.

Students will learn how to:

- Add the TS Gateway role service.
- Create TS connection authorization policies (TS CAPs) and resource authorization policies (TS RAPs) to control terminal server access.

### Windows Server 2008 Administrator Objectives

- 201. Plan server management strategies.
- 401. Provision applications.

### Lecture Focus Questions:

- What ports must be opened in the outer firewall to allow connections to the TS Gateway server?
- Which servers can you allow access to using TS Gateway?
- What is the difference between a TS CAP and a TS RAP? Which restricts access to specific computers?
- Why would you use a RADIUS server with TS Gateway?
- How does TS Gateway integrate with NAP?

### Time

About 25 minutes

### Lab/Activity

- Configure TS Gateway Policies

## **Section 5.1: Application Server**

### **Summary**

In this section students will become familiar with using the Application Server role to add support for running server-based applications.

Students will learn how to:

- Add application server roles and role services.
- Verify the operation of IIS.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.
- 104. Plan application servers and services.

### **Lecture Focus Questions:**

- Which role service enables remote invocation of applications that are built on and hosted in COM+ and Enterprise Services components?
- When might you use the TCP port sharing feature?
- What are the four methods you can use to start and stop applications remotely when you add the Windows Process Activation Service Support role service?
- Which IIS role services are server-side scripting technologies? Which role services execute applications on the IIS server?
- What is the difference between ISAPI extensions and ISAPI filters? When would you use each?
- Which file extensions are associated with a server-side include?

### **Time**

About 20 minutes

## Section 5.2: Hyper-V

### Summary

This section provides the basics of planning and using Hyper-V as a Windows Server 2008 virtualization solution to consolidate multiple physical machines onto a single hardware platform. Hyper-V is a hypervisor solution running a thin layer of software that sits between the hardware and the host operating system.

Students will learn how to:

- Add the Hyper-V role.
- Create and manage virtual networks.
- Create and manage virtual machines.

### Windows Server 2008 Administrator Objectives

- 104. Plan application servers and services.
- 401. Provision applications.

### Lecture Focus Questions:

- How is server virtualization different than network virtualization?
- What is the main difference between Hyper-V and Virtual PC or Virtual Server?
- How many parent partitions can you have on a server running Hyper-V?
- Which operating system versions and architecture types support Hyper-V? What are the hardware requirements for installing Hyper-V?
- What is disk pass-through? What does this allow you to do when configuring virtual machines?
- Which virtual disk type offers the best performance? Which type minimizes disk space use?
- What is the difference between an internal virtual network and a private virtual network?
- When would you need to use a legacy virtual network adapter?
- How many virtual machines can you run on each Windows Server 2008 version without additional server licensing?

### Time

About 50 minutes

## **Section 6.1: Active Directory**

### **Summary**

Students will learn how to install Active Directory roles to provide features and services for the Active Directory environment.

Students will learn how to:

- Add the Active Directory roles and role services.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.

### **Lecture Focus Questions:**

- What is the difference between Active Directory Domain Services (AD DS) and Active Directory Lightweight Directory Services (AD LDS)? How are they similar?
- Which role would you implement to safeguard digital information from unauthorized use?
- Which Active Directory role is required when implementing IPsec and EFS in a domain-wide environment?
- Which server versions support Active Directory Federation Services (AD FS)?

### **Time**

About 10 minutes

## **Section 6.2: RODC**

### **Summary**

This section explores using a read-only domain controller (RODC) to provide a secure additional domain controller for a domain by hosting read-only partitions of the Active Directory database.

Students will learn how to:

- Plan for an installation of RODC.

### **Windows Server 2008 Administrator Objectives**

- 103. Plan infrastructure services server roles.

### **Lecture Focus Questions:**

- What is the purpose of administrator role separation?
- How does unidirectional replication protect your network?
- What are the steps within the RODC authentication process?
- How does BitLocker increase the security of an RODC?

### **Time**

About 15 minutes

## Section 6.3: Certificate Services

### Summary

This section examines using Active Directory Certificate Services (AD CS) to issue certificates to users and computers in your organization. The four types of CA types are defined:

1. Enterprise root
2. Enterprise subordinate
3. Standalone root
4. Standalone subordinate

Students will become familiar with the role services that are available when installing the Active Directory and elements to be considered when planning a certificate authority structure.

Students will learn how to:

- Add Certificate Services role services to meet the network requirements.
- Configure a CA to support an online responder.

### Windows Server 2008 Administrator Objectives

- 103. Plan infrastructure services server roles.

### Lecture Focus Questions:

- What are the advantages of using an enterprise CA over a standalone CA?
- How does Web enrollment differ from autoenrollment?
- Which role service lets you centralize certificate revocation requests? What advantages does this service provide over clients using CRLs?
- What does the registration authority do when using NDES?
- Which servers and clients are capable of using Suite B encryption?
- Which certificate version is capable of using Suite B encryption?
- What is the advantage of taking the root CA offline?
- Why shouldn't you take an enterprise CA offline? How can you use an offline root CA but still use enterprise CAs?

### Time

About 40 minutes

### Lab/Activity

- Add Role Services for AD CS 1
- Add Role Services for AD CS 2

## Section 6.4: Group Policy

### Summary

This section provides an overview of how Group Policy is used to manage users and computers. The Group Policy Management Console (GPMC) allows an administrator to manage and maintain all aspects of the Group Policy from a centralized console. GPO templates simplify the creation of new GPOs by allowing you to copy or import settings into a new GPO.

Students will learn how to:

- Create, link, and edit GPOs.
- Block GPO inheritance and enforce GPOs.
- Control GPO application using permissions, WMI filtering, and loopback processing.
- Enable the Administrative Template central store and create a starter GPO.

### Windows Server 2008 Administrator Objectives

- 203. Plan and implement group policy strategy.

### Lecture Focus Questions:

- How does inheritance affect Group Policy settings?
- How is the Block Inheritance setting affected by the No Override setting?
- How can you apply Group Policy settings to specific users or groups?
- How can you apply Group Policy settings to specific computers?
- How does loopback processing affect computer settings?
- What is the difference between deleting a GPO and deleting a GPO link?
- What is the Administrative Template central store? What advantages do you gain by enabling the central store?
- What is the difference between using a starter GPO and copying an existing GPO?
- How can you copy a GPO from one domain to another? How can you copy starter GPOs?
- What is the difference between restore and import when working with GPO backups?

### Time

About 60 minutes

### Lab/Activity

- Modify GPO Links
- Control GPO Inheritance

- Configure GPO Permissions
- Create a Starter GPO

## **Section 6.5: Software Distribution**

### **Summary**

This section provides a summary of points to consider using Group Policy to control software distribution. Students will become familiar with deployment and configuration options.

### **Windows Server 2008 Administrator Objectives**

- 203. Plan and implement group policy strategy.
- 301. Implement patch management strategy.
- 401. Provision applications.

### **Lecture Focus Questions:**

- What is the difference between assigned and published software?
- Why should you use the UNC path to an installer package rather than the local path?
- Which distribution method supports installing software during logon? Which option prevents software from being uninstalled by the user?

### **Time**

About 10 minutes

## **Section 6.6: Password Policies**

### **Summary**

In this section students will learn how to configure fine-grained Password Policies. Windows Server 2008 provides two ways of setting password policies; account policies and granular password policies. Students will learn when to select one method over the other.

Students will learn how to:

- Configure password policies for groups of users who need policies different from the domain password policies.

### **Windows Server 2008 Administrator Objectives**

- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- What happens when you configure Account Policies settings in a GPO linked to an OU?
- How can you configure different account policy settings for different users? Which tool would you use to do so?
- Which object types can you associate with a granular password policy? Which object type should you use in most cases?

### **Time**

About 20 minutes

## Section 7.1: WSUS

### Summary

This section discusses implementing a Windows Server Update Services (WSUS) solution to control and enforce patch management of updates. WSUS allows the administrator to configure a server on the intranet as a centralized point for updating software.

Students will learn how to:

- Install WSUS and configure a WSUS server to download updates from Microsoft Update.
- Synchronize and approve updates.
- Configure a child server as a replica of an upstream server.
- Create computer groups for targeting, and manually modify group membership.
- Configure targeting options on the WSUS server.
- Control client update behavior through Group Policy.

### Windows Server 2008 Administrator Objectives

- 301. Implement patch management strategy.

### Lecture Focus Questions:

- How many WSUS servers within a single organization need to contact the Microsoft Update Web site to get a list of available updates?
- When should you deploy multiple, independent WSUS servers? How is this configuration similar to a single WSUS server?
- How would you deploy WSUS when an Internet connection is not allowed for an isolated network?
- When using client-side targeting, how do you identify the computer group for a specific computer? How does this differ from server-side targeting?
- By default, where does a client's Automatic Updates feature look for available updates? How would you change this when using WSUS?

### Time

About 70 minutes

### Lab/Activity

- Configure Server-side Targeting
- Configure a Downstream Server
- Configure Client-side Targeting

## **Section 7.2: Server Performance**

### **Summary**

This section examines performance monitoring technologies used to monitor and control server performance in Windows Server 2008. Windows Reliability and Performance Monitor is a tool which provides system statistics that the administrator can use to monitor the server performance. Windows System Resource Manager (WSRM) is a tool used to control the use of system resources by creating resource allocation policies.

Students will learn how to:

- View system real-time statistical displays.
- Add specific object counters to Performance Monitor for local or remote machines.
- Use the System Stability Chart to see historical system information.
- Add the Windows System Resource Manager feature.
- Configure resource allocation policies in WSRM.

### **Windows Server 2008 Administrator Objectives**

- 302. Monitor servers for performance evaluation and optimization.

### **Lecture Focus Questions:**

- What is the relationship between a counter and an object?
- What kind of data collector allows you to capture software process events?
- What action can you take if you want to know when the CPU in a system runs over 80% more than 15% of the time?
- What is the purpose of a baseline when monitoring system performance?
- Which WSRM policy allocates resources evenly between Terminal Services sessions?

### **Time**

About 35 minutes

## Section 7.3: Event Logs

### Summary

In this section students will learn about event logs and considerations for planning an event monitoring strategy. By default Windows Server 2008 has the following event logs available:

- Application
- Security
- Setup
- System
- Forwarded Events

Students will learn how to:

- Create a custom view.
- Configure event log properties.
- Configure event subscriptions and view forwarded events.
- Attach a task to an event or log.

### Windows Server 2008 Administrator Objectives

- 302. Monitor servers for performance evaluation and optimization.

### Lecture Focus Questions:

- How does a custom view differ from adding a filter to a log?
- How can you combine events from multiple logs into a single report?
- How can you combine events from multiple servers onto a single server?
- What tasks can you attach to an event or log?
- What is the default extension for saved event log files?
- Which operating systems support event subscriptions?
- Which log do you view to see events generated on other computers using event subscriptions?

### Time

About 25 minutes

## Section 7.4: Server Management

### Summary

This section discusses administrative tools for server management. These include: Server Manager, Scripting Tools, Remote Desktop, Terminal Services Gateway (TS Gateway), MMC snap-ins, Telnet, and Windows Remote Shell.

Students will learn how to:

- Use Server Manager to view and manage roles, role services, and features.
- Use Server Manager to view and manage the server configuration.
- Use ServermanagerCMD or Ocsetup to add server roles.

### Windows Server 2008 Administrator Objectives

- 201. Plan server management strategies.

### Lecture Focus Questions:

- How do firewall ports affect your ability to remotely manage a server?
- What firewall port must be opened for Remote Desktop connections?
- What advantage does using TS Gateway have over using Remote Desktop?
- What is the effect of enabling the Remote Administration exception in the firewall?
- What are the operating system requirements for RSAT?
- Which remote administration tools could you use if the firewall had only ports 80 and 443 open?
- When managing a Server Core installation, which scripting tool will not work?

### Time

About 25 minutes

## **Section 7.5: Auditing**

### **Summary**

This section provides the details of enabling auditing by configuring audit policies to track the success or failure of system events. Windows Server 2008 provides four new auditing levels:

- Directory Service Access
- Directory Service Changes
- Directory Service Replication
- Detailed Directory Service Replication

Students will learn how to:

- Use Group Policy to enforce auditing.

### **Windows Server 2008 Administrator Objectives**

- 303. Monitor and maintain security and policies.

### **Lecture Focus Questions:**

- What is the difference between auditing for success and auditing for failure?
- What is the difference between Account Logon and Logon auditing?
- What additional step must you complete in order to audit NTFS file access?
- How can you configure auditing to track changes to Active Directory objects?
- What are the results of excessive auditing?
- Which event IDs are recorded when a change is made to an Active Directory object?

### **Time**

About 25 minutes

### **Lab/Activity**

- Configure Auditing

## Section 7.6: Administrative Delegation

### Summary

This section explores using administrative delegation to share administrative tasks with other users. Students will become familiar with various built-in groups which can be used to delegate authority.

Students will learn how to:

- Use the Delegation of Control wizard to delegate administrative tasks for Active Directory objects.
- Edit the ACL of an Active Directory object to modify or remove delegated permissions.

### Windows Server 2008 Administrator Objectives

- 202. Plan for delegated administration.

### Lecture Focus Questions:

- How can you modify permissions assigned using the Delegation of Control wizard? How do you reset permissions on Active Directory objects to the default settings?
- What can a user who is a member of the DnsAdmins group do?
- How can you allow a user to manage only a single server?
- How do you allow users to modify content in DFS folders and in IIS virtual directories?
- Which built-in groups let you allow users to view server performance information and events?
- When would you use the Server Operators built-in group?

### Time

About 35 minutes

## Section 7.7: GPO Troubleshooting

### Summary

This section discusses GPO troubleshooting strategies and tools to analyze the effective Group Policy settings on a target user or computer. The Group Policy Management Console is used to manage and maintain group policies and troubleshoot group policy objects. The Group Policy Results wizard is used to determine the current effects of group policy settings and the Group Policy Modeling Wizard is used to simulate the effects of GPO changes. The **Gpupdate** command is used to manually refresh group policy settings.

Students will learn how to:

- Use the Group Policy Management Console to view and verify GPO settings.
- Run Group Policy Modeling and Group Policy Results to analyze GPO application.

### Windows Server 2008 Administrator Objectives

- 203. Plan and implement group policy strategy.

### Lecture Focus Questions:

- Which tool would you use to ask "What if?" questions about GPO design and application?
- When running Group Policy Results, why does the target computer need to be turned on?
- When are computer and user GPO settings applied?
- How do you force the reapplication of GPO settings?

### Time

About 15 minutes

## **Section 8.1: Backup and Restore**

### **Summary**

This section provides information about using Windows Server Backup to manage backup and recovery for Windows Server 2008. This tool replaces NTbackup.exe in previous Windows versions. Three types of backups are available: scheduled backup, manual backup, and system state backup. Windows Server Backup does not back up to tape. Several types of recovery types are available depending upon the type of backup performed.

Students will learn how to:

- Install Windows Server Backup.
- Create a backup schedule.
- Perform a Backup Once operation.

### **Windows Server 2008 Administrator Objectives**

- 503. Plan for backup and recovery.

### **Lecture Focus Questions:**

- Which backup storage type(s) would you choose if you wanted to be able to restore individual folders or files?
- What volumes are always included in scheduled backups? How can you create a backup to exclude these volumes?
- How can you create automatic backups with a frequency less than once a day?
- Which backup type can only be performed from the command prompt?

### **Time**

About 40 minutes

### **Lab/Activity**

- Back Up a Server

## **Section 8.2: Active Directory Recovery**

### **Summary**

This section explores strategies for restoring lost Active Directory data. Students will become familiar with nonauthoritative restore, authoritative restore, and tombstone lifetime. Several methods for performing a domain controller restore are presented, as well as how to backup and restore only Group Policy data using the Group Policy Management console.

Students will learn how to:

- Back up and restore GPOs and starter GPOs.

### **Windows Server 2008 Administrator Objectives**

- 203. Plan and implement group policy strategy.
- 503. Plan for backup and recovery.

### **Lecture Focus Questions:**

- What is the difference between an authoritative and a nonauthoritative restore?
- How does the tombstone lifetime affect Active Directory backups? When would you need to be concerned with changing this setting?
- How can snapshots help you preserve Active Directory data? Why are they not as useful as a backup when you need to restore large numbers of objects?
- Which backup type should you perform if you want to back up the Active Directory database?
- When would you use a full server restore instead of another method to recover a domain controller?
- What methods would you use to move a GPO to another domain? What methods could you use to move a starter GPO to another domain?
- What is the difference between import and restore when working with GPO backups?

### **Time**

About 20 minutes

## **Section 8.3: Network Load Balancing (NLB)**

### **Summary**

In this section students will learn how to manage and configure Network Load Balancing (NLB) to disperse workload between multiple servers for optimal resource utilization, throughput, or response time.

Students will learn how to:

- Create an NLB cluster.
- Define port rules to customize how cluster hosts respond.

### **Windows Server 2008 Administrator Objectives**

- 502. Plan high availability.

### **Lecture Focus Questions:**

- What IP address do clients use to connect to computers running NLB?
- What is the heartbeat, and how is it used in convergence?
- When will convergence occur?
- What should you do on a cluster host to use unicast mode if the host needs to perform peer-to-peer communications with other cluster hosts?
- How can you prevent a cluster host from responding to traffic sent to a specific port?
- Which client affinity option should you use when clients connect to a NLB cluster using multiple proxy servers?
- What happens to traffic not identified by a port rule? How can you control which cluster host responds?
- What happens if a cluster host has a weight value of 0 when multiple host filtering is used?

### **Time**

About 30 minutes

### **Lab/Activity**

- Configure an NLB Cluster 1
- Configure an NLB Cluster 2

## **Section 8.4: Failover Clustering**

### **Summary**

This section discusses using Failover Clustering to increase the availability and fault tolerance of network servers by creating clusters of servers that use shared disk resources.

Students will learn how to:

- Create a failover cluster.

### **Windows Server 2008 Administrator Objectives**

- 502. Plan high availability.

### **Lecture Focus Questions:**

- How is Failover Clustering different from NLB?
- Which application types are best used with NLB and not failover clustering?
- How does a single-instance application differ from a multiple-instance application?
- Which quorum mode should be used if you have an even number of cluster hosts? Why?
- Which quorum mode allows the cluster to continue operating even if only one cluster host is still available?
- Which methods can you use to assign IP addresses to cluster members?

### **Time**

About 20 minutes

## Practice Exams

### Summary

This section provides information to help prepare students to take the exam and to register for the exam.

Students will also have the opportunity of testing their mastery of the concepts presented in this course to reaffirm that they are ready for the certification exam. For example, all questions that apply to **Objective 100. Planning for Server Deployment** are grouped together and presented in practice exam *100. Server Deployment, All Questions*. Students will typically take about 60-90 minutes to complete each of the following practice exams.

- 100. Server Deployment, All Questions (94 questions)
- 200. Server Management, All Questions (44 questions)
- 300. Monitoring and Maintaining Servers, All Questions (35 questions)
- 400. Application and Data Provisioning, All Questions (17 questions)
- 500. High Availability, All Questions (30 questions)

The *Certification Practice Exam* consists of 52 questions that are randomly selected from the above practice exams. Each time the Certification Practice Exam is accessed different questions may be presented. The Certification Practice Exam has a time limit of 90 minutes -- just like the real certification exam. A passing score of 95% should verify that the student has mastered the concepts and is ready to take the real certification test.