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**Implementing, Managing and Maintaining a
Microsoft Windows Server 2003 Network
Infrastructure**

Exam Code: 70-291**Certifications:****Microsoft Certified (MCP)****Microsoft Certified Systems Administrator (MCSA 2003) Core****Microsoft Certified Systems Engineer (MCSE 2003) Core****Prerequisites:**

None

About This Study Guide

This Study Guide provides all the information required to pass the Microsoft 70-291 exam - Implementing, Managing and Maintaining a Microsoft Windows Server 2003 Network Infrastructure. It however, does not represent a complete reference work but is organized around the specific skills that are tested in the exam. Thus, the information contained in this Study Guide is specific to the 70-291 exam and not only to Implementing, Managing and Maintaining a Microsoft Windows Server 2003 Network Infrastructure. It includes the information required to answer questions related to the maintaining Windows Server 2003 environment, Windows 2000, Windows XP Professional, Windows NT, and Windows 98 that may be asked during the exam. Topics covered in this Study Guide include: Installing Windows Server 2003, Implementing, Managing, and Maintaining IP Addressing; Configuring TCP/IP Addressing on a Server Computer; Managing DHCP; Managing DHCP Clients and Leases; Managing DHCP Relay Agent; Managing DHCP Databases; Managing DHCP Scope Options; Managing Reservations and Reserved Clients; Troubleshooting TCP/IP Addressing; Diagnosing and Resolving Issues Related To Automatic Private IP Addressing (APIPA); Diagnosing and Resolving Issues Related To Incorrect TCP/IP Configuration; Troubleshoot DHCP; Diagnosing and Resolving Issues Related to DHCP Authorization; Verifying DHCP Reservation Configuration; Examining the System Event Log and DHCP Server Audit Log Files to Find Related Events; Diagnosing and Resolving Issues Related To Configuration of DHCP Server and Scope Options; Verifying the DHCP Relay Agent; Verifying Database Integrity; Implementing, Managing, and Maintaining Name Resolution; Installing and Configuring the DNS Server Service; Configuring DNS Server Options; Configuring DNS Zone Options; Configuring DNS Forwarding; Managing DNS; Manage DNS Zone Settings; Manage DNS Record Settings; Manage DNS Server Options; Monitor DNS; Implementing, Managing, and Maintaining Network Security; Implementing Secure Network Administration Procedures; Using Security Templates; Monitoring Network Protocol Security; Implementing, Managing, and Maintaining Routing and Remote Access; Configuring Routing and Remote Access User Authentication; Configuring Remote Access Authentication Protocols; Configuring Internet Authentication Service (IAS) To Provide Authentication for Routing and Remote Access Clients; Configuring Routing and Remote Access Policies to Permit or Deny Access; Managing Remote Access; Managing Packet Filters; Managing Routing and Remote Access Routing Interfaces; Managing Devices and Ports; Managing Routing Protocols; Managing Routing and Remote Access Clients; Managing TCP/IP Routing; Managing Routing Protocols; Managing Routing Tables; Managing Routing Ports; Implementing Secure Access between Private Networks; Troubleshooting User Access to Remote Access Services; Diagnosing and Resolving Issues Related To Remote Access VPNs; Diagnosing and Resolving Issues Related To Establishing a Remote Access Connection; Diagnosing and Resolving User Access to Resources beyond the Remote Access Server; Troubleshooting Routing and Remote Access Routing; Troubleshooting Demand-Dial Routing; Troubleshooting Router-To-Router VPNs; Maintaining a Network Infrastructure; Monitoring Network Traffic; Troubleshooting Connectivity to the Internet;

Intended Audience

This Study Guide is targeted specifically at people who wish to take the Microsoft MCSA / MCSE exam 70-

291 exam - Implementing, Managing and Maintaining a Microsoft Windows Server 2003 Network Infrastructure. This information in this Study Guide is specific to the exam. It is not a complete reference work. Although our Study Guides are aimed at new comers to the world of IT, the concepts dealt with in this Study Guide are complex and require an understanding of material provided for the CompTIA A+, Network+ and Server+ exams.

Note: There is a fair amount of overlap between the 70-291 and the 70-290 exams. Don't skim over the information that seems familiar. Read over it again to refresh your memory.

How To Use This Study Guide

To benefit from this Study Guide we recommend that you:

- Study each chapter carefully until you fully understand the information. This will require regular and disciplined work.
- If possible, perform all the walk-throughs that are included in this Study Guide to gain practical experience, referring back to the text so that you understand the information better. Remember, it is easier to understand how tasks are performed by practicing those tasks rather than trying to memorize each step.
- Be sure that you have studied and understand the entire Study Guide before you take the exam.

Note: Remember to pay special attention to these note boxes as they contain important additional information that is specific to the exam.

Good luck!

Topic 1: Installing and Deploying Windows Server 2003

You can install Windows Server 2003 directly from the CD-Rom or from a network share. The Windows Server 2003 installation process consists of five stages

Stage 1: Hard Drive Preparation: In text mode Setup checks the hard drive for consistency and errors. It allows you to format and create the Windows Server 2003 partition if you need to and copies setup files to the hard drive. Setup then reboots the computer.

Stage 2: Setup Wizard: The graphical user interface Setup Wizard gathers information from you; such as regional settings, your name and organization, the Windows Server 2003 CD-key, and computer name. The Windows Server 2003 Setup Program then creates the local Administrator user account and requests a password for it.

Stage 3: Installing Network Components: After the Setup Wizard has gathered the necessary information from you in Stage 2, it begins the network components installation. It detects your network adapter card; allows you to choose which network components, such as the network client, file and printer sharing and protocols, to install; allows you to join a workgroup or domain; and installs the components you have chosen.

Stage 4: Completing the Installation: The Setup Wizard completes the installation by installing the startmenu

items and applying and saving the configuration settings you chose in the previous stages. It then deletes the temporary setup files and reboots the computer.

Stage 5: Post Installation: After the installation is complete, you must perform the "Product Activation" and configure your server. You should also check your device manager for undetected or nonfunctioning hardware components.

Section 1.1: System Requirements

Before installing Windows Server 2003, you must ensure that the computer meets the minimum system

requirements for Windows Server 2003.

Table 1.1: Windows Server 2003 Minimum System Requirements

| Component | Minimum Requirement |
|-----------------|---|
| Processor | Pentium 133 MHz (Pentium III 550 MHz recommended for Standard Edition and Pentium III 733 MHz for Enterprise Edition) |
| Memory | 128 MB Ram (256 MB Ram recommended) |
| Hard Disk Space | 1.5 GB hard disk free space |
| Networking | Standard network adapter card |
| Display | Monitor and adapter with minimum resolution of the VGA standard |
| I/O devices | CD-ROM, keyboard, mouse, or other pointing devices. |

Section 1.2: Installing Windows Server 2003 from the CD-Rom

When installing Windows Server 2003 on a new computer from the CD-Rom you must boot directly from the CD-Rom. Unlike Windows 2000, Windows Server 2003 does not support booting from boot disks. Therefore, if your computer does not support booting from the CD-Rom, you must install Windows Server 2003 from a network share or from within an existing operating system.

Place the Windows Server 2003 installation disk in the CD-Rom and reboot the computer. During the boot process you will be prompted to "press any key to boot from CD-Rom". Once you have pressed a key the installation of Windows Server 2003 will begin.

Section 1.3: Installing Windows Server 2003 from a Network Share

To install Windows Server 2003 over the network you must copy the i386 folder from the Windows Server 2003 Installation CD to a shared network folder. You must also ensure that the computer has a can connect to the network share when it has booted.

Section 1.4: Performing an Unattended Installation

Microsoft allows for the automated installation of Windows Server 2003 through unattended installations. There are three mechanisms through which an unattended installation can be performed. These are through:

- unattended answer files;
- disk imaging using the System Preparation Tool; and
- Remote Installation Services

1.4.1: Using an Unattended Answer File

The first mechanism you can use to perform an unattended installation of Windows Server 2003 is to use an answer file. An answer file is an automated script that supply's the Windows Server 2003 Setup program with all the information it would require during the installation.

- You can use Setup Manager located in the deploy.cab file in the /support/tools folder of the Windows Server 2003 Installation CD to create and modify an answer file or you can manually create the Answer file. You can use Setup Manager to create an answer file for an unattended installation, a sysprep install, and for a Remote Installation Services.

1.4.2: Using the System Preparation Tool

With disk imaging it is possible to install and configure Windows Server 2003 and all the applications and application update packs on a test computer and then create an exact image of the hard drive that can then be used to install Windows Server 2003 and the applications on other client computers. However, all the target computers to which the image is to be applied must have the same hardware configuration as the test

computer. You will also have to change the computer name of all the target computers as each computer on the network must have a unique name.

You should use the Sysprep, after installing and configuring Windows Server 2003, the applications and application update packages on a test computer, to prepare the computer of disk imaging. You should then run the disk imaging program after Sysprep has completed. Sysprep adds a mini-Setup Wizard to the disk image that will request the user-specific information such as productID, user name, network configuration, etc, on the first reboot of the target computer. This information can either be supplied by the user or by an answer file.

1.4.3: Using Remote Installation Services (RIS)

Unlike Windows 2000 Server, Windows Server 2003 can be deployed using Remote Installation Services (RIS). Remote installation is the process of connecting to Remote Installation Services (RIS) server from a target computer and then performing an automated installation of Windows Server 2003 on the target computer. This is the most effective method of deploying Windows Server 2003. Remote Installation allows administrators to use a centrally located computer to install Windows Server 2003 on a target computer, i.e. the computer on which the Windows Server 2003 operating system is to be installed, anywhere on a network. It however requires that your network already has a Windows Server 2003 server infrastructure in place and that the target computers support remote booting.

Section 1.5: Windows Server 2003 Licensing

The use of Windows Server 2003 requires two distinct types of licensing: a product license, i.e., the CDkey, which allows you to install the Windows Server 2003 operating system on a computer; and a Client Access License (CAL), which allows clients to connect to the Windows Server 2003 computer.

Windows Server 2003 provides three CAL modes: a per server mode, which sets the number of concurrent users or clients that can log on to a specific Windows Server 2003 computer; a per user mode, which permits an unlimited number of concurrent users to connect to the Windows Server 2003 computer, providing each has a CAL; and a per device mode, which permits an unlimited number of concurrent client computers, or devices, to connect to the Windows Server 2003 computer, providing that each device has a CAL.

Section 1.6: Deploying Software Applications

1.6.1: Software Installation and Maintenance Technology

The software installation and maintenance technology in Windows Server 2003 uses Group Policy in conjunction with Windows Installer to automate and manage software installations, updates and removal from a centralized location. Group Policy can be used to assign the software application to a group of users that are members of an OU, and allows you to manage the various phases of software deployment.

There are four phases of software life cycle:

- **Preparation:** preparing the files that allows you to use Group Policy to deploy the application software. This involves copying the Windows Installer package files to a software distribution point. The Windows Installer application files can be obtained from the application's vendor or can be created through the use of third-party utilities.
- **Deployment:** the administrator creates a Group Policy Object (GPO) that installs the software on the target computers and links the GPO to the appropriate Organizational Unit. During this phase the software is installed.
- **Maintenance:** the software is upgraded with a new version or redeployed with a patch or a service pack.
- **Removal:** to remove software that is no longer required, you must remove the Windows installer package from the GPO that was used to deploy the software. The software is then automatically removed when a user log on or when the computer restarts.

Windows Installer consists of Windows Installer service, which is a client-side service, and Windows Installer package. Windows Installer package uses the .msi file extension that replaces the Setup.exe file and

contains all the information that Windows Installer services requires to install the software. The software developer provides the Windows Installer package with the application. If a Windows Installer package does not come with an application, you can create a Windows Installer package or repackage the application, using a third-party utility. Alternatively you could create an application file (.zap) that uses the application's existing setup program. A .zap file is not a native Windows Installer package.

Advantages of using Native Windows Installer packages:

- Automatic File Repair when a critical application file becomes corrupt. The application automatically returns to the installation source to retrieve a new copy of the file.
- Clean Removal without leaving orphaned files and without deleting shared files used by another application.
- Transformable. You can customize a Windows Installer package to meet the requirements set by your company by using authoring and repackaging tools. Transformed Windows Installer packages are identified by the .mst file extension.
- Patches. Patches and upgrades can be applied to the installed applications. These patches use the .msp file extension.

Note: A .zap file is not a native Windows Installer package and does not offer the same benefits as Windows Installer packages. It therefore does not support automatic repairing and cannot be transformed.

1.6.1.1: Acquiring and Modifying Software Packages

The preparation phase involves two key processes: package acquisition and package modification. The Software Installation and Maintenance technology can only deploy and manage Windows Installer package files. Thus, you must have a package file for an application before that application can be deployed using Group Policy. Administrators have the following three options for acquiring package files:

- Obtain a package file from the software vendor;
- Repackage an application by create a package file using repackaging software; and
- Create a text file with the .zap extension.

Package modifications are similar to Windows Installer package files but have an .mst file extension.

Modifications allow you to take one software application, such as Microsoft Office, and create any number of custom installations. You can then create GPOs, assign these different versions to different users, and install the software.

1.6.1.2: Deploying Software Packages

When you deploy software packages, you can assign the package to a user or computer, or you can publish the software package. In addition, you can also deploy .zap files.

1.6.1.3: Assigning Software Packages

Software packages can be assigned to users or computers.

- When you assign a software package to a user, the program is advertised when the user logs on, but is not installed until the first time the user starts the application. The user can start the installation of the application by selecting it from the Start menu or by document invocation, i.e., by double-clicking an icon or a file type associated with the application. By initially only advertising applications, you can minimize the impact on the local hard disk while keeping applications available to the user at all times. To assign an application to users, do the following:

- Click on the START button
- Point to PROGRAMS
- Click on ADMINISTARTIVE TOOLS
- Click on ACTIVE DIRECTORY USERS AND COMPUTERS

- Expand the domain containing the users to whom you want to assign an application
- In the list of Group Policy Object Links, select the appropriate GPO (if no GPO exists, create one)
- Then click EDIT
- Expand the User Configuration node
- Expand the Software Settings node
- Then right-click the Software Installation node
- On the pop-up menu, point to NEW
- Then click PACKAGE
- In the File Name text box, enter the path to the package
- Then click OPEN
- In the Deploy Software dialog box, click ASSIGNED
- Then click OK

When you assign a software package to a computer, you ensure that certain applications will be available on that computer regardless of who logs on to the computer. When you assign an application to a computer, the software is installed automatically when the computer is next turned on.

The steps for assigning an application to computers are almost identical to the steps for assigning an application to users. To assign an application to computers, do the following:

- Click on the START button
- Point to PROGRAMS
- Click on ADMINISTRATIVE TOOLS
- Click on ACTIVE DIRECTORY USERS AND COMPUTERS
- Expand the domain containing the computer to which you want to assign an application
- In the list of Group Policy Object Links, select the appropriate GPO (if no GPO exists, create one)
- Then click EDIT
- Expand the Computer Configuration node
- Expand the Software Settings node
- Then right-click the Software Installation node
- On the pop-up menu, point to NEW
- Then click PACKAGE
- In the File Name text box, enter the path to the package
- Then click OPEN
- In the Deploy Software dialog box, click ASSIGNED
- Then click OK

1.6.1.4: Publishing Software Packages

When an application is published to a user, it is not installed. The advertisement is stored in Active Directory directory services, so the software is readily available. A user can install the application by using Add/Remove Programs or by using document invocation.

- To use Add/Remove Programs, the user would start Control Panel and double-click the Add/Remove Programs icon. When he or she clicks Add New Programs, the set of programs available to the user is displayed in user friendly names. The user can then select the desired program and install the software.
- The user will install the application by document invocation when he or she double-clicks an unknown file type. When the user does this, the computer sends a query to Active Directory directory services to see if there are any applications associated with the file extension. If Active Directory directory services contain such an application, the computer then checks if this application has either been published or assigned to the user. If the application has been published or assigned to the user, the computer then

checks if the application is set for Auto-Install This Application By File Extension Activation. If the administrator has set the application to Auto-Install, the application is installed.

1.6.1.5: Deploying .zap Files

Software Installation normally works only with Windows Installer package files. However, you can get around this requirement by creating a .zap file that provides instructions for deploying the application. You should only use .zap files to publish applications when it is not feasible to use repackaging software to repackage an application and when a Windows Installer package file from a software vendor is unavailable. A .zap file is a text file that can be parsed and executed by Software Installation. These files allow you to publish non-Windows Installer applications with the following limitations:

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