Windows
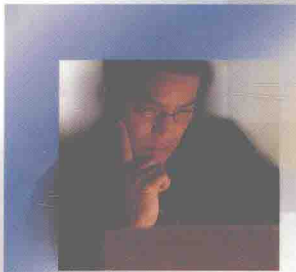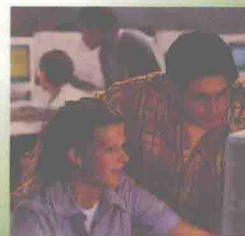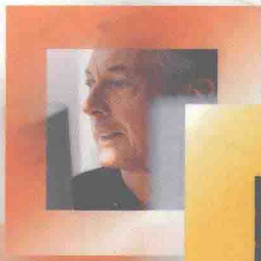
CD-ROM
Included

Academic
Learning
Series

Microsoft®
Windows® 2000
Professional

Microsoft®

Microsoft®
Windows® 2000
Professional

Microsoft®

About This Book

Welcome to *MCSE Training Kit—Microsoft Windows 2000 Professional*. This kit introduces you to the Windows 2000 family of products and prepares you to install, configure, administer, and support Microsoft Windows 2000 Professional.

This kit introduces the various tools for administering and configuring Windows 2000 including the Microsoft Management Console, Task Scheduler, Control Panel, and the registry. You will learn about the network protocols and services that ship with Windows 2000. This kit concentrates on Transmission Control Protocol/Internet Protocol (TCP/IP), the network protocol of choice for Windows 2000. It also introduces you to the Domain Name System (DNS), which is an Internet and TCP/IP standard name service, and is required for Windows 2000 domains and directory services based on Active Directory technology.

Windows 2000 domains and Active Directory directory services are also introduced in this course, but both these features are available only with the Windows 2000 Server family of products. Active Directory directory services integrate the Internet concept of a namespace with Windows 2000 directory service. Active Directory directory services use DNS as its domain naming and location service so Windows 2000 domain names are also DNS names. In fact, the core unit of logical structure in Active Directory directory services is the domain.

Each chapter in this book is divided into lessons. Most lessons include hands-on procedures that allow you to practice or demonstrate a particular concept or skill. Each lesson ends with a short summary and each chapter ends with a set of review questions to test your knowledge of the chapter material.

The "Getting Started" section of this chapter provides important setup instructions that describe the hardware and software requirements to complete the procedures in this course. It also provides information about the networking configuration necessary to complete some of the hands-on procedures. Read through this section thoroughly before you start the lessons.

Intended Audience

Anyone who wants to learn more about Windows 2000 Professional will find this book useful. This book was developed for information technology (IT) professionals who need to design, plan, implement, and support Windows 2000 Professional or who plan to take the related Microsoft Certified Professional exam 70-210, Installing, Configuring, and Administering Microsoft Windows 2000 Professional.

Note For more information on becoming a Microsoft Certified Systems Engineer, see the section, "The Microsoft Certified Professional Program," later in this chapter.

Prerequisites

This course requires that students meet the following prerequisite: A knowledge of the fundamentals of current networking technology is required.

Reference Materials

You might find the *Windows 2000 Professional Resource Kit* a useful reference for this training kit.

Features of This Book

Each chapter opens with a "Before You Begin" section, which prepares you for completing the chapter.

▶ The chapters are then broken into lessons. Whenever possible, lessons contain practices that give you an opportunity to use the skills being presented or explore the part of the application being described. All practices offer step-by-step procedures that are identified with a bullet symbol like the one to the left of this paragraph.

The "Review" section at the end of the chapter allows you to test what you have learned in the chapter's lessons. Appendix A, "Questions and Answers," contains all of the book's questions and corresponding answers.

Notes

Several types of notes appear throughout the lessons.

- Notes marked **Tip** contain explanations of possible results or alternative methods.
- Notes marked **Important** contain information that is essential to completing a task.

- Notes marked **Note** contain supplemental information.
- Notes marked **Caution** contain warnings about possible loss of data.

Conventions

The following conventions are used throughout this book.

Notational Conventions

- Characters or commands that you type appear in **bold lowercase** type.
- *Italic* in syntax statements indicates placeholders for variable information. *Italic* is also used for book titles.
- Names of files and folders appear in Title Caps, except when you are to type them directly. Unless otherwise indicated, you can use all lowercase letters when you type a filename in a dialog box or at a command prompt.
- Filename extensions appear in all lowercase.
- Acronyms appear in all uppercase.
- Monospace type represents code samples, examples of screen text, or entries that you might type at a command prompt or in initialization files.
- Square brackets [ ] are used in syntax statements to enclose optional items. For example, [*filename*] in command syntax indicates that you can choose to type a filename with the command. Type only the information within the brackets, not the brackets themselves.
- Braces { } are used in syntax statements to enclose required items. Type only the information within the braces, not the braces themselves.
- Icons represent specific sections in the book as follows:

Icon	Represents
	A hands-on practice. You should perform the practice to give yourself an opportunity to use the skills being presented in the lesson.
	Chapter review questions. These questions at the end of each chapter allow you to test what you have learned in the lessons. You will find the answers to the review questions in Appendix A, "Questions and Answers."

Keyboard Conventions

- A plus sign (+) between two key names means that you must press those keys at the same time. For example, "Press Alt+Tab" means that you hold down Alt while you press Tab.

- A comma (,) between two or more key names means that you must press each of the keys consecutively, not together. For example, "Press Alt, F, X" means that you press and release each key in sequence. "Press Alt+W, L" means that you first press Alt and W together, and then release them and press L.

- You can choose menu commands with the keyboard. Press the Alt key to activate the menu bar, and then sequentially press the keys that correspond to the highlighted or underlined letter of the menu name and the command name. For some commands, you can also press a key combination listed on the menu.

- You can select or clear check boxes or option buttons in dialog boxes with the keyboard. Press the Alt key, and then press the key that corresponds to the underlined letter of the option name. Or you can press Tab until the option is highlighted, and then press the spacebar to select or clear the check box or option button.

- You can cancel the display of a dialog box by pressing the Esc key.

Chapter and Appendix Overview

This self-paced training course combines notes, hands-on procedures, and review questions to teach you how to install, configure, administer, and support Windows 2000 Professional. It is designed to be completed from beginning to end, but you can choose a customized track and complete only the sections that interest you. (See the next section, "Finding the Best Starting Point for You," for more information.) If you choose the customized track option, see the "Before You Begin" section in each chapter. Any hands-on procedures that require preliminary work from preceding chapters refer to the appropriate chapters.

The book is divided into the following chapters:

- The "About This Book" section contains a self-paced training overview and introduces the components of this training. Read this section thoroughly to get the greatest educational value from this self-paced training and to plan which lessons you will complete.

- Chapter 1, "Introduction to Windows 2000," presents an overview of the Windows 2000 operating system and the four products that make up this family. It introduces some of the new features and benefits of Windows 2000 and explains why Windows 2000 is easier to use and manage and provides greater compatibility, file management capabilities, and security than previous versions of Windows. This chapter also provides an introduction to workgroups and domains.

- Chapter 2, "Installing Windows 2000 Professional," presents a list of prein-stallation tasks that you need to complete before you begin your installation, as well as the hardware requirements for installing Windows 2000 Profes-sional. It then steps you through the process of installing from a CD-ROM, and as a hands-on exercise, has you install Windows 2000 Professional on your computer. Finally the chapter discusses installing Windows 2000 over the network and how to troubleshoot installation problems.

- Chapter 3, "Using Microsoft Management Console and Task Scheduler," presents two of the primary administrative tools available in Windows 2000: the Microsoft Management Console (the MMC) and Task Scheduler. It defines custom consoles, console trees, details panes, snap-ins, and exten-sions, and discusses the differences between Author mode and User mode. It also explains how you can use custom consoles for remote administration and troubleshooting. The hands-on portion has you use the MMC to create custom consoles, and then add a snap-in to an existing custom console. In the second hands-on practice, you configure Task Scheduler to launch a program, at a specified time.

- Chapter 4, "Using Windows Control Panel," presents some of the applications in Control Panel that you use to customize the hardware and software con-figuration for a computer. You use the System icon to configure hardware devices or services by creating and configuring hardware profiles. You also use it to configure performance options, environment variables, and startup and recovery settings. The hands-on practice allows you to change the paging file size and to add an environment variable. You use the Display icon to view or modify display properties. Windows 2000 supports a maximum of nine monitors. This chapter also includes a section on installing hardware, both Plug and Play hardware and non–Plug and Play hardware. It explains how to use the Add/Remove Hardware Wizard and how to manually install hardware.

- Chapter 5, "Using the Registry," introduces the registry, the hierarchical data-base where Windows 2000 stores system configuration information. This chapter also presents an overview of Registry Editor, a tool that allows you to view and modify the registry. The hands-on practice has you use Registry Editor to view information in the registry, use the Find Key command to search the registry, modify the registry by adding a value to it, and save a subtree as a file so that you can use an editor, like Notepad, to search the file.

- Chapter 6, "Managing Disks," presents an overview of Windows 2000 disk management. You can manage disks locally or on remote computers. You can create a custom console and add the Disk Management snap-in to it, or you can use the Disk Management snap-in included in the preconfigured Com-puter Management snap-in. The Disk Management snap-in provides shortcut

menus to show you which tasks you can perform on the selected object, and it includes wizards to guide you through creating partitions and volumes and upgrading disks. The hands-on practice has you upgrade a basic disk to a dynamic disk, create a new volume, and mount a volume.

■ Chapter 7, "Installing and Configuring Network Protocols," presents the skills and knowledge necessary to configure Transmission Control Protocol/Internet Protocol (TCP/IP) and to install other network protocols, including NWLink, NetBIOS Enhanced User Interface (NetBEUI), and Data Link Control (DLC). The chapter also discusses the process for configuring network bindings. The hands-on practices allow you to verify your computer's configuration and then configure your computer to use a static IP address. Next you configure your computer to use a DHCP server to automatically assign an IP address to your computer, and test the Automatic Private IP Addressing feature in Windows 2000. Finally, you install and configure NWLink, change the binding order, unbind a protocol, and then bind a protocol.

■ Chapter 8, "Using the DNS Service," introduces Domain Name System (DNS), a distributed database that is used in TCP/IP networks to translate computer names to IP addresses. It also presents the skills and knowledge necessary to configure clients to use the DNS Service. In the hands-on practice, you configure a computer running Windows 2000 Professional to be a DNS client.

■ Chapter 9, "Introducing Active Directory Directory Services," presents the Windows 2000 directory service, Active Directory directory services. A directory service uniquely identifies users and resources on a network. Active Directory directory services provide a single point of network management, allowing you to add, remove, and relocate users and resources easily. Active Directory directory services are available only with the Windows 2000 Server family of products.

■ Chapter 10, "Setting Up and Managing User Accounts," introduces you to user accounts and how to plan your user accounts. It also presents the skills and knowledge necessary to create local user accounts and to set properties for them. In the hands-on practices, you create local user accounts. You then test the user accounts, modify some of the user account properties, and then test the modified user account properties.

■ Chapter 11, "Setting Up and Managing Groups," introduces you to groups and to group user accounts to allow for easier assignment of permissions. It also presents the skills and knowledge necessary to implement local groups and built-in groups. In the hands-on practice, you create local groups, add members to the local groups when you create them, and add members to the groups after the groups have been created. You delete a member from one of the groups, and then you delete one of the local groups that you created.

- Chapter 12, "Setting Up and Configuring Network Printers," introduces you to the Windows 2000 printing terminology, as well as presenting the skills and knowledge necessary to set up and share network printers. This chapter also presents how to troubleshoot common printing problems that are associated with setting up network printers. In the hands-on practice, you use the Add Printer wizard to install and share a local printer. This chapter also introduces printer pools and setting priorities.

- Chapter 13, "Administering Network Printers," presents the four major types of tasks involved with administering network printers: managing printers, managing documents, troubleshooting printers, and performing tasks that require the Manage Printers permission. This chapter also explains how Microsoft Windows 2000 allows you to control printer usage and administration by assigning permissions. In the hands-on practices, you assign forms to paper trays, set up a separator page, and take ownership of a printer. You also print a document, set a notification for a document, change the priority for a document, and then cancel a document.

- Chapter 14, "Securing Resources with NTFS Permissions," introduces the NTFS folder and file permissions and explains how to assign them to user accounts and groups. It explains how moving or copying files and folders affects NTFS file and folder permissions. It also explains how to troubleshoot common resource access problems. In the hands-on practices, you plan and apply NTFS permissions for folders and files based on business scenarios, and then test them. You also observe the effects of taking ownership of a file, and determine the effects of permission and ownership when you copy or move files.

- Chapter 15, "Administering Shared Folders," explains how to share folders so that the folders and their contents are accessible over the network. This chapter also explains how sharing folders provides another way to secure file resources, one that can be used on FAT or FAT32 partitions. In the hands-on exercises, you share a folder, determine the current permissions for the shared folder and assign shared folder permissions to groups, and stop sharing a folder. In the optional hands-on exercises, you connect to a shared folder and test the combined effects of shared folder permissions and NTFS permissions.

- Chapter 16, "Auditing Resources and Events," introduces the Microsoft Windows 2000 Local Security Policy and Group Policy. One of the features controlled by Local Security Policy or Group Policy is auditing. Auditing is a tool for maintaining network security that allows you to track user activities and systemwide events. This chapter also introduces audit policies and what you need to consider before you set one up, as well as how to set up auditing on resources and how to maintain security logs. In the hands-on practices, you

plan an audit policy for your computer, set up an audit policy by enabling auditing on certain events, view the security log file, and configure Event Viewer to overwrite events when the log file is filled.

- Chapter 17, "Configuring Group Policy and Local Security Policy," explains how to use the Windows 2000 Local Security Policy or Group Policy snap-in to improve the security on your computer. This chapter explains the Windows 2000 Account Policies and some of the available Security Options. In the first hands-on practice, you configure and test one of the Account Policies settings, Minimum Password Length. In the second hands-on practice, you configure and test three of the Security Policy settings.

- Chapter 18, "Managing Data Storage," introduces data storage management on NTFS-formatted volumes. Data management includes using compression, using disk quotas, increasing the security of files and folders on your computer by using the Encrypting File System (EFS), and defragmenting a disk. In the hands-on practice, you compress files and folders, display the compressed files and folders in a different color, uncompress a file, and test the effects that copying and moving files have on compression. You also configure default quota management settings to limit the amount of data users can store on a drive and configure a custom quota setting for a user account. You test the disk quota and then turn off quota management. Finally, you encrypt a file and then attempt to access it.

- Chapter 19, "Backing Up and Restoring Data," introduces the Windows Backup tool that allows you to back up and restore data. It explains the five types of backup—normal, copy, incremental, differential, and daily—and how these can be combined to meet your backup needs. In the hands-on practices, you use the Backup Wizard to back up some files to your hard disk, and you create a backup job to perform a backup operation later by using Task Scheduler. You then restore some of the files you backed up.

- Chapter 20, "Monitoring Access to Network Resources," prepares you to monitor network resources. You learn about the Shared Folders snap-in and how to use it to view and create shares. You also learn how to use the Shared Folders snap-in to view sessions and open files and how to use it to disconnect users from shared folders. In the hands-on practices, you use the Shared Folders snap-in to view the shared folders, to open files, and to disconnect all users from all open files. You also use the Shared Folders snap-in to create a new share and then stop sharing it.

- Chapter 21, "Configuring Remote Access," presents the new protocols for use with remote access, and it provides an understanding of the new options and interfaces in Windows 2000 to connect computers and configure protocols

correctly to meet all your remote access requirements. In the hands-on practices, you use Network And Dial-up Connections to launch the Network Connection wizard to configure an inbound dial-up connection and allow Virtual Private Connections, and then to configure an outbound connection.

- Chapter 22, "The Windows 2000 Boot Process," introduces the Microsoft Windows 2000 boot process for Intel-based computers. It also introduces the Boot.ini file and explains how to create a Windows 2000 boot disk. In the hands-on practice, you create a Windows 2000 boot disk for Intel-based computers and then test it. In addition, you repair a boot problem by using a Windows 2000 boot disk and by using the Last Known Good Configuration option.

- Chapter 23, "Deploying Windows 2000," introduces Setup Manager and the system preparation tools. Setup Manager makes it easy to create the Unattend.txt files that are necessary for scripted installations, and the System Preparation tool helps you prepare master disk images for efficient mass installations. This chapter also explains remote installations, outlines how to install and configure remote installation servers, lists the client requirements for remote installations, and lists the steps to create boot floppies and a remote boot disk to help you efficiently deploy Windows 2000 Professional. Finally, this chapter explains how to upgrade previous versions of Windows to Windows 2000 and how to deploy service packs.

- Chapter 24, "Configuring Windows 2000 for Mobile Computers," introduces the new features in Microsoft Windows 2000 Professional that make mobile computing easier to do. The features discussed in this chapter include using offline folders and files, using Synchronization Manager, configuring and using power schemes, enabling Hibernate mode, and enabling Advanced Power Management.

- Chapter 25, "Implementing, Managing, and Troubleshooting Hardware Devices and Drivers," introduces Device Manager and explains how you use it to manage and troubleshoot devices. It also introduces the System Information snap-in and explains how it helps you manage your system. You learn how to use Device Manager, the System File Checker utility, and the Windows Signature Verification utility to configure, monitor, and troubleshoot driver signing. You also learn how to use Device Manager to upgrade your computer from a single processor to a multiprocessor system, and you learn how to use Performance Console as a tool to monitor system performance. Finally, you learn how to install, configure, and troubleshoot miscellaneous devices, including fax support, scanners, cameras, and mouse devices.

- Appendix A, "Questions and Answers," lists all of the practice questions and review questions from the book, showing the chapter and section where the question appears, and the suggested answer.

- Appendix B, "Creating Setup Boot Disks," outlines the steps to create the Windows 2000 Setup disks for computers that don't support booting from a CD-ROM drive.

- Appendix C, "Understanding the DHCP Service," provides an introduction to the DHCP service.

- Appendix D, "Managing Backup Tapes," provides an introduction to rotating and archiving backup tapes.

- The glossary provides definitions for many of the key words and concepts presented in the course. It also contains some additional basic networking terminology.

Finding the Best Starting Point for You

Because this book is self-paced, you can skip some lessons and revisit them later. But note that you must complete the procedures in Chapter 2, "Installing Windows 2000 Professional," before you can perform procedures in the other chapters. Use the following table to find the best starting point for you:

If you	Follow this learning path
Are preparing to take the Microsoft Certified Professional exam 70-210, Installing, Configuring, and Administering Microsoft Windows 2000 Professional	Read the "Getting Started" section. Then work through Chapters 1–2. Work through the remaining chapters in any order.
Are reviewing information about specific topics from the exam	Use the "Where to Find Specific Skills in This Book" section that follows this table.

Where to Find Specific Skills in This Book

The following tables provide a list of the skills measured on certification exam 70-210, Installing, Configuring, and Administering Microsoft Windows 2000 Professional. The table provides the skill, and where in this book you will find the lesson relating to that skill.

Note Exam skills are subject to change without prior notice and at the sole discretion of Microsoft.

Installing Windows 2000 Professional

Skill Being Measured	Location in Book
Perform an attended installation of Windows 2000 Professional	Chapter 2, Lessons 2 and 3
Perform an unattended installation of Windows 2000 Professional	Chapter 23, Lessons 1–3
Upgrade from a previous version of Windows to Windows 2000 Professional	Chapter 23, Lessons 1 and 4
Deploy service packs	Chapter 23, Lesson 5
Troubleshoot failed installations	Chapter 2, Lesson 4

Implementing and Conducting Administration of Resources

Skill Being Measured	Location in Book
Monitor, manage, and troubleshoot access to files and folders	Chapter 14, Lessons 1–6 Chapter 18, Lesson 1
Manage and troubleshoot access to shared folders	Chapter 15, Lessons 1, 3, and 4
Connect to local and network print devices	Chapter 12, Lesson 3 Chapter 13, Lessons 1–3
Configure and manage file systems	Chapter 2, Lesson 1

Implementing, Managing, and Troubleshooting Hardware Devices and Drivers

Skill Being Measured	Location in Book
Implement, manage, and troubleshoot disk devices	Chapter 4, Lessons 4 and 5 Chapter 6, Lessons 1 and 2 Chapter 18, Lesson 2 Chapter 25, Lesson 1
Implement, manage, and troubleshoot display devices	Chapter 4, Lessons 2, 4, and 5 Chapter 25, Lesson 1
Implement, manage, and troubleshoot mobile computer hardware	Chapter 24, Lesson 2
Implement, manage, and troubleshoot input and output devices	Chapter 25, Lessons 1 and 4
Update drivers	Chapter 25, Lesson 3
Monitor and configure multiple processing units	Chapter 25, Lesson 3
Install, configure, and troubleshoot network adapters	Chapter 7, Lessons 1–4 Chapter 25, Lesson 1

Monitoring and Optimizing System Performance and Reliability

Skill Being Measured	Location in Book
Manage and troubleshoot driver signing	Chapter 25, Lesson 2
Configure, manage, and troubleshoot Task Scheduler	Chapter 3, Lesson 3
Manage and troubleshoot the use and synchronization of offline files	Chapter 24, Lesson 1
Optimize and troubleshoot performance of the Windows 2000 Professional desktop	Chapter 4, Lesson 3 Chapter 7, Lesson 4 Chapter 18, Lesson 4 Chapter 25, Lesson 3
Manage hardware profiles	Chapter 3, Lesson 1 Chapter 4, Lesson 1 Chapter 25, Lessons 1, 3, and 4
Recover systems and user data	Chapter 22, Lessons 3 and 5

Configuring and Troubleshooting the Desktop Environment

Skill Being Measured	Location in Book
Configure and manage user profiles	Chapter 10, Lesson 4
Configure support for multiple languages or multiple locations	Chapter 4, Lesson 6
Install applications by using Windows Installer packages	Chapter 1, Lesson 2
Configure and troubleshoot desktop settings	Chapter 4, Lesson 6
Configure and troubleshoot fax support	Chapter 25, Lesson 4
Configure and troubleshoot accessibility services	Chapter 4, Lesson 6

Implementing, Managing, and Troubleshooting Network Protocols and Services

Skill Being Measured	Location in Book
Configure and troubleshoot the TCP/IP protocol	Chapter 7, Lesson 1
Connect to computers by using dial-up networking	Chapter 21, Lessons 2 and 3
Connect to shared resources on a Microsoft network	Chapter 15, Lessons 1–4

Implementing, Monitoring, and Troubleshooting Security

Skill Being Measured	Location in Book
Encrypt data on a hard disk by using Encrypting File System (EFS)	Chapter 18, Lesson 3
Implement, configure, manage, and troubleshoot local Group Policy	Chapter 11, Lessons 1–2 Chapter 18, Lesson 3
Implement, configure, manage, and troubleshoot local user accounts	Chapter 10, Lessons 1–4 Chapter 11, Lessons 1 and 2
Implement, configure, manage, and troubleshoot local user authentication	Chapter 10, Lessons 1–4
Implement, configure, manage, and troubleshoot a security configuration	Chapter 16, Lesson 3 Chapter 17, Lessons 1 and 2 Chapter 18, Lesson 3

Getting Started

This self-paced training course contains hands-on procedures to help you learn about Windows 2000 Professional.

Hardware Requirements

Each computer must have the following minimum configuration. All hardware should be on the Microsoft Windows 2000 Professional Hardware Compatibility List.

- Pentium CPU
- At least 32 MB RAM (64 MB RAM recommended)
- One or more hard disks with a minimum of 500 MB of free disk space (1 GB recommended)
- Network adapter card
- Video display adapter with VGA resolution or higher
- CD-ROM drive, 12X or faster recommended (Note: A CD-ROM drive is not required for installing Windows 2000 over a network.)
- Keyboard
- Microsoft mouse or compatible pointing device

Software Requirements

Microsoft Windows 2000 Professional is required to complete the procedures in this course.

Setup Instructions

Complete installation instructions are provided in Lesson 2, "Installing Windows 2000 from a CD-ROM," of Chapter 2, "Installing Windows 2000 Professional."

The Online Book

The Supplemental Course Materials CD-ROM includes an online version of the book that you can view on screen using Microsoft Internet Explorer 5 or later.

▶ **To use the online version of this book**

1. Insert the Supplemental Course Materials CD-ROM into your CD-ROM drive.

2. Select Run from the Start menu on your desktop, and type
   D:\Ebook\Setup.exe (where D is the name of your CD-ROM disk drive).

Note You must have the CD inserted in your CD-ROM drive for the online version of the book to run properly.

The Microsoft Certified Professional Program

The Microsoft Certified Professional (MCP) program provides the best method to prove your command of current Microsoft products and technologies. Microsoft, an industry leader in certification, is on the forefront of testing methodology. Our exams and corresponding certifications are developed to validate your mastery of critical competencies as you design and develop, or implement and support, solutions with Microsoft products and technologies. Computer professionals who become Microsoft certified are recognized as experts and are sought after industry-wide.

The Microsoft Certified Professional program offers eight certifications, based on specific areas of technical expertise:

- *Microsoft Certified Professional (MCP).* Demonstrated in-depth knowledge of at least one Microsoft operating system. Candidates may pass additional Microsoft certification exams to further qualify their skills with Microsoft BackOffice products, development tools, or desktop programs.

- *Microsoft Certified Professional + Internet.* MCPs with a specialty in the Internet are qualified to plan security, install and configure server products, manage server resources, extend servers to run scripts, monitor and analyze performance, and troubleshoot problems.

- *Microsoft Certified Professional + Site Building.* Demonstrated what it takes to plan, build, maintain, and manage Web sites using Microsoft technologies and products.

- *Microsoft Certified Systems Engineer (MCSE).* Qualified to effectively plan, implement, maintain, and support information systems in a wide range of computing environments with Microsoft Windows NT Server and the Microsoft BackOffice integrated family of server software.