Tom Carpenter

Exam 98-349

Microsoft® Windows® Operating System ESSENTIALS

SYBEX SERIOUS SKILLS.

MICROSOFT® WINDOWS® OPERATING SYSTEM

ESSENTIALS

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Tom Carpenter

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I hope you see all that reflected in these pages. I'd be very interested to hear your comments and get your feedback on how we're doing. Feel free to let me know what you think about this or any other Sybex book by sending me an email at `nedde@wiley.com`. If you think you've found a technical error in this book, please visit `http://sybex.custhelp.com`. Customer feedback is critical to our efforts at Sybex.

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I dedicate this book to my wife and children.
You are the most important people in this world
to me. I cherish every moment with you
and love you more every day.

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I would like to acknowledge the great staff at Wiley. You always make a good book great. Specific thanks go out to the technical and copy editors who worked hard to make this a great book. Thanks to all of you. Additionally, I would like to thank my family, who tolerated me through yet one more book and this one in particular as the writing schedule was definitely one that consumed a lot of my time. You are all amazing. Finally, I want to thank God for giving me the strength to write this book and undertake every other endeavor in life. Thank you.

About the Author

Tom Carpenter is a consultant and trainer based out of Marysville, OH. He is the founder and current Senior Consultant for The Systems Education and Consulting Company (SysEdCo). SysEdCo provides training on Microsoft technologies, wireless networking, security, and IT professional development. Tom is the author of several books on topics ranging from wireless network administration to SQL Server database administration and optimization. Tom holds several certifications, including MCITP: SQL Server 2008 Database Administrator, CWNA, CWSP, Project+, and several additional Microsoft certifications. He spends every spare moment he can with his amazing wife and children. You can reach the author by writing to `carpenter@sysedco.com`.

Contents at a Glance

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Introduction

Windows computers are important tools used on modern networks. They are used to send and receive emails, create documents, and use intensive business applications. Computer support administrators are in high demand and modern technologies such as virtual desktops and cloud computing have only increased the importance of the support professional's job.

The Microsoft Technology Associate Certification

The Microsoft Technology Associate (MTA) certification is a certification provided for entry-level professionals and those with long careers in the industry who have never acquired a certification credential. It includes three separate tracks: Information Technology (IT) Professional, Developer, and Database. The IT Professional track is for individuals pursuing work as administrators. The Developer track is for individuals pursuing work as programmers and software engineers. The Database track is for individuals pursuing work as database administrators and database developers.

The IT Professional series includes four certifications:

Windows Operating System (OS) Fundamentals This certification assumes no previous knowledge and allows you to start from the beginning to learn how to administer and support Windows 7 clients. The knowledge acquired through the Networking Fundamentals and Security Fundamentals certifications will be helpful as you study Windows OS fundamentals, but it is important to remember that the MTA certification exams have no prerequisites. The Windows OS Fundamentals exam and this book give you a solid foundation for working as a Windows Desktop administrator in a Microsoft technology environment. You earn this certification by taking and passing exam 98-349. This book covers the objectives for the 98-349 exam.

Windows Server Administration Fundamentals This certification assumes no previous knowledge and allows you to start from the beginning to learn how to administer Windows servers. The knowledge acquired through the Networking Fundamentals and Security Fundamentals certifications will be helpful as you study Windows Server administration fundamentals, but it is important to remember that the MTA certification exams have no prerequisites. The Windows Server Administration Fundamentals exam gives you a solid foundation for working as a server administrator in a Microsoft technology environment. You earn this

certification by taking and passing exam 98-365. My book *Microsoft Windows Server Administration Essentials* (Sybex, 2011) covers the objectives for the 98-365 exam.

Networking Fundamentals This is an important certification in the MTA IT Professional track. It lays a solid foundation of basic networking knowledge needed to administer modern networks and also helps you prepare for more advanced Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP) tracks. You earn this certification by taking and passing exam 98-366. The book *Microsoft Windows Networking Essentials* by Darril Gibson (Sybex, 2011) covers the objectives for the 98-366 exam.

Security Fundamentals Security Fundamentals is another important certification in the MTA IT Professional track. It complements the knowledge learned in the Networking Fundamentals certification and adds fundamental security knowledge needed by administrators. IT administrators in any environment need to be aware of the risks with IT systems. You earn this certification by taking and passing exam 98-367. The book *Microsoft Windows Security Essentials* by Darril Gibson (Sybex, 2011) covers the objectives for the 98-367 exam.

Each of these certifications can serve as a stepping-stone to Microsoft's next levels of certifications: Microsoft Certified Technology Specialist (MCTS) and Microsoft Certified IT Professional (MCITP).

Appendix B highlights the Microsoft certification program. The appendix also lists the exam objectives for Exam 98-349 and how they map to this book's content.

Who Should Read This Book

This book is for current or aspiring professionals seeking a quick grounding in the fundamentals of administration in a Microsoft Windows environment. The goal is to provide quick, focused coverage of fundamental skills.

If you want to start a career in Windows Desktop support or are already working in the field and want to fill in some gaps on fundamental topics, this book is for you. You can use the knowledge gained from this book as a foundation for more advanced studies. Additionally, this book will act as an excellent reference for the day-to-day tasks you must perform as a Windows Desktop administrator.

This book is focused on the objectives of the Microsoft Technology Associates (MTA) Windows OS Fundamentals certification. This is the first numbered certification in the MTA IT Professional series (with the exam number 98-349), but you can take the four IT Professional series exams in any order you desire. You can read more about the MTA certifications and MTA exam certification paths at `www.microsoft.com/learning/en/us/certification/mta.aspx`.

What You Will Learn

You will learn the essentials of Windows Desktop administration in a Microsoft environment. In addition, this book covers all the objectives of the Microsoft Technology Associates Windows Server Administration Fundamentals exam (exam 98-349).

What You Need

To perform the procedures provided throughout this book, you will need a Windows 7 Desktop to work with. This Desktop can be a virtual machine or a direct installation on computer hardware. The good news is that Windows 7 will run on practically any desktop computer that you can buy today. You can install the trial edition of Windows 7 and use it for up to 90 days. You can download the trial edition from `http://technet.microsoft.com/en-us/evalcenter/cc442495`.

If you want to run Windows 7 in a virtual machine on top of another Windows OS, you will need to have at least 4 GB of system memory in your computer and you will need to download the free VMware Player virtualization software. This software can run 64-bit and 32-bit operating systems, unlike Windows Virtual PC (which Microsoft provides for Windows 7). You can download the VMware Player from `http://www.vmware.com/go/downloadplayer`. Chapter 2, "Installing Windows," provides instructions for performing an installation of Windows 7.

What Is Covered in This Book

Microsoft Windows Operating System Essentials is organized to provide you with the knowledge needed to master the basics of administration in a Microsoft environment.

Chapter 1, "Windows Operating Systems Overview," provides an overview of the Windows operating system (OS) and the historical evolution of Windows. You also learn about the OS architecture and management interfaces.

Chapter 2, "Installing Windows," describes the options you have for Windows 7 installations and discusses the important considerations that you must take into account when upgrading. Virtualized installations are also explained.

Chapter 3, "Managing the Desktop," explains the Windows 7 Desktop and its features. Provides instructions for working with gadgets, display settings, shortcuts, and the Aero interface.

Chapter 4, "Using Native Applications," describes the applications included with Windows, such as Notepad, Paint, Calculator, Internet Explorer, and Windows Media Player. Also covers newer tools like the Snipping Tool.

Chapter 5, "Managing with the Control Panel," explains the Control Panel and its interfaces. Explores Administrative Tools available in Windows 7. Covers accessibility features and other important Control Panel applets.

Chapter 6, "Mobility and Remote Management," describes the mobility and remote management features of Windows 7, including SyncCenter, Windows Mobility Center, Remote Desktop, Remote Assistance, and Windows PowerShell remoting.

Chapter 7, "Managing Applications," provides instructions for planning and installing local and networked applications. Covers the use of Group Policy for application control and discusses important topics like application virtualization and the management of services.

Chapter 8, "Controlling Malware," explains what malware is and the different forms it takes. Describes options for malware protection and the specific Microsoft solutions available to secure your system from malware.

Chapter 9, "File Management," teaches the important aspects of filesystems and explains the differences among the available filesystems in Windows 7. Covers working with encryption and libraries as well.

Chapter 10, "Network Shares," explains file sharing and the process used to create shares. Addresses NTFS and share permissions. Defines the methods used to share printers and printer drivers.

Chapter 11, "Device Management," describes device drivers and how they interact with plug-and-play operations. Shows you how to use the Device Manager and connect and manage devices. Covers printers and system devices as well.

Chapter 12, "Storage Management," addresses the importance of understanding the various storage types available and selecting the right ones for your needs. Explains how to work with Disk Management and use online storage solutions.

Chapter 13, "Windows Troubleshooting," explains both the troubleshooting processes and the troubleshooting tools used to analyze problems in a Windows environment. Covers Disk Defragmenter, Disk Cleanup, and the Task Scheduler.

Chapter 14, "Backup and Recovery," describes the various backup planning actions and the backup options available in Windows 7. Provides instructions for using System Restore, system images, and Backup and Restore.

Chapter 15, "Windows Update," explains the planning and implementation of update procedures. Describes both Windows Update and Microsoft Update. Provides instructions for implementing a network-based update provisioning solution.

Appendix A, "Answers to Review Questions," includes all of the answers to the review questions found in "The Essentials and Beyond" section at the end of every chapter.

Appendix B, "Microsoft's Certification Program," maps the objectives in the MTA Windows Operating System Fundamentals (exam 98-349) to the specific chapters where each objective is covered.

In addition, we have created an online Glossary, as well as "Appendix C, Answers to Additional Exercises," which contains the suggested or recommended answers to the additional exercises we have included at the end of each chapter. You can download these at `www.sybex.com/go/osessentials`.

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As the author, I would be glad to help you in your learning process. If you ever have questions along the way, feel free to email me at `carpenter@sysedco.com`. Thanks for reading.

CHAPTER 1

Windows Operating Systems Overview

The Windows operating system (OS) has evolved over several decades of development. To fully understand the way Windows functions today, you should know the roots of the current system. In this chapter, you will learn the history of Windows.

To troubleshoot problems on Windows systems, you must be familiar with the basic architecture of the OS. For this reason, this chapter will also explore the Windows architecture. The architecture defines how the OS functions, and understanding it is essential to grasping many of the topics discussed in later chapters.

Finally, this chapter will describe the interfaces used by administrators and users of the Windows operating systems. This discussion includes exploratory overviews of the graphical user interface (GUI), the Command Prompt, and Windows PowerShell.

- **Discovering the history of Windows**
- **Understanding the OS architecture**
- **Identifying Windows interfaces**

Discovering the History of Windows

The modern Windows OS did not begin with the graphical capabilities it has today. The OS has its roots in text-based systems and simple graphical interfaces. In this section, I'll describe these earlier operating systems to help you understand where the current system came from and why it works as it does. You will also learn about the timeline of Windows development alongside the progressive development of personal computers (PCs). It all begins with the Disk Operating System, better known as DOS.

DOS—The Precursor

The first OS Microsoft sold was MS-DOS 1.0. The very name, Disk Operating System, was indicative of the time when it was released. In 1981, there were no document scanners, Universal Serial Bus (USB) microphones, game controllers, or digital cameras. The primary function of the OS was to allow for the loading of applications and the management of disks or storage. DOS was, and is, a text-based operating system. It had no built-in GUI, and it worked with basic typed commands. Many of these commands still exist in the most current Windows OS.

The DOS OS was popular from 1981 all the way to 1999. After 1999 and the release of Windows 2000, the GUI-based OSs became more popular in business settings.

DOS was originally developed by Microsoft for IBM. In fact, Microsoft licensed a product named QDOS/86 and used it as the starting point to develop MS-DOS. The first version of MS-DOS (version 1.0) was released in August 1981 and supported a maximum of 128 kilobytes of random access memory (RAM). It also supported the File Allocation Table (FAT) filesystem. Figure 1.1 shows the text-based interface for controlling and using DOS. This example is a screen capture from a DOS 6.22 installation showing the output of the CHKDSK command, which was used to view information about the contents of the disk and to analyze the disk for potential problems.

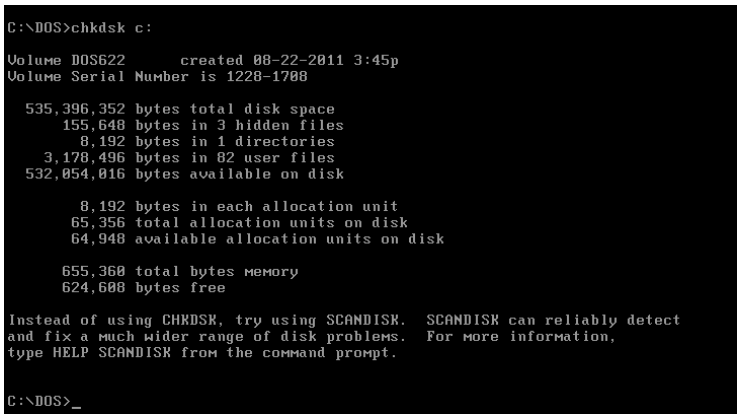

FIGURE 1.1 The DOS 6.22 text-based interface showing the output of the CHKDSK command

DOS applications could have a graphical interface, but the DOS system itself provided no greater graphical functions than a simple ASCII character–based interface. Figure 1.2 shows an example of a DOS ASCII-based application: the

ScanDisk application that shipped with DOS 6.22. ScanDisk checked the disk for errors and attempted to repair any that were discovered.

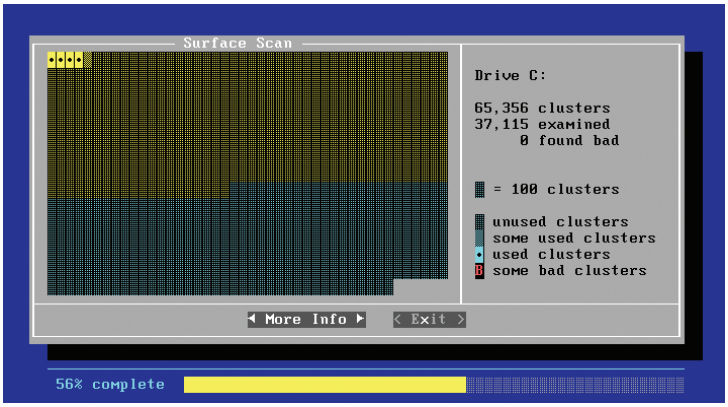

FIGURE 1.2 ScanDisk was an ASCII-based GUI application.

The DOS OS used four elements in the boot process. The first was the boot sector, or boot code. The boot code was stored on the boot drive and indicated that the IO.SYS file should be loaded to start the OS. The IO.SYS file called and loaded the MSDOS.SYS file. When the OS loaded, the command interpreter was loaded as the fourth and final part of the OS. The command interpreter was contained within the COMMAND.COM file. Most modern OSs still use the boot sector or boot code, but this code loads different files to start the OS. For example, in a Windows 7 system, the boot code loads the Windows Boot Manager (BOOTMGR.EXE) file to begin the OS load.

The COMMAND.COM file contained DOS's internal commands, among them the DIR, CD, and CLS commands.

During the boot process, DOS systems used two primary configuration files to determine the drivers and settings for the machine. The first file loaded and processed was CONFIG.SYS. This text-based configuration file was used to set system parameters and load device drivers. The second file loaded was AUTOEXEC.BAT. This text-based configuration file could perform any function a standard batch file could perform. It was also used to load device drivers and initial applications on the machine.

Batch files were used in DOS to group several commands together as a single unit for easy processing. They also provided scripting capabilities. Batch files are still used in Windows 7 today.

Several versions of DOS were released from 1981 to the final release of version 6.22 in 1994. DOS was the underlying OS in all versions of Windows from Windows 1.0 to Windows ME, including the very popular Windows 95 and Windows 98 operating systems of the 1990s. The version of DOS used in Windows 95 through Windows 98 is often called DOS 7.0, and the version used in Windows ME is often called DOS 8.0. Many vendors released their own DOS distributions that could be used as an alternative to MS-DOS. These competing

versions included Dr. DOS (with the latest release of Dr. DOS 8.1 in 2005), Novell DOS, IBM PC DOS, and PhysTechSoft's PTS-DOS.

Windows 3.1—The GUI

Although several companies, including Apple, Xerox, and Commodore, produced graphical interfaces, there can be no question as to which company has sold more licenses for its graphical interface—Windows GUI interfaces have outsold all the others combined many times over. This popularity is not an automatic testament to its superiority over other GUI interfaces, but it does mean that the typical computing professional is more likely to encounter it than any other interface today.

Windows shipped with several different GUIs from version 1.0 through version 3.0; however, the Windows 3.1 system became popular in the early to mid-1990s and set the path that modern Windows systems are still on today. Figure 1.3 shows the Windows 3.1 GUI, with the Program Manager in the background and the File Manager running in the foreground.

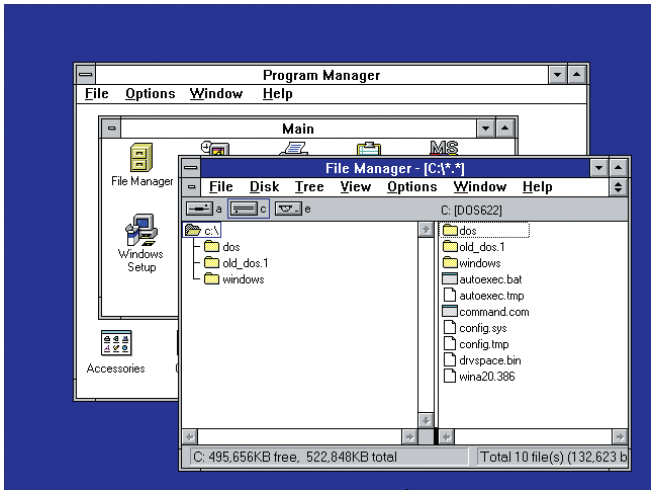

FIGURE 1.3 The Windows 3.1 GUI showing the Program Manager and the File Manager

The Windows 3.1 system included menus, windows that could be resized, and a launching system known as the Program Manager, which supported program groups and icon shortcuts. Many of the concepts used in the Windows 3.1 environment are still used in the modern Windows 7 GUI today.

The next version of Windows, which was based on the DOS and Windows 3.1 systems, was Windows 95. At the same time that the DOS and Windows 3.1 systems