Tom Carpenter

Exam 98-365

Microsoft®

Windows Server® Administration ESSENTIALS

SYBEX SERIOUS SKILLS.

MICROSOFT® WINDOWS SERVER® ADMINISTRATION

ESSENTIALS

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Tom Carpenter

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Thank you for choosing *Microsoft Windows Server Administration Essentials*. This book is part of a family of premium-quality Sybex books, all of which are written by outstanding authors who combine practical experience with a gift for teaching.

Sybex was founded in 1976. More than 30 years later, we're still committed to producing consistently exceptional books. With each of our titles, we're working hard to set a new standard for the industry. From the paper we print on, to the authors we work with, our goal is to bring you the best books available.

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Best regards,

NEIL EDDE
Vice President and Publisher
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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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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.

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Contents at a Glance

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Introduction

Servers are important tools used on modern networks. They provide email support, file and print services, application functionality, and so much more. Server administrators are in high demand, and modern technologies such as virtualization and cloud computing have only increased the importance of the server administrator's job.

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 three certifications:

Windows Server Administration Fundamentals This certification assumes no previous knowledge of Windows Server Administration 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 certification programs 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 and this book give 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. This book covers the objectives for the 98-365 exam.

Networking Fundamentals This is an important certification in the MTA IT Professional track. It provides the knowledge that 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.

Security Fundamentals Security Fundamentals is the another important certification in the MTA IT Professional track. It complements the knowledge learned in the Networking Fundamentals certification process 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.

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).

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 Server environment. The goal is to provide quick, focused coverage of fundamental skills.

If you want to start a career in server administration 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 Server administrator.

This book is focused on the objectives of the Microsoft Technology Associates (MTA) Server Administration Fundamentals certification. This is the first numbered certification in the MTA IT Professional series (exam number 98-365), but you can take the three 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 server administration in a Microsoft environment. In addition, this book covers all the objectives of the Microsoft Technology Associates Windows Server Administration Fundamentals exam (exam 98-365).

What You Need

In order to perform the procedures provided throughout this book, you will need a Windows server. This server can be a virtual machine or a direct installation on computer hardware. The good news is that Windows Server 2008 R2 will run on practically any desktop computer that will run Windows 7. You can install the trial edition of Windows Server 2008 R2 and use it for up to 180 days. The trial edition can be downloaded from: **`http://www.microsoft.com/windowsserver2008/en/us/trial-software.aspx`**.

If you want to run Windows Server 2008 R2 in a virtual machine on top of Windows 7, you will need to have at least 4 GB of system memory in your Windows 7 computer, and you will need to download the free VMware Player

virtualization software. This software can run 64-bit operating systems, unlike Windows Virtual PC that Microsoft provides for Windows 7. You can download the VMware Player from this location: `http://www.vmware.com/go/downloadplayer`. Chapter 2, "Installing Windows Servers," provides instructions for performing an installation of Windows Server 2008 R2.

What Is Covered in This Book?

Microsoft Windows Server Administration Essentials is organized to provide you with the information you need to master the basics of administration in a Microsoft server environment.

Chapter 1: Windows Server Overview This chapter provides an overview of the Windows Server operating system and servers in general. It contrasts servers with clients and explains the benefits that servers provide. The concept of the server role is explained and the different server types are briefly discussed.

Chapter 2: Installing Windows Servers Chapter 2 explains the options you have for Windows Server installation and discusses the important considerations that must be made when upgrading servers. Server Core is introduced as well, and the concept of working with device drivers is also explained.

Chapter 3: Managing Windows Server Storage After installing Windows Server, you will need to configure the storage locations for file servers, application servers, and more. This chapter introduces data storage concepts and the technologies used for storage. You will also learn about fault tolerant storage through the use of RAID arrays and learn to identify storage technologies.

Chapter 4: Administering Services Chapter 4 defines the concept of a service and the important roles services play on modern networks. You will explore service configuration and management procedures. The chapter concludes with an explanation of service problem troubleshooting procedures.

Chapter 5: Active Directory Infrastructure Active Directory is Microsoft's directory service solution. This chapter introduces you to Active Directory concepts including the Domain Name System (DNS), sites, and replication. You will learn the information required to plan an Active Directory installation in this chapter.

Chapter 6: Configuring Active Directory While Chapter 5 introduces the concepts of Active Directory, this chapter steps you through the process of installing Active Directory from start-to-finish.

Chapter 7: Managing Active Directory Now that Active Directory is up and running, you will learn to manage it in this chapter. You will explore both the graphical user interface tools and the command-line tools available for Active Directory administration and management.

Chapter 8: Group Policy Management Group Policy is used to centrally configure, manage, secure, and control your Windows computers that participate in an Active Directory domain. This chapter introduces the concepts of Group Policy and provides you with instructions for creating and managing policy settings.

Chapter 9: Application Servers Application servers are implemented to support the applications that run on your network. This chapter introduces you to application servers in general and then explores specific server types, including database servers, mail servers, collaboration servers, monitoring servers, and threat-management servers.

Chapter 10: Internet Information Services (IIS) Internet Information Servers (IIS) is the web server provided with Windows Server and even the Windows client operating systems. This chapter introduces you to the IIS components and management processes.

Chapter 11: File and Print Servers File and print servers are among the oldest server types. This chapter covers file and share permissions and the proper implementation procedures for printer sharing.

Chapter 12: Remote Access Technologies You cannot always go to a computer or server to manage it. This chapter introduces you to remote management tools that are available for administering Windows servers; it also addresses security through the use of virtual private networks (VPNs).

Chapter 13: Server Troubleshooting Troubleshooting skills are important for a Windows server administrator, and this chapter provides an essential overview of these skills. You will learn about troubleshooting methodologies and specific tools you can use in the troubleshooting process.

Chapter 14: Performance Tuning This chapter introduces you to performance analysis topics and then explores the different performance analysis tools in Windows Server. These tools include the Performance Monitor, the Resource Monitor, and the Task Manager.

Chapter 15: Server Maintenance In this final chapter, you will learn about important tasks and tools that help you maintain a stable server implementation. You will learn how to maintain hardware, plan for server downtime, use Windows Update, automate using logs and alerts, and plan for business continuity.

Appendix A: Answers to Review Questions This appendix 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 This appendix highlights the Microsoft certification program, and it lists the exam objectives for Exam 98-365 and how they map to this book's content.

In addition, we have created an online Glossary, the suggested or recommended answers to the additional exercises we have included at the end of each chapter, as well as additional exercises for instructors. You can download these at: www.sybex.com/go/winadminessentials.

Sybex strives to keep you supplied with the latest tools and information you need for your work. Please check their website at: www.sybex.com/go/winadminessentials, where we'll post additional content and updates that supplement this book if the need arises. Enter **server administration essentials** in the Search box (or type the book's ISBN: **978-1-118-01686-2**), and click Go to get to the book's update page.

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 Server Overview

Servers play a vital role on modern business computing networks. They provide such important services as e-mail, file storage, collaboration, and security. This chapter introduces you to servers in general and Microsoft Windows Server in specific. You will learn about the differences between servers and clients and the different designs of today's server hardware. Next, you will learn about the different roles servers play on modern computing networks and why these roles are important. Finally, you will explore the specifics of Windows Server. You will learn about the different interfaces it provides, networking features it offers, management features it supports, and the different editions of the product that are available. The following topics will provide coverage of this information:

- **Introducing Servers**
- **Understanding Server Roles**
- **Microsoft Windows Server Features**

Introducing Servers

If you want to understand Windows servers, you must begin by understanding servers in general. In this section, you will learn what servers are, how they differ from clients, and the various shapes and sizes in which they are manufactured. I will begin by defining what a server is so that you can keep this definition in mind as you read through the rest of this book.

Understanding Server Concepts

Computer networks are used to provide communications between computing devices. The computing devices include network infrastructure hardware devices, such as routers, switches, and firewalls. They also include clients and servers. Servers are used to provide services to the networked devices.

A *modem* is a modulator and demodulator that uses the telephone network to carry digital data as analog signals.

Servers must be connected to a network so that other devices (clients) can consume their services. These networks may include local area networks (LANs), wide area networks (WANs), and any other type of network on which the servers communicate. In the early days of computing, a server often sat on the other end of a telephone line allowing only one user to connect at a time. Even though this is not efficient, it still represents a network being used to access a server. The telephone line created the network connection between the client and the server.

The services provided by a server include three primary categories of service:

DNS names look like `mypc.domain.name` or `yourpc.domain.name`. The leftmost portion is the host name and the rest is the domain name. Together they form a *fully qualified domain name* (FQDN).

Network Services Network services include any service that exists to provide network functionality. For example, the Dynamic Host Configuration Protocol (DHCP) is used to provide Internet Protocol (IP) configuration settings that allow client devices to communicate on the network. Another example is the Domain Name System (DNS) server service, which resolves Internet-like domain names to IP addresses. These Internet-like names are called *hostnames*.

Security Services Security services include those services that provide authentication, authorization, confidentiality, or some form of protection to the network and networked devices. An example of a security service is the Active Directory Domain Service (AD DS), which could also be partially categorized as a network service. AD DS provides the user accounts that are used to log on to Windows Server-based networks. When these accounts are used for logon processes, authentication is performed and authentication is a security service. An additional security service is the IPSec Policy Service, which enforces security settings for Internet Protocol (IP)-based communications.

Because they provide more than one type of service, some services can be placed in multiple categories of service.

Information Services Information services include any service that provides information access, information management, or information processing. For example, the Microsoft SQL Server service provides database access and database management. This functionality qualifies SQL Server as an information service. Microsoft SharePoint is another example of an information service. It provides for information storage and retrieval, as well as collaboration.

You will learn more about services in Chapter 4.

Understanding Client/Server Concepts

The term *client/server model* became very popular starting in the 1980s. The term simply indicates that an application is broken into two components: the *client* component—a computing device or application that consumes services—and the server component. Some of the processing is performed at the client and the rest is performed at the server. A modern example of this is a web-based application that depends on both the web server and the web browser (the client) to perform the required processing: The server retrieves and processes data that is then sent to the web browser. The browser reformats this data for the

current screen resolution of the user's workstation. The point is that the two components work together.

It is not enough, however, to say that a server does part of the processing and the client does another part of the processing. In most client/server model systems, a single server can service many clients. You can define the relationship as a many-to-one relationship between the clients and the servers, as depicted in Figure 1.1: You can see that one file server provides file storage and retrieval services to multiple PC clients, a Mac client, and even a laptop computer. The clients are the many, and the server is the one in the many-to-one relationship.

The first multiuser computer sharing method was developed by Fernando Corbató at Massachusetts Institute of Technology (MIT) in 1961.

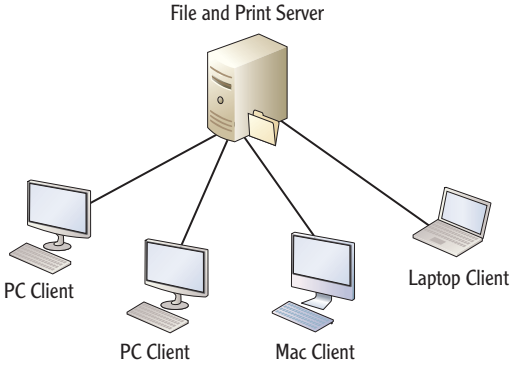

FIGURE 1.1 The many-to-one relationship of client/server computing

Additionally, the clients consume services from the network itself in that they utilize bandwidth made available by the network. *Bandwidth*, in this context, is defined as the maximum information that can be transmitted simultaneously across a communications channel. Each client consumes a portion of this bandwidth for network communications.

Table 1.1 provides a comparison of servers and clients.

TABLE 1.1 Comparing Servers and Clients

Typical Server Characteristics	Typical Client Characteristics
Used by many users	Used by one user at a time
Built from high-quality components	Built from average quality components
Optimized for background applications	Optimized for visual foreground applications
Provides services to the network	Consumes services from the network

In addition to the contrasting of servers and clients, you should understand the servers and clients available in the Microsoft product line. The following Microsoft server operating systems are still very popular today:

- Windows Server 2003
- Windows Server 2003 R2
- Windows Server 2008
- Windows Server 2008 R2

The following Microsoft client operating systems are very popular:

- Windows XP
- Windows Vista
- Windows 7

Historically, Microsoft has released a new version of their client and server operating systems every two to four years. For example, Windows Vista was released in 2006 for business customers, although it wasn't released until January, 2007 for consumers. Windows 7 was released in 2009. Similarly, Windows Server 2003 was released in 2003 and Windows Server 2003 R2 was released in 2005.

Furthermore, a greater period exists between major version number releases of the operating systems. For example, Windows Vista was considered a major version number release that changed the major version number of the operating system from 5 to 6, whereas Windows 7, released very shortly thereafter, was considered an interim minor version release. To see this, access a Command Prompt on a Windows 7 system by clicking Start ➢ All Programs ➢ Accessories ➢ Command Prompt and then execute the `ver` command. You will see that it is version 6.1, as shown in Figure 1.2. Windows Vista was version 6.0.

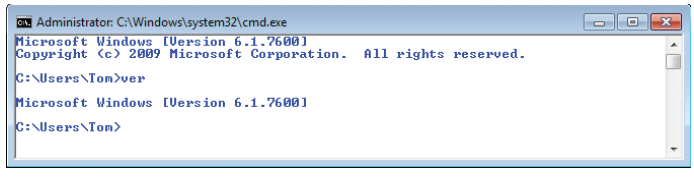

FIGURE 1.2 Viewing the version of Windows

The time between the release of Windows Vista and Windows 7 was approximately three years; however, the time between the release of Windows 2000 (a major version release at version 5.0) and Windows Vista (the next major version