Networking

A GUIDE TO

Microsoft® Windows NT® Server 4.0 in the Enterprise

Jeffrey Williams
David Johnson

COURSE
TECHNOLOGY

A G U I D E T O
Microsoft® Windows NT®
Server 4.0
in the Enterprise

Jeffrey Williams
David Johnson

Contributing Authors:
Christopher Budd
J. Michael Stewart
Steven Linthicum
Jonathan Taylor
Pete Schwatka

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PREFACE

To know a little bit about technology is dangerous. This book aims to close the gap between basic familiarity with Windows NT Server and true understanding of Windows NT Server. At the same time, this book will prepare you for Microsoft's Certification Exam 70-068, "Implementing and Supporting Microsoft Windows NT Server 4.0 in the Enterprise." The Enterprise exam is the most difficult and comprehensive of the four core exams required for the Microsoft Certified System Engineer (MCSE) certification. Passing it is a major milestone on the road to becoming an MCSE.

As Windows NT Server has matured over time and through its various revisions (do you remember Lan Manager?), powerful functionality has been added, giving an administrator new opportunities as well as introducing new complexities. By completing this book, you will gain a better perspective on what is possible using Windows NT, how to make that happen, and what to do if it doesn't go perfectly.

Overcoming challenges at the enterprise level is one of the most rewarding experiences in the careers of most administrators. This is likely due to the satisfaction associated with demonstrating such a high level of competence and understanding such complicated systems.

Because textbook explanations alone will not prepare a technician for working at the enterprise level, this book contains a number of features aimed at maximizing the learning experience. Each chapter includes hands-on projects that walk you through the various tasks step-by-step, giving you hands-on experience. In addition, each chapter contains case studies that place you in the role of problem solver, requiring you to think through the concepts of the chapter in order to provide a successful solution. Also, each chapter contains review questions aimed at preparing you to complete the certification exam successfully.

Chapters 1 and 2 introduce you to the concepts and planning associated with networking Windows NT at the enterprise level, including security, interoperability, and domain structure. Chapter 3 builds on this by covering networking protocols and protocol bindings as they apply to Windows NT Server.

Beginning with chapters 4 and 5, you will focus on the application layer with Windows NT core and optional services, including very comprehensive coverage of Remote Access. In chapter 6 you will learn how to configure and protect your online storage.

Chapters 7 through 9 take you through the management side of Windows NT at the enterprise level. You will learn how to manage clients and servers as well as utilize user and group accounts, profiles, and system policies.

Chapters 10 and 11 cover some of the interoperability aspects of the enterprise, such as connections to NetWare and Appletalk networks. Also, installation and configuration of multiprotocol routing are discussed at length to further extend your knowledge of your connectivity options.

The remaining four chapters take what you have learned to a higher level by applying it to troubleshooting and optimization. Optimization and baselining help you determine how your network is performing, and the troubleshooting chapters teach you how to choose appropriate resolutions for problems related to each of the topics covered in the book. Special attention is paid to resolving the most difficult of problems, such as those involving Routing and Remote Access Services, and troubleshooting and debugging STOP errors (also known as the "Blue Screen of Death").

FEATURES

To help you fully understand Windows NT concepts, there are many features in this book designed to improve its pedagogical value.

- **Chapter Objectives** Each chapter in this book begins with a detailed list of the concepts to be mastered within that chapter. This list provides you with a quick reference to the contents of that chapter as well as a useful study aid.

- **Illustrations and Tables** Numerous illustrations of server screens and components help you to visualize common setup steps, theories, and concepts. In addition, many tables provide details and comparisons of both practical and theoretical information.

- **Hands-On Projects** Although it is important to understand the theory behind server and networking technology, nothing can improve upon real-world experience. To this end, along with theoretical explanations, each chapter provides numerous hands-on projects aimed at providing you with real-world implementation experience.

- **Chapter Summaries** Each chapter's text is followed by a summary of the concepts it has introduced. These summaries provide a helpful way to recap and revisit the ideas covered in each chapter.

- **Review Questions.** End-of-chapter assessment begins with a set of review questions that reinforce the ideas introduced in each chapter. These questions not only ensure that you have mastered the concepts, but also are written to help prepare you for the Microsoft certification examination.

- **Case Project** Located at the end of each chapter are several case projects that ask you to solve real-world, enterprise problems.

TEXT AND GRAPHIC CONVENTIONS

Wherever appropriate, additional information and exercises were added to this book to help you better understand what is being discussed in the chapter. Icons throughout the text alert you to additional materials. These icons are described below.

The Note icon is used to present additional helpful material related to the subject being described.

Each hands-on activity in this book is preceded by the Hands-on icon and a description of the exercise that follows.

Tips provide extra information about how to attack a problem, how to set up Windows NT Server for a particular need, or what to do to in certain real-world situations.

The cautions are included to help you anticipate potential mistakes or problems so you can prevent them from happening.

Case project icons mark case projects at the end of each chapter.

INSTRUCTOR'S MATERIALS

The following supplemental materials are available when this book is used in a classroom setting. All of the supplements available with this book are provided to the instructor on a single CD-ROM.

Electronic Instructor's Manual. The Instructor's Manual that accompanies this textbook includes:

■ Additional instructional material to assist in class preparation, including suggestions for lecture topics, suggested lab activities, tips on setting up a lab for the hands-on assignments, and alternative lab setup ideas in situations where lab resources are limited.

■ Solutions to all end-of-chapter materials, including the Project and Case assignments.

Course Test Manager 1.1. Accompanying this book is a powerful assessment tool known as the Course Test Manager. Designed by Course Technology, this cutting-edge Windows-based testing software helps instructors design and administer tests and pre-tests. In addition to being able to generate tests that can be printed and administered, this full-featured program also has an online testing component that allows students to take tests at the computer and have their exams automatically graded.

PowerPoint presentations. This book comes with Microsoft PowerPoint slides for each chapter. These are included as a teaching aid for classroom presentation, to make available to students on the network for chapter review, or to be printed for classroom distribution. Instructors, please feel at liberty to add your own slides for additional topics you introduce to the class.

Simulations. Featured on the Instructor's Resource Kit CD-ROM are several simulations, written in Visual Basic, which animate key concepts including starting a server service; sharing a folder as a network resource; setting up a network (shared) printer; setting up TCP/IP network protocol properties; creating and modifying user accounts for network management; setting up network account policies (password and account lockout management policies); setting up account auditing; setting up rights policies; and installing the Network Monitor Agent. Also, the Windows NT Server Installation Simulator, which simulates an actual installation, is provided. These simulations work in conjunction with many of the hands-on exercises in the book, and can be run in a 16-bit or 32-bit environment. The host workstation operating system and setup are unaffected by running the simulation software.

TRANSCENDER CERTIFICATION TEST PREP SOFTWARE

Bound into the back of this book is a CD-ROM containing Transcender Corporation's Implementing and Supporting Microsoft Windows NT Server 4.0 certification exam preparation software with one full exam that simulates the Microsoft exam (Exam 70-068).

ACKNOWLEDGMENTS

Jeffrey Williams: I owe a great deal to a great many. The greatest thanks go to my wife, Amanda, for her tolerance and exceptional forbearance in a project that grew from naught to infinity overnight. Mea culpas and acts of contrition are forthcoming.

A special thanks to Kristen Duerr for the opportunity to challenge myself in a new way, Ann Shaffer for helping me along that way (and making sure I could always keep up), and Jennifer Normandin for holding up the light that led me the last few miles. Extra thanks to our technical editor, Nick DiTirro of Lakeland Community College; to reviewers Joe Gannon of New Hampshire Technical College and Connie Batten of the University of Minnesota, who always made sure that my i's were dotted and my t's were crossed; and to Christopher, who in addition to his contributions to the book, made sure I never lost sight of what was most important.

David Johnson: First, I would like to thank Ann Shaffer, Jennifer Normandin, and the staff at Course Technology for making this rather arduous project a success. It has been a difficult time, to say the least, and you pulled it off successfully. I would also like to thank the staff at LANWrights for making sure I had the time to work on this book and continue the path we've chosen. Finally, my vast appreciation goes out to J. Michael Stewart, without whose help this book would not be possible.

DEDICATION

This book is dedicated to Raymond, who taught me how to see; to my parents, who taught me how to be; and especially to Amanda, who taught me how to feel.

— Jeff Williams

I'd like to dedicate this book to Ahnon, my best friend and confidant. You remind me of what life can be.

— David Johnson

PREPARING FOR MICROSOFT CERTIFICATION

Microsoft offers a program called the Microsoft Certified Professional (MCP) program. Becoming a Microsoft Certified Professional can open many doors for you. Whether you want to be a network engineer, product specialist, or software developer, obtaining the appropriate Microsoft Certified Professional credentials can provide a formal record of your skills to potential employers. Certification can be equally effective in helping you secure a raise or promotion.

The Microsoft Certified Professional program is made up of many courses in several different tracks. Combinations of individual courses can lead to certification in a specific track. Most tracks require a combination of required and elective courses. One of the most common tracks for beginners is the Microsoft Certified Product Specialist (MCPS). By obtaining this status, your credentials tell a potential employer that you are an expert in a specialized computing area such as Personal Computer Operating Systems on a specific product, like Microsoft Windows 95.

How Can Transcender's Test Prep Software Help?

To become a Microsoft Certified Professional, you must pass rigorous certification exams that provide a valid and reliable measure of technical proficiency and expertise. The CD-ROM contained in this book, Transcender Corporation's Limited Version certification exam preparation software, can be used in conjunction with the book to help you assess your progress in the event you choose to pursue Microsoft Professional Certification. The Transcender CD-ROM presents a series of questions that were expertly prepared to test your readiness for the official Microsoft Certification examination on Implementing and Supporting Windows NT Server 4.0 (Exam 70-068). These questions were taken from a larger series of practice tests produced by the Transcender Corporation—practice tests that simulate the interface and format of the actual certification exams. Transcender's complete product also offers explanations for all questions. The rationale for each correct answer is carefully explained, and specific page references are given for Microsoft Product Documentation and Microsoft Press reference books. These page references enable you to study from additional sources.

Practice test questions from Transcender Corporation are acknowledged as the best available. In fact, with their full product, Transcender offers a money-back guarantee if you do not pass the exam. If you have trouble passing the practice examination included on the enclosed CD-ROM, you should consider purchasing the full product with additional practice tests and personalized feedback. Details and pricing information are available at the back of this book. A sample of the full Transcender product is on the enclosed CD-ROM, including remedial explanations.

The Transcender product is a great tool to help you prepare to become certified. If you experience technical problems with this product, please e-mail Transcender at *course@transcender.com* or call (615) 726-8779.

Want to Know More about Microsoft Certification?

There are many additional benefits to achieving Microsoft Certified status. These benefits apply to you as well as to your potential employer. As a Microsoft Certified Professional (MCP), you will be recognized as an expert on Microsoft products, have access to ongoing technical information from Microsoft, and receive special invitations to Microsoft conferences and events. You can obtain a comprehensive, interactive tool that provides full details about the Microsoft Certified Professional program online at *www.microsoft.com/train_cert/cert/certif.htm*. For more information on texts at Course Technology that will help prepare you for certification exams, visit our site at *www.course.com*.

When you become a Certified Product Specialist, Microsoft sends you a Welcome Kit that contains:

- An 8½ × 11" Microsoft Certified Product Specialist wall certificate. Also, within a few weeks after you have passed any exam, Microsoft sends you a Microsoft Certified Professional Transcript that shows which exams you have passed.

- A Microsoft Certified Professional Program membership card.

- A Microsoft Certified Professional lapel pin.

- A license to use the Microsoft Certified Professional logo. You are licensed to use the logo in your advertisements, promotions, proposals, and other materials, including business cards, letterheads, advertising circulars, brochures, yellow page advertisements, mailings, banners, resumes, and invitations.

- A Microsoft Certified Professional logo sheet. Before using the camera-ready logo, you must agree to the terms of the licensing agreement.

- A Microsoft TechNet CD-ROM.

- A 50% discount toward a one-year membership in the Microsoft TechNet Technical Information Network, which provides valuable information via monthly CD-ROMs.

- Dedicated forums on CompuServe (GO MECFORUM) and The Microsoft Network, which enable Microsoft Certified Professionals to communicate directly with Microsoft and one another.

- A one-year subscription to Microsoft Certified Professional Magazine, a career and professional development magazine created especially for Microsoft Certified Professionals.

- A Certification Update subscription. Certification Update is a bimonthly newsletter from the Microsoft Certified Professional program that keeps you informed of changes and advances in the program and exams.

- Invitations to Microsoft conferences, technical training sessions, and special events.

- Eligibility to join the Network Professional Association, a worldwide association of computer professionals. Microsoft Certified Product Specialists are invited to join as associate members.

A Certified Systems Engineer receives all the benefits mentioned above as well as the following additional benefits:

- Microsoft Certified Systems Engineer logos and other materials to help you identify yourself as a Microsoft Certified Systems Engineer to colleagues or clients.

- Ten free incidents with the Microsoft Support Network and a 25% discount on purchases of additional 10-packs of Priority Development and Desktop Support incidents.

- A one-year subscription to the Microsoft TechNet Technical Information Network.

- A one-year subscription to the Microsoft Beta Evaluation program. This benefit provides you with up to 12 free monthly beta software CDs for many of Microsoft's newest software products. This enables you to become familiar with new versions of Microsoft products before they are generally available. This benefit also includes access to a private CompuServe forum where you can exchange information with other program members and find information from Microsoft on current beta issues and product information.

Certify Me!

So you are ready to become a Microsoft Certified Professional. The examinations are administered through Sylvan Prometric (formerly Drake Prometric) and are offered at more than 700 authorized testing centers around the world. Microsoft evaluates certification status based on current exam records. Your current exam record is the set of exams you have passed. To maintain Microsoft Certified Professional status, you must remain current on all the requirements for your certification.

Registering for an exam is easy. To register, contact Sylvan Prometric, 2601 West 88th Street, Bloomington, MN, 55431, at (800) 755-EXAM (3926). Dial (612) 896-7000 or (612) 820-5707 if you cannot place a call to an 800 number from your location. You must call to schedule the exam at least one day before the day you want to take the exam. Taking the exam automatically enrolls you in the Microsoft Certified Professional program; you do not need to submit an application to Microsoft Corporation.

When you call Sylvan Prometric, have the following information ready:

- Your name, organization (if any), mailing address, and phone number.

- A unique ID number (e.g., your Social Security number).

- The number of the exam you wish to take (70-67 for the Implementing and Supporting Microsoft Windows NT Server 4.0 exam).

- A payment method (e.g., credit card number). If you pay by check, payment is due before the examination can be scheduled. The fee to take each exam is currently $100.

READ THIS BEFORE YOU BEGIN

To the Student

This book comes with an NT Server installation simulator, available from your instructor, that enables you to practice the installation steps from any computer with Windows 3.1 or higher. Your instructor also can provide electronic simulations to help you practice important server setup activities. Each chapter of the book ends with review questions, Hands-on projects, and case assignments. Your instructor can provide you with answers to the review questions and additional information about the Hands-on projects. When you complete the case assignments you can submit them electronically or in written form.

To the Instructor

Please refer to the Instructor's Resource Kit that accompanies this text for more details.

Setting up the classroom or lab file server To complete the projects and assignments in this book, the students will need access to a Windows NT server. To maximize the learning experience, it is recommended that you have two or more file servers which can be dedicated for classroom use. (You'll need to be able to modify the servers' configuration frequently.) These servers need not be expensive models, but should be on Microsoft's Hardware Compatibility List. The advantage in having several servers for student projects is that the students have more flexibility in their practice. (The ideal would be one server per student.) Every server should be equipped with Microsoft Windows NT Server 4.0 with Service Pack 3 and have enough licenses for all students who need

to access them. The Instructor's Resource Kit contains many suggestions about how to set up a lab, including how to equip and manage a lab in which there are limited resources. It also contains alternative projects and assignments for students.

Internet Assignments A few projects require Internet access for information searches and for downloading files. Although these projects are not mandatory, they will help train the student in using this resource as a prospective server administrator.

System Requirements All hardware, especially the server hardware, should be included on Microsoft's Hardware Compatibility List. The recommended software and hardware configurations are as follows:

Workstation Clients:

- Windows 95 or Windows NT Workstation 4.0 (if an NT Workstation computer is used, it must be a member of the NT Server's domain)
- 486 or higher processor with 16 MB of RAM (Pentium or higher preferred with 32+ MB of RAM)
- VGA monitor
- Mouse or other pointing device

- Network interface card cabled to the classroom file server
- Hard disk with at least 100 MB free
- At least one high density 3.5-inch floppy disk drive
- Internet access and a browser (recommended but not required – used for selected assignments)

Windows NT Server:

- Windows NT Server 4.0 with Service Pack 3 and Network Monitor installed, configured as a Primary Domain Controller
- 32-bit bus computer with an 80486 25 MHz or faster processor
- VGA or better resolution monitor
- Mouse or pointing device
- High density 3.5-inch floppy disk drive
- CD-ROM drive
- 32 MB or more memory
- One or more hard disks with at least 500 MB of disk storage (three additional unused hard drives

will be necessary to complete exercises using Disk Administrator)
- Network interface card for network communications (two network interface cards – preferably attached to different networks - are needed for some projects)
- Tape system (recommended but not required)
- Two identical modems (if these modems are external, additional serial ports may be required)
- Printer (to practice setting up a network printer)

Other recommended equipment:

- A second Windows NT Server with a modem (required for some exercises)
- Two or more phone lines
- One or more Macintosh computers accessible on the network

- A Novell NetWare server running Version 3.x (or 4.x in bindery emulation mode) and an account with Supervisor rights

System Requirements for Transcender Corporation's Test Prep Software:

- 8 MB RAM (16 MB recommended)
- VGA/256 Color display or better
- CD-ROM drive

- Microsoft Windows 3.1, Windows for Workgroups 3.11, Windows NT 3.51, Windows NT 4.0, or Windows 95/98

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