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# TCP/IP

Exam 70-059

**Microsoft  
Certified  
Systems  
Engineer**

**Adaptive  
Testing  
Edition**

Gary Novosel, Kurt Hudson,  
James Michael Stewart



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Keith Weiskamp  
Publisher, Certification Insider Press

## About The Authors

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**Gary Novosel** is an MCSE, MCP+Internet, and MCT. He is currently employed as an IM Project Manager with Compaq Computer Corporation in northwest Houston, TX. He started building PCs and networks in 1983, has expertise in Unix as well as Windows NT, and is an expert in distributed document management. Gary is *summa cum laude* from the University of the State of New York with a bachelor's degree in computer information systems. He has consulted for General Electric, the Department of Defense, the Department of Energy, and several commercial nuclear power plants. Gary served nine years in the nuclear Navy in both submarines and nuclear instructor service.

In his spare time, Gary enjoys taking perfectly good pieces of wood and attempting to turn them into recognizable objects (other than sawdust). Gary also spends much of his off time with his wife, Yvete; daughter, Jamie; grandson, Matthew; and pet dog-humans, Lady and Chancey. You can contact Gary by email at [gnovosel@swbell.net](mailto:gnovosel@swbell.net).

**Kurt Hudson**, president of HudLogic, Inc., has earned MCSE, MCSE+Internet, MCT, and A+ Certified Technician ratings. He began his technical career with the U.S. Air Force, earning medals for systems efficiency, training excellence, and national security. He has worked for Unisys, where he helped to launch two Windows 95 support operations for Microsoft and Compaq, and for Productivity Point International, where he trained hundreds of computer support engineers and system administrators. Today, he writes commercial technical publications, trains computer professionals, and troubleshoots networking problems. He has authored or co-authored several publications, which are listed at [www.hudlogic.com](http://www.hudlogic.com). You can reach Kurt via email at [kurt@hudlogic.com](mailto:kurt@hudlogic.com).

**James Michael Stewart** is a full-time writer focusing on Windows NT and Internet topics. Most recently, he has worked on several titles in the *Exam Cram* and *Exam Prep* series, including *NT Server 4*, *NT Workstation 4*, *NT Server 4 in the Enterprise*, *Windows 98*, *IIS 4*, *Proxy 2*, and *FrontPage 98*. Michael has written articles for numerous print and online publications, including *C|Net*, *Computer Currents*, *InfoWorld*, *Windows NT Magazine*, and *Datamation*. He is also a regular speaker at Network+Interop and has taught at TISC, WNTIS, and NT SANS.

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Finally, to my Mom. Although you probably don't understand what's in this book, you can now show everybody what I do for a living. Thanks for being my Mom.

—*Gary Novosel*

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—*Kurt Hudson*

Thanks to my boss, Ed Tittel, for including me in this book series. To my parents, Dave and Sue, thanks for your love and consistent support. To Mark, I count the days until...well, I've been counting for so long I don't remember anymore. To HERbert, everyone knows what type of pet you are because you've marked everything I own with cat fur. And finally, as always, to Elvis—every time I sing in the shower, I have to fish the glue-on lamb-chop sideburns out of the drain.

—*James Michael Stewart*

## About The Authors

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Michael has been developing Windows NT 4 MCSE-level courseware and training materials for several years, including both print and online publications, as well as classroom presentation of NT training materials. He has been an MCSE since 1997, with a focus on Windows NT 4.

Michael has a degree in philosophy and has self-acquired his computer knowledge based on almost 14 years of hands-on experience. He has been active on the Internet for quite some time, where most people know him by his “nomme de wire” McIntyre. You can reach Michael by email at [michael@lanw.com](mailto:michael@lanw.com) or through his Web page at [www.lanw.com/jmsbio.htm](http://www.lanw.com/jmsbio.htm).

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# Introduction

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Welcome to *MCSE TCP/IP Exam Cram, Adaptive Testing Edition*! This book aims to help you get ready to take—and pass—the Microsoft certification Exam 70-059, titled “Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0.” This Introduction explains Microsoft’s certification programs in general and talks about how the *Exam Cram* series can help you prepare for Microsoft’s certification exams.

*Exam Cram* books help you understand and appreciate the subjects and materials you need to pass Microsoft certification exams. *Exam Cram* books are aimed strictly at test preparation and review. They do not teach you everything you need to know about a topic (such as the ins and outs of managing a DHCP server, or all the nitty-gritty details involved in using WINS or subnet masking). Instead, we (the authors) present and dissect the questions and problems we’ve found that you’re likely to encounter on a test. We’ve worked from Microsoft’s own training materials, preparation guides, and tests, and from a battery of third-party test preparation tools. Our aim is to bring together as much information as possible about Microsoft certification exams.

Nevertheless, to completely prepare yourself for any Microsoft test, we recommend that you begin by taking the Self-Assessment included in this book immediately following this Introduction. This tool will help you evaluate your knowledge base against the requirements for an MCSE under both ideal and real circumstances.

Based on what you learn from that exercise, you might decide to begin your studies with some classroom training or some background reading. On the other hand, you might decide to pick up and read one of the many study guides available from Microsoft or third-party vendors on certain topics, including The Coriolis Group’s *Exam Prep* series (for which a title on TCP/IP is also available).

We also strongly recommend that you install, configure, and fool around with the software that you’ll be tested on, because nothing beats hands-on experience and familiarity when it comes to understanding the questions you’re likely to encounter on a certification test. Book learning is essential, but hands-on experience is the best teacher of all!

# The Microsoft Certified Professional (MCP) Program

The MCP Program currently includes seven separate tracks, each of which boasts its own special acronym (as a would-be certificant, you need to have a high tolerance for alphabet soup of all kinds):

- **MCP (Microsoft Certified Professional)** This is the least prestigious of all the certification tracks from Microsoft. Passing any of the major Microsoft exams (except the Networking Essentials exam) qualifies an individual for MCP credentials. Individuals can demonstrate proficiency with additional Microsoft products by passing additional certification exams.
- **MCP+I (Microsoft Certified Professional + Internet)** This midlevel certification is attained by completing three core exams: "Implementing and Supporting Microsoft Windows NT Server 4.0," "Internetworking Microsoft TCP/IP on Microsoft Windows NT 4.0," and "Implementing and Supporting Internet Information Server 3.0 and Microsoft Index Server 1.1" or "Implementing and Supporting Microsoft Internet Information Server 4.0."
- **MCP+SB (Microsoft Certified Professional + Site Building)** This certification program is designed for individuals who are planning, building, managing, and maintaining Web sites. Individuals with the MCP+SB credential will have demonstrated the ability to develop Web sites that include multimedia and searchable content and Web sites that connect to and communicate with a back-end database. It requires one MCP exam, plus two of these three exams: "Designing and Implementing Commerce Solutions with Microsoft Site Server, 3.0, Commerce Edition," "Designing and Implementing Web Sites with Microsoft FrontPage 98," and "Designing and Implementing Web Solutions with Microsoft Visual InterDev 6.0."
- **MCSE (Microsoft Certified Systems Engineer)** Anyone who has a current MCSE is warranted to possess a high level of expertise with Windows NT (version 3.51 or 4.0) and other Microsoft operating systems and products. This credential is designed to prepare individuals to plan, implement, maintain, and support information systems and networks built around Microsoft Windows NT and its BackOffice family of products.

To obtain an MCSE, an individual must pass four core operating system exams, plus two elective exams. The operating system exams require

individuals to demonstrate competence with desktop and server operating systems and with networking components.

You must pass at least two Windows NT-related exams to obtain an MCSE: “Implementing and Supporting Microsoft Windows NT Server” (version 3.51 or 4.0) and “Implementing and Supporting Microsoft Windows NT Server in the Enterprise” (version 3.51 or 4.0). These tests are intended to indicate an individual’s knowledge of Windows NT in smaller, simpler networks and in larger, more complex, and heterogeneous networks, respectively.

*Note: The NT 3.51 version is scheduled to be retired by Microsoft sometime in 1999.*

You must pass two additional tests as well. These tests are related to networking and desktop operating systems. At present, the networking requirement can be satisfied only by passing the Networking Essentials test. The desktop operating system test can be satisfied by passing a Windows 95, Windows NT Workstation (the version must match the NT version for the core tests), or Windows 98 test.

The two remaining exams are elective exams. An elective exam may fall in any number of subject or product areas, primarily BackOffice components. These include tests on Internet Explorer 4, SQL Server, IIS, Proxy Server, SNA Server, Exchange Server, Systems Management Server, and the like. However, it is also possible to test out on electives by taking advanced networking topics like “Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0” (but here again, the version of Windows NT involved must match the version for the core requirements taken). If you are on your way to becoming an MCSE and have already taken some exams, visit [www.microsoft.com/mcp/certstep/mcse.htm](http://www.microsoft.com/mcp/certstep/mcse.htm) for information about how to proceed with your MCSE certification.

Whatever mix of tests is completed toward MCSE certification, individuals must pass six tests to meet the MCSE requirements. It’s not uncommon for the entire process to take a year or so, and many individuals find that they must take a test more than once to pass. Our primary goal with the *Exam Cram* series is to make it possible, given proper study and preparation, to pass all Microsoft certification tests on the first try. Table 1 shows the required and elective exams for the MCSE certification.

## Table 1 MCSE Requirements\*

### Core

#### All 3 of these are required

Exam 70-067	Implementing and Supporting Microsoft Windows NT Server 4.0
Exam 70-068	Implementing and Supporting Microsoft Windows NT Server 4.0 in the Enterprise
Exam 70-058	Networking Essentials

#### Choose 1 from this group

Exam 70-064	Implementing and Supporting Microsoft Windows 95
Exam 70-073	Implementing and Supporting Microsoft Windows NT Workstation 4.0
Exam 70-098	Implementing and Supporting Microsoft Windows 98

### Elective

#### Choose 2 from this group

Exam 70-088	Implementing and Supporting Microsoft Proxy Server 2.0
Exam 70-079	Implementing and Supporting Microsoft Internet Explorer 4.0 by Using the Internet Explorer Administration Kit
Exam 70-087	Implementing and Supporting Microsoft Internet Information Server 4.0
Exam 70-081	Implementing and Supporting Microsoft Exchange Server 5.5
Exam 70-059	Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0
Exam 70-028	Administering Microsoft SQL Server 7.0
Exam 70-029	Designing and Implementing Databases with Microsoft SQL Server 7.0
Exam 70-056	Implementing and Supporting Web Sites Using Microsoft Site Server 3.0
Exam 70-086	Implementing and Supporting Microsoft Systems Management Server 2.0
Exam 70-085	Implementing and Supporting Microsoft SNA Server 4.0

\* This is not a complete listing—you can still be tested on some earlier versions of these products. However, we have included mainly the most recent versions so that you may test on these versions and thus be certified longer. We have not included any tests that are scheduled to be retired.

- **MCSE+I (Microsoft Certified Systems Engineer + Internet)** This is a newer Microsoft certification and focuses not just on Microsoft operating systems, but also on Microsoft's Internet servers and TCP/IP.

To obtain this certification, an individual must pass seven core exams plus two elective exams. The core exams include not only the server operating systems (Windows NT Server and Server in the Enterprise) and a desktop OS (Windows 95, Windows 98, or Windows NT Workstation), but also include Networking Essentials, TCP/IP, Internet Information Server (IIS), and the Internet Explorer Administration Kit (IEAK).

The two remaining exams are elective exams. These elective exams can be in any of four product areas: SQL Server, SNA Server, Exchange Server, or Proxy Server. Table 2 shows the required and elective exams for the MCSE+I certification.

**Table 2 MCSE+Internet Requirements\*****Core****All 6 of these are required**

<b>Exam 70-067</b>	Implementing and Supporting Microsoft Windows NT Server 4.0
<b>Exam 70-068</b>	Implementing and Supporting Microsoft Windows NT Server 4.0 in the Enterprise
<b>Exam 70-058</b>	Networking Essentials
<b>Exam 70-059</b>	Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0
<b>Exam 70-087</b>	Implementing and Supporting Microsoft Internet Information Server 4.0
<b>Exam 70-079</b>	Implementing and Supporting Microsoft Internet Explorer 4.0 by Using the Internet Explorer Administration Kit

**Choose 1 from this group**

<b>Exam 70-064</b>	Implementing and Supporting Microsoft Windows 95
<b>Exam 70-073</b>	Implementing and Supporting Microsoft Windows NT Workstation 4.0
<b>Exam 70-098</b>	Implementing and Supporting Microsoft Windows 98

**Elective****Choose 2 from this group**

<b>Exam 70-088</b>	Implementing and Supporting Microsoft Proxy Server 2.0
<b>Exam 70-081</b>	Implementing and Supporting Microsoft Exchange Server 5.5
<b>Exam 70-028</b>	Administering Microsoft SQL Server 7.0
<b>Exam 70-029</b>	Designing and Implementing Databases with Microsoft SQL Server 7.0
<b>Exam 70-056</b>	Implementing and Supporting Web Sites Using Microsoft Site Server 3.0
<b>Exam 70-085</b>	Implementing and Supporting Microsoft SNA Server 4.0

\* This is not a complete listing—you can still be tested on some earlier versions of these products. However, we have included mainly the most recent versions so that you may test on these versions and thus be certified longer. We have not included any tests that are scheduled to be retired.

- **MCSD (Microsoft Certified Solution Developer)** The MCSD credential reflects the skills required to create multitier, distributed, and COM-based solutions, in addition to desktop and Internet applications, using new technologies. To obtain an MCSD, an individual must demonstrate the ability to analyze and interpret user requirements; select and integrate products, platforms, tools, and technologies; design and implement code and customize applications; and perform necessary software tests and quality assurance operations.

To become an MCSD, you must pass a total of four exams: three core exams and one elective exam. Each candidate must also choose one of these two desktop application exams—"Designing and Implementing Desktop Applications with Microsoft Visual C++ 6.0" or "Designing and Implementing Desktop Applications with Microsoft Visual Basic 6.0"—*plus* one of these two distributed application exams—"Designing and Implementing Distributed Applications with Microsoft Visual C++ 6.0" or "Designing and Implementing Distributed Applications with Microsoft Visual Basic 6.0."

## Introduction

*Note: Microsoft is planning to release desktop application and distributed application exams on Visual J++ and Visual FoxPro in the spring of 1999.*

Elective exams cover specific Microsoft applications and languages, including Visual Basic, C++, the Microsoft Foundation Classes, Access, SQL Server, Excel, and more.

- **MCDBA (Microsoft Certified Database Administrator)** The MCDBA credential reflects the skills required to implement and administer Microsoft SQL Server databases. To obtain an MCDBA, an individual must demonstrate the ability to derive physical database designs, develop logical data models, create physical databases, create data services by using Transact-SQL, manage and maintain databases, configure and manage security, monitor and optimize databases, and install and configure Microsoft SQL Server.

To become an MCDBA, you must pass a total of five exams: four core exams and one elective exam. The required core exams are "Administering Microsoft SQL Server 7.0," "Designing and Implementing Databases with Microsoft SQL Server 7.0," "Implementing and Supporting Microsoft Windows NT Server 4.0," and "Implementing and Supporting Microsoft Windows NT Server 4.0 in the Enterprise."

The elective exams that you can choose from cover specific uses of SQL Server and include "Designing and Implementing Distributed Applications with Visual Basic 6.0," "Designing and Implementing Distributed Applications with Visual C++ 6.0," "Designing and Implementing Data Warehouses with Microsoft SQL Server 7.0 and Microsoft Decision Support Services 1.0," and two exams that relate to NT: "Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0" and "Implementing and Supporting Microsoft Internet Information Server 4.0".

Note that the exam covered by this book can be used as the elective for the MCDBA certification. Table 3 shows the requirements for the MCDBA certification.

- **MCT (Microsoft Certified Trainer)** Microsoft Certified Trainers are individuals who are deemed able to deliver elements of the official Microsoft curriculum, based on technical knowledge and instructional ability. Thus, it is necessary for an individual seeking MCT credentials (which are granted on a course-by-course basis) to pass the related certification exam for a course and complete the official Microsoft training in the subject area, and to demonstrate an ability to teach.

## Table 3 MCDBA Requirements

### Core

#### All 4 of these are required

<b>Exam 70-028</b>	Administering Microsoft SQL Server 7.0
<b>Exam 70-029</b>	Designing and Implementing Databases with Microsoft SQL Server 7.0
<b>Exam 70-067</b>	Implementing and Supporting Microsoft Windows NT Server 4.0
<b>Exam 70-068</b>	Implementing and Supporting Microsoft Windows NT Server 4.0 in the Enterprise

### Elective

#### Choose 1 from this group

<b>Exam 70-015</b>	Designing and Implementing Distributed Applications with Microsoft Visual C++ 6.0
<b>Exam 70-019</b>	Designing and Implementing Data Warehouses with Microsoft SQL Server 7.0 and Microsoft Decision Support Services 1.0
<b>Exam 70-059</b>	Internetworking with Microsoft TCP/IP on Microsoft Windows NT 4.0
<b>Exam 70-087</b>	Implementing and Supporting Microsoft Internet Information Server 4.0
<b>Exam 70-175</b>	Designing and Implementing Distributed Applications with Microsoft Visual Basic 6.0

This latter criterion may be satisfied by proving that one has already attained training certification from Novell, Banyan, Lotus, the Santa Cruz Operation, or Cisco, or by taking a Microsoft-sanctioned workshop on instruction. Microsoft makes it clear that MCTs are important cogs in the Microsoft training channels. Instructors must be MCTs before Microsoft will allow them to teach in any of its official training channels, including Microsoft's affiliated Certified Technical Education Centers (CTECs) and the Microsoft Online Institute (MOLI).

Certification is an ongoing activity. Once a Microsoft product becomes obsolete, MCPs typically have 12 to 18 months in which they may recertify on current product versions. (If individuals do not recertify within the specified time period, their certifications become invalid.) Because technology keeps changing and new products continually supplant old ones, this should come as no surprise.

The best place to keep tabs on the MCP Program and its various certifications is on the Microsoft Web site. The current root URL for the MCP program is [www.microsoft.com/mcp/](http://www.microsoft.com/mcp/). But Microsoft's Web site changes often, so if this URL doesn't work, try using the Search tool on Microsoft's site with either "MCP" or the quoted phrase "Microsoft Certified Professional Program" as a search string. This will help you find the latest and most accurate information about Microsoft's certification programs.

# Taking A Certification Exam

Alas, testing is not free. Each computer-based MCP exam costs \$100, and if you don't pass, you may retest for an additional \$100 for each additional try. In the United States and Canada, tests are administered by Sylvan Prometric and by Virtual University Enterprises (VUE). Here's how you can contact them:

- **Sylvan Prometric** You can sign up for a test through the company's Web site at [www.slspro.com](http://www.slspro.com). Or, you can register by phone at 800-755-3926 (within the United States or Canada) or at 410-843-8000 (outside the United States and Canada).
- **Virtual University Enterprises** You can sign up for a test or get the phone numbers for local testing centers through the Web page at [www.microsoft.com/train\\_cert/mcp/vue\\_info.htm](http://www.microsoft.com/train_cert/mcp/vue_info.htm).

To sign up for a test, you must possess a valid credit card, or contact either company for mailing instructions to send them a check (in the U.S.). Only when payment is verified, or a check has cleared, can you actually register for a test.

To schedule an exam, call the number or visit either of the Web pages at least one day in advance. To cancel or reschedule an exam, you must call before 7 P. M. pacific standard time the day before the scheduled test time (or you may be charged, even if you don't appear to take the test). When you want to schedule a test, have the following information ready:

- Your name, organization, and mailing address.
- Your Microsoft Test ID. (Inside the United States, this means your Social Security number; citizens of other nations should call ahead to find out what type of identification number is required to register for a test.)
- The name and number of the exam you wish to take.
- A method of payment. (As we've already mentioned, a credit card is the most convenient method, but alternate means can be arranged in advance, if necessary.)

Once you sign up for a test, you'll be informed as to when and where the test is scheduled. Try to arrive at least 15 minutes early. You must supply two forms of identification—one of which must be a photo ID—to be admitted into the testing room.

All exams are completely closed-book. In fact, you will not be permitted to take anything with you into the testing area, but you will be furnished with a blank sheet of paper and a pen or, in some cases, an erasable plastic sheet and an erasable pen. We suggest that you immediately write down on that sheet of



paper all the information you've memorized for the test. In *Exam Cram* books, this information appears on a tear-out sheet inside the front cover of each book. You will have some time to compose yourself, to record this information, and even to take a sample orientation exam before you begin the real thing. We suggest you take the orientation test before taking your first exam, but because they're all more or less identical in layout, behavior, and controls, you probably won't need to do this more than once.

When you complete a Microsoft certification exam, the software will tell you whether you've passed or failed. Results are broken into several topic areas. Even if you fail, we suggest you ask for—and keep—the detailed report that the test administrator should print for you. You can use this report to help you prepare for another go-round, if needed.

If you need to retake an exam, you'll have to schedule a new test with Sylvan Prometric or VUE and pay another \$100.



The first time you fail a test, you can retake the test the next day. However, if you fail a second time, you must wait 14 days before retaking that test. The 14-day waiting period remains in effect for all retakes after the first failure.

## Tracking MCP Status

As soon as you pass any Microsoft exam other than Networking Essentials, you'll attain Microsoft Certified Professional (MCP) status. Microsoft also generates transcripts that indicate which exams you have passed and your corresponding test scores. You can order a transcript by email at any time by sending an email to [mcp@msprograms.com](mailto:mcp@msprograms.com). You can also obtain a copy of your transcript by downloading the latest version of the MCT Guide from the Web site and consulting the section titled "Key Contacts" for a list of telephone numbers and related contacts.

Once you pass the necessary set of exams (one for MCP, six for MCSE, or nine for MCSE+I), you'll be certified. Official certification normally takes anywhere from four to six weeks, so don't expect to get your credentials overnight. When the package for a qualified certification arrives, it includes a Welcome Kit that contains a number of elements:

- An MCP, MCSE, or MCSE+I certificate, suitable for framing, along with a Professional Program Membership card and lapel pin.
- A license to use the MCP logo, thereby allowing you to use the logo in advertisements, promotions, and documents, and on letterhead, business cards, and so on. Along with the license comes an MCP logo sheet,