

- Acknowledgments p. iii
- Preface p. xiii
- Chapter 1 Introduction p. 1
- Who Needs Net+? I Just Want to Learn About Networks! p. 1
- What Is Network+ Certification? p. 1
- What Is CompTIA? p. 2
- The Current Network+ Certification Exam Release p. 2
- How Do I Become Network+ Certified? p. 3
- What Are the Tests Like? p. 3
- How Do I Take the Tests? p. 4
- How Much Does the Test Cost? p. 4
- How to Pass the Network+ Exam p. 4
- Obligate Yourself p. 5
- Set Aside the Right Amount of Study Time p. 5
- Studying for the Test p. 5
- Chapter 2 Defining Networking p. 8
- The Birth of Networking p. 10
- Pre-Networking Issues p. 12
- ARPANET p. 14
- The Goal of Networking p. 15
- What to Share? p. 15
- How Do We Share? p. 16
- Servers and Clients p. 16
- Making Shared Resources Usable p. 19
- Sharing a Resource p. 19
- Accessing a Shared Resource p. 20
- The Goal of Networking Redux p. 21
- Chapter 2 Review p. 22
- Chapter 3 Building a Network with OSI p. 26
- Welcome to MHTechEd! p. 27
- Let's Get Physical p. 28
- The NIC p. 30
- The Two Aspects of Hardware p. 34
- Beyond the Single Wire--Network Software p. 36
- There's Frames in Them Thar Frames! p. 38
- Assembly and Disassembly p. 40
- Talking on a Network p. 40
- Standardized Formats p. 41
- Network Applications p. 42
- How Dana Gets Her Document p. 43
- The OSI Seven-Layer Model p. 47
- Biography of a Model p. 47
- The Seven Layers p. 47
- Chapter 3 Review p. 51

- Chapter 4 Hardware Concepts p. 56
- Topology p. 57
- Hybrid Topologies p. 58
- Cabling p. 60
- Coax p. 60
- Twisted Pair p. 62
- Fiber-Optic p. 64
- Networking Industry Standards--IEEE p. 65
- Chapter 4 Review p. 67
- Chapter 5 Ethernet Basics p. 72
- Information in a Teeming Sea of Proto-Geeks p. 73
- How Ethernet Works p. 73
- Physical Bus p. 74
- Organizing the Data: Ethernet Frames p. 74
- CSMA/CD p. 76
- Termination p. 79
- Cable Breaks p. 80
- Ethernet Cabling Systems p. 81
- 10Base5 p. 81
- 10Base2 p. 84
- Extending the Network: Repeaters and Bridges p. 87
- Repeaters p. 87
- Bridges p. 90
- Chapter 5 Review p. 94
- Chapter 6 Modern Ethernet p. 98
- 10BaseT p. 99
- 10BaseT Topology p. 100
- UTP p. 102
- 10BaseT Limits and Specifications p. 104
- 10BaseFL p. 104
- Connecting Ethernet Segments p. 105
- How Big Can an Ethernet Network Be? The 5-4-3 Rule p. 107
- A Useful Approximation p. 107
- High-Speed Ethernet p. 109
- 100Base Ethernet p. 109
- Gigabit Ethernet p. 111
- Switched Ethernet p. 111
- Full-Duplex Ethernet p. 113
- Chapter 6 Review p. 115
- Chapter 7 Non-Ethernet Networks p. 120
- Token Ring p. 121
- Logical Ring Topology p. 121
- Physical Star p. 123
- Token Ring vs. Ethernet p. 126

- Gone But Not Forgotten--ARCnet and LocalTalk p. 127
- ARCnet p. 127
- LocalTalk p. 128
- LAN to WAN--FDDI and ATM p. 128
- FDDI p. 128
- ATM p. 129
- Don't Be an Ethernet Snob! p. 129
- Chapter 7 Review p. 130
- Chapter 8 Installing a Physical Network p. 134
- Structured Cabling p. 135
- Cable Basics--A Star Is Born p. 136
- The Basic Star p. 137
- Structured Cable Network Components p. 137
- Planning the Installation p. 144
- Installing the Cable p. 148
- Making Connections p. 150
- Labeling the Cable p. 151
- Testing the Cable Runs p. 152
- Getting Physical p. 154
- Beyond the Basic Star p. 154
- Switched Networks p. 155
- Multispeed Networks p. 156
- Multiple Floors, Multiple Buildings p. 157
- Backbones and Building Entrances p. 158
- Complexity Is Cool! p. 158
- NICs p. 159
- Ethernet NICs p. 159
- Token Ring NICs p. 160
- Installing NICs p. 162
- Lights p. 164
- Direct Cable Connections p. 165
- Diagnostics and Repair of Physical Cabling p. 165
- Diagnosing Physical Problems p. 165
- Check Your Lights p. 166
- Check the NIC p. 167
- Cable Testing p. 167
- Toners p. 167
- Chapter 8 Review p. 169
- Chapter 9 Wireless Networking p. 174
- Wireless Networking Basics p. 175
- Wireless Networking Hardware p. 176
- Wireless Networking Software p. 177
- Wireless Network Modes p. 178
- Wireless Networking Security p. 179

- Wireless Networking Speed p. 182
- Wireless Networking Range p. 182
- Wireless Network Broadcasting Frequencies p. 183
- Wireless Networking Media Access Methods p. 183
- Wireless Networking Standards p. 184
- IEEE 802.11-Based Wireless Networking p. 184
- Bluetooth p. 187
- Configuring Wireless Networking p. 191
- Wi-Fi and HomeRF p. 191
- Bluetooth p. 194
- Troubleshooting Wireless Networks p. 195
- Troubleshooting Wi-Fi and HomeRF Wireless Networks p. 196
- Troubleshooting Bluetooth p. 198
- Chapter 9 Review p. 201
- Chapter 10 Protocols p. 206
- Network Protocols p. 207
- Protocol Stacks p. 207
- Protocols by Layer p. 207
- Implementing Protocols p. 214
- Multiple Protocols p. 215
- Binding p. 216
- Installation p. 216
- Protocol Concepts p. 218
- NetBIOS/NetBEUI p. 218
- In the Early Days p. 218
- NetBIOS at Session p. 219
- NetBEUI at Transport p. 222
- NetBIOS/NetBEUI Naming Weaknesses p. 222
- Installing NetBIOS/NetBEUI p. 223
- NetBIOS/NetBEUI--Fading Away p. 225
- IPX/SPX p. 225
- NCP/SAP at Session p. 226
- IPX/SPX at Transport and Network p. 226
- Installing IPX/SPX p. 227
- Splitting Protocols I: NetBIOS over IPX/SPX p. 228
- TCP/IP p. 229
- Applications p. 230
- TCP at Session p. 230
- TCP as Transport p. 231
- IP at Network p. 231
- Installing TCP/IP p. 231
- Splitting Protocols II: NetBIOS over TCP/IP p. 232
- Also-Ran Protocols p. 232
- AppleTalk p. 233

- DLC p. 233
- Chapter 10 Review p. 234
- Chapter 11 TCP/IP p. 238
- IP Address Basics p. 239
- IP Address Format p. 239
- Converting IP Addresses p. 240
- Local vs. Remote p. 243
- ARP p. 245
- Gateways p. 246
- Subnet Masks and Subnetting p. 248
- Network IDs p. 248
- Subnet Mask p. 249
- Class Licenses p. 251
- Classless Subnetting p. 253
- Special IP Addresses p. 257
- Other Critical TCP/IP Settings p. 258
- DNS p. 258
- DHCP p. 261
- WINS p. 261
- TCP/UDP/ICMP Ports p. 263
- TCP p. 263
- UDP p. 263
- ICMP p. 264
- IPv6 p. 266
- Chapter 11 Review p. 267
- Chapter 12 Network Operating Systems p. 272
- Categorizing Operating Systems p. 273
- Client/Server vs. Peer-to-Peer p. 275
- Security p. 278
- Security Models p. 279
- The Major Network Operating Systems p. 284
- Microsoft Windows p. 284
- Windows 9x p. 285
- Windows NT p. 288
- Windows 2000 p. 292
- Windows XP p. 298
- Windows Server 2003 p. 299
- User Profiles p. 299
- Novell NetWare p. 300
- UNIX and Linux p. 301
- Mac OS p. 303
- Creating Servers and Clients p. 304
- Network Interface p. 304
- Protocol p. 305

- Naming p. 305
- Server or Client p. 306
- Super User Accounts p. 306
- Groups p. 306
- Passwords p. 306
- Chapter 12 Review p. 309
- Chapter 13 Sharing Resources p. 314
- Resource Naming p. 315
- UNC p. 316
- URL p. 318
- Permissions p. 318
- Dueling Security Models p. 319
- Windows 9x Permissions p. 320
- Windows NT Permissions p. 320
- Windows 2000/2003 Permissions p. 323
- Windows XP Permissions p. 324
- NetWare 3.x Rights p. 325
- NetWare 4.x/5.x/6.x p. 325
- UNIX/Linux p. 326
- Sharing Is Sharing p. 326
- Sharing Resources p. 327
- Sharing Folders p. 327
- Sharing Printers p. 336
- Accessing Shared Resources p. 338
- Accessing Files in Windows p. 338
- Accessing Shared Printers in Windows p. 339
- Troubleshooting Shared Resources p. 339
- Access Errors p. 341
- Chapter 13 Review p. 342
- Chapter 14 Going Large with TCP/IP p. 346
- DNS p. 347
- DNS in Detail p. 347
- The DNS Cache p. 355
- DNS Servers p. 355
- Troubleshooting DNS p. 357
- DHCP p. 359
- DHCP in Detail p. 360
- DHCP Servers p. 360
- Troubleshooting DHCP p. 362
- Release or Renew? p. 362
- WINS p. 363
- WINS in Detail p. 363
- Configuring WINS Clients p. 366
- Troubleshooting WINS p. 366

- Diagnosing TCP/IP Networks p. 366
- Chapter 14 Review p. 369
- Chapter 15 TCP/IP and the Internet p. 374
- Real-World Routers p. 375
- Static Routes p. 376
- SNMP p. 380
- Dynamic Routing p. 381
- Connecting to the Internet p. 382
- NAT p. 383
- Proxy Server p. 384
- So What's the Big Difference Between NAT and a Proxy, Anyway? p. 385
- TCP/IP Applications p. 385
- The Web p. 385
- E-mail p. 391
- FTP p. 394
- Telnet p. 397
- Chapter 15 Review p. 399
- Chapter 16 Remote Connectivity p. 404
- SOHO LAN Connections p. 405
- Telephone Options p. 405
- Public Switched Telephone Network p. 405
- ISDN p. 409
- DSL p. 411
- Cable Modems p. 414
- Satellite p. 414
- Which Connection? p. 415
- WAN Connections p. 415
- Copper Carriers: T1 and T3 p. 416
- Fiber Carriers: SONET/SDH and OC p. 419
- Packet Switching p. 420
- Using Remote Access p. 421
- Dial-Up to the Internet p. 422
- Private Dial-Up p. 429
- VPNs p. 431
- Dedicated Connection p. 432
- Internet Connection Sharing p. 434
- Troubleshooting Remote Access p. 436
- Is the Physical Remote Connection Running? p. 436
- Is Your Hardware Running? p. 437
- Are You Configured? p. 437
- Is the Server Awake? p. 437
- Chapter 16 Review p. 439
- Chapter 17 Protecting Your Network p. 444
- Defining Network Threats p. 445

- Internal Threats p. 445
- External Threats p. 446
- Protecting from Internal Threats p. 450
- Passwords p. 450
- User Account Control p. 451
- Careful Use of Permissions p. 455
- Policies p. 455
- Protecting a Network from External Threats p. 458
- Physical Protection p. 459
- Firewalls p. 459
- Encryption p. 463
- Public Keys and Certificates p. 466
- VLAN p. 467
- Implementing External Network Security p. 469
- Personal Connections p. 469
- SOHO Connections p. 471
- Large Network Connections p. 471
- Chapter 17 Review p. 473
- Chapter 18 Interconnecting Network Operating Systems p. 478
 - Connecting to Windows p. 480
 - Connecting Macintosh to Windows 9x Shared Resources p. 481
 - Connecting UNIX/Linux Systems to Windows 9x Systems p. 481
 - Connecting to Windows Workstations (NT 2000 XP) p. 483
 - Connecting to Windows Server Systems p. 484
 - Connecting to NetWare p. 487
 - Connecting Windows Systems to NetWare p. 487
 - Connecting Macintosh to NetWare p. 489
 - Native File Access p. 490
 - Connecting to Macintosh p. 490
 - Connecting Windows Systems to Macintosh Serving Systems p. 491
 - Connecting UNIX/Linux Systems to Macintosh Sharing Systems p. 491
 - Connecting to UNIX/Linux p. 491
 - Connecting Windows Systems to UNIX/Linux Sharing Systems p. 492
 - Connecting Macintosh Systems to UNIX/Linux Sharing Systems p. 492
 - When All Else Fails, Terminal Emulate! p. 493
- Chapter 18 Review p. 495
- Chapter 19 The Perfect Server p. 500
 - Protection of Data--Fault Tolerance p. 502
 - RAID p. 504
 - NAS p. 511
 - SAN p. 512
 - Tape Backup p. 512
 - Data Redundancy Is the Key p. 513
 - Speed p. 514

- Fast NICs p. 514
- Make the Drives Faster p. 515
- It's Not Just Hardware p. 515
- Reliability p. 516
- Good Power p. 516
- The Computer Virus p. 517
- Environment p. 520
- Putting Them All Together p. 521
- Nothing's Perfect p. 522
- Chapter 19 Review p. 523
- Chapter 20 Zen and the Art of Network Support p. 528
- Troubleshooting Tools p. 529
- "Touchy" Tools p. 529
- Hardware Tools p. 530
- Software Tools p. 531
- Your Toolbox p. 532
- The Troubleshooting Process p. 532
- Backups p. 533
- Baselines p. 536
- Troubleshooting Model p. 540
- Troubleshooting as Art--Mike's Four-Layer Model p. 543
- Using the Four-Layer Model p. 545
- Troubleshooting Scenarios p. 546
- "I Can't Log In!" p. 546
- "I Can't Get to This Web Site!" p. 547
- "Our Web Server Is Sluggish!" p. 547
- "I Can't See Anything in Network Neighborhood!" p. 548
- Troubleshooting Is Fun! p. 548
- Chapter 20 Review p. 549
- Glossary p. 555
- Index p. 599