Master all the skills to pass the Network+ Exam!

Network+ Certification

Total preparation for passing COMPTIA's Network+ Exam! In-depth coverage of every exam objective TCP/IP theory and real-world practice

Suranaree University of Technology



31051000604732

Network fundamentals, configuration, management, security, troubleshooting, and more!

Tim Hoffman, Kostya Ryvkin & Dave Houde

Introduction to Networking 1
What Is Networking? 2
Why Do We Need Networking? 3
Network Planning 4
Types of Networks 5
The Peer-to-Peer Network 6
Server-Based Networks 8
Network Topologies 11
Logical Topologies 12
Physical Topologies 13
Segments and Backbones 17
Summary 19
2
Major Operating Systems 23
Novell NetWare 24
Novell NetWare 3.1x 25
Novell NetWare 4.1 29
Performance 31
Security Services 34
Novell NetWare Version 5 35
Microsoft Windows NT Server 4.0 39
Resources Required 40
Installation 40
Performance 41
Fault Tolerance Support 41

Comptia Network+ Exam Requirements Matrix xix

Acknowledgments

About the Authors

Introduction

	Dinastoni Comison 45
	Directory Services 45 Microsoft Windows 2000 Server 45
	. Resources Required 46
	Performance 46
	Fault Tolerance Support 46
	Network Services 47
	Directory Services 47
	Security Services 48
	Support for Hardware 48
	Wizardry 48
	UNIX 49
	Sun Solaris 49
	Linux 50
	UNIX Features and Functionality 50
	IBM Operating System/2 (OS/2) 53
	Clients 53
	Microsoft Windows 95/98 and Windows NT
	4.0 Workstation 53
	Connecting to the Server 55
	Summary 57
3	·
introat	action to Standards 63
	What are Standards? 64
	Standards and Models 65
	Protocols 66
	Standards for Network Interface Cards 67
	DoD Four-Layer Model 67
	Network Interface Layer 68
	Internet Layer 69
	Transport Layer 70
	Application Layer 70
	Open Systems Interconnect Model 72
	Application Layer 73
	Presentation Layer 74
	Session Layer 75
	Transport Layer 76
	Network Laver 76

Network Services 42

	Data Link Layer 76
	Physical Layer 77
	Putting it all Together 78
	Protocol Mapping 78
	IEEE 802 MODEL 80
	Media Access Control (MAC) Sublayer 81
	Logical Link Control (LLC) Sublayer 82
	Encapsulation 82
	Summary 83
4	
Cables,	Access Methods, and Network Architecture 87
	Types of Cables 88
	Coaxial Cable 89
	Twisted Pair 98
	Fiber Optic Cable 107
	Choosing the Right Cable Type 110
	Access Methods 112
	Carrier-Sense Multiple Access with Collision Detection
	(CSMA/CD) 113
	Carrier-Sense Multiple Access with Collision Avoidance
	(CSMA/CA) 114
	Token Passing 114
	Demand Priority 115
	Network Architecture 116
	Ethernet 116
	10BASE-T Ethernet 118
	Token Ring 127
	ArcNet 132
	Cabling 134
	Summary 134
5	
Wide A	rea Networks 141
	Introduction to Wide-Area-Network Technologies 142
	Connecting Two or More LANs 142
	Segmenting the Existing LAN 143

Connecting Your LAN to Other Foreign Systems

and Environments 145

How Does the Computer Use the Subnet Mask? 222
Automating IP Address Assignment Using DHCP 224
The DHCP Process 225
DHCP Lease Duration 226
DHCP Scopes and Options 227
DHCP Relay Agents 228
NetBIOS over TCP/IP 230
NetBIOS Names 231
NetBIOS Name Registration, Discovery, and Release 232
NetBIOS Name Scopes 233
NetBIOS Name Resolution 235
Standard Name Resolution Methods 235
Name Resolution Methods Specific to Microscoft 236
Name Resolution Nodes 237
The LMHOSTS File 238
Host Name Resolution 241
What Is a Host Name? 242
Standard Name Resolution Methods 243
Name Resolution Methods Specific to Microsoft 244
Name Resolution Using a HOSTS File 244
Name Resolution Using a DNS Server 245
Summary 246
7
Troubleshooting TCP/IP 253
General Considerations 254
Diagnostic Tools Overview 254
TCP/IP Troubleshooting Guidelines 256
Subnet Mask Problems 260
Testing IP Communications 261
Routing Problems 264
Testing TCP/IP Name Resolution 267
NetBIOS Name Resolution Problems 267
Host Name Resolution Problems 270
Session Communications Problems 272
Troubleshooting Tools 272
Event Viewer 273

Performance Monitor 273

Using Microsoft Network Monitor 274 Summary 279
8
Remote Connectivity 285
Hardware and Software 286
Modem Types 287
Modem Installation and Configuration 288
Modem Transmission Rates 291
Modem Connection Requirements 292
Media 294
Public-Switched Telephone Network 294
Integrated Services Digital Network 296
Other Connection Options 297
Protocols 298
Serial Line Internet Protocol 298
Point-to-Point Protocol 299
Point-to-Point Tunneling Protocol 301
Summary 303
9
Network Administration 309
Installation 310
Planning 312
Performing the Installation 315
Administration 316
Security 318
Physical Security 318
Logical Security 319
Summary 323
·
10
Maintaining the Network 327
The Physical Environment 328
Line Power 328
Electrostatic Discharge 329
Electromagnetic Interference 330
Radio Frequency Interference 330
Climate 330

Monitoring the System 331 The Virus Threat 334 Anti-virus Policies and Training 334 Backup Program 334 Anti-virus Software 334 Backup Program 336 Backup Equipment 337 What and When to Backup 338 Backup Methods 339 Backup Strategy 340 Tape Management and Storage 340 Testing and Logging 341 Managing the Program 342 Fault Tolerance 343 Disk Mirroring 343 Stripe Set with Parity 345 Other RAIDs 348 Sector Sparing 348 Volume Sets 348 Hardware RAID 349 **Uninterruptible Power Supply 349** Software Patches 350 Where Should I Obtain Patches? 351 How Can I Tell What the Patch Does and How It Will Work on My System? 351 How Do I Install the Patch? 352 When Will I Need to Reinstall the Patch? 352 Summary 353 Network Troubleshooting Troubleshooting Methodology 360 STEP 1: Identify the Exact Issue 361 STEP 2: Recreate the Problem 362 STEP 3: Isolate the Cause 363 STEP 4: Formulate a Correction 365

STEP 5: Implement the Correction 366

STEP 6: Test the Correction 366

Physical Placement 331

xiv Contents

STEP 7: Document the Problem and the Solution 366
STEP 8: Give Feedback 367

Wire to Application 371
Go Easy Early 372
Walk Through the Protocol Stack 373
Network Interface Cards 374

Network Analysis Resources 379
Crossover Cables 380
Tone Generator/Tone Locator 380
Time-Domain Reflectometers 380
Protocol Analyzers 381

Summary 381

Appendix 385 Glossary 435 Index 453