

Microsoft

# Understanding IPv6

3  
THIRD  
EDITION

Covers Windows® 8  
and Windows Server® 2012



Joseph Davies

# Understanding IPv6

THIRD EDITION

## Your essential guide to IPv6—now updated for Windows 8 and Windows Server 2012

Get in-depth technical information to put IPv6 technology to work—including networks with computers running Windows® 8 and Windows Server® 2012. Written by a networking expert, this reference explains IPv6 features and benefits, and provides detailed information to help you implement this protocol. You'll learn best practices for using IPv6 services in your Windows network, whether you're an IT professional, a network administrator, or an IT student.

### Discover how to:

- Use Windows features and tools to implement IPv6 on your network
- Set up a test lab to experiment with IPv6 configuration and functionality
- Determine a practical IPv6 addressing and routing plan for your network
- Use IPv6 transition technologies to support both IPv4 and IPv6 during deployment
- Implement IPv6 security features and measures
- Deploy native IPv6 connectivity on an IPv4-only intranet
- Apply best practices from the Microsoft corporate network case study
- Test your understanding of IPv6 concepts with end-of-chapter quizzes

### Web content includes:

- Classroom-ready Microsoft® PowerPoint® slides for teaching IPv6
- IPv6 capture files that display packet structure and protocol processes (viewable with Microsoft Network Monitor 3.4)
- Ready to download at <http://go.microsoft.com/fwlink/?Linkid=253018>

For system requirements, see the Introduction.



U.S.A. \$49.99  
Canada \$52.99  
(recommended)

Operating Systems/Windows

### About the Author

Joseph Davies is an award-winning author and instructor with 18 years of experience in TCP/IP, networking, and security technologies. The author of *Understanding IPv6, Second Edition* and *Windows Server 2008 TCP/IP Protocols and Services*, he also wrote "The Cable Guy," a monthly column for Microsoft TechNet and *TechNet Magazine*.

### ALSO LOOK FOR



### Windows Internals, Sixth Edition Part 1

Mark Russinovich, David A. Solomon,  
and Alex Ionescu  
ISBN 978-0-7356-4873-9

[microsoft.com/mspress](http://microsoft.com/mspress)

 Windows®

**Microsoft**

# Understanding IPv6

*Third Edition*

Joseph Davies

---

Published with the authorization of Microsoft Corporation by:  
O'Reilly Media, Inc.  
1005 Gravenstein Highway North  
Sebastopol, California 95472

Copyright © 2012 by Microsoft Corporation  
All rights reserved. No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

ISBN: 978-0-7356-5914-8

1 2 3 4 5 6 7 8 9 LSI 7 6 5 4 3 2

Printed and bound in the United States of America.

Microsoft Press books are available through booksellers and distributors worldwide. If you need support related to this book, email Microsoft Press Book Support at [mspinput@microsoft.com](mailto:mspinput@microsoft.com). Please tell us what you think of this book at <http://www.microsoft.com/learning/booksurvey>.

Microsoft and the trademarks listed at <http://www.microsoft.com/about/legal/en/us/IntellectualProperty/Trademarks/EN-US.aspx> are trademarks of the Microsoft group of companies. All other marks are property of their respective owners.

The example companies, organizations, products, domain names, email addresses, logos, people, places, and events depicted herein are fictitious. No association with any real company, organization, product, domain name, email address, logo, person, place, or event is intended or should be inferred.

This book expresses the author's views and opinions. The information contained in this book is provided without any express, statutory, or implied warranties. Neither the authors, O'Reilly Media, Inc., Microsoft Corporation, nor its resellers, or distributors will be held liable for any damages caused or alleged to be caused either directly or indirectly by this book.

**Acquisitions and Developmental Editor:** Ken Jones

**Production Editor:** Holly Bauer

**Editorial Production:** Octal Publishing, Inc.

**Technical Reviewer:** Ed Horley

**Copyeditor:** Richard Carey

**Indexer:** Ellen Troutman Zaig

**Cover Design:** Twist Creative • Seattle

**Cover Composition:** Karen Montgomery

**Illustrator:** Rebecca Demarest

---

*For Kara:  
My lady, my love, my life.*



---

# Contents at a Glance

---

	<i>Foreword</i>	<i>xxvii</i>
	<i>Preface</i>	<i>xxix</i>
	<i>Introduction</i>	<i>xxxii</i>
CHAPTER 1	Introduction to IPv6	1
CHAPTER 2	IPv6 Protocol for Windows	17
CHAPTER 3	IPv6 Addressing	57
CHAPTER 4	The IPv6 Header	91
CHAPTER 5	ICMPv6	117
CHAPTER 6	Neighbor Discovery	131
CHAPTER 7	Multicast Listener Discovery and MLD Version 2	183
CHAPTER 8	Address Autoconfiguration	205
CHAPTER 9	IPv6 and Name Resolution	227
CHAPTER 10	IPv6 Routing	253
CHAPTER 11	IPv6 Transition Technologies	283
CHAPTER 12	ISATAP	301
CHAPTER 13	6to4	323
CHAPTER 14	Teredo	347
CHAPTER 15	IP-HTTPS	369
CHAPTER 16	NAT64/DNS64	377
CHAPTER 17	IPv6 Security Considerations	387
CHAPTER 18	DirectAccess	397
CHAPTER 19	Deploying IPv6 on an Intranet	413
CHAPTER 20	IPv6 on the Microsoft Corporate Network	437

---

APPENDIX A	IPv6 RFC Index	451
APPENDIX B	Testing for Understanding Answers	457
APPENDIX C	Setting Up an IPv6 Test Lab	487
APPENDIX D	IPv6 Reference Tables	515
APPENDIX E	Link-Layer Support for IPv6	519
APPENDIX F	Windows Sockets Changes for IPv6	539
APPENDIX G	Mobile IPv6	549
APPENDIX H	Teredo Protocol Processes	605
	<i>Glossary</i>	627
	<i>Index</i>	641



# Contents

*Foreword* .....xxvii  
*Preface* ..... xxix  
*Introduction* ..... xxxi

**Chapter 1 Introduction to IPv6 1**

Limitations of IPv4 .....1  
Consequences of the Limited IPv4 Address Space .....2  
Features of IPv6.....6  
    New Header Format .....6  
    Large Address Space .....6  
    Stateless and Stateful Address Configuration.....7  
    IPsec Header Support Required .....7  
    Better Support for Prioritized Delivery .....7  
    New Protocol for Neighboring Node Interaction .....8  
    Extensibility.....8  
Comparison of IPv4 and IPv6 .....8  
IPv6 Terminology .....9  
The Case for IPv6 Deployment.....12  
    IPv6 Solves the Address Depletion Problem.....12  
    IPv6 Solves the Disjoint Address Space Problem .....12  
    IPv6 Solves the International Address Allocation Problem.....13  
    IPv6 Restores End-to-End Communication.....13  
    IPv6 Uses Scoped Addresses and Address Selection.....14  
    IPv6 Has More Efficient Forwarding.....14  
    IPv6 Has Support for Security and Mobility .....15  
Testing for Understanding.....15

---

**What do you think of this book? We want to hear from you!**

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

[microsoft.com/learning/booksurvey](https://microsoft.com/learning/booksurvey)

<b>Chapter 2 IPv6 Protocol for Windows</b>	<b>17</b>
Architecture of the IPv6 Protocol for Windows . . . . .	17
Features of the IPv6 Protocol for Windows . . . . .	19
Installed, Enabled, and Preferred by Default . . . . .	20
Basic IPv6 Stack Support . . . . .	21
IPv6 Stack Enhancements . . . . .	21
GUI and Command-Line Configuration . . . . .	22
Integrated IPsec Support . . . . .	22
Windows Firewall Support . . . . .	22
Temporary Addresses . . . . .	23
Random Interface IDs . . . . .	23
DNS Support . . . . .	24
Source and Destination Address Selection . . . . .	24
Support for ipv6-literal.net Names . . . . .	24
LLMNR . . . . .	25
PNRP . . . . .	25
Literal IPv6 Addresses in URLs . . . . .	25
Static Routing . . . . .	26
IPv6 over PPP . . . . .	26
DHCPv6 . . . . .	27
ISATAP . . . . .	27
6to4 . . . . .	27
Teredo . . . . .	27
PortProxy . . . . .	28
IP-HTTPS . . . . .	28
NAT64/DNS64 . . . . .	28
Group Policy Settings for Transition Technologies . . . . .	29
Application Support . . . . .	30
Application Programming Interfaces . . . . .	30
Windows Sockets . . . . .	31
Winsock Kernel . . . . .	31
Remote Procedure Call . . . . .	31
IP Helper . . . . .	31
Win32 Internet Extensions . . . . .	32

.NET Framework .....	32
Windows Runtime .....	32
Windows Filtering Platform .....	32
Windows Management Instrumentation Version 2.....	33
Manually Configuring the IPv6 Protocol.....	33
Configuring IPv6 Through the Properties of Internet Protocol Version 6 (TCP/IPv6) .....	34
Configuring IPv6 with Windows PowerShell.....	37
Configuring IPv6 with the Netsh.exe Tool.....	37
Disabling IPv6 .....	40
IPv6-Enabled Tools.....	42
Ipconfig .....	42
Route .....	43
Ping.....	44
Tracert .....	45
Pathping.....	46
Netstat.....	47
Displaying IPv6 Configuration with Windows PowerShell.....	49
Get-NetIPAddress -AddressFamily IPv6.....	49
Get-NetRoute -AddressFamily IPv6 .....	50
Get-NetNeighbor -AddressFamily IPv6 .....	51
Displaying IPv6 Configuration with Netsh .....	51
Netsh interface ipv6 show interface.....	51
Netsh interface ipv6 show address .....	52
Netsh interface ipv6 show route .....	52
Netsh interface ipv6 show neighbors.....	53
Netsh interface ipv6 show destinationcache.....	53
References .....	53
Testing for Understanding.....	54

<b>Chapter 3 IPv6 Addressing</b>	<b>57</b>
The IPv6 Address Space . . . . .	57
IPv6 Address Syntax . . . . .	58
Compressing Zeros . . . . .	60
IPv6 Prefixes . . . . .	60
Types of IPv6 Addresses . . . . .	61
Unicast IPv6 Addresses . . . . .	62
Global Unicast Addresses . . . . .	62
Link-Local Addresses . . . . .	65
Unique Local Addresses . . . . .	66
Special IPv6 Addresses . . . . .	67
Transition Addresses . . . . .	68
Multicast IPv6 Addresses . . . . .	68
Solicited-Node Address . . . . .	70
Mapping IPv6 Multicast Addresses to Ethernet Addresses . . . . .	71
Anycast IPv6 Addresses . . . . .	72
Subnet-Router Anycast Address . . . . .	73
IPv6 Addresses for a Host . . . . .	73
IPv6 Addresses for a Router . . . . .	74
Subnetting the IPv6 Address Space . . . . .	75
Step 1: Determining the Number of Subnetting Bits . . . . .	75
Step 2: Enumerating Subnetted Address Prefixes . . . . .	76
IPv6 Address Allocation Strategies . . . . .	81
IPv6 Interface Identifiers . . . . .	82
EUI-64 Address-Based Interface Identifiers . . . . .	83
Temporary Address Interface Identifiers . . . . .	87
IPv4 Addresses and IPv6 Equivalents . . . . .	88
References . . . . .	89
Testing for Understanding . . . . .	89

---

**Chapter 4 The IPv6 Header 91**

Structure of an IPv6 Packet . . . . . 91

IPv4 Header . . . . . 92

IPv6 Header . . . . . 94

    Values of the Next Header Field . . . . . 96

    Comparing the IPv4 and IPv6 Headers . . . . . 97

IPv6 Extension Headers . . . . . 99

    Extension Headers Order . . . . . 101

    Hop-by-Hop Options Header . . . . . 101

    Destination Options Header . . . . . 105

    Routing Header . . . . . 107

    Fragment Header . . . . . 108

    Authentication Header . . . . . 112

    Encapsulating Security Payload Header and Trailer . . . . . 112

IPv6 MTU . . . . . 113

Upper-Layer Checksums . . . . . 114

References . . . . . 115

Testing for Understanding . . . . . 115

**Chapter 5 ICMPv6 117**

ICMPv6 Overview . . . . . 117

    Types of ICMPv6 Messages . . . . . 118

    ICMPv6 Header . . . . . 118

ICMPv6 Error Messages . . . . . 119

    Destination Unreachable . . . . . 119

    Packet Too Big . . . . . 121

    Time Exceeded . . . . . 123

    Parameter Problem . . . . . 123

ICMPv6 Informational Messages . . . . . 124

    Echo Request . . . . . 124

    Echo Reply . . . . . 125

Comparing ICMPv4 and ICMPv6 Messages . . . . .	127
Path MTU Discovery . . . . .	127
Changes in PMTU . . . . .	128
References . . . . .	129
Testing for Understanding . . . . .	130

**Chapter 6 Neighbor Discovery 131**

Neighbor Discovery Overview . . . . .	131
Neighbor Discovery Message Format . . . . .	133
Neighbor Discovery Options . . . . .	134
Source and Target Link-Layer Address Options . . . . .	134
Prefix Information Option . . . . .	136
Redirected Header Option . . . . .	139
MTU Option . . . . .	141
Route Information Option . . . . .	143
Neighbor Discovery Messages . . . . .	145
Router Solicitation . . . . .	145
Router Advertisement . . . . .	146
Neighbor Solicitation . . . . .	150
Neighbor Advertisement . . . . .	152
Redirect . . . . .	155
Summary of Neighbor Discovery Messages and Options . . . . .	157
Neighbor Discovery Processes . . . . .	158
Conceptual Host Data Structures . . . . .	158
Address Resolution . . . . .	159
Neighbor Unreachability Detection . . . . .	163
Duplicate Address Detection . . . . .	167
Router Discovery . . . . .	170
Redirect Function . . . . .	176
Host Sending Algorithm . . . . .	179
IPv4 Neighbor Messages and Functions and IPv6 Equivalents . . . . .	181
References . . . . .	181
Testing for Understanding . . . . .	181

---

**Chapter 7 Multicast Listener Discovery and MLD Version 2 183**

MLD and MLDv2 Overview .....183

IPv6 Multicast Overview .....184

    Host Support for Multicast.....184

    Router Support for Multicast.....185

MLD Packet Structure.....188

MLD Messages.....189

    Multicast Listener Query.....189

    Multicast Listener Report.....191

    Multicast Listener Done.....193

Summary of MLD.....194

MLDv2 Packet Structure.....194

MLDv2 Messages.....195

    The Modified Multicast Listener Query.....195

    MLDv2 Multicast Listener Report.....197

Summary of MLDv2.....201

MLD and MLDv2 Support in Windows.....201

References.....202

Testing for Understanding.....203

**Chapter 8 Address Autoconfiguration 205**

Address Autoconfiguration Overview.....205

    Types of Autoconfiguration.....205

    Autoconfigured Address States.....206

Autoconfiguration Process.....207

DHCPv6.....210

    DHCPv6 Messages.....212

    DHCPv6 Stateful Message Exchange.....215

    DHCPv6 Stateless Message Exchange.....215

    DHCPv6 Support in Windows.....216

IPv6 Protocol for Windows Autoconfiguration Specifics.....220

Autoconfigured Addresses for the IPv6 Protocol for Windows.....221

References .....	224
Testing for Understanding.....	225

**Chapter 9 IPv6 and Name Resolution 227**

Name Resolution for IPv6 .....	227
DNS Enhancements for IPv6 .....	227
LLMNR .....	228
Source and Destination Address Selection.....	231
Source Address Selection Algorithm .....	233
Destination Address Selection Algorithm .....	235
Fixing IPv6 Brokenness in Windows Server 2012 and Windows 8.....	237
Example of Using Address Selection.....	238
Name Resolution Support in Windows.....	240
Hosts File .....	240
DNS Resolver.....	241
DNS Server Service .....	242
DNS Dynamic Update .....	243
DNS Zone Transfers.....	244
Source and Destination Address Selection .....	244
LLMNR Support .....	246
Support for ipv6-literal.net Names.....	247
Peer Name Resolution Protocol .....	248
Name Resolution Policy Table .....	249
DNS Security Extensions.....	250
References .....	250
Testing for Understanding.....	251

**Chapter 10 IPv6 Routing 253**

Routing in IPv6 .....	253
IPv6 Routing Table Entry Types .....	254
Route Determination Process .....	254
Strong and Weak Host Behaviors .....	255
Example IPv6 Routing Table for Windows.....	256



End-to-End IPv6 Delivery Process .....	260
IPv6 on the Sending Host .....	260
IPv6 on the Router .....	262
IPv6 on the Destination Host .....	265
IPv6 Routing Protocols .....	268
Overview of Dynamic Routing .....	268
Routing Protocol Technologies .....	269
Routing Protocols for IPv6 .....	270
Static Routing with the IPv6 Protocol for Windows .....	272
Configuring Static Routing with Windows PowerShell .....	272
Configuring Static Routing with Netsh .....	275
Configuring Static Routing with Routing and Remote Access .....	277
Dead Gateway Detection .....	278
References .....	280
Testing for Understanding .....	280

## **Chapter 11 IPv6 Transition Technologies 283**

Overview .....	283
Node Types .....	284
IPv6 Transition Addresses .....	284
Transition Mechanisms .....	286
Using Both IPv4 and IPv6 .....	286
IPv6-over-IPv4 Tunneling .....	288
DNS Infrastructure .....	290
Tunneling Configurations .....	291
Router-to-Router .....	292
Host-to-Router and Router-to-Host .....	292
Host-to-Host .....	293
Types of Tunnels .....	294
Traffic Translation .....	296
NAT64/DNS64 .....	296
PortProxy .....	297
References .....	299
Testing for Understanding .....	300

---

**Chapter 12 ISATAP** **301**

ISATAP Overview . . . . . 301

    ISATAP Tunneling . . . . . 302

    ISATAP Tunneling Example . . . . . 303

ISATAP Components . . . . . 304

Router Discovery for ISATAP Hosts . . . . . 306

    Resolving the Name "ISATAP" . . . . . 307

    Using the ISATAP Router Name Group Policy Setting . . . . . 311

    Using the *Set-NetIsatapConfiguration -Router* Windows PowerShell Command . . . . . 311

    Using the *netsh interface isatap set router* Command . . . . . 312

ISATAP Addressing Example . . . . . 312

ISATAP Routing . . . . . 313

ISATAP Communication Examples . . . . . 314

    ISATAP Host to ISATAP Host . . . . . 314

    ISATAP Host to IPv6 Host . . . . . 315

Configuring an ISATAP Router . . . . . 317

    Example Using Windows PowerShell Commands . . . . . 318

    Example Using Netsh Commands . . . . . 320

ISATAP in Windows Server 2012 and Windows 8 . . . . . 321

References . . . . . 321

Testing for Understanding . . . . . 321

**Chapter 13 6to4** **323**

6to4 Overview . . . . . 323

    6to4 Tunneling . . . . . 324

    6to4 Tunneling Example . . . . . 325

6to4 Components . . . . . 327

6to4 Addressing Example . . . . . 328

    6to4 Routing . . . . . 330

6to4 Support in Windows . . . . . 331

    6to4 Host/Router Support . . . . . 331

    6to4 Router Support . . . . . 332

6to4 Communication Examples . . . . .	336
6to4 Host to 6to4 Host/Router . . . . .	336
6to4 Host to IPv6 Host . . . . .	337
Example of Using ISATAP and 6to4 Together . . . . .	341
Part 1: From ISATAP Host A to 6to4 Router A . . . . .	343
Part 2: From 6to4 Router A to 6to4 Router B . . . . .	344
Part 3: From 6to4 Router B to ISATAP Host B . . . . .	344
References . . . . .	345
Testing for Understanding . . . . .	345

**Chapter 14 Teredo 347**

Introduction to Teredo . . . . .	347
Teredo Benefits . . . . .	348
Teredo Support in Microsoft Windows . . . . .	348
Teredo and Protection from Unsolicited Incoming IPv6 Traffic . . . . .	349
Network Address Translators (NATs) . . . . .	350
Teredo Components . . . . .	351
Teredo Client . . . . .	352
Teredo Server . . . . .	352
Teredo Relay . . . . .	353
Teredo Host-Specific Relay . . . . .	353
The Teredo Client and Host-Specific Relay in Windows . . . . .	354
Teredo Addresses . . . . .	356
Teredo Packet Formats . . . . .	360
Teredo Data Packet Format . . . . .	360
Teredo Bubble Packets . . . . .	360
Teredo Indicators . . . . .	361
Teredo Routing . . . . .	363
On-Link Teredo Client Destinations . . . . .	364
Intersite Teredo Client Destinations . . . . .	365
IPv6 Internet Destinations . . . . .	365

Windows-Based Teredo Server and Relay . . . . .	365
Configuring a Teredo Server . . . . .	365
Configuring a Teredo Relay . . . . .	366
References . . . . .	367
Testing for Understanding. . . . .	367
<b>Chapter 15 IP-HTTPS</b>	<b>369</b>
Introduction to IP-HTTPS . . . . .	369
IP-HTTPS Traffic. . . . .	370
IP-HTTPS Components. . . . .	371
Establishing an IP-HTTPS Connection. . . . .	372
IP-HTTPS Client Routing . . . . .	373
Configuring IP-HTTPS Client Settings . . . . .	374
IP-HTTPS Features in Windows Server 2012 and Windows 8 . . . . .	374
Summary. . . . .	375
References . . . . .	375
Testing for Understanding. . . . .	375
<b>Chapter 16 NAT64/DNS64</b>	<b>377</b>
Introduction to NAT64/DNS64. . . . .	377
Limitations of NAT64/DNS64. . . . .	378
How NAT64/DNS64 Works . . . . .	379
Configuration Requirements for NAT64/DNS64 . . . . .	379
DNS Name Query and Response . . . . .	380
IPv6 Traffic from the IPv6-Only Node . . . . .	382
Configuring NAT64/DNS64 in Windows Server 2012 . . . . .	384
Summary. . . . .	385
References . . . . .	386
Testing for Understanding. . . . .	386

---

**Chapter 17 IPv6 Security Considerations 387**

IPv6 Security Considerations . . . . .387

Authorization for Automatically Assigned Addresses  
and Configurations . . . . .388

    Recommendations . . . . .388

Prevention of Rogue IPv6 Routers . . . . .389

    Recommendations . . . . .389

Protection of IPv6 Packets . . . . .389

    Recommendations . . . . .390

Host Protection from Scanning and Attacks . . . . .390

    Address Scanning . . . . .390

    Port Scanning . . . . .391

    Recommendations . . . . .391

Control of Tunneled Traffic on Your Intranet . . . . .391

    Recommendations . . . . .392

Control of What Traffic Is Exchanged with the Internet . . . . .393

    Recommendations . . . . .394

Summary . . . . .395

References . . . . .395

Testing for Understanding . . . . .396

**Chapter 18 DirectAccess 397**

Overview of DirectAccess . . . . .397

How DirectAccess Uses IPv6 . . . . .398

    DirectAccess Client Traffic over the IPv4 Internet . . . . .399

    DirectAccess Client Traffic over the Intranet . . . . .399

    Force Tunneling . . . . .400

    DirectAccess and IPv6 Routing . . . . .401

DirectAccess and the Role of IPsec . . . . .403

    Encryption . . . . .404

    Data Integrity . . . . .404

DirectAccess and the Role of the NRPT .....	405
NRPT Exemptions .....	406
Network Location Detection .....	406
Network Location Awareness .....	407
Network Location Detection Process .....	407
How DirectAccess Works .....	408
DirectAccess Client on the Intranet .....	408
DirectAccess Client on the Internet .....	409
Summary .....	411
References .....	412
Testing for Understanding .....	412

## **Chapter 19 Deploying IPv6 on an Intranet 413**

Introduction .....	413
Planning for IPv6 Deployment .....	413
Platform Support for IPv6 .....	414
Application Support for IPv6 .....	415
Network Management Infrastructure Support for IPv6 .....	415
Unicast IPv6 Addressing Architecture .....	416
Tunnel-Based IPv6 Connectivity .....	417
Other IPv6 Transition Technologies .....	420
Native IPv6 Connectivity .....	421
Name Resolution with DNS .....	422
Native IPv6 Addressing Allocation .....	423
Host-Based Security and IPv6 Traffic .....	424
Controlled or Prioritized Delivery for IPv6 Traffic .....	425
Deploying IPv6 .....	427
Obtain Global Address Space .....	427
Set Up an IPv6 Test Network .....	427
Begin Application Migration .....	428
Configure DNS Infrastructure to Support AAAA Records and Dynamic Updates .....	430
Upgrade IPv4-Only Hosts to IPv6/IPv4 Hosts .....	430
Begin Deploying a Native IPv6 Infrastructure .....	431

Connect Portions of Your Intranet over the IPv4 Internet . . . . .	432
Connect Portions of Your Intranet over the IPv6 Internet . . . . .	433
Summary . . . . .	433
References . . . . .	434
Testing for Understanding . . . . .	435
<b>Chapter 20 IPv6 on the Microsoft Corporate Network</b>	<b>437</b>
Introduction . . . . .	437
Characteristics of the Microsoft Corpnet . . . . .	438
History of IPv6 in Microsoft . . . . .	438
Deployment Philosophy . . . . .	439
Current Deployment of IPv6 on the Microsoft Corpnet . . . . .	440
Short and Long-Term Plans for IPv6 on the Microsoft Corpnet . . . . .	443
Deployment Details . . . . .	444
Addressing Plan and Routing Infrastructure . . . . .	444
DirectAccess . . . . .	444
Security for IPv6 Traffic on the Microsoft Corpnet . . . . .	445
Deployment Planning and Recommendations . . . . .	446
Overall Planning . . . . .	446
Deployment Recommendations . . . . .	448
Summary . . . . .	449
Testing for Understanding . . . . .	450
<b>Appendix A IPv6 RFC Index</b>	<b>451</b>
General . . . . .	451
Addressing . . . . .	451
Applications . . . . .	452
Sockets API . . . . .	452
Transport Layer . . . . .	452
Internet Layer . . . . .	453
Network Layer Security . . . . .	454
Link Layer . . . . .	454

Routing .....	.454
IPv6 Transition Technologies .....	.455
<b>Appendix B Testing for Understanding Answers</b>	<b>457</b>
Chapter 1: Introduction to IPv6 .....	.457
Chapter 2: IPv6 Protocol for Windows .....	.459
Chapter 3: IPv6 Addressing .....	.461
Chapter 4: The IPv6 Header .....	.464
Chapter 5: ICMPv6 .....	.465
Chapter 6: Neighbor Discovery .....	.466
Chapter 7: Multicast Listener Discovery and MLD Version 2 .....	.469
Chapter 8: Address Autoconfiguration .....	.470
Chapter 9: IPv6 and Name Resolution .....	.472
Chapter 10: IPv6 Routing .....	.473
Chapter 11: IPv6 Transition Technologies .....	.475
Chapter 12: ISATAP .....	.476
Chapter 13: 6to4 .....	.477
Chapter 14: Teredo .....	.478
Chapter 15: IP-HTTPS .....	.479
Chapter 16: NAT64/DNS64 .....	.480
Chapter 17: IPv6 Security Considerations .....	.481
Chapter 18: DirectAccess .....	.482
Chapter 19: Deploying IPv6 on an Intranet .....	.483
Chapter 20: IPv6 on the Microsoft Corporate Network .....	.484
<b>Appendix C Setting Up an IPv6 Test Lab</b>	<b>487</b>
IPv6 Test Lab Setup .....	.487
Hardware and Software Requirements .....	.489



- [click Conscience and Casuistry in Early Modern Europe \(Ideas in Context\)](#)
- [Misterioso \(A-gruppen, Book 1\) pdf, azw \(kindle\)](#)
- [click Too Many Dinosaurs pdf](#)
- [click The Berenstain Bears and the Big Blooper](#)
- [read Aristotle On Poetics](#)
- [read \*\*Modelling Perception with Artificial Neural Networks\*\*](#)
  
- <http://www.freightunlocked.co.uk/lib/After-Snowden--Privacy--Secrecy--and-Security-in-the-Information-Age.pdf>
- <http://deltaphenomics.nl/?library/Misterioso--A-gruppen--Book-1-.pdf>
- <http://studystategically.com/freebooks/Too-Many-Dinosaurs.pdf>
- <http://fitnessfatale.com/freebooks/Mapping-Early-Modern-Japan--Space--Place--and-Culture-in-the-Tokugawa-Period--1603-1868.pdf>
- <http://serazard.com/lib/Aristotle-On-Poetics.pdf>
- <http://twilightblogs.com/library/Death-of-a-Prankster--Hamish-MacBeth--Book-7-.pdf>