# Contents

#### Foreword XXV **Chapter 1 Introduction to Wireless Local** Area Networks 1 Introduction 2 e, **Reviewing Networking Basics** 3 **Defining Topologies** 3 **Bus** Topology Star Topology **Ring Topology** Mesh Topology 5 CSMA/CD versus Deterministic Access 6 Cabling 7 Understanding How Wireless Fits into the 9 **OSI** System Model Tracking Data through the OSI System Model 13 OSI and Wireless: Layer 2 and Down 14 OSI and Wireless: Layer 3 and Up 20 Review of TCP/IP Basics 20 Understanding TCP/IP Addressing 21 TCP 25 UDP 26 Summary 27 Solutions Fast Track 28 Frequently Asked Questions 29

# Common Practice for Subnetting TCP/IP Address Space

# This practice serves many purposes:

- It does not use registered IP space for wireless devices; which typically do not include servers.
- It enables the organization to subnet the address space without any restrictions.
- It allows for easy identification of WLAN traffic on the network because it is not sharing address space with the wired network.

ix

# Phase Modulation

The following modulation techniques are used in Cisco Aironet radios:

- Binary Phase Shift Keying (BPSK)
- Quadrature Phase Shift Keying (QPSK)
- Complimentary Code Keying (CCK)

Chapter 2 Wireless LAN Overview	31
Introduction	32
Understanding the Fundamentals of Radio	
Frequency	32
Wireless Radio Signal Transmission and	
Reception	34
Frequency	37
Bandwidth	40
WLAN Frequency Bands	41
Modulation	42
Phase Modulation	44
Communicating with Wireless LAN Technologies	48
Microwave Technology	48
Infrared Technology	49
Spread Spectrum Technology	50
Synchronization	52
Frequency Hopping	52
Direct Sequence Spread Spectrum (DSSS)	53
DSSS Channel Setup	54
Spectrum Technology Comparisons:	
Frequency Hopping versus Direct	
Sequence	55
Implementing a Wireless LAN Architecture	55
The OSI Reference Model	56
Logical Wireless System Components	59
Distribution System	59
Medium Access Technique	59
Synchronization and Error Control	60
Routing Mechanisms	60
Application Interface	60
Physical Wireless System Components	60
Medium	60
Access Point (AP)	60
Antenna	61
Wireless Station	61
Server	61

Keeping Pace with Wireless Networking	
Standards	61
Institute of Electrical and Electronic	
Engineers (IEEE)	62
802.11	66
802.11b	77
802.11a	79
Other Related Working Groups	80
European Telecommunications	
Standards Institute (ETSI)	81
Wireless Ethernet Compatibility	
Alliance (WECA)	86
WLAN Interoperability Forum (WLIF)	87
Infrared Data Association	87
Summary	88
Solutions Fast Track	89
Frequently Asked Questions	91
Chapter 3 Cisco Wireless LAN	
Product Line	93
Introduction	94
Introduction Overview of Cisco Wireless Systems	94 95
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line	94 95 95
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User	94 95 95
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity	94 95 95 96
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses	94 95 95 96 97
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges	94 95 95 96 97 99
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series	94 95 95 96 97 99 99
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350	94 95 95 96 97 99 99
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices	94 95 95 96 97 99 99
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features	94 95 95 96 97 99 99 99 99
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features Features of the Cisco Aironet 340 Series	94 95 95 96 97 99 99 99 103 110
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features Features of the Cisco Aironet 340 Series Individual 340 Series Device Features	94 95 95 96 97 99 99 99 103 110 110
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features Features of the Cisco Aironet 340 Series Individual 340 Series Device Features Cisco's Aironet Wireless NICs	94 95 95 96 97 99 99 103 110 110
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features Features of the Cisco Aironet 340 Series Individual 340 Series Device Features Cisco's Aironet Wireless NICs Cisco Aironet Antennas	94 95 95 96 97 99 99 99 103 110 110 115 117
Introduction Overview of Cisco Wireless Systems Cisco's WLAN Product Line Using WLANs for Individual User Connectivity Using WLANs to Connect Campuses Cisco's Aironet 3X0 Series APs and Bridges The Cisco Aironet 350 Series Features Common to All 350 Series Devices Individual 350 Series Device Features Features of the Cisco Aironet 340 Series Individual 340 Series Device Features Cisco's Aironet Wireless NICs Cisco Aironet Antennas Ceiling Mount Omni-Directional Antenna	94 95 95 96 97 99 99 103 110 110 115 117 120

# Answers to Your Frequently Asked Questions

**Q:** How far can a wireless client communicate to an Access Point (AP)?

V

A: Client adapters can support 11 Mbps at a range of 400 feet (120m) in open environments and 100 feet (30m) in typical closed/ indoor environments. Client adapter can support 1 Mbps at a range of up to 1,500 feet (460m) in open environments and 300 feet (90m) in closed/indoor environments.

# Designing & Planning...

6

#### Calculating the Fresnel Zone

e)

A bit of mathematics is required to calculate the size of the Fresnel zone radius at its widest point (midpoint radius). The following formula will allow you to calculate the radius in feet of the widest point in your Fresnel zone:

#### Fresnel Zone Radius Formula

$$R = 72.1 \sqrt{\frac{d_1 d_2}{F_{GHz} (d_1 + d_2)}}$$

High-Gain Mast Mount Omni-Directional	
Antenna	120
Pillar Mount Diversity Omni-Directional	
Antenna	121
POS Diversity Dipole Omni-Directional	
Antenna	121
Diversity Ceiling Mount Omni-Directional	
Patch Antenna	121
Directional Wall Mount Patch Antenna	122
Diversity Directional Wall Mount Patch	
Antenna	122
Yagi Antenna	123
Dish Antenna	123
Summary	125
Solutions Fast Track	127
Frequently Asked Questions	129
Chapter 4 Wireless Network Design	131
Introduction	132
Wireless Planning Considerations	132
Wireless Benefits and Limitations	134
what Type of Data will Be	124
Iraversing the Wireless Network?	134
How Much Data Will Be	105
Traversing the Wireless Network?	135
what is the Return On Investment	126
for Your Wireless Implementation?	136
Determining if Wireless Is Dicht	
for Your Business?	126
Dog Your Business:	150
d <sub>2</sub> ) Have Any Destrictions That Would	
Prohibit Vou from Implementing a	
Wireless I AN Solution?	137
Mobility	138
Throughput versus Data Rate and Load	139
The ugip at versus Data Pate and Doud	1 1 1
Cost and Return on Investment	141

Wireless Design Considerations	143
Attenuation	143
Attenuation Due to Antenna Cabling	144
Attenuation Due to Exterior	
Considerations	144
Accounting for the Fresnel Zone and	
Earth Bulge	149
Radio Frequency Interference	150
Interference from Radio Transmitters	151
Harmonics	152
Application Considerations	152
Structural Considerations	153
Andromeda Manufacturing Rough Design	156
Wireless Design 1	157
Wireless Design 2	157
Performing a Wireless Site Survey	158
Preparation	159
Sample Pre-Site Survey Form	160
Other Preparations	162
Infrastructure Awareness	166
What Types of Network Media	
Are Used?	166
What Operating Systems,	
Protocols, and Drivers Are Used?	168
What Hubs Are Used?	168
What Switches Are Used?	168
What Routers Are Used?	169
What Bridges Are Used?	169
How Is Power Supplied?	170
Preparing a Site Survey Kit	170
Using Client Adapters in the Survey	171
Using APs and Bridges in the Survey	172
Choosing Antennas for the Survey	173
Providing Battery Packs and Inverters	
for the Survey	174
Providing Tools for the Survey	175

# Setting the WEP Key



Bringing Temporary Mounting	
Equipment for the Survey	178
Performing an Interior Wireless Site	Survey 180
Designing for Coverage	. 181
Designing Seamless Roaming	183
Considering Rate Shifting	184
Performing the Interior Survey	184
Using the Cisco Aironet Client	
Utility for Interior Site Survey	rs 186
Watching Your Power Consump	tion 190
Setting Your Service Set IDs	191
Interior Survey Problems	191
Performing an Exterior Wireless Site	e Survey 193
Wireless Design Examples	195
Warehouse Design Example 1	196
Warehouse Design Example 2	197
Warehouse Design Example 3	198
Retail Design Example	198
Education Design Example 1	199
Education Design Example 2	200
Point-to-Point Design Example 1	201
Point-to-Point Design Example 2	201
Point-to-Point Design Example 3	203
Summary	204
Solutions Fast Track	205
Frequently Asked Questions	206
Chapter 5 Installation and Configu	ration
of Cisco 340 and Cisco 350 Series	
Access Points	209
Introduction	210
Installation of the Cisco 340/350 Series	AP 213

Introduction	210
Installation of the Cisco 340/350 Series AP	213
Specific Differences of the Cisco 350	
Series AP	215
Power Requirements	216
Network Connectivity	217

Initial Configuration of the Cisco 340 and	
350 Series AP	219
IP Setup Utility	220
Terminal Emulator Setup	221
Web-Based Configuration of the Cisco 340	
and 350 Series APs	223
Configuring the Cisco 340 and	
350 Series APs	223
Configuring the Web Interface	224
Configuring a Name Server	224
The Radio Hardware Setting	224
The AP Radio Port Status Screen	227
Setting the Time	227
User Accounts	228
Setting the WEP Key	229
Accounting Setup	232
Hot Standby	233
Publicly Secure Packet Forwarding	233
Troubleshooting the Cisco 340 and	
350 Series APs	234
Web-Based Configuration of the Cisco 340	
BSE/BSM Series AP	241
Configuring the Cisco 340 BSE/BSM	
Series AP	242
Troubleshooting the Cisco 340	
BSE/BSM Series AP	246
Summary	247
Solutions Fast Track	248
Frequently Asked Questions	249
Chapter 6 Installation and Configuration	
of Cisco Aironet Bridges	253
Introduction	254
Understanding the Role of	
Traditional Network Bridges	254
Types of Network Bridges	256

#### Comparing Traditional Bridges with Wireless Bridges

e,

6

Cisco Aironet 340 and 350 wireless bridges can be used in one of three modes:

- Wireless bridge between two wired network segments (point-to-point)
- Wireless bridge between three or more wired network segments (point-tomultipoint)
- Wireless bridge used as a repeater (repeater)

Comparing Traditional Bridges with	
Wireless Bridges	259
Cisco Aironet Wireless Bridge—	
Point to Point	260
Cisco Aironet Wireless Bridge—	
Point-to-Multipoint	261
Cisco Wireless Bridge—Repeater	261
Installation of the Cisco Aironet Bridge Unit	262
Installing the Antenna	263
DSSS (Direct Sequence Spread Spectrum)	263
Configuring the Network Port	265
Configuring the Console Port	266
Applying Power	267
Working with Root and Non-Root	
Modes on a Wireless Bridge	267
Overview of the Spanning Tree Protocol	269
Initial Setup of the Cisco Aironet Wireless Bridge	273
Configuring the Bridge Using	
the Command-Line Interface	273
Configuring the Bridge Using the	
Command Menus	273
General Configuration Recommendations	
and Notes	275
Performing the Initial Configuration	275
Assigning the Radio Parameters	276
Assigning IP Information	277
Operational Configuration of the	
Cisco Aironet Wireless Bridge	279
Console Access	279
Telnet Access	279
Web Browser Access	280
Using the Cisco Aironet Wireless Bridge	
Radio Main Menu	281
Configuring the Basic Rates Option	282
Configuring the Frequency Option	282
Configuring the IEEE 802.11 Options	282

Configuring the LinkTests Options	288
Configuring the Extended Options	288
Configuring the Ethernet Port	292
Configuring the Network Identifiers	292
Console Management Access	294
Configuring Passwords	294
Configuring Privileges	295
SNMP Support	295
Configuring the Time Service	296
Setting Up Association Tables	297
Using Filters	300
Configuring the Multicast Option	300
Configuring the Node Option	301
Configuring the Protocols Option	302
Event Logging	303
Viewing Statistics	305
Throughput Option	306
Radio Option	306
Ethernet Option	307
Status Option	308
Map Option	308
Watch Option	308
History Option	308
Node Option	308
ARP Option	309
Display Time Option	309
Ipadr Option	309
Cisco Aironet Wireless Bridge Troubleshooting	309
Network Menu Option	310
Connect Option	310
Escape Option	310
Find Option	311
Ping Option	311
Linktest Menu Options	311
Restart Option	314
Default and Reset Options	314

### Client Adapter Auto Installer



A DOS-based Solution of the safeguard of the safeguard of the safeguard of the INI or TXT configuration file. The utility encrypts the file by using a scrambling algorithm that can be decrypted by the Auto Installer. The utility is called EncryptIni.exe: Cisc

- 1. Select Start | Run.
- 2. In the Open prompt, type **Command** and press **Enter**.
- 3. Using the DOS commands, navigate to the directory where the Encryptlni.exe and the configuration files are located.
- 4. Type Encryptlni.exe <configuration file name>.

Loading Firmware and Configurations	314
Xmodem and Crc-xmodem	315
FTP—File Transfer Protocol	315
Distribute	317
BOOTP and DHCP	318
Class	318
Backing Up Wireless Bridge Configurations	318
Summary	320
Solutions Fast Track	323
Frequently Asked Questions	327
Chapter 7 Installation and Configuration	
of Cisco Wireless Network Cards	329
Introduction	330
Cisco Aironet Client Adapter Types	331
Comparing the Cisco Aironet 340 and	
350 Series Wireless LAN Adapters	331
Cisco Aironet Client Utility (ACU)	333
Installing and Configuring the	
Cisco Aironet LAN Adapter Card	334
Installing the Cisco ACU	335
Cisco Aironet Client Profile Manager	336
Creating a New Aironet Client Profile	337
Using an Existing Aironet Client Profile	337
Modifying an Existing Aironet Client	
Profile	338
Reconfiguring Profiles with the	
Default Aironet Client Profile Values	338
Renaming Profiles Stored within	
the ACU	338
Deleting Profiles Stored within	
the ACU	338
Importing Profiles to the ACU	338
Exporting Profiles from the ACU	339
Restricting Profile Access to	
Administrative Users	339

Cisco Aironet Client Installation and	
Configuration	340
Configuring the Cisco Aironet	
Client System Parameter	341
Setting the Client Name	341
Setting the SSID	341
Setting Power Save Mode	342
Setting the Network Type	342
Cisco Aironet Client RF Network	
Configuration	343
Configuring the Data Rate	344
Choosing Radio Headers	345
Setting World Mode	345
Selecting the Power Level	345
Setting the Data Retries Value	346
Selecting Maximum Packet Size	346
Configuring the Cisco Aironet	
Client: Advanced (Infrastructure)	346
Antenna Mode (Receive)/Antenna	
Mode (Transmit)	347
Specified AP	348
RTS Threshold	348
RTS Retry Limit	348
Cisco Aironet Client Advanced Ad Hoc	
Configuration	348
Antenna Mode (Receive)/Antenna	
Mode (Transmit)	349
RTS Threshold	350
RTS Retry Limit	350
Wake Duration (Kms)	350
Beacon Period (Kms)	351
Cisco Aironet Client Network Security	
Configuration	351
Setting the Security Parameters	352
Allow Association to Mixed Cells	353
Client Adapter Auto Installer	353

#### **Designing &** Planning... ----

6

#### **Preventing Dictionary Attacks Using EAP**

e,

EAP was designed to support extended authentication. When you implement EAP, you can avoid dictionary attacks by using nonpassword-based schemes such as biometrics, certificates, OTP, smart cards, and token cards.

You should be sure that if you are using password-based schemes that they use some form of mutual authentication so that they are more protected against dictionary attacks.

Using the Auto Installer	354
Installation Configuration File Field	
Definition	354
Client Adapter Diagnostics	357
Configuring ACU Diagnostics Preferences	357
Displaying the Current Status	358
Displaying the Operational Statistics	358
Displaying the Link Status Meter	361
Signal Strength Indicator	362
Signal Quality Indicator	362
Signal Status Line	362
Performing a Radio Frequency Link Test	362
Client Adapter Indicator LEDs	364
LED Display Patterns	364
Summary	367
Solutions Fast Track	369
Frequently Asked Questions	372
Chapter 8 Cisco Wireless Security	375
Chapter 8 Cisco Wireless Security Introduction	<b>375</b> 376
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals	<b>375</b> 376
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection	<ul><li><b>375</b></li><li>376</li><li>377</li></ul>
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality	<ul> <li><b>375</b></li> <li>376</li> <li>377</li> <li>377</li> </ul>
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity	<ul> <li><b>375</b></li> <li>376</li> <li>377</li> <li>377</li> <li>379</li> </ul>
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability	<b>375</b> 376 377 377 379 380
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Privacy	<ul> <li><b>375</b></li> <li>376</li> <li>377</li> <li>377</li> <li>379</li> <li>380</li> <li>381</li> </ul>
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Privacy Ensuring Authentication	<ul> <li><b>375</b></li> <li>376</li> <li>377</li> <li>377</li> <li>379</li> <li>380</li> <li>381</li> <li>381</li> </ul>
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP)	<b>375</b> 376 377 377 379 380 381 381 385
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard	<b>375</b> 376 377 377 380 381 381 385 389
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication	<b>375</b> 376 377 377 380 381 381 385 389 392
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication Cisco Light Extensible	<b>375</b> 376 377 377 380 381 381 385 389 392
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication Cisco Light Extensible Authentication Protocol (LEAP)	<b>375</b> 376 377 377 380 381 381 381 385 389 392 393
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication Cisco Light Extensible Authentication Protocol (LEAP) Configuration and Deployment of LEAP	<b>375</b> 376 377 377 380 381 381 385 389 392 393 395
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication Cisco Light Extensible Authentication Protocol (LEAP) Configuration and Deployment of LEAP Ensuring Authorization	<b>375</b> 376 377 377 380 381 381 385 389 392 393 395 396
Chapter 8 Cisco Wireless Security Introduction Understanding Security Fundamentals and Principles of Protection Ensuring Confidentiality Ensuring Integrity Ensuring Availability Ensuring Availability Ensuring Privacy Ensuring Authentication Extensible Authentication Protocol (EAP) An Introduction to the 802.1x Standard Per-Packet Authentication Cisco Light Extensible Authentication Protocol (LEAP) Configuration and Deployment of LEAP Ensuring Authorization MAC Filtering	<b>375</b> 376 377 377 380 381 381 385 389 392 393 395 396 398

Where in the Authentication/Association	
Process Does MAC Filtering Occur?	399
Determining MAC Filtering Is Enabled	400
MAC Spoofing	400
Ensuring Non-Repudiation	401
Accounting and Audit Trails	404
Using Encryption	405
Encrypting Voice Data	406
Encrypting Data Systems	407
Reviewing the Role of Policy	407
Identifying Resources	409
Understanding Classification Criteria	411
Implementing Policy	412
Addressing the Issues with Policy	415
Implementing WEP	417
Defining WEP	417
Creating Privacy with WEP	418
The WEP Authentication Process	419
WEP Benefits and Advantages	419
WEP Disadvantages	420
The Security Implications of Using WEP	420
Implementing WEP on the Cisco	
Aironet AP 340	420
Exploiting WEP	421
Security of 64-Bit versus 128-Bit Keys	422
Acquiring a WEP Key	422
Addressing Common Risks and Threats	423
Finding a Target	424
Finding Weaknesses in a Target	424
Exploiting Those Weaknesses	426
Sniffing, Interception, and Eavesdropping	427
Defining Sniffing	427
Sample Sniffing Tools	427
Sniffing Case Scenario	428
Protecting Against Sniffing and	
Eavesdropping	430

### Yagi Articulating Mount



Spoofing and Unauthorized Access	430
Defining Spoofing	430
Sample Spoofing Tools	431
Protecting Against Spoofing	
and Unauthorized Attacks	432
Network Hijacking and Modification	432
Defining Hijacking	432
Sample Hijacking Tools	434
Hijacking Case Scenario	434
Protection against Network	
Hijacking and Modification	434
Denial of Service and Flooding Attacks	435
Defining DoS and Flooding	435
Sample DoS Tools	436
DoS and Flooding Case Scenario	436
Protecting Against DoS and Flooding Attacks	437
Summary	438
Solutions Fast Track	439
Frequently Asked Questions	444
Frequently Asked Questions Chapter 9 Cisco Aironet Accessories	444 <b>447</b>
Frequently Asked Questions Chapter 9 Cisco Aironet Accessories Introduction	444 <b>447</b> 448
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories	444 <b>447</b> 448 449
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount	444 <b>447</b> 448 449 449
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount	444 <b>447</b> 448 449 449 450
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring	444 <b>447</b> 448 449 449 450 450
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories	444 <b>447</b> 448 449 449 450 450 452
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit	444 <b>447</b> 448 449 450 450 450 452 452
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit	444 <b>447</b> 448 449 449 450 450 452 452 454
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies	444 448 449 450 450 452 452 452 454 457
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies Access Point / Bridge Serial Cable	444 448 449 450 450 452 452 452 454 457 458
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies Access Point / Bridge Serial Cable NEMA Enclosures	444 448 449 450 450 452 452 452 454 457 458 460
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies Access Point / Bridge Serial Cable NEMA Enclosures Cabling, Connectors, and Bulkhead Extenders	444 448 449 450 450 452 452 452 454 457 458 460 462
Frequently Asked Questions <b>Chapter 9 Cisco Aironet Accessories</b> Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies Access Point / Bridge Serial Cable NEMA Enclosures Cabling, Connectors, and Bulkhead Extenders Cabling	444 448 449 450 450 452 452 452 454 457 458 460 462 463
Frequently Asked Questions  Chapter 9 Cisco Aironet Accessories Introduction Antenna Accessories Yagi Articulating Mount Magnetic Mount Lightning Arrestor with Grounding Ring Bridge and Access Point Accessories Bridge Mounting Kit Bridge Slide Mount Kit Access Point / Bridge Spare Power Supplies Access Point / Bridge Serial Cable NEMA Enclosures Cabling, Connectors, and Bulkhead Extenders Cabling RG-58 and RG-8 Cabling	444 448 449 450 450 452 452 452 454 457 458 460 462 463 464

Index	477
Frequently Asked Questions	475
Solutions Fast Track	473
Summary	472
Radio Country Options	469
Bulkhead Extenders	468
<b>RP-TNC</b> Connectors	467
Connectors	467