



# Your PDF Guides

You can read the recommendations in the user guide, the technical guide or the installation guide for ZYXEL NWA3160-N. You'll find the answers to all your questions on the ZYXEL NWA3160-N in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

User manual ZYXEL NWA3160-N  
User guide ZYXEL NWA3160-N  
Operating instructions ZYXEL NWA3160-N  
Instructions for use ZYXEL NWA3160-N  
Instruction manual ZYXEL NWA3160-N

## NWA3000-N Series

*Wireless N Business WLAN 3000 Series Access Point*

### User's Guide

#### Default Login Details

IP Address	https://192.168.1.2
User Name	admin
Password	1234

Version 2.23  
Edition 1, 1/2011

[www.zyxel.com](http://www.zyxel.com)

# ZyXEL

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**Manual abstract:**

@@Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you! The Technical Writing Team, ZyXEL Communications Corp., 6 Innovation Road II, Science-Based Industrial Park, Hsinchu, 300, Taiwan. E-mail: techwriters@zyxel.com.tw NWA3000-N Series User's Guide 3 Document Conventions Document Conventions Warnings and Notes These are how warnings and notes are shown in this User's Guide. Warnings tell you about things that could harm you or your device. Note: Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations. Syntax Conventions • The product in this book may be referred to as the "NWA3000-N series AP", the "device", the "AP", or the "system" in this User's Guide. • Product labels, screen names, field labels and field choices are all in bold font.

• A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the "enter" or "return" key on your keyboard. • "Enter" means for you to type one or more characters and then press the [ENTER] key. "Select" or "choose" means for you to use one of the predefined choices. • A right angle bracket ( > ) within a screen name denotes a mouse click. For example, Maintenance > Status > Show Statistics means you first click Maintenance in the navigation panel, then the Status sub menu and finally the Show Statistics button to get to that screen.

• Units of measurement may denote the "metric" value or the "scientific" value. For example, "k" for kilo may denote "1000" or "1024", "M" for mega may denote "1000000" or "1048576" and so on. • "e.g.," is a shorthand for "for instance", and "i.

e.," means "that is" or "in other words". • Screens reproduced here for demonstration purposes may not exactly match the screens on your device. 4 NWA3000-N Series User's Guide Document Conventions Icons Used in Figures Figures in this User's Guide may use the following generic icons. The NWA3000-N series AP icon is not an exact representation of your device. NWA3000-N series AP Computer Notebook computer Server Printer Firewall Telephone Switch Router NWA3000-N Series User's Guide 5 Safety Warnings Safety Warnings • Do NOT use this product near water, for example, in a wet basement or near a swimming pool. • Do NOT expose your device to dampness, dust or corrosive liquids. • Do NOT store things on the device. • Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.

• Connect ONLY suitable accessories to the device. • ONLY qualified service personnel should service or disassemble this device. • Make sure to connect the cables to the correct ports. • Place connecting cables carefully so that no one will step on them or stumble over them. • Always disconnect all cables from this device before servicing or disassembling. • Use ONLY an appropriate power adaptor or cord for your device. • Connect the power adaptor or cord to the right supply voltage (for example, 110V AC in North America or 230V AC in Europe). • Do NOT allow anything to rest on the power adaptor or cord and do NOT place the product where anyone can walk on the power adaptor or cord. • Do NOT use the device if the power adaptor or cord is damaged as it might cause electrocution. • If the power adaptor or cord is damaged, remove it from the power outlet.

• Do NOT attempt to repair the power adaptor or cord. Contact your local vendor to order a new one. • Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning. • "Not to remove the plug and plug into a wall outlet by itself; always attach the plug to the power supply first before insert into the wall.

" • (In other words, do NOT remove the plug and connect it to a power outlet by itself; always attach the plug to the power adaptor first before connecting it to a power outlet.) • Antenna Warning! This device meets ETSI and FCC certification requirements when using the included antenna(s). Only use the included antenna(s). • If you wall mount your device, make sure that no electrical lines, gas or water pipes will be damaged. • The PoE (Power over Ethernet) devices that supply or receive power and their connected Ethernet cables must all be completely indoors.

• The indoors versions of this product are for indoor use only (utilisation intérieure exclusivement). This product is recyclable. Dispose of it properly. 6 NWA3000-N Series User's Guide Table of Contents Table of Contents About This User's Guide .....

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.....

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.....

..... 3 Document Conventions.

.....

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.....

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.....  
.....  
.....  
..... 4 Safety Warnings...

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 6 Table of Contents...

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 7 Part I: User's Guide.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

15 Chapter 1 Introduction .....

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*17 1.1 Overview .....*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*..... 17 1.2 Applications for the NWA3000-N series AP ...*

.....  
.....  
.....  
.....

.....  
.....  
.....

*18 1.2.1 Bridge / Repeater ...*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*..... 18 1.2.2 AP + Bridge ...*

.....  
.....  
.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... 22 1.

2.3 MBSSID .....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

... 22 1.3 Management Mode .

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... 23 1.

4 Ways to Manage the NWA3000-N series AP .....

.....

.....

.....

.....

.....

.....

.....

24 1.5 Good Habits for Managing the NWA3000-N series AP .....

.....  
.....  
.....  
.....

*. 25 1.6 Hardware Connections ...*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*. 26 1.7 LEDs .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*8 Starting and Stopping the NWA3000-N series AP .....*

.....  
.....  
.....  
.....

.....  
.....

*... 29 Chapter 2 The Web Configurator ..*

.....  
.....  
.....  
.....

.....  
.....



.....  
.....  
.. 33 2.3.1 Title Bar .  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.. 34 2.3.2 Navigation Panel .  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

... 34 2.3.3 Warning Messages .....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
. 38 2.3.4 Site Map ..  
.....

.....  
.....  
.....

.....  
.....  
.....



.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*38 2.3.5 Object Reference ...*

.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*38 2.3.6 Tables and Lists .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*.. 44 Chapter 3 Configuration Basics...*

.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*..... 49 NWA3000-N Series User's Guide 7 Table of Contents 3.1 Overview ..*

.....  
.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....  
... 49 3.

*2 Object-based Configuration .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*.. 49 3.3 Feature Configuration Overview .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*... 49 3.3.1 Feature .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....  
.....  
.....  
.... 50 3.3.2 MGNT Mode ....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.. 50 3.3.3 LAN Setting .

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.. 50 3.3.4 Wireless ..

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
50 3.3.5 Device HA ...

.....  
.....

.....  
.....



.....  
.....  
.....

.....  
.....  
... 52 3.4.  
*3 MON Profile .....*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
*.. 52 3.5 System ..*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*.. 52 3.5.1 WWW, SSH, TELNET, FTP, SNMP, and Auth. Server .....*

.....  
.....  
.....

*.. 52 3.5.2 Logs and Reports .*

.....  
.....

.....  
.....  
.....

.....



.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*. 55 4.1 Sample Network Setup .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*..... 55 4.1.1 Set the Management Modes ..*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*.... 56 4.1.2 Set the LAN IP Address and Management VLAN (vlan99) ....*

.....

.....

.....

.....

.....

*. 57 4.1.3 Set Up Wireless User Authentication ..*

.....

.....

.....

.....

.....

.....  
.....  
.....  
.....

. 58 4.1.4 Create the AP Profiles (staff, guest) .....

.....  
.....  
.....

. 103 7.2 About CAPWAP ...

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 103 7.2.1 CAPWAP Discovery and Management ...

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

104 7.2.2 Managed AP Finds the Controller ...

.....

.....  
.....  
.....

.....  
.....  
.....

... 104 7.2.3 CAPWAP and IP Subnets .....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....



.....

.....

*... 104 7.2.4 Notes on CAPWAP .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*... 105 7.3 The Management Mode Screen .*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*.. 105 Chapter 8 LAN Setting ...*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*107 8.1 LAN Setting Overview ....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....  
.....  
.....  
..... 107 8.

*1.1 What You Can Do in this Chapter .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*.. 107 8.1.2 What You Need to Know .*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*.... 107 8.  
2 LAN Setting .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*.... 108 8.  
2.1 Add or Edit a DNS Setting .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....

.....  
...110 Chapter 9 Wireless .

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... 111 9.1 Overview .

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

...111 9.1.1 What You Can Do in this Chapter ....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

...111 9.1.2 What You Need to Know .....

.....

.....

.....

.....

.....

.....

.....

.....  
.....  
.....  
.....  
.....  
.....  
*.....111 9.2 Controller.*



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.....  
.....  
.....  
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.....  
.....  
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.....  
.....

*.112 9.3 AP Management .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*.....113 NWA3000-N Series User's Guide 9 Table of Contents 9.3.1 Edit AP List ...*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*...115 9.4 MON Mode .*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*116 9.4.1 Add/Edit Rogue/Friendly List .....*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*..118 9.5 Load Balancing ..*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*...119 9.5.*

*1 Disassociating and Delaying Connections .....*

.....  
.....  
.....

.....  
.....

*... 120 9.6 DCS .*

.....  
.....  
.....

.....  
.....

.....  
.....  
.....  
.....  
.....

..... 122 9.

*7 Technical Reference .....*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....

*. 124 Chapter 10 Device HA ....*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*. 127 10.1 Overview .....*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.... 127 10.1.1 What You Can Do in this Chapter ....

.....  
.....  
.....

.....  
.....  
.....

.....  
127 10.1.2 What You Need to Know ...

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
128 10.1.3 Before You Begin ...

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

. 128 10.2 Device HA General .....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 129 10.3 Active-Passive Mode .



.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*.. 131 10.3.1 Edit Monitored Interface .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*... 134 10.4 Technical Reference .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*..... 135 Chapter 11 User ..*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....  
.....  
*.. 137 11.1 Overview .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*..... 137 11.1.1 What You Can Do in this Chapter ...*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*.....  
.. 137 11.1.2 What You Need To Know .*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*.....  
.. 137 11.2 User Summary ..*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... 138 11.2.1 Add/Edit User ..

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

... 139 11.3 Setting .....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

..... 141 11.

3.1 Edit User Authentication Timeout Settings .....

.....  
.....  
.....

.....  
.....  
.....  
.....

.. 144 Chapter 12 AP Profile.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....



.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*.. 149 12.2.1 Add/Edit Radio Profile .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*..... 150 12.3 SSID ...*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*..... 154 12.  
3.1 SSID List .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*..... 154 12.3.*



.....  
.....  
.....  
.....

*.. 165 13.1.1 What You Can Do in this Chapter .*

.....  
.....  
.....  
.....  
.....  
.....  
.....

*... 165 13.1.2 What You Need To Know .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*.. 165 13.2 MON Profile .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*166 13.2.1 Add/Edit MON Profile .....*

.....  
.....  
.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... 167 13.3 Technical Reference ....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

168 Chapter 14 Certificates .....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

. 171 14.1 Overview .....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

.... 171 14.1.1 What You Can Do in this Chapter ....

.....  
.....



.....  
.....

.....  
.....  
.....  
.....

.....  
*171 14.1.2 What You Need to Know ...*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
*171 14.1.3 Verifying a Certificate ...*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*173 14.2 My Certificates ....*

.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... *175 14.2.*

*1 Add My Certificates ....*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

*. 177 14.2.2 Edit My Certificates ..*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*.... 181 14.2.3 Import Certificates ....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*... 184 14.3 Trusted Certificates .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*185 14.3.1 Edit Trusted Certificates .....*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....

*. 187 14.3.2 Import Trusted Certificates .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*... 190 14.4 Technical Reference .*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*... 191 Chapter 15 System .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*... 193 15.1 Overview .*

.....  
.....

.....  
.....  
.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*.. 193 15.1.1 What You Can Do in this Chapter ..*

.....

.....

.....

.....

.....

.....

.....

.....

*.. 193 15.2 Host Name .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*.. 194 15.3 Date and Time .....*

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

*..... 194 15.3.1 Pre-defined NTP Time Servers List ...*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... 197 15.

*3.2 Time Server Synchronization ....*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

*.. 198 15.4 Console Speed .....*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*..... 199 15.5 WWW Overview ....*

.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*. 200 15.5.1 Service Access Limitations ..*

.....  
.....  
.....

.....  
.....  
.....  
.....  
.....

*.. 200 15.5.2 System Timeout .*

.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*..... 200 15.5.3 HTTPS ...*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*.. 200 15.5.4 Configuring WWW Service Control .....*

.....  
.....  
.....

.....  
.....  
.....

*..... 201 15.5.5 HTTPS Example ..*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

... 203 15.6 SSH .

.....  
.....  
.....  
.....

.....  
.....  
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.....  
.....  
.....

.....  
.....  
.....

..... 209 15.6.1 How SSH Works ...

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 210 15.6.2 SSH Implementation on the NWA3000-N series AP .

.....  
.....

.....  
.....  
.....

.....211 15.6.3 Requirements for Using SSH ..

.....  
.....  
.....

.....  
.....  
.....

.....





.....  
.....  
.....  
.....  
.....  
..... 215 15.9 SNMP ..

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

... 217 15.9.1 Supported MIBs .....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

. 218 15.9.2 SNMP Traps ..

.....

.....  
.....  
.....  
.....

.....  
.....  
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.....

.....  
.....  
.....  
.....

..... 218 15.9.3 Configuring SNMP ...

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

.... 219 15.  
*9.4 Adding or Editing an SNMPv3 User Profile ....*

.....  
.....  
.....  
.....

.....  
.....

*. 220 15.10 Internal RADIUS Server ...*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*... 221 15.10.1 Configuring the Internal RADIUS Server .....*

.....  
.....  
.....  
.....

.....  
.....  
.....

*..... 222 15.10.2 Adding or Editing a Trusted AP Profile .*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*.... 224 15.11 Technical Reference .....*

.....  
.....  
.....  
.....  
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.....  
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.....

.....  
.....

*.. 225 Chapter 16 Log and Report ...*

.....  
.....  
.....

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.....  
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.....  
.....  
.....

.....

*... 227 16.1 Overview .*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*. 227 16.1.1 What You Can Do In this Chapter ..*

.....  
.....  
.....

.....  
.....  
.....

*.. 227 16.2 Email Daily Report .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*227 16.3 Log Setting .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*... 229 16.3.*

*1 Log Setting Summary .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

*... 230 16.3.2 Edit Log Settings .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*... 232 16.3.3 Edit Remote Server .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*. 236 16.3.4 Active Log Summary ..*

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*. 238 Chapter 17 File Manager ....*

.....

.....  
.....  
.....  
.....

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.....  
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.....  
.....  
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.....

*. 241 17.1 Overview ...*

.....

.....  
.....  
.....  
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.....

.....  
.....  
.....

.....

.....

.....

.... 241 17.

*1.1 What You Can Do in this Chapter .....*

.....

.....

.....

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.....

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.....

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.... 241 17.1.2 What you Need to Know ...

.....

.....

.....

.....

.....

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.....

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.... 241 17.2 Configuration File ....

.....

.....

.....

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.....

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.....

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.....

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.... 243 17.3 Firmware Package .....

.....

.....

.....

.....

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.....

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.....

.....

.....

.....  
. 248 17.4 Shell Script ...

.....  
.....

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.....  
.....  
.....

.....  
.....  
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.....

.....  
.....  
.....  
.....

..... 249 Chapter 18 Diagnostics.

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
. 253 18.1 Overview ...

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.... 253 18.

1.1 What You Can Do in this Chapter ....

.....  
.....  
.....

.....  
.....  
.....  
.....  
.....

*253 18.2 Diagnostics .....*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*..... 253 18.3 Packet Capture .*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*254 18.3.1 Packet Capture Files .....*

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*..... 256 18.3.2 Example of Viewing a Packet Capture File ...*

.....  
.....  
.....



.....  
.....  
.....  
..... 257 18.4 Wireless Frame Capture ..

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 258 18.4.1 Wireless Frame Capture Files ...

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... 261 12 NWA3000-N Series User's Guide Table of Contents Chapter 19 Reboot....

.....  
.....  
.....

.....  
.....  
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.....  
.....

.....  
.....  
.....

..... 263 19.1 Overview .

.....  
.....  
.....

.....  
.....  
.....

.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
*. 263 19.1.1 What You Need To Know ..*

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
*263 19.2 Reboot ....*

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
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.....  
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.....  
*. 263 Chapter 20 Shutdown....*

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*. 265 20.1 Overview ...*

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.....

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.... 265 20.

*1.1 What You Need To Know .....*

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... 265 20.2 Shutdown .

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*265 Chapter 21 Troubleshooting.....*

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*. 267 21.1 Overview ...*

.....  
.....  
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.....

*.... 267 21.*

*2 Power, Hardware Connections, and LEDs .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*267 21.3 NWA3000-N series AP Access and Login .....*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....

*.. 268 21.4 Internet Access ..*

.....  
.....

.....  
.....  
.....  
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.....  
.....  
.....  
.....

.....  
.....

.....  
.....  
..... 270 21.5 Wireless AP Troubleshooting ....

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

..... 272 21.6 Resetting the NWA3000-N series AP ...

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

..... 277 21.7 Getting More Troubleshooting Help ....

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

.. 278 Chapter 22 Product Specifications ...

.....  
.....  
.....  
.....  
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.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

.. 279 22.1 Wall-Mounting Instructions .....

.....  
.....  
.....

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

..... 282 *Appendix A Log Descriptions* ...

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

.. 285 *Appendix B Importing Certificates* ...

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

305 *Appendix C Wireless LANs* .....

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

... 319 *Appendix D Open Software Announcements* ..

.....  
.....  
.....  
.....  
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When WDS security is enabled, both APs must use the same pre-shared key. Once the security settings of peer sides match one another, the connection between devices is made. 18 NWA3000-N Series User's Guide Chapter 1 Introduction At the time of writing, WDS security is compatible with other ZyXEL access points only. Refer to your other access point's documentation for details. Figure 1 Bridge Application Figure 2 Repeater Application NWA3000-N Series User's Guide 19 Chapter 1 Introduction 1.

2.1.1 Bridge / Repeater Mode Example In the example below, when both NWA3000-N series APs are in Bridge/Repeater mode, they form a WDS (Wireless Distribution System) allowing the computers in LAN 1 to connect to the computers in LAN 2. Figure 3 Bridging Example Be careful to avoid bridge loops when you enable bridging in the NWA3000-N series AP. Bridge loops cause broadcast traffic to circle the network endlessly, resulting in possible throughput degradation and disruption of communications. The following examples show two network topologies that can lead to this problem: 20 NWA3000-N Series User's Guide Chapter 1 Introduction • If two or more NWA3000-N series APs (in bridge mode) are connected to the same hub. Figure 4 Bridge Loop: Two Bridges Connected to Hub • If your NWA3000-N series AP (in bridge mode) is connected to a wired LAN while communicating with another wireless bridge that is also connected to the same wired LAN. Figure 5 Bridge Loop: Bridge Connected to Wired LAN To prevent bridge loops, ensure that you enable Spanning Tree Protocol (STP) in the Wireless screen or your NWA3000-N series AP is not set to bridge mode while connected to both wired and wireless segments of the same LAN. NWA3000-N Series User's Guide 21 Chapter 1 Introduction 1.2.

2 AP + Bridge In AP + Bridge mode, the NWA3000-N series AP supports both AP and bridge connection at the same time. In the figure below, A and B use X as an AP to access the wired network, while X and Y communicate in bridge mode. When the NWA3000-N series AP is in AP + Bridge mode, security between APs (WDS) is independent of the security between the wireless stations and the AP. If you do not enable WDS security, traffic between APs is not encrypted.

When WDS security is enabled, both APs must use the same pre-shared key. Unless specified, the term "security settings" refers to the traffic between the wireless stations and the NWA3000-N series AP. Figure 6 AP + Bridge Application Y X A B 1.2.3 MBSSID A Basic Service Set (BSS) is the set of devices forming a single wireless network (usually an access point and one or more wireless clients). The Service Set Identifier (SSID) is the name of a BSS. In Multiple BSS (MBSSID) mode, the 22 NWA3000-N Series User's Guide Chapter 1 Introduction NWA3000-N series AP provides multiple virtual APs, each forming its own BSS and using its own individual SSID profile. You can assign different wireless and security settings to each SSID profile. This allows you to compartmentalize groups of users, set varying access privileges, and prioritize network traffic to and from certain BSSs. To the wireless clients in the network, each SSID appears to be a different access point. As in any wireless network, clients can associate only with the SSIDs for which they have the correct security settings.

See Section 4.1 on page 55 for an example of using MBSS. 1.3 Management Mode One NWA3000-N series AP uses Control And Provisioning of Wireless Access Points (CAPWAP, see RFC 5415) to allow one AP to configure and manage up to 24 others. This centralized management can greatly reduce the effort of setting up and maintaining multiple devices.

An NWA3000-N series AP in this group (ZLD-based models) can manage other APs in this group1. • NWA3160-N • NWA3550-N • NWA3560-N It can also use legacy device information hyper-links to connect to the Web Configurators of the following ZyNOS-based NWA-3000 series APs: • NWA-3160 • NWA-3163 • NWA-3500 • NWA-3550 • NWA-3166 1. Not all of these models were available at the time of writing. NWA3000-N Series User's Guide 23 Chapter 1 Introduction The following figure illustrates a CAPWAP wireless network. The user (U) configures the controller AP (C), which then automatically updates the configurations of the managed APs (M1 ~ M4). Figure 7 CAPWAP Network Example U C M1 M2 M3 M4 1.4 Ways to Manage the NWA3000-N series AP You can use the following ways to manage the NWA3000-N series AP. Web Configurator The Web Configurator allows easy NWA3000-N series AP setup and management using an Internet browser. This User's Guide provides information about the Web Configurator. Command-Line Interface (CLI) The CLI allows you to use text-based commands to configure the NWA3000-N series AP.

You can access it using remote management (for example, SSH or Telnet) or via the console port. See the Command Reference Guide for more information.

24 NWA3000-N Series User's Guide Chapter 1 Introduction Console Port You can use the console port to manage the NWA3000-N series AP using CLI commands. See the Command Reference Guide for more information about the CLI. The default settings for the console port are as follows. Table 1 Console Port Default Settings SETTING Speed Data Bits Parity Stop Bit Flow Control VALUE 115200 bps 8 None 1 Off File Transfer Protocol (FTP) This protocol can be used for firmware upgrades and configuration backup and restore. Simple Network Management Protocol (SNMP) The NWA3000-N series AP can be monitored by an SNMP manager. See the SNMP chapter in this User's Guide. Controller Set one NWA3000-N series AP to be a controller and set other NWA3000-N series APs to be managed by it. 1.

5 Good Habits for Managing the NWA3000-N series AP Do the following things regularly to make the NWA3000-N series AP more secure and to manage it more effectively. • Change the password often. Use a password that's not easy to guess and that consists of different types of characters, such as numbers and letters. • Write down the password and put it in a safe place. NWA3000-N Series User's Guide 25 Chapter 1 Introduction • Back up the configuration (and make sure you know how to restore it).

Restoring an earlier working configuration may be useful if the device becomes unstable or even crashes. If you forget your password, you will have to reset the NWA3000-N series AP to its factory default settings. If you backed up an earlier configuration file, you won't have to totally re-configure the NWA3000-N series AP; you can simply restore your last configuration. 1.6 Hardware Connections See your Quick Start Guide for information on making hardware connections.

26 NWA3000-N Series User's Guide Chapter 1 Introduction 1.7 LEDs The following are the LED descriptions for your NWA3000-N series AP. Figure 8 LEDs Table 2 LEDs LABEL WLAN COLOR Green STATUS On Blinking DESCRIPTION The wireless LAN is active.



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The wireless LAN is active, and transmitting or receiving data. The wireless LAN is not active. Off NWA3000-N Series User's Guide 27 Chapter 1 Introduction Table 2 LEDs (continued) LABEL ETHERNET COLOR Green STATUS On Blinking DESCRIPTION The NWA3000-N series AP has a 10/100 Mbps Ethernet connection. The NWA3000-N series AP has a 10/100 Mbps Ethernet connection and is sending or receiving data. The NWA3000-N series AP has a 1000 Mbps Ethernet connection. The NWA3000-N series AP has a 1000 Mbps Ethernet connection and is sending/receiving data. The NWA3000-N series AP does not have an Ethernet connection.

The NWA3000-N series AP is receiving power and functioning properly. The NWA3000-N series AP is not receiving power. Either • or • If the LED blinks after the boot up process, the system has failed. If the LED blinks during the boot up process, the system is starting up. Yellow On Blinking Off POWER/SYS Green On Off Red Blinking Off The NWA3000-N series AP successfully boots up. 28 NWA3000-N Series User's Guide Chapter 1 Introduction 1.8 Starting and Stopping the NWA3000-N series AP Here are some of the ways to start and stop the NWA3000-N series AP. Always use Maintenance > Shutdown or the shutdown command before you turn off the NWA3000-N series AP or remove the power. Not doing so can cause the firmware to become corrupt. Table 3 Starting and Stopping the NWA3000-N series AP METHOD Turning on the power Rebooting the NWA3000-N series AP DESCRIPTION A cold start occurs when you turn on the power to the NWA3000-N series AP.

The NWA3000-N series AP powers up, checks the hardware, and starts the system processes. A warm start (without powering down and powering up again) occurs when you use the Reboot button in the Reboot screen or when you use the reboot command. The NWA3000-N series AP writes all cached data to the local storage, stops the system processes, and then does a warm start. If you press the RESET button, the NWA3000-N series AP sets the configuration to its default values and then reboots. Clicking Maintenance > Shutdown > Shutdown or using the shutdown command writes all cached data to the local storage and stops the system processes.

Wait for the device to shut down and then manually turn off or remove the power. It does not turn off the power. Power off occurs when you turn off the power to the NWA3000-N series AP. The NWA3000-N series AP simply turns off. It does not stop the system processes or write cached data to local storage.

Using the RESET button Clicking Maintenance > Shutdown > Shutdown or using the shutdown command Disconnecting the power The NWA3000-N series AP does not stop or start the system processes when you apply configuration files or run shell scripts although you may temporarily lose access to network resources. NWA3000-N Series User's Guide 29 Chapter 1 Introduction 30 NWA3000-N Series User's Guide CHAPTER 2.1 Overview 2 The Web Configurator

The NWA3000-N series AP Web Configurator allows easy management using an Internet browser. In order to use the Web Configurator, you must: • Use Internet Explorer 7.0 and later or Firefox 1.5 and later • Allow pop-up windows • Enable JavaScript (enabled by default) • Enable Java permissions (enabled by default) • Enable cookies The recommended screen resolution is 1024 x 768 pixels and higher. NWA3000-N Series User's Guide 31 Chapter 2 The Web Configurator 2.2 Access 1 Make sure your NWA3000-N series AP hardware is properly connected. See the Quick Start Guide. Browse to <https://192>.

168.1.2. The Login screen appears. 2 3 4 Enter the user name (default: "admin") and password (default: "1234"). Click Login. If you logged in using the default user name and password, the Update Admin Info screen appears. Otherwise, the dashboard appears. This screen appears every time you log in using the default user name and default password. If you change the password for the default user account, this screen does not appear anymore.

32 NWA3000-N Series User's Guide Chapter 2 The Web Configurator 2.3 The Main Screen The Web Configurator's main screen is divided into these parts: Figure 9 The Web Configurator's Main Screen A B C • A - Title Bar • B - Navigation Panel • C - Main Window NWA3000-N Series User's Guide 33 Chapter 2 The Web Configurator 2.3.1 Title Bar The title bar provides some useful links that always appear over the screens below, regardless of how deep into the Web Configurator you navigate. Figure 10 Title Bar The icons provide the following functions.

Table 4 Title Bar: Web Configurator Icons LABEL Logout Help About Site Map Object Reference Console DESCRIPTION Click this to log out of the Web Configurator. Click this to open the help page for the current screen. Click this to display basic information about the NWA3000-N series AP. Click this to see an overview of links to the Web Configurator screens. Click this to open a screen where you can check which configuration items reference an object.

Click this to open the console in which you can use the command line interface (CLI). See the NWA3000-N series AP CLI Reference Guide for details. Click this to open a popup window that displays the CLI commands sent by the Web Configurator. CLI 2.3.2 Navigation Panel Use the menu items on the navigation panel to open screens to configure NWA3000-N series AP features. Click the arrow in the middle of the right edge of the navigation panel to hide the navigation panel menus or drag it to resize them. The following sections introduce the NWA3000-N series AP's navigation panel menus and their screens.

Figure 11 Navigation Panel 34 NWA3000-N Series User's Guide Chapter 2 The Web Configurator 2.3.

2.1 Dashboard The dashboard displays general device information, system status, system resource usage, and interface status in widgets that you can rearrange to suit your needs. For details on the Dashboard's features, see Chapter 5 on page 75. 2.3.2.2 Monitor Menu The monitor menu screens display status and statistics information. Table 5 Monitor Menu Screens Summary FOLDER OR LINK LAN Status Wireless AP Info Radio List AP List Displays information about the radios of the connected APs. Displays which APs are currently connected to the NWA3000-N series AP. This is available when the NWA3000-N series AP is in controller mode.

Displays information about the connected stations. Displays information about suspected rogue APs. Use these screens to connect to legacy NWA3000-N series AP 3000 APs. This is available when the NWA3000-N series AP is in controller mode. View Log View AP Log Displays log entries for the NWA3000-N series AP.

Displays logs for connected APs. TAB FUNCTION Displays general LAN interface information and packet statistics. Station Info Rogue AP Legacy Device Info Log 2.3.2.

3 Configuration Menu Use the configuration menu screens to configure the NWA3000-N series AP's features.



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*Table 6 Configuration Menu Screens Summary FOLDER OR LINK MGNT Mode TAB FUNCTION Set whether the NWA3000-N series AP is controlling other NWA3000-N series APs, working as a standalone AP, or being managed by another NWA3000-N series AP. Manage the LAN Ethernet interface including VLAN settings. LAN Setting Wireless NWA3000-N Series User's Guide 35 Chapter 2 The Web Configurator Table 6 Configuration Menu Screens Summary (continued) FOLDER OR LINK Controller TAB FUNCTION Configure how the NWA3000-N series AP handles APs that newly connect to the network. This is available when the NWA3000-N series AP is in controller mode. Edit wireless AP information, remove APs, and reboot them. Configure how the NWA3000-N series AP monitors for rogue APs. Configure load balancing for traffic moving to and from wireless clients. Configure dynamic wireless channel selection. AP Management MON Mode Load Balancing DCS Device HA General Configure device HA global settings, and see the status of each interface monitored by device HA.*

*Device HA is available when the NWA3000-N series AP is in controller mode. Configure active-passive mode device HA. Active-Passive Mode Object Users User Setting Create and manage users. Manage default settings for all users, general settings for user sessions, and rules to force user authentication. Create and manage wireless radio settings files that can be associated with different APs. Create and manage wireless SSID, security, and MAC filtering settings files that can be associated with different APs. Create and manage rogue AP monitoring files that can be associated with different APs. AP Profile Radio SSID MON Profile Certificate My Certificates Trusted Certificates System Host Name Date/Time Console Speed WWW SSH TELNET Create and manage the NWA3000-N series AP's certificates. Import and manage certificates from trusted sources. Configure the system and domain name for the NWA3000-N series AP.*

*Configure the current date, time, and time zone in the NWA3000-N series AP. Set the console speed. Configure HTTP, HTTPS, and general authentication. Configure SSH server and SSH service settings. Configure telnet server settings for the NWA3000 series AP.*

*36 NWA3000-N Series User's Guide Chapter 2 The Web Configurator Table 6 Configuration Menu Screens Summary (continued) FOLDER OR LINK FTP SNMP Auth. Server Log & Report Email Daily Report Log Setting Configure where and how to send daily reports and what reports to send. Configure the system log, e-mail logs, and remote syslog servers. TAB FUNCTION Configure FTP server settings. Configure SNMP communities and services.*

*Configure settings for the NWA3000-N series AP's built-in authentication server. 2.3.2.4 Maintenance Menu Use the maintenance menu screens to manage configuration and firmware files, run diagnostics, and reboot or shut down the NWA3000-N series AP. Table 7 Maintenance Menu Screens Summary FOLDER OR LINK File Manager TAB Configuration File Firmware Package Shell Script FUNCTION Manage and upload configuration files for the NWA3000-N series AP. View the current firmware version and to upload firmware. Manage and run shell script files for the NWA3000 series AP. Collect diagnostic information. Capture packets for analysis.*

*Capture wireless frames from APs for analysis. Restart the NWA3000-N series AP. Turn off the NWA3000-N series AP. Diagnostics Diagnostic Packet Capture Wireless Frame Capture Reboot Shutdown NWA3000-N Series User's Guide 37 Chapter 2 The Web Configurator 2.3.3 Warning Messages Warning messages, such as those resulting from misconfiguration, display in a popup window. Figure 12 Warning Message 2.3.4 Site Map Click Site MAP to see an overview of links to the Web Configurator screens. Click a screen's link to go to that screen.*

*Figure 13 Site Map 2.3.5 Object Reference Click Object Reference to open the Object Reference screen. Select the type of object and the individual object and click Refresh to show which configuration 38 NWA3000-N Series User's Guide Chapter 2 The Web Configurator settings reference the object. The following example shows which configuration settings reference the ldap-users user object (in this case the first firewall rule).*

*Figure 14 Object Reference The fields vary with the type of object. The following table describes labels that can appear in this screen. Table 8 Object References LABEL Object Name DESCRIPTION This identifies the object for which the configuration settings that use it are displayed. Click the object's name to display the object's configuration screen in the main window. This field is a sequential value, and it is not associated with any entry. This is the type of setting that references the selected object. Click a service's name to display the service's configuration screen in the main window. If it is applicable, this field lists the referencing configuration item's position in its list, otherwise N/A displays. This field identifies the configuration item that references the object. If the referencing configuration item has a description configured, it displays here. Click this to update the information in this screen. Click Cancel to close the screen. # Service Priority Name Description Refresh Cancel NWA3000-N Series User's Guide 39 Chapter 2 The Web Configurator 2.3.5.*

*1 CLI Messages Click CLI to look at the CLI commands sent by the Web Configurator. These commands appear in a popup window, such as the following. Figure 15 CLI Messages Click Clear to remove the currently displayed information. Note: See the Command Reference Guide for information about the commands. 2.3.5.2 Console The Console allows you to use CLI commands from directly within the Web Configurator rather than having to use a separate terminal program. In addition to logging in directly to the NWA3000-N series AP's CLI, you can also log into other devices on the network through this Console. It uses SSH to establish a connection.*

*40 NWA3000-N Series User's Guide Chapter 2 The Web Configurator Note: To view the functions in the Web Configurator user interface that correspond directly to specific NWA3000-N series AP CLI commands, use the CLI Messages window (see Section 2.3.5.1 on page 40) in tandem with this one. Figure 16 Console The following table describes the elements in this screen.*

*Table 9 Console LABEL Command Line DESCRIPTION Enter commands for the device that you are currently logged into here. If you are logged into the NWA3000-N series AP, see the CLI Reference Guide for details on using the command line to configure it. Device IP Address This is the IP address of the device that you are currently logged into. Logged-In User This displays the username of the account currently logged into the NWA3000-N series AP through the Console Window. Note: You can log into the Web Configurator with a different account than used to log into the NWA3000-N series AP through the Console.*

*NWA3000-N Series User's Guide 41 Chapter 2 The Web Configurator Table 9 Console (continued) LABEL Connection Status This displays the connection status of the account currently logged in.*



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If you are logged in and connected, then this displays 'Connected'. If you lose the connection, get disconnected, or logout, then this displays 'Not Connected'. Tx/RX Activity Monitor This displays the current upload / download activity. The faster and more frequently an LED flashes, the faster the data connection. DESCRIPTION Before you use the Console, ensure that: • Your web browser of choice allows pop-up windows from the IP address assigned to your NWA3000-N series AP. • Your web browser allows Java programs. • You are using the latest version of the Java program (<http://www.java.com>).

To login in through the Console: 1 Click the Console button on the Web Configurator title bar. 2 Enter the IP address of the NWA3000-N series AP and click OK. 42 NWA3000-N Series User's Guide Chapter 2 The Web Configurator Next, enter the User Name of the account being used to log into your target device and then click OK. 3 4 You may be prompted to authenticate your account password, depending on the type of device that you are logging into. Enter the password and click OK. 5 If your login is successful, the command line appears and the status bar at the bottom of the Console updates to reflect your connection state. NWA3000-N Series User's Guide 43 Chapter 2 The Web Configurator 2.3.6 Tables and Lists The Web Configurator tables and lists are quite flexible and provide several options for how to display their entries. 2.

3.6.1 Manipulating Table Display Here are some of the ways you can manipulate the Web Configurator tables. 1 Click a column heading to sort the table's entries according to that column's criteria. 2 Click the down arrow next to a column heading for more options about how to display the entries. The options available vary depending on the type of fields in the column. Here are some examples of what you can do: • Sort in ascending alphabetical order • Sort in descending (reverse) alphabetical order • Select which columns to display • Group entries by field • Show entries in groups • Filter by mathematical operators (<, >, or =) or searching for text. 44 NWA3000-N Series User's Guide Chapter 2 The Web Configurator Select a column heading cell's right border and drag to re-size the column. 3 4 Select a column heading and drag and drop it to change the column order. A green check mark displays next to the column's title when you drag the column to a valid new location.

5 Use the icons and fields at the bottom of the table to navigate to different pages of entries and control how many entries display at a time. NWA3000-N Series User's Guide 45 Chapter 2 The Web Configurator 2.3.6.2 Working with Table Entries The tables have icons for working with table entries. A sample is shown next. You can often use the [Shift] or [Ctrl] key to select multiple entries to remove, activate, or deactivate. Table 10 Common Table Icons Here are descriptions for the most common table icons. Table 11 Common Table Icons LABEL Add DESCRIPTION Click this to create a new entry. For features where the entry's position in the numbered list is important (features where the NWA3000-N series AP applies the table's entries in order like the firewall for example), you can select an entry and click Add to create a new entry after the selected entry.

Double-click an entry or select it and click Edit to open a screen where you can modify the entry's settings. In some tables you can just click a table entry and edit it directly in the table. For those types of tables small red triangles display for table entries with changes that you have not yet applied. To remove an entry, select it and click Remove. The NWA3000-N series AP confirms you want to remove it before doing so. To turn on an entry, select it and click Activate. To turn off an entry, select it and click Inactivate. Select an entry and click Object Reference to open a screen that shows which settings use the entry. To change an entry's position in a numbered list, select it and click Move to display a field to type a number for where you want to put that entry and press [ENTER] to move the entry to the number that you typed. For example, if you type 6, the entry you are moving becomes number 6 and the previous entry 6 (if there is one) gets pushed up (or down) one.

Edit Remove Activate Inactivate Object Reference Move 46 NWA3000-N Series User's Guide Chapter 2 The Web Configurator 2.3.6.3 Working with Lists When a list of available entries displays next to a list of selected entries, you can often just double-click an entry to move it from one list to the other. In some lists you can also use the [Shift] or [Ctrl] key to select multiple entries, and then use the arrow button to move them to the other list.

Figure 17 Working with Lists NWA3000-N Series User's Guide 47 Chapter 2 The Web Configurator 48 NWA3000-N Series User's Guide CHAPTER 3.1 Overview 3 Configuration Basics This section provides information to help you configure the NWA3000-N series AP effectively. Some of it is helpful when you are just getting started. Some of it is provided for your reference when you configure various features in the NWA3000N series AP. 3.

2 Object-based Configuration The NWA3000-N series AP stores information or settings as objects. You use these objects to configure many of the NWA3000-N series AP's features and settings. Once you configure an object, you can reuse it in configuring other features. When you change an object's settings, the NWA3000-N series AP automatically updates all the settings or rules that use the object. For example, if you create a local certificate object, you can have HTTPS, FTP, SSH, and other settings use it. If you modify the local certificate object, all the HTTPS, FTP, SSH, and other settings that are linked to that object automatically apply the updated settings. You can use the Configuration > Objects screens to create objects before you configure features that use them. If you are in a screen that uses objects, you can also usually select Create new Object to be able to configure a new object. Use the Object Reference screen to see what objects are configured and which configuration settings reference specific objects. 3.

3 Feature Configuration Overview This section provides information about configuring the main features in the NWA3000-N series AP. The features are listed in the same sequence as the menu item(s) in the Web Configurator. Each feature description is organized as shown below. NWA3000-N Series User's Guide 49 Chapter 3 Configuration Basics 3.3.1 Feature This provides a brief description. See the appropriate chapter(s) in this User's Guide for more information about any feature. This shows you the sequence of menu items and tabs you should click to find the main screen(s) for this feature. See the web help or the related User's Guide chapter for information about each screen.



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*These are other features you should configure before you configure the main screen(s) for this feature.*

*If you did not configure one of the prerequisites first, you can often select an option to create a new object. After you create the object PREREQUISITES you return to the main screen to finish configuring the feature. You may not have to configure everything in the list of prerequisites. For example, you do not have to create a schedule for a policy route unless time is one of the criterion. There are two uses for this.*

*MENU ITEM(S) WHERE USED These are other features you should usually configure or check right after you configure the main screen(s) for this feature. You have to delete the references to this feature before you can delete any settings. Note: PREREQUISITES or WHERE USED does not appear if there are no prerequisites or references in other features to this one. For example, no other features reference AP management entries, so there is no WHERE USED entry. 3.*

*3.2 MGNT Mode Use this screen to set the NWA3000-N series AP to control other NWA3000-N series APs, work as a standalone AP, or be managed by another NWA3000-N series AP. MENU ITEM(S) Configuration > MGNT Mode. 3.3.3 LAN Setting Use this screen to configure the LAN Ethernet interface including VLAN settings. MENU ITEM(S) Configuration > LAN Setting. 3.3.4 Wireless Use these screens to manage your wireless Access Points.*

*MENU ITEM(S) Configuration > Wireless. 50 NWA3000-N Series User's Guide Chapter 3 Configuration Basics PREREQUISITES Radio profiles, SSID profiles, and security profiles 3.3.5 Device HA To increase network reliability, device HA lets a backup NWA3000-N series AP automatically take over if a master NWA3000-N series AP fails. Device HA is available when the NWA3000-N series AP is in controller mode. MENU ITEM(S) Configuration > Device HA PREREQUISITES Interfaces (with a static IP address), to-NWA3000-N series AP firewall 3.4 Objects Objects store information and are referenced by other features. If you update this information in response to changes, the NWA3000-N series AP automatically propagates the change through the features that use the object. Select an object (such as a user) and then click Object Reference at the top of the list box where the object appears in order to display basic information about it. The following table introduces the objects.*

*You can also use this table when you want to delete an object because you have to delete references to the object first. Table 12 Objects Overview OBJECT user ap profile mon profile certificates WHERE USED See the User section on page 51 for details. See the AP Profile section on page 52 for details. See the MON Profile section on page 52 for details. WWW, SSH, FTP, controller 3.*

*4.1 User Use these screens to configure the NWA3000-N series AP's administrator and user accounts. The NWA3000-N series AP provides the following user types. Table 13 User Types TYPE admin limited-admin user ABILITIES Change NWA3000-N series AP configuration (web, CLI) Look at NWA3000-N series AP configuration (web, CLI). Perform basic diagnostics (CLI) Access network services.*

*Browse user-mode commands (CLI) NWA3000-N Series User's Guide 51 Chapter 3 Configuration Basics 3.4.2 AP Profile Use these screens to configure preset profiles for the Access Points (APs) connected to your NWA3000-N series AP's wireless network. Table 14 AP Profile Types TYPE Radio SSID Security MAC Filtering ABILITIES Create radio profiles for the APs on your network. Create SSID profiles for the APs on your network. Create security profiles for the APs on your network. Create MAC filtering profiles for the APs on your network. 3.4.3 MON Profile Use these screens to set up monitor mode configurations that allow your connected APs to scan for other wireless devices in the vicinity.*

*Table 15 MON Profile Types TYPE Monitor ABILITIES Create monitor mode configurations that can be used by the APs to periodically listen to a specified channel or number of channels for other wireless devices broadcasting on the 802.11 frequencies. 3.5 System This section introduces some of the management features in the NWA3000-N series AP. Use Host Name to configure the system and domain name for the NWA3000-N series AP. Use Date/Time to configure the current date, time, and time zone in the NWA3000-N series AP. Use Console Speed to set the console speed. Use Language to select a language for the Web Configurator screens. 3.5.*

*1 WWW, SSH, TELNET, FTP, SNMP, and Auth. Server Use these screens to set which services or protocols can be used to access the NWA3000-N series AP. MENU ITEM(S) Configuration > System > WWW, SSH, TELNET, FTP, SNMP, Auth. Server PREREQUISITES certificates (WWW, SSH, FTP) 52 NWA3000-N Series User's Guide Chapter 3 Configuration Basics 3.5.*

*2 Logs and Reports The NWA3000-N series AP provides a system log, offers two e-mail profiles to which to send log messages, and sends information to four syslog servers. It can also e-mail you statistical reports on a daily basis. MENU ITEM(S) Configuration > Log & Report 3.5.3 File Manager Use these screens to upload, download, delete, or run scripts of CLI commands.*

*You can manage:*

- *Configuration files. Use configuration files to back up and restore the complete configuration of the NWA3000-N series AP. You can store multiple configuration files in the NWA3000-N series AP and switch between them without restarting.*
- *Shell scripts. Use shell scripts to run a series of CLI commands. These are useful for large, repetitive configuration changes and for troubleshooting. You can edit configuration files and shell scripts in any text editor. MENU ITEM(S) Maintenance > File Manager 3.5.4 Diagnostics The NWA3000-N series AP can generate a file containing the NWA3000-N series AP's configuration and diagnostic information.*

*It can also capture packets going through the NWA3000-N series AP's interfaces so you can analyze them to identify network problems MENU ITEM(S) Maintenance > Diagnostics 3.5.5 Shutdown Use this to shutdown the device in preparation for disconnecting the power. Always use Maintenance > Shutdown > Shutdown or the shutdown command before you turn off the NWA3000-N series AP or remove the power. Not doing so can cause the firmware to become corrupt. MENU ITEM(S) Maintenance > Shutdown NWA3000-N Series User's Guide 53 Chapter 3 Configuration Basics 54 NWA3000-N Series User's Guide CHAPTER 4.1 Sample Network Setup 4 Tutorials This tutorial shows you how to use CAPWAP to have one NWA3000-N series AP control other NWA3000-N series APs to create a wireless network that allows two types of connections: staff and guest. Staff connections have full access to the network, while guests are limited to Internet access (DNS, HTTP and HTTPS services). Figure 18 Tutorial Network Topology C A A Controller B Managed APs Requirements: A DHCP server (A) with Option 138, an AD server, a switch (B) that supports 802.*



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1q, a Layer-3 routing device and a firewall (C).

Note: In this topology the firewall, such as a ZyWALL, controls what services traffic from different VLANs can use. NWA3000-N Series User's Guide 55 Chapter 4 Tutorials The following VLAN settings are used in this tutorial: Table 16 Tutorial Topology Summary VLAN Management Staff Guest VLAN ID 99  
101 102 IP ADDRESS 10.10.99.10/24 10.  
1.101.254/24 10.1.102.

254/24 Figure 19 Tutorial Guest VLAN Example vlan 102 Controller vlan 102 Managed APs In this example, the guest VLAN (102) can only access the Internet while the staff VLAN (101) has access to all aspects of the network. 4.1.1 Set the Management Modes Use this section to set the management modes for the controller and managed APs. 56 NWA3000-N Series User's Guide Chapter 4 Tutorials 4.1.1.1 Controller 1 Use the Configuration > MGNT MODE screen to set the NWA3000-N series AP to controller mode. 2 The NWA3000-N series AP resets to its default settings for the controller mode including the IP address of 192.168.

1.2 and restarts. Wait a short while before you attempt to log in again. 4.1.1.2 Managed APs 1 Log into the other NWA3000-N series APs and use the Configuration > MGNT MODE screen to set them to be the managed APs using the Auto IP address option so they obtain the controller's IP address from the DHCP server. 2 Now you can no longer log into the web configurator of the managed NWA3000-N series APs; you must manage the NWA3000-N series AP through the controller AP on your network. 4.1.

2 Set the LAN IP Address and Management VLAN (vlan99) This section shows you how to set up the LAN IP address and the VLAN for managing the controller. This is only for network administrators to manage the controller. NWA3000-N Series User's Guide 57 Chapter 4 Tutorials Open the controller's Configuration > LAN Setting screen. 1 • IP Address: Enter 10.10.99.10. • Subnet Mask: Enter 255.255.255.

0. • Gateway: Enter 10.10.99.10. • Management VLAN ID: Enter '99' as the VLAN ID tag. • Click Apply to save these changes. 2 Configure your DHCP server with the controller's IP address configured as option 138 so the managed NWA3000-N series APs can get the controller's IP address from it. See Chapter 7 on page 103 for details. 4.

1.3 Set Up Wireless User Authentication This section shows you how to set up the controller's internal RADIUS server and user accounts. Note: If you did not replace the factory default certificate with one that uses your NWA3000-N series AP's MAC address when you first logged into the NWA3000-N series AP, do it now in the Object > Certificate > My Certificates screen. 58 NWA3000-N Series User's Guide Chapter 4 Tutorials Open the Configuration > System > Auth. Server screen. Turn on the authentication server and select the certificate to use. Click Apply. 1 2 Open the Configuration > Object > User > User screen and click Add. 3 The Add A User window opens. NWA3000-N Series User's Guide 59 Chapter 4 Tutorials User Name: Enter 'guest1'. User Type: User Password: Enter 'guest1', and re-enter it in the Retype field to confirm. Click OK to save these settings. 3a 3b 3c 3d 4 Repeat steps 2 and 3 to create accounts for the staff members. 4.1.

4 Create the AP Profiles (staff, guest) This section shows you how to configure the Access Point (AP) profiles that will be used by your APs once they are connected to the network. You will first create a security profile and an SSID profile for staff access, then you will create a second pair for guest access. Finally, you will associate them with a radio profile which is applied to your AP's radio transmitter. 1 Open the Configuration > Object > AP Profile > SSID > Security List screen and then click the Add button. 60 NWA3000-N Series User's Guide Chapter 4 Tutorials The Add Security Profile window opens. 2 2a 2b Profile Name: Enter wap2. Security Mode: Select wpa2 from the list of available wireless security encryption methods. Under Security Mode, select 802.1X then set the Radius Server Type to Internal. Click OK. 2c 2d 3 Next, open the Configuration > Object > AP Profile > SSID > SSID List screen and click the Add button. NWA3000-N Series User's Guide 61 Chapter 4 Tutorials The Add SSID Profile window opens. 4 4a 4b Profile Name: Enter 'staff'. SSID: Enter 'staff'. This is the wireless network name that appears when wireless clients are looking for networks to join.

Security Profile: Select wpa2 from the list. This is the security profile created in step 2. QoS: Select WMM. VLAN ID: Enter '101'. Turn on intra-BSS traffic blocking. Click OK to save these settings. 4c 4d 4e 4f 4g 5 Repeat steps 3 and 4 to create the guest SSID profile with the same settings except 'guest' as the profile name and SSID and 102 for the VLAN ID. Open the Configuration > Object > AP Profile > Radio screen and then double-click the default entry. 6 62 NWA3000-N Series User's Guide Chapter 4 Tutorials The Edit Radio Profile window opens. 7 7a 7b Activate: Select this to make the radio profile active. MBSSID Settings: Select an entry to change it to a drop-down list. Set #1, to the staff SSID profile and #2 to the guest SSID profile. These are the two profiles you created in steps 3 to 5 of this procedure. Click OK to save these settings. 7c 4.

2 Rogue AP Detection Rogue APs are wireless access points interacting with the network managed by the NWA3000-N series AP but which are not under the control of the network administrator. In short, they are a security risk because they circumvent network security policy. AP detection only works when at least 1 AP is configured for Monitor mode. The following are some suggestions on monitor AP placement: • Neighboring companies that both support wireless network. If you can detect your neighbor's APs and you know they are 'friendly', you can add them to the friendly exception list.

• Reception areas. If a reception area has a high volume of visitor traffic, it might be useful to see if anyone is setting up their wireless device as an AP. • High security areas. An AP set to Monitor mode will let you see if anyone sets up an unauthorized AP that could potentially compromise your security. NWA3000-N Series User's Guide 63 Chapter 4 Tutorials In this example, an employee illicitly connects his own AP (RG) to the network that the NWA3000-N series AP manages. While not necessarily a malicious act, it can nonetheless have severe security consequences on the network. Figure 20 Rogue AP Example A 64 NWA3000-N Series User's Guide Chapter 4 Tutorials Here, an attacker sets up a rogue AP (RG) outside the network, which he uses in an attempt to mimic an NWA3000-N series AP-controlled SSID in order to capture passwords and other information when authorized wireless clients mistakenly connect to it.



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*Figure 21 Rogue AP Example B This tutorial shows you how to detect rogue APs on your network: 1 Click Configuration > Object > MON Profile to open the MON Profile screen and click the Add button. NWA3000-N Series User's Guide 65 Chapter 4 Tutorials Click the Add button. 2 When the Add Mon Profile window opens, configure the following: Activate: Select this to allow your monitor APs to use this profile.*

*Profile Name: For the purposes of this tutorial set this to 'Monitor01'. Channel Dwell Time: Leave this as the default 100 milliseconds. This field is the number of milliseconds that the monitor AP scans each channel before moving on to the next. Scan Channel Mode: Set this to auto to automatically scan channels in the area. 3 4 Click OK to save your changes. Next, click Configuration > Wireless > AP Management. 66 NWA3000-N Series User's Guide Chapter 4 Tutorials Select an AP and click Edit. 5 When the Edit AP List window opens, configure the following: Radio 1 OP Mode: Set this to MON Mode to turn the AP into a rogue AP monitoring device. Radio 1 Profile: Select your newly created 'Monitor01' profile from the list. 6 Click OK to save your changes. See also: Chapter 6 on page 83 and Chapter 13 on page 165. 4.2.1 Rogue AP Containment When the NWA3000-N series AP discovers a rogue AP within its broadcast radius, it can react in one of two ways: If the rogue AP is connected directly to the network (such as plugged into a switch downstream of the NWA3000-N series AP), then the network administrator must manually disconnect it. The NWA3000-N series AP does not allow the isolation of a rogue AP connected directly to the network.*

*However, if a rogue AP independent of the NWA3000-N series AP mimics a legitimate one, then the NWA3000-N series AP can interfere with it by NWA3000-N Series User's Guide 67 Chapter 4 Tutorials broadcasting dummy packets so that it cannot make connections with employee clients and capture data from them. Figure 22 Containing a Rogue AP This tutorial shows you how to quarantine a rogue AP on your network: 1 Click Configuration > Wireless > MON Mode. 68 NWA3000-N Series User's Guide Chapter 4 Tutorials Click the Add button. 2 When the Edit Rogue/Friendly AP List opens, paste the MAC address copied from the other screen in the corresponding field, set its Role as Rogue AP and then click OK to save your changes. 3 The new rogue AP appears in the Rogue/Friendly AP List.*

*Select it, then click the Containment button to quarantine it away from the rest of the network. 4.3 Load Balancing When your AP becomes overloaded, there are two basic responses it can take. The first one is to "delay" a client connection by withholding the connection until the data transfer throughput is lowered or the client connection is picked up by another AP. (If the client isn't picked up after a set period of time, the AP allows it to connect regardless.) The second response is to kick the connections until the AP is no longer considered overloaded. Both of these tactics are known as 'load balancing'. This tutorial shows you how to configure the NWA3000-N series AP's load balancing feature. NWA3000-N Series User's Guide 69 Chapter 4 Tutorials Click Configuration > Wireless > Load Balancing. 1 2 3 Select Enable Load Balancing to turn on this feature.*

*Set the Mode. If you choose By Station Number, then enter the Max Station Number in the available field. This balances network traffic based on the number of specified stations downstream of the NWA3000-N series AP. If you choose By Traffic Level, then enter the traffic threshold at which the NWA3000-N series AP starts balancing connected stations. Select Disassociate station when overloaded to disconnect stations when the load balancing threshold is crossed. The stations are first disconnected based on how long they have been idle, then secondly based on the weakness of their connection signal strength. Click Apply to save your changes. See also: Chapter 9 on page 111. 4 5 4.4 Dynamic Channel Selection Dynamic Channel Selection (DCS) is a feature that allows an AP to automatically select the radio channel upon which it broadcasts by scanning the area around it and determining what channels are currently being used by other devices.*

*When numerous APs broadcast within a given area, they introduce the possibility of heightened radio interference, especially if some or all of them are broadcasting on the same radio channel. This can make accessing the network potentially rather difficult for the stations connected to them. If the interference becomes too great, then the network administrator must open his AP configuration options and manually change the channel to one that no other AP is using (or at least a channel that has a lower level of interference) in order to give the connected stations a minimum degree of channel interference. 70 NWA3000-N Series User's Guide Chapter 4 Tutorials Click Configuration > Wireless > DCS. 1 2 3 Select Enable Dynamic Channel Selection to turn on this feature.*

*Set the DCS Time Interval. This is how often the NWA3000-N series AP surveys the other APs within its broadcast radius. If you place your APs in an area with a large number of competing APs, set this number lower to ensure that your device can adjust quickly changing conditions. Select DCS Sensitivity Level. This is how sensitive the APs on your network are to other channels.*

*Generally, as long as the area in which your AP is located has minimal interference from other devices you can set the DCS Sensitivity Level to Low. This means that the AP has a very broad tolerance. Select Enable DCS Client Aware. Select this so that the APs on your network do not change channels as long as any wireless clients are connected to them. When they must change channels, they will wait until all stations disconnect first. Set the 2.4-GHz Channel Selection Method to auto. Select a 2.4 GHz Channel Deployment scheme. Choose Three-Channel Deployment to have the device rotate through 3 channels.*

*Choose FourChannel Deployment to have the device rotate through 4 channels, if allowed. Click Apply to save your changes. See also: Chapter 9 on page 111. 4 5 6 7 8 NWA3000-N Series User's Guide 71 Chapter 4 Tutorials 72 NWA3000-N Series User's Guide P ART II Technical Reference 73 74 CHAPTER 5.1 Overview 5 Dashboard Use the Dashboard screens to check status information about the NWA3000-N series AP. 5.1.1 What You Can Do in this Chapter The main Dashboard screen (Section 5.2 on page 76) displays the NWA3000-N series AP's general device information, system status, system resource usage, and interface status. You can also display other status screens for more information.*

*NWA3000-N Series User's Guide 75 Chapter 5 Dashboard 5.2 Dashboard This screen is the first thing you see when you log into the NWA3000-N series AP. It also appears every time you click the Dashboard icon in the navigation panel.*



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