

management and
configuration guide



hp procurve
wireless access point 420

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HP ProCurve Wireless Access Point 420

October 2004

Management and Configuration Guide

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Applicable Products

HP ProCurve Wireless Access Point 420 na (J8130A)
HP ProCurve Wireless Access Point 420 ww (J8131A)

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Getting Started

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Introduction

This *Management and Configuration Guide* is intended to support the following access points:

- HP ProCurve Wireless Access Point 420 na
- HP ProCurve Wireless Access Point 420 ww

This guide describes how to use the command line interface (CLI) and web browser interface to configure, manage, and monitor access point operation. A troubleshooting chapter is also included.

For information on other product documentation for this access point, refer to “Related Publications” on page 1-4.

The *Product Documentation CD-ROM* shipped with the access point includes a copy of this guide. You can also download a copy from the HP ProCurve website, <http://www.hp.com/go/hpprocurve>. (See “Getting Documentation From the Web” on page 1-5.)

Conventions

This guide uses the following conventions for command syntax and displayed information.

Command Syntax Statements

Syntax: radius-server address [secondary] <host_ip_address | host_name>

- Vertical bars (|) separate alternative, mutually exclusive elements.
- Square brackets ([]) indicate optional elements.
- Braces (< >) enclose required elements.
- Braces within square brackets ([< >]) indicate a required element within an optional choice.
- Boldface indicates use of a CLI command, part of a CLI command syntax, or other displayed element in general text. For example:

“Use the **copy tftp** command to download the key from a TFTP server.”

- Italics indicate variables for which you must supply a value when executing the command. For example, in this command syntax, *<host_ip_address | host_name >* indicates that you must provide an IP address or a host name:

Syntax: radius-server address [secondary] *<host_ip_address | host_name >*

Command Prompts

In the default configuration, your access point displays the following CLI prompt:

```
HP ProCurve Access Point 420#
```

To simplify recognition, this guide uses `HP420` to represent command prompt. For example:

```
HP420#
```

(You can use the **prompt** command to change the text in the CLI prompt.)

Screen Simulations

Figures containing simulated screen text and command output look like this:

```
HP420#show version
Version v2.0.38.0B027
HP420#
```

Figure 1-1. Example of a Figure Showing a Simulated Screen

In some cases, brief command-output sequences appear outside of a numbered figure. For example:

```
HP420 (if-ethernet) #ip address 192.168.1.2 255.255.255.0
192.168.1.253
HP420 (if-ethernet) #dns primary-server 192.168.1.55
```

Related Publications

Installation and Getting Started Guide. Use the *Installation and Getting Started Guide* shipped with your access point to prepare for and perform the physical installation. This guide also steps you through connecting the access point to your network and assigning IP addressing, as well as describing the LED indications for correct operation and trouble analysis.

HP provides a PDF version of this guide on the *Product Documentation CD-ROM* shipped with the access point. You can also download a copy from the HP ProCurve website. (See “Getting Documentation From the Web” on page 1-5.)

Release Notes. Release notes are posted on the HP ProCurve website and provide information on new software updates:

- New features and how to configure and use them
- Software management, including downloading software to the access point
- Software fixes addressed in current and previous releases

To view and download a copy of the latest release notes for your access point, see “Getting Documentation From the Web” on page 1-5.

Getting Documentation From the Web

1. Go to the HP ProCurve website at <http://www.hp.com/go/hpprocurve>
2. Click on **Technical support**.
3. Click on **Product manuals**.
4. Click on the product for which you want to view or download a manual.

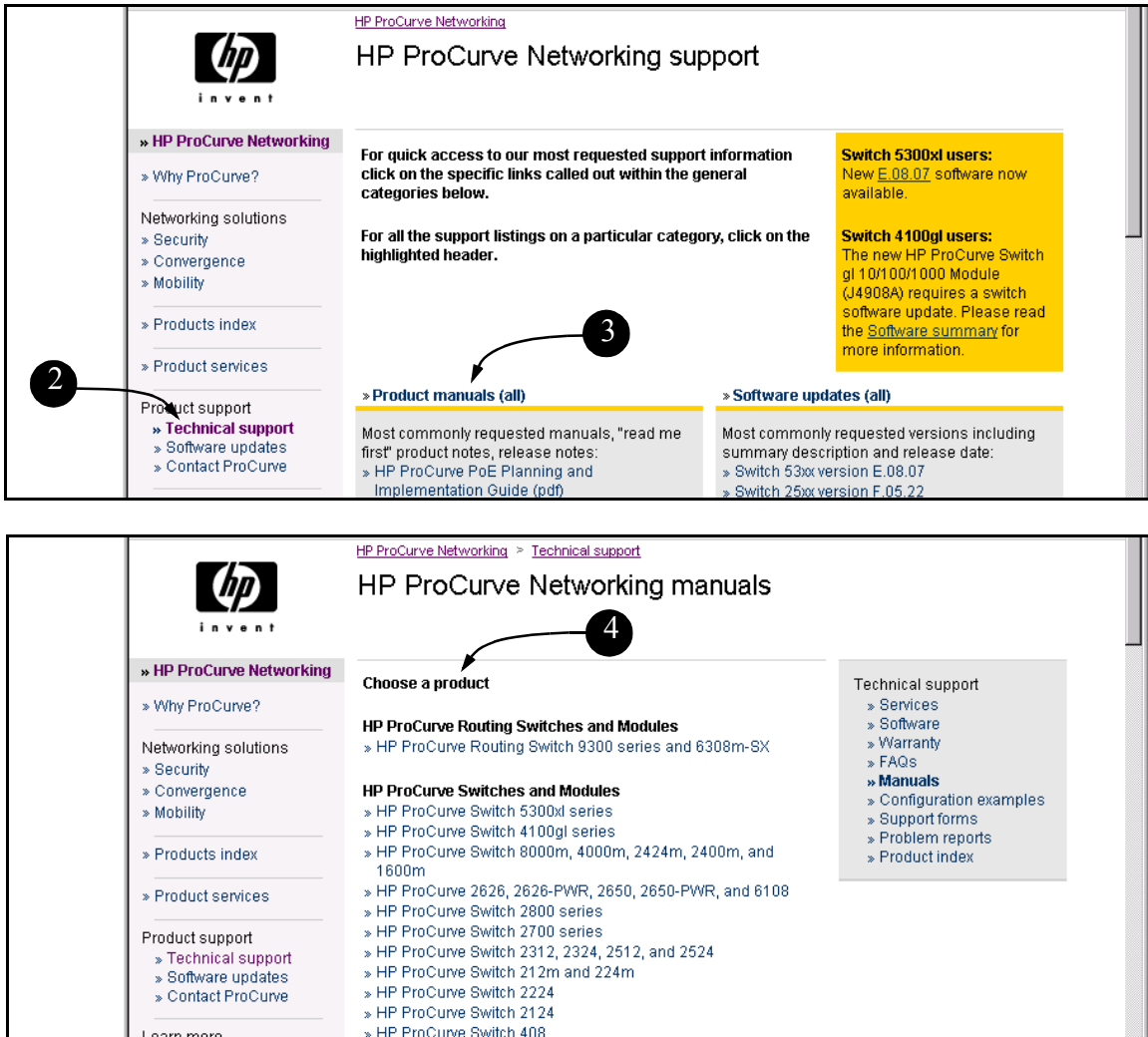


Figure 1-2. Finding Product Manuals on the HP ProCurve Website

Sources for More Information

- If you need information on specific features in the HP Web Browser Interface (hereafter referred to as the “web browser interface”), use the online help available for the web browser interface. For more information on web browser Help options, refer to “Online Help for the HP Web Browser Interface” on page 4-16.
- If you need further information on Hewlett-Packard access point technology, visit the HP ProCurve website at:

<http://www.hp.com/go/hpprocurve>

Need Only a Quick Start?

IP Addressing. If you just want to give the access point an IP address so that it can communicate on your network, HP recommends that you use the CLI to quickly configure IP addressing. To do so, do one of the following:

- Enter **config** at the CLI Exec level prompt.

```
HP420#config
```

- Enter **interface ethernet** at the CLI Configuration level prompt.

```
HP420(config)#interface ethernet
```

- Enter the IP address, subnet mask, and gateway at the CLI Interface Configuration level prompt.

```
HP420(if-ethernet)#ip address <address>  
<subnet_mask> <gateway>
```

For more on using the CLI, see Chapter 6, “Using the Command Line Interface (CLI)”.

To Set Up and Install the Access Point in Your Network

Important!

Use the *Installation and Getting Started Guide* shipped with your access point for the following:

- Notes, cautions, and warnings related to installing and using the access point
- Instructions for physically installing the access point in your network

- Quickly assigning an IP address, subnet mask, and gateway, set a Manager password, and (optionally) configure other basic features.
- Interpreting LED behavior.

For the latest version of the *Installation and Getting Started Guide* and other documentation for your access point, visit to the HP ProCurve website. (Refer to “Getting Documentation From the Web” on page 1-5.)

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Selecting a Management Interface

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Understanding Management Interfaces 2-2

Advantages of Using the CLI 2-3

Advantages of Using the HP Web Browser Interface 2-4

Overview

This chapter describes the following:

- Access Point management interfaces
 - Advantages of using each interface type
-

Understanding Management Interfaces

Management interfaces enable you to reconfigure the access point and to monitor its status and performance. Interface types include:

- **CLI**—a command line interface offering the full set of access point commands through the VT-100/ANSI console built into the access point—**page 2-3**
- **Web browser interface**—an access point interface offering status information and a subset of access point commands through a standard web browser (such as Netscape Navigator or Microsoft Internet Explorer)—**page 2-4**
- **SNMP**—a network management application such as HP ProCurve Manager to manage the access point via the Simple Network Management Protocol (SNMP) from a network management station.

This manual describes how to use the CLI (chapters 3, 5 and 6), the web browser interface (chapters 4 and 5), and how to use these interfaces to configure and monitor the access point.

For information on how to access the web browser interface Help, refer to “Online Help for the HP Web Browser Interface” on page 4-16.

Advantages of Using the CLI

HP420#	Exec Level
HP420 (config) #	Global Configuration Level
HP420 (<context>) #	Context Configuration Levels (Ethernet, wireless)

Figure 2-1. Command Prompt Examples

- Provides access to the complete set of the access point configuration features.
- Offers out-of-band access (through the RS-232 connection) or Telnet (in-band) access.
- Enables quick, detailed system configuration and management access to system operators and administrators experienced in command prompt interfaces.
- Provides help at each level for determining available options and variables.

CLI Usage

- For information on how to use the CLI, refer to chapter 3, “Using the Command Line Interface (CLI).”
- To perform specific procedures (such as configuring IP addressing), use the Contents listing at the front of the manual to locate the information you need.
- For monitoring and analyzing access point operation, refer to the appropriate section in chapter 5, “Access Point Configuration.”
- For information on individual CLI commands, refer to the Index or to the online Help provided in the CLI interface.

Advantages of Using the HP Web Browser Interface

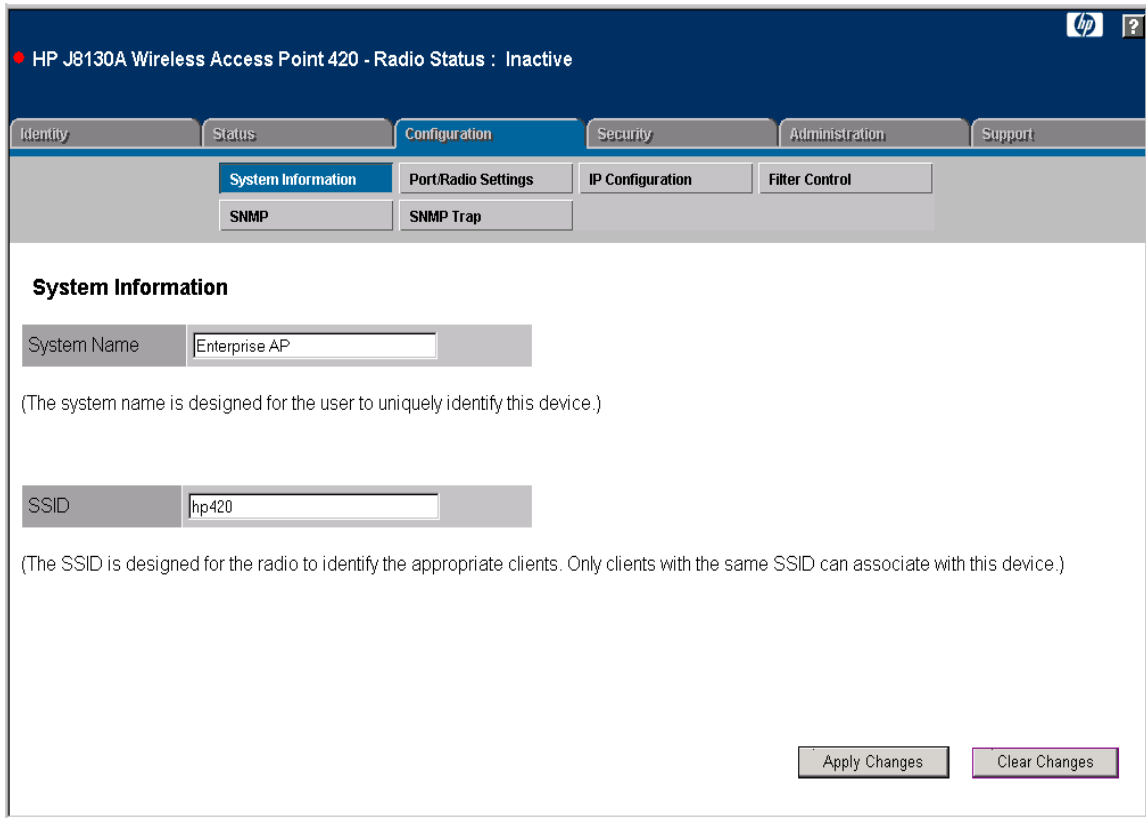


Figure 2-2. Example of the HP Web Browser Interface

- **Easy access** to the access point from anywhere on the network
- **Familiar browser interface**—locations of window objects consistent with commonly used browsers, uses mouse clicking for navigation, no terminal setup
- **Many features have all their fields in one screen** so you can view all values at once
- **More visual cues**, using colors, status bars, device icons, and other graphical objects instead of relying solely on alphanumeric values
- **Display of acceptable ranges of values available** in configuration list boxes

Using the Command Line Interface (CLI)

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Overview

The CLI is a text-based command interface for configuring and monitoring the access point. The CLI gives you access to the access point's full set of commands while providing the same password protection that is used in the web browser interface.

Accessing the CLI

The CLI is accessed through the access point console. You can access the console out-of-band by directly connecting a terminal device to the access point, or in-band by using Telnet.

Using the CLI

The CLI offers these privilege levels to simplify configuration:

1. Exec
2. Global Configuration
3. Context Configuration

Note

CLI commands are not case-sensitive.

When you use the CLI to make a configuration change, the access point immediately saves the change to non-volatile memory. Whenever you reboot the access point, all changes made since the last reboot are retained.

Privilege Level at Logon

The access point provides a single password for the CLI. To secure management access to the access point, you must set the Manager password. *Without a Manager password configured, anyone having serial port or Telnet access to the access point can reach all CLI command modes.*

When you use the CLI to log on to the access point, you will be prompted to enter a password. For example:

```
Ready
Username: admin
Password: 
```

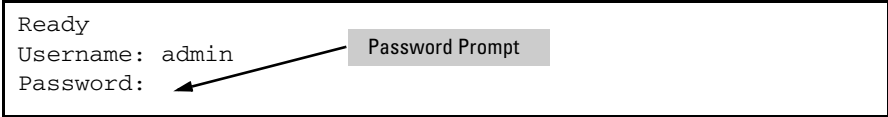


Figure 3-1. Example of CLI Log-On Screen with Password

When you log onto the CLI, you will see a command prompt:

```
HP420#_
```

Caution

HP strongly recommends that you configure a Manager password. If a Manager password is not configured, the access point is not password-protected, and anyone having in-band or out-of-band access to the access point may be able to compromise access point and network security.

Pressing the Reset button on the back of the access point for more than five seconds removes password protection. *For this reason, it is recommended that you protect the access point from physical access by unauthorized persons.*

Privilege Level Operation

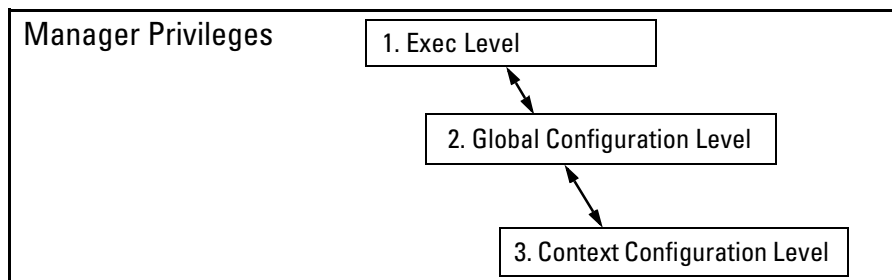


Figure 3-2. Access Sequence for Privilege Levels

Exec Privileges

Exec privileges allow you to examine the current configuration, perform system-level actions that do not require saving changes, and move between the three levels of access: Exec, Global Configuration, and Context Configuration. (See figure 3-2.) A "#" character delimits the Exec prompt. For example:

```
HP420#_ Manager prompt.
```

- **Exec level:** Allows you to examine the current configuration, perform system-level actions that do not require saving changes, and move between the different access levels. The prompt for the Exec level contains only the system name and the "#" delimiter, as shown above.
- **Global Configuration level:** Enables you to make configuration changes to the access point's software features. The prompt for the Global Configuration level includes the system name and "(config)". To select this level, enter the **config** command at the Exec prompt. For example:

```
HP420# _ Enter config at the Manager prompt.  
HP420(config)#_ The Global Config prompt.
```

- **Context Configuration level:** Enables you to make configuration changes in a specific context, such as the Ethernet interface or the wireless interface. The prompt for the Context Configuration level includes the system name and the selected context. For example:

```
HP420(if-ethernet)#  
HP420(if-wireless g)#
```

The Context level is useful, for example, if you want to execute several commands directed at the same interface. To select this level, enter the specific context at the Global Configuration level prompt. For example, to select the context level for the Ethernet interface, you would enter the following command and see the indicated result:

```
HP420 (config) #interface ethernet
HP420 (if-ethernet) #
```

Table 3-1. Privilege Level Hierarchy

Privilege Level	Example of Prompt and Permitted Operations	
Manager Privilege		
Exec Level	HP420#	<i>Perform system-level actions such as system control, monitoring, and diagnostic commands. For a list of available commands, enter ? at the prompt.</i>
Global Configuration Level	HP420 (config) #	<i>Execute configuration commands. For a list of available commands, enter ? at the prompt.</i>
Context Configuration Level	HP420 (if-ethernet) # HP420 (if-wireless g) #	<i>Execute context-specific configuration commands, such as a particular access point interface. This is useful for entering a series of commands for the same context. For a list of available commands, enter ? at the prompt.</i>

How To Move Between Levels

Change in Levels	Example of Prompt, Command, and Result
Exec level <i>to</i> Global configuration level	HP420#config HP420 (config) #
Global configuration level <i>to a</i> Context configuration level	HP420 (config)#interface ethernet HP420 (if-ethernet) #
Move from any level to the preceding level	HP420 (if-ethernet) #end HP420 (config) #end HP420 #
Move from any level to the Exec level	HP420 (if-ethernet) #exit HP420 # <i>—or—</i> HP420 (config) #exit HP420 #

Changing Parameter Settings. Regardless of which interface is used (CLI, or web browser interface), the most recently configured version of a parameter setting overrides any earlier settings for that parameter. For example, if you use the web interface to configure an IP address of “X” for the Ethernet interface and later use the CLI to configure a different IP address of “Y”, then “Y” replaces “X” as the IP address for the Ethernet interface.

Listing Commands and Command Options

At any privilege level you can:

- List all of the commands available at that level
- List the options for a specific command

Listing Commands Available at Any Privilege Level

At a given privilege level you can list and execute the commands that level offers. For example, at the Exec level, you can list and execute only the Exec level commands; and at the Configuration level, you can list and execute the commands available only to Configuration levels.

Type "?" To List Available Commands. Typing the ? symbol lists the commands you can execute at the current privilege level. For example, typing ? at the Exec level produces this listing:

```
HP420#?  
Exec commands:  
  bootfile   Specify Application Bootfile  
  configure  Enter configuration mode  
  copy       Copy from one file to another  
  country    Set the country code  
  delete     Delete a file  
  dir        List files on a file system  
  exit       Exit from the EXEC  
  help       Description of the help system  
  ping       Send echo messages  
  reset      Reset this system  
  show       Show information  
HP420#
```

Figure 3-3. Example of the Exec Level Command Listing

Typing **?** at the Configuration level produces this listing:

```
HP420(config)#?  
Configure commands:  
  802.1x          Set 802.1x  
  end             Return to previous mode  
  exit           Exit to the EXEC mode  
  filter         Bridge protocol filtering  
  help          Description of the help system  
  iapp          Enable IAPP  
  interface      Into the interface configure mode  
  ip            Set IP  
  logging        Modify message logging facilities  
  mac-access     Local MAC filtering  
  mac-authentication Set RADIUS MAC Authentication  
  native-vlanid Set Native VLAN ID <1-4094>  
  no            Negate  
  password       Assign the privileged password(max length:16)  
  prompt        Set system's prompt  
  radius-server Set radius server  
  show          Show general configuration status  
  snmp-server   Modify SNMP parameters  
  snmpv3        Modify SNMP parameters  
  sntp-server   Set Sntp  
  system        Set system name  
---More---
```

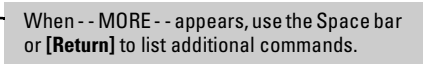


Figure 3-4. Example of the Configuration-Level Command Listing

When **-- MORE --** appears, there are more commands in the listing. To list the next set of commands, press the Space bar. To list the remaining commands one-by-one, repeatedly press **[Enter]**. To stop the listing, type **[Ctrl] [C]**.

Typing **?** at the Global Configuration level or the Context Configuration level produces similar results. In a particular context level, the first block of commands in the listing are the commands that are most relevant to the current context.

Use [Tab] To Complete a Command Word. You can use **[Tab]** to quickly complete the current word in a command. To do so, type one or more consecutive characters for a command and then press **[Tab]** (with no spaces allowed). The CLI completes the current word (if you have typed enough of

the word for the CLI to distinguish it from other possibilities). For example, at the Global Configuration level, if you press **[Tab]** immediately after typing "u", the CLI displays the command that begins with "u". For example:

```
HP420 (config) #u[Tab]
HP420 (config) #username
```

Use Shorthand Entries. You can abbreviate commands and options as long as they contain enough letters to be distinguished from any other currently available commands or options.

Command Option Displays

Conventions for Command Option Displays. When you use the CLI to list options for a particular command, you will see one or more of the following conventions to help you interpret the command data:

- Braces (< >) indicate a required choice.
- Square brackets ([]) indicate optional elements.
- Vertical bars (|) separate alternative, mutually exclusive options in a command.

Listing Command Options. You can use the CLI to remind you of the options available for a command by entering command keywords followed by **?**. For example, suppose you want to see the command options for configuring SNMP:

```
HP420 (config) #snmp-server ?
  community  Set SNMP community string
  contact     Set text for mib sysContact
  enable      Enable Server
  host        Specify hosts to receive SNMP
  location    Text for mib object sysLocation
  trap        Enable SNMP traps
HP420 (config) #snmp-server
```

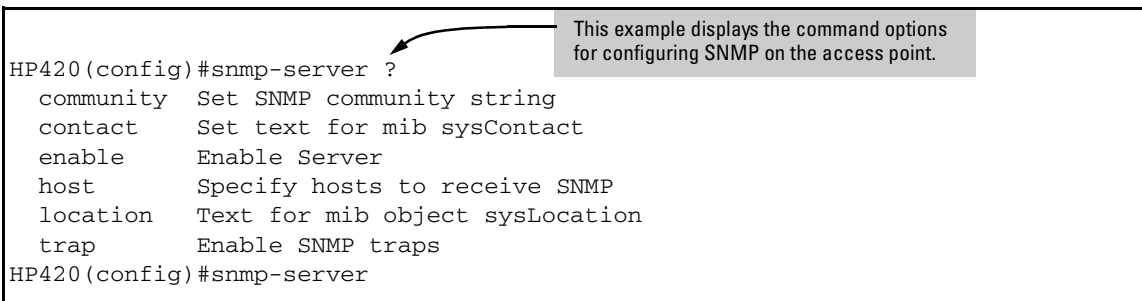


Figure 3-5. Example of How To List the Options for a Specific Command

Configuration Commands and the Context Configuration Modes

You can execute basic configuration commands in the global configuration mode. However, you must use a context mode to execute context-specific commands.

The configuration options include interface (ethernet or wireless) context modes:

Ethernet Context . Includes interface-specific commands that apply only to the Ethernet interface. The prompt for this mode includes the identity of the Ethernet interface:

```
HP420(config)# interface ethernet
```

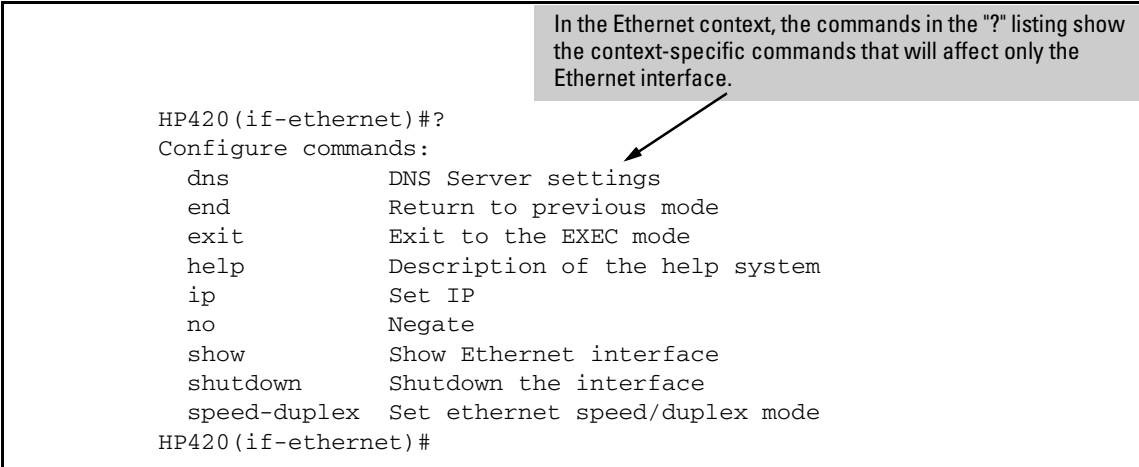
Command executed at configuration level for entering Ethernet interface context.

```
HP420(if-ethernet)#
```

Resulting prompt showing Ethernet interface context.

```
HP420(if-ethernet)#?
```

Lists the commands you can use in the Ethernet interface context.



```
HP420(if-ethernet)#?  
Configure commands:  
  dns          DNS Server settings  
  end          Return to previous mode  
  exit         Exit to the EXEC mode  
  help        Description of the help system  
  ip          Set IP  
  no          Negate  
  show        Show Ethernet interface  
  shutdown    Shutdown the interface  
  speed-duplex Set ethernet speed/duplex mode  
HP420(if-ethernet)#
```

In the Ethernet context, the commands in the "?" listing show the context-specific commands that will affect only the Ethernet interface.

Figure 3-6. Context-Specific Commands Affecting Ethernet Interface Context

Wireless Context . Includes wireless-specific commands that apply only to the wireless interface. The prompt for this mode includes the identity of the wireless interface:

HP420(config)#interface wireless g	<i>Command executed at configuration level to enter wireless context.</i>
HP420(if-wireless g)#	<i>Resulting prompt showing wireless context.</i>
HP420(if-wireless g)#?	<i>Lists commands you can use in the wireless context.</i>

In the wireless context, the commands in the "?" listing show the commands that will affect only the wireless interface.





```

HP420(if-wireless g)#?
  antenna-mode          Set antenna mode
  beacon-interval       Set beacon interval
  channel                Set channel
  closed-system         Set Closed System
  description           Set description
  dtim-period          Set DTIM
  end                   Return to previous mode
  exit                  Exit to the EXEC mode
  fragmentation-length  Set fragment length
  help                  Description of the help system
  key-length-wep       set WEP key length
  max-association       Maximum association munber
  multicast-data-rate  Set the multicast data rate
  no                    Negate
  preamble              Preamble length
  radio-mode            Set radio mode
  rts-threshold         Rts threshold
  security-suite        security setting
  show                  Show wireless interface
  shutdown              Shutdown
  slot-time             Fix the slot time
  speed                 Speed
  ssid                  SSID
  transmit-key-wep     Transmit key index
  transmit-limits      Set detachable antenna gain attenuation
  transmit-power       Transmit power
  wep-key               Set key
  wpa-preshaed-key     WPA enter Pre-shared key
HP420(if-wireless g)#

```

Figure 3-7. Context-Specific Commands Affecting Wireless Context

CLI Control and Editing

Keystrokes	Function
[Ctrl] [A]	Jumps to the first character of the command line.
[Ctrl] [B] or 	Moves the cursor back one character.
[Ctrl] [D]	Deletes the character at the cursor.
[Ctrl] [E]	Jumps to the end of the current command line.
[Ctrl] [F] or 	Moves the cursor forward one character.
[Ctrl] [K]	Deletes from the cursor to the end of the command line.
[Ctrl] [L] or [Ctrl] [R]	Repeats current command line on a new line.
[Ctrl] [N] or 	Enters the next command line in the history buffer.
[Ctrl] [P] or 	Enters the previous command line in the history buffer.
[Ctrl] [U]	Deletes from the cursor to the beginning of the command line.
[Ctrl] [W]	Deletes the last word typed.
[Esc] [B]	Moves the cursor backward one word.
[Esc] [D]	Deletes from the cursor to the end of the word.
[Esc] [F]	Moves the cursor forward one word.
[Delete] or [Backspace]	Deletes the first character to the left of the cursor in the command line.

Using the HP Web Browser Interface

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Overview

The HP web browser interface built into the access point lets you easily access the access point from a browser-based PC on your network. This lets you do the following:

- Make configuration changes to the access point
- Control access to the management interface by configuring a user name and password
- Maintain access security for wireless clients using WPA or WEP shared keys
- Encrypt data communications between clients and access points using various algorithms, including WEP, TKIP, or AES
- Optimize your network uptime by using the System Log

This chapter covers the following:

- General features (page 4-3)
- Starting a web browser interface session (page 4-4)
- Tasks for your first web browser interface session (page 4-7)
 - Configuring a user name and password for management access in the web browser interface (page 4-7)
 - Set the SNMP community names (page 4-9)
 - Set the access point Service Set Identifier (page 4-10)
 - Enable radio communications and select a channel (page 4-11)
 - Changing IP settings (page 4-13)
 - Setting wireless network security (page 4-14)
 - Getting access to online help for the web browser interface (page 4-16)
- Description of the web browser interface
 - The Home Page (page 4-5)
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- Status Reporting Features
 - The AP Status window (page 4-17)
 - Station status (page 4-19)
 - Event logs (page 4-21)
 - The Status bar (page 4-22)

General Features

The access point includes these web browser interface features:

Access Point Configuration:

- System identification and service set identifier
- IP settings via manual configuration or DHCP
- RADIUS client identification
- Wireless client authentication via IEEE 802.1X
- Filter control between wireless clients, between wireless clients and the management interface, or for specified protocol types
- SNMP community strings, trap managers, and SNMPv3 settings
- Usernames and passwords
- Firmware upgrade and system reset
- System log server and log message levels
- SNTP client and manual clock configuration

Access Point Radio Interface:

- Radio signal parameters
- Wireless client security, including WEP and WPA

Access Point status

- System configuration
- Wireless configuration
- Station status
- Event logs

Starting a Web Browser Interface Session with the Access Point

You can start a web browser session using a standalone web browser on a network connection from a PC in the following ways:

- Directly connected to your network
- Connected through remote access to your network

This procedure assumes that you have a supported web browser installed on your PC or workstation, and that an IP address has been configured on the access point. If you are using a Domain Name Server (DNS), your device may have a name associated with it (for example, **hp420**) that you can type in the **Location or Address** field instead of the IP address. Using DNS names typically improves browser performance. See your network administrator for any name associated with the access point. (For more information on assigning an IP address, refer to “IP Configuration” on page 4-14.)

The operating systems, web browsers, and Java support required to manage the access point through the browser interface are listed in the following table::

Operating System	Internet Explorer	Netscape	Mozilla	Mozilla Firefox	Java
Windows 2000 Professional	5.0 ¹	7.0 ² 7.1 ²	1.7.3 ²	1.0PR ²	¹ Microsoft Java Virtual Machine 5.00.3810. ² Sun Java 2 Runtime Environment Standard Edition v1.4.1 and v1.4.2
Windows 2000 Professional SP4	5.0 ^{1,2}	7.0 ² 7.1 ²	1.7.3 ²	1.0PR ²	
Windows 2000 Server SP4	5.0 ^{1,2}	7.0 ² 7.1 ²		1.0PR ²	
Windows XP Professional version 2002 SP1	6.0 ^{1,2}	7.0 ² 7.1 ²	1.7.3 ²	1.0PR ²	
Windows XP Professional version 2002 SP2	6.0 ^{1,2}	7.0 ² 7.1 ²	1.7.3 ²	1.0PR ²	
Windows 2003 Server	6.0 ^{1,2}	7.0 ² 7.1 ²	1.7.3 ²	1.0PR ²	
Mac OS 9.2		7.0			Sun Java 2 Runtime Environment Standard Edition v1.4.2
Linux kernel 2.4.18.44			1.0.1		

Note:

Access point management can be limited to access from the Ethernet interface. For more on this feature, see “Setting up Filter Control” on page 5-47.

Type the IP address (or DNS name) of the access point in the browser **Location or Address** field and press **[Enter]**. (It is not necessary to include **http://**.)

10.11.12.195 **[Enter]** *Example of an IP address.*

HP420 **[Enter]** *Example of a DNS-type name.*

Description of Browser Interface

Browser elements covered in this section include:

- The Home Page (below)
- The Support URL (page 4-6)

The Home Page

The home page is the entry point for the web browser interface. The following figure identifies the various parts of the screen.

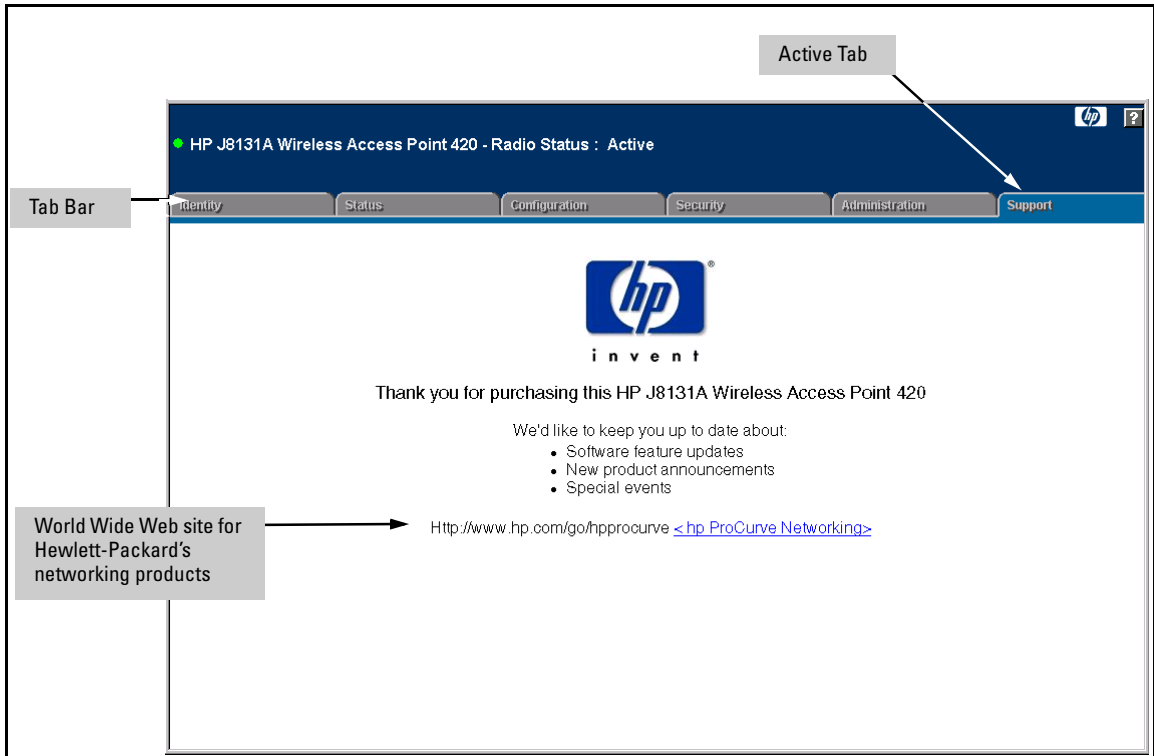


Figure 4-1. The Home Page

Support URL

The home page for the access point's web browser interface is the **Support** tab. This page provides the following URL:

<http://www.hp.com/go/hpprocurve>

which is the World Wide Web site for Hewlett-Packard's networking products. Click on the link on this page and you can get to support information regarding your access point, including white papers, firmware updates, and more.

Tasks for Your First HP Web Browser Interface Session

The first time you access the web browser interface, there are a number of basic tasks that you should perform:

- Set the Manager user name and password
- Set the SNMP community names
- Set the access point Service Set Identifier (SSID)
- Enable radio communications and select a channel
- Change TCP/IP settings
- Set radio security options

Changing the User Name and Password in the Browser Interface

You may want to change both the user name and password to enhance access security for the management interface on your access point. A single user name and password allow full read/write access to the web browser interface.

Note

If you want security beyond that achieved with user names and passwords, you can disable access to the web browser interface. This is done by executing **no ip http server** at the Global Configuration level command prompt in the CLI. Then, management access is only from the CLI, through the console port or Telnet, or through SNMP.

To set the user name or password with the web browser interface:

1. Click the Administration tab and then the **[Change Password]** button to display the Change Password menu.

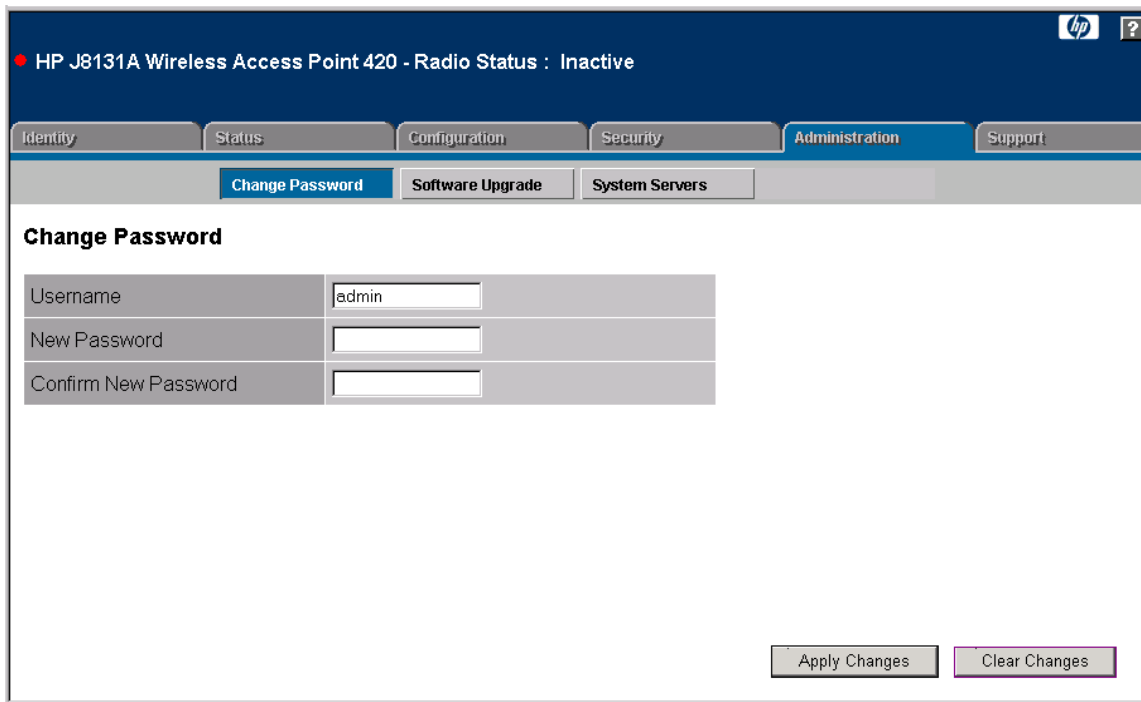


Figure 4-2. The Change Password Window

2. Click in the appropriate box in the Change Password menu and enter a user name or password. You will be required to repeat the password string in the confirmation box.

Both the user name and password can be from 3 to 16 printable ASCII characters.
3. Click on **[Apply Changes]** to activate the user name and password.

Note

The user name and password you assign in the web browser interface will overwrite the previous settings assigned in either the web browser interface or the access point console. That is, the most recently assigned user name and password are immediately effective for the access point, regardless of which interface was used to assign these parameters.

The manager user name and password are used to control access to the CLI and web browser management interfaces for the access point. Once set, you will be prompted to supply the user name and password every time you try to access the access point through these interfaces.

If You Lose the User Name or Password

If you lose the user name or password, you can clear them by pressing the Reset button on the back of the access point for at least five seconds. *This action deletes the password and resets the user name to the factory default settings for all of the access point's interfaces. All configuration information is reset to the factory default values, including:*

- User name and password
- Console event log (cleared)
- Network counters (reset to zero)
- Configured IP address
- SNMP Configuration

Caution

The Reset button is provided for your convenience, but its presence means that if you are concerned with the security of the access point configuration and operation, you should make sure the access point is installed in a secure location.

Setting SNMP Community Names

You can manage the access point from a network management station running a Simple Network Management Protocol (SNMP) management application such as HP ProCurve Manager.

The access point SNMP agent supports SNMP versions 1, 2c, and 3. Management access from SNMP v1 or v2c stations is controlled by community names. To communicate with the access point, an SNMP v1 or v2c management station must first submit a valid community name for authentication. The default community names are “public” for read-only access and “private” for read/write access. If you intend to support SNMP v1 or v2c managers, it is recommended that you change the default community names to prevent unauthorized access.

If you intend to support SNMP v3 managers, you need to configure user names, set specific security levels, and assigned them to a group. For more information, see “Web: Configuring SNMP v3 Users” on page 5-18.

To change the default community names for SNMP v1 or v2c management access, follow these steps:

1. Select the **Configuration** tab.
2. Click the **[SNMP]** button.

Using the HP Web Browser Interface

Tasks for Your First HP Web Browser Interface Session

3. Select **Enable** to enable SNMP management.
4. Type text strings to replace the default community names for read-only and read/write access.
5. Click the **[Apply Changes]** button.

The screenshot shows the HP J8130A Wireless Access Point 420 web interface. The top navigation bar includes tabs for Identity, Status, Configuration (selected), Security, Administration, and Support. Under the Configuration tab, there are sub-tabs for System Information, Port/Radio Settings, IP Configuration, and Filter Control. The SNMP sub-tab is selected, showing the SNMP Security configuration page. The page title is "SNMP Security". Below the title, there are radio buttons for "SNMP: Disable Enable". Below this, there are four rows of configuration fields: "Location" (empty), "Contact" (value: "Contact"), "Community Name (Read Only)" (value: "public"), and "Community Name (Read/Write)" (value: "private"). Below these is the "Engine ID" field with the value "00:00:00:0b:00:00:00:30:f1:81:83:12". At the bottom, there is a table for "SNMP Users" with columns: User, Group, Auth Type, Passphrase, Priv Type, Passphrase, and Action. The "New User" row is partially filled with "RO" in the Group column, "None" in the Auth Type column, and "None" in the Priv Type column. An "Add" button is located to the right of the "New User" row.

Figure 4-3. Setting SNMP Community Names

Setting the SSID

The Service Set Identifier (SSID) is a recognizable text string that identifies the wireless network. All wireless clients that want to connect to the network through the access point must set their SSIDs to the same as that of the access point.

To set the access point SSID, click the **Configuration** tab and then the **[System Information]** button. Enter a text string up to 32 characters in the SSID box. Click the **[Apply Changes]** button to save the setting.

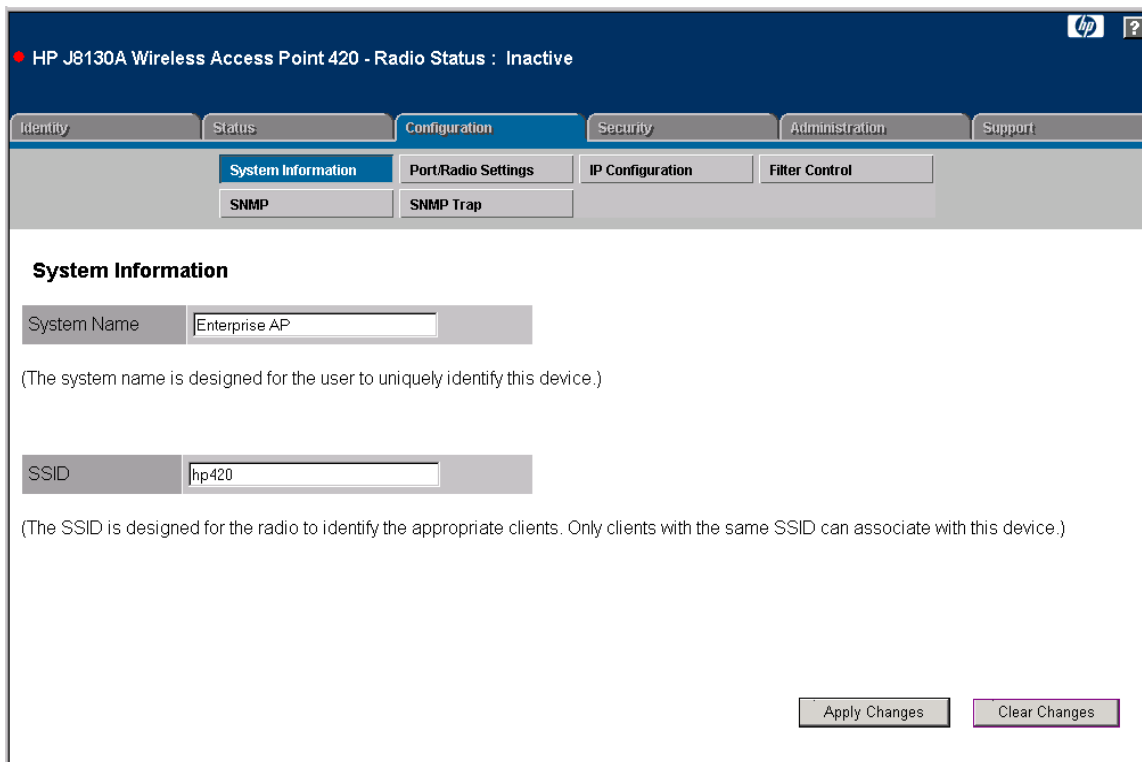


Figure 4-4. Setting the SSID

Setting the Radio Channel

The access point's radio channel settings are limited by local regulations, which determine the number of channels that are available. You can manually set the access point's radio channel or allow it to automatically select an unoccupied channel.

Note

If you are using the worldwide product, J8131A, before configuring radio settings on the access point, you must first use the CLI to set the Country Code so that the radio channels used conform to your local regulations. See "Using the CLI to Set the Country Code" on page 5-58.

Using the HP Web Browser Interface

Tasks for Your First HP Web Browser Interface Session

The access point uses the configured radio channel to communicate with wireless clients. When multiple access points are deployed in the same area, be sure to choose a channel separated by at least five channels to avoid having the channels interfere with each other. You can deploy up to three access points in the same area (for example, channels 1, 6, 11).

1. Click the **Configuration** tab, and then click the **[Port/Radio Settings]** button.
2. Select the **Working Mode**.
3. Click the **[Radio Mode Change]** button.

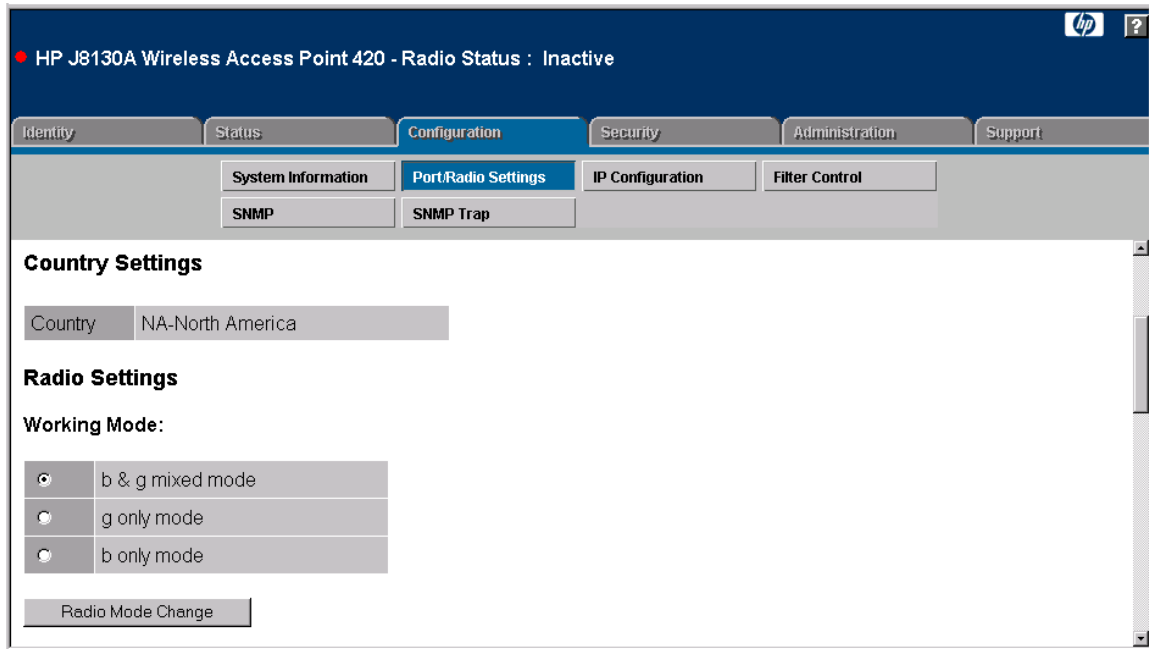


Figure 4-5. Changing the Radio Working Mode

4. Check the **Enable** box to enable radio communications.
5. Select the radio channel from the scroll-down box, or mark the **Enable** radio button for **Auto Channel Select**.
6. Click the **[Apply Changes]** button to save the settings.

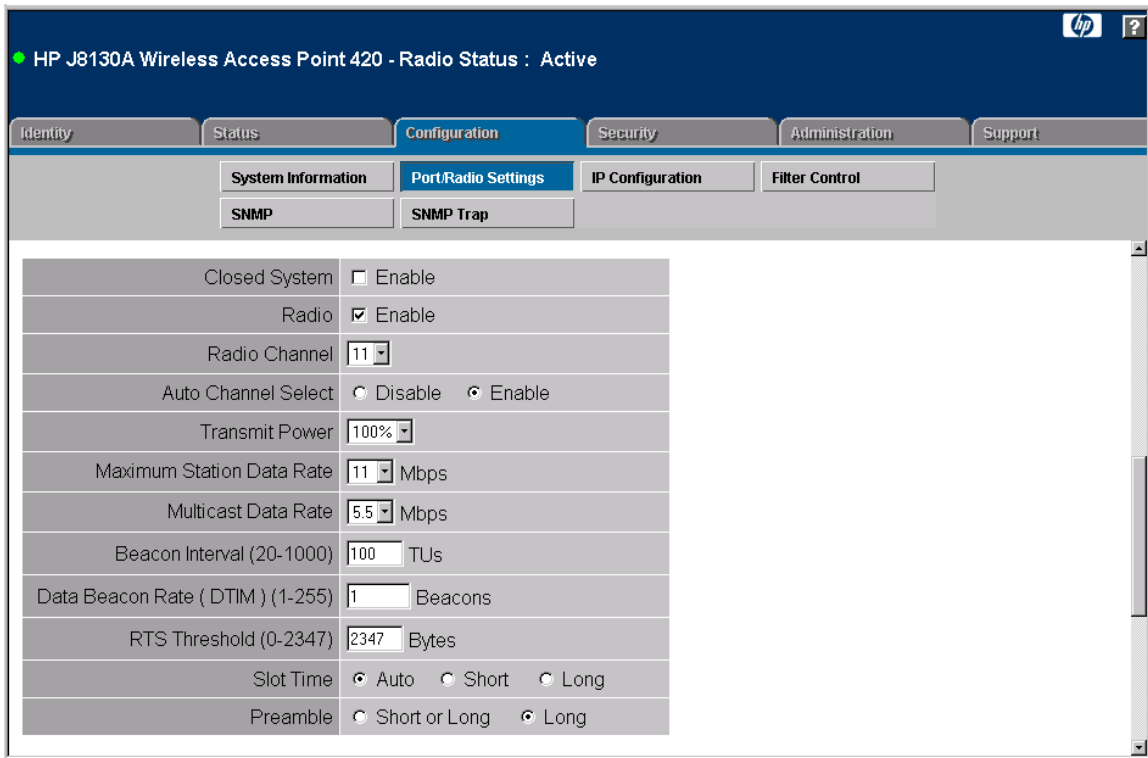


Figure 4-6. Radio Channel Selection

Configuring TCP/IP Settings

You can use the web browser interface to manage the access point only if it already has an IP address that is reachable through your network. You can set an initial IP address for the access point by using the CLI interface. After you have network access to the access point, you can then use the web browser interface to modify the initial IP configuration.

1. Click the **Configuration** tab, and then click the [IP Configuration] button.
2. Select either **Obtain the IP Address from the DHCP Server** or **Use the Static IP Address below**.
3. If you select to use a static IP address, you must manually enter the IP address and subnet mask.
4. If a management station exists on another network segment, enter the IP address of a gateway that can route traffic between these segments.

Using the HP Web Browser Interface

Tasks for Your First HP Web Browser Interface Session

5. Enter the IP address for the primary and secondary DNS servers to be used for host-name to IP address resolution.
6. Click the **[Apply Changes]** button.

Note

If you change the IP address using the web interface, you must log in again using the new address.

The screenshot shows the HP J8130A Wireless Access Point 420 web interface. The page title is "HP J8130A Wireless Access Point 420 - Radio Status : Inactive". The navigation menu includes Identity, Status, Configuration, Security, Administration, and Support. Under Configuration, there are sub-menus for System Information, Port/Radio Settings, IP Configuration (selected), and Filter Control. Below IP Configuration, there are sub-menus for SNMP and SNMP Trap. The main content area is titled "IP Configuration Settings" and contains a "DHCP Client" section with two radio buttons: "Obtain the IP Address from the DHCP Server" (selected) and "Use the Static IP Address below". Below this are five input fields for static IP configuration: IP Address (192.168.1.1), Subnet Mask (255.255.255.0), Default Gateway (0.0.0.0), Primary DNS Address (0.0.0.0), and Secondary DNS Address (0.0.0.0). At the bottom right, there are "Apply Changes" and "Clear Changes" buttons.

Field	Value
IP Address	192.168.1.1
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
Primary DNS Address	0.0.0.0
Secondary DNS Address	0.0.0.0

Figure 4-7. IP Configuration

Configuring Security Settings

The access point is configured by default as an “open system,” which broadcasts a beacon frame including the configured SSID. Wireless clients can read the SSID from the beacon. If the “closed system” option is selected when configuring the access point, the SSID is not broadcast in the beacon frame.

For more secure data transmissions, the access point provides client authentication and data encryption based on shared keys that are distributed to all stations.

Wired Equivalent Privacy (WEP) is implemented to provide a basic level of security, preventing unauthorized access to the network and encrypting data transmitted between wireless clients and the access point.

To implement WEP and set up shared keys, follow these steps:

1. Click the **Security** tab and then the [**Security Suite**] button.
2. Select the wizard option **Static WEP**.
3. Select the key length to be used by all clients, **64**, **128**, or **152** bit.
4. For the **Key Index**, select one key to be used to encrypt data transmitted from the access point.
5. Select the Key Type, **Hex** or **Ascii**.
6. Enter one or more keys conforming the length and type already selected.
7. Click the [**Apply Changes**] button.

Note

The WEP settings must be the same on each client in your wireless network.

WEP is the security protocol initially specified in the IEEE 802.11 standard for wireless communications. While WEP provides a margin of security for environments with light network traffic, it is not sufficient for enterprise use where highly-sensitive data is transmitted.

For more robust wireless security, you should consider implementing other features supported by the access point. Wi-Fi Protected Access (WPA) and IEEE 802.1X provide improved data encryption and user authentication. See “Configuring Wireless Security” on page 5-68.

Using the HP Web Browser Interface

Tasks for Your First HP Web Browser Interface Session

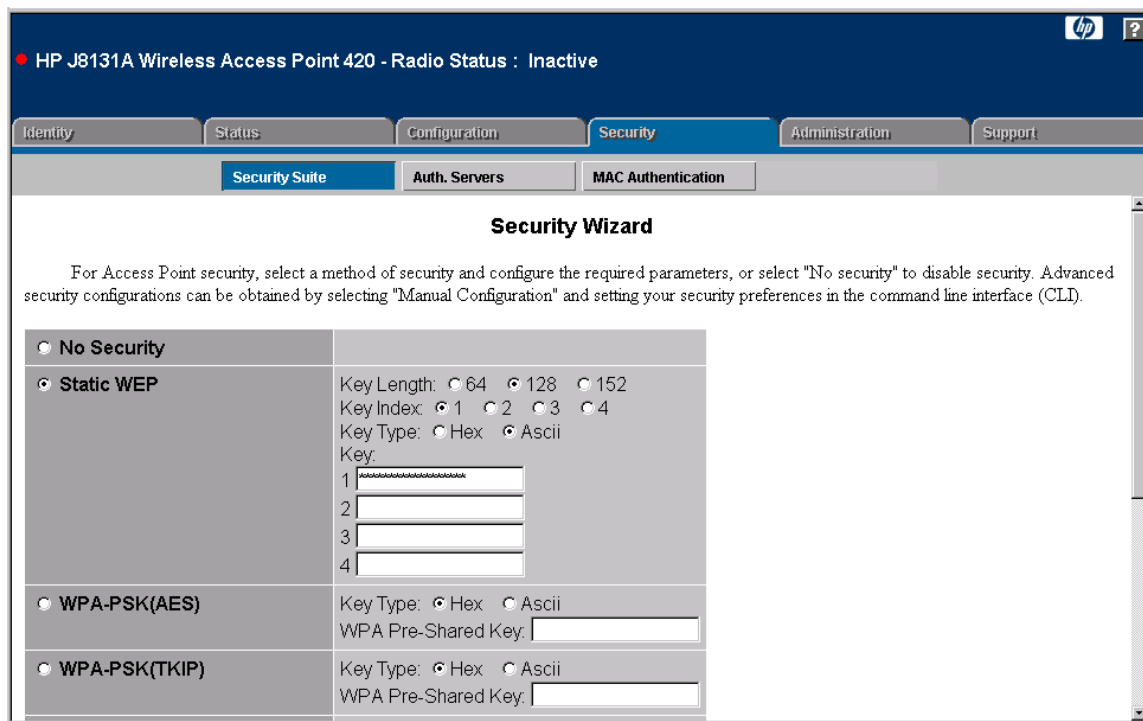


Figure 4-8. Security Settings

Online Help for the HP Web Browser Interface

Online Help is available for the web browser interface. You can use it by clicking on the question mark button in the upper-right corner of any of the web browser interface screens.

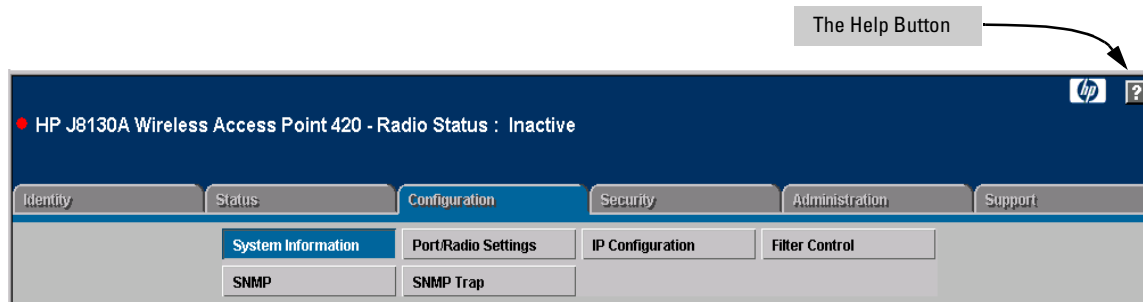


Figure 4-9. The Help Button

Status Reporting Features

Browser elements covered in this section include:

- The AP Status window (below)
- Station status (page 4-19)
- Event logs (page 4-21)
- The Status bar (page 4-22)

The AP Status Window

The AP Status window displays basic system configuration settings, as well as the settings for the wireless interface.

The following figure identifies the various parts of the AP Status window.

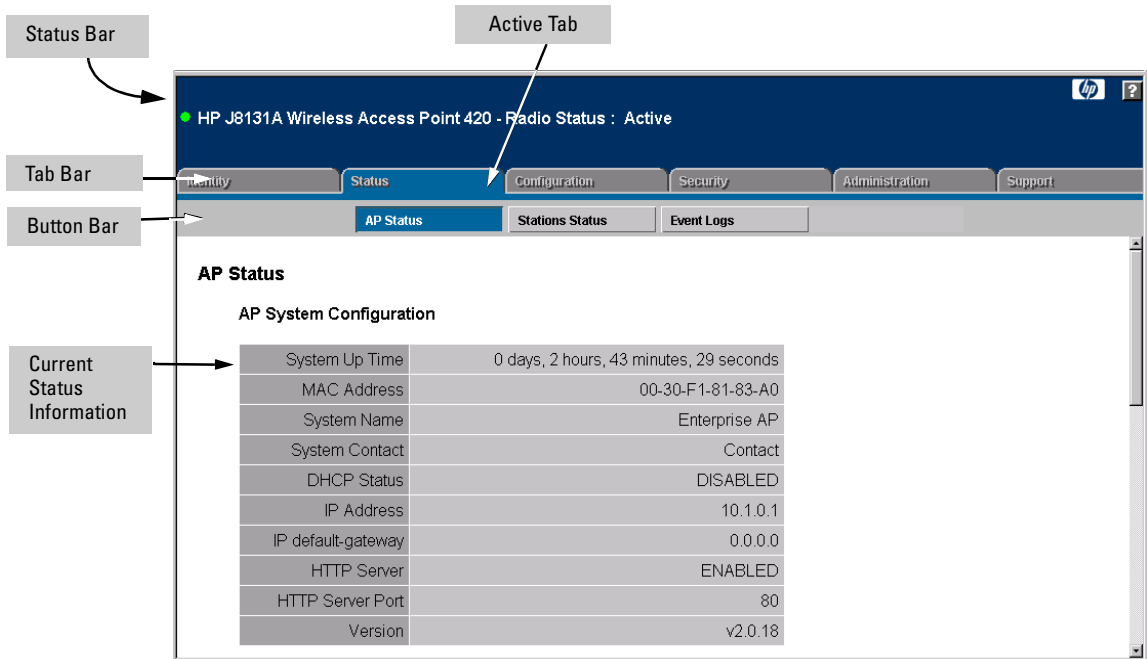


Figure 4-10. The AP Status Window

AP System Configuration. The AP System Configuration table displays the basic system configuration settings:

- **System Up Time:** Length of time the access point has been up.
- **MAC Address:** The physical layer address for this device.
- **System Name:** Name assigned to this system.
- **System Contact:** Administrator responsible for the system.
- **DHCP Status:** Shows if IP configuration is via a DHCP server.
- **IP Address:** IP address of the management interface for this device.
- **IP Default Gateway:** IP address of the gateway router between this device and management stations that exist on other network segments.
- **HTTP Server:** Shows if management access via HTTP is enabled.
- **HTTP Server Port:** Shows the TCP port used by the HTTP interface.
- **Version:** Shows the version number for the runtime software.

AP Wireless Configuration. The AP Wireless Configuration table displays the following wireless interface settings:

- **SSID:** The service set identifier that identifies this wireless group.
- **Radio:** Indicates if the access point is operating in 802.11b, 802.11g, or mixed (b & g) mode.
- **Radio Status:** Indicates if the access point radio is enabled or disabled.
- **Auto Channel Select:** Indicates if the access point automatically selects an unoccupied radio channel.
- **Radio Channel:** The radio channel through which the access point communicates with wireless clients.
- **Radio Encryption:** The key size used for data encryption.
- **Radio Authentication Type:** Shows if open system or shared key authentication is used.
- **802.1x:** Shows if IEEE 802.1X access control for wireless clients is enabled.

AP Ethernet Configuration. The AP Ethernet Configuration table displays the following ethernet interface settings:

- **Subnet Mask:** The mask that identifies the host address bits used for routing to specific subnets.
- **Primary DNS:** The IP address of the primary Domain Name Server on the network.
- **Secondary DNS:** The IP address of the secondary Domain Name Server on the network.

- **Speed-Duplex:** The operating speed and duplex mode of the access point's RJ-45 Ethernet interface.

Station Status

The Station Status window shows the wireless clients currently associated with the access point.

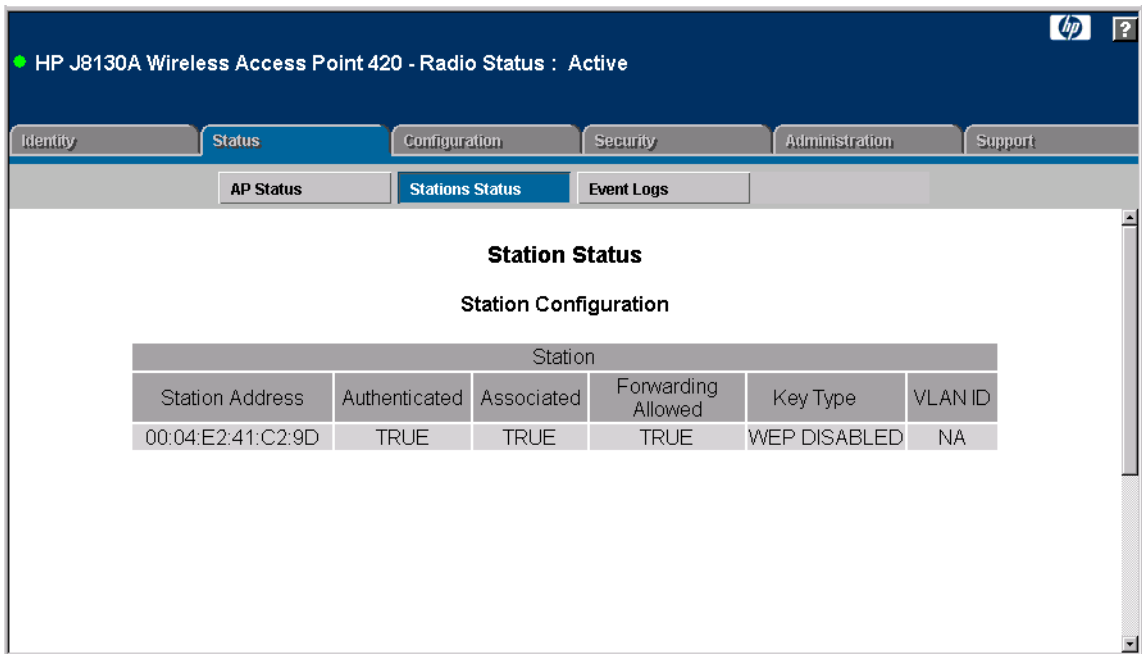


Figure 4-11. The Station Status Window

The Station Configuration table displays the following information:

- **Station Address:** The MAC address of the wireless client.
- **Authenticated:** Shows if the station has been authenticated. The two basic methods of authentication supported for 802.11 wireless networks are “open system” and “shared key.” Open-system authentication accepts any client attempting to connect to the access point without verifying its identity. The shared-key approach uses Wired Equivalent Privacy (WEP) to verify client identity by distributing a shared key to stations before attempting authentication.
- **Associated:** Shows if the station has been successfully associated with the access point. Once authentication is completed, stations can associate with the current access point, or reassociate with a new access point. The

association procedure allows the wireless system to track the location of each mobile client, and ensures that frames destined for each client are forwarded to the appropriate access point.

- **Forwarding Allowed:** If 802.1X is being used shows if the station has passed 802.1X authentication and is now allowed to forward traffic to the access point. If authentication is not required this value is TRUE for all clients.
- **Key Type:** Displays one of the following:
 - **none:** The client is not using encryption keys.
 - **static-wep:** The client is using static WEP keys for encryption.
 - **dynamic-wep:** The client is using 802.1X authentication with dynamic WEP keys.
 - **wpa-tkip:** The client is using Wi-Fi Protected Access (dynamic mode) with TKIP keys.
 - **wpa-aes:** The client is using Wi-Fi Protected Access (dynamic mode) with AES keys.
 - **wpa-psk-tkip:** The client is using Wi-Fi Protected Access (pre-shared key mode) with WEP keys.
 - **wpa-psk-aes:** The client is using Wi-Fi Protected Access (pre-shared key mode) with WEP keys.
- **VLAN ID:** Displays the VLAN ID assigned to the client.

Event Logs

The Event Logs window shows the log messages generated by the access point and stored in memory.

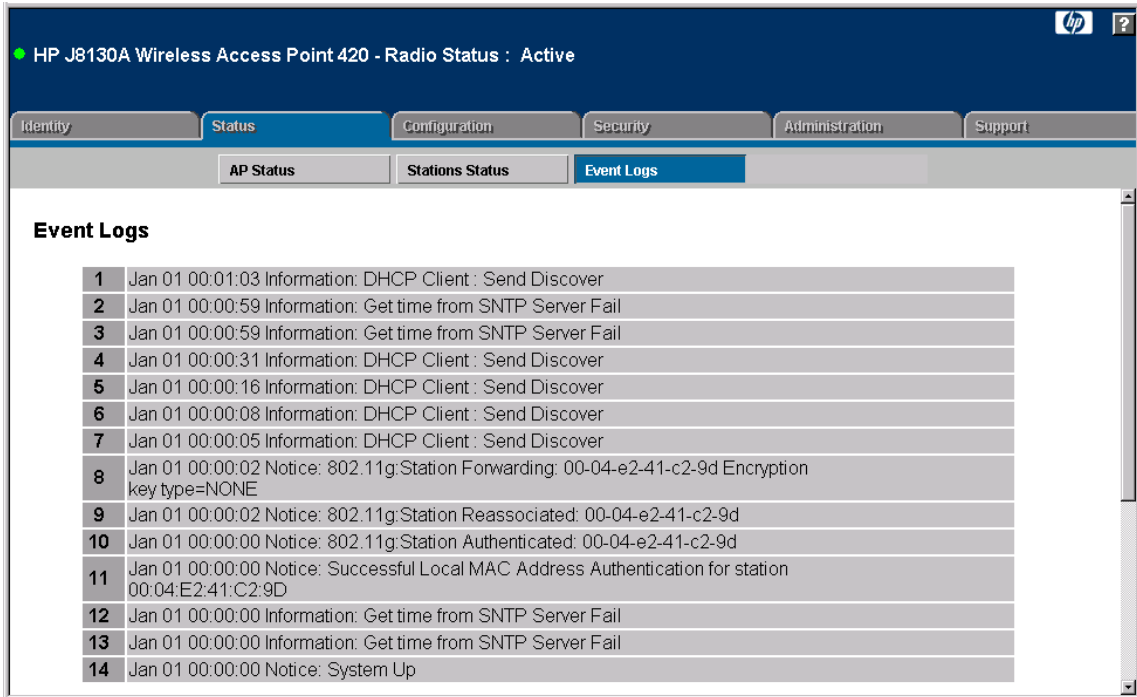


Figure 4-12. The Event Logs Window

The Event Logs table displays the following information:

- **Log Time:** The time the log message was generated.
- **Event Level:** The logging level associated with this message. For a description of the various levels, see “Enabling System Logging” on page 5-31.
- **Event Message:** The content of the log message.

The Status Bar

The Status Bar is displayed in the upper left corner of the web browser interface screen. Figure 4-13 shows an expanded view of the status bar.

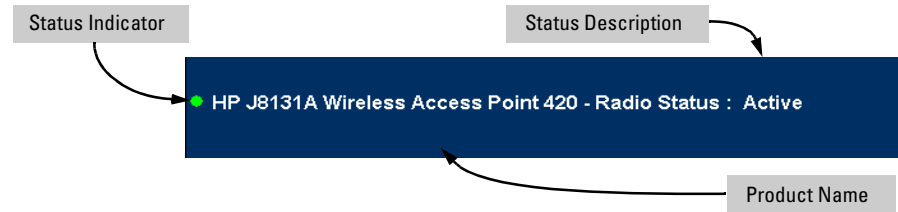


Figure 4-13. Example of the Status Bar

The Status bar consists of three objects:

- **Status Indicator.** Indicates, by icon, the radio status of the access point.
 - **Green:** Indicates the radio is active.
 - **Red:** Indicates the radio is inactive.
- **Status Description.** A text description of the radio status; active or inactive.
- **Product Name.** The product name of the access point to which you are connected in the current web browser interface session.

Access Point Configuration

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Overview

This Chapter describes how to:

- View and modify the configuration for system management access
- View and modify access point system information
- Configure IP settings
- Configure SNMP settings
- Configure SNTP client and manual clock
- Set up RADIUS client authentication
- Set up filter control between wireless clients, between wireless clients and the management interface, or for specified protocol types
- Modify radio settings
- Configure wireless security

Modifying System Management Access

Management access to the access point's web and CLI interface is controlled through a single user name and password. You can also gain additional in-band access security by using control filters (see "Setting up Filter Control" on page 5-47).

Caution

HP strongly recommends that you configure a new Manager password and not use the default. If a Manager password is not configured, then the access point is not password-protected, and anyone having in-band or out-of-band access to the access point may be able to compromise access point and network security.

Pressing the Reset button on the back of the access point for more than five seconds removes password protection. *For this reason, it is recommended that you protect the access point from physical access by unauthorized persons.*

Web: Setting User Names and Passwords

The **Change Password** window enables the access point's management user name and password to be set.

The web interface enables you to modify these parameters:

- **Username:** The name of the user. The default name is "admin." (Length: 3-16 printable ASCII characters, case sensitive.)
- **New Password:** The password for management access. (Length: 3-16 printable ASCII characters, case sensitive) There is no default password.

To Set a User Name and Password:

1. Select the **Administration** tab.
2. Click the [**Change Password**] button.
3. Type a new user name in the **Username** text field.
4. Type a password in the **New Password** text field.
5. Type the password again in the **Confirm New Password** text field.
6. Click the [**Apply Changes**] button.

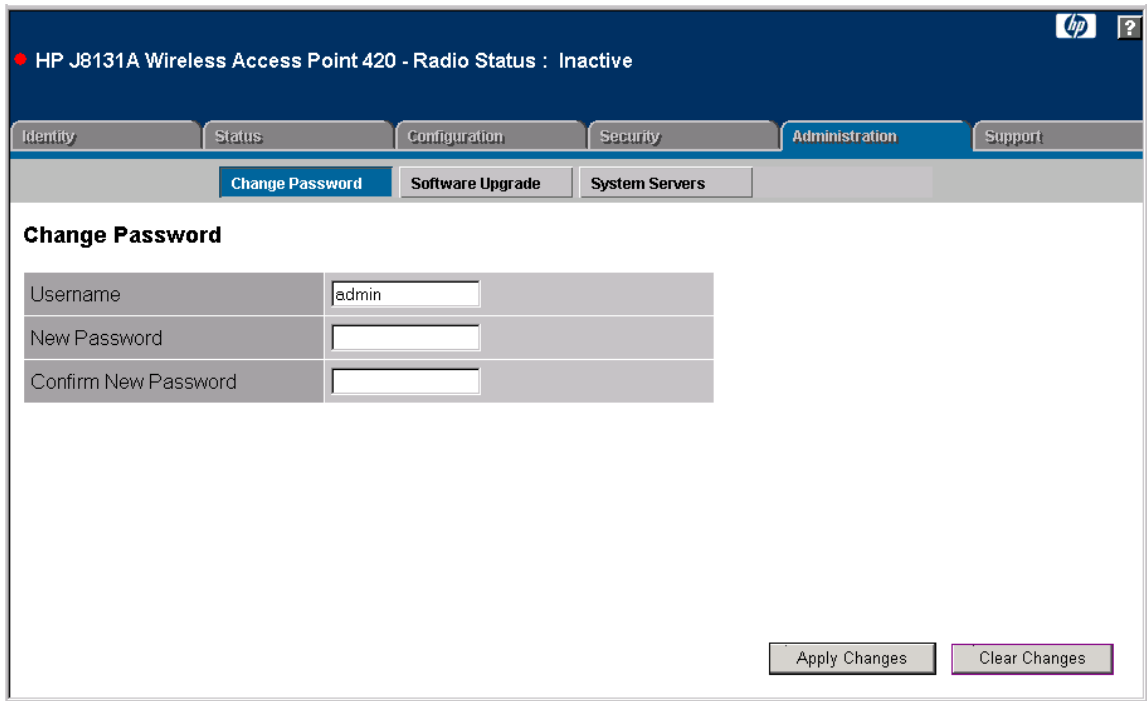


Figure 5-1. The Change Password Window

CLI: Setting User Names and Passwords

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>username <name></code>	page 6-12
<code>[no] password <password></code>	page 6-13

This example shows how to set a new user name and password.

```
HP420(config)#username bob  
HP420(config)#password hp420ap  
HP420(config)#
```

Modifying System Information

The access point's system information parameters can be left at their default settings. However, modifying these parameters can help you to more easily distinguish one device from another in your network.

You should set a Service Set Identification (SSID) to identify the wireless network service provided by the access point. Only clients with the same SSID can associate with the access point.

Web: Setting the System Name and SSID

To modify the access point's system name and radio Service Set Identification (SSID), use the **System Information** window on the **Configuration** tab.

The web interface enables you to modify these parameters:

- **System Name:** An alias for the access point only, enabling the device to be uniquely identified on the network. Users can enter a maximum of 32 characters as a System Name.
- **SSID:** The name of the basic service set provided by the access point. Clients that want to connect to the network through the access point must set their SSIDs to the same as that of the access point. (Range: 1 - 32 characters)

To Set a System Name and SSID:

1. Select the **Configuration** tab.
2. Click the [**System Information**] button.
3. Type a name to identify the access point in the **System Name** text field.
4. Type an identification string in the **SSID** text field.
5. Click the [**Apply Changes**] button.

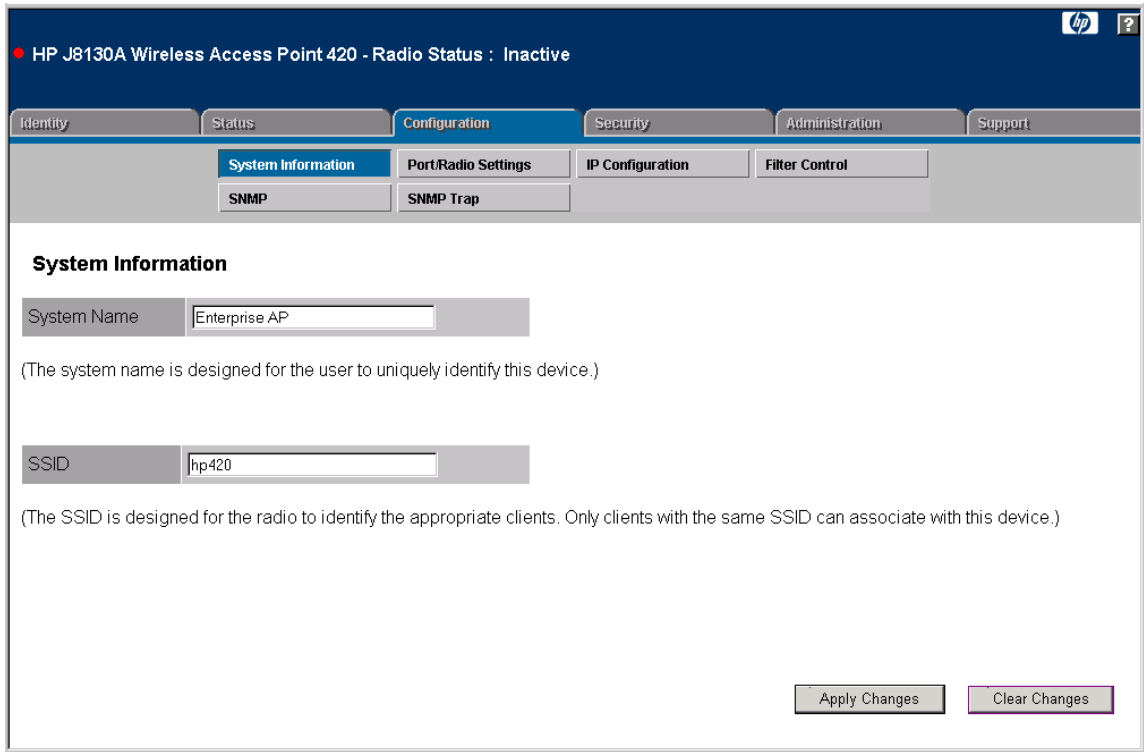


Figure 5-2. The System Information Window

CLI: Setting the System Name and SSID

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
interface <ethernet wireless g>	page 6-62
system name <name>	page 6-12
ssid <string>	page 6-72
show system	page 6-23

The following example shows how to set the system name.

```
HP420(config)#system name AP420
```


To set the SSID to “RD-AP#3” and display it, enter the CLI commands shown in the following example.

```
HP420(config)#interface wireless g
Enter Wireless configuration commands, one per line.
HP420(if-wireless g)#ssid RD-AP#3
HP420(if-wireless g)#show

Wireless Interface Information
=====
-----Identification-----
Description           : Enterpris  e 802.11g Access Point
SSID                  : RD-AP#3
Radio mode            : 802.11b o  nly
Channel                : 3
Status                : Enabled
-----802.11 Parameters-----
Transmit Power        : FULL (18  dBm)
Max Station Data Rate : 11Mbps
Multicast Data Rate   : 5.5Mbps
Fragmentation Threshold : 2346 bytes
RTS Threshold         : 2347 byte  s
Beacon Interval       : 100 TUs
DTIM Interval         : 2 beacons
Preamble Length       : LONG
Slot time              : LONG
Maximum Association   : 128 stati  ons
-----Security-----
Closed System         : DISABLED
802.11 Authentication : OPEN
WPA clients           : SUPPORTED
802.1x                 : DISABLED
Encryption            : DISABLED
**[WEP key]*****
Key Length            : -----
Default Transmit Key  : 1
Cipher                : WEP
WEP Key Data Type     : Hexadecim  al
Static Keys :
Key 1: EMPTY Key 2: EMPTY Key 3: EMPTY Key 4: EMPTY
**[WPA key]*****
WPA mode              : Dynamic k  ey
Multicast cipher      : WEP
Unicast cipher        : TKIP
Pre-shared Key Data Type : Hexadecimal
```

Access Point Configuration
Modifying System Information

```
-----Antenna-----
Antenna mode           : Single
Antenna gain attenuation
  Low channe   1      : 100%
  Mid channe   1      : 100%
  High chann   e1     : 100%
=====
HP420(if-wireless g)#
```

To display the configured system name, use the **show system** command, as shown in the following example.

```
HP420#show system
System Information
=====
Serial Number          : A252014354
System Up time         : 0 days, 1 hours, 28 minutes, 9 seconds
System Name            : AP420
System Location        :
System Contact         : Contact
System Country Code    : NA - North America
MAC Address            : 00-30-F1-81-83-12
IP Address             : 192.168.1.1
Subnet Mask            : 255.255.255.0
Default Gateway        : 0.0.0.0
VLAN State             : DISABLED
Native VLAN ID         : 1
IAPP State             : ENABLED
DHCP Client            : ENABLED
HTTP Server            : ENABLED
HTTP Server Port       : 80
Slot Status            : Dual band(b/g)
Software Version       : v2.0.38.0B032
=====
HP420#
```

Configuring IP Settings

Configuring the access point with an IP address expands your ability to manage the access point and use its features. A number of access point features depend on IP addressing to operate.

Note

You can use the web browser interface to access IP addressing only if the access point already has an IP address that is reachable through your network.

By default, the access point is configured to automatically receive IP addressing from a Dynamic Host Configuration Protocol (DHCP) server. However, if you are not using a DHCP server to configure IP addressing, use the CLI to manually configure the initial IP values. After you have network access to the access point, you can use the web browser interface to modify the initial IP configuration, if needed.

Note

If there is no DHCP server on your network, or DHCP fails, the access point will automatically start up with a default IP address of 192.168.1.1.

Web: Configuring IP Settings Statically or via DHCP

The **IP Configuration** window on the **Configuration** tab enables the DHCP client to be enabled or the Transmission Control Protocol/Internet Protocol (TCP/IP) settings to be manually specified.

The web interface enables you to modify these parameters:

- **Obtain the IP Address from the DHCP Server:** The DHCP client is enabled. The IP address, subnet mask, default gateway, and Domain Name Server (DNS) address are dynamically assigned to the access point by the network DHCP server.
- **Use the Static IP Address Below:** The DHCP client is disabled. The IP address settings are configured manually.
 - **IP Address:** The IP address of the access point. Valid IP addresses consist of four decimal numbers, 0 to 255, separated by periods.
 - **Subnet Mask:** The mask that identifies the host address bits used for routing to specific subnets.
 - **Default Gateway:** The default gateway is the IP address of the next-hop gateway router for the access point, which is used if the requested destination address is not on the local subnet.

- **Primary and Secondary DNS Address:** The IP address of Domain Name Servers on the network. A DNS maps numerical IP addresses to domain names and can be used to identify network hosts by familiar names instead of the IP addresses.

To Enable the DHCP Client:

1. Select the **Configuration** tab.
2. Click the [**IP Configuration**] button.
3. Select **Obtain the IP Address from the DHCP Server**.
4. Click the [**Apply Changes**] button.

To Configure IP Settings Manually:

1. Select the **Configuration** tab.
2. Click the [**IP Configuration**] button.
3. Select **Use the Static IP Address below**.
4. Type the IP address and the subnet mask in the text fields provided.
5. (Optional) If you have management stations, DNS, Radius, or other network servers located on another subnet, type the IP address of the default gateway router in the text field provided. Otherwise, leave the address as all zeros (0.0.0.0).
6. (Optional) If you have one or more DNS servers located on the local network, type the IP addresses in the text fields provided. Otherwise, leave the addresses as all zeros (0.0.0.0).
7. Click the [**Apply Changes**] button.

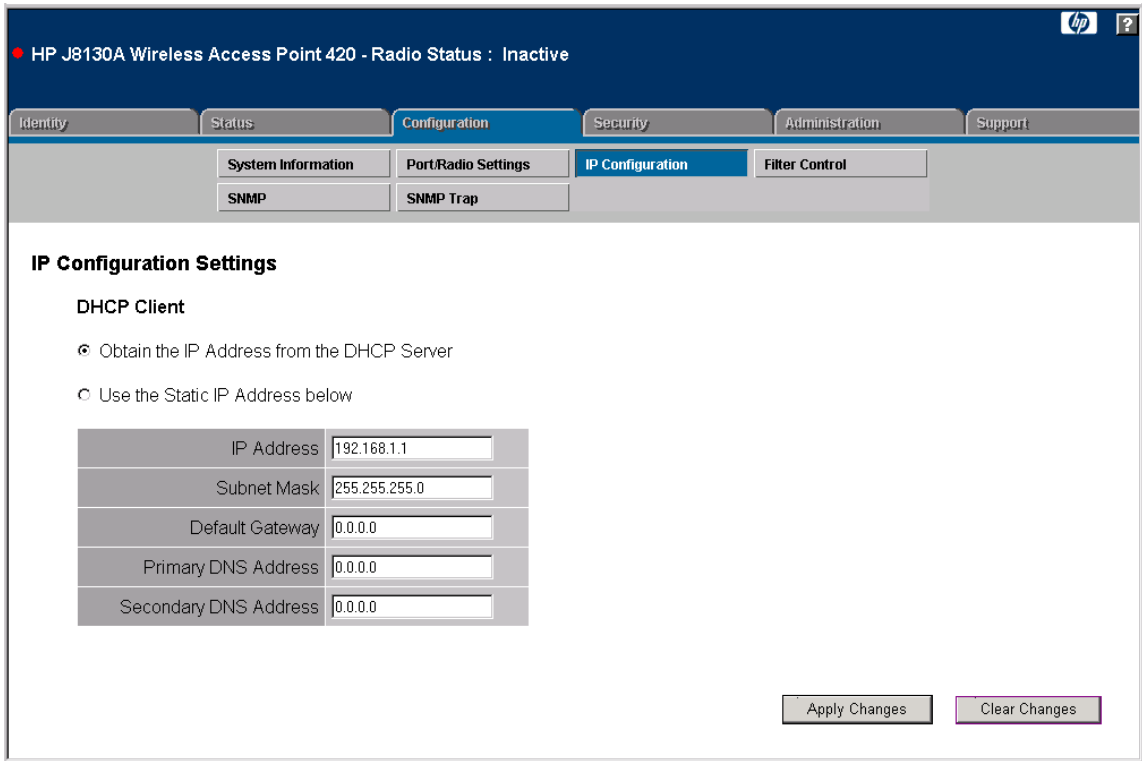


Figure 5-3. The IP Configuration Window

CLI: Configuring IP Settings Statically or via DHCP

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
interface <ethernet wireless g>	page 6-62
[no] ip address <ip-address> <netmask> <gateway>	page 6-63
[no] ip dhcp	page 6-64
dns primary-server <server-address>	page 6-62
dns secondary-server <server-address>	page 6-62
show interface [ethernet]	page 6-66

The following example shows how to enable the DHCP client.

```
HP420(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
HP420(if-ethernet)#ip dhcp
HP420(if-ethernet)#
```

To set the access point's IP parameters manually, you must first disable the DHCP client. The following example shows how to disable the DHCP client and then specify an IP address, subnet mask, default gateway, and DNS server addresses.

```
HP420(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
HP420(if-ethernet)#no ip dhcp
HP420(if-ethernet)#ip address 10.1.0.1 255.255.255.0
10.1.0.254
HP420(if-ethernet)#dns primary-server 10.1.0.55
HP420(if-ethernet)#dns secondary-server 10.1.2.19
HP420(if-ethernet)#
```

To display the current IP settings from the Ethernet interface configuration context, use the **show** command. To display the current IP settings from the Exec level, use the **show interface ethernet** command as shown in the following example.

```
HP420#show interface ethernet
Ethernet Interface Information
=====
IP Address           : 10.1.0.1
Subnet Mask          : 255.255.255.0
Default Gateway      : 10.1.0.254
Primary DNS          : 10.1.0.55
Secondary DNS        : 10.1.2.19
Speed-duplex         : 100Base-TX Half Duplex
Admin status         : Up
Operational status   : Up
=====
HP420#
```

Configuring SNMP

You can use a network management application such as HP ProCurve Manager to manage the access point via the Simple Network Management Protocol (SNMP) from a network management station. To implement SNMP management, the access point must have an IP address and subnet mask, configured either manually or dynamically.

You can configure the access point to respond to SNMP requests and generate SNMP traps. When SNMP management stations send requests to the access point (either to return information or to set a parameter), it provides the requested data or sets the specified parameter. The access point can also be configured to send information to SNMP managers through trap messages, which inform the manager that certain events have occurred.

The access point SNMP agent supports SNMP versions 1, 2c, and 3. Management access from SNMP v1 or v2c stations is controlled by community names. To communicate with the access point, an SNMP v1 or v2c management station must first submit a valid community name for authentication. If you intend to support SNMP v1 or v2c managers, you need to assign community names and set the access level.

Management access from SNMP v3 stations provides additional security features that cover message integrity, authentication, and encryption. To support access from SNMP v3 management stations, you need to define users, assign them to a group, and set the authentication and encryption security level. The access point can also send trap messages to SNMP v3 managers by specifying the “target” management station and user.

Note

The access point supports the following Management Information Bases (MIBs): HP proprietary MIB, SNMPv2 MIB, 802.11 MIB and MIB II.

Web: Setting Basic SNMP Parameters

The **SNMP** window on the **Configuration** tab controls management access to the access point from management stations using SNMP.

The web interface enables you to modify these parameters:

- **SNMP:** Enables or disables SNMP management access and also enables the access point to send SNMP traps (notifications). SNMP management is enabled by default.

- **Location:** A text string that describes the system location. (Maximum length: 255 characters)
- **Contact:** A text string that describes the system contact. (Maximum length: 255 characters)
- **Community Name (Read/Write):** Defines the SNMP community access string that has read/write access. Authorized management stations are able to both retrieve and modify MIB objects. (Maximum length: 32 characters, case sensitive)
- **Community Name (Read Only):** Defines the SNMP community access string that has read-only access. Authorized management stations are only able to retrieve MIB objects. (Maximum length: 32 characters, case sensitive)

To Enable SNMP and Set Parameters:

1. Select the **Configuration** tab.
2. Click the [**SNMP**] button.
3. Select **Enable** to enable SNMP management.
4. Type text strings to replace the default community names for read-only and read/write access. (Recommended for security.)
5. (Optional) Type a text string to identify the location of the access point in the **Location** text field.
6. (Optional) Type a text string or name to identify a system administration contact in the **Contact** text field.
7. Click the [**Apply Changes**] button.

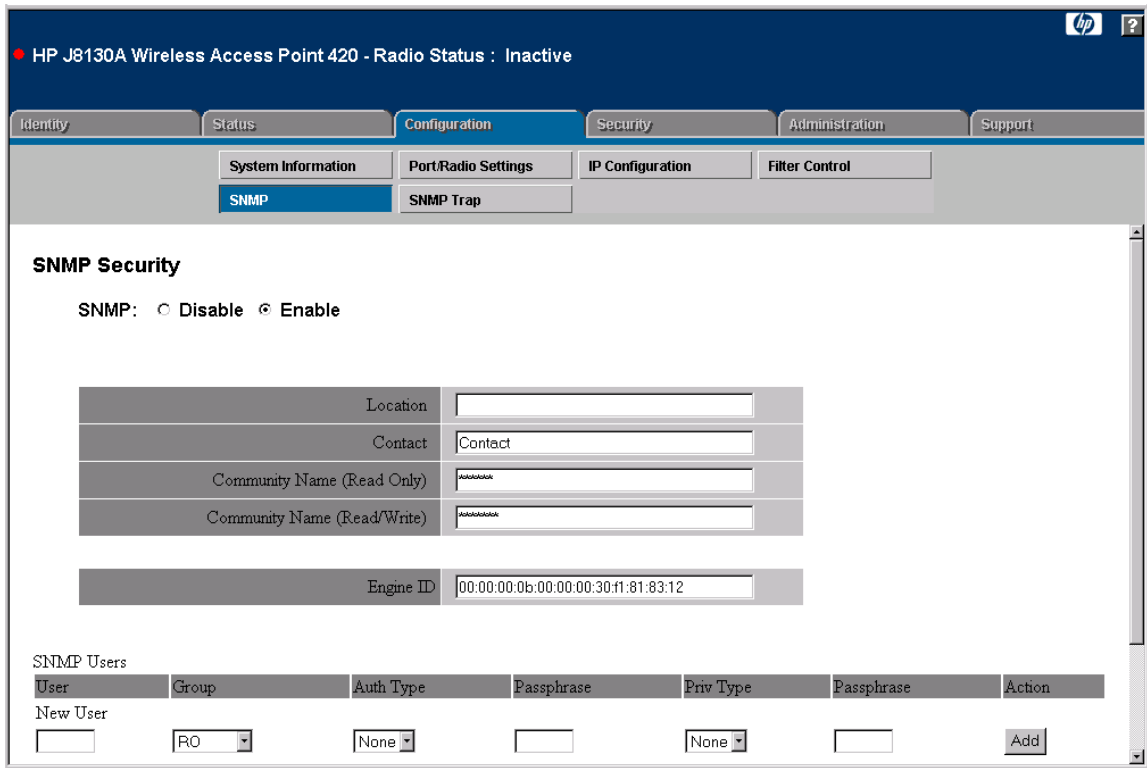


Figure 5-4. The SNMP Window

CLI: Setting Basic SNMP Parameters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>[no] snmp-server enable server</code>	page 6-27
<code>[no] snmp-server community <string> [ro rw]</code>	page 6-26
<code>[no] snmp-server contact <string></code>	page 6-27
<code>[no] snmp-server location <text></code>	page 6-31
<code>show snmp-server</code>	page 6-38

Access Point Configuration

Configuring SNMP

SNMP management on the access point is enabled by default. To disable SNMP management, type the following command:

```
HP420(config)#no snmp-server enable server
```

The following example shows how to enable SNMP, configure the community strings, and set the location and contact parameters.

```
HP420(config)#snmp-server enable server
HP420(config)#snmp-server community alpha rw
HP420(config)#snmp-server community beta ro
HP420(config)#snmp-server location 2F-R19
HP420(config)#snmp-server contact Paul
HP420(config)#
```

To display the current SNMP settings from the Exec level, use the **show snmp-server** command, as shown in the following example.

```

HP420#show snmp-server

SNMP Information
=====
Service State   : Enable
Community (ro)  : *****
Community (rw)  : *****
Location        : 2F-R19
Contact         : Paul

EngineId       :80:00:07:e5:80:00:00:2e:62:00:00:00:18
EngineBoots:1

Trap Destinations:
  1:          0.0.0.0, Community: *****, State: Disabled
  2:          0.0.0.0, Community: *****, State: Disabled
  3:          0.0.0.0, Community: *****, State: Disabled
  4:          0.0.0.0, Community: *****, State: Disabled

      systemDown Enabled          systemUp Enabled
dot11StationAssociation Enabled    dot11StationAuthentication Enabled
dot11StationReAssociation Enabled   dot11StationRequestFail Enabled
      dot1xAuthFail Enabled        dot1xAuthNotInitiated Enabled
      dot1xAuthSuccess Enabled      dot1xMacAddrAuthFail Enabled
dot1xMacAddrAuthSuccess Enabled     iappContextDataSent Enabled
      iappStationRoamedFrom Enabled  iappStationRoamedTo Enabled
      localMacAddrAuthFail Enabled   localMacAddrAuthSuccess Enabled
configFileVersionChanged Enabled    radiusServerChanged Enabled
      dot11InterfaceFail Enabled     snmpServerFail Enabled

=====
HP420#

```

Web: Configuring SNMP v3 Users

The **SNMP** window on the **Configuration** tab also enables the configuration of SNMP v3 users and the engine ID.

An SNMP v3 engine is an independent SNMP agent that resides on the access point and is identified by an ID number. This engine protects against message replay, delay, and redirection. The engine ID is also used in combination with user passwords to generate the security keys for authenticating and encrypting SNMP v3 packets.

The web interface enables you to modify these parameters:

- **Engine ID:** An engine ID is automatically generated that is unique to the access point. This is referred to as the default engine ID. If the engine ID is deleted or changed, all SNMP users will be cleared. You will need to reconfigure all existing users. Therefore, if you want to change the default engine ID, it must be changed first before configuring other SNMP v3 parameters.
- **SNMP Users:** Each SNMP v3 user is defined by a unique name. Users must be configured with a specific security level and assigned to a group. The access point allows up to 10 SNMP v3 users to be configured.
 - **Group:** Users must be assigned to one of three pre-defined groups. Other groups cannot be defined. The available groups are:
 - **RO** - A read-only group using no authentication and no data encryption. Users in this group use no security, either authentication or encryption, in SNMP messages they send to the agent. This is the same as SNMP v1 or SNMP v2c.
 - **RWAuth** - A read/write group using authentication, but no data encryption. Users in this group send SNMP messages that use an MD5 password for authentication, but not a DES key for encryption.
 - **RWPriv** - A read/write group using authentication and data encryption. Users in this group send SNMP messages that use an MD5 password for authentication and a DES key for encryption. Both the MD5 password and DES key must be defined.
 - **Auth Type:** The authentication type used for the SNMP user; either MD5 or none. When MD5 is selected, a password must be entered in the following **Passphrase** field.
 - **Priv Type:** The data encryption type used for the SNMP user; either DES or none. When DES is selected, a key must be entered in the following **Passphrase** field.

Note

SNMPv3 Users must be assigned to groups that have the same security levels. If a user who has “AuthPriv” security (uses authentication and encryption) is assigned to a read-only (RO) group, the user will not be able to access the database. An AuthPriv user must be assigned to the RWPriv group with the AuthPriv security level. See “snmpv3 user” on page 6-32 for more information.

To Configure SNMP v3 Users:

1. Select the **Configuration** tab.
2. Click the [**SNMP**] button.
3. (Optional) If you want to change the default engine ID, enter the new ID and click the [**Apply Changes**] button first before making other configuration changes.
4. Under **SNMP Users**, type a name in the **New User** field. User names are case sensitive and can be up to 32 characters maximum.
5. Assign the user to a group by selecting **RO**, **RWAuth**, or **RWPriv** from the **Group** drop-down list.
 - a. If the user is assigned to the **RWAuth** or **RWPriv** group, select **MD5** from the **Auth Type** drop-down list and enter a password. The password must be between 8 and 32 ASCII characters and can include spaces.
 - b. If the user is assigned to the **RWPriv** group, also select **DES** from the **Priv Type** drop-down list and enter a key. The key must be between 8 and 32 ASCII characters and can include spaces.
6. Click the [**Add**] button to add the new user to the **User List**.

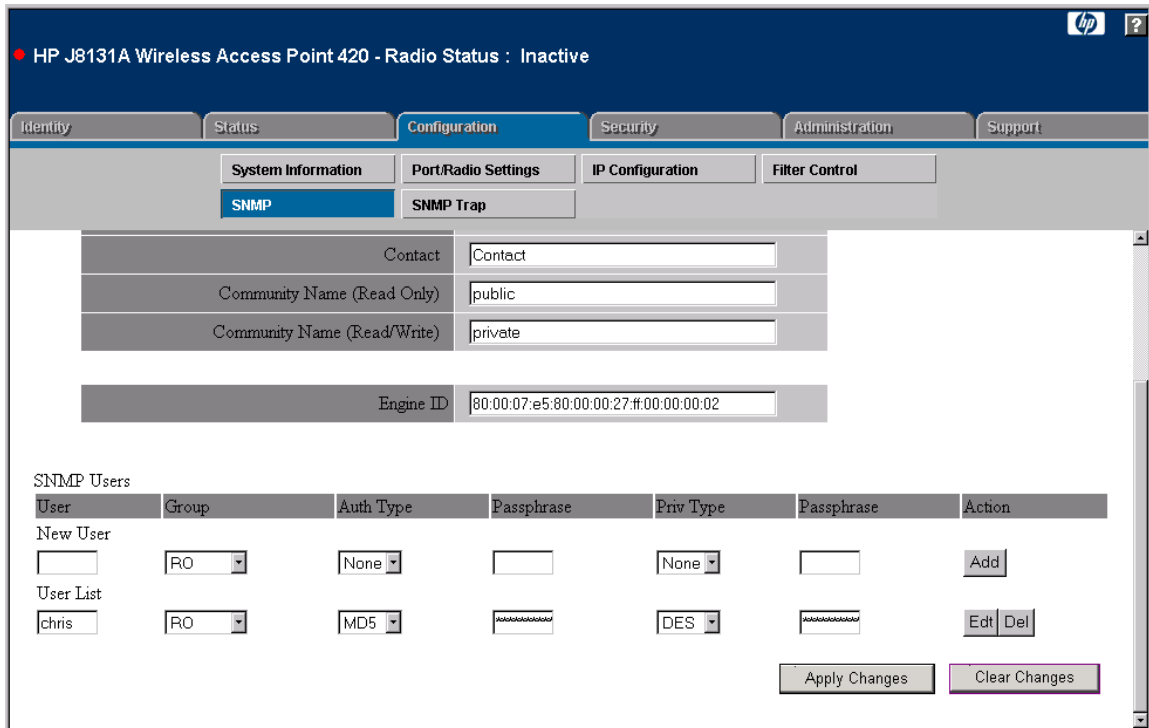


Figure 5-5. Configuring SNMPv3 Users

CLI: Configuring SNMP v3 Users

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>[no] snmpv3 engine-id <engine-id></code>	page 6-31
<code>[no] snmpv3 user [<user-name>]</code>	page 6-32
<code>show snmpv3</code>	page 6-37

Using the CLI to Set an Engine ID. A new engine ID can be specified by entering 5 to 32 hexadecimal characters using the format `xx:xx:xx:xx` (for example, `1a:2b:3c:4d:00:ff`). To set a new engine ID, type the following command:

```
HP420(config)#snmp-server engine-id 1a:2b:3c:4d:5e:6f:70
```

Using the CLI to Configure SNMP v3 Users. The following example shows how to create an SNMP v3 user, assign the user to the RWPriv group, and set authentication and encryption parameters.

```
HP420(config)#snmpv3 user
User Name<1-32>      :chris
Group Name<1-32>     :RWPriv
Authtype(md5,<cr>none):md5
    Passphrase<8-32>:a good secret
Privacy(des,<cr>none):des
    Passphrase<8-32>:a very good secret
HP420(config)#
```

Note

The group names, authentication and privacy types are case sensitive. For example, **RWPriv** cannot be entered as “rwpriv” and **md5** cannot be entered as “MD5.”

Web: Configuring SNMP v3 Trap Targets and filters

The **SNMP Trap** window on the **Configuration** tab enables SNMP v3 users to be configured to receive notification messages (traps) from the access point. An SNMP Target ID is created that specifies the SNMP v3 user, IP address, and UDP port. By default, all trap messages are enabled and sent to configured Target IDs. User-defined trap filters can be created and assigned to Target IDs so that only specified traps are sent.

The access point allows up to 10 Target IDs and 10 trap filters to be created. Each filter can be defined by up to 20 MIB subtree ID entries.

The web interface enables you to modify these parameters:

- **SNMP Targets:** Configures SNMP v3 trap targets.
 - **Target ID** – A user-defined name that identifies a receiver of traps. (Maximum length: 32 characters)
 - **IP Address** – Specifies the IP address of the receiving management station.
 - **UDP Port** – The UDP port that is used on the receiving management station for trap messages.
 - **SNMP User** – The defined SNMP v3 user that is to receive trap messages. (Note that SNMP v3 users must first be defined.)
 - **Assigned Filter** – The name of a user-defined trap filter that is applied to the target. If no filter is assigned to the target, all traps are sent.

- **SNMP Trap Filters:** Configures SNMP v3 trap filters.
 - **Filter ID** – A user-defined name that identifies the filter. (Maximum length: 32 characters)
 - **Subtree OID** – Specifies the MIB subtree to be filtered. The OID can specify one trap or include all the traps under the OID subtree. The MIB subtree must be defined in the form “.1.3.6.1” and always start with a “.”. A full list of supported traps and OIDs are provided on page 5-27. The **[Edit]** button can be used to add up to 20 OID subtrees to the same filter.
 - **Filter Type** – Indicates if the MIB subtree traps specified by the Subtree OID are to be sent to the receiving target.
 - **Include:** The MIB subtree traps are to be sent to the assigned receiving target.
 - **Exclude:** The MIB subtree traps are not to be sent to the assigned receiving target.

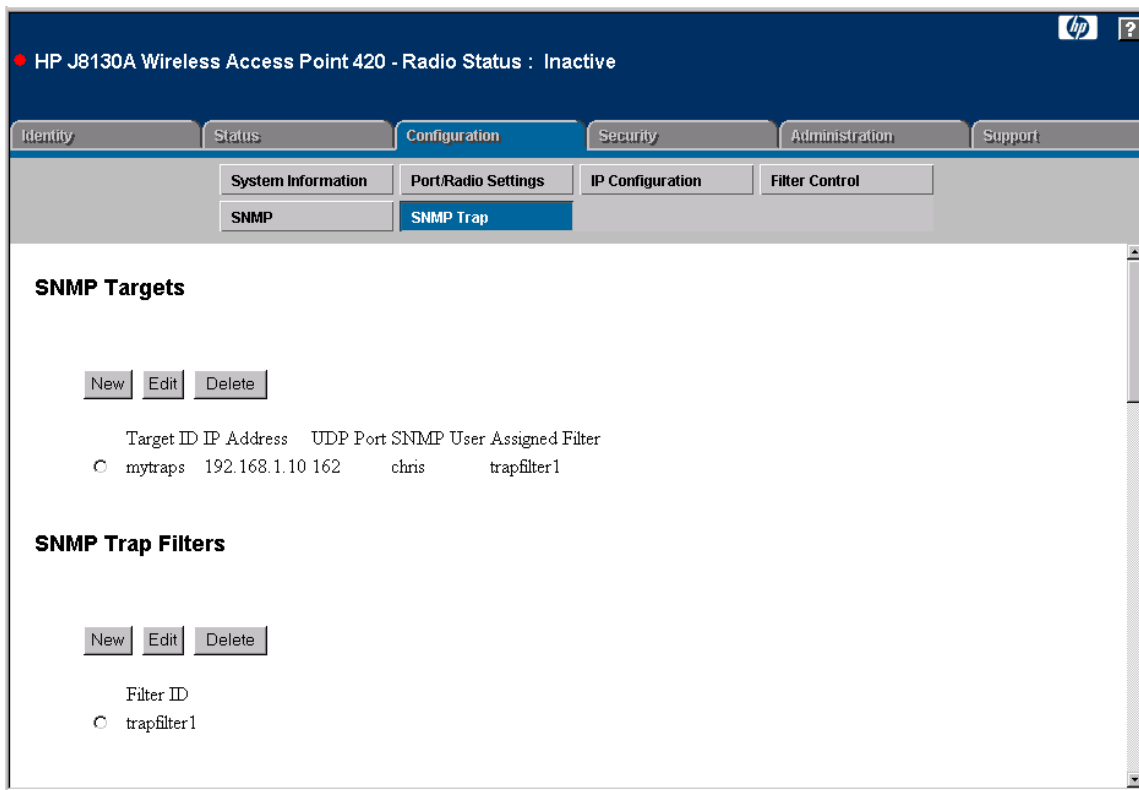


Figure 5-6. Creating SNMP v3 Trap Targets and Filters

To Create SNMP Trap Targets:

1. Select the **Configuration** tab.
2. Click the [SNMP Trap] button.
3. Click the [New] button under **SNMP Targets**.
4. In the **SNMP Target Address** window, type a name for the **Target ID**.
5. Specify the IP address of the receiving management station and the UDP port used.
6. Type the SNMP v3 user name of the trap receiver. (User names must first be created using the web interface or CLI.)
7. (Optional) Assign a trap filter by selecting the filter name from the drop-down list. If a filter is not assigned to the Target ID, all traps are sent. (Trap filter must first be created for the name to appear in the drop-down list.)
8. Click the [Apply Changes] button to return to the **SNMP Trap** window where the new target ID appears in the **SNMP Targets** list.

The screenshot shows the configuration interface for an HP J8130A Wireless Access Point 420. The top navigation bar includes tabs for Identity, Status, Configuration (selected), Security, Administration, and Support. Under the Configuration tab, there are sub-tabs for System Information, Port/Radio Settings, IP Configuration, and Filter Control. The SNMP Trap sub-tab is active. The main content area is titled "SNMP Target Address" and contains a form with the following fields:

Target ID	traptarget
IP Address	192.168.1.10
UDP Port	162
SNMP User	chris

Below the form is an "Optional Filter Assignment" dropdown menu. At the bottom right, there are two buttons: "Apply Changes" and "Clear Changes".

Figure 5-7. Creating SNMP Trap Targets

To Create SNMP Trap Filters:

1. Select the **Configuration** tab.
2. Click the [**SNMP Trap**] button.
3. Click on the [**New**] button under **SNMP Trap Filters**.

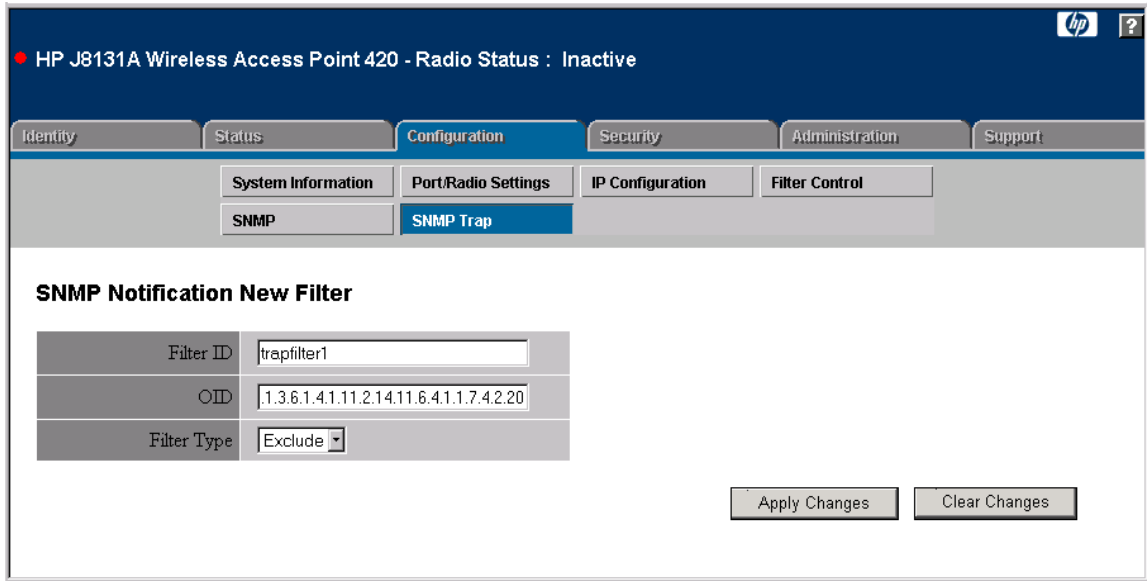


Figure 5-8. Creating SNMP Trap Filters

4. In the **SNMP Notification New Filter** window, type a name for the filter.
5. Specify a MIB subtree OID to filter.
6. Select the filter type, either **Exclude** or **Include**. MIB objects in the filter set to **Include** are sent to the receiving target and objects set to **Exclude** are not sent. By default, all traps are sent to configured targets.
7. Click the [**Apply Changes**] button to return to the **SNMP Trap** window.
8. (Optional) Add other MIB subtree OIDs to the filter by selecting the filter ID and clicking the [**Edit**] button. You can specify multiple **Exclude** or **Include** OID subtrees to define a filter. The filter entries are applied in the defined sequence.

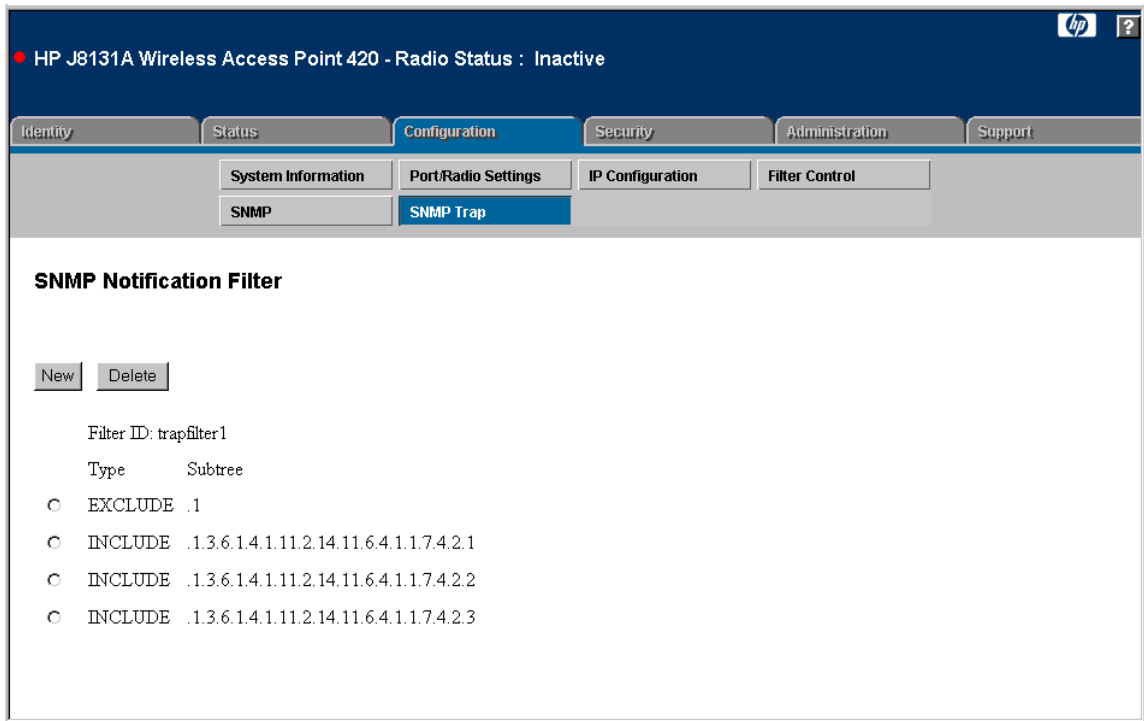


Figure 5-9. Adding SNMP Trap Filter Objects

CLI: Configuring SNMP v3 Trap Targets and Filters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>[no] snmpv3 filter <filter-id> <include exclude> <subtree></code>	page 6-35
<code>[no] snmpv3 filter-assignments <target-id> <filter-id></code>	page 6-36
<code>[no] snmpv3 targets <target-id> <ip-addr> <sec-name> [version {3}] [udp-port {port-number}] [notification-type {TRAP}]</code>	page 6-34
<code>show snmpv3</code>	page 6-37

Creating SNMP v3 Trap Filters. To create a notification filter, use the **snmp-server filter** command from the CLI configuration mode. Use the command more than once with the same filter ID to build a filter that specifies multiple MIB objects. To view the current SNMP filters, use the **show snmpv3** command from the CLI Exec mode.

The following example creates a filter ID “trapfilter” that sends only dot11StationAssociation and dot11StationReAssociation traps to the assigned receiving target. By default all traps are sent, so you must first “exclude” all trap objects. You can then “include” the required trap objects to send to the target. Note that the filter entries are applied in the sequence that they are defined.

```
HP420(config)#snmpv3 filter trapfilter exclude .1
HP420(config)#snmpv3 filter trapfilter include
.1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.1
HP420(config)#snmpv3 filter trapfilter include
.1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.2
HP420(config)#
```

Creating SNMP v3 Trap Targets and Assigning Filters. To create a trap target, use the **snmp-server targets** command from the CLI configuration mode. If no filter is assigned to a target, all traps are sent. To assign a filter to a target, use the **snmp-server filter-assignments** command. (Note that the filter must first be configured.) To view the current SNMP targets and filter assignments, use the **show snmpv3** command from the CLI Exec mode.

```
HP420(config)#snmpv3 targets mytraps 192.168.1.33 chris
HP420(config)#snmpv3 filter-assignments mytraps trapfilter
HP420(config)#
```

Web: Configuring SNMP v1 and v2c Trap Destinations

The **SNMP Trap** window on the **Configuration** tab provides configuration for SNMP v1 and v2c trap notifications that can be sent to specified management stations.

The web interface enables you to modify these parameters:

- **Trap Destination (1 to 4):** Enables recipients (up to four) of SNMP notifications. For each destination, enter the IP address or the host name, and the community name.
- **Trap Destination IP Address:** Specifies the IP address or the host name (from 1 to 20 characters) for the recipient of SNMP notifications.

- **Trap Destination Community Name:** The community string sent with the notification operation. (Maximum length: 32 characters)
- **Trap Configuration:** Allows selection of specific SNMP notifications to send (includes traps for SNMP v1 and v2c hosts and v3 targets). The following are available:
 - **sysSystemDown** – The access point is about to shutdown and reboot. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.18)
 - **sysSystemUp** – The access point is up and running. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.17)
 - **sysRadiusServerChanged** – The access point has changed from the primary RADIUS server to the secondary, or from the secondary to the primary. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.19)
 - **sysConfigFileVersionChanged** – The access point's configuration file has been changed. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.20)
 - **dot11StationAssociation** – A client station has successfully associated with the access point. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.1)
 - **dot11StationReAssociation** – A client station has successfully re-associated with the access point. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.2)
 - **dot11StationAuthentication** – A client station has been successfully authenticated. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.3)
 - **dot11StationRequestFail** – A client station has failed association, re-association, or authentication. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.4)
 - **dot11InterfaceFail** – The 802.11g interface has failed. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.5)
 - **dot1xMacAddrAuthSuccess** – A client station has successfully authenticated its MAC address with the RADIUS server. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.6)
 - **dot1xMacAddrAuthFail** – A client station has failed MAC address authentication with the RADIUS server. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.7)
 - **dot1xAuthNotInitiated** – A client station did not initiate 802.1X authentication. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.8)
 - **dot1xAuthSuccess** – A 802.1X client station has been successfully authenticated by the RADIUS server. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.9)

- **dot1xAuthFail** – A 802.1X client station has failed RADIUS authentication. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.10)
- **localMacAddrAuthSuccess** – A client station has successfully authenticated its MAC address with the local database on the access point. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.11)
- **localMacAddrAuthFail** – A client station has failed authentication with the local MAC address database on the access point. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.12)
- **iappStationRoamedFrom** – A client station has roamed from another access point (identified by its IP address). (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.13)
- **iappStationRoamedTo** – A client station has roamed to another access point (identified by its IP address). (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.14)
- **iappContextDataSent** – A client station's Context Data has been sent to another access point with which the station has associated. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.15)
- **sntpServerFail** – The access point has failed to set the time from the configured SNTP server. (Object ID: 1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.16)

To Configure SNMP Trap Destinations:

1. Select the **Configuration** tab.
2. Click the [**SNMP Trap**] button.
3. Type the IP address in the **Trap Destination IP Address** field and specify one of the configured community names in the **Trap Destination Community Name** field.
4. Under **Trap Configuration**, check or clear the required traps, or use the [**Enable All Traps**] or [**Disable All Traps**] buttons to select or unselect all supported traps.
5. Click the [**Apply Changes**] button.

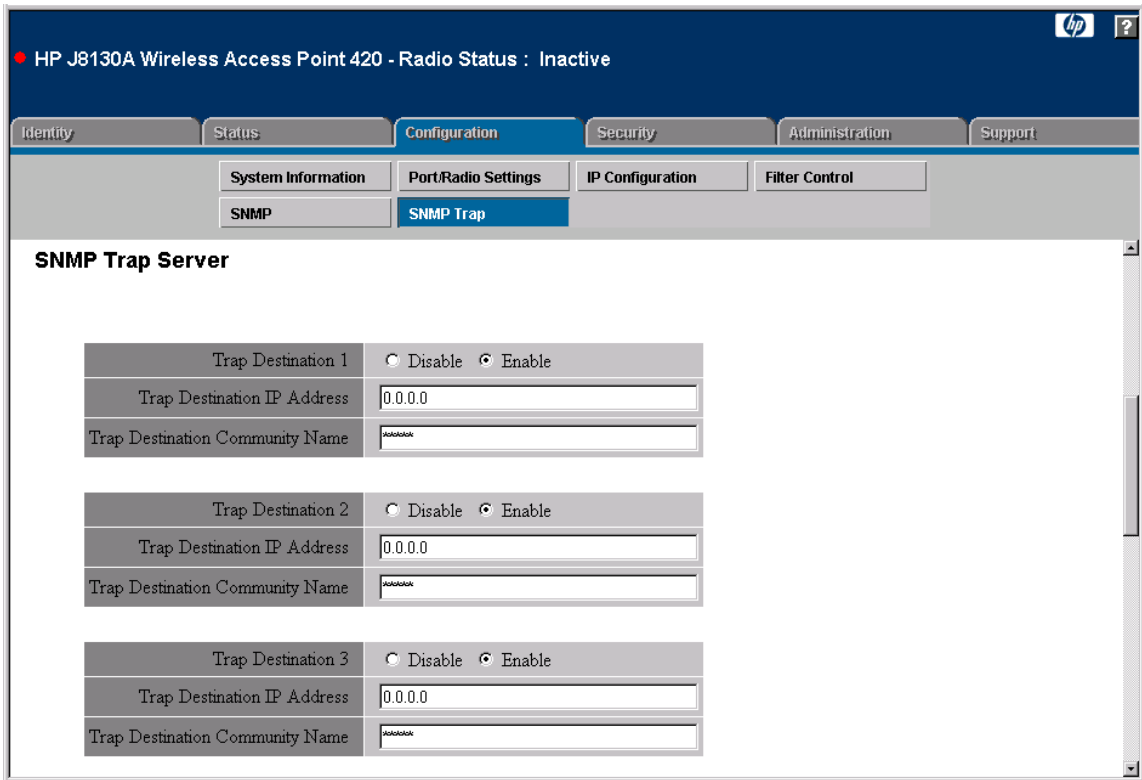


Figure 5-10. Configuring SNMP Trap Destinations

CLI: Configuring SNMP v1 and v2c Trap Destinations

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
[no] snmp-server host <server_index> <host_ip_address> <host_name> <community-string>	page 6-28
[no] snmp-server trap <trap>	page 6-29
show snmp-server	page 6-38

Access Point Configuration Configuring SNMP

To send SNMP v1 and v2c traps to a management station, specify the host IP address using the **snmp-server host** command and enable specific traps using the **snmp-server trap** command.

```
HP420(config)#snmp-server host 1 192.168.1.10 private
HP420(config)#snmp-server host 2 192.168.1.19 private
HP420(config)#snmp-server trap dot11stationassociation
HP420(config)#snmp-server trap dot11stationauthentication
HP420#
```

To display the current SNMP settings from the Exec level, use the **show snmp-server** command, as shown in the following example.

```
HP420#show snmp-server
SNMP Information
=====
Service State : Enable
Community (ro) : *****
Community (rw) : *****
Location      : 2F-R19
Contact       : Paul

EngineId      :80:00:07:e5:80:00:00:27:ff:00:00:00:02
EngineBoots:2

Trap Destinations:
 1:      192.168.1.1  0, Community: *****, State: Enabled
 2:      192.168.1.1  9, Community: *****, State: Enabled
 3:        0.0.0.    0, Community:      , State: Enabl ed
 4:        0.0.0.    0, Community:      , State: Enabl ed

      syste      mDown Disabled      systemUp Disab led
do t11StationAssociation Enabled      dot11StationAuthentication Enabled
dot11StationReAssociation Disabled      dot11StationR equestFail Disabled
      dot1xAut  hFail Disabled      dot1xAuthNo  tInitiated Disabled
      dot1xAuthSu ccess Disabled      dot1xMacAd  drAuthFail Disabled
do t1xMacAddrAuthSuccess Disabled      iappConte  xtDataSent Disabled
iappStationRoamedFrom Disabled      iappStati  onRoamedTo Disabled
      localMacAddrAut hFail Disabled      localMacAddrA uthSuccess Disabled
con figFileVersionChanged Disabled      radiusSer  verChanged Disabled
      dot11Interfac eFail Disabled      sntp      ServerFail Disabled
=====
HP420#
```

Enabling System Logging

The access point supports a logging process that can control error messages saved to memory or sent to a Syslog server. The logged messages serve as a valuable tool for isolating access point and network problems.

The system allows you to limit the messages that are logged by specifying a minimum severity level. The following table lists the error message levels from the most severe (Alert) to least severe (Debug). The message levels that are logged include the specified minimum level up to the Alert level.

Error Level	Description
Alert	Immediate action needed
Critical	Critical conditions (e.g., memory allocation, or free memory error - resource exhausted)
Error	Error conditions (e.g., invalid input, default used)
Warning	Warning conditions (e.g., return false, unexpected return)
Notice	Normal but significant condition, such as cold start
Informational	Informational messages only
Debug	Debugging messages

Note

There are only Critical, Notice, and Informational messages implemented at this time.

The access point error log can be viewed using the web interface from the **Event Logs** window on the **Status** tab. The **Event Logs** window displays the last 128 messages logged in chronological order, from the newest to the oldest.

Log messages are only generated since the last reboot. Rebooting the access point erases all previous log messages. Consider configuring the access point to log messages to a Syslog server (see “Web: Setting Logging Parameters” on page 5-32 or “CLI: Setting Logging Parameters” on page 5-33).

Web: Setting Logging Parameters

The **System Servers** window on the **Administration** tab enables system logs and Syslog server details to be configured for the access point.

The web interface enables you to modify these parameters:

- **System Log Setup:** Enables the logging of error messages.
- **Logging Host:** Enables the sending of log messages to a Syslog server host.
- **Server Name/IP:** The IP address or name of a Syslog server.
- **Logging Console:** Enables the logging of error messages to the console.
- **Logging Level:** Sets the minimum severity level for event logging

To Enable Logging:

1. Select the **Administration** tab.
2. Click the [**System Servers**] button.
3. For **System Log Setup**, select **Enable**.
4. For **Logging Level**, select the minimum severity level to be logged.
5. (Optional) If you want to send log messages to a Syslog server, perform these steps:
 - a. Set **Logging Host** to **Enable**.
 - b. In the **Server Name/IP** field, type the IP address or name of a Syslog server.
6. (Optional) If you want to send log messages to the console, set **Logging Console** to **Enable**.
7. Click the [**Apply Changes**] button.

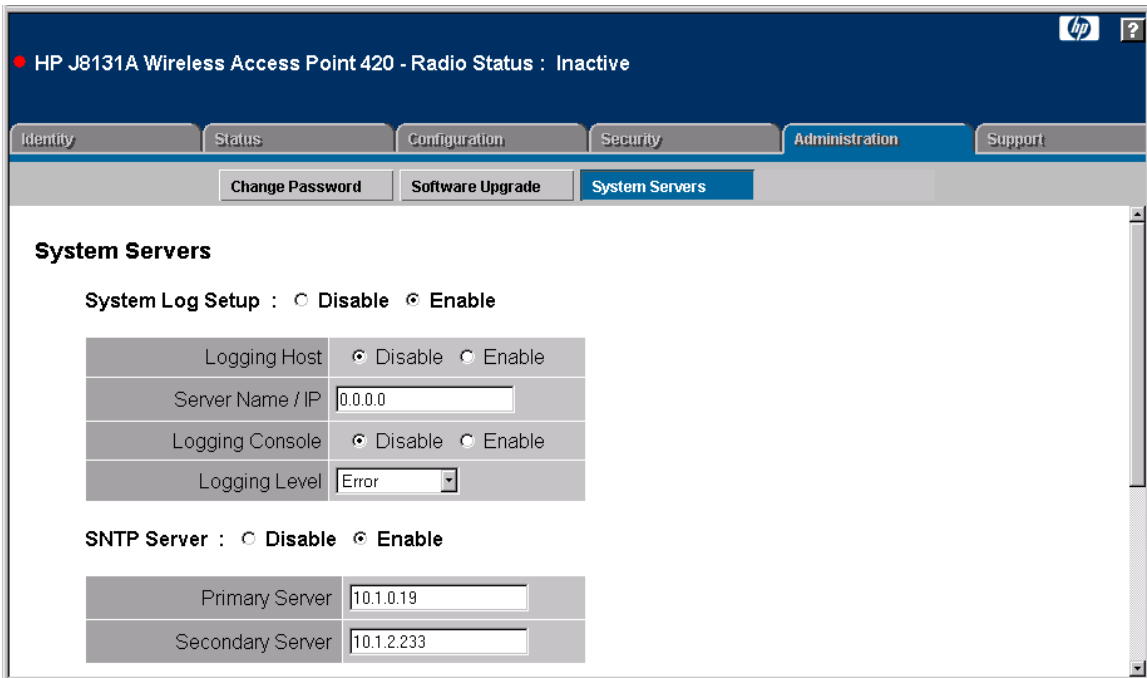


Figure 5-11. Setting Logging Parameters

CLI: Setting Logging Parameters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
[no] logging on	page 6-15
[no] logging host <host_name host_ip_address>	page 6-15
[no] logging console	page 6-16
logging level <Alert Critical Error Warning Notice Informational Debug>	page 6-16
logging facility-type <type>	page 6-17
show logging	page 6-18

The following example shows how to enable logging, set the minimum severity level of messages to be logged, and send messages to the console.

```
HP420(config)#logging on
HP420(config)#logging level critical
HP420(config)#logging console
HP420(config)#
```

The following example shows how to configure the access point to send logging messages to a Syslog server. The CLI also provides a command to specify the facility type tag sent in Syslog messages. (See RFC 3164.) This type has no effect on the kind of messages reported by the access point. However, it may be used by the Syslog server to sort messages or to store messages in the corresponding database.

```
HP420(config)#logging host 10.1.0.3
HP420(config)#logging facility-type 19
HP420(config)#
```

To display the current logging settings from the Exec level, use the **show logging** command, as shown in the following example.

```
HP420#show logging

Logging Information
=====
Syslog State           : Enabled
Logging Host State     : Enabled
Logging Console State  : Enabled
Server Domain name/IP : 10.1.0.3
Logging Level          : Error
Logging Facility Type  : 19
=====

HP420#
```

Configuring SNTP

Simple Network Time Protocol (SNTP) allows the access point to set its internal clock based on periodic updates from a time server (SNTP or NTP). Maintaining an accurate time on the access point enables the system log to record meaningful dates and times for event entries. If the clock is not set, the access point will only record the time from the factory default set at the last bootup.

The access point acts as an SNTP client in unicast mode, periodically sending time synchronization requests to specific time servers. You can configure up to two time server IP addresses. The access point will attempt to poll each server in the configured sequence.

SNTP is enabled by default. The access point also allows you to disable SNTP and set the system clock manually.

Setting the Time Zone. SNTP uses Coordinated Universal Time (or UTC, formerly Greenwich Mean Time, or GMT) based on the time at the Earth's prime meridian, zero degrees longitude. To display a time corresponding to your local time, you must indicate the number of hours and minutes your time zone is east or west of UTC.

Web: Setting SNTP Parameters

The **System Servers** window on the **Administration** tab enables SNTP server and time zone details to be configured for the access point.

The web interface enables you to modify these parameters:

- **SNTP Server:** Configures the access point to operate as an SNTP unicast client. When enabled, at least one time server IP address must be specified.
 - **Primary Server:** The IP address of an SNTP or NTP time server that the access point attempts to poll for a time update.
 - **Secondary Server:** The IP address of a secondary SNTP or NTP time server. The access point first attempts to update the time from the primary server, if this fails it attempts an update from the secondary server.
- **Set Time Zone:** Selects the time zone that specifies the number of hours before (east) or after (west) UTC.

- **Enable Daylight Saving:** The access point provides a way to automatically adjust the system clock for Daylight Saving Time (DST) changes. To use this feature you define the month and date to begin and to end the change from standard time. During this period the system clock is set back by one hour.

To Set SNTP Parameters:

1. Select the **Administration** tab.
2. Click the [**System Servers**] button.
3. For **SNTP Server**, select **Enable**.
4. For the primary time server, type the IP address in the **Primary Server** field.
5. For the secondary time server, type the IP address in the **Secondary Server** field.
6. From the **Enter Time Zone** drop-down menu, select the time appropriate for your region.
7. (Optional) If your region uses Daylight Saving Time, check the **Enable Daylight Saving** check box and then select the dates to implement this feature.
8. Click the [**Apply Changes**] button.

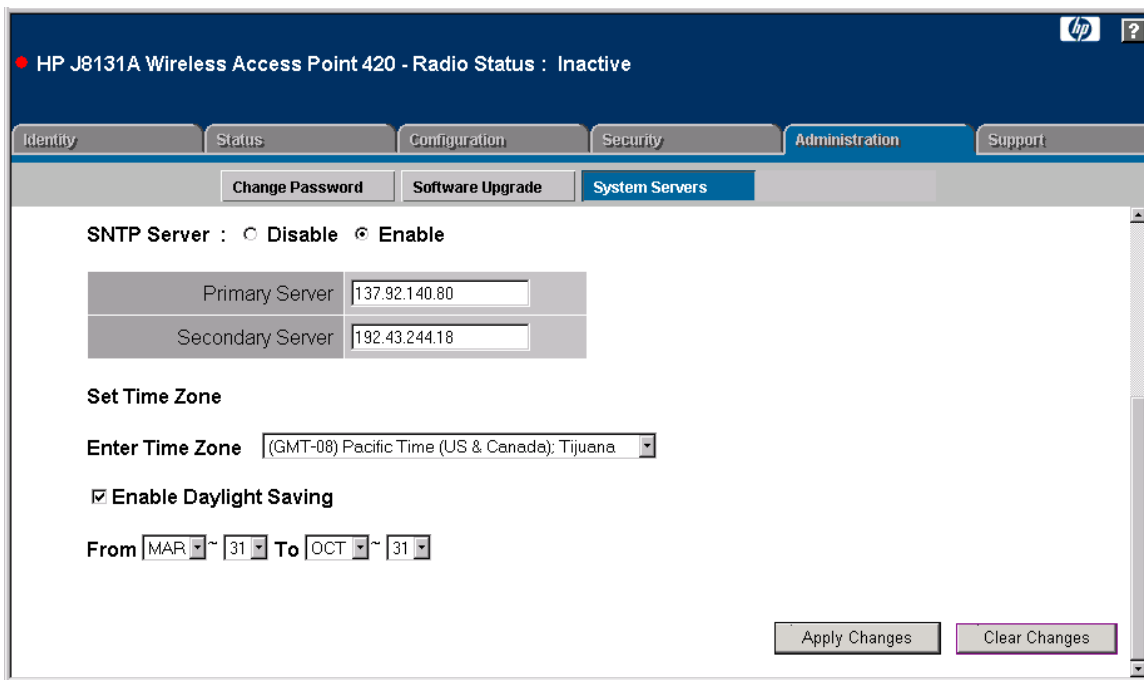


Figure 5-12. Setting SNTP Parameters

CLI: Setting SNTP Parameters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>[no] sntp-server enable</code>	page 6-20
<code>sntp-server ip <1 2> <ip></code>	page 6-19
<code>sntp-server date-time</code>	page 6-20
<code>[no] sntp-server daylight-saving</code>	page 6-21
<code>sntp-server timezone <hours></code>	page 6-22
<code>show sntp</code>	page 6-23

The following example shows how to enable SNTP, configure primary and secondary time server IP addresses, set the time zone, and enable Daylight Saving.

```
HP420(config)#sntp-server enable
HP420(config)#sntp-server ip 1 10.1.0.19
HP420(config)#sntp-server ip 2 10.1.2.233
HP420(config)#sntp-server timezone -8
HP420(config)#sntp-server daylight-saving
Enter Daylight saving from which month<1-12>: 3
and which day<1-31>: 31
Enter Daylight saving end to which month<1-12>: 10
and which day<1-31>: 31
HP420(config)#
```

The following example shows how configure the access point's system clock manually. Note that you must first disable SNTP to be able use the **sntp-server date-time** command.

```
HP420(config)#no sntp-server enable
HP420(config)#sntp-server date-time
Enter Year<1970-2100>: 2003
Enter Month<1-12>: 8
Enter Day<1-31>: 9
Enter Hour<0-23>: 15
Enter Min<0-59>: 25
HP420(config)#
```

To display the current SNTP and clock settings from the Exec level, use the **show sntp** command, as shown in the following example.

```
HP420#show sntp

SNTP Information
=====
Service State      : Enabled
SNTP (server 1) IP : 10.1.0.19
SNTP (server 2) IP : 10.1.2.233
Current Time       : 17 : 31, Aug 9th, 2003
Time Zone          : -8 (PACIFIC)
Daylight Saving    : Enabled, from Mar, 31th to Oct, 31th
=====

HP420#
```


Configuring Ethernet Interface Parameters

The access point's Ethernet interface can be configured to use auto-negotiation to set the operating speed and duplex mode. When auto-negotiation is disabled, the operating speed and duplex mode must be manually set to match that of the connected device. Auto-negotiation is enabled by default.

Note

When using auto-negotiation, be sure that the attached device supports IEEE 802.3u standard auto-negotiation and is not set to a forced speed and duplex mode.

Web: Setting Ethernet Interface Parameters

The **Port/Radio Settings** window on the **Configuration** tab enables the access point's Ethernet interface settings to be configured.

The web interface enables you to modify these parameters:

- **Auto:** The Ethernet interface automatically sets the operating speed and duplex mode to match that of the attached device.
- **100Base-TX Full Duplex:** The Ethernet interface is set to operate at 100 Mbps full duplex.
- **100Base-TX Half Duplex:** The Ethernet interface is set to operate at 100 Mbps half duplex.
- **10Base-T Full Duplex:** The Ethernet interface is set to operate at 10 Mbps full duplex.
- **10Base-T Half Duplex:** The Ethernet interface is set to operate at 10 Mbps half duplex.

To Configure Ethernet Interface Settings:

1. Select the **Configuration** tab.
2. Click the [**Port/Radio Settings**] button.
3. Under **Port Settings**, select the setting to match that of the connected device; either **Auto** or one of the forced speed and duplex mode options.
4. Click the [**Apply Changes**] button.

To display the current operating status for the Ethernet interface, use the AP Status window on the Status tab. See “The AP Status Window” on page 4-17.

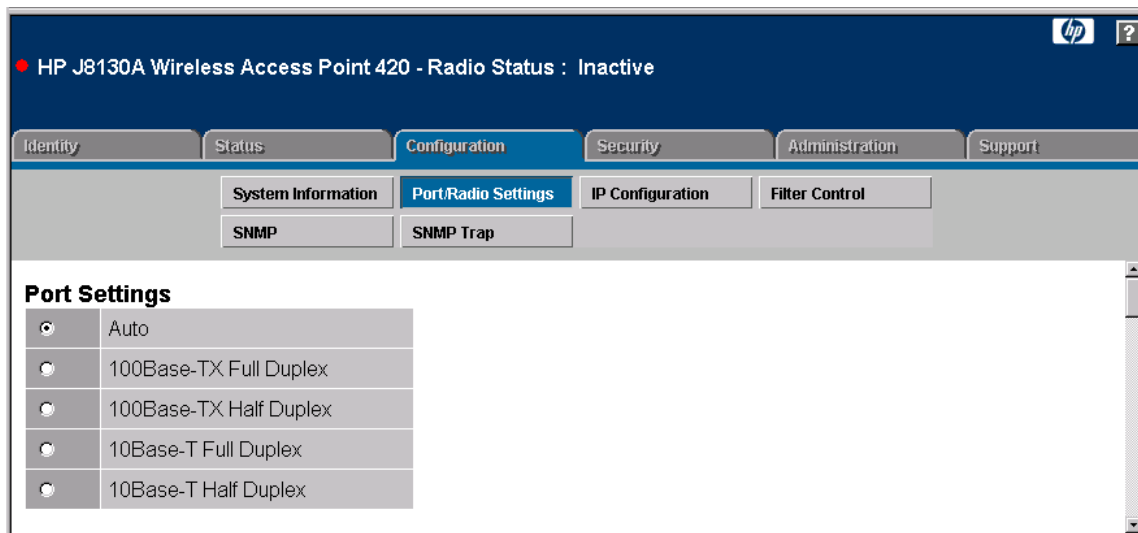


Figure 5-13. Setting Ethernet Interface Parameters

CLI: Setting Ethernet Interface Parameters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
interface <ethernet wireless g>	page 6-62
[no] shutdown	page 6-65
speed-duplex <auto 10MH 10MF 100MF 100MH>	page 6-66
show interface [ethernet]	page 6-66

The following example shows how to disable the Ethernet interface, force the setting to 100 Mbps full duplex, and then re-enable it.

```
HP420(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
HP420(if-ethernet)#shutdown
HP420(if-ethernet)#speed-duplex 100mf
HP420(if-ethernet)#no shutdown
HP420(if-ethernet)#
```

To display the current Ethernet interface status from the Exec level, use the **show interface ethernet** command, as shown in the following example.

```
HP420#show interface ethernet
Ethernet Interface Information
=====
IP Address           : 10.1.0.1
Subnet Mask          : 255.255.255.0
Default Gateway      : 0.0.0.0
Primary DNS          : 0.0.0.0
Secondary DNS        : 0.0.0.0
Speed-duplex         : 100Base-TX Full Duplex
Admin status         : Up
Operational status   : Up
=====
HP420#
```

Configuring RADIUS Client Authentication

Remote Authentication Dial-in User Service (RADIUS) is an authentication protocol that uses software running on a central server to control access to RADIUS-aware devices on the network. An authentication server contains a database of user credentials for each user that requires access to the network.

A primary RADIUS server must be specified for the access point to implement IEEE 802.1X (802.1X) network access control and Wi-Fi Protected Access (WPA) wireless security. A secondary RADIUS server may also be specified as a backup should the primary server fail or become inaccessible.

A RADIUS server can also be configured to provide MAC address authentication of wireless clients. If required, the access point can support both MAC address and 802.1X authentication using a RADIUS server. However, configuring RADIUS MAC address authentication with WPA security is not supported. For more information, see “Web: Configuring MAC Address Authentication” on page 5-87.

Note

This configuration guide assumes that you have already configured the RADIUS server(s) to support the access point. The configuration of RADIUS server software is beyond the scope of this guide, refer to the documentation provided with the RADIUS server software.

Web: Setting RADIUS Server Parameters

The **Auth. Servers** window on the **Security** tab provides the primary and secondary RADIUS server setup parameters.

The web interface enables you to modify these parameters to use RADIUS authentication on the access point:

- **MAC Address Format:** Sets the format for specifying MAC addresses on the RADIUS server.
 - **Multi Colon** - Enter MAC addresses in the form xx:xx:xx:xx:xx:xx.
 - **Multi Dash** - Enter MAC addresses in the form xx-xx-xx-xx-xx-xx.
 - **No Delimiter** - Enter MAC addresses in the form xxxxxxxxxxxx.
 - **Single Dash** - Enter MAC addresses in the form xxxxxx-xxxxxx.

- **VLAN ID Format:** Sets the format for specifying VLAN IDs on the RADIUS server.
 - **Ascii** - Enter VLAN IDs as an ASCII string.
 - **Hex** - Enter VLAN IDs as a hexadecimal number.
- **Primary RADIUS Server Setup:** Configure the following settings to use RADIUS authentication on the access point.
 - **IP Address:** Specifies the IP address or host name of the RADIUS server.
 - **Port:** The User Datagram Protocol (UDP) port number used by the RADIUS server for authentication messages. (Range: 1024-65535; Default: 1812)
 - **Secret Key:** A shared text string used to encrypt messages between the access point and the RADIUS server. Be sure that the same text string is specified on the RADIUS server. Do not use blank spaces in the string. (Maximum length: 20 characters)
 - **Timeout:** Number of seconds the access point waits for a reply from the RADIUS server before resending a request. The default is 5 seconds. (Range: 1-60 seconds)
 - **Retransmit Attempts:** The number of times the access point tries to resend a request to the RADIUS server before authentication fails. (Range: 1 - 30)
- **Secondary RADIUS Server Setup:** Configure a secondary RADIUS server to provide a backup in case the primary server fails. The access point uses the secondary server if the primary server fails or becomes inaccessible. Once the access point switches over to the secondary server, it periodically attempts to establish communication again with primary server. If communication with the primary server is re-established, the secondary server reverts to a backup role.

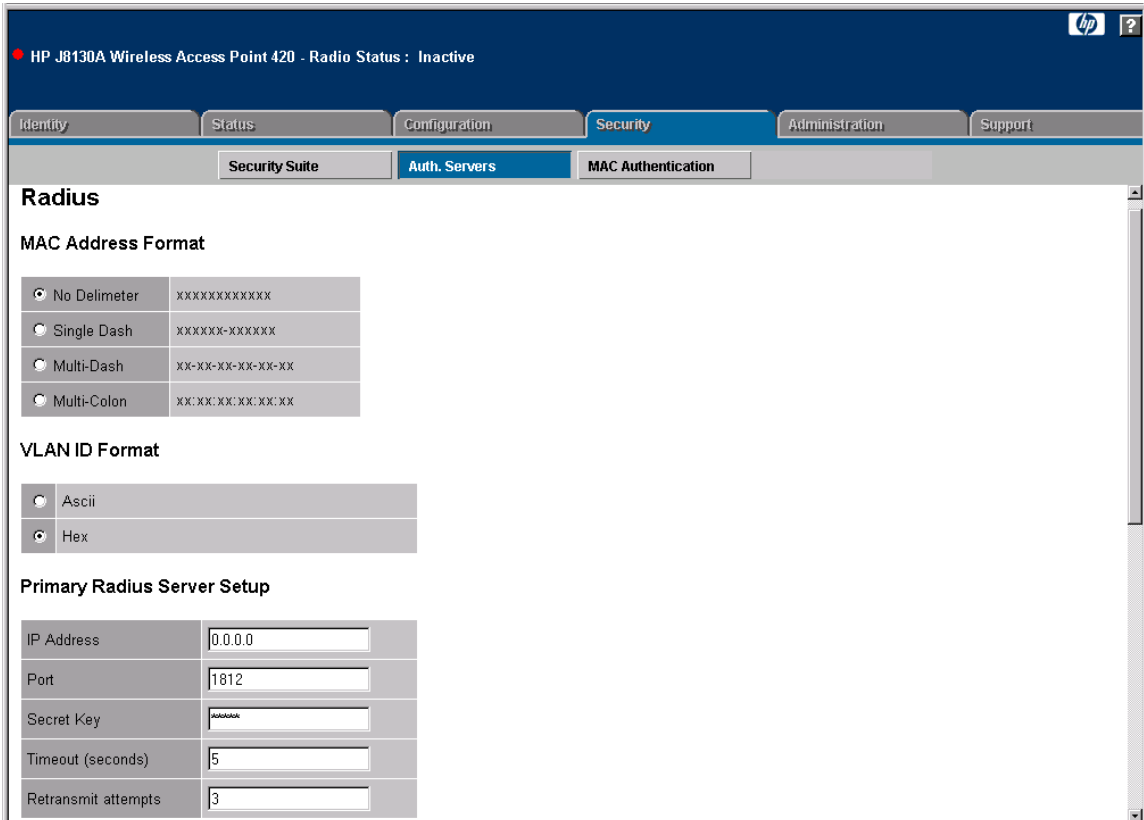
To Set RADIUS Server Parameters:

1. Select the **Security** tab.
2. Click the [**Auth. Servers**] button.
3. For the primary RADIUS server, type the IP address in the **IP Address** field.
4. In the **Port** field, specify the UDP port number used by the RADIUS server for authentication. The default and recommended port number is 1812.
5. In the **Secret Key** field, specify the shared text string that is also used by the RADIUS server.

Access Point Configuration

Configuring RADIUS Client Authentication

- (Optional) For the **Timeout** and **Retransmit Attempts** fields, accept the default values unless you experience problems connecting to the RADIUS server over the network.
- (Optional) If you have a secondary RADIUS server in the network, specify its IP address and other parameters in the appropriate fields. Otherwise, leave the IP address setting as all zeros (0.0.0.0).
- Set the **MAC Address Format** and **VLAN ID Format** as required.
- Click the **[Apply Changes]** button.



HP J8130A Wireless Access Point 420 - Radio Status : Inactive

Identity | Status | Configuration | **Security** | Administration | Support

Security Suite | **Auth. Servers** | MAC Authentication

Radius

MAC Address Format

<input checked="" type="radio"/> No Delimiter	xxxxxxxxxxxx
<input type="radio"/> Single Dash	xxxxxx-xxxxxx
<input type="radio"/> Multi-Dash	xx-xx-xx-xx-xx-xx
<input type="radio"/> Multi-Colon	xx:xx:xx:xx:xx:xx

VLAN ID Format

<input type="radio"/> Ascii
<input checked="" type="radio"/> Hex

Primary Radius Server Setup

IP Address	0.0.0.0
Port	1812
Secret Key	XXXXXXXXXX
Timeout (seconds)	5
Retransmit attempts	3

Figure 5-14. The Auth. Servers Window

CLI: Setting RADIUS Server Parameters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
radius-server address [secondary] <host_ip_address host_name>	page 6-43
radius-server [secondary] port <port_number>	page 6-44
radius-server [secondary] key <key_string>	page 6-44
radius-server [secondary] retransmit <number_of_retries>	page 6-45
radius-server [secondary] timeout <number_of_seconds>	page 6-45
radius-server mac-format <multi-colon multi-dash no-delimiter single-dash>	page 6-46
radius-server vlan-format <hex ascii>	page 6-47
show radius	page 6-47

The following example shows how to configure the primary RADIUS server parameters, including the IP address, UDP port number, secret key, timeout, retransmit attempts, and the MAC address and VLAN ID formats.

```
HP420(config)#radius-server address 10.1.2.25
HP420(config)#radius-server port 1812
HP420(config)#radius-server key green
HP420(config)#radius-server timeout 10
HP420(config)#radius-server retransmit 5
HP420(config)#radius-server mac-format single-dash
HP420(config)#radius-server vlan-format ascii
HP420(config)#
```

The following example shows how to configure the secondary RADIUS server IP address and secret key.

```
HP420(config)#radius-server address secondary 10.1.1.103
HP420(config)#radius-server secondary key blue
HP420(config)#
```

To display the current RADIUS server settings from the Exec level, use the **show radius** command, as shown in the following example.

```
HP420#show radius
=====
Radius MAC Address Format:  SINGLE_DASH
Radius VLAN ID Format:  ASCII

Radius Server Information
=====
IP           : 10.1.2.25
Port        : 1812
Key         : *****
Retransmit  : 5
Timeout     : 10
=====

Radius Secondary Server Information
=====
IP           : 10.1.1.103
Port        : 1812
Key         : *****
Retransmit  : 3
Timeout     : 5
=====
HP420#
```


Setting up Filter Control

The access point can employ VLAN ID and network traffic frame filtering to control access to network resources and increase security.

Access and Frame Filtering. You can prevent communications between wireless clients associated to the access point, only allowing traffic between clients and the wired network. You can also prevent any wireless client from performing any access point configuration through any of its management interfaces, including web, Telnet, or SNMP access. Frame filtering can also be enabled to control specific Ethernet protocol traffic that is forwarded to or from wireless clients.

VLAN ID Filtering. The access point can enable the support of VLAN-tagged traffic passing between wireless clients and the wired network. Up to 64 VLAN IDs can be mapped to specific wireless clients, allowing users to remain within the same VLAN as they move around a campus site. This feature can also be used to control access to network resources from wireless clients, thereby improving security.

A VLAN ID (a number between 1 and 4094) can be assigned to each client after successful authentication using IEEE 802.1X and a central RADIUS server. The user VLAN IDs must be configured on the RADIUS server for each user authorized to access the network. If a user does not have a configured VLAN ID, the access point assigns the user to its own configured native VLAN ID.

When setting up VLAN IDs for each user on the RADIUS server, be sure to use the RADIUS attributes and values as indicated in the following table.

Number	RADIUS Attribute	Value
64	Tunnel-Type	VLAN (13)
65	Tunnel-Medium-Type	802
81	Tunnel-Private-Group-ID	VLANID (1 to 4094 as hexadecimal or an ASCII string)

Note

VLAN IDs on the RADIUS server can be entered as a hexadecimal number or an ASCII string, as set by the VLAN ID Format (see page 5-43). The specific configuration of RADIUS server software is beyond the scope of this guide. Refer to the documentation provided with the RADIUS server software.

When VLAN filtering is enabled, the access point must be using a security configuration that enables 802.1X authentication (see page 5-74) and have a RADIUS server configured (see page 5-42). Wireless clients must also support 802.1X client software to be assigned to a specific VLAN.

When VLANs are enabled, the access point's Ethernet interface drops all received traffic that does not include a VLAN tag. To maintain network connectivity to the access point and wireless clients, be sure that the access point is connected to a device port that supports IEEE 802.1Q VLAN tags.

When VLAN filtering is disabled, the access point ignores the VLAN tags on any received frames.

Note

Enabling or disabling VLAN support using the Web or CLI requires a system reboot.

Web: Enabling VLAN Support and Setting Filters

The **Filter Control** window on the **Configuration** tab to configure frame filtering on the access point's wireless and Ethernet interfaces.

The web interface enables you to modify these parameters:

- **Native VLAN ID:** The VLAN ID assigned to wireless client users that are not assigned to a specific VLAN by RADIUS server configuration. The Native VLAN ID is limited to a number between 1 and 4094.
- **VLAN:** Enables or disables VLAN tagging support on the access point. Changing the VLAN support forces a reboot.
- **Local Bridge Filter:** Controls wireless-to-wireless communications between clients through the access point. However, it does not affect communications between wireless clients and the wired network.
 - **Disable:** Allows wireless-to-wireless communications between clients through the access point.
 - **Enable:** Blocks wireless-to-wireless communications between clients through the access point.
- **AP Management Filter:** Controls management access to the access point from wireless clients. Management interfaces include the web, Telnet, or SNMP.
 - **Disable:** Allows management access from wireless clients.
 - **Enable:** Blocks management access from wireless clients.
- **Ethernet Type Filter:** Controls checks on the Ethernet type of all incoming and outgoing Ethernet packets against the protocol filtering table.

- **Disable:** Access point does not filter Ethernet protocol types.
- **Enable:** Access point filters Ethernet protocol types based on the configuration of protocol types in the filter table. If a protocol has its status set to “ON,” the protocol is not passed by the access point.

To Enable VLAN Support:

1. Select the **Security** tab.
2. Click the [**Security Suite**] button.
3. Select a security wizard option that employs 802.1X authentication, such as **Dynamic WEP (802.1x)**, **WPA (AES-802.1x)**, or **WPA (TKIP-802.1x)**. See “Web: Using the Security Wizard” on page 5-74 for more details.
4. Click the [**Apply Changes**] button.
5. Click the **RADIUS Server** link or [**Authentication Servers**] button.
6. Configure parameters for the primary RADIUS server and, optionally, a secondary RADIUS server. See “Web: Setting RADIUS Server Parameters” on page 5-42 for more details.
7. Click the [**Apply Changes**] button.
8. Click the [**Filter Control**] button on the **Configuration** tab.
9. Type a number between 1 and 4094 in the **Native VLAN ID** text field.
10. Set **VLAN** to enable.
11. Click the [**Apply Changes**] button.
12. Reboot the access point.

To Set Local and Management Filters:

1. Select the **Configuration** tab.
2. Click the [**Filter Control**] button.
3. To prevent wireless-to-wireless client communication, set **Local Bridge Filter** to enable.
4. To prevent access point management from wireless clients, set **AP Management Filter** to enable.
5. To implement specific Ethernet protocol filters, set **Ethernet Type Filter** to enable.
 - a. From the list of protocol types, select **ON** for those protocols that you want to filter from the access point.
6. Click the [**Apply Changes**] button.

7. Reboot the access point by using the **[Reboot]** button from the **Software Upgrade** screen on the **Administration** tab.

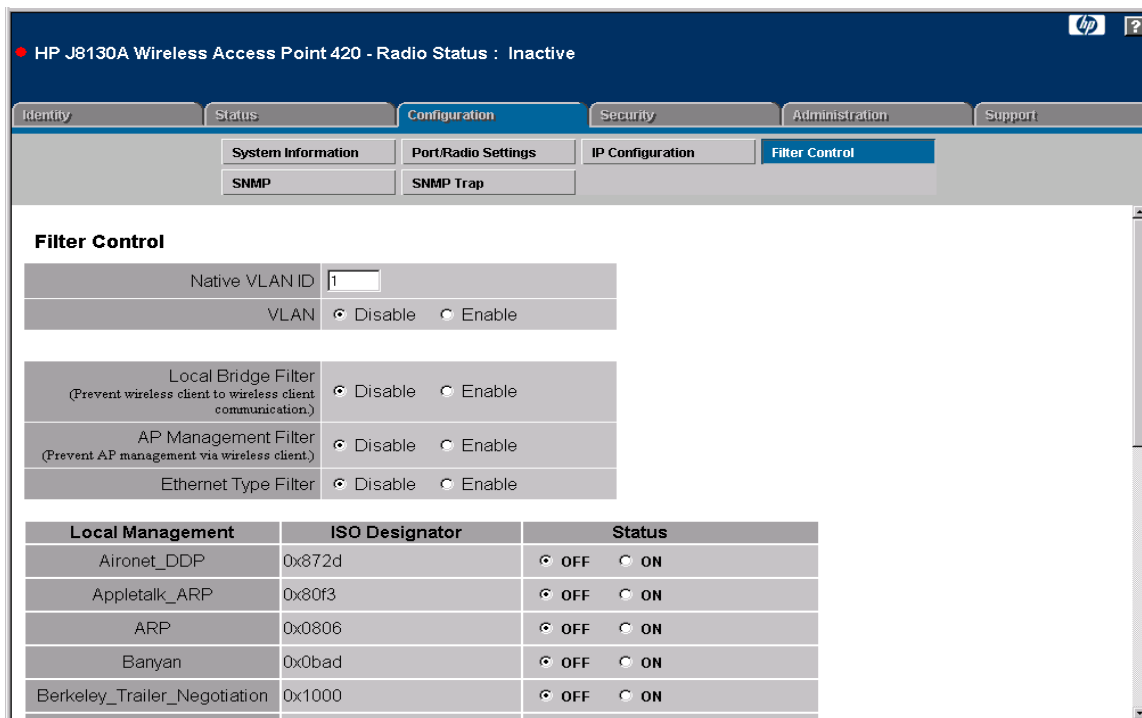


Figure 5-15. The Filter Control Window

CLI: Enabling VLAN Support and Setting Filters

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
[no] vlan enable	page 6-89
native-vlanid <vlan_id>	page 6-90
[no] filter local-bridge	page 6-56
[no] filter ap-manage	page 6-57
[no] filter ethernet-type enable	page 6-57

Command Syntax	CLI Reference Page
[no] filter ethernet-type protocol <protocol>	page 6-58
show filters	page 6-59

The following example shows how to set the native VLAN ID and enable VLAN support. Note that to enable or disable VLAN support, you must reboot the access point.

```
HP420(config)#native-vlanid 5
HP420(config)#vlan enable
Reboot system now? <y/n>:
```

The following example shows how to enable filtering for management access and wireless-to-wireless communications.

```
HP420(config)#filter local-bridge
HP420(config)#filter ap-manage
HP420(config)#
```

The following example shows how to enable protocol filtering, preventing the access point from forwarding Novell IPX frames.

```
HP420(config)#filter ethernet-type protocol novell-ipx(old)
HP420(config)#filter ethernet-type protocol novell-ipx(new)
HP420(config)#filter ethernet-type enable
HP420(config)#
```

The following example shows how to display the current filter status for the access point.

Access Point Configuration
Setting up Filter Control

```
HP420#show filters

Protocol Filter Information
=====
Local Bridge          :ENABLED
AP Management          :ENABLED
Ethernet Type Filter  :ENABLED

Enabled Protocol Filters
-----
Protocol: Novell_IPX(new)          ISO: 0x8138
Protocol: Novell_IPX(old)         ISO: 0x8137
=====
HP420#
```

Modifying Radio Settings

The access point can operate in three standard modes, IEEE 802.11b only, 802.11g only, or a mixed 802.11b/802.11g mode.

Note

Both the IEEE 802.11g and 802.11b standards operate within the 2.4 GHz band. In a wireless LAN environment there can often be interference from other 2.4 GHz devices, such as cordless phones. If you experience poor wireless LAN performance, try to limit any possible sources of radio interference within the service area.

The IEEE 802.11g standard is an extension of the IEEE 802.11b standard and enables client stations with 802.11b wireless network cards to associate to an 802.11g access point. However, the 802.11b standard uses Complementary Code Keying (CCK) modulation technology to achieve a communication rate of up to 11 Mbps, whereas 802.11g uses Orthogonal Frequency Division Multiplexing (OFDM) to reach rates of up to 54 Mbps. (Note that the 802.11g standard is backward-compatible with 802.11b and therefore includes the ability to use OFDM or CCK modulation.) To support both 802.11g and 802.11b clients, the access point has to first communicate with all clients using CCK and only switch to OFDM for data transfers between 802.11g-compatible clients. This mechanism has the effect of reducing the maximum throughput for 802.11g clients in the network.

Working in its mixed “b/g” mode, the access point will experience reduced data throughput, even if there are no 802.11b clients active in the network. To achieve a higher throughput, you can set the access point to operate in 802.11g-only mode, which ignores all 802.11b clients in the service area.

Note

Both the IEEE 802.11g and 802.11b standards operate within the 2.4 GHz band. If you are operating in “802.11g-only” mode, any 802.11b devices in the service area will contribute to the radio frequency noise and affect network performance.

External Antenna Configuration. If you install an external antenna for the access point, the antenna mode must be set for the antenna type; either diversity or single. Also, the access point’s transmit power must be limited to conform to local regulations. Use the regional settings for each external antenna option in each radio mode as provided in the Transmit Power Control tables (see page 5-62).

Web: Modifying the Radio Working Mode and Settings

The **Port/Radio Settings** window on the **Configuration** tab provides the basic settings for the access point's radio operation.

The access point's radio channel settings are limited by local regulations, which determine the number of channels that are available.

Note

If you are using the worldwide product, J8131A, before you can configure the radio settings the Country Setting must be set using the CLI. See “Using the CLI to Set the Country Code” on page 5-58.

The web interface enables you to modify these parameters:

- **Working Mode:** Selects a standard operating mode for the access point.
 - **b & g mixed mode:** Both 802.11b and 802.11g clients can communicate with the access point. This is the default configuration.
 - **g only mode:** Only 802.11g clients can communicate with the access point.
 - **b only mode:** Both 802.11b and 802.11g clients can communicate with the access point, but 802.11g clients can only transfer data at 802.11b standard rates (up to 11 Mbps).
- **Radio:** Enables radio communications on the access point.
- **Radio Channel:** The radio channel that the access point uses to communicate with wireless clients. When multiple access points are deployed in the same area, be sure to choose a channel separated by at least five channels to avoid having the channels interfere with each other. You can deploy up to three access points in the same area (for example, channels 1, 6, 11).
- **Auto Channel Select:** Enables the access point to automatically select an unoccupied radio channel.
- **Transmit Power:** Adjusts the power of the radio signals transmitted from the access point. The higher the transmission power, the farther the transmission range.
- **Maximum Station Data Rate:** The maximum data rate at which a client can connect to the access point. The maximum transmission distance is affected by the data rate. The lower the data rate, the longer the transmission distance.
- **Multicast Data Rate:** The maximum data rate at which the access point transmits multicast and broadcast traffic.

- **Beacon Interval:** The rate at which beacon frames are transmitted from the access point. The beacon frames allow wireless clients to maintain contact with the access point. They may also carry power-management information.
- **Data Beacon Rate:** The rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions.

Known also as the Delivery Traffic Indication Map (DTIM) interval, it indicates how often the MAC layer forwards broadcast/multicast traffic, which is necessary to wake up stations that are using Power Save mode. The default value of 2 indicates that the access point will save all broadcast/multicast frames for the Basic Service Set (BSS) and forward them after every second beacon. Using smaller DTIM intervals delivers broadcast/multicast frames in a more timely manner, causing stations in Power Save mode to wake up more often and drain power faster. Using higher DTIM values reduces the power used by stations in Power Save mode, but delays the transmission of broadcast/multicast frames.

- **RTS Threshold:** Sets the packet size threshold at which a Request to Send (RTS) signal must be sent to a receiving station prior to the sending station starting communications. The access point sends RTS frames to a receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS (clear to send) frame to notify the sending station that it can start sending data.

If the RTS threshold is set to 0, the access point never sends RTS signals. If set to 2347, the access point always sends RTS signals. If set to any other value, and the packet size equals or exceeds the RTS threshold, the RTS/CTS (Request to Send / Clear to Send) mechanism will be enabled.

- **Slot Time:** Sets the basic unit of time the access point uses for calculating waiting times before data is transmitted.
 - **Short:** Sets the slot time to short (9 microseconds). A short slot time can increase data throughput on the access point, but requires that all clients can support a short slot time (that is, 802.11g-compliant clients must support a short slot time).
 - **Long:** Sets the slot time to long (20 microseconds). A long slot time is required if the access point has to support 802.11b clients.
 - **Auto:** Sets the slot time according to the capability of clients that are currently associated. When the Working Mode is set to **g only mode** or **b & g mixed mode** the access point initially uses a short slot time, but if an 802.11b client attempts association, it automatically changes to using a long slot time. When the Working Mode is set to **b only mode**, the access point always uses a long slot time.

- **Preamble:** Sets the length of the signal preamble that is used at the start of a data transmission. Using a short preamble (96 microseconds) instead of a long preamble (192 microseconds) can increase data throughput on the access point, but requires that all clients can support a short preamble.
 - **Long:** Sets the preamble to long. Using a long preamble ensures the access point can support all 802.11b and 802.11g clients.
 - **Short or Long:** Sets the preamble according to the capability of clients that are currently associated. Uses a short preamble if all associated clients can support it, otherwise a long preamble is used.

To Change the Working Mode:

1. Select the **Configuration** tab.
2. Click the [**Port/Radio Settings**] button.
3. Select the working mode you want to use, **b & g mixed mode**, **g only mode**, or **b only mode**.
4. Click the [**Radio Mode Change**] button.

To Modify Radio Settings:

1. Select the **Configuration** tab.
2. Click the [**Port/Radio Settings**] button.
3. To enable the radio, check the **Enable** check box next to **Radio**.
4. Select **Enable** for **Auto Channel Select**, or select a specific number for the **Radio Channel**. If you are deploying access points in the same area, be sure to select channel numbers that are at least five apart (for example, channels 1, 6, 11).
5. Modify other radio parameters, if appropriate.
6. Click the [**Apply Changes**] button.

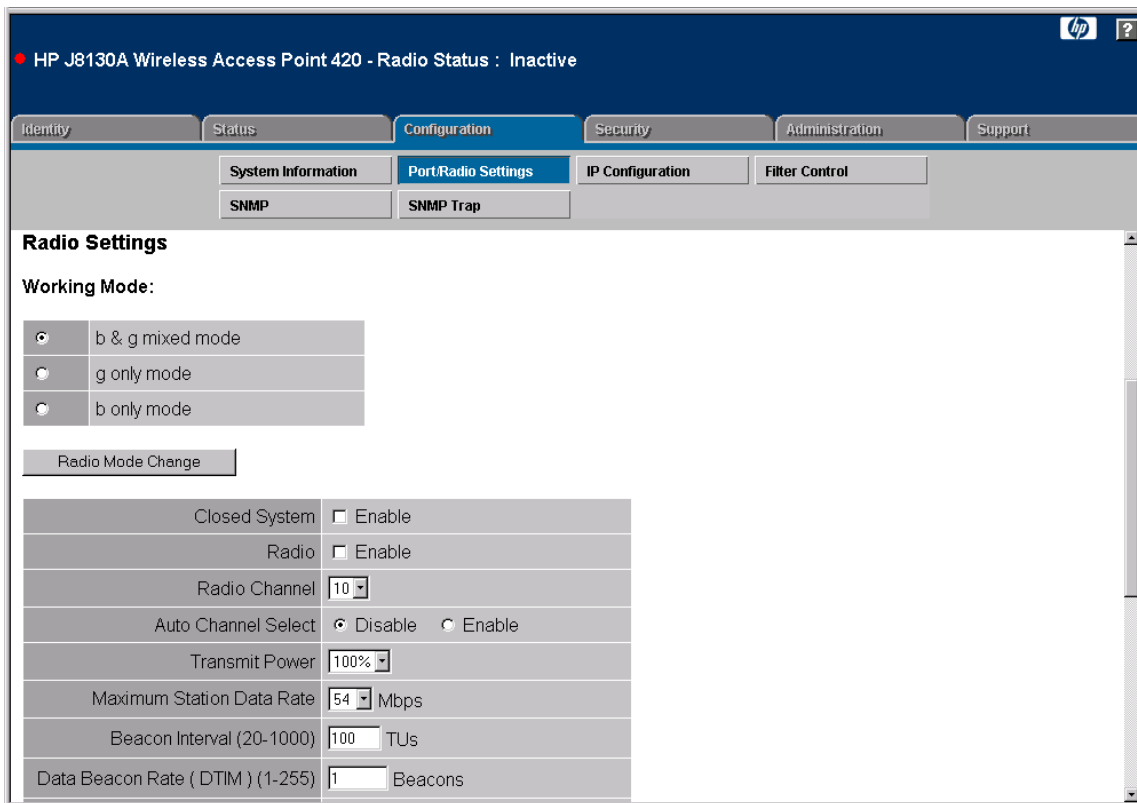


Figure 5-16. Port/Radio Settings Window

CLI: Modifying the Radio Working Mode and Settings

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
country <country_code>	page 6-9
interface <ethernet wireless g>	page 6-62
radio-mode <b g b+g>	page 6-67
speed <speed>	page 6-70
multicast-data-rate <speed>	page 6-70
channel <channel auto>	page 6-71

Command Syntax	CLI Reference Page
beacon-interval <interval>	page 6-73
dtim-period <interval>	page 6-73
fragmentation-length <length>	page 6-74
rts-threshold <threshold>	page 6-75
slot-time [short long auto]	page 6-76
preamble [long shorterlong]	page 6-77
transmit-power <signal-strength>	page 6-78
max-association <count>	page 6-79
[no] shutdown	page 6-85
show interface wireless g	page 6-86

Using the CLI to Set the Country Code. The correct code must be set for the country in which you operate the access point so that it uses the correct authorized radio channels for wireless network devices.

Note

The J8130A comes with the country pre-configured; the J8131A does not. The radio is disabled if the Country Code is not set. Once the Country Code is set, the radio can be enabled.

The following example shows how to set the Country Code for the access point to United Kingdom (GB). You can display the available country codes by using the **country ?** command. A full list of the access point's Country Codes is provided in Table 6-1 on page 6-10.

```
HP420#country ?
```

```
WORD Country code: AL-ALBANIA, DZ-ALGERIA, AR-ARGENTINA, AM-ARMENIA,  
AU-AUSTRALIA, AT-AUSTRIA, AZ-AZERBAIJAN, BH-BAHRAIN, BY-BELARUS,  
BE-BELGIUM, BZ-BELIZE, BO-BOLIVIA, BR-BRAZIL, BN-BRUNEI_DARUSSALAM,  
BG-BULGARIA, CA-CANADA, CL-CHILE, CN-CHINA, CO-COLOMBIA, CR-COSTA_RICA,  
HR-CROATIA, CY-CYPRUS, CZ-CZECH_REPUBLIC, DK-DENMARK,  
DO-DOMINICAN_REPUBLIC, EC-ECUADOR, EG-EGYPT, EE-ESTONIA, FI-FINLAND,  
FR-FRANCE, GE-GEORGIA, DE-GERMANY, GR-GREECE, GT-GUATEMALA,  
HK-HONG_KONG, HU-HUNGARY, IS-ICELAND, IN-INDIA, ID-INDONESIA, IR-IRAN,  
IE-IRELAND, IL-ISRAEL, IT-ITALY, JP-JAPAN, JO-JORDAN, KZ-KAZAKHSTAN,  
KP-NORTH_KOREA, KR-KOREA_REPUBLIC, KW-KUWAIT, LV-LATVIA, LB-LEBANON,  
LI-LIECHTENSTEIN, LT-LITHUANIA, LU-LUXEMBOURG, MO-MACAU, MK-MACEDONIA,  
MY-MALAYSIA, MX-MEXICO, MC-MONACO, MA-MOROCCO, NA-NORTH_AMERICA,  
NL-NETHERLANDS, NZ-NEW_ZEALAND, NO-NORWAY, OM-OMAN, PK-PAKISTAN,  
PA-PANAMA, PE-PERU, PH-PHILIPPINES, PL-POLAND, PT-PORTUGAL,  
PR-PUERTO_RICO, QA-QATAR, RO-ROMANIA, RU-RUSSIA, SA-SAUDI_ARABIA,  
SG-SINGAPORE, SK-SLOVAK_REPUBLIC, SI-SLOVENIA, ZA-SOUTH_AFRICA,  
ES-SPAIN, SE-SWEDEN, CH-SWITZERLAND, SY-SYRIA, TW-TAIWAN, TH-THAILAND,  
TR-TURKEY, UA-UKRAINE, AE-UNITED_ARAB_EMIRATES, GB-UNITED_KINGDOM,  
US-UNITED_STATES, UY-URUGUAY, VE-VENEZUELA, VN-VIETNAM
```

```
HP420#country gb
```

```
HP420#
```

Once the Country Code has been set, the CLI command is no longer available. If you need to change the Country Code, you must reload the access point default configuration by using the **reset configuration** command, or by pressing the access point's Reset button for more than five seconds.

Using the CLI to Set the Working Mode. The following example shows how to set the working mode for the access point to 802.11g-only mode.

```
HP420(config)#interface wireless g  
Enter Wireless configuration commands, one per line.  
HP420(if-wireless g)#radio-mode g  
HP420(if-wireless g)#
```

Note

You must set the Country Code and radio mode before configuring other radio settings. These basic settings affect the radio channels and values that are available for other parameters.

Using the CLI to Configure Radio Settings. The following example shows how to enable and disable the radio, as well as configure other radio parameters.

```
HP420(config)#interface wireless g
Enter Wireless configuration commands, one per line.
HP420(if-wireless g)#shutdown
HP420(if-wireless g)#speed 24
HP420(if-wireless g)#multicast-data-rate 2
HP420(if-wireless g)#channel 9
HP420(if-wireless g)#beacon-interval 60
HP420(if-wireless g)#dtim-period 8
HP420(if-wireless g)#fragmentation-length 1024
HP420(if-wireless g)#rts-threshold 2000
HP420(if-wireless g)#slot-time short
HP420(if-wireless g)#preamble short-or-long
HP420(if-wireless g)#transmit-power 50%
HP420(if-wireless g)#max-association 64
HP420(if-wireless g)#no shutdown
```

To display the current radio settings from the Exec level, use the **show interface wireless g** command, as shown in the following example.

```
HP420#show interface wireless g

Wireless Interface Information
=====
-----Identification-----
Description                : Enterprise 802.11g Access Point
SSID                       : Enterprise Wireless AP
Radio mode                  : 802.11b only
Channel                     : 9
Status                      : Enabled
-----802.11 Parameters-----
Transmit Power              : HALF (18 dBm)
Max Station Data Rate       : 24Mbps
Multicast Data Rate         : 2Mbps
Fragmentation Threshold     : 1024 bytes
RTS Threshold               : 2000 bytes
Beacon Interval             : 60 TUs
DTIM Interval               : 8 beacons
Preamble Length             : SHORT OR LONG
Slot time                   : SHORT
Maximum Association         : 64 stations
```

```
-----Security-----
Closed System                : DISABLED
802.11 Authentication        : OPEN
WPA clients                  : SUPPORTED
802.1x                       : DISABLED
Encryption                   : DISABLED
**[WEP key]*****
Key Length                   : -----
Default Transmit Key        : 1
Cipher                       : WEP
WEP Key Data Type           : Hexadecimal
Static Keys :
  Key 1: EMPTY  Key 2: EMPTY  Key 3: EMPTY  Key 4: EMPTY
**[WPA key]*****
WPA mode                     : Dynamic key
Multicast cipher             : WEP
Unicast cipher               : TKIP
Pre-shared Key Data Type    : Hexadecimal
-----Antenna-----
Antenna mode                 : Diversity
Antenna gain attenuation
  Low channel                : 80%
  Mid channel                 : 63%
  High channel                : 70%
=====
HP420#
```

Web: Setting the Antenna Mode and Transmit Power Control Limits

The **Port/Radio Settings** window on the **Configuration** tab provides access to the configuration settings for external antennas.

Caution

An improper combination of transmit power and antenna gain may result in an EIRP power level in excess of the legally imposed limit. The transmit power reduction required for each antenna in each radio mode is listed in the following tables. Failure to adhere to these guidelines may violate the radio laws for your region.

External Antenna	802.11b Transmit Power Control (TPC) Settings (%)											
	FCC/IC			EU/ETSI			Japan			Taiwan		
	L	M	H	L	M	H	L	M	H	L	M	H
2 dBi Indoor Diversity, J8442A	100	100	100	100	100	100	100	100	100	100	100	100
5 dBi Indoor/Outdoor Omni, J8441A	100	100	100	63	63	63	63	63	63	100	100	100
6.5 dBi Indoor/Outdoor Directional Diversity, J8445A	79	79	79	32	32	32	100	100	63	79	79	79
7 dBi Indoor/Outdoor Directional, J8443A	79	79	79	32	32	32	100	100	80	79	79	79
8 dBi Outdoor Omni, J8444A	—	—	—	32	32	32	50	50	50	79	79	79
11 dBi Indoor/Outdoor wide angle directional, J8446A*	—	—	—	13	13	20	50	50	25	40	79	40
* Use of this antenna in the EU/ETSI region requires an additional insertion loss of 4 dB for this radio mode. Insertion loss is made up of added cable, connectors, and lightning arrestors.												

External Antenna	802.11g Transmit Power Control (TPC) Settings (%)											
	FCC/IC			EU/ETSI			Japan			Taiwan		
	L	M	H	L	M	H	L	M	H	L	M	H
2 dBi Indoor Diversity, J8442A	100	100	100	100	100	100	100	100	100	100	100	100
5 dBi Indoor/Outdoor Omni, J8441A	71	100	71	79	79	79	100	100	100	71	100	71
6.5 dBi Indoor/Outdoor Directional Diversity, J8445A	40	100	40	50	50	50	100	100	100	40	100	40

External Antenna	802.11g Transmit Power Control (TPC) Settings (%)											
	FCC/IC			EU/ETSI			Japan			Taiwan		
	L	M	H	L	M	H	L	M	H	L	M	H
7 dBi Indoor/Outdoor Directional, J8443A	40	100	40	40	40	40	100	100	100	40	100	40
8 dBi Outdoor Omni, J8444A	—	—	—	40	40	40	100	100	100	32	100	32
11 dBi Indoor/Outdoor wide angle directional, J8446A*	—	—	—	20	20	20	100	100	100	18	79	22
* Use of this antenna in the EU/ETSI region or Taiwan requires an additional insertion loss of 2 dB for this radio mode. Insertion loss is made up of added cable, connectors, and lightning arrestors.												

External Antenna	802.11b/g (Dual Mode) Transmit Power Control (TPC) Settings (%)											
	FCC/IC			EU/ETSI			Japan			Taiwan		
	L	M	H	L	M	H	L	M	H	L	M	H
2 dBi Indoor Diversity, J8442A	100	100	100	100	100	100	100	100	100	100	100	100
5 dBi Indoor/Outdoor Omni, J8441A	71	100	71	63	63	63	63	63	63	71	100	71
6.5 dBi Indoor/Outdoor Directional Diversity, J8445A	40	79	40	32	32	32	100	100	63	40	79	40
7 dBi Indoor/Outdoor Directional, J8443A	40	79	40	32	32	32	100	100	80	40	79	40
8 dBi Outdoor Omni, J8444A	—	—	—	32	32	32	50	50	50	32	79	32
11 dBi Indoor/Outdoor wide angle directional, J8446A*	—	—	—	13	13	20	50	50	25	18	79	22
* Use of this antenna in the EU/ETSI region requires an additional insertion loss of 4 dB for this radio mode. Use of this antenna in Taiwan requires an additional insertion loss of 2 dB for this radio mode. Insertion loss is made up of added cable, connectors, and lightning arrestors.												

The web interface enables you to modify these parameters:

- **Transmit Limits:** Sets the reduction in transmit power required for the external antenna to conform with local regulations. (Default: 100% for all channels)
 - **Low Channel:** The percentage of full power allowed for low radio channels.
 - **Mid Channel:** The percentage of full power allowed for middle radio channels.

- **High Channel:** The percentage of full power allowed for high radio channels.
- **Antenna Mode:** Sets the operation mode for the antenna type currently attached to the access point. (Default: Diversity)
 - **Diversity:** A diversity antenna system includes two identical antenna elements that are both used to transmit and receive radio signals. The access point's antennas are diversity antennas. External diversity antennas have two pigtail connections to the access point.
 - **Single:** Non-diversity antennas with one antenna element that have only a single pigtail cable connection to the access point. These antennas attach to the access point's right antenna connector. The access point's right antenna is the one on the side closest to the LED indicators.

Note

For more information on using an external antenna with the access point, refer to the *Installation and Getting Started Guide*.

To Modify the Antenna Mode and Transmit Power Control Settings:

1. Select the **Configuration** tab.
2. Click the [**Port/Radio Settings**] button.
3. Scroll down to the **External Antennas** section at the bottom of the page.
4. From the **Antenna Mode** drop-down menu, select **Diversity** or **Single** for the type of antenna attached to the access point.
5. From the drop-down menu for **Low Channel**, **Mid Channel**, and **High Channel**, select the settings as given for the antenna and region in the Transmit Power Control Settings table for that radio mode (b; g; b and g).
6. Click the [**Apply Changes**] button.

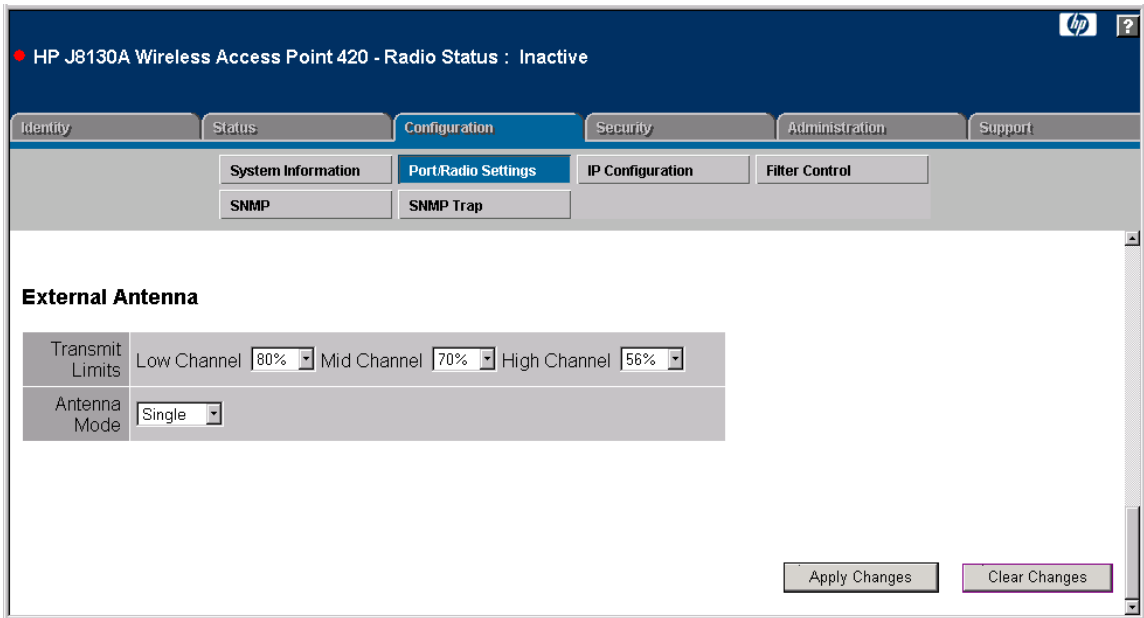


Figure 5-17. Antenna Mode and Port/Radio Settings Window

CLI: Setting the Antenna Mode and Transmit Power Control Limits

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>interface <ethernet wireless g></code>	page 6-62
<code>antenna-mode <diversity single></code>	page 6-68
<code>transmit-limits <low> <middle> <high></code>	page 6-77
<code>show interface wireless g</code>	page 6-86

Using the CLI to Set the Antenna Mode. The following example shows how to set the antenna mode for the access point when using a non-diversity antenna.

```
HP420(config)#interface wireless g
Enter Wireless configuration commands, one per line.
HP420(if-wireless g)#antenna-mode single
HP420(if-wireless g)#
```

Using the CLI to Set the Transmit Power Control Limits. The following example shows how to set the transmit power control limits when using an external antenna with the access point.

If using the 6.5 dBi Indoor/Outdoor Directional Diversity antenna (J8445A) in North America with the access point set to dual (b and g) mode, the TPC settings table for dual mode (see page 5-63) indicates the following settings are required: 40% for the low channel, 79% for the middle channel, and 40% for the high channel.

```
HP420(config)#interface wireless g
Enter Wireless configuration commands, one per line.
HP420(if-wireless g)#transmit-limits 40 79 40
HP420(if-wireless g)#
```

You can use the **show** command to display the current radio settings from the wireless interface configuration level.

```
HP420(if-wireless g)#show

Wireless Interface Information
=====
-----Identification-----
Description           : Enterprise 802.11g Access Point
SSID                  : Enterprise Wireless AP
Radio mode            : 802.11b only
Channel               : 9
Status                : Enabled
-----802.11 Parameters-----
Transmit Power        : HALF (18 dBm)
Max Station Data Rate : 24Mbps
Multicast Data Rate   : 2Mbps
Fragmentation Threshold : 1024 bytes
RTS Threshold         : 2000 bytes
```

```
Beacon Interval           : 60 TUs
DTIM Interval             : 8 beacons
Preamble Length           : SHORT OR LONG
Slot time                  : SHORT
Maximum Association       : 64 stations
-----Security-----
Closed System             : DISABLED
802.11 Authentication     : OPEN
WPA clients                : SUPPORTED
802.1x                     : DISABLED
Encryption                 : DISABLED
**[WEP key]*****
Key Length                 : -----
Default Transmit Key      : 1
Cipher                     : WEP
WEP Key Data Type         : Hexadecimal
Static Keys :
  Key 1: EMPTY  Key 2: EMPTY  Key 3: EMPTY  Key 4: EMPTY
**[WPA key]*****
WPA mode                   : Dynamic key
Multicast cipher           : WEP
Unicast cipher             : TKIP
Pre-shared Key Data Type  : Hexadecimal
-----Antenna-----
Antenna mode               : Single
Antenna gain attenuation
  Low channel              : 40%
  Mid channel              : 79%
  High channel             : 40%
=====
HP420#
```

Configuring Wireless Security

The access point is configured by default as an “open system,” which broadcasts a beacon frame including the configured SSID. If a wireless client has a configured SSID of “any,” it can read the SSID from the beacon and use it to allow immediate connection to the access point.

To improve wireless network security, you have to implement two main functions:

- **Authentication:** It must be verified that clients attempting to connect to the network are authorized users.
- **Data Encryption:** Data passing between the access point and clients must be protected from interception and eavesdropping.

For a more secure network, the access point can implement one or a combination of the following security mechanisms:

- Wired Equivalent Privacy (WEP)
- IEEE 802.1X
- Wireless MAC address filtering
- Wi-Fi Protected Access (WPA)

The security mechanisms that may be employed depend on the level of security required, the network and management resources available, and the software support provided on wireless clients.

Wired Equivalent Privacy (WEP). WEP provides a basic level of security, preventing unauthorized access to the network and encrypting data transmitted between wireless clients and the access point. WEP uses static shared keys (fixed-length hexadecimal or alphanumeric strings) that are manually distributed to all clients that want to use the network.

WEP is the security protocol initially specified in the IEEE 802.11 standard for wireless communications. Unfortunately, WEP has been found to be seriously flawed and cannot be recommended for a high level of network security. For more robust wireless security, the access point provides Wi-Fi Protected Access (WPA) for improved data encryption and user authentication.

IEEE 802.1X Network Access Control. IEEE 802.1X is a standard framework for network access control that uses a central RADIUS server for user authentication. This control feature prevents unauthorized access to the

network by requiring an 802.1X client application to submit user credentials for authentication. The 802.1X standard uses the Extensible Authentication Protocol (EAP) to pass user credentials (either digital certificates, usernames and passwords, or other) from the client to the RADIUS server. Client authentication is then verified on the RADIUS server before the access point grants client access to the network.

The 802.1X EAP packets are also used to pass dynamic unicast session keys and static broadcast keys to wireless clients. Session keys are unique to each client and are used to encrypt and correlate traffic passing between a specific client and the access point. You can also enable broadcast key rotation, so the access point provides a dynamic broadcast key and changes it at a specified interval.

MAC Address Filtering. Using MAC address filtering, you can configure the access point with a list of the MAC addresses of wireless clients that are authorized to access the network. This provides a basic level of authentication for wireless clients attempting to gain access to the network. A database of authorized MAC addresses can be stored locally on the access point or remotely on a central RADIUS server.

Wi-Fi Protected Access (WPA). WPA employs a combination of several technologies to provide an enhanced security solution for 802.11 wireless networks. The access point supports the following WPA components and features:

- **IEEE 802.1X (802.1X) and the Extensible Authentication Protocol (EAP):** WPA employs 802.1X as its basic framework for user authentication and dynamic key management. The 802.1X client and RADIUS server should use an appropriate EAP type—such as EAP-TLS (Transport Layer Security), EAP-TTLS (Tunneled TLS), or PEAP (Protected EAP)—for strongest authentication. Working together, these protocols provide “mutual authentication” between a client, the access point, and a RADIUS server that prevents users from accidentally joining a rogue network. Only when a RADIUS server has authenticated a user’s credentials will encryption keys be sent to the access point and client.

Note

Implementing WPA on wireless clients requires a WPA-enabled network card driver and 802.1X client software that supports the EAP authentication type that you want to use. Windows XP provides native WPA support, other systems require additional software.

- **Temporal Key Integrity Protocol (TKIP):** WPA specifies TKIP as the data encryption method to replace WEP. TKIP avoids the problems of WEP static keys by dynamically changing data encryption keys. TKIP

starts with a master (temporal) key for each user session and then mathematically generates other keys to encrypt each data packet. TKIP provides further data encryption enhancements by including a message integrity check for each packet and a re-keying mechanism, which periodically changes the master key.

- **WPA Pre-Shared Key (PSK) Mode:** For enterprise deployment, WPA requires a RADIUS authentication server to be configured on the wired network. However, for small office networks that may not have the resources to configure and maintain a RADIUS server, WPA provides a simple operating mode that uses just a pre-shared password for network access. The Pre-Shared Key mode uses a common password for user authentication that is manually entered on the access point and all wireless clients. The PSK mode uses the same TKIP packet encryption and key management as WPA in the enterprise, so it provides a robust and manageable alternative for small networks.
- **Mixed WPA and WEP Client Support:** WPA enables the access point to indicate its supported encryption and authentication mechanisms to clients using its beacon frame. WPA-compatible clients can likewise respond to indicate their WPA support. This enables the access point to determine which clients are using WPA security and which are using legacy WEP. The access point uses TKIP unicast data encryption keys for WPA clients and WEP unicast keys for WEP clients. The global encryption key for multicast and broadcast traffic must be the same for all clients, therefore it restricts encryption to a WEP key.
- **Advanced Encryption Standard (AES) Support:** WPA specifies AES encryption as an optional alternative to TKIP and WEP. AES provides very strong encryption using a completely different ciphering algorithm to TKIP and WEP. The developing IEEE 802.11i wireless security standard has specified AES as an eventual replacement for TKIP and WEP. However, because of the difference in ciphering algorithms, AES requires new hardware support in client network cards that is currently not widely available. The access point includes AES support as a future security enhancement.

Table 5-1. Summary of Wireless Security

Security Mechanism	Client Support	Implementation Considerations
Static WEP Keys	Built-in support on all 802.11b and 802.11g devices	<ul style="list-style-type: none"> • Provides only weak security • Requires manual key management
Dynamic WEP Keys with 802.1X	Requires 802.1X client support in system or by add-in software (support provided in Windows 2000 SP3 or later and Windows XP)	<ul style="list-style-type: none"> • Provides dynamic key rotation for improved WEP security • Requires configured RADIUS server • 802.1X EAP type may require management of digital certificates for clients and server
MAC Address Filtering	Uses the MAC address of client network card	<ul style="list-style-type: none"> • Provides only weak user authentication • Management of authorized MAC addresses • Can be combined with other methods for improved security • Optional configured RADIUS server
WPA with 802.1X	Requires WPA-enabled system and network card driver (native support provided in Windows XP)	<ul style="list-style-type: none"> • Provides robust security in WPA-only mode • Offers support for legacy WEP clients, but with increased security risk • Requires configured RADIUS server • 802.1X EAP type may require management of digital certificates for clients and server
WPA PSK Mode	Requires WPA-enabled system and network card driver (native support provided in Windows XP)	<ul style="list-style-type: none"> • Provides good security in small networks • Requires manual management of pre-shared key

When you have decided which security mechanisms to implement in your network, refer to the following tables for a summary of the access point configuration procedures.

For more details on security configurations that are possible using the CLI, see “CLI: Configuring Security Settings” on page 5-81.

Table 5-1. Summary of Wireless Security Configuration

Configuring Encryption in the HP ProCurve Wireless Access Point 420			
Encryption Methods and Process	CLI Privilege Level and Commands***	Additional Requirements	Notes
No Security 1. Configure Security Suite wizard option 1	Context Configuration Level HP420(if-wireless g)#security-suite 1		
WPA with 802.1X ONLY 1. Define MAC authentication method 2. Configure RADIUS server* 3. Configure Security Suite wizard option 6 (AES cipher) or 7 (TKIP cipher)	Global Configuration Level HP420(config)#mac-authentication server local OR HP420(config)#no mac-authentication server HP420(config)#radius-server address <RADIUS server IP address> HP420(config)#radius-server key <RADIUS server shared secret> Context Configuration Level HP420(if-wireless g)#security-suite <6 7>	RADIUS server required. 802.1X supplicant required. WPA supported client required.	
WPA Pre-shared Key ONLY 1. Define MAC authentication method 2. Configure Security Suite wizard option 3 (AES cipher) or 4 (TKIP cipher) 3. Configure key	Global Configuration Level HP420(config)#mac-authentication server local OR HP420(config)#no mac-authentication server Context Configuration Level HP420(if-wireless g)#security-suite <3 4> HP420(if-wireless g)#wpa-preshared-key <ASCII HEX> <preshared key>	WPA supported client required.	Requires manual key management.
WEP Dynamic ONLY 1. Define MAC authentication method 2. Configure RADIUS server* 3. Configure Security Suite wizard option 5	Global Configuration Level HP420(config)#mac-authentication server local OR HP420(config)#no mac-authentication server HP420(config)#radius-server address <RADIUS server IP address> HP420(config)#radius-server key <RADIUS server shared secret> Context Configuration Level HP420(if-wireless g)#security-suite 5	RADIUS server required. 802.1X supplicant required. WEP supported client required.	

Configuring Encryption in the HP ProCurve Wireless Access Point 420			
Encryption Methods and Process	CLI Privilege Level and Commands***	Additional Requirements	Notes
WEP Static ONLY 1. Define MAC authentication method 2. Configure Security Suite wizard option 2 (encryption only) or as shared-key (includes authentication) 3. Configure key length 4. Configure key index 5. Configure key	Global Configuration Level HP420(config)#mac-authentication server remote** OR HP420(config)#mac-authentication server local OR HP420(config)#no mac-authentication server Context Configuration Level HP420(if-wireless g)#security-suite 2 OR HP420(if-wireless g)#security-suite shared-key HP420(if-wireless g)#key-length-wep <64 128 152> HP420(if-wireless g)#transmit-key-wep <1 2 3 4> HP420(if-wireless g)#wep-key <1 2 3 4> <ASCII HEX> <key>	WEP supported client required.	Requires manual key management. Encryption index, length and type configured in the access point must match those configured in the clients.

* The AP 420 supports the following Extensible Authentication Protocol (EAP) methods: MD5, TLS, TTLS and PEAP

** Please refer to the table "Configuring MAC Authentication in the HP ProCurve Wireless Access Point 420"

*** To start, the access point is in the factory default configuration.

Conventions used:

Vertical bars separate alternative, mutually exclusive elements (|).

Braces enclose required elements (< >).

Italics indicate variables for which the user must supply a value when executing the command.

Table 5-2. Summary of MAC Authentication Configuration

Configuring MAC Authentication in the HP ProCurve Wireless Access Point 420							
MAC Authentication Mode	MAC Authentication	Local MAC Authentication	MAC Authentication Table			RADIUS	Comments
		MAC Table Permission	MAC Address	Permission			
				Active	Inactive		
Local MAC authentication	Local MAC	Deny	xx-xx-xx-xx-xx-xx	*		Not needed	All MAC addresses allowed unless entry set to active in the MAC Authentication Table. Can be combined with other methods for improved security.

Configuring MAC Authentication in the HP ProCurve Wireless Access Point 420							
MAC Authentication Mode	MAC Authentication	Local MAC Authentication	MAC Authentication Table			RADIUS	Comments
		MAC Table Permission	MAC Address	Permission			
				Active	Inactive		
Local MAC authentication	Local MAC	Allow	XX-XX-XX-XX-XX-XX	*		Not needed	All MAC addresses denied unless entry set to active in MAC Authentication Table. Can be combined with other methods for improved security.
Remote MAC authentication	Radius MAC	MAC address permission policy based on RADIUS server configuration.	RADIUS Server Use PAP authentication and enter MAC address as specified by the Radius MAC Address Format. User and password on the RADIUS server must be the same.			MUST	Works with static and dynamic WEP keys. Does not work with WPA with 802.1X or WPA-PSK.

Web: Using the Security Wizard

The **Security Suite** window on the **Security** tab provides wireless security configuration for the access point using a “wizard.” The security wizard offers a choice of eight options. Six of the options cover the most common security configurations possible for the access point, one is for no security, and one is for manual configuration of other security settings using the CLI.

Basic parameters required for a security option configuration are provided in the window, all other access point settings are made automatically. Three options require a RADIUS server to be configured. A link to the **Auth. Servers** window is provided where RADIUS server parameters and 802.1X key refresh rates can be configured.

The security wizard provides these options:

- **No Security:** The access point is configured as an open system with no user authentication or data encryption. This is the default setting.

- **Static WEP:** Use static IEEE 802.11 Wired Equivalent Privacy (WEP) shared keys for user authentication and data encryption. Requires the setting of at least one key by specifying the key length, type, and the transmit key index. Note that the WEP shared keys must be the same for each client in the wireless network.
 - **Key Length:** Select 64 Bit, 128 Bit, or 152 Bit. Note that the same size of encryption key must be supported on all wireless clients.
 - **Key Index:** Selects the key number to use for encryption of transmitted data.
 - **Key Type:** Select the preferred method of entering WEP encryption keys on the access point and enter up to four keys:
 - **Hex:** Enter keys as 10 hexadecimal digits (0 to 9 and A to F) for 64 bit keys, 26 hexadecimal digits for 128 bit keys, or 32 hexadecimal digits for 152 bit keys.
 - **Ascii:** Enter keys as 5 alphanumeric characters for 64 bit keys, 13 alphanumeric characters for 128 bit keys, or 16 alphanumeric characters for 152 bit keys.

Note

WEP has been found to be seriously flawed and cannot be recommended for a high level of network security. For more robust wireless security, the access point provides Wi-Fi Protected Access (WPA) for improved data encryption and user authentication.

- **WPA-PSK (AES):** Configures WPA Pre-Shared Key mode for security using AES encryption for multicast and broadcast traffic. (Note that AES encryption must be supported by all wireless clients.) Requires the key type to be specified and a key value entered. All wireless clients must be configured with the same key to communicate with the access point.
 - **Hex:** Enter a key as a string of 64 hexadecimal numbers.
 - **Ascii:** Enter a key as an easy-to-remember form of letters and numbers. The string must be from 8 to 63 characters, which can include spaces.
- **WPA-PSK (TKIP):** Configures WPA Pre-Shared Key mode for security using TKIP encryption for multicast and broadcast traffic. Requires the key type to be specified and a key value entered. All wireless clients must be configured with the same key to communicate with the access point.
 - **Hex:** Enter a key as a string of 64 hexadecimal numbers.
 - **Ascii:** Enter a key as an easy-to-remember form of letters and numbers. The string must be from 8 to 63 characters, which can include spaces.

- **Dynamic WEP (802.1x):** Use 802.1X for user authentication and to pass dynamic WEP unicast session keys and static broadcast keys to wireless clients. Requires a RADIUS server to be configured and available in the wired network. You can also configure 802.1X parameters for reauthentication and key rotation, so the access point changes the dynamic keys at a specified intervals.
- **WPA (802.1x-AES):** Use WPA with 802.1X for user authentication and to dynamically distribute encryption keys to clients. Sets the multicast encryption cipher as AES, which must be supported on all wireless clients. Requires a RADIUS server to be configured and available in the wired network. The 802.1X parameters for reauthentication and key refresh can also be configured.
- **WPA (802.1x-TKIP):** Use WPA with 802.1X for user authentication and to dynamically distribute encryption keys to clients. Sets the multicast encryption cipher as TKIP, which must be supported on all wireless clients. Requires a RADIUS server to be configured and available in the wired network. The 802.1X parameters for reauthentication and key refresh can also be configured.
- **Manual Configuration (CLI):** Use the CLI to manually configure a specific security setting other than those provided by the wizard. The current configuration of security parameters is displayed in the Web interface window.
 - **Authentication:** Indicates the basic 802.11 authentication setting for the access point; either “open” or using shared keys.
 - **Open:** Accepts network access attempts from any client without authentication using a static shared WEP key. This setting is required if you plan to use WPA or 802.1X as a security mechanism. If no other security mechanism is configured, the network has no protection and is open to all users.
 - **Shared Key:** The access point is using static WEP shared keys for the authentication of clients. This setting requires that at least one WEP key is configured on the access point and all clients.
 - **WPA Mode:** Indicates if WPA support is required by clients that are attempting access to the network.
 - **wpa-disabled:** WPA is disabled. Clients do not use WPA to gain access to the network.
 - **wpa-required:** Only WPA-enabled clients can gain access to the network.
 - **wpa-supported:** Supports clients with or without WPA. Clients only capable of supporting WEP can also access the network.
 - **802.1x:** Indicates if 802.1X is used for the authentication of clients.

- **None:** The access point does not use 802.1X authentication for any wireless client. After successful wireless association with the access point, each client is allowed to access the network.
- **Supported:** The access point supports 802.1X authentication only for clients initiating the 802.1X authentication process (the access point does not initiate 802.1X authentication). For clients initiating 802.1X, only those successfully authenticated are allowed to access the network. For those clients not initiating 802.1X, access to the network is allowed after successful wireless association with the access point.
- **Required:** The access point enforces 802.1X authentication for all associated wireless clients. If 802.1X authentication is not initiated by a client, the access point will initiate authentication. Only those clients successfully authenticated with 802.1X are allowed to access the network.
- **Cipher:** Indicates the encryption method used for multicast (and broadcast) and unicast traffic.
 - **wep-tkip:** Using WEP keys for multicast encryption and TKIP keys for unicast encryption.
 - **tkip-tkip:** Using TKIP keys for both multicast and unicast encryption.
 - **aes-aes:** Using AES keys for both multicast and unicast encryption.

For security wizard options that require a RADIUS server, parameters can be configured on the **Auth. Servers** window. See “Web: Setting RADIUS Server Parameters” on page 5-42 for more details. The **Auth. Servers** window also provides the following 802.1X parameters for reauthentication and key refresh rates when using dynamic WEP or WPA security:

- **Broadcast Key Refresh Rate:** Sets the interval at which the broadcast keys are refreshed for stations using 802.1X dynamic keying. (Range: 0 - 1440 minutes; Default: 0 = disabled)
- **Session Key Refresh Rate:** The interval at which the access point refreshes unicast session keys for associated clients. (Range: 0 - 1440 minutes; Default: 0 = disabled)
- **802.1x Reauthentication Refresh Rate:** The time period after which a connected client must be re-authenticated. During the re-authentication process of verifying the client credentials on the RADIUS server, the client remains connected the network. Only if re-authentication fails is network access blocked. (Range: 0-65535 seconds; Default: 0 = Disabled)

To Configure Static WEP Shared Keys:

1. Select the **Security** tab.

2. Click the [**Security Suite**] button.
3. Select wizard option **Static WEP**.
4. Select the key length to be used by all clients, **64**, **128**, or **152** bit.
5. For the **Key Index**, select one key to be used to encrypt data transmitted from the access point.
6. Select the Key Type, **Hex** or **Ascii**.
7. Enter one or more keys conforming the length and type already selected.
8. Click the [**Apply Changes**] button.

To Configure Dynamic WEP Keys:

1. Select the **Security** tab.
2. Click the [**Security Suite**] button.
3. Select wizard option **Dynamic WEP (802.1x)**.
4. Click the [**Apply Changes**] button.
5. Click the **Radius Server** link.
6. Configure parameters for the primary RADIUS server and, optionally, a secondary RADIUS server. See “Web: Setting RADIUS Server Parameters” on page 5-42 for more details.
7. For the **Broadcast Key Refresh Rate**, enter a time period between 0 (disabled) and 1440 minutes.
8. For the **Session Key Refresh Rate**, enter a time period between 0 (disabled) and 1440 minutes.
9. For the **802.1x Re-Authentication Refresh Rate**, enter a time period between 0 (disabled) and 65535 seconds.
10. Click the [**Apply Changes**] button.

To Configure WPA with 802.1X:

1. Select the **Security** tab.
2. Click the [**Security Suite**] button.
3. Select wizard option **WPA (AES-802.1x)** or **WPA (TKIP-802.1x)**, as required.
4. Click the [**Apply Changes**] button.
5. Click the **Radius Server** link.

6. Configure parameters for the primary RADIUS server and, optionally, a secondary RADIUS server. See “Web: Setting RADIUS Server Parameters” on page 5-42 for more details.
7. Configure time interval periods for 802.1X reauthentication and key refresh rates.
8. Click the **[Apply Changes]** button.

To Configure WPA in Pre-shared Key Mode:

1. Select the **Security** tab.
2. Click the **[Security Suite]** button.
3. Select wizard option **WPA-PSK (AES)** or **WPA-PSK (TKIP)**, as required.
4. Select the key type, **Hex** or **Ascii**.
5. For the **WPA Pre-Shared Key**, enter exactly 64 hexadecimal digits or between 8 and 63 alphanumeric characters. (Be sure that all wireless clients use the same pre-shared key.)
6. Click the **[Apply Changes]** button.

Access Point Configuration

Configuring Wireless Security

HP J8131A Wireless Access Point 420 - Radio Status : Inactive

Identity | Status | Configuration | **Security** | Administration | Support

Security Suite | Auth. Servers | MAC Authentication

Security Wizard

For Access Point security, select a method of security and configure the required parameters, or select "No security" to disable security. Advanced security configurations can be obtained by selecting "Manual Configuration" and setting your security preferences in the command line interface (CLI).

<input type="radio"/> No Security	
<input type="radio"/> Static WEP	Key Length: <input type="radio"/> 64 <input checked="" type="radio"/> 128 <input type="radio"/> 152 Key Index: <input checked="" type="radio"/> 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 Key Type: <input checked="" type="radio"/> Hex <input type="radio"/> Ascii Key: 1 <input type="text"/> 2 <input type="text"/> 3 <input type="text"/> 4 <input type="text"/>
<input type="radio"/> WPA-PSK(AES)	Key Type: <input checked="" type="radio"/> Hex <input type="radio"/> Ascii WPA Pre-Shared Key: <input type="text"/>
<input checked="" type="radio"/> WPA-PSK(TKIP)	Key Type: <input type="radio"/> Hex <input checked="" type="radio"/> Ascii WPA Pre-Shared Key: <input type="text"/>
<input type="radio"/> Dynamic WEP(802.1x)	RADIUS Server
<input type="radio"/> WPA(AES-802.1x)	RADIUS Server
<input type="radio"/> WPA(TKIP-802.1x)	RADIUS Server
<input type="radio"/> Manual Configuration (CLI)	Current Configuration

Figure 5-18. Security Suite Window

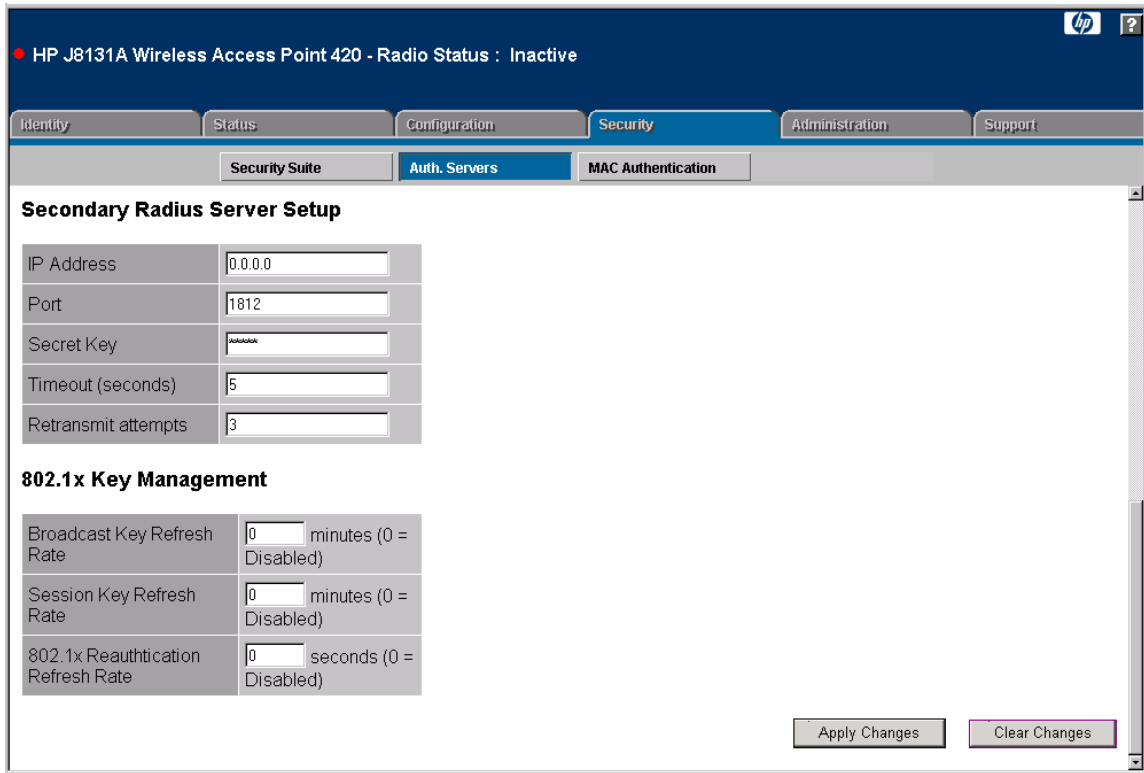


Figure 5-19. The Auth. Servers Window 802.1X Setup

CLI: Configuring Security Settings

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
interface <ethernet wireless g>	page 6-62
key-length-wep <64 128 152>	page 6-80
transmit-key-wep <index>	page 6-81
[no] wep-key <index> <type> <value>	page 6-80
security-suite <wizard open-system shared-key> <wpa-disabled wpa-required wpa-supported> <802.1x-disabled 802.1x-required 802.1x-supported psk> <wep wep-tkip tkip-tkip aes-aes>	page 6-82

Command Syntax	CLI Reference Page
wpa-preshared-key <type> <value>	page 6-85
802.1x broadcast-key-refresh-rate <rate>	page 6-50
802.1x session-key-refresh-rate <rate>	page 6-50
802.1x session-timeout <seconds>	page 6-51
show interface wireless g	page 6-86
show station	page 6-87

To configure access point security using the CLI, the **security-suite** command provides wizard options to set parameters for six common security mechanisms. These wizard options (numbered 1 to 7) can be summarized as follows:

- **1** - No security (open authentication with encryption disabled).
- **2** - Static WEP shared keys used for encryption (open authentication).
- **3** - WPA pre-shared key authentication and AES encryption.
- **4** - WPA pre-shared key authentication and TKIP encryption.
- **5** - 802.1X authentication and dynamic WEP key encryption.
- **6** - WPA with 802.1X using AES encryption.
- **7** - WPA with 802.1X using TKIP encryption.

The same security configurations and others can also be set using the **security-suite** command without using the wizard options. This offers the possibility of setting the following combination of security mechanisms:

- Static WEP shared-key authentication and encryption.
- A combination of Static and dynamic WEP.
- Mixed mode static WEP keys and WPA-PSK, using WEP encryption for the multicast cipher and TKIP for the unicast cipher.
- Mixed mode dynamic WEP keys and WPA with 802.1X, using WEP encryption for the multicast cipher and TKIP for the unicast cipher.
- Mixed mode static and dynamic WEP keys and WPA with 802.1X, using WEP encryption for the multicast cipher and TKIP for the unicast cipher. (Note that this mode does not support WPA-PSK clients.)

Using the CLI to Configure Static WEP Shared Keys. The following example shows how to configure the access point to use static WEP keys for authentication and encryption. The **security-suite shared-key** command must be used first to enable 802.11 shared-key authentication and enable encryption. Other WEP key parameters can then be configured.

```
HP420(config)#interface wireless g
Enter Wireless configuration commands, one per line.
HP420(if-wireless g)#security-suite shared-key
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#
```

The following example shows how to configure the access point to use static WEP keys for encryption only.

```
HP420(if-wireless g)#security-suite 2
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#
```

Or, you can configure static WEP encryption keys without using the **security-suite** command wizard option.

```
HP420(if-wireless g)#security-suite open-system wpa-disabled
802.1x-disabled
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#
```

Using the CLI to Configure WPA-PSK Mode. To configure the access point to operate in WPA-PSK mode, use the **security-suite** command wizard option 3 for AES encryption, or option 4 for TKIP encryption. Then set the key value using the **wpa-preshared-key** command.

The following example shows how to configure access point security for WPA-PSK mode. Supported clients must be WPA-enabled and configured with the same pre-shared key.

```
HP420(if-wireless g)#security-suite 3
HP420(if-wireless g)#wpa-preshared-key ASCII a very good
secret key
HP420(if-wireless g)#
```

Alternatively, you can use the following **security-suite** command to configure WPA-PSK (AES) mode without using the wizard option:

```
HP420(if-wireless g)#security-suite open-system wpa-
required psk aes-aes
```

Using the CLI to Configure Dynamic WEP Keys. The following example shows how to configure the access point to use dynamic WEP keys using 802.1X for authentication and key management. The **security-suite** command wizard option 5 can be used to set the security parameters. The 802.1X broadcast and session key refresh rates and a re-authentication timeout are also set.

This example assumes that a RADIUS server is configured and available on the wired network, it also assumes that the RADIUS server parameters are configured on the access point.

```
HP420(if-wireless g)#security-suite 5
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```

Alternatively, you can use the following **security-suite** command to configure dynamic WEP encryption without using the wizard option:

```
HP420(if-wireless g)#security-suite open-system wpa-
disabled 802.1x-required
```

Using the CLI to Configure WPA with 802.1X. To configure the access point to support only WPA-enabled clients, use the **security-suite** command wizard option 6 for AES encryption, or option 7 for TKIP encryption. (Also requires RADIUS server configuration.)

```
HP420(if-wireless g)#security-suite 6
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```

Alternatively, you can use the following **security-suite** command to configure WPA (AES) with 802.1X without using the wizard option:

```
HP420(if-wireless g)#security-suite open-system wpa-required
802.1x-required aes-aes
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```

Using the CLI to Configure Dynamic and Static WEP Key Combination. The following example shows how to manually configure access point security to support a combination of clients using both static and dynamic WEP keys. (Also requires RADIUS server configuration.)

```
HP420(if-wireless g)#security-suite open-system wpa-disabled
802.1x-supported
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```

Using the CLI to Configure Mixed Mode Static WEP Keys and WPA-PSK. The following example shows how to manually configure access point security to support static WEP users as well as WPA-PSK clients.

```
HP420(if-wireless g)#security-suite open-system wpa-
supported 802.1x-disabled wep
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#wpa-preshared-key ASCII a very good
secret key
HP420(if-wireless g)#
```

Using the CLI to Configure Mixed Mode Dynamic WEP Keys and WPA with 802.1X. The following example shows how to manually configure access point security to support WPA users as well as clients that only use dynamic WEP keys. (Also requires RADIUS server configuration.)

```
HP420(if-wireless g)#security-suite open-system wpa-
supported 802.1x-required wep
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```

Using the CLI to Configure Mixed Mode Static and Dynamic WEP Keys and WPA with 802.1X. The following example shows how to manually configure access point security to support clients using static or dynamic WEP keys and those using dynamic WPA. (Also requires RADIUS server configuration.)

```
HP420(if-wireless g)#security-suite open-system wpa-
supported 802.1x-supported wep
HP420(if-wireless g)#key-length-wep 128
HP420(if-wireless g)#wep-key 2 ascii 1234512345abc
HP420(if-wireless g)#transmit-key-wep 2
HP420(if-wireless g)#end
HP420(config)#802.1x broadcast-key-refresh-rate 5
HP420(config)#802.1x session-key-refresh-rate 5
HP420(config)#802.1x session-timeout 600
HP420(config)#
```


Web: Configuring MAC Address Authentication

The access point can be configured to authenticate client MAC addresses against a database stored locally on the access point or remotely on a RADIUS server. Client MAC addresses in the local database can be specified as allowed or denied access to the network. This enables the access point to control which devices can associate with the access point.

Note

If a RADIUS authentication server is used for MAC authentication, the server must first be configured in the **Auth. Servers** window.

Client station MAC authentication occurs prior to any IEEE 802.1X authentication configured for the access point. However, a client's MAC address provides relatively weak user authentication, since MAC addresses can be easily captured and used by another station to break into the network. Using 802.1X provides more robust user authentication using user names and passwords or digital certificates. So, although you can configure the access point to use MAC address and 802.1X authentication together, it is better to choose one or the other, as appropriate. Consider the following guidelines:

- Use MAC address authentication for a small network with a limited number of users. MAC addresses can be manually configured on the access point itself without the need to set up a RADIUS server. The access point supports up to 1024 MAC addresses in its filtering table, but managing a large number of MAC addresses across more than one access point quickly becomes very cumbersome.
- Use IEEE 802.1X authentication for networks with a larger number of users and where security is the most important issue. A RADIUS server is required in the wired network to control the user credentials (digital certificates, smart cards, passwords, or other) of wireless clients. The 802.1X authentication approach provides a standards-based, flexible, and scalable solution that can be centrally managed.

Note

Software version 2.0.37 or earlier supports up to only 256 MAC addresses in the local database. Software version 2.0.38 or later supports up to 1024 MAC addresses.

If you choose to configure RADIUS MAC authentication and 802.1X together, the RADIUS MAC address authentication occurs before 802.1X authentication. If the RADIUS MAC authentication is successful, 802.1X authentication is performed. When RADIUS MAC authentication fails, 802.1X authentication is not performed.

Note

The access point does not support a security combination of RADIUS MAC authentication and WPA with 802.1X or WPA pre-shared key.

The **MAC Authentication** window on the **Security** tab enables the access point to be configured to use MAC address authentication.

The web interface enables you to modify these parameters:

- **MAC Authentication:** The type of authentication method the system employs when authenticating a wireless client's MAC address.
 - **Local MAC:** The MAC address of the associating station is compared against the local database stored on the access point. The **Local MAC Authentication** section enables the local database to be set up. The access point supports up to 1024 MAC addresses.
 - **Radius MAC:** The MAC address of the associating station is sent to a configured RADIUS server for authentication.
 - **Disable:** No checks are performed on an associating station's MAC address.
- **Local MAC Authentication:** Configures the local MAC authentication database. The MAC database provides a mechanism to take certain actions based on a wireless client's MAC address. The MAC list can be configured to allow or deny network access to specific clients.
 - **MAC Table Permission:** Specifies the action for MAC addresses listed in the local MAC database table.
 - **Deny:** Blocks access for all MAC addresses listed in the local database that are set to **Active**. All other client MAC addresses are permitted access.
 - **Allow:** Permits access only for MAC addresses listed in the local database that are set to **Active**. All other client MAC addresses are blocked.
 - **MAC Address:** Adds the specified MAC addresses into the local MAC database. Enter six pairs of hexadecimal digits separated by hyphens, for example, 00-90-D1-12-AB-89.
- **MAC Authentication Table:** Displays current entries in the local MAC database.
 - **Index:** The number of the entry in the database table.
 - **MAC Address:** Physical address of a client.
 - **Active:** When selected, the MAC address will be denied or allowed network access based on the setting of the **MAC Table Permission**.
 - **Inactive:** When selected, the MAC address is not filtered.

- **Delete:** When selected, the specified MAC address entry is removed from the database when the **[Apply Changes]** button is clicked.

To Configure MAC Authentication Using a Local Database:

1. Select the **Security** tab.
2. Click the **[MAC Authentication]** button.
3. Set **MAC Authentication** to **Local MAC**.
4. Under **Local MAC authentication**, set **MAC Table Permission** to **Allow**. This blocks all unknown MAC addresses from gaining access to the network.
5. For each authorized wireless client, enter the MAC address in the **MAC Address** text field and click the **[Add]** button. The new entries appear in the **MAC Authentication Table**.
6. In the **MAC Authentication Table**, set all authorized client MAC addresses to **Active**.
7. Click the **[Apply Changes]** button.

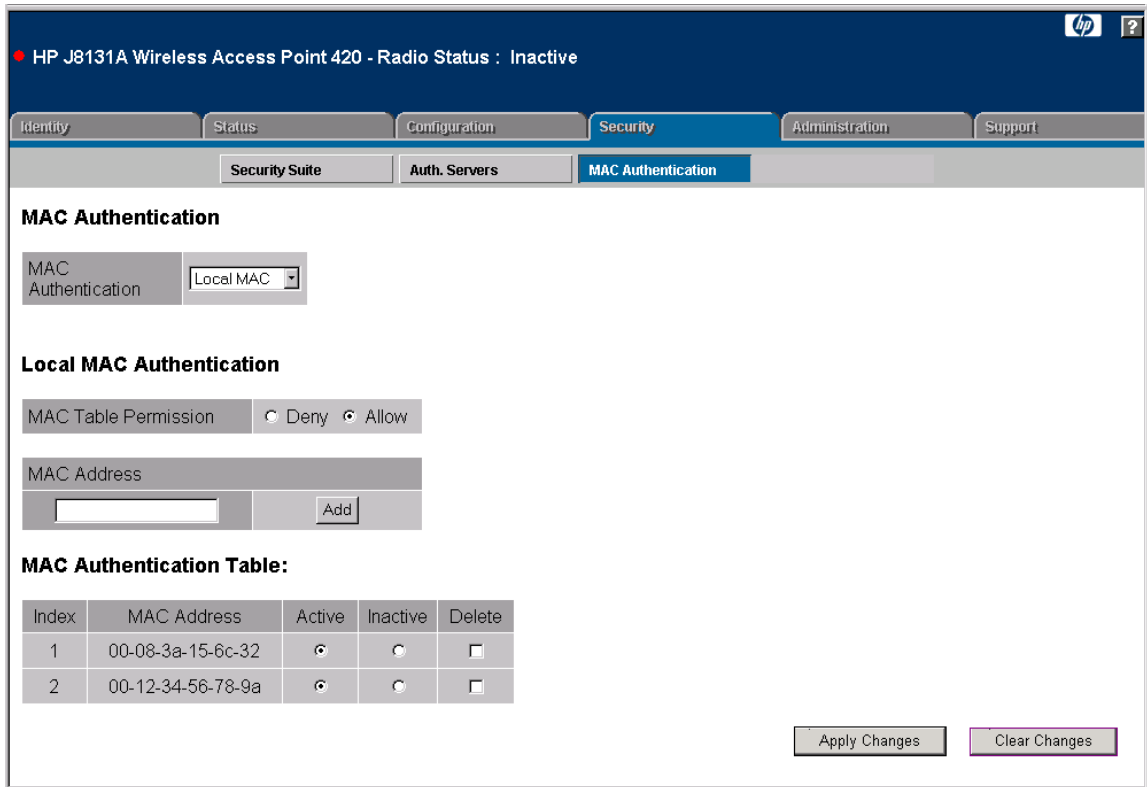


Figure 5-20. Local MAC Authentication

CLI: Configuring MAC Address Authentication

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
mac-authentication server [local remote]	page 6-53
mac-access permission <allowed denied>	page 6-52
mac-access entry <mac-address> <active inactive deleted>	page 6-52
mac-authentication session-timeout <seconds>	page 6-54
show authentication	page 6-54

Configuring Local MAC Authentication. The following example shows how to configure MAC address authentication using the access point's local database. The example shows three client MAC addresses that are permitted to access the network. All other MAC addresses are denied access.

```
HP420(config)#mac-authentication server local
HP420(config)#mac-access permission allowed
HP420(config)#mac-access entry 00-70-50-cc-99-1a active
HP420(config)#mac-access entry 00-70-23-7a-1c-bb active
HP420(config)#mac-access entry 00-70-51-49-d3-26 active
HP420(config)#
```

The following example shows how to delete a MAC address from the access point's local database.

```
HP420(config)#mac-access entry 00-70-50-cc-99-1a deleted
HP420(config)#
```

Configuring RADIUS MAC Authentication. The following example shows how to configure MAC address authentication using a database configured on a RADIUS server. When using a RADIUS server for authentication, you can also configure a timeout interval that forces associated clients to be reauthenticated. Use the **mac-authentication session-timeout** command to set the number of seconds for the reauthentication interval.

```
HP420(config)#mac-authentication server remote
HP420(config)#mac-authentication session-timeout 300
HP420(config)#
```

Displaying MAC Authentication Settings. The following example shows how to display the current authentication configuration on the access point from the Exec level.

```
HP420#show authentication

Authentication Information
=====
MAC Authentication Server      : LOCAL
MAC Auth Session Timeout Value : 0 secs
802.1x                         : DISABLED
Broadcast Key Refresh Rate    : 0 min
Session Key Refresh Rate      : 0 min
802.1x Session Timeout Value  : 0 secs
MAC table permission          : ALLOW active MAC addresses
found in the filter table.

Filter Table

MAC Address                    Status
-----
00-70-23-7a-1c-bb             ACTIVE
00-70-51-49-d3-26             ACTIVE
=====
HP420#
```

Command Line Reference

Contents

Overview	6-2
General Commands	6-3
System Management Commands	6-8
SNMP Commands	6-25
Flash/File Commands	6-39
RADIUS Client	6-43
Authentication	6-49
Filtering Commands	6-56
Interface Commands	6-60
IAPP Command	6-88
VLAN Commands	6-89

Overview

This chapter describes the commands provided by the CLI.

The CLI commands can be broken down into the functional groups shown below.

Command Group	Description	Page
General	Basic commands for entering configuration mode, restarting the system, or quitting the CLI	6-3
System Management	Controls user name, password, system logs, browser management options, clock settings, and a variety of other system information	6-8
SNMP	Configures community access strings and trap managers	6-25
Flash/File	Manages code image or access point configuration files	6-39
RADIUS	Configures the RADIUS client used with 802.1X authentication	6-43
Authentication	Configures IEEE 802.1X access control and MAC address filtering	6-49
Filtering	Filters communications between wireless clients, controls access to the management interface from wireless clients, and filters traffic using specific Ethernet protocol types	6-56
Interface	Configures connection parameters for the Ethernet interface and wireless interface	6-60
IAPP	Enables roaming between multi-vendor access points	6-88
VLANs	Configures VLAN membership	6-89

The access mode shown in the following tables is indicated by these abbreviations: **GC** (Global Configuration), and **IC** (Interface Configuration).

General Commands

Command	Function	Mode	Page
configure	Activates global configuration mode	Exec	6-3
end	Returns to the previous configuration mode	GC, IC	6-4
exit	Returns to the Exec mode, or exits the CLI	any	6-4
ping	Sends ICMP echo request packets to another node on the network	Exec	6-5
reset	Restarts the system	Exec	6-6
show history	Shows the command history buffer	Exec	6-6
show line	Shows the configuration settings for the console port	Exec	6-7

configure

This command activates Global Configuration mode. You must enter this mode to modify most of the settings on the access point. You must also enter Global Configuration mode prior to enabling the context modes for Interface Configuration. See “Using the CLI” on page 3-2.

Default Setting

None

Command Mode

Exec

Example

```
HP420#configure
HP420(config)#
```

Related Commands

end (page 6-4)

end

This command returns to the previous configuration mode.

Default Setting

None

Command Mode

Global Configuration, Interface Configuration

Example

This example shows how to return to the Configuration mode from the Ethernet Interface Configuration mode:

```
HP420 (if-ethernet) #end  
HP420 (config) #
```

exit

This command returns to the Exec mode or exits the configuration program.

Default Setting

None

Command Mode

Any

Example

This example shows how to return to the Exec mode from the Interface Configuration mode, and then quit the CLI session:

```
HP420 (if-ethernet) #exit  
HP420 #exit  
CLI session with the Access Point is now closed  
Username:
```

ping

This command sends ICMP echo request packets to another node on the network.

Syntax

```
ping <host_name | ip_address>
```

- *host_name* - Alias of the host.
- *ip_address* - IP address of the host.

Default Setting

None

Command Mode

Exec

Command Usage

- Use the ping command to see if another site on the network can be reached.
- The following are some results of the **ping** command:
 - *Normal response* - The normal response occurs in one to ten seconds, depending on network traffic.
 - *Destination does not respond* - If the host does not respond, a “timeout” appears in ten seconds.
 - *Destination unreachable* - The gateway for this destination indicates that the destination is unreachable.
 - *Network or host unreachable* - The gateway found no corresponding entry in the route table.
- Press **[Esc]** to stop pinging.

Example

```
HP420#ping 10.1.0.9
10.1.0.9 is alive
HP420#
```

reset

This command restarts the system or restores the factory default settings.

Syntax

```
reset <board | configuration>
```

- board - Reboots the system.
- configuration - Resets the configuration settings to the factory defaults, and then reboots the system.

Default Setting

None

Command Mode

Exec

Command Usage

When the system is restarted, it will always run the Power-On Self-Test.

Example

This example shows how to reset the system:

```
HP420#reset board  
Reboot system now? <y/n>: y
```

show history

This command shows the contents of the command history buffer.

Default Setting

None

Command Mode

Exec

Command Usage

- The history buffer size is fixed at 10 commands.
- Use the up or down arrow keys to scroll through the commands in the history buffer.

Example

In this example, the show history command lists the contents of the command history buffer:

```
HP420#show history
config
exit
show history
HP420#
```

show line

This command displays the console port's configuration settings.

Command Mode

Exec

Example

The console port settings are fixed at the values shown below.

```
HP420#show line
Console Line Information
=====
databits   : 8
parity     : none
speed      : 9600
stop bits  : 1
=====
HP420#
```

System Management Commands

These commands are used to configure the user name, password, system logs, browser management options, clock settings, and a variety of other system information.

Command	Function	Mode	Page
<i>Country Setting</i>	Sets the country code for correct radio operation		
country	Sets the access point country code	Exec	6-9
<i>Device Designation</i>	Configures information that uniquely identifies this device		
prompt	Customizes the command line prompt	GC	6-11
system name	Specifies the host name for the access point	GC	6-12
<i>User Access</i>	Configures the user name and password for management access		
username	Configures the user name for management access	GC	6-12
password	Specifies the password for management access	GC	6-13
<i>Web Server</i>	Enables management access via a Web browser		
ip http port	Specifies the port to be used by the Web browser interface	GC	6-13
ip http server	Allows the access point to be monitored or configured from a browser	GC	6-14
<i>Event Logging</i>	Controls logging of error messages		
logging on	Controls logging of error messages	GC	6-15
logging host	Adds a syslog server host IP address that will receive logging messages	GC	6-15
logging console	Initiates logging of error messages to the console	GC	6-16
logging level	Defines the minimum severity level for event logging	GC	6-16
logging facility-type	Sets the facility type for remote logging of syslog messages	GC	6-17
show logging	Displays the state of logging	Exec	6-18

Command	Function	Mode	Page
<i>System Clock</i>	Sets the system clock via an NTP/SNTP server		
sntp-server ip	Specifies one or more time servers	GC	6-19
sntp-server enable	Accepts time from the specified time servers	GC	6-20
sntp-server date-time	Manually sets the system date and time	GC	6-20
sntp-server daylight-saving	Sets the start and end dates for daylight savings time	GC	6-21
sntp-server timezone	Sets the time zone for the access point's internal clock	GC	6-22
show sntp	Shows current SNTP configuration settings	Exec	6-23
<i>System Status</i>	Displays system configuration and version information		
show system	Displays system information	Exec	6-23
show version	Displays version information for the system	Exec	6-24

country

This command configures the access point's Country Code, which identifies the country of operation and sets the correct authorized radio channels.

This command is available only if you are using the worldwide product, J8131A.

Syntax

`country <country_code>`

country_code - A two character code that identifies the country of operation. See Table 6-1 on page 6-10 for a full list of the available codes.

Table 6-1. Access Point Country Codes

Country	Code	Country	Code	Country	Code	Country	Code
Albania	AL	Dominican Republic	DO	Kuwait	KW	Qatar	QA
Algeria	DZ	Ecuador	EC	Latvia	LV	Romania	RO
Argentina	AR	Egypt	EG	Lebanon	LB	Russia	RU
Armenia	AM	Estonia	EE	Liechtenstein	LI	Saudia Arabia	SA
Australia	AU	Finland	FI	Lithuania	LT	Singapore	SG
Austria	AT	France	FR	Luxembourg	LU	Slovak Republic	SK
Azerbaijan	AZ	Georgia	GE	Macau	MO	Slovenia	SI
Bahrain	BH	Germany	DE	Macedonia	MK	South Africa	ZA
Belarus	BY	Greece	GR	Malaysia	MY	Spain	ES
Belgium	BE	Guatemala	GT	Mexico	MX	Sweden	SE
Belize	BZ	Hong Kong	HK	Monaco	MC	Switzerland	CH
Bolivia	BO	Hungary	HU	Morocco	MA	Syria	SY
Brazil	BR	Iceland	IS	North America	NA	Taiwan	TW
Brunei Darussalam	BN	India	IN	Netherlands	NL	Thailand	TH
Bulgaria	BG	Indonesia	ID	New Zealand	NZ	Turkey	TR
Canada	CA	Iran	IR	Norway	NO	Ukraine	UA
Chile	CL	Ireland	IE	Oman	OM	United Arab Emirates	AE
China	CN	Israel	IL	Pakistan	PK	United Kingdom	GB
Colombia	CO	Italy	IT	Panama	PA	United States	US
Costa Rica	CR	Japan	JP	Peru	PE	Uruguay	UY
Croatia	HR	Jordan	JO	Philippines	PH	Venezuela	VE
Cyprus	CY	Kazakhstan	KZ	Poland	PL	Vietnam	VN
Czech Republic	CZ	North Korea	KP	Portugal	PT		
Denmark	DK	Korea Republic	KR	Puerto Rico	PR		

Default Setting

99 (no country set)

Command Mode

Exec

Command Usage

- The access point's Country Code must be set before the radio can be enabled.
- The available Country Code settings can be displayed by using the **country ?** command.
- The Country Codes US (United States) and CA (Canada) are effectively the same setting and are both implemented as NA (North America).
- After a Country Code has been set the **country** command is no longer available from the CLI. If you need to change the Country Code, the access point configuration must be reset to its default values by using the **reset configuration** command, or by pressing the reset button for more than five seconds.

Example

```
HP420#country us  
HP420#
```

prompt

This command customizes the CLI prompt. Use the **no** form to restore the default prompt.

Syntax

```
prompt <string>  
no prompt
```

string - Any alphanumeric string to use for the CLI prompt.
(Maximum length: 255 characters)

Default Setting

HP ProCurve Access Point 420

Command Mode

Global Configuration

Example

```
HP420(config)#prompt RD2
RD2(config)#
```

system name

This command specifies or modifies the system name for this device.

Syntax

```
system name <name>
```

name - The name of this host. (Maximum length: 32 characters)

Default Setting

Enterprise AP

Command Mode

Global Configuration

Example

```
HP420(config)#system name HP420 Access Point
HP420(config)#
```

username

This command configures the user name for management access.

Syntax

```
username <name>
```

name - The name of the user.

(Length: 3-16 characters, case sensitive.)

Default Setting

admin

Command Mode

Global Configuration

Example

```
HP420(config)#username bob  
HP420(config)#
```

password

After initially logging onto the system, you should set the password. Remember to record it in a safe place. Use the **no** form to reset the default password.

Syntax

```
password <password>  
no password
```

password - Password for management access.
(Length: 3-16 characters, case sensitive)

Default Setting

None

Command Mode

Global Configuration

Example

```
HP420(config)#password hp420ap  
HP420(config)#
```

ip http port

This command specifies the TCP port number used by the Web browser interface. Use the **no** form to use the default port.

Syntax

```
ip http port <port-number>  
no ip http port
```

port-number - The TCP port to be used by the browser interface.
(Range: 1024-65535)

Default Setting

80

Command Mode

Global Configuration

Command Usage

To avoid using common reserved TCP port numbers below 1024, the configurable range is restricted to between 1024 and 65535. However, the default port number is 80. To reset the default port number, use the **no ip http port** command.

Example

```
HP420(config)#ip http port 49153
HP420(config)#
```

Related Commands

ip http server (page 6-14)

ip http server

This command allows this device to be monitored or configured from a browser. Use the **no** form to disable this function.

Syntax

```
ip http server
no ip http server
```

Default Setting

Enabled

Command Mode

Global Configuration

Example

```
HP420(config)#ip http server
HP420(config)#
```

Related Commands

ip http port (page 6-13)

logging on

This command controls logging of error messages, i.e., sending debug or error messages to memory. The **no** form disables the logging process.

Syntax

```
logging on  
no logging
```

Default Setting

None

Command Mode

Global Configuration

Command Usage

The logging process controls error messages saved to memory. You can use the **logging level** command to control the type of error messages that are stored in memory.

Example

```
HP420 (config) #logging on  
HP420 (config) #
```

logging host

This command specifies a Syslog server host that will receive logging messages. Use the **no** form to remove Syslog server host.

Syntax

```
logging host <host-name | host-ip-address>  
no logging host
```

- *host-name* - The name of a Syslog server. (Range: 1-20 characters)
- *host-ip-address* - The IP address of a Syslog server.

Default Setting

None

Command Mode

Global Configuration

Example

```
HP420(config)#logging host 10.1.0.3  
HP420(config)#
```

logging console

This command initiates logging of error messages to the console. Use the **no** form to disable logging to the console.

Syntax

```
logging console  
no logging console
```

Default Setting

Disabled

Command Mode

Global Configuration

Example

```
HP420(config)#logging console  
HP420(config)#
```

logging level

This command sets the minimum severity level for event logging.

Syntax

```
logging level <Alert | Critical | Error | Warning | Notice | Informational | Debug>
```

Default Setting

Error

Command Mode

Global Configuration

Command Usage

Messages sent include the selected level down to the Alert level.

Level Argument	Description
Alerts	Immediate action needed
Critical	Critical conditions (for example, memory allocation, or free memory error - resource exhausted)
Error	Error conditions (for example, invalid input, default used)
Warning	Warning conditions (for example, return false, unexpected return)
Notice	Normal but significant condition, such as cold start
Informational	Informational messages only
Debug	Debugging messages

* There are only Critical, Notice, and Informational messages for the current firmware.

Example

```
HP420(config)#logging level alert  
HP420(config)#
```

logging facility-type

This command sets the facility type for remote logging of Syslog messages.

Syntax

logging facility-type <type>

type - A number that indicates the facility used by the Syslog server to dispatch log messages to an appropriate service. (Range: 16-23)

Default Setting

16

Command Mode

Global Configuration

Command Usage

The command specifies the facility type tag sent in Syslog messages. (See RFC 3164.) This type has no effect on the kind of messages reported by the access point. However, it may be used by the Syslog server to sort messages or to store messages in the corresponding database.

Example

```
HP420(config)#logging facility 19
HP420(config)#
```

show logging

This command displays the logging configuration.

Syntax

```
show logging
```

Command Mode

Exec

Example

```
HP420#show logging

Logging Information
=====
Syslog State           : Disabled
Logging Host State     : Enabled
Logging Console State  : Disabled
Server Domain name/IP  : none
Logging Level          : Error
Logging Facility Type   : 16
=====

HP420#
```


sntp-server ip

This command sets the IP address of the servers to which SNTP time requests are issued. Use this command with no arguments to clear all time servers from the current list.

Syntax

```
sntp-server ip <1 | 2> <ip>
```

- 1 - First time server.
- 2 - Second time server.
- *ip* - IP address of a time server (NTP or SNTP).

Default Setting

```
137.92.140.80  
192.43.244.18
```

Command Mode

Global Configuration

Command Usage

When SNTP client mode is enabled using the **sntp-server enable** command, the **sntp-server ip** command specifies the time servers from which the access point polls for time updates. The access point will poll the time servers in the order specified until a response is received.

Example

```
HP420(config)#sntp-server ip 10.1.0.19  
HP420#
```

Related Commands

sntp server enable (page 6-20)
show sntp (page 6-23)

sntp-server enable

This command enables SNTP client requests for time synchronization with NTP or SNTP time servers specified by the **sntp-server ip** command. Use the **no** form to disable SNTP client requests.

Syntax

```
sntp-server enable  
no sntp-server enable
```

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

The time acquired from time servers is used to record accurate dates and times for log events. Without SNTP, the access point only records the time starting from the factory default set at the last bootup (i.e., 00:14:00, January 1, 1970).

Example

```
HP420 (config) #sntp-server enable  
HP420 (config) #
```

Related Commands

sntp-server ip (page 6-19)
show sntp (page 6-23)

sntp-server date-time

This command sets the system clock.

Default Setting

00:14:00, January 1, 1970

Command Mode

Global Configuration

Example

This example sets the system clock to 17:37 June 19, 2003.

```
HP420#sntp-server date-time
Enter Year<1970-2100>: 2003
Enter Month<1-12>: 6
Enter Day<1-31>: 19
Enter Hour<0-23>: 17
Enter Min<0-59>: 37
HP420#
```

Related Commands

sntp-server enable (page 6-20)

sntp-server daylight-saving

This command sets the start and end dates for daylight savings time. Use the **no** form to disable daylight savings time.

Syntax

```
sntp-server daylight-saving
no sntp-server daylight-saving
```

Default Setting

Disabled

Command Mode

Global Configuration

Command Usage

The command sets the system clock back one hour during the specified-period.

Example

This sets daylight savings time to be used from March 31st to October 31st.

```
HP420(config)#sntp-server daylight-saving
Enter Daylight saving from which month<1-12>: 3
and which day<1-31>: 31
Enter Daylight saving end to which month<1-12>: 10
and which day<1-31>: 31
HP420(config)#
```

sntp-server timezone

This command sets the time zone for the access point's internal clock.

Syntax

```
sntp-server timezone <hours>
```

hours - Number of hours before/after UTC. (Range: -12 to +12 hours)

Default Setting

None

Command Mode

Global Configuration

Command Usage

This command sets the local time zone relative to the Coordinated Universal Time (UTC, formerly Greenwich Mean Time or GMT), based on the earth's prime meridian, zero degrees longitude. To display a time corresponding to your local time, you must indicate the number of hours and minutes your time zone is east (before) or west (after) of UTC.

Example

```
HP420(config)#sntp-server timezone +8
HP420(config)#
```

show sntp

This command displays the current time and configuration settings for the SNTP client.

Command Mode

Exec

Example

```
HP420#show sntp

SNTP Information
=====
Service State      : Enabled
SNTP (server 1) IP : 137.92.140.80
SNTP (server 2) IP : 192.43.244.18
Current Time       : 08 : 04, Jun 20th, 2003
Time Zone          : +8 (TAIPEI, BEIJING)
Daylight Saving    : Enabled, from Jun, 1st to Sep, 1st
=====

HP420#
```

show system

This command displays basic system configuration settings.

Default Setting

None

Command Mode

Exec

Example

```
HP420#show system
System Information
=====
Serial Number      : 0000000001
System Up time    : 0 days, 6 hours, 10 minutes, 25
seconds
System Name       : Enterprise AP
System Location   :
System Contact    : Contact
System Country Code : NA - North America
MAC Address       : 00-30-F1-81-83-12
IP Address        : 192.168.1.1
Subnet Mask       : 255.255.255.0
Default Gateway   : 0.0.0.0
VLAN State        : DISABLED
Native VLAN ID    : 1
IAPP State        : ENABLED
DHCP Client       : ENABLED
HTTP Server       : ENABLED
HTTP Server Port  : 80
Slot Status       : Dual band(b/g)
Software Version  : v2.0.38.0B027
=====
HP420#
```

show version

This command displays the software version for the system.

Default Setting

None

Command Mode

Exec

Example

```
HP420#show version
Version v2.0.38.0B027
HP420#
```

SNMP Commands

The access point includes an agent that supports Simple Network Management Protocol (SNMP) versions 1, 2c, and 3. Access to the agent using SNMP v1 and v2c is controlled by community strings. To communicate with the access point, a management station must first submit a valid community string for authentication.

Access to the access point using SNMP v3 provides additional security features that cover message integrity, authentication, and encryption; as well as controlling notifications that are sent to specified user targets.

Command	Function	Mode	Page
snmp-server community	Sets up the community access string to permit access to SNMP commands	GC	6-26
snmp-server contact	Sets the system contact string	GC	6-27
snmp-server enable server	Enables SNMP service and traps	GC	6-27
snmp-server host	Specifies the recipient of an SNMP notification operation	GC	6-28
snmp-server trap	Enables specific SNMP notifications	GC	6-29
snmp-server location	Sets the system location string	GC	6-31
snmpv3 engine id	Sets the engine ID for SNMP v3	GC	6-31
snmpv3 user	Sets the name of the SNMP v3 user	GC	6-32
snmpv3 targets	Configures SNMP v3 notification targets	GC	6-34
snmpv3 filter	Configures SNMP v3 notification filters	GC	6-35
snmpv3 filter-assignments	Assigns SNMP v3 notification filters to targets	GC	6-36
show snmpv3	Displays SNMP v3 user settings, targets, filters, and filter assignments	Exec	6-37
show snmp-server	Displays the status of SNMP communications	Exec	6-38

snmp-server community

This command defines the community access string for the Simple Network Management Protocol. Use the **no** form to remove the specified community string.

Syntax

```
snmp-server community <string> [ro | rw]  
no snmp-server community <string>
```

- *string* - Community string that acts like a password and permits access to the SNMP protocol. (Maximum length: 32 characters, case sensitive)
- *ro* - Specifies read-only access. Authorized management stations are only able to retrieve MIB objects.
- *rw* - Specifies read/write access. Authorized management stations are able to both retrieve and modify MIB objects.

Default Setting

- *public* - Read-only access. Authorized management stations are only able to retrieve MIB objects.
- *private* - Read/write access. Authorized management stations are able to both retrieve and modify MIB objects.

Command Mode

Global Configuration

Command Usage

If you enter a community string without the **ro** or **rw** option, the default is read only.

Example

```
HP420(config)#snmp-server community alpha rw  
HP420(config)#
```


snmp-server contact

This command sets the system contact string. Use the **no** form to remove the system contact information.

Syntax

```
snmp-server contact <string>  
no snmp-server contact
```

string - String that describes the system contact.
(Maximum length: 255 characters)

Default Setting

Contact

Command Mode

Global Configuration

Example

```
HP420(config)#snmp-server contact Paul  
HP420(config)#
```

Related Commands

snmp-server location (page 6-31)

snmp-server enable server

This command enables SNMP management access and also enables this device to send SNMP traps (i.e., notifications). Use the **no** form to disable SNMP service and trap messages.

Syntax

```
snmp-server enable server  
no snmp-server enable server
```

Default Setting

Enabled

Command Mode

Global Configuration

Command Usage

- This command enables both authentication failure notifications and link up-down notifications.
- The **snmp-server host** command specifies the host device that will receive SNMP notifications.

Example

```
HP420 (config) #snmp-server enable server  
HP420 (config) #
```

Related Commands

snmp-server host (page 6-28)

snmp-server host

This command specifies the recipient of an SNMP notification. Use the **no** form to remove the specified host.

Syntax

```
snmp-server host <server_index><host_ip_address | host_name> <community-string>
```

```
no snmp-server host <server_index>
```

- *server_index* - The index number of the host. (Range: 1-4)
- *host_ip_address* - IP of the host (the targeted recipient).
- *host_name* - Name of the host. (Range: 1-20 characters)
- *community-string* - Password-like community string sent with the notification operation. Although you can set this string using the **snmp-server host** command by itself, we recommend that you define this string using the **snmp-server community** command prior to using the **snmp-server host** command. (Maximum length: 32 characters)

Default Setting

Host Address: None
Community String: public

Command Mode

Global Configuration

Command Usage

The **snmp-server host** command is used in conjunction with the **snmp-server enable server** command to enable SNMP notifications.

Example

```
HP420 (config) #snmp-server host 1 10.1.19.23 batman
HP420 (config) #
```

Related Commands

snmp-server enable server (page 6-27)

snmp-server trap

This command enables the access point to send specific SNMP traps (i.e., notifications) to SNMP v1 and v2c hosts and v3 targets. Use the **no** form to disable specific trap messages.

Syntax

```
snmp-server trap <trap>
no snmp-server trap <trap>
```

- *trap* - One of the following SNMP trap messages:
 - **dot11InterfaceFail** - the 802.11g interface has failed
 - **dot11StationAssociation** - a client station has successfully associated with the access point
 - **dot11StationAuthentication** - a client station has been successfully authenticated
 - **dot11StationReAssociation** - a client station has successfully re-associated with the access point
 - **dot11StationRequestFail** - a client station has failed association, re-association, or authentication
 - **dot1xAuthFail** - a 802.1X client station has failed RADIUS authentication
 - **dot1xAuthNotInitiated** - a client station did not initiate 802.1X authentication
 - **dot1xAuthSuccess** - an 802.1X client station has been successfully authenticated by the RADIUS server
 - **dot1xMacAddrAuthFail** - a client station has failed MAC address authentication with the RADIUS server
 - **dot1xMacAddrAuthSuccess** - a client station has successfully authenticated its MAC address with the RADIUS server

- **iappContextDataSent** - a client station's Context Data has been sent to another access point with which the station has associated
- **iappStationRoamedFrom** - a client station has roamed from another access point (identified by its IP address)
- **iappStationRoamedTo** - a client station has roamed to another access point (identified by its IP address)
- **localMacAddrAuthFail** - a client station has failed authentication with the local MAC address database on the access point
- **localMacAddrAuthSuccess** - a client station has successfully authenticated its MAC address with the local database on the access point
- **sntpServerFail** - the access point has failed to set the time from the configured SNTP server
- **sysConfigFileVersionChanged** - the access point's configuration file has been changed
- **sysRadiusServerChanged** - the access point has changed from the primary RADIUS server to the secondary, or from the secondary to the primary
- **sysSystemDown** - the access point is about to shutdown and reboot
- **sysSystemUp** - the access point is up and running

Default Setting

All traps enabled

Command Mode

Global Configuration

Command Usage

This command is used in conjunction with the **snmp-server host** and **snmp server enable server** commands to enable SNMP notifications.

Example

```
HP420 (config) #snmp-server trap dot11StationAssociation
HP420 (config) #
```

snmp-server location

This command sets the system location string. Use the **no** form to remove the location string.

Syntax

```
snmp-server location <text>  
no snmp-server location
```

text - String that describes the system location.
(Maximum length: 255 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
HP420(config)#snmp-server location WC-19  
HP420(config)#
```

Related Commands

snmp-server contact (page 6-27)

snmpv3 engine-id

This command is used for SNMP v3. It is used to uniquely identify the access point among all access points in the network. Use the **no** form to restore the default engine ID.

Syntax

```
snmpv3 engine-id <engine-id>  
no snmpv3 engine-id
```

engine-id - The engine ID in hexadecimal (5 -32 characters).

Default Setting

A unique engine ID is automatically generated by the access point.

Command Mode

Global Configuration

Command Usage

- This command is used in conjunction with the **snmpv3 user** command.
- Entering this command invalidates the engine ID that is currently configured.
- If the engine ID is deleted or changed, all SNMP users will be cleared. You will need to reconfigure all existing users.

Example

```
HP420 (config) #snmpv3 engine-id 1a:2b:3c:4d:00:ff  
HP420 (config) #
```

snmpv3 user

This command configures the SNMP v3 users that are allowed to manage the access point. Use the **no** form to delete an SNMP v3 user.

Syntax

```
snmpv3 user  
no snmpv3 user <user-name>
```

user-name - A user-defined string for the SNMP user. (32 characters maximum)

Default Setting

None

Command Mode

Global Configuration

Command Usage

- Up to 10 SNMP v3 users can be configured on the access point.
- The SNMP engine ID is used to compute the authentication/privacy digests from the pass phrase. You should therefore configure the engine ID with the **snmpv3 engine-id** command before using this configuration command.

- The access point enables SNMP v3 users to be assigned to three pre-defined groups. Other groups cannot be defined. The available groups are:
 - **RO** - A read-only group using no authentication and no data encryption. Users in this group use no security, either authentication or encryption, in SNMP messages they send to the agent. This is the same as SNMP v1 or SNMP v2c.
 - **RWAuth** - A read/write group using authentication, but no data encryption. Users in this group send SNMP messages that use an MD5 password for authentication, but not a DES key for encryption.
 - **RWPriv** - A read/write group using authentication and data encryption. Users in this group send SNMP messages that use an MD5 password for authentication and a DES key for encryption. Both the MD5 password and DES key must be defined.
- The command prompts for the following information to configure an SNMP v3 user:
 - **User Name** - A user-defined string for the SNMP user. (32 characters maximum, case sensitive)
 - **Group Name** - The name of the SNMP group to which the user is assigned (32 characters maximum, case sensitive). There are three pre-defined groups: RO, RWAuth, or RWPriv.
 - **Authtype** - The authentication type used for user authentication: **md5** or **none**.
 - **Passphrase** - The user password required when authentication is used (8 – 32 ASCII characters).
 - **Privacy** - The encryption type used for SNMP data encryption: **des** or **none**.
 - **Passphrase** - The user key required when data encryption is used (8 – 32 ASCII characters).
- Users must be assigned to groups that have the same security levels. If a user who has “AuthPriv” security (uses authentication and encryption) is assigned to a read-only (RO) group, the user will not be able to access the database. An AuthPriv user must be assigned to the RWPriv group with the AuthPriv security level.
- To configure a user for the RWAuth group, you must select the **Authtype** and an MD5 password.
- To configure a user for the RWPriv group, you must select the **Authtype** as well as the **Privacy** type, and configure an MD5 password and a DES key.

Example

```
HP420 (config) #snmpv3 user
User Name<1-32>      :chris
Group Name<1-32>     :RWPriv
Authtype (md5, <cr>none) :md5
    Passphrase<8-32> :a good secret
Privacy (des, <cr>none) :des
    Passphrase<8-32> :a very good secret
HP420 (config) #
```

snmpv3 targets

This command configures SNMP v3 notification targets. Use the **no** form to delete an SNMP v3 target.

Syntax

```
snmpv3 targets <target-id> <ip-addr> <sec-name> [version {3}] [udp-port {port-number}] [notification-type {TRAP}]
no snmpv3 targets <target-id>
```

- *target-id* - A user-defined name that identifies a receiver of SNMP notifications. (Maximum length: 32 characters)
- *ip-addr* - Specifies the IP address of the management station to receive notifications.
- *sec-name* - The defined SNMP v3 user name that is to receive notifications.
- *version* - The SNMP version of notifications. Currently only version **3** is supported in this command.
- *udp-port* - The UDP port that is used on the receiving management station for notifications.
- *notification-type* - The type of notification that is sent. Currently only **TRAP** is supported.

Default Setting

None

Command Mode

Global Configuration

Command Usage

- The access point supports up to 10 SNMP v3 target IDs.

- The SNMP v3 user name that is specified in the target must first be configured using the **snmpv3 user** command.

Example

```
HP420(config)#snmpv3 targets mytraps 192.168.1.33 chris
HP420(config)#
```

snmpv3 filter

This command configures SNMP v3 notification filters. Use the **no** form to delete an SNMP v3 filter or remove a subtree from a filter.

Syntax

```
snmpv3 filter <filter-id> <include | exclude> <subtree>
no snmpv3 filter <filter-id> [subtree]
```

- *filter-id* - A user-defined name that identifies an SNMP v3 notification filter. (Maximum length: 32 characters)
- *include* - Indicates objects in the MIB subtree to be sent to the assigned receiving target.
- *exclude* - Indicates objects in the MIB subtree not to be sent to the assigned receiving target.
- *subtree* - The part of the MIB subtree that is to be included in the filter.

Default Setting

None

Command Mode

Global Configuration

Command Usage

- By default, all trap messages are enabled and sent to configured Target IDs. To disable a trap, use the **no snmp-server trap** command.
- The access point allows up to 10 notification filters to be created. Each filter can be defined by up to 20 MIB subtree ID entries.
- Use the command more than once with the same filter ID to build a filter that includes or excludes multiple MIB objects.
- The MIB subtree must be defined in the form “.1.3.6.1” and always start with a “.”.

Example

This example creates a filter "trapfilter" that will send only the hpdot11StationAssociation trap to the assigned receiving target.

```
HP420(config)#snmpv3 filter trapfilter exclude .1
HP420(config)#snmpv3 filter trapfilter include
.1.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.1
HP420(config)#
```

snmpv3 filter-assignments

This command assigns SNMP v3 notification filters to targets. Use the **no** form to remove an SNMP v3 filter assignment.

Syntax

```
snmpv3 filter-assignments <target-id> <filter-id>
no snmpv3 filter-assignments <target-id>
```

- *target-id* - A user-defined name that identifies a receiver of SNMP notifications. (Maximum length: 32 characters)
- *filter-id* - A user-defined name that identifies an SNMP v3 notification filter. (Maximum length: 32 characters)

Default Setting

None

Command Mode

Global Configuration

Command Usage

By default, all trap messages are enabled and sent to configured Target IDs. If no filter is assigned to a target, all enabled traps are sent. To disable a trap, use the **no snmp-server trap** command.

Example

```
HP420(config)#snmpv3 filter-assignments mytraps trapfilter
HP420(config)#
```

show snmpv3

This command displays the SNMP v3 users, trap targets, filter assignments and settings.

Command Mode

Exec

Example

```

HP420#show snmpv3
EngineId      :00:00:00:0b:00:00:00:30:f1:81:83:12
EngineBoots:4
SNMP Users
=====
UserName      :chris
GroupName     :RWPriv
AuthType      :MD5
    Passphrase:*****
PrivType      :DES
    Passphrase:*****
-----
=====
SNMP Filters
=====
Filter: trapfilter1
    Type: exclude
    Subtree: iso.3.6.1.4.1.11.2.14.11.6.4.1.1.7.4.2.20
    Mask: None
-----
=====
SNMP Filter Assignment
=====
HostID        FilterID
-----
mytraps       trapfilter1
=====
SNMP Targets
=====
Host ID       : mytraps
User          : chris
IP Address    : 192.168.1.10
UDP Port      : 162
-----
=====
HP420#HP420#

```

show snmp-server

This command displays the SNMP configuration settings.

Command Mode

Exec

Example

```
HP420#show snmp-server

SNMP Information
=====
Service State           : Enable
Community (ro)         : *****
Community (rw)         : *****
Location                : WC-19
Contact                 : Paul

EngineId      :80:00:07:e5:80:00:00:2e:62:00:00:00:18
EngineBoots:1

Trap Destinations:
  1:      192.168.1.9, Community: *****, State: Enabled
  2:      0.0.0.0, Community: *****, State: Disabled
  3:      0.0.0.0, Community: *****, State: Disabled
  4:      0.0.0.0, Community: *****, State: Disabled

      systemDown Enabled                systemUp Enabled
dot11StationAssociation Enabled dot11StationAuthentication Enabled
dot11StationReAssociation Enabled dot11StationRequestFail Enabled
      dot1xAuthFail Enabled            dot1xAuthNotInitiated Enabled
      dot1xAuthSuccess Enabled          dot1xMacAddrAuthFail Enabled
dot1xMacAddrAuthSuccess Enabled      iappContextDataSent Enabled
      iappStationRoamedFrom Enabled      iappStationRoamedTo Enabled
      localMacAddrAuthFail Enabled        localMacAddrAuthSuccess Enabled
configFileVersionChanged Enabled      radiusServerChanged Enabled
      dot11InterfaceFail Enabled          snmpServerFail Enabled

=====
HP420#
```

Flash/File Commands

These commands are used to manage the system software or configuration files.

Command	Function	Mode	Page
bootfile	Specifies the software file used to start up the system	Exec	6-39
copy	Copies a software or configuration file between flash memory and a FTP/TFTP server	Exec	6-40
delete	Deletes a software or configuration file	Exec	6-41
dir	Displays a list of files in flash memory	Exec	6-42

bootfile

This command specifies the software file used to start up the system.

Syntax

```
bootfile <filename>
```

filename - Name of the software or configuration file.

Default Setting

None

Command Mode

Exec

Command Usage

- Use the dir command to see the eligible file names.

Example

```
HP420#bootfile hp420-2.bin
HP420#
```

copy

This command copies a boot file or software file between an FTP/TFTP server and the access point's flash memory. It also allows you to upload a copy of the configuration file from the access point's flash memory to an FTP/TFTP server. When you save the configuration settings to a file on an FTP/TFTP server, that file can later be downloaded to the access point to restore system operation. The success of the file transfer depends on the accessibility of the FTP/TFTP server and the quality of the network connection.

Syntax

```
copy <ftp | tftp> file  
copy config <ftp | tftp>
```

- ftp - Keyword that allows you to copy to/from an FTP server.
- tftp - Keyword that allows you to copy to/from a TFTP server.
- file - Keyword that allows you to copy a boot, software, or configuration file to flash memory.
- config - Keyword that allows you to upload the configuration file from flash memory.

Default Setting

None

Command Mode

Exec

Command Usage

- The system prompts for data required to complete the copy command.
- Only a configuration file can be *uploaded* to an FTP/TFTP server, but every type of file can be *downloaded* to the access point.
- HP recommends not changing the name of a software file when downloading a new software. This name helps to quickly identify the software revision that the file contains.
- Due to the size limit of the flash memory, the access point supports only two software files.
- The configuration file must always be named "syscfg" prior to downloading it to the access point.

Example

The following example shows how to upload the configuration settings to a file on the TFTP server:

```
HP420#copy config tftp
TFTP Source file name:syscfg
TFTP Server IP:192.168.1.19
HP420#
```

The following example shows how to download a configuration file:

```
HP420#copy tftp file
1. Application image
2. Config file
3. Boot block image
Select the type of download<1,2,3>: [1]:2
TFTP Source file name:syscfg
TFTP Server IP:192.168.1.19
HP420#
```

delete

This command deletes a software or configuration file.

Syntax

```
delete filename
```

filename - Name of the configuration or software file.

Default Setting

None

Command Mode

Exec

Caution-

Beware of deleting software files from flash memory. At least one software file is required in order to boot the access point. If there are multiple software files in flash memory, and the one used to boot the access point is deleted, be sure you first use the **bootfile** command to update the software file booted at startup before you reboot the access point. See “Downloading Access Point Software” on page A-3 for more information.

Example

This example shows how to delete the **test.cfg** configuration file from flash memory.

```
HP420#delete test.cfg
Are you sure you wish to delete this file? <y/n>:
HP420#
```

Related Commands

bootfile (page 6-39)
dir (page 6-42)

dir

This command displays a list of files in flash memory.

Command Mode

Exec

Command Usage

File information is shown below:

Column Heading	Description
File Name	The name of the file.
Type	(2) Software and (5) Configuration file
File Size	The length of the file in bytes.

Example

The following example shows how to display all file information:

```
HP420#dir
File Name                               Type      File Size
-----
dflt-img.bin                            2         1325119
hp420-2038B027.bin                       2         1495283
syscfg                                    5          24448
syscfg_bak                               5          24448

      131072 byte(s) available
HP420#
```


RADIUS Client

Remote Authentication Dial-in User Service (RADIUS) is a logon authentication protocol that uses software running on a central server to control access for RADIUS-aware devices to the network. An authentication server contains a database of user credentials for each wireless client that requires access to the network. RADIUS client configuration is required for the access point to support MAC authentication and IEEE 802.1X.

Command	Function	Mode	Page
radius-server address	Specifies the RADIUS server address	GC	6-43
radius-server port	Sets the RADIUS server network port	GC	6-44
radius-server key	Sets the RADIUS encryption key	GC	6-44
radius-server retransmit	Sets the number of retries	GC	6-45
radius-server timeout	Sets the interval between sending authentication requests	GC	6-45
radius-server mac-format	Sets the format for MAC addresses on the RADIUS server	GC	6-46
radius-server vlan-format	Sets the format for VLAN IDs on the RADIUS server	GC	6-47
show radius	Shows the current RADIUS settings	Exec	6-47

radius-server address

This command specifies the primary and secondary RADIUS servers.

Syntax

```
radius-server address [secondary] <host_ip_address | host_name>
```

- `secondary` - Secondary server.
- `host_ip_address` - IP address of server.
- `host_name` - Host name of server. (Range: 1-20 characters)

Default Setting

None

Command Mode

Global Configuration

Example

```
HP420 (config) #radius-server address 192.168.1.25  
HP420 (config) #
```

radius-server port

This command sets the RADIUS server network port.

Syntax

radius-server [secondary] port <port_number>

- secondary - Secondary server.
- *port_number* - RADIUS server UDP port used for authentication messages. (Range: 1024-65535)

Default Setting

1812

Command Mode

Global Configuration

Example

```
HP420 (config) #radius-server port 49153  
HP420 (config) #
```

radius-server key

This command sets the RADIUS encryption key.

Syntax

radius-server [secondary] key <key_string>

- secondary - Secondary server.
- *key_string* - Encryption key used to authenticate logon access for client. Do not use blank spaces in the string. (Maximum length: 20 characters)

Default Setting

DEFAULT

Command Mode

Global Configuration

Example

```
HP420(config)#radius-server key green  
HP420(config)#
```

radius-server retransmit

This command sets the number of retries.

Syntax

```
radius-server [secondary] retransmit <number_of_retries>
```

- secondary - Secondary server.
- *number_of_retries* - Number of times the access point will try to authenticate logon access via the RADIUS server. (Range: 1 - 30)

Default Setting

3

Command Mode

Global Configuration

Example

```
HP420(config)#radius-server retransmit 5  
HP420(config)#
```

radius-server timeout

This command sets the interval between transmitting authentication requests to the RADIUS server.

Syntax

```
radius-server [secondary] timeout <number_of_seconds>
```

- secondary - Secondary server.

- *number_of_seconds* - Number of seconds the access point waits for a reply before resending a request. (Range: 1-60)

Default Setting

5

Command Mode

Global Configuration

Example

```
HP420 (config)#radius-server timeout 10
HP420 (config)#
```

radius-server mac-format

This command sets the format for specifying MAC addresses on the RADIUS server.

Syntax

radius-server mac-format <multi-colon | multi-dash | no-delimiter | single-dash>

- multi-colon - Enter MAC addresses in the form **xx:xx:xx:xx:xx:xx**.
- multi-dash - Enter MAC addresses in the form **xx-xx-xx-xx-xx-xx**.
- no-delimiter - Enter MAC addresses in the form **xxxxxxxxxxxx**.
- single-dash - Enter MAC addresses in the form **xxxxxx-xxxxxx**.

Default Setting

No delimiter

Command Mode

Global Configuration

Example

```
HP420 (config)#radius-server mac-format multi-colon
HP420 (config)#
```

radius-server vlan-format

This command sets the format for specifying VLAN IDs on the RADIUS server.

Syntax

```
radius-server vlan-format <hex | ascii>
```

- hex - Enter VLAN IDs as a hexadecimal number.
- ascii - Enter VLAN IDs as an ASCII string.

Default Setting

Hex

Command Mode

Global Configuration

Example

```
HP420(config)#radius-server vlan-format ascii  
HP420(config)#
```

show radius

This command displays the current settings for the RADIUS server.

Default Setting

None

Command Mode

Exec

Example

```
HP420#show radius
=====
Radius MAC Address Format: NO_DELIMITER
Radius VLAN ID Format: HEX

Radius Server Information
=====
IP           : 192.168.1.25
Port        : 181
Key         : *****
Retransmit  : 5
Timeout     : 10
=====

Radius Secondary Server Information
=====
IP           : 0.0.0.0
Port        : 1812
Key         : *****
Retransmit  : 3
Timeout     : 5
=====
HP420#
```

Authentication

The access point supports IEEE 802.1X (802.1X) access control for wireless clients. This control feature prevents unauthorized access to the network by requiring an 802.1X client application to submit user credentials for authentication. Client authentication is then verified by a RADIUS server using EAP (Extensible Authentication Protocol) before the access point grants client access to the network. The 802.1X EAP packets are also used to pass dynamic unicast session keys and static broadcast keys to wireless clients.

Client MAC addresses can also be used for authentication on the access point. For local MAC authentication, first define the default filtering policy using the **mac-access permission** command. Then enter the MAC addresses to be filtered, indicating if they are active or inactive. For RADIUS MAC authentication, the MAC addresses and filtering policy must be configured on the RADIUS server

Command	Function	Mode	Page
802.1x broadcast-key-refresh-rate	Sets the interval at which the primary broadcast keys are refreshed for stations using 802.1X dynamic keying	GC	6-50
802.1x session-key-refresh-rate	Sets the interval at which unicast session keys are refreshed for associated stations using dynamic keying	GC	6-50
802.1x session-timeout	Sets the timeout after which a connected client must be re-authenticated	GC	6-51
mac-access permission	Sets filtering to allow or deny listed addresses	GC	6-52
mac-access entry	Enters or removes MAC addresses from the filter table	GC	6-52
mac-authentication server	Sets address filtering to be performed with local or remote options	GC	6-53
mac-authentication session-timeout	Sets the interval at which associated clients will be re-authenticated with the RADIUS server authentication database	GC	6-54
show authentication	Shows all 802.1X authentication settings, as well as the address filter table	Exec	6-54

802.1x broadcast-key-refresh-rate

This command sets the interval at which the broadcast keys are refreshed for stations using 802.1X dynamic keying.

Syntax

```
802.1x broadcast-key-refresh-rate <rate>
```

rate - The interval at which the access point rotates broadcast keys.
(Range: 0 - 1440 minutes)

Default Setting

0 (Disabled)

Command Mode

Global Configuration

Command Usage

- The access point uses EAPOL (Extensible Authentication Protocol Over LANs) packets to pass dynamic unicast session and broadcast keys to wireless clients. The **802.1x broadcast-key-refresh-rate** command specifies the interval after which the broadcast keys are changed. The **802.1x session-key-refresh-rate** command specifies the interval after which unicast session keys are changed.
- Dynamic broadcast key rotation allows the access point to generate a random group key and periodically update all key-management capable wireless clients.

Example

```
HP420 (config) #802.1x broadcast-key-refresh-rate 5  
HP420 (config) #
```

802.1x session-key-refresh-rate

This command sets the interval at which unicast session keys are refreshed for associated stations using dynamic keying.

Syntax

```
802.1x session-key-refresh-rate <rate>
```

rate - The interval at which the access point refreshes a session key.
(Range: 0 - 1440 minutes)

Default Setting

0 (Disabled)

Command Mode

Global Configuration

Command Usage

Session keys are unique to each client, and are used to authenticate a client connection, and correlate traffic passing between a specific client and the access point.

Example

```
HP420 (config) #802.1x session-key-refresh-rate 5
HP420 (config) #
```

802.1x session-timeout

This command sets the time period after which a connected client must be re-authenticated.

Syntax

802.1x session-timeout <*seconds*>

seconds - The number of seconds. (Range: 0-65535)

Default

0 (Disabled)

Command Mode

Global Configuration

Example

```
HP420 (config) #802.1x session-timeout 300
HP420 (config) #
```

mac-access permission

This command sets filtering to allow or deny listed MAC addresses.

Syntax

mac-access permission <allowed | denied>

- allowed - Only MAC addresses entered as “active” in the address filtering table are permitted access.
- denied - MAC addresses entered as “active” in the address filtering table are blocked.

Default

Denied

Command Mode

Global Configuration

Example

```
HP420(config)#mac-access permission denied
HP420(config)#
```

Related Commands

mac-access entry (page 6-52)

show authentication (page 6-54)

mac-access entry

This command enters or removes MAC address from the filter table.

Syntax

mac-access entry <mac-address> <active | inactive | deleted>

- *mac-address* - Physical address of a client. Enter six pairs of hexadecimal digits separated by hyphens, e.g., 00-90-D1-12-AB-89.
- active - Adds the MAC address to the filter table as an active entry.
- inactive - Adds the MAC address to the filter table as an inactive entry.
- deleted - Removes the MAC address entry from the filter table.

Default

None

Command Mode

Global Configuration

Command Usage

- Software version 2.0.37 or earlier supports up to only 256 MAC addresses in the local filter table. Software version 2.0.38 or later supports up to 1024 MAC addresses.
- An active MAC address entry in the filter table may be allowed or denied access depending on the global setting configured for the table using the **mac-access permission** command.

Example

```
HP420(config)#address filter entry 00-70-50-cc-99-1a allowed  
HP420(config)#
```

Related Commands

mac-access permission (page 6-52)

show authentication (page 6-54)

mac-authentication server

This command sets address filtering to be performed with local or remote options. Use the **no** form to disable MAC address authentication.

Syntax

```
mac-authentication server [local | remote]
```

- **local** - Authenticate the MAC address of wireless clients with the local authentication database during 802.11 association.
- **remote** - Authenticate the MAC address of wireless clients with the RADIUS server.

Default

local

Command Mode

Global Configuration

Command Usage

The access point does not support a security combination of RADIUS MAC authentication and WPA with 802.1X or WPA pre-shared key.

Example

```
HP420(config)#mac-authentication server remote  
HP420(config)#
```

Related Commands

- mac-access entry** (page 6-52)
- radius-server address** (page 6-43)
- show authentication** (page 6-54)

mac-authentication session-timeout

This command sets the interval at which associated clients will be reauthenticated with the RADIUS server authentication database. Use the **no** form to disable reauthentication.

Syntax

```
mac-authentication session-timeout <seconds>  
seconds - Re-authentication interval. (Range: 0-65535)
```

Default

0 (disabled)

Command Mode

Global Configuration

Example

```
HP420(config)#mac-authentication session-timeout 300  
HP420(config)#
```

show authentication

This command shows all MAC address and 802.1X authentication settings, as well as the MAC address filter table.

Command Mode

Exec

Example

```
HP420#show authentication

Authentication Information
=====
MAC Authentication Server      : LOCAL
MAC Auth Session Timeout Value : 0 secs
802.1x                        : DISABLED
Broadcast Key Refresh Rate    : 0 min
Session Key Refresh Rate      : 0 min
802.1x Session Timeout Value  : 0 secs
MAC table permission          : ALLOW active MAC addresses
found in the filter table.

Filter Table

MAC Address                    Status
-----
00-70-23-7a-1c-bb             ACTIVE
00-70-51-49-d3-26             ACTIVE
=====
HP420(config)#
```

Filtering Commands

The commands described in this section are used to filter communications between wireless clients, control access to the management interface from wireless clients, and filter traffic using specific Ethernet protocol types.

Command	Function	Mode	Page
filter local-bridge	Disables communication between wireless clients	GC	6-56
filter ap-manage	Prevents wireless clients from accessing the management interface	GC	6-57
filter ethernet-type enable	Checks the Ethernet type for all incoming and outgoing Ethernet packets against the protocol filtering table	GC	6-57
filter ethernet-type protocol	Sets a filter for a specific Ethernet type	GC	6-58
show filters	Shows the filter configuration	Exec	6-59

filter local-bridge

This command disables communication between wireless clients. Use the **no** form to disable this filtering.

Syntax

```
filter local-bridge  
no filter local-bridge
```

Default

Disabled

Command Mode

Global Configuration

Command Usage

This command can disable wireless-to-wireless communications between clients via the access point. However, it does not affect communications between wireless clients and the wired network.

Example

```
HP420(config)#filter local-bridge  
HP420(config)#
```

filter ap-manage

This command prevents wireless clients from accessing the management interface on the access point. Use the **no** form to disable this filtering.

Syntax

```
filter ap-manage  
no filter ap-manage
```

Default

Disabled

Command Mode

Global Configuration

Example

```
HP420(config)#filter ap-manage  
HP420(config)#
```

filter ethernet-type enable

This command checks the Ethernet type on all incoming and outgoing Ethernet packets against the protocol filtering table. Use the **no** form to disable this feature.

Syntax

```
filter ethernet-type enable  
no filter ethernet-type enable
```

Default

Disabled

Command Mode

Global Configuration

Command Usage

This command is used in conjunction with the **filter ethernet-type protocol** command to determine which Ethernet protocol types are to be filtered.

Example

```
HP420 (config) #filter ethernet-type enable  
HP420 (config) #
```

Related Commands

filter ethernet-type protocol (page 6-58)

filter ethernet-type protocol

This command sets a filter for a specific Ethernet type. Use the **no** form to disable filtering for a specific Ethernet type.

Syntax

```
filter ethernet-type protocol <protocol>  
no filter ethernet-type protocol <protocol>
```

protocol - An Ethernet protocol type.

- Aironet-DDP
- Appletalk-ARP
- ARP
- Banyan
- Berkeley-Trailer-Neg
- CDP
- DEC-LAT
- DEC-MOP
- DEC-MOP-Dump-Load
- DEC-XNS
- EAPOL
- Enet-Config-Test
- Ethertalk
- IP
- LAN-Test
- NetBEUI
- Novell-IPX(new)
- Novell-IPX(old)
- RARP
- Telxon-TXP
- X25-Level-3

Default

None

Command Mode

Global Configuration

Command Usage

Use the **filter ethernet-type enable** command to enable filtering for Ethernet types specified in the filtering table, or the **no filter ethernet-type enable** command to disable all filtering based on the filtering table.

Example

```
HP420(config)#filter ethernet-type protocol ARP
HP420(config)#
```

Related Commands

filter ethernet-type enable (page 6-57)

show filters

This command shows the filter options and protocol entries in the filter table.

Command Mode

Exec

Example

The example below shows ARP frames filtered indicating its Ethernet protocol ID (0x0806).

```
HP420#show filters
Protocol Filter Information
=====
Local Bridge           :ENABLED
AP Management          :ENABLED
Ethernet Type Filter  :ENABLED

Enabled Protocol Filters
-----
Protocol: ARP                               ISO: 0x0806
=====
HP420#
```

Interface Commands

The commands described in this section configure connection parameters for the Ethernet interface and wireless interface.

Command	Function	Mode	Page
<i>General Interface</i>			
interface	Enters specified interface configuration mode	GC	6-62
<i>Ethernet Interface</i>			
dns primary-server	Specifies the primary name server	IC-E	6-62
dns secondary-server	Specifies the secondary name server	IC-E	6-62
ip address	Sets the IP address for the Ethernet interface	IC-E	6-63
ip dhcp	Submits a DHCP request for an IP address	IC-E	6-64
shutdown	Disables the Ethernet interface	IC-E	6-65
speed-duplex	Configures speed and duplex operation	IC-E	6-66
show interface ethernet	Shows the status for the Ethernet interface	Exec	6-66
<i>Wireless Interface</i>			
radio-mode	Sets the radio working mode	IC-W	6-67
antenna-mode	Sets the access point's antenna mode	IC-W	6-68
description	Adds a description to the wireless interface	IC-W	6-68
closed-system	Closes access to clients without a pre-configured SSID	IC-W	6-69
speed	Configures the maximum data rate at which a station can connect to the access point	IC-W	6-70
multicast-data-rate	Configures the maximum data rate at which the access point can transmit multicast traffic	IC-W	6-70
channel	Configures the radio channel	IC-W	6-71
ssid	Configures the service set identifier	IC-W	6-72
beacon-interval	Configures the rate at which beacon frames are transmitted from the access point	IC-W	6-73

Command	Function	Mode	Page
dtim-period	Configures the rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions	IC-W	6-73
fragmentation-length	Configures the minimum packet size that can be fragmented	IC-W	6-74
rts-threshold	Sets the packet size threshold at which an RTS must be sent to the receiving station prior to the sending station starting communications	IC-W	6-75
slot-time	Sets the basic unit of time the access point uses for calculating transmission waiting times	IC-W	6-76
preamble	Sets the length of the signal preamble at the start of a data transmission	IC-W	6-77
transmit-limits	Sets the reduction in transmit power required for an external antenna to conform with local regulations	IC-W	6-77
transmit-power	Adjusts the power of the radio signals transmitted from the access point	IC-W	6-78
max-association	Configures the maximum number of clients that can be associated with the access point at the same time	IC-W	6-79
key-length-wep	Sets the bit length of WEP keys	IC-W	6-80
wep-key	Sets the keys used for WEP encryption	IC-W	6-80
transmit-key-wep	Sets the index of the WEP key to be used for encrypting data frames sent between the access point and wireless clients	IC-W	6-81
security-suite	Defines wireless security for the access point	IC-W	6-82
wpa-preshared-key	Defines a WPA pre-shared key value	IC-W	6-85
shutdown	Disables the wireless interface	IC-W	6-85
show interface wireless g	Shows the status for the wireless interface	Exec	6-86
show station	Shows the wireless clients associated with the access point	Exec	6-87

interface

This command configures an interface type and enters interface configuration mode.

Syntax

```
interface <ethernet | wireless g>
```

- ethernet - Interface for wired network.
- wireless g - Interface for wireless clients.

Default Setting

None

Command Mode

Global Configuration

Example

To specify the 10/100Base-TX network interface, enter the following command:

```
HP420 (config) #interface ethernet  
HP420 (if-ethernet) #
```

dns server

This command specifies the address for the primary or secondary domain name server to be used for name-to-address resolution.

Syntax

```
dns primary-server <server-address>
```

```
dns secondary-server <server-address>
```

- primary-server - Primary server used for name resolution.
- secondary-server - Secondary server used for name resolution.
- *server-address* - IP address of domain-name server.

Default Setting

None

Command Mode

Global Configuration

Command Usage

The primary and secondary name servers are queried in sequence.

Example

This example specifies two domain-name servers.

```
HP420 (if-ethernet) #dns primary-server 192.168.1.55
HP420 (if-ethernet) #dns secondary-server 10.1.0.55
HP420 (if-ethernet) #
```

Related Commands

show interface ethernet (page 6-66)

ip address

This command sets the IP address for the (10/100Base-TX) Ethernet interface. Use the **no** form to restore the default IP address.

Syntax

```
ip address <ip-address> <netmask> <gateway>
no ip address
```

- *ip-address* - IP address
- *netmask* - Network mask for the associated IP subnet. This mask identifies the host address bits used for routing to specific subnets.
- *gateway* - IP address of the default gateway

Default Setting

```
IP address: 192.168.1.1
Netmask: 255.255.255.0
```

Command Mode

Interface Configuration (Ethernet)

Command Usage

- DHCP is enabled by default. To manually configure a new IP address, you must first disable the DHCP client with the **no ip dhcp** command.
- You must assign an IP address to this device to gain management access over the network or to connect to existing IP subnets. You can manually configure a specific IP address using this command, or direct the device to obtain an address from a DHCP server using the

ip dhcp command. Valid IP addresses consist of four numbers, 0 to 255, separated by periods. Anything other than this format will not be accepted by the configuration program.

Example

```
HP420(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
HP420(if-ethernet)#ip address 192.168.1.2 255.255.255.0
192.168.1.253
HP420(if-ethernet)#
```

Related Commands

ip dhcp (page 6-64)

ip dhcp

This command enables the DHCP client for the access point. Use the **no** form to disable the DHCP client.

Syntax

```
ip dhcp
no ip dhcp
```

Default Setting

Enabled

Command Mode

Interface Configuration (Ethernet)

Command Usage

- You must assign an IP address to this device to gain management access over the network or to connect to existing IP subnets. You can manually configure a specific IP address using the **ip address** command, or direct the device to obtain an address from a DHCP server using this command.
- When you use this command, the access point will begin broadcasting DHCP client requests. The current IP address (i.e., default or manually configured address) will continue to be effective until a DHCP reply is received. Requests will be broadcast periodically by this device in an effort to learn its IP address. (DHCP values can include the IP address, subnet mask, and default gateway.)

Example

```
HP420(config)#interface ethernet
Enter Ethernet configuration commands, one per line.
HP420(if-ethernet)#ip dhcp
HP420(if-ethernet)#
```

Related Commands

ip address (page 6-63)

shutdown

This command disables the Ethernet interface. To restart a disabled interface, use the **no** form.

Syntax

```
shutdown
no shutdown
```

Default Setting

Interface enabled

Command Mode

Interface Configuration (Ethernet)

Command Usage

This command allows you to disable the Ethernet interface due to abnormal behavior (e.g., excessive collisions), and re-enable it after the problem has been resolved. You may also want to disable the Ethernet interface for security reasons.

Example

The following example disables the Ethernet interface.

```
HP420(if-ethernet)#shutdown
HP420(if-ethernet)#
```

speed-duplex

This command configures the speed and duplex mode of the Ethernet interface when auto-negotiation is disabled. Use the **no** form to restore the default.

Syntax

```
speed-duplex <auto | 10MH | 10MF | 100MH | 100MF>
```

- auto - autonegotiate the speed and duplex mode
- 10MH - Forces 10 Mbps, half-duplex operation
- 10MF - Forces 10 Mbps, full-duplex operation
- 100MH - Forces 100 Mbps, half-duplex operation
- 100MF - Forces 100 Mbps, full-duplex operation

Default Setting

Auto-negotiation is enabled by default.

Command Mode

Interface Configuration (Ethernet)

Command Usage

If auto-negotiation is disabled, the speed and duplex mode must be configured to match the setting of the attached device.

Example

The following example configures the Ethernet interface to 100 Mbps, half-duplex operation.

```
HP420 (if-ethernet) #speed-duplex 100mh  
HP420 (if-ethernet) #
```

show interface ethernet

This command displays the status for the Ethernet interface.

Syntax

```
show interface [ethernet]
```

Default Setting

Ethernet interface

Command Mode

Exec

Example

```
HP420#show interface ethernet
Ethernet Interface Information
=====
IP Address           : 192.168.1.1
Subnet Mask          : 255.255.255.0
Default Gateway      : 192.168.1.253
Primary DNS          : 192.168.1.55
Secondary DNS        : 10.1.0.55
Speed-duplex         : 100Base-TX Half Duplex
Admin status         : Up
Operational status   : Up
=====
HP420#
```

radio-mode

This command sets the working mode for the wireless interface.

Syntax

```
radio-mode <b | g | b+g>
```

- **b** - b-only mode: Both 802.11b and 802.11g clients can communicate with the access point, but 802.11g clients can only transfer data at 802.11b standard rates (up to 11 Mbps).
- **g** - g-only mode: Only 802.11g clients can communicate with the access point.
- **b+g** - b & g mixed mode: Both 802.11b and 802.11g clients can communicate with the access point.

Default Setting

b & g mixed mode

Command Mode

Interface Configuration (Wireless)

Example

```
HP420(if-wireless g)#radio-mode g
HP420(if-wireless g)#
```

antenna-mode

This command sets the antenna mode for the access point.

Syntax

antenna-mode <diversity | single>

- **diversity** - A diversity antenna system includes two identical antenna elements that are both used to transmit and receive radio signals. The access point's antennas are diversity antennas. External diversity antennas have two pigtail connections to the access point.
- **single** - Non-diversity antennas with one antenna element that have only a single pigtail cable connection to the access point. These antennas attach to the access point's right antenna connector. The access point's right antenna is the one on the side closest to the LED indicators.

Default Setting

Diversity

Command Mode

Interface Configuration (Wireless)

Example

```
HP420(if-wireless g)#antenna-mode single
HP420(if-wireless g)#
```

description

This command adds a description to the wireless interface. Use the **no** form to remove the description. The wireless interface description is displayed when using the **show interface wireless g** command from the Exec level.

Syntax

description <*string*>
no description

string - Comment or a description for this interface.
(Range: 1-80 characters)

Default Setting

Enterprise 802.11g Access Point

Command Mode

Interface Configuration (Wireless)

Example

```
HP420(config)#interface wireless g
HP420(if-wireless g)#description RD-AP#3
HP420(if-wireless g)#
```

closed-system

This command closes access to clients without a pre-configured SSID. Use the **no** form to disable this feature.

Syntax

```
closed-system
no closed-system
```

Default Setting

Disabled

Command Mode

Interface Configuration (Wireless)

Command Usage

When closed system is enabled, the access point will not include its SSID in beacon messages. Clients with a configured SSID of "any" will not be able to associate with the access point.

Example

```
HP420(if-wireless g)#closed-system
HP420(if-wireless g)#
```

speed

This command configures the maximum data rate at which a station can connect to the access point.

Syntax

```
speed <speed>
```

speed - Maximum access speed allowed for wireless clients.
(Options: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, 54 Mbps)

Default Setting

54 Mbps

Command Mode

Interface Configuration (Wireless)

Command Usage

The access point supports automatic rate adjustment, which dynamically changes the data rate to maintain optimum connectivity with clients. You can set a maximum data rate for all clients, however individual clients will fall back to lower rates depending on their connection conditions. Clients farther away from the access point will use a lower data rate than clients close to the access point.

Example

```
HP420 (if-wireless g) #speed 6  
HP420 (if-wireless g) #
```

multicast-data-rate

This command configures the maximum data rate at which the access point transmits multicast and broadcast traffic.

Syntax

```
multicast-data-rate <speed>
```

speed - Maximum rate allowed for multicast data. (Options: 1, 2, 5.5, 11 Mbps for b-only and b+g modes; 6, 12, 24 Mbps for g-only mode)

Default Setting

1 Mbps for b-only and b+g modes
6 Mbps for g-only mode

Command Mode

Interface Configuration (Wireless)

Example

```
HP420(if-wireless g)#multicast-data-rate 2  
HP420(if-wireless g)#
```

channel

This command configures the radio channel through which the access point communicates with wireless clients.

Syntax

channel <channel| auto>

- *channel* - Manually sets the radio channel used for communications with wireless clients.
 - J8130A: The range is channels 1 to 11
 - J8131A: The range is channels 1 to 14 depending on the country setting
- *auto* - Automatically selects an unoccupied channel (if available). Otherwise, the lowest channel is selected.

Default Setting

Automatic channel selection

Command Mode

Interface Configuration (Wireless)

Command Usage

- The available channel settings are limited by local regulations, which determine the number of channels that are available.
- When multiple access points are deployed in the same area, be sure to choose a channel separated by at least five channels to avoid having the channels interfere with each other. You can deploy up to three access points in the same area (e.g., channels 1, 6, 11).

- For most wireless adapters, the channel for wireless clients is automatically set to the same as that used by the access point to which it is linked.

Example

```
HP420(if-wireless g)#channel 1  
HP420(if-wireless g)#
```

ssid

This command configures the Service Set Identifier (SSID).

Syntax

`ssid <string>`

string - The name of a basic service set supported by the access point.
(Range: 1 - 32 characters)

Default Setting

Enterprise Wireless AP

Command Mode

Interface Configuration (Wireless)

Command Usage

Clients that want to connect to the network via the access point must set their SSIDs to the same as that of the access point.

Example

```
HP420(if-wireless g)#ssid RD-AP#3  
HP420(if-wireless g)#
```

beacon-interval

This command configures the rate at which beacon frames are transmitted from the access point.

Syntax

```
beacon-interval <interval>
```

interval - The rate for transmitting beacon frames.
(Range: 20-1000 milliseconds)

Default Setting

100

Command Mode

Interface Configuration (Wireless)

Command Usage

The beacon frames allow wireless clients to maintain contact with the access point. They may also carry power-management information.

Example

```
HP420 (if-wireless g) #beacon-interval 150  
HP420 (if-wireless g) #
```

dtim-period

This command configures the rate at which stations in sleep mode must wake up to receive broadcast/multicast transmissions.

Syntax

```
dtim-period <interval>
```

interval - Interval between the beacon frames that transmit broadcast or multicast traffic. (Range: 1-255 beacon frames)

Default Setting

2

Command Mode

Interface Configuration (Wireless)

Command Usage

- The Delivery Traffic Indication Map (DTIM) packet interval value indicates how often the MAC layer forwards broadcast/multicast traffic. This parameter is necessary to wake up stations that are using Power Save mode.
- The DTIM is the interval between two synchronous frames with broadcast/multicast information. The default value of 2 indicates that the access point will save all broadcast/multicast frames for the Basic Service Set (BSS) and forward them after every second beacon.
- Using smaller DTIM intervals delivers broadcast/multicast frames in a more timely manner, causing stations in Power Save mode to wake up more often and drain power faster. Using higher DTIM values reduces the power used by stations in Power Save mode, but delays the transmission of broadcast/multicast frames.

Example

```
HP420(if-wireless g)#dtim-period 100  
HP420(if-wireless g)#
```

fragmentation-length

This command configures the minimum packet size that can be fragmented when passing through the access point.

Syntax

fragmentation-length <*length*>

length - Minimum packet size for which fragmentation is allowed.
(Range: 256-2346 bytes)

Default Setting

2346

Command Mode

Interface Configuration (Wireless)

Command Usage

- If the packet size is smaller than the preset fragment size, the packet will not be fragmented.
- Fragmentation of the PDUs (Package Data Unit) can increase the reliability of transmissions because it increases the probability of a successful transmission due to smaller frame size. If there is signifi-

cant interference present, or collisions due to high network utilization, try setting the fragment size to send smaller fragments. This will speed up the retransmission of smaller frames. However, it is more efficient to set the fragment size larger if very little or no interference is present because it requires overhead to send multiple frames.

Example

```
HP420 (if-wireless g)#fragmentation-length 512  
HP420 (if-wireless g)#
```

rts-threshold

This command sets the packet size threshold at which a Request to Send (RTS) signal must be sent to the receiving station prior to the sending station starting communications.

Syntax

`rts-threshold <threshold>`

threshold - Threshold packet size for which to send an RTS.
(Range: 0-2347 bytes)

Default Setting

2347

Command Mode

Interface Configuration (Wireless)

Command Usage

- If the threshold is set to 0, the access point never sends RTS signals. If set to 2347, the access point always sends RTS signals. If set to any other value, and the packet size equals or exceeds the RTS threshold, the RTS/CTS (Request to Send / Clear to Send) mechanism will be enabled.
- The access point sends RTS frames to a receiving station to negotiate the sending of a data frame. After receiving an RTS frame, the station sends a CTS frame to notify the sending station that it can start sending data.
- Access points contending for the wireless medium may not be aware of each other. The RTS/CTS mechanism can solve this “Hidden Node” problem.

Example

```
HP420(if-wireless g)#rts-threshold 256  
HP420(if-wireless g)#
```

slot-time

This command sets the basic unit of time the access point uses for calculating waiting times before data is transmitted.

Syntax

slot-time [short | long | auto]

- short - Sets the slot time to short (9 microseconds).
- long - Sets the slot time to long (20 microseconds).
- auto - Sets the slot time according to the capability of clients that are currently associated.

Default Setting

Auto

Command Mode

Interface Configuration (Wireless)

Command Usage

- Setting the slot time to short can increase data throughput on the access point, but requires that all clients can support the short slot time.
- Set the slot time to long if the access point has to support 802.11b clients.
- If the slot time is set to **short** and the radio mode (working mode) changed to b-only, the slot time is automatically set to **auto**.

Example

```
HP420(if-wireless g)#slot-time short  
HP420(if-wireless g)#
```

Related Commands

radio-mode (page 6-67)

preamble

This command sets the length of the signal preamble that is used at the start of a data transmission.

Syntax

preamble [long | short-or-long]

- long - Sets the preamble to long.
- short-or-long - Sets the preamble according to the capability of clients that are currently associated. Uses a short preamble if all associated clients can support it, otherwise a long preamble is used.

Default Setting

Short-or-long

Command Mode

Interface Configuration (Wireless)

Command Usage

- Using a short preamble (96 microseconds) instead of a long preamble (192 microseconds) can increase data throughput on the access point, but requires that all clients can support a short preamble.
- Set the preamble to long to ensure the access point can support all 802.11b and 802.11g clients.

Example

```
HP420 (if-wireless g) #preamble short-or-long
HP420 (if-wireless g) #
```

transmit-limits

This command sets the reduction in transmit power required for an external antenna to conform with local regulations.

Syntax

transmit-limits <low> <middle> <high>

low - The percentage of full power allowed for low radio channels.
(Options: 100, 90, 80, 70, 63, 56, 50, 45, 40, 35, 32, 28, 25, 22, 20, 18, 16, 14, 13, 11, 10)

middle - The percentage of full power allowed for middle radio channels. (Options: 100, 90, 80, 70, 63, 56, 50, 45, 40, 35, 32, 28, 25, 22, 20, 18, 16, 14, 13, 11, 10)

high - The percentage of full power allowed for high radio channels. (Options: 100, 90, 80, 70, 63, 56, 50, 45, 40, 35, 32, 28, 25, 22, 20, 18, 16, 14, 13, 11, 10)

Default Setting

100% for all channels

Command Mode

Interface Configuration (Wireless)

Command Usage

Configure the transmit limit settings for the specific external antenna and region as given in the Transmit Power Control Settings tables (see page 5-62) for that radio mode (b; g; b and g).

Example

```
HP420(if-wireless g)#transmit-limits 80 63 70
HP420(if-wireless g)#
```

transmit-power

This command adjusts the power of the radio signals transmitted from the access point.

Syntax

`transmit-power <signal-strength>`

signal-strength - Signal strength transmitted from the access point.
(Options: full, 90%, 80%, 70%, 63%, 56%, 50%, 45%, 40%, 35%, 32%, 28%, 25%, 22%, 20%, 18%, 16%, 14%, 13%, 11%, 10%, min)

Default Setting

full

Command Mode

Interface Configuration (Wireless)

Command Usage

- The **min** keyword indicates minimum power.
- The longer the transmission distance, the higher the transmission power required.

Example

```
HP420 (if-wireless g) #transmit-power 50%  
HP420 (if-wireless g) #
```

max-association

This command configures the maximum number of clients that can be associated with the access point at the same time.

Syntax

```
max-association <count>
```

count - Maximum number of associated stations. (Range: 0-128)

Default Setting

128

Command Mode

Interface Configuration (Wireless)

Example

```
HP420 (if-wireless g) #max-association 32  
HP420 (if-wireless g) #
```

key-length-wep

This command defines the bit length of WEP keys.

Syntax

```
key-length-wep <64 | 128 | 152>
```

- 64 - Set the WEP key length as 64 bits.
- 128 - Set the WEP key length as 128 bits.
- 152 - Set the WEP key length as 152 bits.

Default Setting

128

Command Mode

Interface Configuration (Wireless)

Command Usage

- You must enable encryption on the access point before setting the WEP key length.
- You must set the WEP key length using this command before defining a WEP key with the **wep-key** command.

Example

```
HP420(if-wireless g)#key-length-wep 128  
HP420(if-wireless g)#
```

Related Commands

wep-key (page 6-80)

wep-key

This command sets the keys used for WEP encryption. Use the **no** form to delete a configured key.

Syntax

```
key <index> <type> <value>  
no key <index>
```

- *index* - Key index. (Range: 1-4)
- *type* - Input format. (Options: ASCII, HEX)

- *value* - The key string.
 - For 64-bit keys, use 5 alphanumeric characters or 10 hexadecimal digits.
 - For 128-bit keys, use 13 alphanumeric characters or 26 hexadecimal digits.
 - For 152-bit keys, use 16 alphanumeric characters or 32 hexadecimal digits.

Default Setting

None

Command Mode

Interface Configuration (Wireless)

Command Usage

- To enable Wired Equivalent Privacy (WEP), first use the **security-suite shared-key** command.
- You must enable encryption with the **encryption** command and set the key length with the **key-length-wep** command before configuring at least one WEP key with this command.
- If WEP is enabled, all wireless clients must be configured with the same shared keys to communicate with the access point.

Example

```
HP420 (if-wireless g) #wep-key 1 hex 1234512345
HP420 (if-wireless g) #wep-key 2 ascii abcde
HP420 (if-wireless g) #
```

Related Commands

security-suite (page 6-82)

key-length-wep (page 6-80)

transmit-key-wep

This command sets the index of the WEP key to be used for encrypting data frames broadcast or multicast from the access point to wireless clients.

Syntax

```
transmit-key-wep <index>
```

index - Key index. (Range: 1-4)

Default Setting

1

Command Mode

Interface Configuration (Wireless)

Command Usage

- If you use WEP key encryption, the access point uses the transmit key to encrypt multicast and broadcast data signals that it sends to client devices. Other keys can be used for decryption of data from clients.
- When using IEEE 802.1X, the access point uses a dynamic WEP key to encrypt unicast, broadcast, and multicast messages to 802.1X-enabled clients. However, because the access point sends the WEP keys during the 802.1X authentication process, these keys do not have to appear in the client's WEP key list.

Example

```
HP420 (if-wireless g) #transmit-key-wep 2  
HP420 (if-wireless g) #
```

security-suite

This command defines the mechanisms employed by the access point for wireless security.

Syntax

```
security-suite <wizard | open-system | shared-key>  
<wpa-disabled | wpa-required | wpa-supported>  
<802.1x-disabled | 802.1x-required | 802.1x-supported | psk>  
<wep | wep-tkip | tkip-tkip | aes-aes>
```

- *wizard* - Provides a choice of seven security options that are automatically set.
 - 1 - No security (open authentication with encryption disabled).
 - 2 - Static WEP shared keys used for encryption (open authentication).
 - 3 - WPA pre-shared key authentication and AES encryption used for the multicast cipher.
 - 4 - WPA pre-shared key authentication and TKIP encryption used for the multicast cipher.
 - 5 - 802.1X authentication and dynamic WEP keys.

- 6 - WPA with 802.1X using AES encryption for the multicast cipher.
- 7 - WPA with 802.1X using TKIP encryption for the multicast cipher.
- open-system - Accepts clients without verifying identities using a shared WEP key.
- shared-key - Authentication is based on a WEP shared key that has been distributed to all stations.
- wpa-disabled - WPA is disabled.
- wpa-required - Supports only clients using WPA.
- wpa-supported - Support clients with or without WPA.
- 802.1x-disabled - 802.1X is not used for authentication. The access point uses WPA-PSK and/or static WEP keys for security.
- 802.1x-required - 802.1X is always used for authentication. The access point uses WPA and/or dynamic WEP keys for security.
- 802.1x-supported - 802.1X can be used by clients initiating authentication. The access point uses WPA and/or static or dynamic WEP keys for security.
- psk - WPA pre-shared key is used for security.
- wep - Static or dynamic WEP keys are used for multicast encryption.
- wep-tkip - WPA with 802.1X or WPA-PSK uses WEP keys for multicast encryption and TKIP keys for unicast encryption.
- tkip-tkip - WPA with 802.1X uses TKIP keys for both multicast and unicast encryption.
- aes-aes - WPA with 802.1X uses AES keys for both multicast and unicast encryption.

Default Setting

Wizard option **1** (no security)

Command Mode

Interface Configuration (Wireless)

Command Usage

- When using this command to configure WPA or 802.1X for authentication and dynamic keying, you must use the **open-system** argument.
- Shared key authentication can only be used when at least one static WEP key has been defined with the **wep-key** command.

- When **wpa-required** or **wpa-supported** is selected, clients are authenticated using 802.1X via a RADIUS server. Each client has to be WPA-enabled or support 802.1X client software. A RADIUS server must also be configured and be available in the wired network.
- When the WPA mode is set to **psk**, the key must first be generated and distributed to all wireless clients before they can successfully associate with the access point. Use the **wpa-preshared-key** command to configure the key.
- WPA enables the access point to support different unicast encryption keys for each client. However, the global encryption key for multicast and broadcast traffic must be the same for all clients. This command sets the encryption type that is used for multicast and unicast traffic.
- If any clients supported by the access point are not WPA enabled, the multicast-cipher algorithm must be set to WEP.
- When 802.1X is disabled, the access point does not support 802.1X authentication for any station. After successful 802.11 association, each client is allowed to access the network.
- When 802.1X is supported, the access point supports 802.1X authentication only for clients initiating the 802.1X authentication process. The access point does NOT initiate 802.1X authentication. For stations initiating 802.1X, only those stations successfully authenticated are allowed to access the network. For those stations not initiating 802.1X, access to the network is allowed after successful 802.11 association.
- When 802.1X is required, the access point enforces 802.1X authentication for all 802.11 associated stations. If 802.1X authentication is not initiated by the station, the access point will initiate authentication. Only those stations successfully authenticated with 802.1X are allowed to access the network.

Example

The following example configures mixed mode client support for dynamic WEP keys and WPA with 802.1X.

```
HP420(if-wireless g)#security-suite open-system wpa-
supported 802.1x-required wep
HP420(if-wireless g)#
```

wpa-preshared-key

This command defines a Wi-Fi Protected Access (WPA) pre-shared key.

Syntax

wpa-preshared-key <type> <value>

- *type* - Input format. (Options: **ASCII**, **HEX**)
- *value* - The key string.
 - For **ASCII** input, type a string between 8 and 63 alphanumeric characters.
 - For **HEX** input, type exactly 64 hexadecimal digits.

Command Mode

Interface Configuration (Wireless)

Command Usage

- To support Wi-Fi Protected Access (WPA) for client authentication, use the **security-suite** command to specify that WPA pre-shared key mode is required and use this command to configure one static key.
- If WPA is used in pre-shared key mode, all wireless clients must be configured with the same pre-shared key to communicate with the access point.

Example

```
HP420(if-wireless g)#wpa-preshared-key ASCII agoodsecret  
HP420(if-wireless g)#
```

Related Commands

security-suite (page 6-82)

shutdown

This command disables the wireless interface. Use the **no** form to enable the interface.

Syntax

```
shutdown  
no shutdown
```

Default Setting

v2.0.37 software or earlier: Interface enabled
v2.0.38 software or later: Interface disabled

Command Mode

Interface Configuration (Wireless)

Example

```
HP420(if-wireless g)#shutdown  
HP420(if-wireless g)#
```

show interface wireless g

This command displays the status for the wireless interface.

Command Mode

Exec

Example

```
HP420#show interface wireless g  
  
Wireless Interface Information  
=====
```

-----Identification-----	
Description	: Enterprise 802.11g Access Point
SSID	: Enterprise Wireless AP
Radio mode	: 802.11b only
Channel	: 9
Status	: Enabled

```
-----802.11 Parameters-----  
Transmit Power      : HALF (18 dBm)  
Max Station Data Rate : 24Mbps  
Multicast Data Rate  : 2Mbps  
Fragmentation Threshold : 1024 bytes  
RTS Threshold        : 2000 bytes  
Beacon Interval      : 60 TUs  
DTIM Interval        : 8 beacons  
Preamble Length      : SHORT  
Slot time            : SHORT  
Maximum Association  : 64 stations
```

```

-----Security-----
Closed System                : DISABLED
802.11 Authentication       : OPEN
WPA clients                  : SUPPORTED
802.1x                       : DISABLED
Encryption                   : DISABLED
**[WEP key]*****
Key Length                   : -----
Default Transmit Key        : 1
Cipher                       : WEP
WEP Key Data Type           : Hexadecimal
Static Keys :
  Key 1: EMPTY  Key 2: EMPTY  Key 3: EMPTY  Key 4: EMPTY
**[WPA key]*****
WPA mode                     : Dynamic key
Multicast cipher             : WEP
Unicast cipher               : TKIP
Pre-shared Key Data Type    : Hexadecimal
-----Antenna-----
Antenna mode                 : Diversity
Antenna gain attenuation
  Low channel                : 80%
  Mid channel                : 63%
  High channel               : 70%
=====
HP420#

```

show station

This command shows the wireless clients associated with the access point. The "Station Address" displayed is the client's MAC address.

Command Mode

Exec

Example

```

HP420#show station
802.11g Station Table
Station Address   : 00-04-E2-41-C2-9D
  Authenticated   : TRUE
  Associated      : TRUE
  Forwarding Allowed : TRUE
HP420#

```

IAPP Command

The command described in this section enables the protocol signaling required to ensure the successful handover of wireless clients roaming between different IEEE 802.11f-compliant access points. The IEEE 802.11f protocol can ensure successful roaming between access points in a multi-vendor environment.

iapp

This command enables the protocol signaling required to hand over wireless clients roaming between different 802.11f-compliant access points. Use the **no** form to disable 802.11f signaling.

Syntax

```
iapp  
no iapp
```

Default

Enabled

Command Mode

Global Configuration

Command Usage

The current 802.11 standard does not specify the signaling required between access points in order to support clients roaming from one access point to another. In particular, this can create a problem for clients roaming between access points from different vendors. This command is used to enable or disable 802.11f handover signaling between different access points, especially in a multi-vendor environment.

Example

```
HP420(config)#iapp  
HP420(config)#
```

VLAN Commands

The access point can enable the support of VLAN-tagged traffic passing between wireless clients and the wired network. Up to 64 VLAN IDs can be mapped to specific wireless clients, allowing users to remain within the same VLAN as they move around a campus site.

When VLAN is enabled on the access point, a VLAN ID (a number between 1 and 4094) can be assigned to each client after successful authentication using IEEE 802.1X and a central RADIUS server. The user VLAN IDs must be configured on the RADIUS server for each user authorized to access the network. If a user does not have a configured VLAN ID, the access point assigns the user to its own configured native VLAN ID.

Note-

When VLANs are enabled, the access point's Ethernet interface drops all received traffic that does not include a VLAN tag. To maintain network connectivity to the access point and wireless clients, be sure that the access point is connected to a device port that supports IEEE 802.1Q VLAN tags.

The VLAN commands supported by the access point are listed below.

Command	Function	Mode	Page
vlan enable	Enables VLAN-tag support for all traffic	GC	6-89
native-vlanid	Configures the native VLAN for the access point	GC	6-90

vlan

This command enables VLAN-tag support for all traffic. Use the **no** form to disable VLANs.

Syntax

```
vlan enable
no vlan
```

Default

Disabled

Command Mode

Global Configuration

Command Usage

When VLANs support is enabled or disabled on the access point, the system requires a reboot.

Example

```
HP420(config)#vlan enable  
Reboot system now? <y/n>: y
```

native-vlanid

This command configures the native VLAN ID for the access point.

Syntax

```
native-vlanid <vlan-id>
```

vlan-id - Native VLAN ID. (Range: 1-4094)

Default Setting

1

Command Mode

Global Configuration

Command Usage

When VLANs are enabled on the access point, a VLAN ID (a number between 1 and 4094) can be assigned to each client after successful authentication using IEEE 802.1X and a central RADIUS server. If a user does not have a configured VLAN ID, the access point assigns the user to its own configured native VLAN ID (a number between 1 and 4094).

Example

```
HP420(config)#native-vlanid 3  
HP420(config)#
```


File Transfers

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Overview

You can download new access point software and upload or download configuration files. These features are useful for acquiring periodic access point software upgrades and for storing or retrieving a switch configuration.

This appendix includes the following information:

- Downloading access point software (page A-3)
- Transferring access point configurations (page A-10)

Downloading Access Point Software

HP periodically provides access point software updates through the HP ProCurve website (<http://www.hp.com/go/hpprocurve>). For more information, see the support and warranty booklet shipped with the access point. After you acquire a new access point software file, you can use one of the following methods for downloading the software code to the access point.

General Switch Software Download Rules

After an access point software download, you must reboot the access point to implement the newly downloaded code. Until a reboot occurs, the access point continues to run on the software it was using before the download started.

Note

Downloading new software does not change the current access point configuration. The access point configuration is contained in a separate file that can also be transferred, for example, for archive purposes or to be used in another access point of the same model. HP recommends that you save a copy of the configuration file before upgrading your access point software. See “Transferring Configuration Files” on page A-10 for information on saving the access point’s configuration file.

The access point stores two software files in its flash memory. One has a file name such as **hp420-2038.bin**, which is the current version of software the access point runs. The current software file is overwritten when new software is downloaded to the access point. The other software file, called **dflt-img.bin**, contains a default version of the access point software that is used if the current software file is deleted or fails. The **dflt-img.bin** file cannot be deleted from the system or overwritten.

Using TFTP or FTP To Download Software from a Server

This procedure assumes that:

- A software file for the access point has been stored on a TFTP or FTP server accessible to the access point. (The access point software file is typically available from the HP ProCurve website at <http://www.hp.com/go/hpprocurve>.)
- The access point is properly connected to your network and has already been configured with a compatible IP address and subnet mask.

- The TFTP or FTP server is accessible to the access point through IP.

Before you use the procedure, do the following:

- Obtain the IP address of the TFTP or FTP server on which the access point software file has been stored.
- If VLANs are configured on the access point, determine the name of the VLAN in which the TFTP or FTP server is operating.
- Determine the name of the access point software file stored in the TFTP or FTP server for the access point (for example, **hp420-2038.bin**).

Note

If your TFTP or FTP server is a Unix workstation, *ensure that the case (upper or lower) that you specify for the filename is the same case as the characters in the access point software filenames on the server.*

Web: TFTP/FTP Software Download to the Access Point

The **Software Upgrade** window on the **Administration** tab enables the access point's system software to be upgraded by downloading a new file to the access point's flash memory. The new software file must be stored remotely on an FTP or TFTP server.

Note

Due to the size limit of the flash memory, the access point can store only two software files.

The web interface enables you to modify these parameters:

- **Software Upgrade Remote:** Downloads a software file from a specified remote FTP or TFTP server. The success of the file transfer depends on the accessibility of the FTP or TFTP server and the quality of the network connection.

- **New software file:** Specifies the name of the software file on the server.

The new software file name should not contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for file names on the FTP/TFTP server is 255 characters or 32 characters for files on the access point. (Valid characters: A-Z, a-z, 0-9, ".", "-", "_")

- **IP Address:** The IP address or host name of the FTP or TFTP server.
- **Username:** The user ID used for login on an FTP server.
- **Password:** The password used for login on an FTP server.

- **Restore Factory Settings:** Click the Restore button to reset the access point's configuration settings to the factory defaults and reboot the system.
- **Reset Access Point:** Click the Reset button to reboot the system.

To Download New Software Using FTP or TFTP:

1. Select the **Administration** tab.
2. Click the [**Software Upgrade**] button.
3. Under **Software Upgrade Remote**, select **FTP** or **TFTP** for the server you are using.
4. In the text field **New Software File**, specify the file name of the software on the FTP or TFTP server.
5. In the text field **IP Address**, specify the IP address of the FTP or TFTP server.
6. If using an FTP server, specify the user name and password, if required.
7. Click the [**Start Upgrade**] button.
8. When the download is complete, restart the access point by clicking on the [**Reboot**] button. Alternatively, you can reset the access point defaults and reboot the system by clicking on the [**Reset**] button. Resetting the access point is highly recommended.

Caution

New software that is incompatible with the current configuration automatically restores the access point to default values when first activated after a reboot.

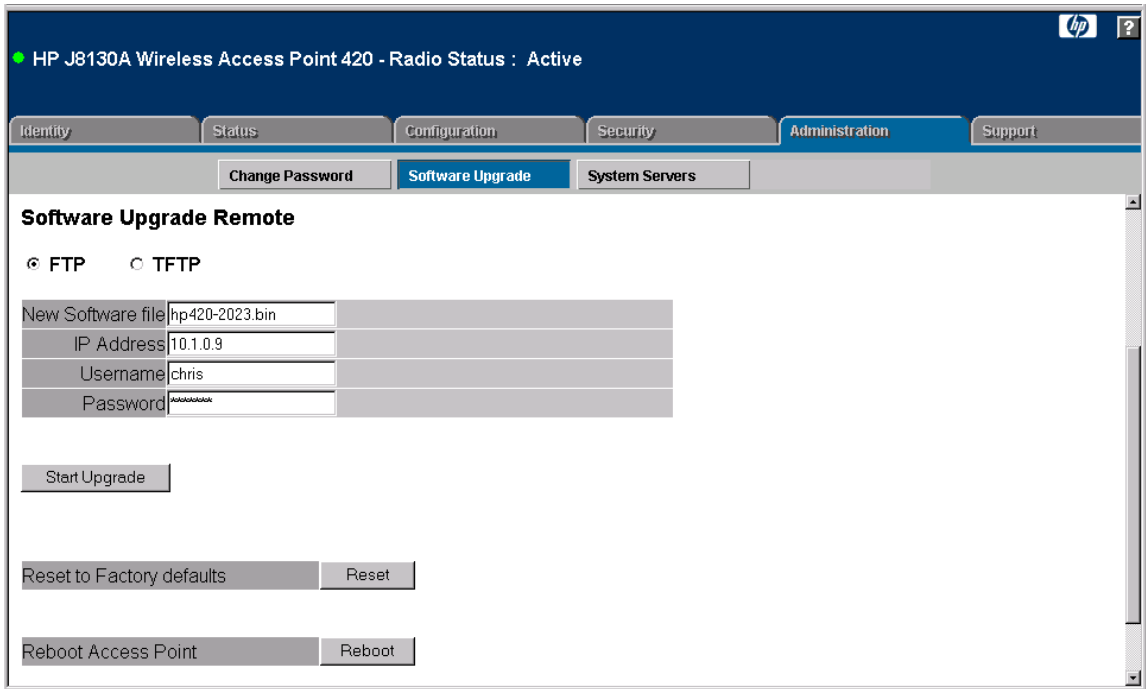


Figure A-1. Remote Software Upgrade

CLI: TFTP/FTP Software Download to the Access Point

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
<code>copy <ftp tftp> file</code>	page 6-40
<code>dir</code>	page 6-42
<code>reset <board configuration></code>	page 6-6

The following example shows how to download new software to the access point using a TFTP server.

```
HP420#copy tftp file
1. Application image
2. Config file
3. Boot block image
Select the type of download<1,2,3>: [1]:1
TFTP Source file name:hp420-2038.bin
TFTP Server IP:10.1.0.9

Removing old runtime! Please wait a few minutes!

Creating file! Please wait a few minutes!
Firmware version of system is v2.0.29 and Updating Run-Time
code v2.0.38 NOW!
This firmware is compatible with hardware.
Updating Boot Line in NVRAM, please wait!
Warning! Updating firmware may cause configuration settings
to be incompatible.
(Suggestion:Using new default configuration settings lets
system be more
efficient,but system will lose current settings.)
Do you want to use NEW CONFIG SETTINGS? <y/n> [n]:n
HP420#dir
File Name                               Type   File Size
-----
dflt-img.bin                            2      1325119
hp420-2037.bin                           2      1325119
syscfg                                   5       17004
syscfg_bak                               5       17004

          262144 byte(s) available

HP420#reset board
Reboot system now? <y/n>: y
```

When the access point finishes downloading the file from the server, a number a messages are displayed as the software is installed before a prompt “**Do you want to use NEW CONFIG SETTINGS? <y/n> [n]:**” appears.

Type “**y**” to reset the configuration to default values and reboot the access point to activate the downloaded software. Type “**n**” to continue to use the current configuration settings without rebooting.

Caution

New software that is incompatible with the current configuration automatically restores the access point to default values when first activated after a reboot.

If you typed “n” to continue using the current configuration settings, you must type **reset board** to reboot the access point and activate the downloaded software.

Using the Web Interface To Download Software From the Local Computer

This procedure assumes that:

- A software file for the access point has been stored on the local computer. (The access point software file is typically available from the HP ProCurve website at <http://www.hp.com/go/hpprocurve>.)
- The access point is properly connected to your network and has already been configured with a compatible IP address and subnet mask.

Before you use the procedure, do the following:

- Store or locate the access point software file on the local computer (for example, **hp420-2038.bin**).

The **Software Upgrade** window on the **Administration** tab enables the access point’s system software to be upgraded by downloading a new file to the access point’s flash memory. The new software file must be stored locally on a management station using the access point’s web interface.

The web interface enables you to modify these parameters:

- **Software Upgrade Local:** Downloads a software file from the web management station to the access point using HTTP. Use the Browse button to locate the file locally on the management station and click Start Upgrade to proceed.

The new software file name should not contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for files on the access point is 32 characters. (Valid characters: A-Z, a-z, 0-9, “.”, “-”, “_”)

- **Restore Factory Settings:** Click the Restore button to reset the access point’s configuration settings to the factory defaults and reboot the system.
- **Reset Access Point:** Click the Reset button to reboot the system.

To Download New Code:

1. Select the **Administration** tab.
2. Click the [**Software Upgrade**] button.
3. Under **Software Upgrade Local**, in the text field **New Software File**, specify the path and file name of the software on the local computer. You can use the [**Browse**] button to find the file.
4. Click the [**Start Upgrade**] button.
5. When the download is complete, restart the access point by clicking on the [**Reboot**] button. Alternatively, you can reset the access point defaults and reboot the system by clicking on the [**Reset**] button.

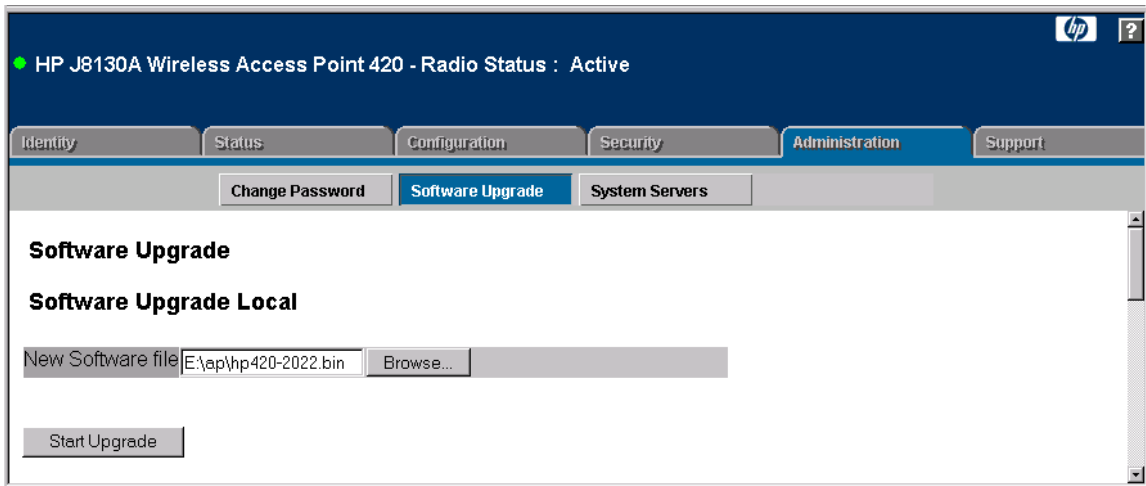


Figure A-2. Local Software Upgrade

Transferring Configuration Files

CLI Commands Used in This Section

Command Syntax	CLI Reference Page
copy config <ftp tftp>	page 6-40
copy <ftp tftp> file	page 6-40
dir	page 6-42
reset <board configuration>	page 6-6

Using the CLI commands described in this section, you can copy access point configuration files to and from an FTP or TFTP server. Transferring configuration files is not available using the web interface.

When you copy the access point configuration file to an FTP/TFTP server, that file can later be downloaded to the access point to restore the system configuration. The success of the file transfer depends on the accessibility of the FTP/TFTP server and the quality of the network connection.

The following example shows how to upload the configuration file to a TFTP server.

```
HP420#copy config tftp
TFTP Source file name:syscfg
TFTP Server IP:192.168.1.19
HP420#
```

The following example shows how to download a configuration file to the access point using a TFTP server. After downloading the configuration file, you must reboot the access point.

```
HP420#copy tftp file
1. Application image
2. Config file
3. Boot block image
Select the type of download<1,2,3>: [1]:2
TFTP Source file name:syscfg
TFTP Server IP:10.1.0.9

HP420#
```

— *This page is intentionally unused.* —

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