CHAPTER 16

Configuring Filters

This chapter describes how to configure and manage MAC address, IP, and Ethertype filters on the access point using the web-browser interface. This chapter contains these sections:

Understanding Filters

Protocol filters (IP protocol, IP port, and Ethertype) prevent or allow the use of specific protocols through the access point radio ports. You can set up individual protocol filters or sets of filters. You can filter protocols for wireless client devices, users on the wired LAN, or both. For example, an SNMP filter on the access point's radio port prevents wireless client devices from using SNMP with the access point but does not block SNMP access from the wired LAN.

IP address and MAC address filters allow or disallow the forwarding of unicast and multicast packets either sent from or addressed to specific IP or MAC addresses. You can create a filter that passes traffic to all addresses except those you specify, or you can create a filter that blocks traffic to all addresses except those you specify.

You can configure filters using the web-browser interface or by entering commands in the CLI.

Note You can include filters in the access point QoS policies.Using the CLI, you can configure up to 2,048 MAC addresses for filtering. Using the web-browser interface, however, you can configure only up to 43 MAC addresses for filtering.

Configuring Filters Using the CLI

To configure filters using CLI commands, you use access control lists (ACLs) and bridge groups. You can find explanations of these concepts and instructions for implementing them in these documents:

- *Cisco IOS Bridging and IBM Networking Configuration Guide, Release 12.4*. Click this link to browse to the "Configuring Transparent Bridging" chapter: http://www.cisco.com/univercd/cc/td/doc/product/software/ios122/122cgcr/fibm_c/bcfpart1/bcftb.htm
- *Catalyst 4908G-L3 Cisco IOS Release 12.0(10)W5(18e) Software Feature and Configuration Guide*. Click this link to browse to the "Command Reference" chapter: http://www.cisco.com/univercd/cc/td/doc/product/l3sw/4908g_l3/ios_12/10w518e/config/cmd_ref.htm

Note Avoid using both the CLI and the web-browser interfaces to configure the wireless device. If you configure the wireless device using the CLI, the web-browser interface might display an inaccurate interpretation of the configuration. However, the inaccuracy does not necessarily mean that the wireless device is misconfigured. For example, if you configure ACLs using the CLI, the web-browser interface might display this message: "Filter 700 was configured on interface Dot11Radio0 using CLI. It must be cleared via CLI to ensure proper operation of the web interface." If you see this message you should use the CLI to delete the ACLs and use the web-browser interface to reconfigure them.

Configuring Filters Using the Web-Browser Interface

This section describes how to configure and enable filters using the web-browser interface. You complete two steps to configure and enable a filter:

1. Name and configure the filter using the filter setup pages.
2. Enable the filter using the Apply Filters page.

These sections describe setting up and enabling three filter types:

- Configuring and Enabling MAC Address Filters, page 16-3
- Configuring and Enabling IP Filters, page 16-9
- Configuring and Enabling Ethertype Filters, page 16-12

Configuring and Enabling MAC Address Filters

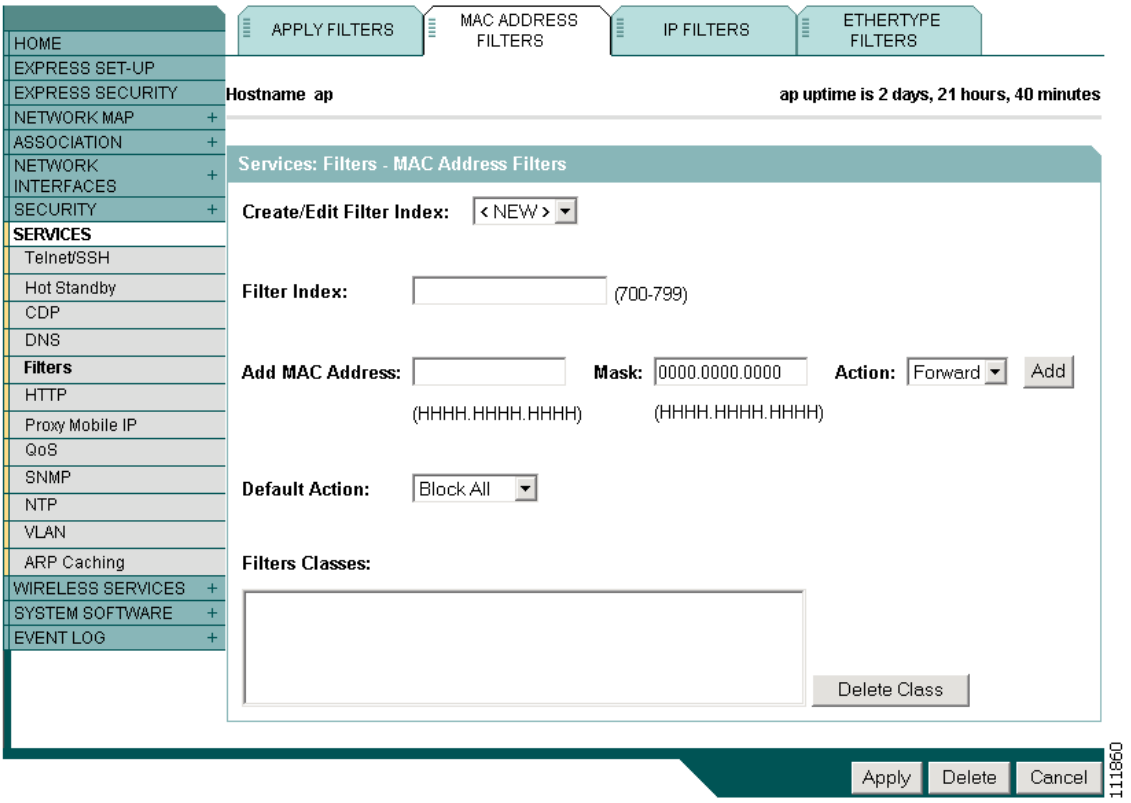
MAC address filters allow or disallow the forwarding of unicast and multicast packets either sent from or addressed to specific MAC addresses. You can create a filter that passes traffic to all MAC addresses except those you specify, or you can create a filter that blocks traffic to all MAC addresses except those you specify.

Note Using the CLI, you can configure MAC addresses for filtering, but because of a NVRAM limitation, you need FTP or TFTP for more than 600 MAC filters. Using the web-browser interface, however, you can configure only up to 43 MAC addresses for filtering.

Note MAC address filters are powerful, and you can lock yourself out of the access point if you make a mistake setting up the filters. If you accidentally lock yourself out of your access point, use the CLI to disable the filters.

Use the MAC Address Filters page to create MAC address filters for the access point. Figure 16-1 shows the MAC Address Filters page.

Figure 16-1 MAC Address Filters Page



Follow this link path to reach the Address Filters page:

1. Click **Services** in the page navigation bar.
2. In the Services page list, click **Filters**.
3. On the Apply Filters page, click the **MAC Address Filters** tab at the top of the page.

Creating a MAC Address Filter

Follow these steps to create a MAC address filter:

Step 1 Follow the link path to the MAC Address Filters page.

Step 2 If you are creating a new MAC address filter, make sure **<NEW>** (the default) is selected in the Create/Edit Filter Index menu. To edit a filter, select the filter number from the Create/Edit Filter Index menu.

Step 3 In the Filter Index field, name the filter with a number from 700 to 799. The number you assign creates an access control list (ACL) for the filter.

Step 4 Enter a MAC address in the Add MAC Address field. Enter the address with periods separating the three groups of four characters (0005.9a39.2110, for example).

Note To make sure the filter operates properly, use lower case for all the letters in the MAC addresses that you enter.

Step 5 Use the Mask entry field to indicate how many bits, from left to right, the filter checks against the MAC address. For example, to require an exact match with the MAC address (to check all bits) enter **0000.0000.0000**. To check only the first 4 bytes, enter **0.0.FFFF**.

Step 6 Select **Forward** or **Block** from the Action menu.

Step 7 Click **Add**. The MAC address appears in the Filters Classes field. To remove the MAC address from the Filters Classes list, select it and click **Delete Class**.

Step 8 Repeat Step 4 through Step 7 to add addresses to the filter.

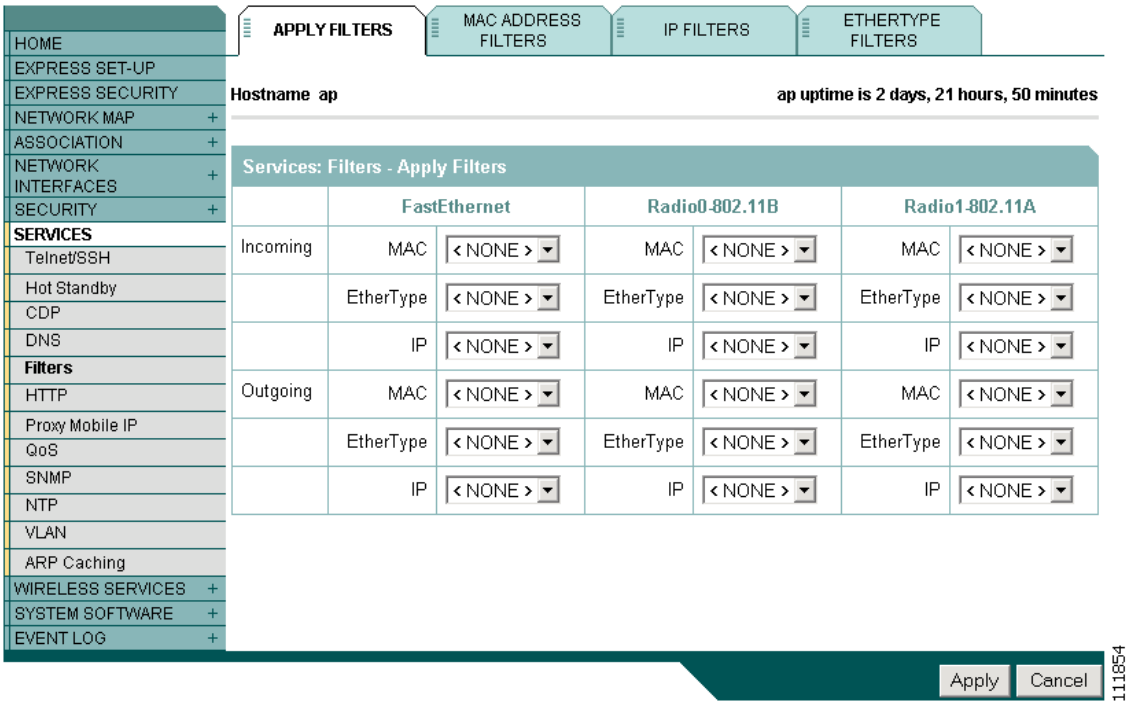
Step 9 Select **Forward All** or **Block All** from the Default Action menu. The filter default action must be the opposite of the action for at least one of the addresses in the filter. For example, if you enter several addresses and you select **Block** as the action for all of them, you must choose **Forward All** as the filter default action.

Tip You can create a list of allowed MAC addresses on an authentication server on your network. Consult the "Configuring Authentication Types" section on page 11-10 for instructions on using MAC-based authentication.

Step 10 Click **Apply**. The filter is saved on the access point, but it is not enabled until you apply it on the Apply Filters page.

Step 11 Click the **Apply Filters** tab to return to the Apply Filters page. Figure 16-2 shows the Apply Filters page.

Figure 16-2 Apply Filters Page



Step 12 Select the filter number from one of the MAC drop-down menus. You can apply the filter to either or both the Ethernet and radio ports, and to either or both incoming and outgoing packets.

Step 13 Click **Apply**. The filter is enabled on the selected ports.

If clients are not filtered immediately, click **Reload** on the System Configuration page to restart the access point. To reach the System Configuration page, click **System Software** on the task menu and then click **System Configuration**.

Note Client devices with blocked MAC addresses cannot send or receive data through the access point, but they might remain in the Association Table as unauthenticated client devices. Client devices with blocked MAC addresses disappear from the Association Table when the access point stops monitoring them, when the access point reboots, or when the clients associate to another access point.

Using MAC Address ACLs to Block or Allow Client Association to the Access Point

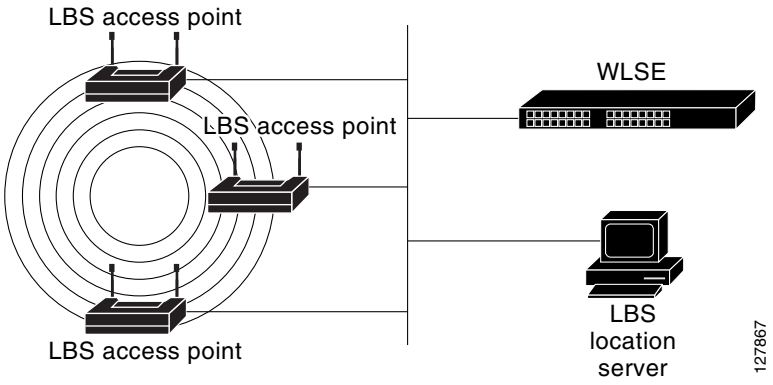
You can use MAC address ACLs to block or allow association to the access point. Instead of filtering traffic across an interface, you use the ACL to filter associations to the access point radio.

Follow these steps to use an ACL to filter associations to the access point radio:

Step 1 Follow Steps 1 through 10 in the "Creating a MAC Address Filter" section on page 16-4 to create an ACL. For MAC addresses that you want to allow to associate, select **Forward** from the Action menu. Select **Block** for addresses that you want to prevent from associating. Select **Block All** from the Default Action menu.

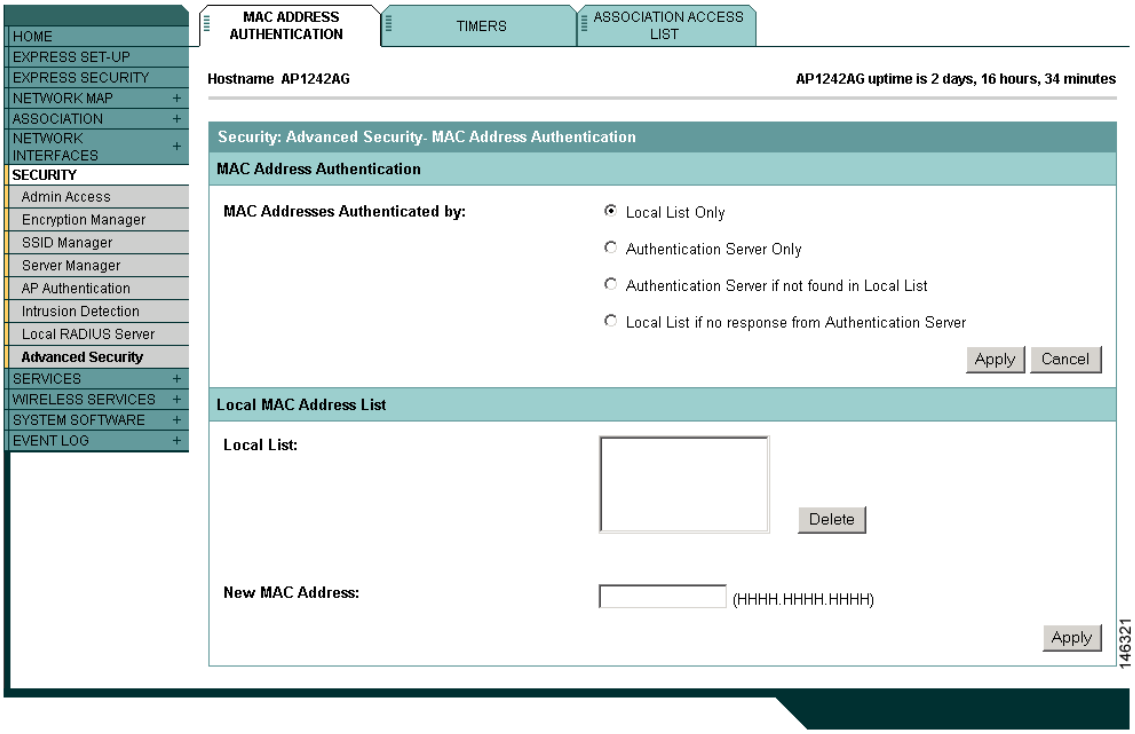
Step 2 Click **Security** to browse to the Security Summary page. Figure 16-3 shows the Security Summary page.

Figure 16-3 Security Summary Page



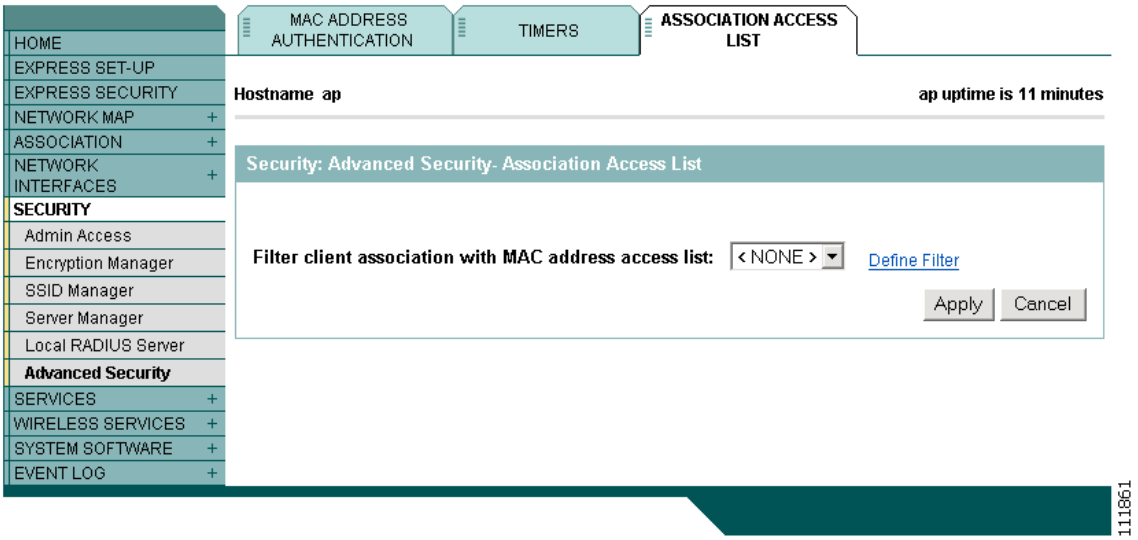
Step 3 Click **Advanced Security** to browse to the Advanced Security: MAC Address Authentication page. Figure 16-4 shows the MAC Address Authentication page.

Figure 16-4 Advanced Security: MAC Address Authentication Page



Step 4 Click the **Association Access List** tab to browse to the Association Access List page. Figure 16-5 shows the Association Access List page.

Figure 16-5 Association Access List Page



Step 5 Select your MAC address ACL from the drop-down menu.

Step 6 Click **Apply**.

Creating a Time-Based ACL

Time-based ACLs are ACLs that can be enabled or disabled for a specific period of time. This capability provides robustness and the flexibility to define access control policies that either permit or deny certain kinds of traffic.

This example illustrates how to configure a time-based ACL through the CLI, where Telnet connection is permitted from the inside to the outside network on weekdays during business hours:

Note A time-based ACL can be defined either on the Fast Ethernet port or on the Radio port of the Aironet AP, based on your requirements. It is never applied on the Bridge Group Virtual Interface (BVI).

Follow these steps to create a time-based ACL.

Step 1 Log in to the AP through the CLI.

Step 2 Use the console port or Telnet in order to access the ACL through the Ethernet interface or the wireless interface.

Step 3 Enter global configuration mode.

Step 4 Create a Time Range. For this example, Test:

AP<config>**#time-range Tes**t

Step 5 Create a time-range:

AP<config>**#time-range periodic weekdays 7:00 to 19:00**

Note Allows access to users during weekdays from 7:00 to 19:00 hrs.

Step 6 Create an ACL . For this example, 101:

AP<config># **ip access-list extended 101**

AP<config-ext-nacl>**#permit tcp 10.1.1.0 0.0.0.255 172.16.1.0 0.0.0.255 eq telnet time-range Test**

Note This ACL permits Telnet traffic to and from the network for the specified time-range Test. It also permits a Telnet session to the AP on weekdays.

Step 7 Apply the time-based ACL to the Ethernet interface:

interface Ethernet0/0

ip address 10.1.1.1 255.255.255.0

ip access-group 101 in

ACL Logging

ACL logging is not supported on the bridging interfaces of AP platforms. When applied on bridging interface, it will work as if configured without "log" option and logging would not take effect. However, ACL logging will work well for the BVI interfaces as long as a separate ACL is used for the BVI interface.

CLI Configuration Example

This example shows the CLI commands that are equivalent to the steps listed in the "Using MAC Address ACLs to Block or Allow Client Association to the Access Point" section on page 16-6:

```
AP# configure terminal
AP(config)# dot11 association access-list 777
AP(config)# end
```

In this example, only client devices with MAC addresses listed in access list 777 are allowed to associate to the access point. The access point blocks associations from all other MAC addresses.

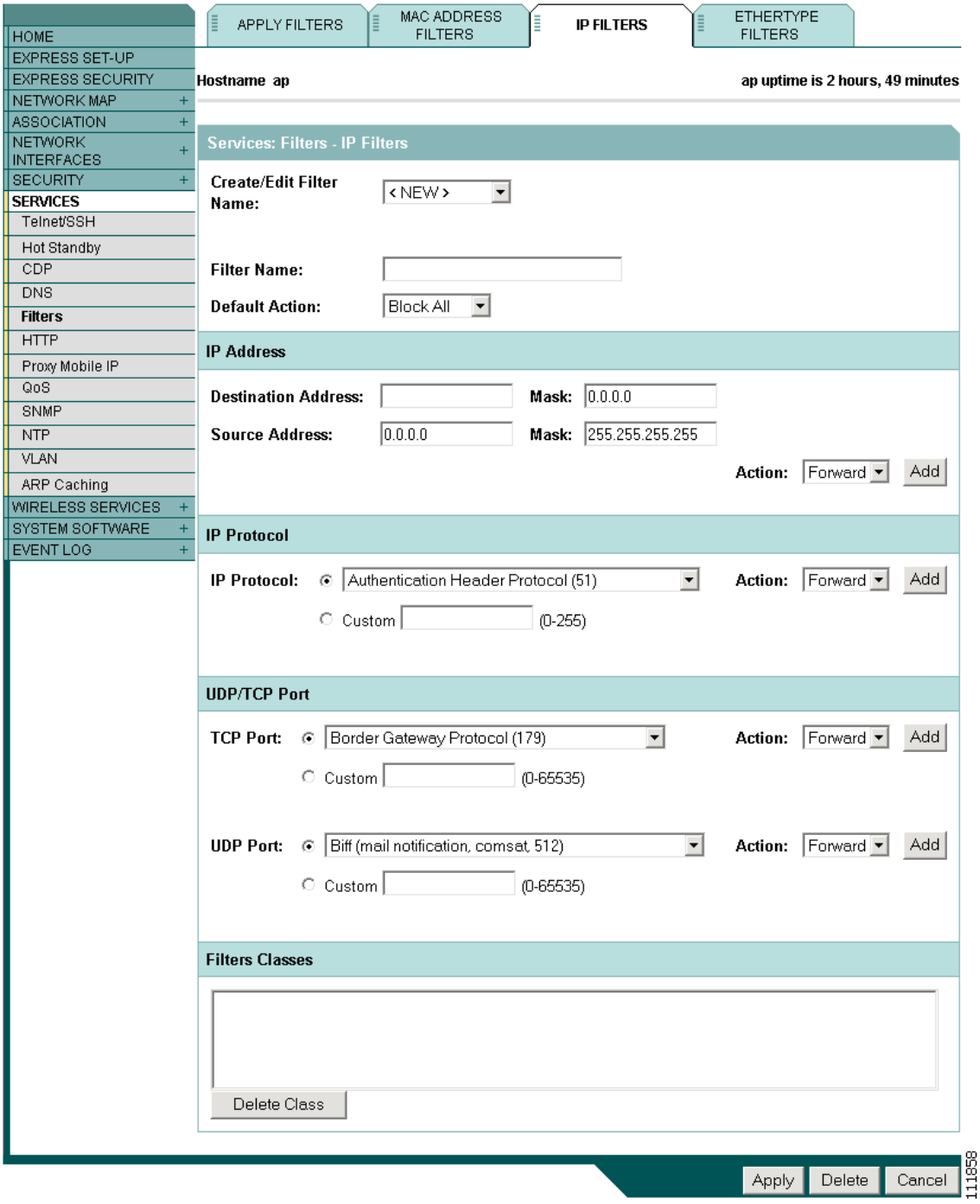
For complete descriptions of the commands used in this example, consult the *Cisco IOS Command Reference for Cisco Aironet Access Points and Bridges*.

Configuring and Enabling IP Filters

IP filters (IP address, IP protocol, and IP port) prevent or allow the use of specific protocols through the access point radio ports, and IP address filters allow or prevent the forwarding of unicast and multicast packets either sent from or addressed to specific IP addresses. You can create a filter that passes traffic to all addresses except those you specify, or you can create a filter that blocks traffic to all addresses except those you specify. You can create filters that contain elements of one, two, or all three IP filtering methods. You can apply the filters you create to either or both the Ethernet and radio ports and to either or both incoming and outgoing packets.

Use the IP Filters page to create IP filters for the access point. Figure 16-6 shows the IP Filters page.

Figure 16-6 IP Filters Page



Follow this link path to reach the IP Filters page:

1. Click **Services** in the page navigation bar.
2. In the Services page list, click **Filters**.
3. On the Apply Filters page, click the **IP Filters** tab at the top of the page.

Creating an IP Filter

Follow these steps to create an IP filter:

Step 1 Follow the link path to the IP Filters page.

Step 2 If you are creating a new filter, make sure **<NEW>** (the default) is selected in the Create/Edit Filter Index menu. To edit an existing filter, select the filter name from the Create/Edit Filter Index menu.

Step 3 Enter a descriptive name for the new filter in the Filter Name field.

Step 4 Select **Forward all** or **Block all** as the filter default action from the Default Action menu. The filter default action must be the opposite of the action for at least one of the addresses in the filter. For example, if you create a filter containing an IP address, an IP protocol, and an IP port and you select **Block** as the action for all of them, you must choose **Forward All** as the filter default action.

Step 5 To filter an IP address, enter an address in the IP Address field.

Note If you plan to block traffic to all IP addresses except those you specify as allowed, put the address of your own PC in the list of allowed addresses to avoid losing connectivity to the access point.

Step 6 Type the mask for the IP address in the Mask field. Enter the mask with periods separating the groups of characters (112.334.556.778, for example). If you enter 255.255.255.255 as the mask, the access point accepts any IP address. If you enter 0.0.0.0, the access point looks for an exact match with the IP address you entered in the IP Address field. The mask you enter in this field behaves the same way that a mask behaves when you enter it in the CLI.

Step 7 Select **Forward** or **Block** from the Action menu.

Step 8 Click **Add**. The address appears in the Filters Classes field. To remove the address from the Filters Classes list, select it and click **Delete Class**. Repeat Step 5 through Step 8 to add addresses to the filter.

If you do not need to add IP protocol or IP port elements to the filter, skip to Step 15 to save the filter on the access point.

Step 9 To filter an IP protocol, select one of the common protocols from the IP Protocol drop-down menu, or select the **Custom** radio button and enter the number of an existing ACL in the Custom field. Enter an ACL number from 0 to 255. See Appendix A, "Protocol Filters," for a list of IP protocols and their numeric designators.

Step 10 Select **Forward** or **Block** from the Action menu.

Step 11 Click **Add**. The protocol appears in the Filters Classes field. To remove the protocol from the Filters Classes list, select it and click **Delete Class**. Repeat Step 9 to Step 11 to add protocols to the filter.

If you do not need to add IP port elements to the filter, skip to Step 15 to save the filter on the access point.

Step 12 To filter a TCP or UDP port protocol, select one of the common port protocols from the TCP Port or UDP Port drop-down menus, or select the **Custom** radio button and enter the number of an existing protocol in one of the Custom fields. Enter a protocol number from 0 to 65535. See Appendix A, "Protocol Filters," for a list of IP port protocols and their numeric designators.

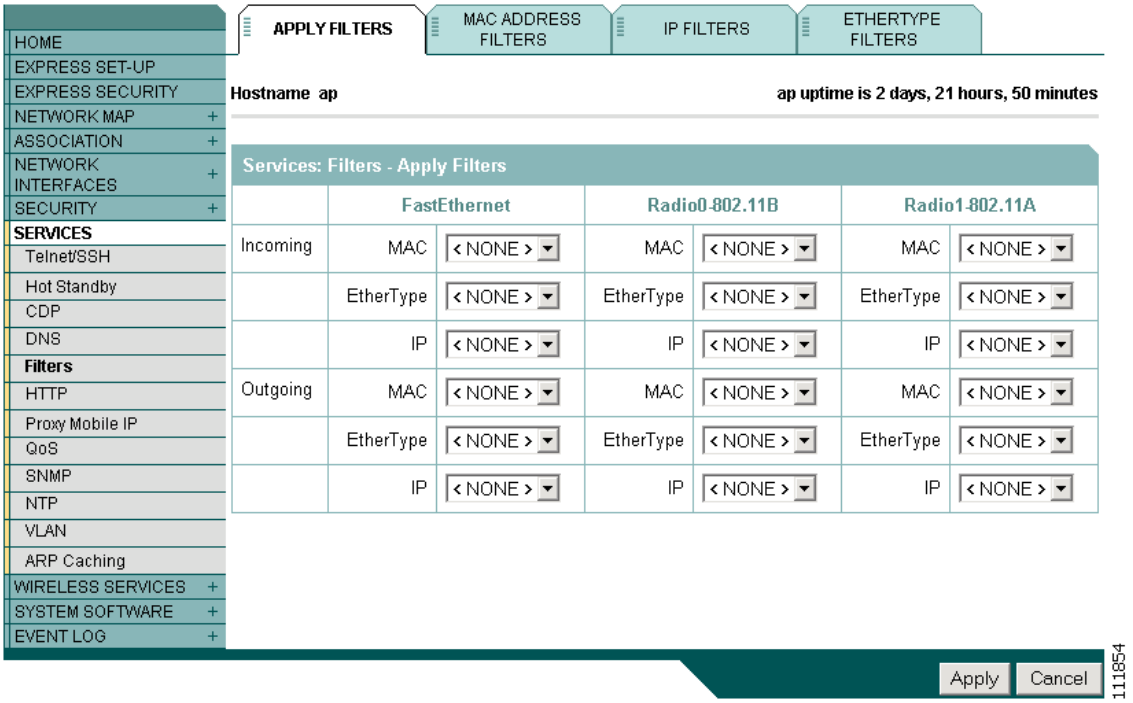
Step 13 Select **Forward** or **Block** from the Action menu.

Step 14 Click **Add**. The protocol appears in the Filters Classes field. To remove the protocol from the Filters Classes list, select it and click **Delete Class**. Repeat Step 12 to Step 14 to add protocols to the filter.

Step 15 When the filter is complete, click **Apply**. The filter is saved on the access point, but it is not enabled until you apply it on the Apply Filters page.

Step 16 Click the **Apply Filters** tab to return to the Apply Filters page. Figure 16-7 shows the Apply Filters page.

Figure 16-7 Apply Filters Page



Step 17 Select the filter name from one of the IP drop-down menus. You can apply the filter to either or both the Ethernet and radio ports, and to either or both incoming and outgoing packets.

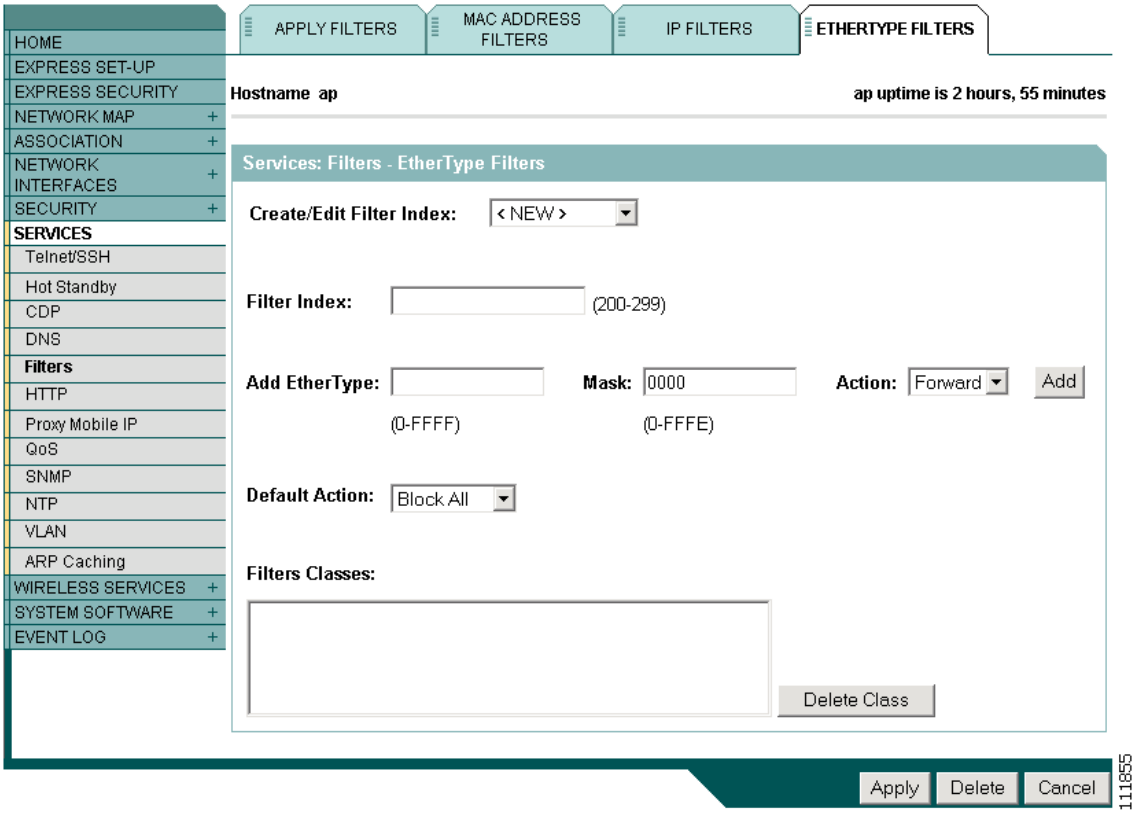
Step 18 Click **Apply**. The filter is enabled on the selected ports.

Configuring and Enabling Ethertype Filters

Ethertype filters prevent or allow the use of specific protocols through the access point Ethernet and radio ports. You can apply the filters you create to either or both incoming and outgoing packets.

Use the Ethertype Filters page to create Ethertype filters for the access point. Figure 16-8 shows the Ethertype Filters page.

Figure 16-8 Ethertype Filters Page



Follow this link path to reach the Ethertype Filters page:

1. Click **Services** in the page navigation bar.
2. In the Services page list, click **Filters**.
3. On the Apply Filters page, click the **Ethertype Filters** tab at the top of the page.

Creating an Ethertype Filter

Follow these steps to create an Ethertype filter:

Step 1 Follow the link path to the Ethertype Filters page.

Step 2 If you are creating a new filter, make sure **<NEW>** (the default) is selected in the Create/Edit Filter Index menu. To edit an existing filter, select the filter number from the Create/Edit Filter Index menu.

Step 3 In the Filter Index field, name the filter with a number from 200 to 299. The number you assign creates an access control list (ACL) for the filter.

Step 4 Enter an Ethertype number in the Add Ethertype field. See Appendix A, "Protocol Filters," for a list of protocols and their numeric designators.

Step 5 Enter the mask for the Ethertype in the Mask field. If you enter **0**, the mask requires an exact match of the Ethertype.

Step 6 Select **Forward** or **Block** from the Action menu.

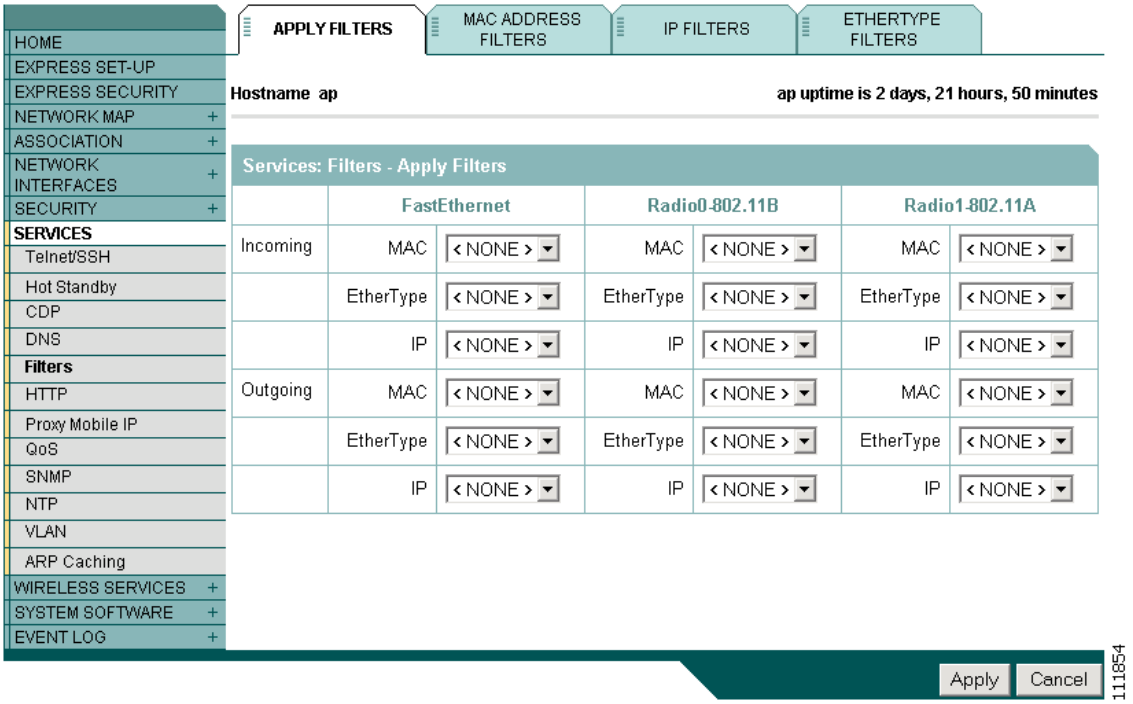
Step 7 Click **Add**. The Ethertype appears in the Filters Classes field. To remove the Ethertype from the Filters Classes list, select it and click **Delete Class**. Repeat Step 4 through Step 7 to add Ethertypes to the filter.

Step 8 Select **Forward All** or **Block All** from the Default Action menu. The filter default action must be the opposite of the action for at least one of the Ethertypes in the filter. For example, if you enter several Ethertypes and you select **Block** as the action for all of them, you must choose **Forward All** as the filter default action.

Step 9 Click **Apply**. The filter is saved on the access point, but it is not enabled until you apply it on the Apply Filters page.

Step 10 Click the **Apply Filters** tab to return to the Apply Filters page. Figure 16-9 shows the Apply Filters page.

Figure 16-9 Apply Filters Page



Step 11 Select the filter number from one of the Ethertype drop-down menus. You can apply the filter to either or both the Ethernet and radio ports, and to either or both incoming and outgoing packets.

Step 12 Click **Apply**. The filter is enabled on the selected ports.