Chapter 15
Configuring IPX

This chapter describes how to configure the Internet Packet Exchange (IPX) protocol on the HP ProCurve 9304M, 9308M, and 6308M-SX routing switches using the CLI and Web management interface.

To display IPX configuration information and statistics, see “Displaying IPX Configuration Information and Statistics” on page 15-17.

For complete syntax information for the CLI commands shown in this chapter, see “Command Line Interface Commands” on page B-1.

Overview of IPX

The IPX protocol was created by Novell™. IPX is built upon a client-server networking architecture.

The Routing Information Protocol (RIP) and the Service Advertisement Protocol (SAP) are two key components of Novell NetWare and its IPX protocol suite. By default, Novell NetWare versions 3.x and 4.x broadcast RIP and SAP updates at 60 second intervals. NetWare uses these broadcasts to collect information for the routing and service tables that it uses for communicating.

NOTE: IPX/RIP is different from IP/RIP. IP/RIP configuration parameters do not apply to IPX/RIP and IPX/RIP parameters do not apply to IP/RIP.

Multiple IPX Frame Type Support per Interface

Up to four different IPX network numbers and frame encapsulation types can be defined for each IPX interface on a routing switch. The multiple encapsulation support allows you to define and receive traffic from four separate IPX networks on a single interface. Each network must have a distinct network number and encapsulation type (Ethernet SNAP, Ethernet 802.2, Ethernet 802.3, or Ethernet II).

Configuring IPX

To use IPX on the routing switch, perform the following tasks:

1. Enable IPX on the routing switch.
2. Enable NetBIOS on the system level.
3. Define the network number and frame type, and enable NetBIOS on IPX interfaces (optional).
4. Modify maximum number of RIP and SAP filters supported.
5. Define RIP, SAP, and forward filters (optional).
6. Assign RIP, SAP, and Forward filter groups (optional).
7. Modify the maximum number of SAP and RIP Route entries supported (optional).
8. Modify the hop count increment for RIP and SAP broadcast packets (optional).
9. Modify the maximum advertisement packet size for RIP and SAP packets (optional).
10. Modify the advertisement interval for RIP and SAP updates (optional).
11. Modify the age timer for learned RIP and SAP entries (optional).

Dynamic IPX Configuration

The IPX Protocol is by default disabled at system startup. When you first enable IPX, you must reset the system. However, after you reset the system all changes to the following parameters become effective immediately.

Global Parameters

- Enabling of NetBIOS Allow
- Defining IPX filters—Forward, RIP, and SAP

Interface Parameters

- Adding, deleting, or modifying IPX network numbers and frame types
- Adding, deleting, or modifying filter groups assigned to interfaces
- Modifying the RIP advertisement packet size
- Modifying the SAP advertisement packet size
- Modifying the RIP advertisement interval
- Modifying the SAP advertisement interval
- Modifying the age timer for learned IPX routes
- Modifying the age timer for learned SAP entries

Enable IPX

The IPX Protocol is by default disabled at system startup.

NOTE: Make sure you restart the system after enabling IPX. After you restart, additional IPX parameter settings take effect immediately.

USING THE CLI

To enable IPX, enter the following commands:

```
HP9300(config)# router ipx
HP9300(config)# exit
```

```
HP9300# write mem
HP9300# reload
```

syntax: router ipx

USING THE WEB MANAGEMENT INTERFACE

To enable IPX:

1. Select the System link from the main menu.
2. Enable IPX.
3. Select the Save To Flash option from the File menu.
4. Select the Reset option from the File menu.

Enable NetBIOS

The routing switch can support routing of NetBIOS broadcasts (type 20) over IPX. IPX must be enabled on the routing switch and the interface level for it to be operational. By default, this feature is disabled.

USING THE CLI

To enable NetBIOS on the routing switch (system level), enter the following command:

```
HP9300(config)# ipx netbios-allow
```

syntax: ipx <netbios-allow | netbios-disallow>

USING THE WEB MANAGEMENT INTERFACE

To enable NetBios (type 20) on the routing switch and an interface:

1. Select the Allow NetBios (type 20) option from the IPX configuration sheet to display the panel shown in Figure 15.1.
2. Select the Enable option.
3. Select the Apply button to assign the changes.

NOTE: After enabling NetBIOS at the global level, you need to enable NetBIOS at the interface level.

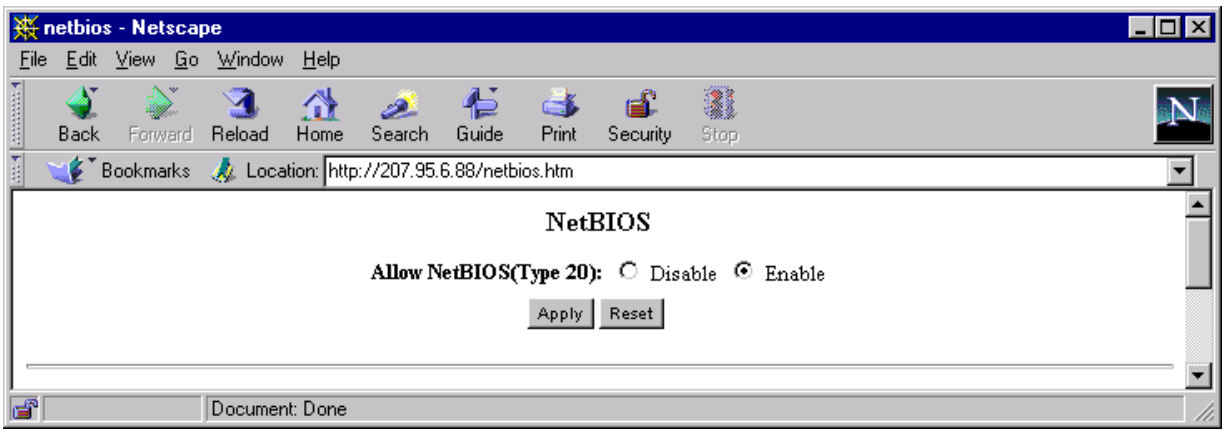

Figure 15.1 NetBIOS configuration panel

Assign IPX Network Number, Frame Type, Enable NetBios on an Interface

Once you enable IPX on the routing switch, you can assign IPX network numbers on an interface-by-interface basis. You also can enable NetBIOS broadcasts on an interface.

USING THE CLI

EXAMPLE: To configure interfaces 1, 2, and 3 with the IPX network number and frame type shown in Figure 15.1, enter the following commands:

```
HP9300(config)# int e1/1
HP9300(config-if-1/1)# ipx network 100 ethernet_802.2
HP9300(config-if-1/1)# int e1/2
HP9300(config-if-1/2)# ipx network 200 ethernet_802.2
HP9300(config-if-1/2)# int e1/3
HP9300(config-if-1/3)# ipx network 300 ethernet_802.2
```

syntax: ipx network <network number> <frame type> [<netbios-allow | netbios-disallow>]

NOTE: Once you configure an interface with a network number and frame type, you can define filters and assign them to the interface.

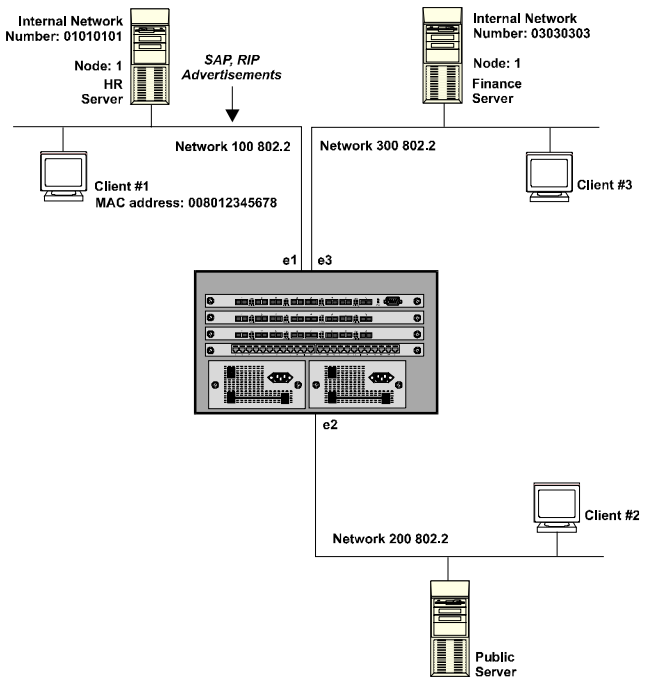

Figure 15.2 Defining and assigning IPX Forward, RIP and SAP filters

USING THE WEB MANAGEMENT INTERFACE

To assign IPX to an interfaces 1, 2 and 3 as shown in Figure 15.2:

1. Select the IPX link from the main menu to display the panel shown in Figure 15.3.
2. Select the port or slot/port numbers to be configured as an IPX interface from the pull down menu.
3. Enter the network number.
4. Select the frame type from the pull down menu.

5. Enable NetBIOS if desired.
6. Select the Add button to assign the changes.

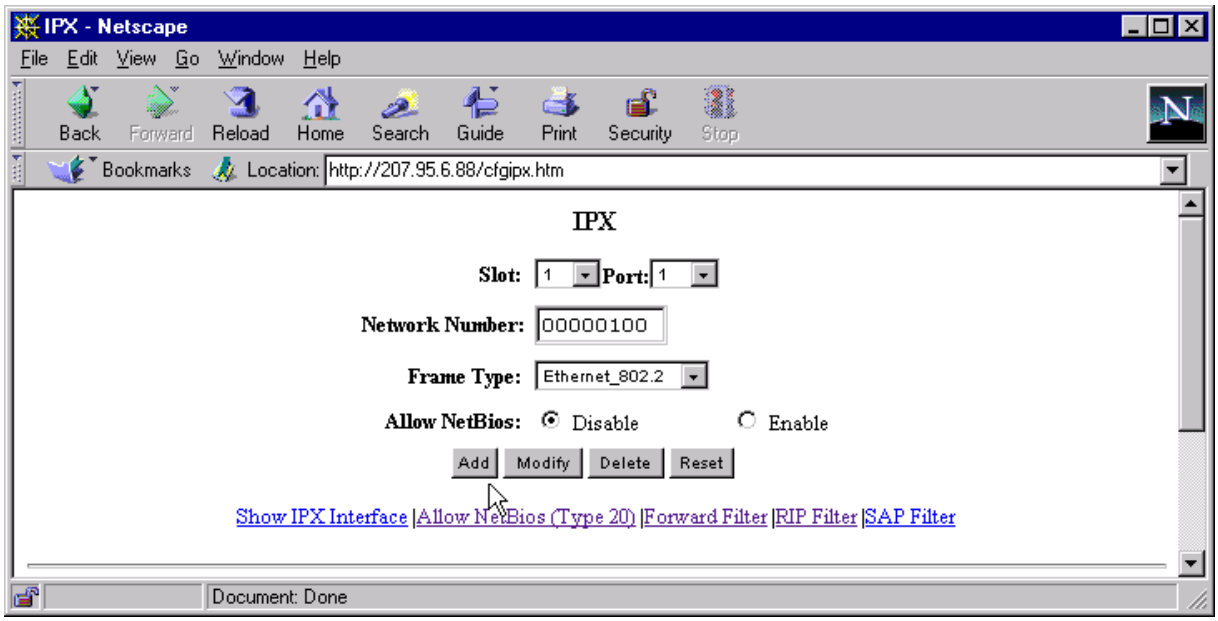

Figure 15.3 IPX configuration sheet

Define and Assign a Forward Filter and Group

You can define a forward filter to allow a remote IPX client access to a restricted-access server. You can define up to 32 forward filters on a routing switch. Once you define the filter, you assign the filter to an interface by placing the filter in a forward filter group.

NOTE: A network number and frame type must be defined for the IPX interface before defining a forward filter.

EXAMPLE: To allow IPX Client 1 on network 100 access to the finance server in Network 300 (Figure 15.2), define the following forward filter at the Global Level and then assign the filter to port 1/3 as a filter group.

NOTE: You can assign forward filters to either the input or output traffic on an interface.

USING THE CLI

```
HP9300(config)# ipx forward-filter 1 permit 100 008012345678 03030303 1 451
HP9300(config)# int e1/3
HP9300(config-if-1/3)# ipx forward-filter-group in 1
```

ipx-forward-filter syntax: ipx forward-filter <filterID> <permit|deny> <source network number|any> <source node number|any> <destination network number|any> <destination node number|any> <destination socket number | any>

ipx-forward-filter-group syntax: ipx forward-filter-group <in|out> <filterID>

NOTE: When you define filters, the network number for a server is its internal network number. The node number for a client is the client's MAC address. The value 1 represents a server.

USING THE WEB MANAGEMENT INTERFACE

EXAMPLE: To allow IPX Client 1 on network 100 access to the finance server in Network 300 (Figure 15.2), define the following forward filter at the Global Level and then assign it to port 1/3 as a filter group.

1. Select Forward Filter from the IPX configuration sheet to display the IPX forward filter entry panel, shown in Figure 15.4.

NOTE: If filters are defined on the routing switch already, the Show Forward Filter summary panel will appear first. In this case, select Add Forward Filter from that panel to assign filters.

2. Enter a filter ID value from 1 – 32.
3. Select either Permit or Deny.
4. Enter the appropriate number for the destination socket of the application running in the Socket field. If you enter all zeros in this field, the filter will accept any socket.
5. Enter the Source Network Address on which you want to filter traffic. If you enter all zeros in this field, the filter will accept any source network.
6. Enter the address of the Source Node within the source network on which you want to filter traffic.
7. Enter the Destination network number. If you enter all zeros in this field, the filter will accept any destination network number.
8. Enter the Destination Node network number. If you enter all zeros in this field, the filter will accept any destination node network number.
9. Select Add to save the defined forward filter.
10. Select the Forward Filter Group option from the Forward Filter panel. The panel shown in Figure 15.5 will appear.

NOTE: If forward filter group assignments already exist on the routing switch, then the Show Forward Filter Group display panel will appear first. In this case, select the Add Filter Forward Group link.

11. Select the port or slot/port combination to which you are assigning the filter(s).
12. Check either or both of the In Filter and Out Filter boxes. If you check the In Filter box, all incoming traffic is filtered as defined. If you check the Out Filter box, all outgoing traffic is filtered. By selecting both the In Filter and Out Filter boxes, you can assign the filters to both incoming and outgoing traffic.
13. Enter the filter ID(s) that you want to assign to the port. You can enter multiple filters entries separated by commas or blanks.
14. Select the Add button to assign the changes.

Modify or Delete a Forward Filter

1. Select Show Forward Filter Group from the IPX Forward Filter entry panel, shown in Figure 15.4.
2. Select the Modify or Delete button next to the filter you want to modify. A panel for that filter will appear.

NOTE: If you select Modify, the configuration panel for that filter will appear. Make the desired changes, and then select the Add button to apply the changes. If you select the Delete button, the filter is removed immediately.

NOTE: You must first delete any filter group assignment before you can delete the filter.

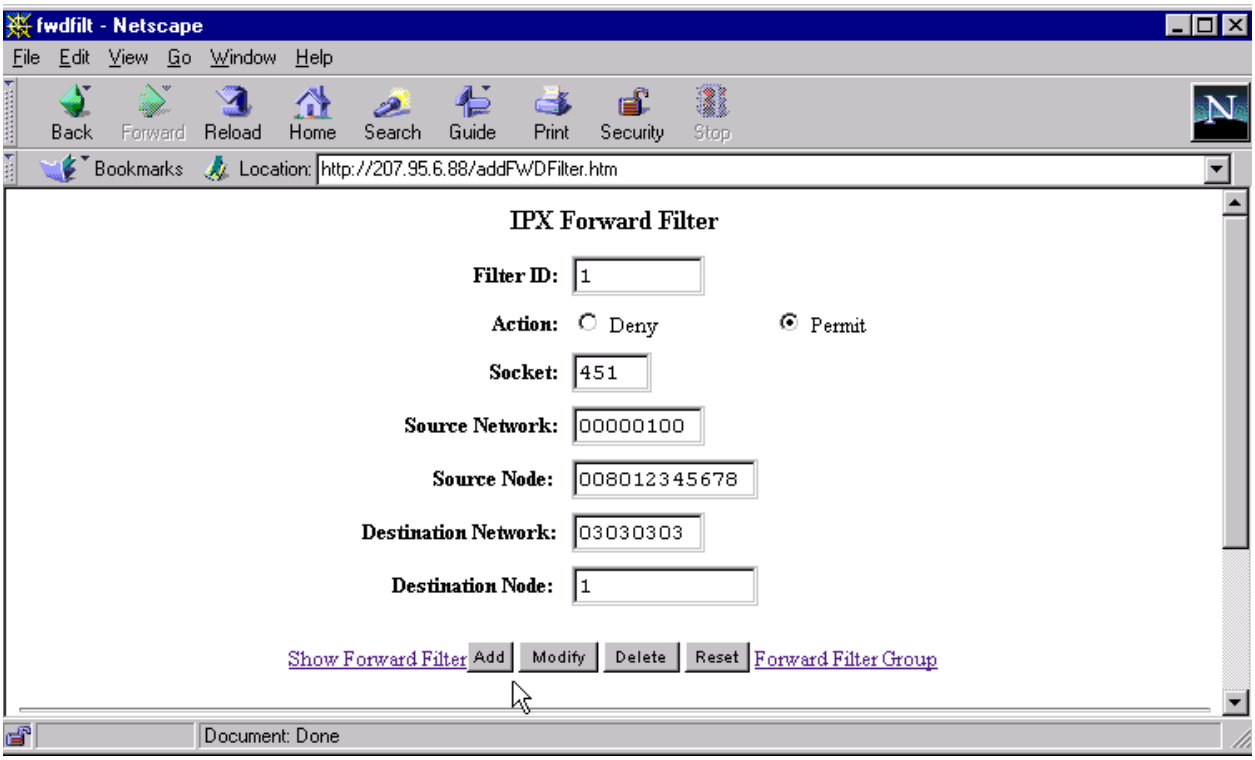

Figure 15.4 Defining a forward filter

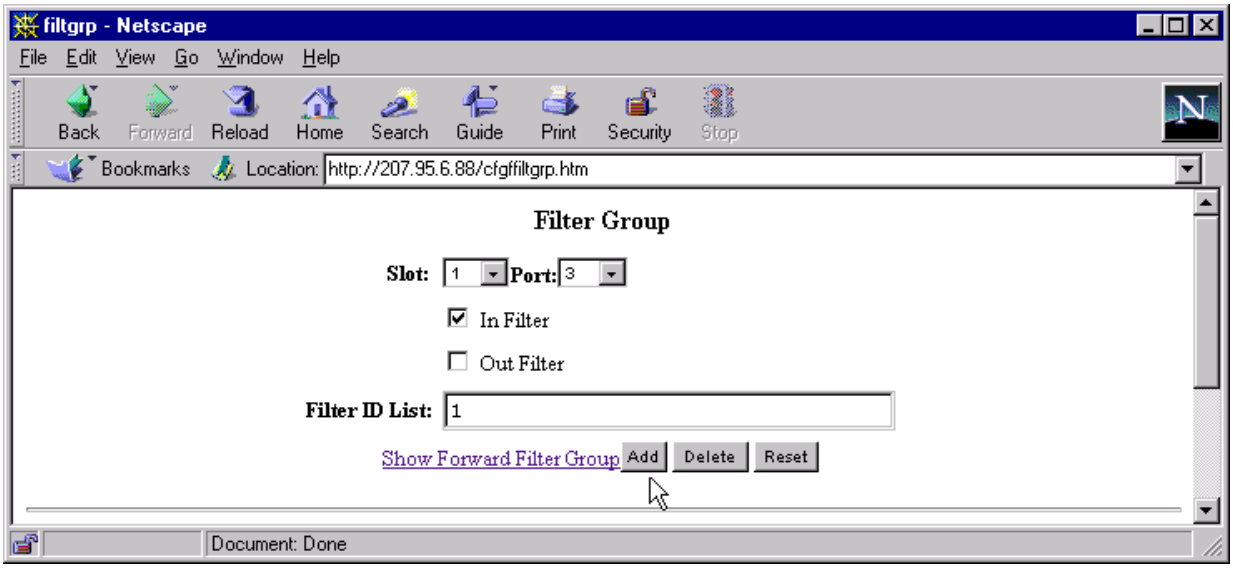

Figure 15.5 Assigning a forward filter group to an interface

Define and Assign an IPX/RIP Filter and Group

You can define a filter for a routing switch to block RIP routes being advertised to other parts of the network. You define RIP filters at the global level and assign them on either a global or interface basis. You can apply filters to either incoming or outgoing traffic. You can define up to 128 IPX/RIP filters on a routing switch.

NOTE: An IPX interface must be defined on the routing switch before you can assign a filter to that interface.

EXAMPLE: To block RIP routes from being advertised outside of Network 100, shown in Figure 15.2, define and assign the following RIP filter on interface 1.

USING THE CLI

```
HP9300(config)# ipx rip-filter 1 deny 100 01010101 any
HP9300(config)# int e1/1
HP9300(config-if-1/1)# ipx rip-filter-group in 1
```

***syntax*:** ipx rip-filter <filterID> <permit|deny> <network number|any> <network mask|any>

***syntax*:** ipx rip-filter-group <in|out> <filterID>

USING THE WEB MANAGEMENT INTERFACE

1. Select the RIP Filter option on the IPX configuration sheet.

   NOTE: If no RIP filters are currently defined on the system, the IPX RIP Filter entry panel immediately appears as shown in Figure 15.6. If RIP filters are defined on the routing switch, the IPX RIP Filter summary panel appears. In this case, select Add IPX RIP Filter from that panel to assign filters.

2. Enter a Filter ID value in the appropriate field as shown on Figure 15.6.
3. Select either Permit or Deny.
4. Enter the source network address on which you want to filter traffic in the Network field. You also can assign a wildcard value of all zeros (00000000) to allow all entries. The zeroes appear as 'any' in the display.
5. Enter the source network address mask for the network address in the Mask field. You can assign a wildcard value of all zeros (00000000) to allow all entries. The zeroes appear as 'any' in the display.
6. Select the Add button to save the filter entry.
7. Select RIP Filter Group from the IPX RIP Filter entry panel. The panel shown in Figure 15.7 will appear.
8. Select the port to which you want to assign the filter(s).
9. Check either or both of the In Filter and Out Filter boxes. If you check the In Filter box, all incoming traffic is filtered. If you check the Out Filter box, all outgoing traffic is filtered. If you check both In Filter and Out Filter, the assigned filters apply to both incoming and outgoing traffic.
10. Enter the filter ID(s) you want to assign to the port. You can enter multiple filter entries separated by commas or blanks. You can display defined filters and their IDs by selecting Show RIP Filters from the RIP Filter panel. To reach that screen from the current one, go back one screen.
11. Select the Add button to assign the filter group assignment.

Modify or Delete a RIP Filter

1. Select Show RIP Filter from the IPX RIP Filter entry panel shown in Figure 15.6.
2. Select the Modify or Delete button next to the filter you want to modify. A panel for that filter will appear.

NOTE: If you select Modify, the configuration panel for that filter will appear. Make the desired changes, and then select the Add button to apply the changes. If you select Delete, the filter is removed immediately.

NOTE: You must delete any filter group assignment that uses the filter before you can delete the filter.

Modify or Delete a RIP Filter Group Assignment

1. Select the Show RIP Filter Group link from the filter group panel shown in Figure 15.7.
2. Select the Modify or Delete button next to the filter group assignment to be modified or removed.

NOTE: If you select Modify, the configuration panel for that filter group will appear. Make the desired changes, and then select the Add button links to apply the changes. If you select Delete, the entry is removed immediately.

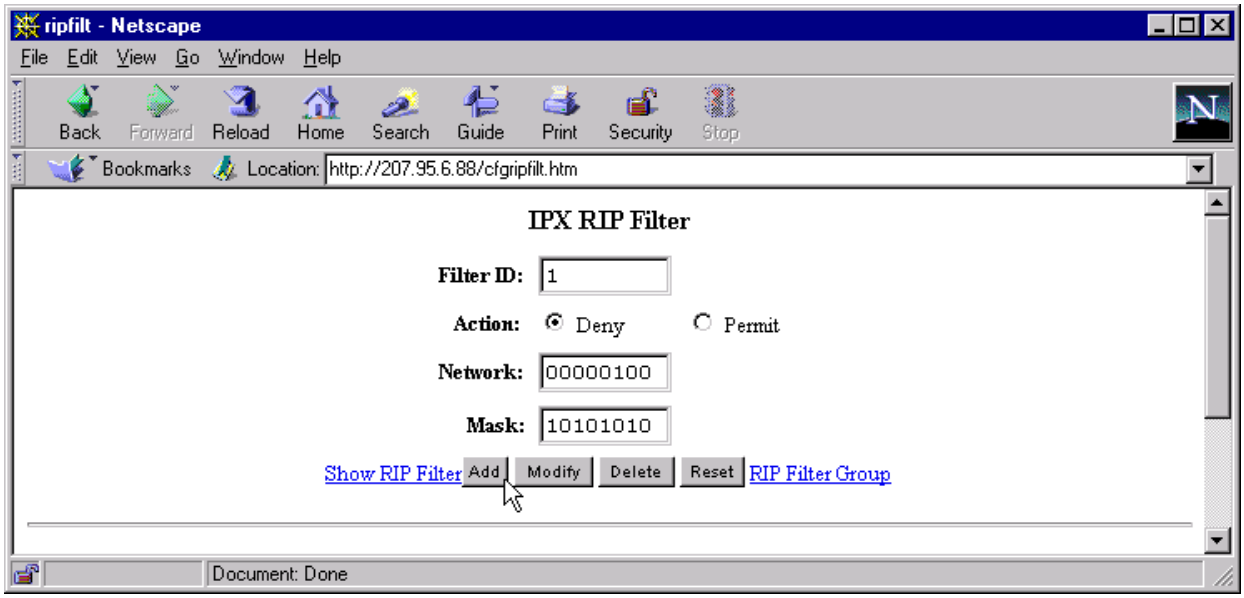

Figure 15.6 RIP filter entry panel

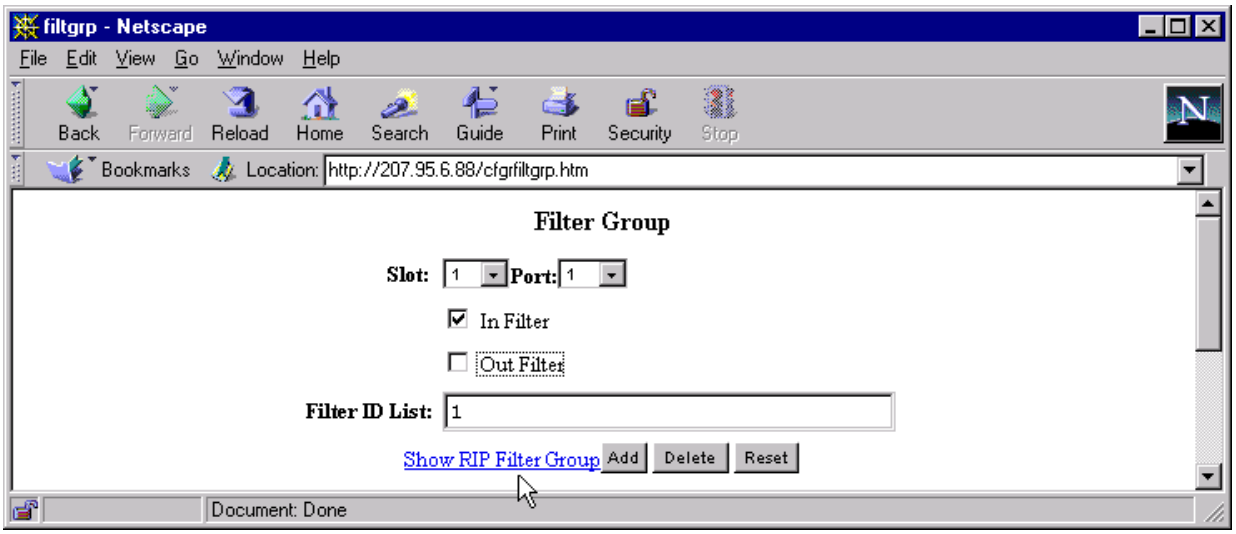

Figure 15.7 Assigning a RIP filter group to an interface

Define and Assign a SAP Filter and Group

You can define a filter for a routing switch to block SAP routes being advertised to other parts of the network. You can define up to 128 SAP filters on the routing switch.

NOTE: IPX interfaces must be defined on the routing switch before you assign a filter to an interface.

EXAMPLE: To define a filter to block SAP routes from the human resources server from being advertised outside of Network 100, define the following SAP filter and assign it to Interface 1.

USING THE CLI

```
HP9300(config)# ipx sap-filter 5 deny 0004 hr_server
HP9300(config)# int e1/1
HP9300(config-if-1/1)# ipx sap-filter-group in 5
```

syntax: ipx sap-filter <filterID> <permit|deny> <server type | any> <server name | any>

syntax: ipx sap-filter-group <in|out> <filterID>

USING THE WEB MANAGEMENT INTERFACE

1. Select SAP Filter from the IPX configuration sheet. The SAP filter entry panel shown in Figure 15.8 will appear.
2. Enter a filter ID value from 1 – 32.
3. Select either Permit or Deny.
4. Enter the service type. You also can enter zero to allow all entries. The zero will appear as "‘any" in the display.
5. Enter the server name. The server name field can also be assigned the wildcard, "any" to accept all server names.
6. Select the Add button to add the Filter.
7. Select Add SAP Filter Group from the Show SAP Filters panel or SAP Filter Group from the IPX SAP Filter entry panel.
8. Select the port or slot/port combination to which you want to assign a filter or filters from the pulldown menu.

9. Check either or both of the In Filter and Out Filter boxes. If you check the In Filter box, all incoming traffic is filtered. If you check the Out Filter box, all outgoing traffic is filtered. If you check both In filter and Out filter, the filters apply to both incoming and outgoing traffic.
10. Enter the filter(s) you want to assign to the port. Use commas or blanks to separate multiple filter entries.
11. Select the Add button to assign the filter group.

Modify or Delete a SAP Filter

1. Select Show SAP Filter from the IPX SAP Filter entry panel.
2. Select the Modify or Delete button next to the filter entry you wish to change or remove.

NOTE: If you select Modify, the configuration panel for that filter group will appear. Make the desired changes, and then select the Add button to apply the changes. If you select Delete, the filter entry is removed immediately.

NOTE: You must delete the filter from filter groups before you can delete the filter itself.

Modify or Delete a SAP Filter Group

1. Select Show SAP Filter Group from the filter group assignment panel.
2. Select the Modify or Delete button next to the entry you want to change or delete.

NOTE: If you select Modify, the configuration panel for that filter group will appear. Make the desired changes, and then select the Add button to apply the changes. If you select Delete, the filter entry is removed immediately.

NOTE: You can view a summary of all defined filters group assignments by selecting SAP Filter Group from the filter group entry panel.

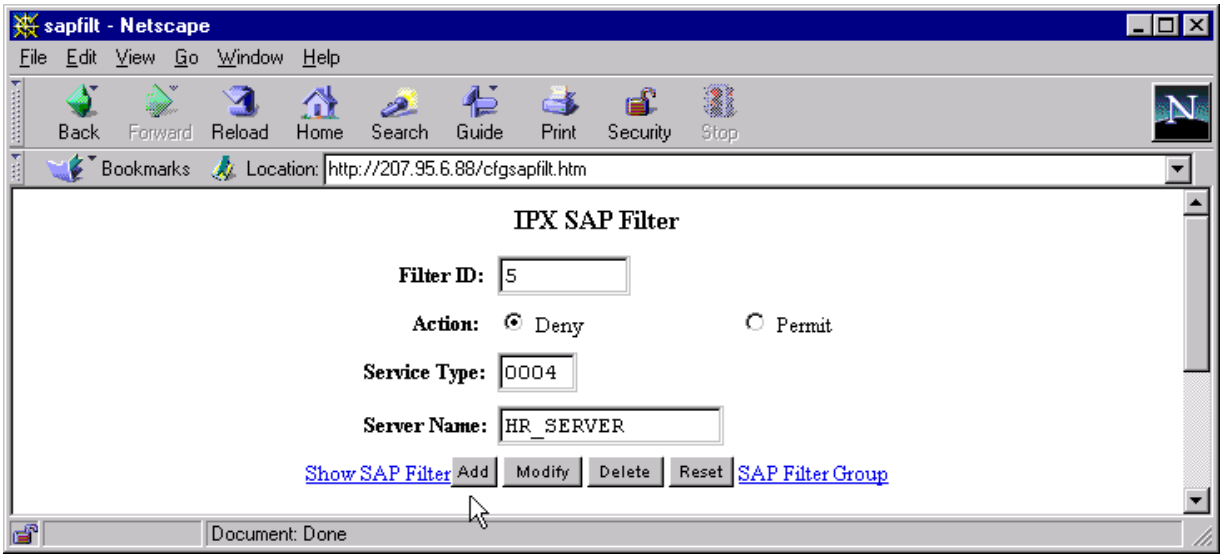

Figure 15.8 SAP filter entry panel

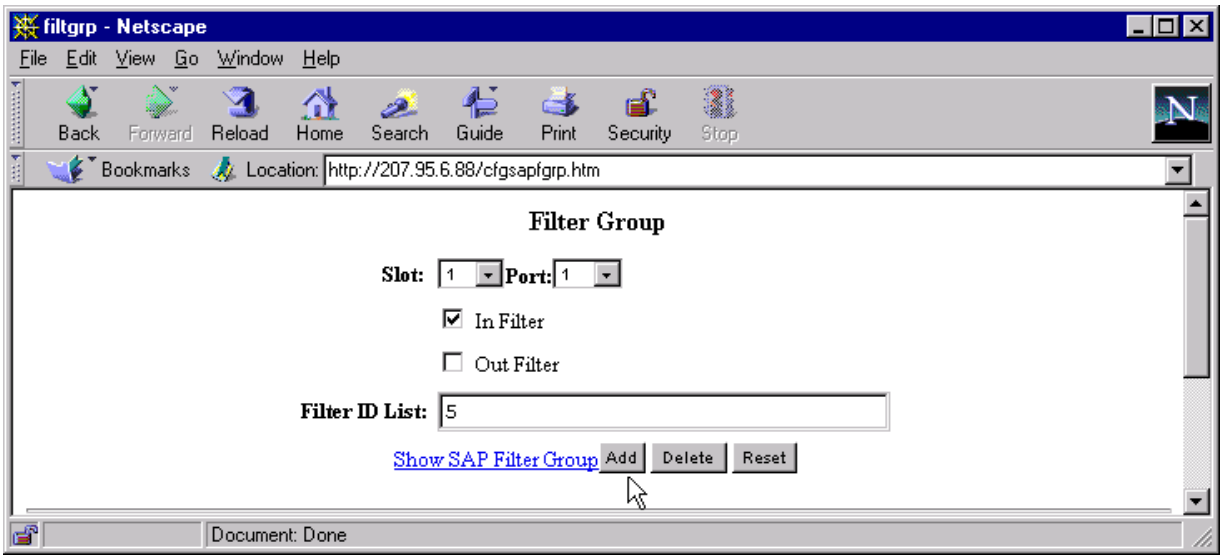

Figure 15.9 Assigning a SAP filter group to an interface

Modify Maximum SAP and RIP Route Entries

You can define the maximum number of IPX/RIP and IPX/SAP routes that the routing switch can store and forward.

- From 64 – 8192 RIP entries can be defined on a routing switch. The default number of RIP entries supported is 2048.
- From 64 – 8192 SAP entries can be defined on a routing switch. The default number of SAP entries supported is 4096.

NOTE: IPX must be enabled on the routing switch for these items to be configurable.

USING THE CLI

To limit the number of RIP entries stored to 3000 from a default of 2048, enter the following command:

```
HP9300(config)# system-max-ipx-rip-entry 3500
```

***syntax*:** system-max-ipx-rip-entry <value>

To limit the number of SAP entries stored to 6000 from a default of 4096, enter the following command:

```
HP9300(config)# ipx max-sap-entries 6000
```

***syntax*:** system-max-ipx-sap-entry <value>

USING THE WEB MANAGEMENT INTERFACE

To modify the maximum number of RIP or SAP route entries supported on a routing switch:

1. Select the Parameter link on the System configuration sheet.
2. Select the Modify button next to the parameter to be changed.
3. Enter the new value for the parameter within the prescribed range of values.
4. Select the Add button to assign the changes.

Modify RIP and SAP Hop Count Increment

You can modify the incremental value (hop) that the routing switch adds to a RIP or SAP record before propagating the record to the next interface. By default, a value of one is added to a record before it is broadcast to the next interface.

In a network of parallel routers, the router that receives a RIP or SAP record with the lowest hop count is seen as the router with the most optimal information and is seen as the primary router. As primary router, it is elected to forward the packet to the next interface.

You can manage which router is selected as the primary router by a host by modifying the hop count assigned to an IPX interface. For example, in Figure 15.10, an administrator wants to ensure that all traffic between server1 and server2 is routed through router 1 and that router 1 is seen as the primary router. To ensure that this occurs, the administrator can assign higher hop counts (for example, 10) to the router interfaces on router 2.

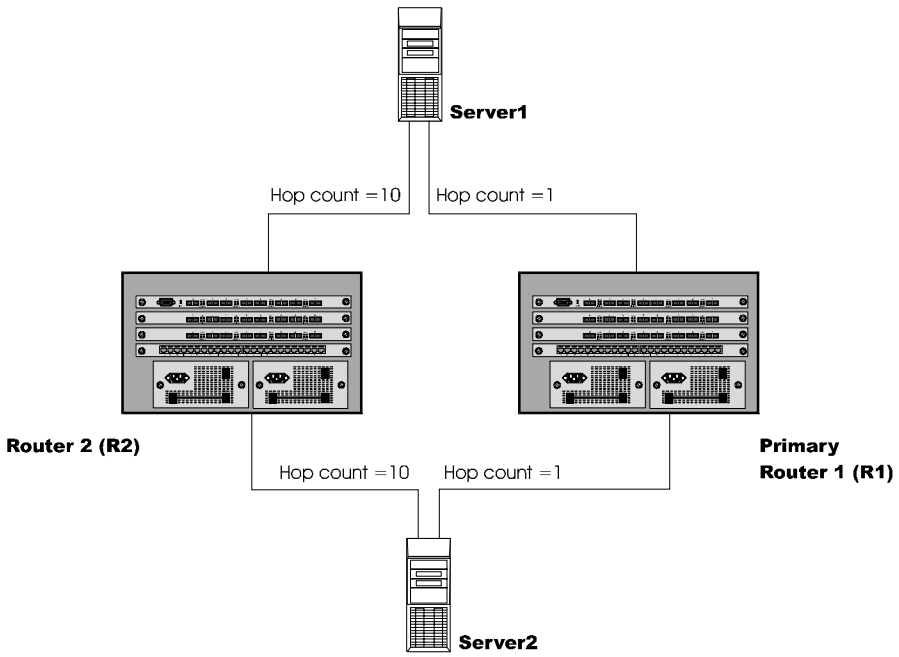

Figure 15.10 Using higher hop count assignments to bias traffic away from the router

USING THE CLI

To increase the hop count increment assessed to interface 1/5, enter the following commands:

```
HP9300(config)# int e 1/5
HP9300(config-if-1/5)# ipx-rip-update-hop-count-increment <2-15>
HP9300(config-if-1/5)# ipx-sap-update-hop-count-increment <2-15>
```

***syntax*:** ipx-rip-update-hop-count-increment <2-15>, ipx-sap-update-hop-count-increment <2-15>

USING THE WEB MANAGEMENT INTERFACE

You cannot modify hop count increments using the Web management interface.

Modify the RIP Advertisement Packet Size

The default IPX RIP packet size is 432 bytes, which allows 50 routes plus 32 bytes of header in an IPX RIP update packet. Each route requires eight bytes. You can configure the packet size to be from 40 bytes (enough for one route) – 1488 bytes (enough for 182 routes).

NOTE: You can specify packet length that does not fall evenly on a route or server boundary. The device will use the packet size but will include only the number of routes or servers that fit entirely within the packet.

To change the RIP advertisement packet size, use the following CLI method.

USING THE CLI

EXAMPLE: To change the maximum packet size of IPX RIP advertisements sent on interface 1/1 from the default 432 bytes to 832 bytes, enter the following command. This command increases the number of IPX RIP routes an advertisement packet holds from 50 to 100.

```
HP9300(config) int e 1/1
HP9300(config-if-1/1) ipx rip-max-packetsize 832
HP9300(config-if-1/1) write mem
```

Syntax: ipx rip-max-packetsize <bytes>

The number of bytes can be from 40 bytes (enough for one route) – 1488 bytes (enough for 182 routes). The default is 432 bytes.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the RIP advertisement packet size using the Web management interface.

Modify the SAP Advertisement Packet Size

The default IPX SAP packet size is 480 bytes, which allows seven servers plus 32 bytes of header in an IPX SAP update packet. Each server requires 64 bytes. You can configure the packet size to be from 96 bytes (enough for one server) – 1440 bytes (enough for 22 servers).

NOTE: You can specify packet length that does not fall evenly on a route or server boundary. The device will use the packet size but will include only the number of routes or servers that fit entirely within the packet.

To change the SAP advertisement packet size, use the following CLI method.

USING THE CLI

EXAMPLE: To change the maximum number of bytes in IPX SAP advertisements sent on interface 5/1 from 480 to 672 (enough for 10 servers plus the 32 bytes of packet header), enter the following commands:

```
HP9300(config) int e 5/1
HP9300(config-if-5/1) ipx sap-max-packetsize 672
HP9300(config-if-5/1) write mem
```

Syntax: ipx sap-max-packetsize <bytes>

The number of bytes can be from 96 bytes (enough for one server) – 1440 bytes (enough for 22 servers). The default is 480 bytes.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the SAP advertisement packet size using the Web management interface.

Modify the RIP Advertisement Interval

The IPX RIP advertisement interval specifies how often the routing switch sends IPX RIP updates to neighboring IPX routers. The update intervals are separate for RIP and SAP and are configurable on an individual interface basis.

By default, the routing switch sends an IPX RIP update every 60 seconds. You can change the interval to be from 10 – 65535 seconds. You cannot disable the advertisements.

NOTE: If you change an advertisement interval, you do not need to change the age time. The software automatically calculates the age time by multiplying the advertisement interval times the age timer, which is 3 by default.

To change the RIP advertisement interval, use the following CLI method.

USING THE CLI

EXAMPLE: To change the advertisement interval for IPX RIP advertisements sent on interface 1/1 from 60 seconds to 30 seconds, enter the following commands:

```
HP9300(config) int e 1/1
HP9300(config-if-1/1) ipx update-time 30
HP9300(config-if-1/1) write mem
```

Syntax: ipx update-time <interval>

The **<interval>** can be from 10 – 65535 seconds. The default is 60.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the RIP advertisement interval using the Web management interface.

Modify the SAP Advertisement Interval

The IPX SAP advertisement interval specifies how often the routing switch sends IPX SAP updates to neighboring IPX routers. The update intervals are separate for RIP and SAP and are configurable on an individual interface basis.

By default, the routing switch sends an IPX SAP update every 60 seconds. You can change the interval to be from 10 – 65535 seconds. You cannot disable the advertisements.

NOTE: If you change an advertisement interval, you do not need to change the age time. The software automatically calculates the age time by multiplying the advertisement interval times the age timer, which is 3 by default.

To change the SAP advertisement packet size, use the following CLI method.

USING THE CLI

EXAMPLE: To change the advertisement interval for IPX SAP advertisements sent on interface 1/1 from 60 seconds to 120 seconds, enter the following commands:

```
HP9300(config) int e 1/1
HP9300(config-if-1/1) ipx sap-interval 120
HP9300(config-if-1/1) write mem
```

Syntax: ipx sap-interval <interval>

The **<interval>** can be from 10 – 65535 seconds. The default is 60.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the SAP advertisement interval using the Web management interface.

Modify the Age Timer for Learned IPX Routes

The age timer specifies how many seconds a learned IPX route can remain in the routing switch's IPX route table before aging out.

The software calculates the age time by multiplying the advertisement interval times the age timer. For example, the default age time for IPX routes is 180 seconds, which is 60 (the default advertisement interval) multiplied by 3 (the default age timer).

You can configure the age timer for RIP to a value from 1 – 65535. The default is 3. You cannot disable the age timer.

To change the age timer for learned IPX routes, use the following CLI method.

USING THE CLI

To change the age timer for IPX routes from 3 to 4 on interface 1/1, enter the following commands.

```
HP9300(config) int e 1/1
HP9300(config-if-1/1) ipx rip-multiplier 4
HP9300(config-if-1/1) write mem
```

Syntax: ipx rip-multiplier <num>

The **<num>** parameter specifies the age time and can be from 1 – 65535. The default is 3.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the route age timer using the Web management interface.

Modify the Age Timer for Learned SAP Entries

The age timer specifies how many seconds a learned IPX server can remain in the routing switch's IPX service table before aging out.

The software calculates the age time by multiplying the advertisement interval times the age timer. For example, the default age time for IPX service entries is 180 seconds, which is 60 (the default advertisement interval) multiplied by 3 (the default age timer).

You can configure the age timer for SAP to a value from 1 – 65535. The default is 3. You cannot disable the age timer.

To change the age timer for learned SAP entries, use the following CLI method.

USING THE CLI

To change the age timer for IPX servers from 3 to 2 on interface 5/1, enter the following commands.

```
HP9300(config) int e 5/1
HP9300(config-if-5/1) ipx sap-multiplier 2
HP9300(config-if-5/1) write mem
```

Syntax: ipx sap-multiplier <num>

The **<num>** parameter specifies the age time and can be from 1 – 65535. The default is 3.

USING THE WEB MANAGEMENT INTERFACE

You cannot modify the SAP age timer using the Web management interface.

Displaying IPX Configuration Information and Statistics

You can use CLI commands and Web management options to display the following IPX information:

- Global IPX parameter settings – see “Displaying Global IPX Configuration Information” on page 15-17.
- IPX interfaces – see “Displaying IPX Interface Information” on page 15-18.
- IPX forwarding cache – see “Displaying the IPX Forwarding Cache” on page 15-20.
- IPX route table – see “Displaying the IPX Route Table” on page 15-21.
- IPX server table – see “Displaying the IPX Server Table” on page 15-22.
- IPX traffic statistics – see “Displaying IPX Traffic Statistics” on page 15-23.

Displaying Global IPX Configuration Information

To display global IPX configuration information for the routing switch, use one of the following methods.

USING THE CLI

To display IPX configuration information, enter the following command at any CLI level:

```
HP9300> show ipx

IPX Enabled
NetBIOS (type 20): Disallowed

Maximum RIP entries: 2048
Maximum SAP entries: 4096

Maximum IPX RIP filters: 32
Maximum IPX SAP filters: 32
Maximum IPX forward filters: 32
```

Syntax: show ipx

This display shows the following information.

Table 2.6: CLI Display of Global IPX Configuration Information

This Field...	Displays...
IPX Enabled	Verifies that IPX is enabled. **Note**: If IPX is disabled, the following message is displayed in stead: "ipx not running"
IPX NetBIOS (type 20)	Indicates whether IPX is configured to allow NetBIOS type 20 packets. This field can have one of the following values: • Allowed • Disallowed To change this parameter, see “Enable NetBIOS” on page 15-3.
Maximum IPX RIP filters	How many IPX route filters you can configure in the routing switch. On some devices, you can change this value by changing the amount of memory allocated for the filters. See “Modifying System Parameter Default Settings” on page 8-69.

Table 2.6: CLI Display of Global IPX Configuration Information (Continued)

This Field...	Displays...
Maximum IPX SAP filters	How many IPX service filters you can configure in the routing switch. On some devices, you can change this value by changing the amount of memory allocated for the filters. See "Modifying System Parameter Default Settings" on page 8-69.
Maximum IPX forward filters	How many IPX forward filters you can configure in the routing switch. On some devices, you can change this value by changing the amount of memory allocated for the filters. See "Modifying System Parameter Default Settings" on page 8-69.

USING THE WEB MANAGEMENT INTERFACE

To determine whether IPX is enabled:

1. Select the System link to display the System configuration sheet.
2. Verify that the Enable option is selected next to IPX. If the option is not selected and you want to enable IPX, see "Enable IPX" on page 15-2.

To determine whether NetBIOS is enabled or disabled:

1. Select the Summary link to display the Summary panel.
2. Click on the checkbox next to IPX to place a checkmark in the box, if one is not already present.
3. Optionally, click on the checkboxes next to the other options. By removing the checkmarks from other options, you can simplify the display.
4. Click the Apply button. IPX information is displayed, including whether NetBIOS type 20 packets are allowed.

To view the maximum number of IPX filters you can configure:

1. Select the System link to display the System configuration sheet.
2. Select Parameter to display the Configure System Parameter Maximum Value panel.
3. Scroll down to display the values in the Max Current Value field for the following parameters:
   - ipx-forward-filter – IPX forward filters
   - ipx-rip-filter – IPX RIP filters
   - ipx-sap-filter – IPX SAP filters

Displaying IPX Interface Information

To display IPX interface information for the routing switch, use one of the following methods.

USING THE CLI

To display IPX interface information, enter the following command at any CLI level:

```
HP9300# show ipx interface ethernet 3/5

Interface Ethernet 3/5
  MAC address: 00e0.5284.0b44  Port state: UP
  IPX network:       0000ABCD  Frame type: ethernet_snap   Allow NetBIOS: NO
  rip-interval: 60  rip-max-packet-size: 432  rip-multiplier: 3
  sap-interval: 60  sap-max-packet-size: 480  sap-multiplier: 3
```

Syntax: show ipx interface [ethernet <portnum> | ve <num>]

The **ethernet <portnum>** parameter lets you specify a routing switch port.

The **ve <num>** parameter lets you specify a virtual interface (VE).

This display shows the following information.

Table 2.7: CLI Display of IPX Interface Information

This Field...	Displays...
Interface	The port or virtual interface on which the IPX interface is configured.
MAC address	The MAC address of the interface.
Port state	The state of the interface. The state can be one of the following: • DOWN • UP
IPX network	The IPX network number.
Frame type	The frame type of the network. The frame type can be one of the following: • ethernet_802.2 • ethernet_802.3 • ethernet_ii • ethernet_snap
Allow NetBIOS	Indicates whether the interface allows NetBIOS traffic. This field can have the following values: • NO • YES
rip-interval	The RIP advertisement interval. The RIP advertisement interval specifies how often the routing switch sends IPX RIP updates to neighboring IPX routers. To modify this parameter, see “Modify the RIP Advertisement Interval” on page 15-15.
rip-max-packet-size	The maximum packet size for IPX RIP updates. The default IPX RIP packet size is 432 bytes, which allows 50 routes plus 32 bytes of header in an IPX RIP update packet. To modify this parameter, see “Modify the RIP Advertisement Packet Size” on page 15-14.
rip-multiplier	The age timer for learned IPX routes. The age timer specifies how many seconds a learned IPX route can remain in the routing switch's IPX route table before aging out. To modify this parameter, see “Modify the Age Timer for Learned IPX Routes” on page 15-16.

Table 2.7: CLI Display of IPX Interface Information (Continued)

This Field...	Displays...
sap-interval	The SAP advertisement interval. The IPX SAP advertisement interval specifies how often the routing switch sends IPX SAP updates to neighboring IPX routers. To modify this parameter, see “Modify the SAP Advertisement Interval” on page 15-15.
sap-max-packet-size	The maximum packet size for IPX SAP advertisements. The default IPX SAP packet size is 480 bytes, which allows seven servers plus 32 bytes of header in an IPX SAP update packet. To modify this parameter, see “Modify the SAP Advertisement Packet Size” on page 15-14.
sap-multiplier	The age timer for learned SAP entries. The age timer specifies how many seconds a learned IPX server can remain in the routing switch's IPX service table before aging out. To modify this parameter, see “Modify the Age Timer for Learned SAP Entries” on page 15-16.

USING THE WEB MANAGEMENT INTERFACE

To display IPX interface information:

1. Select the IPX link to display the IPX panel.
2. Select the Show IPX Interface link.

Displaying the IPX Forwarding Cache

To display the IPX forwarding cache for the routing switch, use one of the following methods.

USING THE CLI

To display the IPX forwarding cache, enter the following command at any CLI level:

```
HP9300> show ipx cache
Total number of IPX cache entries 3

Forwarding

Index  Network   Router      Out-Filter  Frame-Type    Port
1     11110007  0000.0000.0000  off      ethernet_802.3    7
2     11110005  0000.0000.0000  off      ethernet_802.3    5
3     32D564FA  00a0.24bf.89ca  off      ethernet_802.3    5
```

Syntax: show ipx cache [<num(hex)>]

The **<num(hex)>** parameter lets you specify an IPX network number.

This display shows the following information.

Table 2.8: CLI Display of IPX Forwarding Cache

This Field...	Displays...
Total number of IPX cache entries	The number of entries in the forwarding cache.
Index	The row number of this entry in the cache.
Network	The network containing the destination node.
Router	The MAC address of the next-hop IPX router. If the destination is local, the address is shown as all zeros.
Out-Filter	Whether an outbound filter is configured for traffic to the destination network number or node. The value can be one of the following: • No • Yes
Frame-Type	The frame encapsulation type, which can be one of the following: • Ethernet SNAP • Ethernet 802.2 • Ethernet 802.3 • Ethernet II
Port	The port through which the routing switch sends traffic to the destination network and node.

USING THE WEB MANAGEMENT INTERFACE

To display the IPX host cache:

1. Select the Show link to display the Show Statistics panel.
2. Select the IPX Cache link in the IPX section of the panel.

Displaying the IPX Route Table

To display the IPX route table, use one of the following methods.

USING THE CLI

To display the IPX route table, enter the following command at any CLI level:

```
HP9300> show ipx route

Total number of IPX route entries 3

Forwarding

Index   Network   Router          Hops  Ticks Port
1       11110007  0000.0000.0000     0     1     7
2       32D564FA  00a0.24bf.89ca     1     2     5
3       11110005  0000.0000.0000     0     1     5
```

Syntax: show ipx route [<num(hex)>]

The **<num(hex)>** parameter lets you specify an IPX network number.

This display shows the following information.

Table 2.9: CLI Display of IPX Route Table

This Field...	Displays...
Total number of IPX route entries	The number of entries in the table.
Index	The index number of the table entry.
Network	The IPX network at the route's destination.
Router	The MAC address of the next-hop IPX router.
Hops	The number of hops (routers) separating the router from the network.
Ticks	The number of ticks.
Port	The port through which the routing switch sends traffic to the destination network.

USING THE WEB MANAGEMENT INTERFACE

To display the IPX route table:

1. Select the Show link to display the Show Statistics panel.
2. Select the IPX Route link in the IPX section of the panel.

Displaying the IPX Server Table

To display the IPX server table, use one of the following methods.

USING THE CLI

To display the IPX server table, enter the following command at any CLI level:

```
HP9300> show ipx servers

Total number of IPX server entries 3

Index  Network   Node            Socket    Type      Hops
1      32D564FA  0000.0000.0001   0005     026B        1
         Server-name: HPD
2      32D564FA  0000.0000.0001   4006     0278        1
         Server-name: HPM
3      32D564FA  0000.0000.0001   0451     0004        1
         Server-name: HP-MPR2
```

Syntax: show ipx servers [<name>]

The **<name>** parameter lets you specify a server name.

This display shows the following information.

Table 2.10: CLI Display of IPX Server Table

This Field...	Displays...
Index	The index number of the table entry.
Network	The network in which the server is located.
Node	The six-byte node number. The node number can be a MAC address or, for some IPX server types, a "1".
Socket	The two-byte socket number.
Type	The two-byte number for the server type.
Hops	The number of IPX router hops to the server's network.
Server-name	The IPX server name.

USING THE WEB MANAGEMENT INTERFACE

To display the IPX server table:

1. Select the Show link to display the Show Statistics panel.
2. Select the IPX Server link in the IPX section of the panel.

Displaying IPX Traffic Statistics

To display IPX traffic statistics, use one of the following methods.

USING THE CLI

To display IPX traffic statistics, enter the following command at any CLI level:

```
HP9300> show ipx traffic

                                              Dropped              Filtered
Port    Forward    Receive   Transmit    Receive   Transmit   Receive  Transmit
 1/5          46         36          8          2          0         0         0
 1/7           0          0          6          0          0         0         0
Tot           46         36         14          2          0         0         0
```

Syntax: show ipx traffic

This display shows the following information.

Table 2.11: CLI Display of IPX Traffic Statistics

This Field...	Displays...
Port	The port for which the statistics apply. Only the ports that have IPX interfaces configured on them are listed.
Forward	The number of IPX packets received by the routing switch from another device and then sent on the port.
Receive	The number of IPX packets received on the port.

Table 2.11: CLI Display of IPX Traffic Statistics (Continued)

This Field...	Displays...
Transmit	The number of IPX packets originated on the routing switch and sent on the port.
Dropped Receive	The number of packets received on this port by the routing switch that the routing switch dropped.
Dropped Transmit	The number of packets queued for sending on this port by the routing switch but then dropped.
Filtered Receive	The number of packets received by this port that matched an inbound IPX filter configured on the port.
Filtered Transmit	The number of packets queued for sending on this port that matched an outbound IPX filter configured on the port.

USING THE WEB MANAGEMENT INTERFACE

To display summary IPX traffic statistics:

1. Select the Show link to display the Show Statistics panel.
2. Select the Traffic link in the IPX section. The IPX Traffic panel is displayed, as shown in “IPX Traffic panel” on page 15-24.

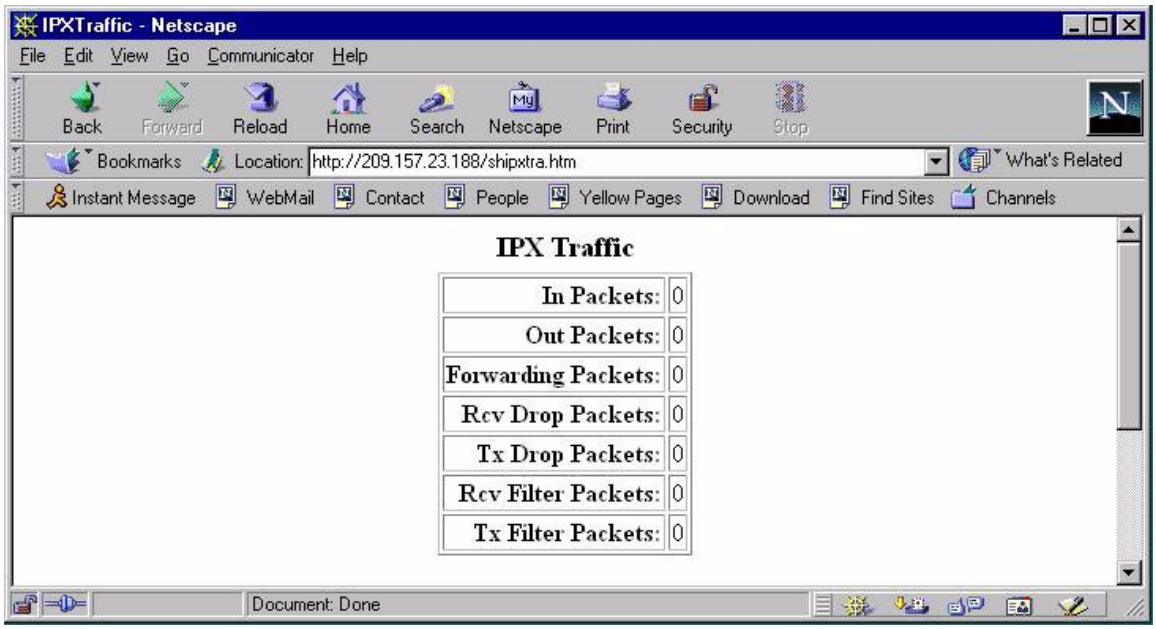

Figure 15.11 IPX Traffic panel

This display shows the following information.

Table 2.12: Web Display of IPX Traffic Statistics

This Field...	Displays...
In Packets	The number of IPX packets received on the routing switch.
Out Packets	The number of IPX packets originated on the routing switch and sent on the routing switch.
Forwarding Packets	The number of IPX packets received by the routing switch from another device and then sent on the routing switch.
Rcv Drop Packets	The number of packets received by the routing switch that the routing switch dropped.
Tx Drop Packets	The number of packets queued for sending by the routing switch but then dropped.
Rcv Filter Packets	The number of packets received by the routing switch that matched an inbound IPX filter.
Tx Filter Packets	The number of packets queued for sending that matched an outbound IPX filter.

To display traffic statistics for each port or virtual interface on which an IPX interface is configured:

1. Select the Show link to display the Show Statistics panel.
2. Select the IPX Port Counter link in the IPX section. The IPX Traffic panel is displayed, as shown in “IPX Port Counter panel” on page 15-25.

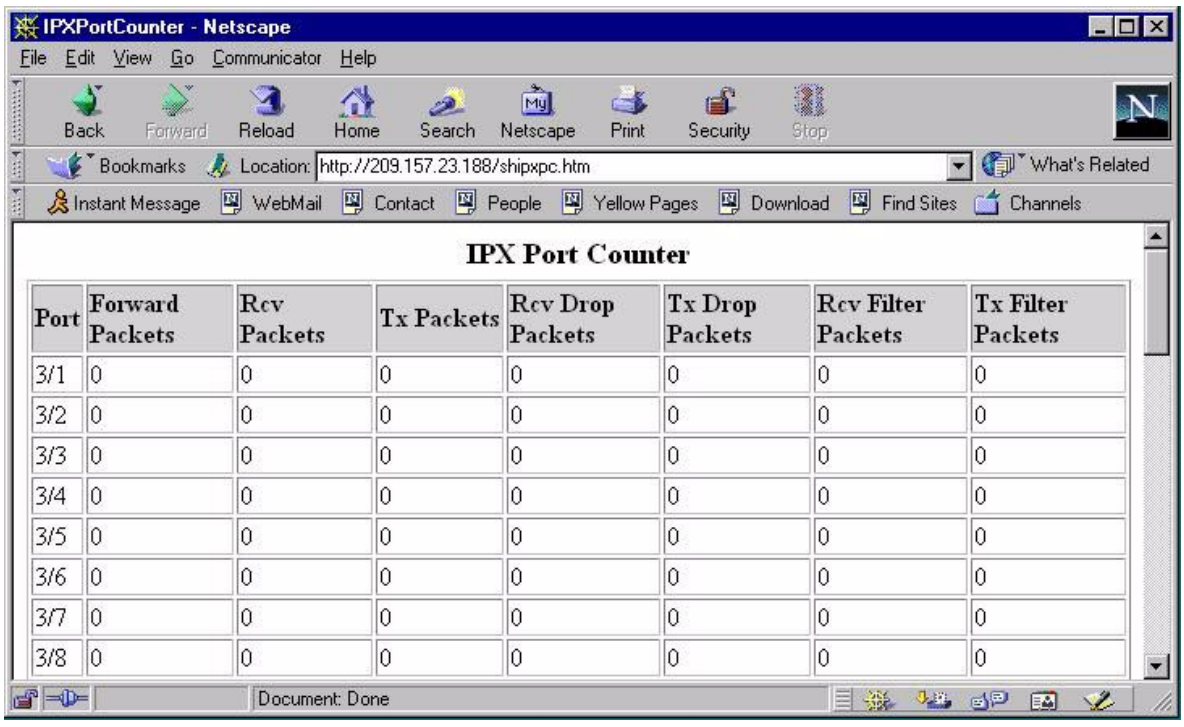

Figure 15.12 IPX Port Counter panel

This display shows the following information.

Table 2.13: Web Display of IPX Port Statistics

This Field...	Displays...
Port	The port or virtual interface on which the IPX interface is configured.
Forward Packets	The number of IPX packets received by the routing switch from another device and then sent on the port.
Rcv Packets	The number of IPX packets received on the port.
Tx Packets	The number of IPX packets originated on the routing switch and sent on the port.
Rcv Drop Packets	The number of packets received on this port by the routing switch that the routing switch dropped.
Tx Drop Packets	The number of packets queued for sending on this port by the routing switch but then dropped.
Rcv Filter Packets	The number of packets received by this port that matched an inbound IPX filter configured on the port.
Tx Filter Packets	The number of packets queued for sending on this port that matched an outbound IPX filter configured on the port.