Chapter 12
Configuring AppleTalk

This chapter describes how to configure AppleTalk on HP 9304M, HP 9308M, and HP 6208M-SX routing switches using the CLI and the Web management interface. The routing switches support Phase II of AppleTalk routing.

For complete syntax information for the CLI commands shown in this chapter, see the *Command Line Interface Reference*.

NOTE: In addition to the routing features described in this chapter, the routing switches support AppleTalk cable VLANs. If you configure multiple cable VLANs, the routing switch bridges traffic within a VLAN and routes traffic between VLANs. See “Configuring AppleTalk Cable VLANs” on page 13-29.

Overview of AppleTalk

AppleTalk inter-networks are built upon distinct networks interconnected by routers. Each network is composed of nodes—workstations, printers, and servers. AppleTalk zones are assigned across AppleTalk networks to further define end-user access to shared resources such as printers and servers.

Address Assignment

AppleTalk node addresses are assigned dynamically. When a Macintosh running AppleTalk starts up, it selects a network address and checks to see if that address is already in use. If the address is already in use by another client, a message will be returned to the requesting station and the process will repeat until an uncommitted address is located.

Network Components

Nodes

The ***node*** is the primary building block of any AppleTalk network. A node is any device on an AppleTalk network such as a workstation, printer, or server running AppleTalk.

Networks

Multiple nodes that share the same logical segment comprise an AppleTalk network. Each node in the network is assigned an AppleTalk address.

An AppleTalk address is comprised of a 16-bit network number and an 8-bit node number. For example, 500.50 refers to node 50 on network 500.

An AppleTalk network address is a single 16-bit network number or a network range (cable range). The network range specifies a range of contiguous network numbers with start and end values.

Zones

AppleTalk zones are logical groupings of AppleTalk nodes defined within and across multiple networks as shown in Figure 12.1. For example, the Finance zone comprises two separate networks, 500 and 600. These network numbers are assigned to a specific interface on a router, and nodes within those networks are automatically assigned numbers in that range.

Defining zones for certain workstations and resources on the network allows you to easily permit or deny access to certain devices or information on the network by providing or hiding information about zones to a node or network. This is further explained in the following sections on filtering.

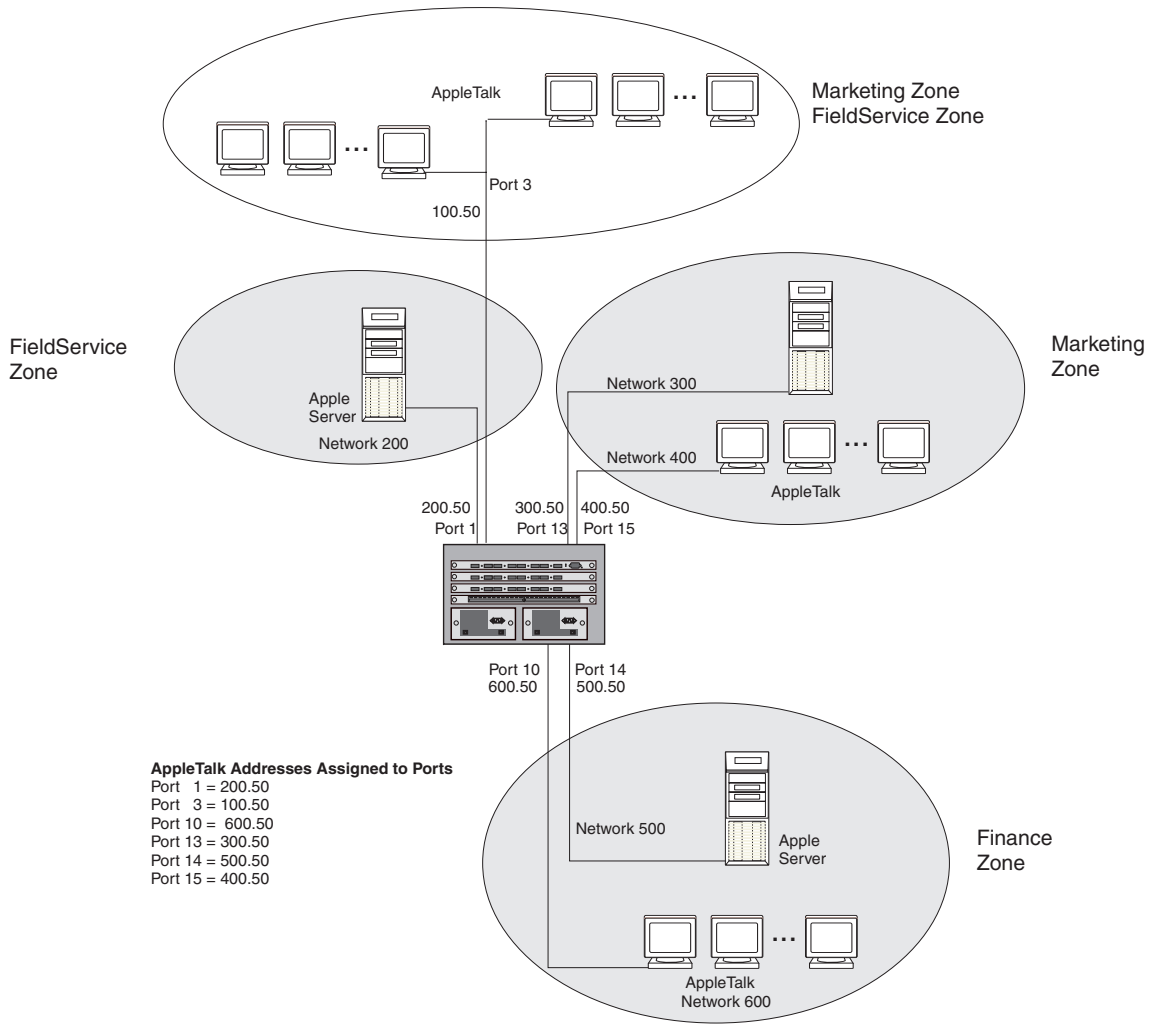


Figure 12.1 AppleTalk Zones defined within and across AppleTalk networks

Zone Filtering

Zone filtering allows you to define access for a network and its nodes by defining single permit or deny filters, rather than defining an access list for each node independently.

By eliminating the need to enter separate numbers for each device or network segment, zone filters improve overall system administration of an AppleTalk network. For example, if a new device such as a server or laser printer is added to an existing zone, all users in that zone automatically have access to that device without any additional configuration.

Additionally, this feature helps eliminate unauthorized access to devices within restricted zones. As new devices are added to secured zones, information on those devices is protected automatically.

Network Filtering

You also can filter on a network basis by enabling the Routing Table Maintenance Protocol (RTMP) filtering capability of zone filtering. When this filter is enabled on an interface, the denied network numbers are removed from the RTMP packet before it is transmitted out of the interface.

You can define deny or permit zone and network filters for AppleTalk on an interface basis. You can define up to 32 filters for routing switches operating with 32MB of memory. For those systems with 8MB of memory installed, you can define up to 16 filters.

Seed and Non-Seed Routers

An AppleTalk router must be configured as either a seed or a non-seed router.

When you configure an AppleTalk router as a seed router, you must define the cable-range, address, and zone names for the router. When you configure a non-seed router, the router will learn its parameters from a seed AppleTalk router on the same segment.

AppleTalk Components Supported on the HP 9304M, HP 9308M, and HP 6208M-SX Routing Switches

The following sections describe the AppleTalk protocol components supported by the HP 9304M, HP 9308M, and HP 6208M-SX routing switches.

Session Layer Support

The ***Zone Information Protocol (ZIP)*** maintains the mapping between defined network numbers and zone names within an AppleTalk network. This information is stored on a router in the zone information table.

ZIP also uses information from the RTMP routing table to stay current on the network topology.

Transport Layer Support

Routing Table Maintenance Protocol (RTMP)

RTMP establishes and maintains the AppleTalk routing table. AppleTalk routers use RTMP to exchange routing information at regular intervals to ensure that each router has the latest routing information.

The periodic updates are sent out every 10 seconds by default.

AppleTalk Echo Protocol (AEP)

AppleTalk routers use AEP to check connectivity to other devices on the network.

AppleTalk Transaction Protocol (ATP)

ATP facilitates transaction-based applications. ATP supports a client/server design in which clients request information and servers reply with a response to that request. The protocol assigns a transaction ID to each request/response pair and allows only one instance of that specific transaction.

A sub-set of ATP is implemented to support ZIP on the HP 9304M, HP 9308M, and HP 6208M-SX routing switches.

Name Binding Protocol (NBP)

NBP maps AppleTalk names used on a network with addresses. For example, a printer for the marketing group may be named MKTG with an address of 100.5. This association is mapped together by the NBP.

NBP is dynamically initiated when the node is started. NBP also addresses registration, deletion, confirmation, and search of names.

Network Layer Support

Datagram Delivery Protocol (DDP)

DDP provides connectionless service between application sockets on an AppleTalk network and administers AppleTalk addresses.

AppleTalk Address Resolution Protocol (AARP)

AARP translates AppleTalk addresses into 48-bit data link addresses. The 48-bit data link address is required in order to send AppleTalk packets to a specific node. AARP is also used to check for duplicate AppleTalk addresses on the network.

An AARP entry notes the mapping between a node's AppleTalk address and its MAC (hardware) address.

Data Link Support

AppleTalk supports the ***EtherTalk Link Access Protocol (ELAP)***, which defines the layer 2 encapsulation for AppleTalk packets.

Dynamic AppleTalk Activation and Configuration

AppleTalk is automatically activated when you enable the protocol on systems running software release 4.0 or later. On platforms running an earlier software release, you must reset the system to initially enable AppleTalk; however, all changes after that occur dynamically.

Configuring AppleTalk Routing

To begin using AppleTalk on a routing switch, perform the following tasks:

1. Enable AppleTalk on the routing switch, if it is not already enabled.
2. Configure AppleTalk as either a seed or a non-seed router.

   When you configure a seed router, you define the cable-range, address, and zone names for the router. When you configure a non-seed router, the router will learn its parameters from another AppleTalk router on the same segment.
3. Define zone and additional zone filters, if desired.
4. Configure virtual interfaces to allow routing between AppleTalk VLANs, if desired.
5. Modify global parameters, if desired.

Enable AppleTalk

To enable AppleTalk routing on a routing switch, use one of the following methods.

NOTE: Once AppleTalk is enabled at the global (system) level, no additional configuration is required at this level unless the default parameters assigned need to be modified to address network requirements. See "Modifying AppleTalk Global Parameters" on page 12-16.

USING THE CLI

```
HP9300(config)# router appletalk
HP9300(config)# write memory
HP9300(config)# end
```

Syntax: router appletalk

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Select the Enable radio button next to AppleTalk.
3. Click the Apply button to apply the changes to the device's running-config file.
4. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Configuring a Seed AppleTalk Router

When you configure an AppleTalk router as a seed router, you must define the cable range, AppleTalk address, and zone names for the router interfaces.

To configure a seed router, perform the following tasks:

1. Configure the cable range (network numbers) to be supported on that interface.
2. Assign an AppleTalk address to the interface.
3. Assign a zone or zones to the interface.
4. Enable AppleTalk routing on the interface.

NOTE: Before configuring interface parameters for AppleTalk, you must enable AppleTalk at the system level.

USING THE CLI

This section describes defining a cable range, assigning network addresses and zones, and enabling AppleTalk routing on an interface.

Configuring the Cable Range for an Interface

To support network numbers from 10 – 50 on interface 1/3, enter the following commands:

```
HP9300(config)# int e 1/3
HP9300(config-if-1/3)# appletalk cable 10 - 50
```

Syntax: appletalk cable <network-number> | <network-number – network-number>

Configuring a Network Address for an Interface

To assign an AppleTalk address of 10.5 to interface 1/3, enter the following command:

```
HP9300(config-if-3)# appletalk address 10.5
```

Syntax: appletalk address <node.network>

Configuring Zones on an Interface

To assign sales, marketing, and finance zones for interface 1/3, enter the following commands:

```
HP9300(config-if-1/3)# appletalk zone sales
HP9300(config-if-1/3)# appletalk zone marketing
HP9300(config-if-1/3)# appletalk zone finance
```

NOTE: You can configure up to 1536 zones on a routing switch.

Enabling AppleTalk Routing on an Interface

To enable AppleTalk routing on interface 1/3, enter the following command:

```
HP9300(config-if-1/3)# appletalk routing
```

Saving Configuration Changes to the Interface

Once you have configured the cable range, network address, zone(s), and AppleTalk routing for an interface, you can preserve the configuration changes by saving them to flash.

```
HP9300(config-if-1/3)# write memory

HP9300(config-if-1/3)# end

HP9300# reload
```

NOTE: When there is more than one seed router on the network, make sure the AppleTalk configuration of each of those seed routers is consistent with other routers on the same segment.

USING THE WEB MANAGEMENT INTERFACE

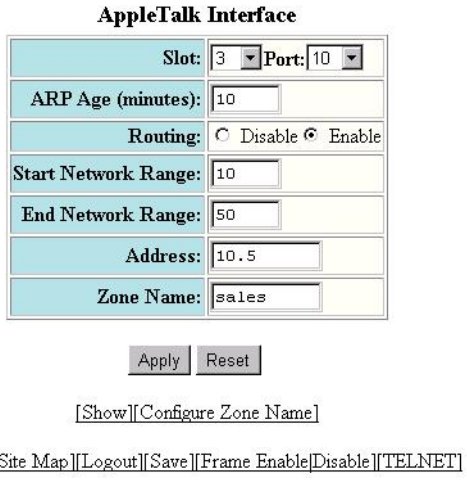
This section describes how to enable AppleTalk on the routing switch as well as how to configure the cable range, network address, and zones for an AppleTalk seed router.

To enable AppleTalk on the routing switch:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Select the Enable radio button next to AppleTalk.
3. Click the Apply button to apply the changes to the device's running-config file.
4. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

To configure an interface as a seed router:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the Interface link to display the AppleTalk Interface table.
5. Click on the Modify button next to the interface you want to configure for AppleTalk. The AppleTalk Interface configuration panel is displayed, as shown in the following example.



6. Select the port or slot/port to be configured from the port pulldown menu(s).
7. Modify the ARP age value from the default value of 10 minutes, if desired. Possible values are 1 – 240 minutes.

8. Beginning in software release 06.x, the AppleTalk ARP age is a global parameter instead of an interface parameter. When you enter an ARP age value for a port and apply the change to the running-config file or save the change to the startup-config file, the change is saved as the global setting. If you try to set different values for different ports, the interface does not display an error message. Instead, the most recent value you enter before saving the configuration change becomes the global setting.
9. Enable the routing option.
10. Configure the range of supported network addresses by entering the lowest supported number in the Start Network Range field and the highest supported number in the End Network Range.
11. Enter the AppleTalk address for the port. The address should be a two decimal number, and the first number should be within the network range entered in step 5 above.
12. Enter a zone name for the port.

NOTE: To enter multiple zone names for a port, select the Configure Zone Name link at the bottom of the entry panel. A separate entry panel for that interface will appear. Enter the name(s) of the other zone(s) on an individual basis, selecting the Add button after each entry. For this example, a summary panel shows the resulting configuration (Figure 12.3).

NOTE: If you do not enter any values other than zero in the network range or address field, and the zone name field is empty, the router will be a non-seed router.

13. Click the Apply button to apply the changes to the device's running-config file.
14. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Configuring a Non-seed AppleTalk Router

This section describes how to configure a non-seed router using the CLI or the Web management interface.

To configure a non-seed router, perform the following tasks:

1. Verify that at least one AppleTalk router in the network of the routing switch being configured is operating as a seed router.

NOTE: This requirement ensures that the non-seed router has a seed router on the same segment, from which it can learn configuration details.

2. Enable AppleTalk at the global level.
3. Enable AppleTalk routing on the interface(s).

Enabling AppleTalk Routing at the Global (System) Level

To enable AppleTalk on the routing switch, use one of the following methods:

USING THE CLI

```
HP9300(config)# router appletalk
```

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Select the Enable radio button next to AppleTalk.
3. Click the Apply button to apply the changes to the device's running-config file.
4. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Enable AppleTalk Routing on an Interface

To enable AppleTalk on interface 1/5, use one of the following methods.

USING THE CLI

```
HP9300(config)# int e 1/5
HP9300(config-if-1/5)# appletalk routing
HP9300(config-if-1/5)# end
HP9300# write memory
HP9300# reload
```

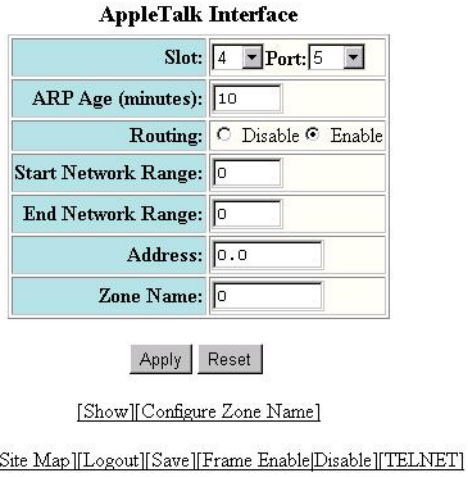
NOTE: By definition, values for the network range, AppleTalk address, and zone name fields are never entered for a non-seed router. If you enter information into these fields, the routing switch is a seed router.

NOTE: Once configured as a non-seed router, the routing switch will send out a query to a seed router on its network to obtain configuration details such as network range, AppleTalk address, and zone name(s) for the routing switch.

USING THE WEB MANAGEMENT INTERFACE

To configure an interface as a non-seed router:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the Interface link to display the AppleTalk Interface table.
5. Click on the Modify button next to the interface you want to configure for AppleTalk. The AppleTalk Interface configuration panel is displayed, as shown in the following example.



6. Select the port or slot/port to be configured from the port pulldown menu(s).
7. Modify the ARP age value from the default value of 10 minutes, if desired. Possible values are 1 – 240 minutes.

8. Beginning in software release 06.x, the AppleTalk ARP age is a global parameter instead of an interface parameter. When you enter an ARP age value for a port and apply the change to the running-config file or save the change to the startup-config file, the change is saved as the global setting. If you try to set different values for different ports, the interface does not display an error message. Instead, the most recent value you enter before saving the configuration change becomes the global setting.
9. Enable the routing option.
10. Click the Apply button to apply the changes to the device's running-config file.
11. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Modifying AppleTalk Interface Configurations

Once AppleTalk is active on a routing switch, all configuration changes are dynamic and require no reset. However, once you configure an interface for AppleTalk, you must enable AppleTalk routing before you can make any changes to the cable range, network address, or zones values. Once you make changes, you then must re-enable AppleTalk routing for the new changes to take effect.

EXAMPLE:

Suppose you want to expand the network numbers supported on interface 3 from the range 10 – 50 to the range 10 – 100. Additionally, you want to add engineering and human resource zones to the interface. To do so, use one of the following methods.

USING THE CLI

```
HP9300(config)# int e1/3
HP9300(config-if-1/3)# no appletalk routing
HP9300(config-if-1/3)# appletalk cable 10-100
HP9300(config-if-1/3)# appletalk zone engineering
HP9300(config-if-1/3)# appletalk zone humanresource
HP9300(config-if-1/3)# appletalk routing
HP9300(config-if-1/3)# end
HP9300# write memory
```

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the Interface link to display the AppleTalk Interface table.
5. Click on the Modify button next to the interface you want to reconfigure for AppleTalk. The AppleTalk Interface configuration panel is displayed.
6. Modify parameters as needed.
7. To modify other interfaces, select the port (and lost number if applicable) from the Port and Slot fields, then modify the values.
8. Click the Apply button to apply the changes to the device's running-config file.
9. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Filtering AppleTalk Zones and Networks

Defining Zone Filters

Zone filtering allows you to define access for a network and its nodes by entering single permit or deny CLI commands, instead of defining an access list for each node independently.

By eliminating the need to enter separate numbers for each device or network segment, zone filters improve overall system administration of an AppleTalk network. For example, if a new device such as a server or laser printer is added to an existing zone, all users in that zone automatically have access to that device without any additional configuration.

Additionally, zone filters help eliminate unauthorized access to devices within restricted zones. As new devices are added to secured zones, information on those devices is protected automatically.

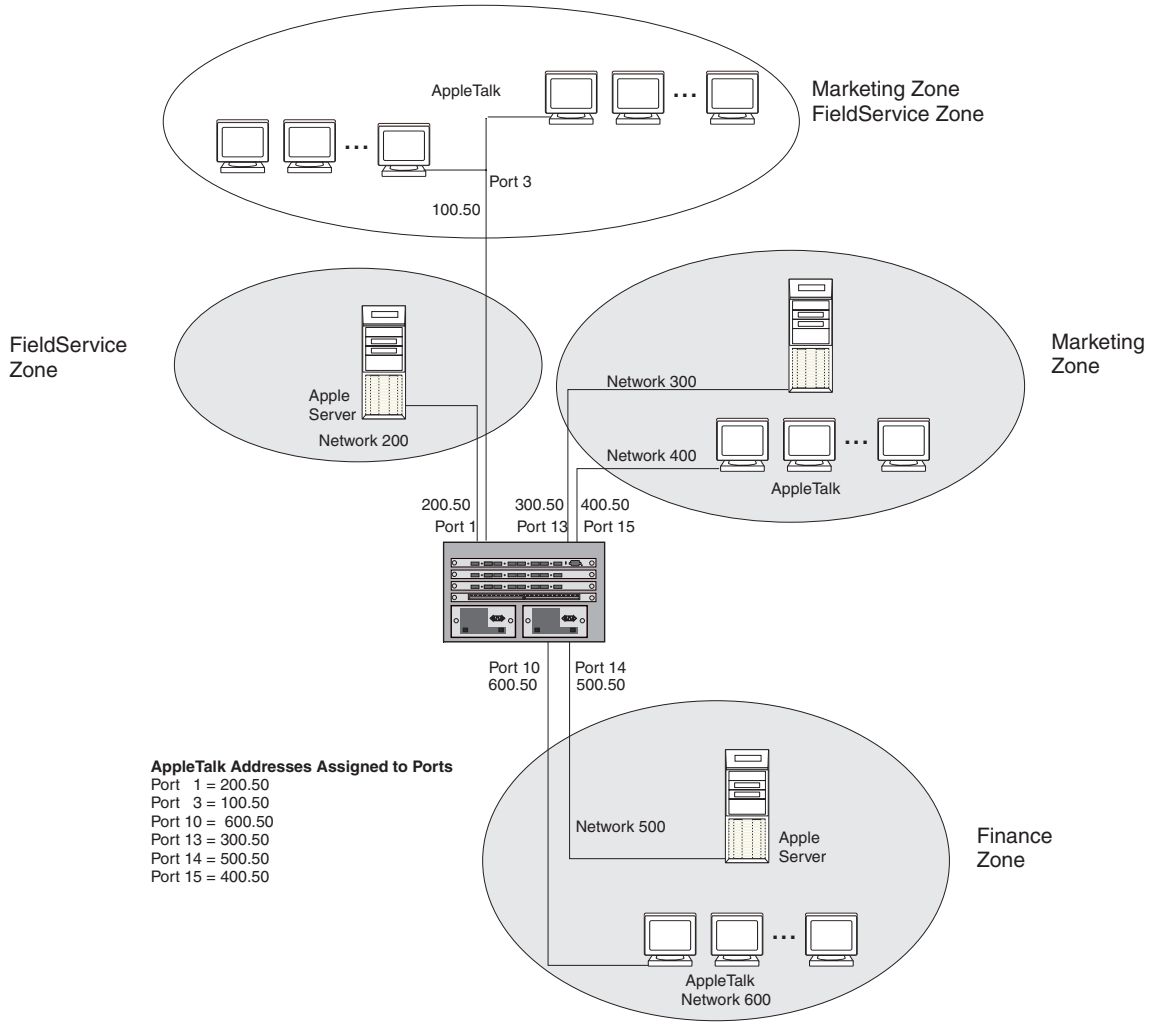


Figure 12.2 AppleTalk zones in a network

EXAMPLE:

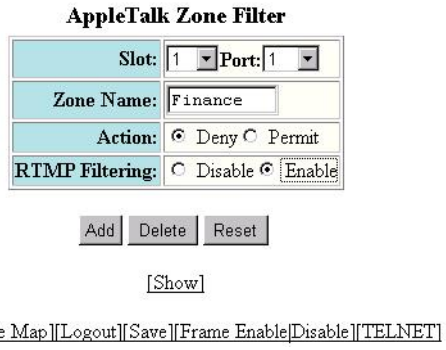
Suppose you want to deny access to the Finance server to users within the Marketing and Field Service zones on the network, as shown in Figure 12.2. To define a zone filter for this, use one of the following methods.

USING THE CLI

```
HP9300(config)# interface e1/1
HP9300(config-if-1/1)# appletalk deny zone finance
HP9300(config-if-1/1)# int e1/3
HP9300(config-if-1/3)# appletalk deny zone finance
HP9300(config-if-1/3)# int e1/13
HP9300(config-if-1/13)# appletalk deny zone finance
HP9300(config-if-1/13)# int e1/15
HP9300(config-if-1/15)# appletalk deny zone finance
```

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the Zone Filter link.
   - If the device does not have any AppleTalk zone filters, the AppleTalk Zone Filter configuration panel is displayed, as shown in the following example.
   - If an AppleTalk zone filter is already configured and you are adding a new one, click on the Configure AppleTalk Zone Filter link to display the AppleTalk Zone Filter configuration panel, as shown in the following example.
   - If you are modifying an existing AppleTalk zone filter, click on the Modify button to the right of the row describing the filter to display the AppleTalk Zone Filter configuration panel, as shown in the following example.



5. Select the interface for which a zone filter is to be defined, from the port or slot/port pull down menu(s). In this example, you are defining a zone filter for interfaces 1, 3, 13, and 15, all of which have membership in either or both of the Marketing and Field Service zones.
6. Enter the name of the zone to which you are permitting or denying access. In this case, enter Finance.
7. Select either Deny or Permit. In this example, select Deny for interfaces 1, 3, 13, and 15.
8. Enable RTMP filtering to filter on a network basis. When RTMP filtering is enabled on an interface, the denied network numbers are removed from the RTMP packet before it is transmitted out of the interface.
9. Click the Apply button to apply the changes to the device's running-config file.
10. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Define Additional Zone Filters

When defining AppleTalk zone filters, you must define both deny and permit relationships for an interface. For instance, in the previous example, a deny filter prevents users within Marketing and Field Service zones from accessing the Finance zone.

Because all additional zones not specifically addressed by a deny filter are permitted by default, you do not need to configure any specific permit definitions, and the requirement of defining both deny and permit relationships is satisfied.

However, the additional zone filter is useful in denying access to those zones not specifically addressed in permit zone filters. Consider the following example.

EXAMPLE:

Suppose Sales, Human Resources (HR), Engineering, and Training zones will be added to the network in the next month. You know in advance that the only other zone that will be allowed access to the Finance zone is the HR zone.

You can configure permit zone filters (Figure 12.2) for ports 4/10 and 4/14 that allow the HR zone to have access to the finance zone and deny access to all others with a deny additional zone filter (Figure 12.2). This approach addresses the current network and all future zone additions with no additional configuration.

USING THE CLI

To define the permit filter for HR on ports 4/10 and 4/14, enter the following commands:

```
HP9300(config)# interface e 4/10
HP9300(config-if-4/10)# no appletalk routing
HP9300(config-if-4/10)# appletalk permit zone HR
HP9300(config-if-4/10)# deny additional-zones
HP9300(config-if-4/10)# appletalk routing
HP9300(config-if-4/10)# int e 4/14
HP9300(config-if-4/14)# no appletalk routing
HP9300(config-if-4/14)# appletalk permit zone HR
HP9300(config-if-4/14)# appletalk routing
HP9300(config-if-4/14)# write memory
```

NOTE: You must disable AppleTalk routing on any interface already operating with AppleTalk before making any modifications to the configuration, and then re-enable routing to activate the change.

USING THE WEB MANAGEMENT INTERFACE

To define the permit and deny filters discussed above:

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the Zone Filter link.
   - If the device does not have any AppleTalk zone filters, the AppleTalk Zone Filter configuration panel is displayed.
   - If an AppleTalk zone filter is already configured and you are adding a new one, click on the Configure AppleTalk Zone Filter link to display the AppleTalk Zone Filter configuration panel.
   - If you are modifying an existing AppleTalk zone filter, click on the Modify button to the right of the row describing the filter to display the AppleTalk Zone Filter configuration panel.

5. Select the interface for which the zone filter is to be defined from the port or slot/port pull down menu(s). In this example, you are defining a permit zone filter for HR for interfaces 10 and 14, which have membership in the Finance zone.
6. Enter the zone name to which access is to be permitted or denied. In this case, the zone name is HR.
7. Select either Deny or Permit. In this example, select Permit for interfaces 10 and 14.
8. Enable RTMP filtering to also filter on a network basis.

NOTE: When this filter is enabled on an interface, the denied network numbers are removed from the RTMP packet before it is transmitted out of the interface. In this example, RTMP filtering is not desired, so this option default is left as disabled.

9. Click the Apply button to apply the changes to the device's running-config file.
10. Click on the Additional Zone Filter link in the tree view.
11. Select the interface for which the zone filter is to be defined, from the port or slot/port pull down menu(s). In this example, define a deny zone filter for interfaces 10 and 14 to deny all other zones not specified in the permit zone filter (steps 1 – 6 above).
12. Select either Deny or Permit. For this example, select Deny for interfaces 10 and 14.
13. Disable RTMP filtering.
14. Click the Apply button to apply the changes to the device's running-config file.
15. Select the Save link at the bottom of the dialog. Select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Network Filtering

EXAMPLE:

To deny access to the Finance server to users within the Marketing and Field Service zones on the network and to prevent information about the zone and the network numbers from being forwarded out of interface 1/1 (Figure 12.2), use one of the following methods.

USING THE CLI

```
HP9300(config-if-1/1)# appletalk deny zone finance rtmp-filtering
```

USING THE WEB MANAGEMENT INTERFACE

To enable RTMP filtering on an interface, define the filter as usual, then enable the RTMP filtering option on the AppleTalk Zone Filter panel.

Routing Between AppleTalk VLANs Using Virtual Interfaces

In addition to supporting AppleTalk VLANs, the routing switches support routing between AppleTalk VLANs using virtual interfaces. The virtual interfaces provide VLANs access to the router functions of routing switches. Using these virtual interfaces eliminates the need to assign a physical port for routing between local VLANs.

AppleTalk routing between virtual and physical interfaces is also supported.

EXAMPLE:

In Figure 12.3, AppleTalk traffic is terminating on ports 1/1 through 1/4. Suppose you want to group all of these interfaces into an AppleTalk protocol VLAN and route traffic to VLANs on other routing switches.

To do so, perform the following steps:

1. Create an AppleTalk protocol VLAN with port membership of ports 1, 2, 3, and 4.
2. Assign a virtual interface to the AppleTalk VLAN to allow it to route traffic to AppleTalk VLANs on remote routing switches.

3. Configure a physical interface on the routing switch that provides access to remote networks to support routing between local and remote AppleTalk VLANs.

NOTE: By supporting assignment of VLANs on interfaces, the routing switch is functioning as a virtual switch.

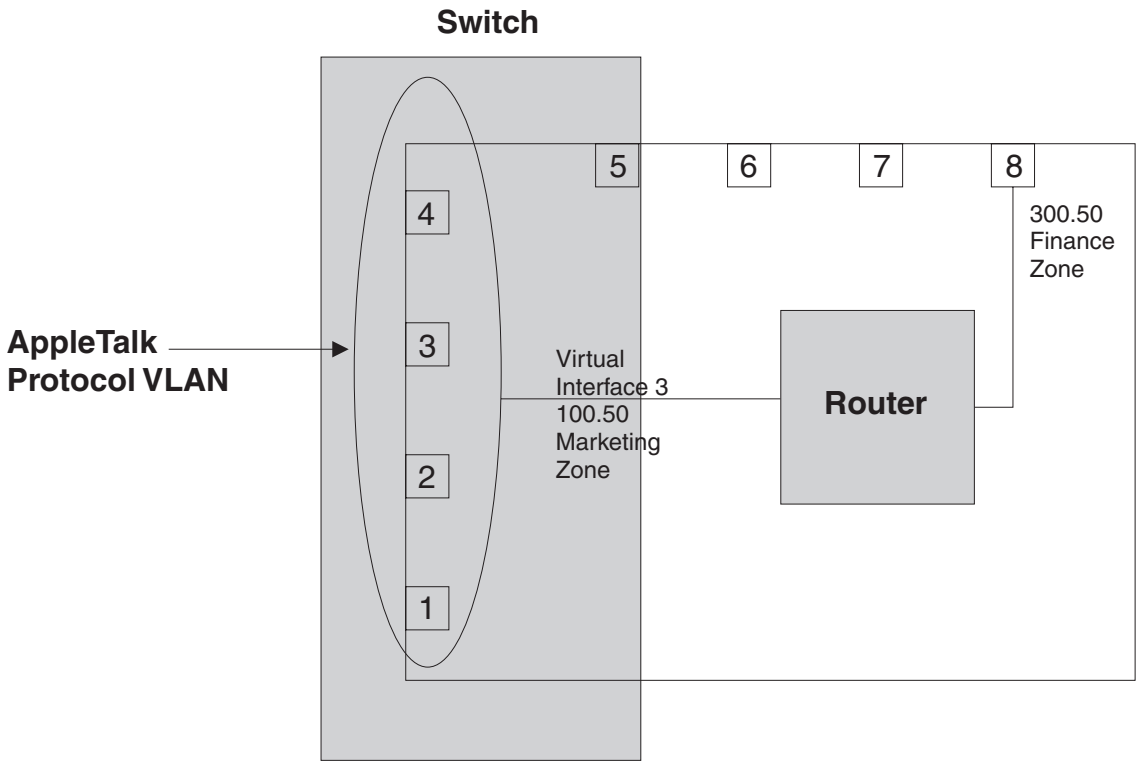


Figure 12.3 Virtual interface provides a routing interface to an AppleTalk VLAN

USING THE CLI

To configure the AppleTalk VLAN as seen in Figure 12.3, enter the following commands:

```
HP9300(config)# router appletalk
HP9300(config)# vlan 1
HP9300(config-vlan-1)# atalk-proto
HP9300(config-vlan-atalk-proto)# static e1/1 to 1/4
HP9300(config-vlan-atalk-proto)# router-interface ve 3
```

To configure the physical interface (e 1/8) to which all outgoing traffic is forwarded, enter the following commands:

```
HP9300(config-vlan-atalk-proto)# int e1/8
HP9300(config-if-1/8)# appletalk cable-range 300 - 300
HP9300(config-if-1/8)# appletalk address 300.50
HP9300(config-if-1/8)# appletalk zone-name Finance
HP9300(config-if-1/8)# appletalk routing
```

To configure the defined AppleTalk VLAN virtual interface ve3, enter the following commands:

```
HP9300(config-if-1/8)# int ve 3
HP9300(config-vif-3)# appletalk cable-range 100 - 100
HP9300(config-vif-3)# appletalk address 100.50
HP9300(config-vif-3)# appletalk zone-name Marketing
HP9300(config-vif-3)# appletalk routing
```

Routing Between Protocol VLANs Within Port-Based VLANs

In Figure 12.4, AppleTalk traffic is terminating on ports 1 – 4 on two separate networks, 100 and 200. Suppose you want to assign these networks to two separate VLANs but would also like to route traffic between the two VLANs and externally to the routing switch.

To create the configuration shown in Figure 12.4, perform the following tasks.

1. Create port-based VLANs 2 and 3.

NOTE: Protocol VLANs must always be within the boundaries of a port-based domain. Whenever port and protocol VLANs operate on a system together, you must create the port-based VLAN before you create the protocol VLAN. The protocol-based VLAN overlays the port-based VLAN.

2. Create AppleTalk protocol VLANs 2 and 3.
3. Configure router interfaces virtual 3 (v3) and virtual 5 (v5).
4. Configure physical interface port 8.

NOTE: Each of the above tasks is described in the following sections.

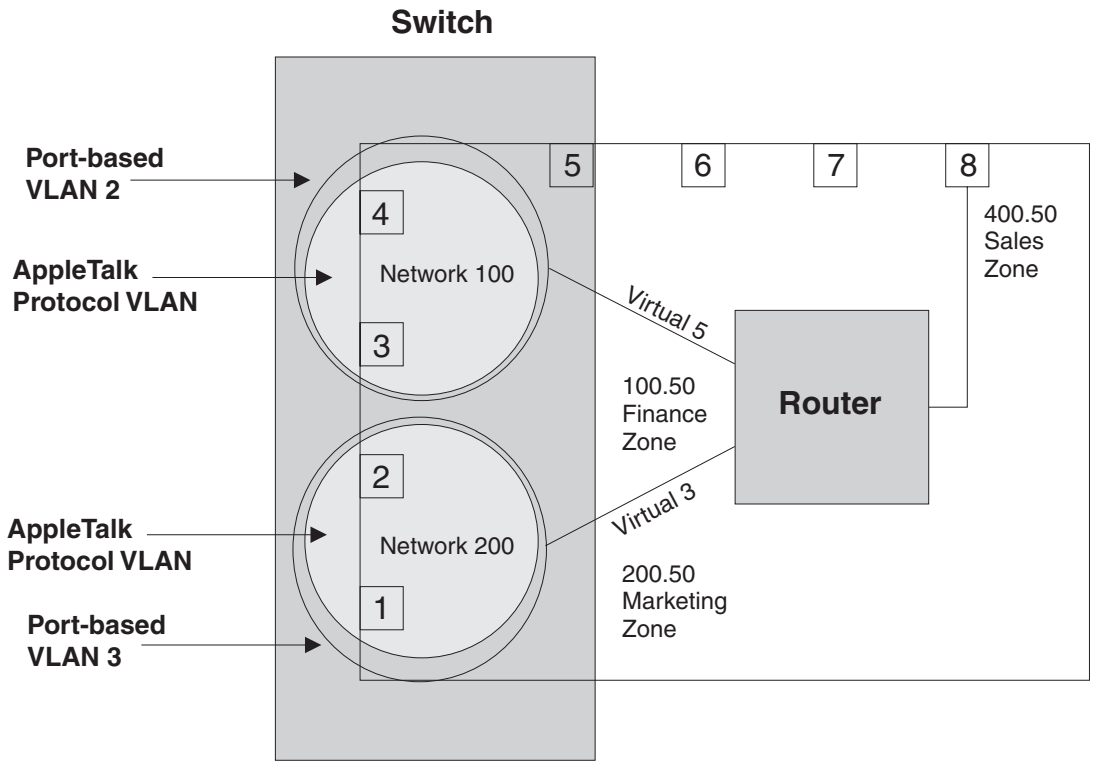


Figure 12.4 Routing between AppleTalk VLANs

USNG THE CLI

```
HP9300(config)# vlan 2 by port
HP9300(config-vlan-2)# untag e1/3 to 1/4
HP9300(config-vlan-2)# atalk-proto
HP9300(config-vlan-atalk-proto)# static e1/3 to 1/4
HP9300(config-vlan-atalk-proto)# router-interface ve 5
HP9300(config-vlan-atalk-proto)# end
HP9300(config-vlan-2)# vlan 3 by port
HP9300(config-vlan-3)# untag e1/1 to 1/2
HP9300(config-vlan-3)# atalk-proto
HP9300(config-vlan-atalk-proto)# router-interface ve 3
```

To configure the physical interface (e8) to which all outgoing traffic is forwarded, enter the following commands:

```
HP9300(config-vlan-atalk-proto)# int e1/8
HP9300(config-if-1/8)# appletalk cable-range 400 - 400
HP9300(config-if-1/8)# appletalk address 400.50
HP9300(config-if-1/8)# appletalk zone-name sales
HP9300(config-if-1/8)# appletalk routing
```

To configure the defined AppleTalk VLAN virtual interfaces ve3 and ve5, enter the following commands:

```
HP9300(config-if-1/8)# int ve 5
HP9300(config-vif-5)# appletalk cable-range 100 - 100
HP9300(config-vif-5)# appletalk address 100.50
HP9300(config-vif-5)# appletalk zone-name finance
HP9300(config-vif-5)# appletalk routing
HP9300(config-vif-5)# int ve 3
HP9300(config-vif-3)# appletalk cable-range 200 - 200
HP9300(config-vif-3)# appletalk address 200.50
HP9300(config-vif-3)# appletalk zone-name marketing
HP9300(config-vif-3)# appletalk routing
HP9300(config-vif-3)# end
HP9300# write memory
```

Modifying AppleTalk Global Parameters

You can modify the following AppleTalk parameters at the global level:

- AppleTalk ARP age
- AppleTalk ARP retransmission count
- AppleTalk ARP retransmission interval
- AppleTalk glean packets
- AppleTalk QoS socket (assigns a higher priority)

- AppleTalk RTMP update interval
- AppleTalk ZIP query interval

The following sections describe these parameters and show how to change them.

AppleTalk ARP Age

To change the AppleTalk ARP age in software release 06.x, use one of the following methods.

USING THE CLI

To change the AppleTalk ARP age, enter the following command at any level of the CLI:

```
HP9300(config)# appletalk arp 30
HP9300(config)# write memory
```

Syntax: [no] appletalk arp-age <num>

The <num> parameter specifies the number of minutes for the ARP age and can be from 1 – 240. The default is 10.

USING THE WEB MANAGEMENT INTERFACE

You can change the AppleTalk ARP age using the Web management interface, but the interface still allows you to enter the ARP age value only on an individual port basis. However, when you enter an ARP age value for a port and apply the change to the running-config file or save the change to the startup-config file, the change is saved as the global setting. If you try to set different values for different ports, the interface does not display an error message. Instead, the most recent value you enter before saving the configuration change becomes the global setting.

1. Log on to the device using a valid user name and password for read-write access.
2. If you have not already enabled AppleTalk, enable it by clicking on the Enable radio button next to AppleTalk on the System configuration dialog, then clicking Apply to apply the change.
3. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
4. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
5. Click on the Interface link to display the AppleTalk Interface table.
6. Click on the Modify button to the right of any port listed in the table to display the AppleTalk Interface configuration panel. Regardless of the port you choose, the setting will take effect globally.
7. Edit the value in the ARP Age field to the new ARP age. You can enter a value from 1 – 240 minutes. The default is 10 minutes.
8. Click the Apply button to apply the change to the device's running-config file.
9. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

AppleTalk ARP Retransmit Count

You can modify the maximum number of times that a packet will be sent out for ARP cache informational updates. The packet is sent out to the maximum amount defined, until the information is received.

If no response is received before the count number expires, the routing switch does not send any additional packets. Possible values are from 1 – 10. The default is 2.

EXAMPLE:

To modify the number of times packet requests are sent out for ARP updates from the default (2) to 8, use one of the following methods.

USING THE CLI

```
HP9300(config)# appletalk arp retransmit-count 8
```

Syntax: appletalk arp retransmit-count <1-10>

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the General link to display the AppleTalk configuration panel.
5. Enter a new ARP retransmit count from 1 – 10 in the ARP Retransmit Count field. For this example, enter 8.
6. Click the Apply button to apply the change to the device's running-config file.
7. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory

NOTE: You also can access the dialog for saving configuration changes by clicking on Command in the tree view, then clicking on Save to Flash.

AppleTalk ARP Retransmit Interval

You can modify the interval between the transmission of ARP packets. Possible values are from 1 – 120 seconds. The default is 1 second.

EXAMPLE:

To modify the ARP retransmission interval from the default value (1) to 15 seconds, use one of the following methods.

USING THE CLI

```
HP9300(config)# appletalk arp retransmit-interval 15
```

Syntax: appletalk arp retransmit-interval <1-120>

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the General link to display the AppleTalk configuration panel.
5. Enter a new AppleTalk ARP Retransmit Interval from 1 – 120 in the ARP Retransmit Interval field. For this example, enter 15.
6. Click the Apply button to apply the change to the device's running-config file.
7. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

AppleTalk Glean Packets

When you enable the glean packet parameter on an AppleTalk router, the router tries to learn the MAC address from the packet instead of sending out an ARP request. The glean packets parameter is disabled by default.

EXAMPLE:

To enable glean packets, use one of the following methods.

USING THE CLI

```
HP9300(config)# appletalk glean-packets
```

Syntax: appletalk glean-packets

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the General link to display the AppleTalk configuration panel.
5. Select Enable next to Glean Packet.
6. Click the Apply button to apply the change to the device's running-config file.
7. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

AppleTalk QoS Socket

The user can use the QoS socket parameter to assign a higher priority to specific AppleTalk sockets. Possible values are 0 (normal priority) to 7 (highest priority). The default value for all sockets is 0.

For more information and procedures, see "Assigning AppleTalk Sockets to Priority Queues" on page 2-25.

AppleTalk RTMP Update Interval

You can change the RTMP update interval to modify how often the routing switch sends RTMP updates on AppleTalk interfaces. Possible values are from 1 – 3600 seconds. The default is 10 seconds.

EXAMPLE:

To change the value to 50 seconds from a default value of 10 seconds, use one of the following methods.

USING THE CLI

```
HP9300(config)# appletalk rtmp-update-interval 50
```

Syntax: appletalk rtmp-update-interval <1-3600>

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the General link to display the AppleTalk configuration panel.
5. Enter a new RTMP update interval from 1 – 3600 in the RTMP Update Interval field. For this example, enter 50.
6. Click the Apply button to apply the change to the device's running-config file.
7. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

AppleTalk ZIP Query Interval

You can change the ZIP query interval to modify how often the routing switch retransmits ZIP query messages. Possible values are from 1 – 1000 seconds. The default is 10 seconds.

EXAMPLE:

To change the ZIP query interval to 30 seconds from the default value (10 seconds), use one of the following methods.

USING THE CLI

```
HP9300(config)# appletalk zip-query-interval 30
```

Syntax: appletalk zip-query <1-1000>

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access.
2. Click on the plus sign next to Configure in the tree view to expand the list of configuration options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Click on the General link to display the AppleTalk configuration panel.
5. Enter a new ZIP query interval from 1 – 1000 in the ZIP Query Interval field. For this example, enter 30.
6. Click the Apply button to apply the change to the device's running-config file.
7. Select the Save link at the bottom of the dialog, then select Yes when prompted to save the configuration change to the startup-config file on the device's flash memory.

Displaying AppleTalk Information

You can use the CLI or the Web management interface to display configuration information and statistics for AppleTalk.

USING THE CLI

When using the CLI, you can access information about AppleTalk by entering the following **show** commands.

NOTE: For more details on these commands, see the *Command Line Interface Reference*.

- **show appletalk arp cache**: Displays the ARP table for the AppleTalk routing protocol.
- **show appletalk forward cache**: Displays the forwarding table for the AppleTalk routing protocol.
- **show appletalk routing table**: Displays the global configuration parameters for the AppleTalk routing protocol.
- **show appletalk zone table**: Displays the network numbers and zones learned on the network.
- **show appletalk interface**: Displays the AppleTalk configuration for an individual interface or all interfaces.
- **show appletalk interface zone**: Displays the zones defined on all AppleTalk interfaces.
- **show appletalk route**: Displays the AppleTalk routing table.
- **show appletalk traffic**: Displays statistical information for RTMP, ZIP, AEP, DDP and AARP packets.

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-only or read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Monitor in the tree view to display the monitoring options.
3. Click on the plus sign next to AppleTalk in the tree view to expand the list of AppleTalk option links.
4. Select one of the following links:
   - The ARP Cache link
   - The Forward Cache link
   - The Interface link
   - The Interface Zone link
   - The Routing Table link
   - The Traffic link
   - The Zone Table link

Clearing AppleTalk Information

USING THE CLI

When using the CLI, you can clear AppleTalk data by entering the following CLI commands:

- **clear appletalk arp cache**: Erases all data in the AppleTalk ARP table, as displayed by the **show appletalk arp** command.
- **clear appletalk forward cache**: Erases all learned data from non-local networks that is currently resident in the AppleTalk cache (forwarding table), as displayed by the **show appletalk cache** command.
- **clear appletalk route**: Erases all learned routes and zones (non-local routes and zones) currently resident in the AppleTalk routing table, as displayed by the show appletalk route command.
- **clear appletalk statistics**: Erases all RTMP, ZIP, AEP, DDP, and AARP statistics for the routing switch. You can display a summary of the statistics that will be erased by entering the **show appletalk traffic** command.

NOTE: For more details on these commands, see the *Command Line Interface Reference*.

USING THE WEB MANAGEMENT INTERFACE

1. Log on to the device using a valid user name and password for read-write access. The System configuration dialog is displayed.
2. Click on the plus sign next to Command in the tree view to expand the list of command options.
3. Click on the Clear link to display the Clear panel.
4. Select one of the following:
   - AppleTalk ARP Cache
   - AppleTalk Forward Cache
   - AppleTalk Route
   - AppleTalk Statistics
5. Click the Apply button to implement the change.