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# Chapter 13

## Configuring AppleTalk

This chapter provides details on how to configure AppleTalk on HP routing switches using the CLI and the Web management interface.

A summary of all CLI commands, noting syntax along with possible values and default values, can also be found in **Appendix B**.

### Overview of AppleTalk

AppleTalk inter-networks are built upon distinct networks interconnected by routers such as HP's 9304M and 9308M. 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 refers to 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.

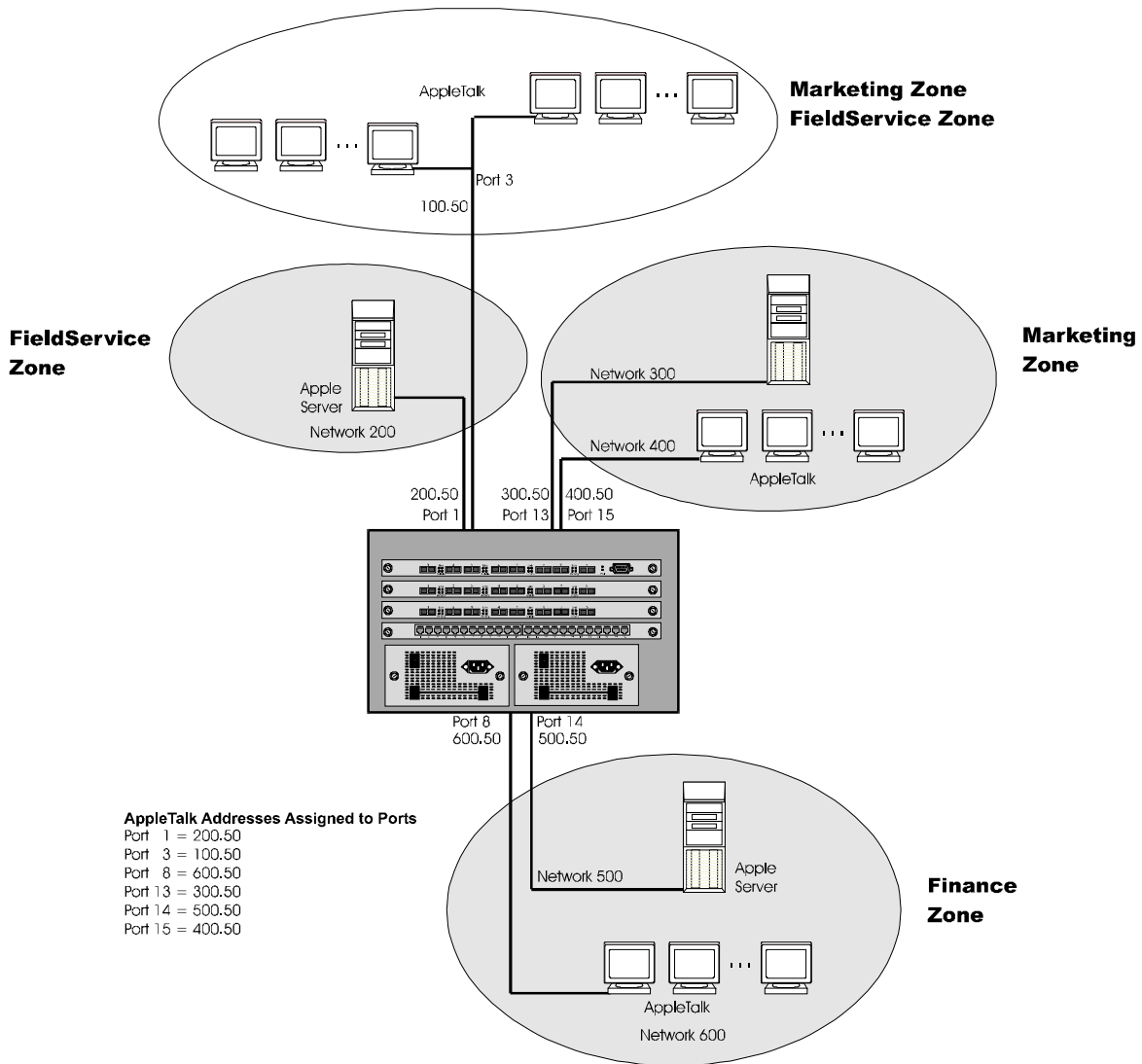
An AppleTalk address is comprised of a 16-bit network number and an 8-bit node number. For example, 500.50 refers to node 50 on network 500.

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 seen in **Figure 13.1**. 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 will automatically be assigned numbers in that range.

Defining zones for certain workstations and resources on the network allows the user 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 explained further in the following sections of filtering.



**Figure 13.1 AppleTalk Zones defined within and across AppleTalk networks**

### Zone Filtering

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

By eliminating the need to enter separate numbers for each device or network segment, overall system administration of an AppleTalk network is improved. For example, if a new device such as a server or laser printer is added to an existing zone, all users in that zone will 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

The user can also 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 will be removed from the RTMP packet before it is transmitted out of the interface.

The user can define deny or permit zone and network filters for AppleTalk on an interface basis. Up to 32 filters can be defined for routers operating with 32MB of memory. For those systems with 8MB of memory installed up to 16 filters can be defined.

## Seed and Non-Seed Routers

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

When an AppleTalk router is configured as a seed router, the user defines cable-range, address and zone names for the router. When configured as a non-seed router, the router will learn its parameters from another seed AppleTalk router on the same segment.

## AppleTalk Components Supported on HP Routing Switches

HP routing switches support Phase II of AppleTalk routing.

A description of the AppleTalk protocol components supported is provided in the following sections.

### 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 RTMP routing table to stay current on the network topology.

### Transport Layer Support

#### ***Routing Table Maintenance Protocol***

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

For HP routing switches, the periodic updates are sent out every 10 seconds by default.

#### ***AppleTalk Echo Protocol (AEP)***

AEP is used to check connectivity to another device on the network.

#### ***AppleTalk Transaction Protocol (ATP)***

ATP facilitates transaction-based applications. It is designed to support 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 HP 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. It 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 enabled as are configuration changes.

## Configuring AppleTalk Routing

To begin using AppleTalk on an HP routing switch, the user must do the following:

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

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**NOTE:** When configured as a seed router, the user defines cable-range, address and zone names for the router. When configured as a non-seed router, the router will learn its parameters from another AppleTalk router on the same segment.

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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 router, the user would enter the following:

#### USING THE CLI

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

**syntax:** router appletalk

---

**NOTE:** When AppleTalk is enabled on an HP routing switch, there is no need to reset the system. The protocol will be activated as soon as it is enabled.

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#### USING THE WEB MANAGEMENT INTERFACE

1. Enable **AppleTalk** on the System configuration sheet.
2. Select the **apply** button to assign the changes.
3. Select the [save to flash](#) link from the main menu to save the changes to flash.

---

**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. A description of those parameters and their possible values is summarized in the **Modifying AppleTalk Global Parameters** section later in this chapter.

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### Configuring a Seed AppleTalk Router

When an AppleTalk router is configured as a seed router, the user defines the cable range, AppleTalk address and zone names for the router interfaces.

To configure a seed router, the user follows these steps:

1. Configure the cable range (i.e. 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.

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

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## USING THE CLI

This section addresses enabling AppleTalk on an interface, defining a cable range for that interface and assigning network addresses and zones as well.

### Enabling AppleTalk Routing on an Interface

To enable AppleTalk routing on an interface (e.g. 3 on slot 2 of the chassis), the user would enter the following:

```
HP9300(config-if-2/3)# appletalk routing
```

### Configuring Cable Range for an Interface

To support network numbers of between 10 and 50 on slot 2, interface 3 of the chassis, the user would enter the following:

```
HP9300(config)# int e 2/3
HP9300(config-if-2/3)# 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 slot 2, interface 3 of the chassis, the user would enter the following:

```
HP9300(config-if-2/3)# appletalk address 10.5
```

**syntax:** appletalk cable <network number | network number - network number>

### Configuring Zones on an Interface

To assign sales, marketing and finance zones for slot 2, interface 3 of the chassis, the user would enter the following:

```
HP9300(config-if-2/3)# appletalk zone sales
HP9300(config-if-2/3)# appletalk zone marketing
HP9300(config-if-2/3)# appletalk zone finance
```

---

**NOTE:** HP routing switches can support up to 1,536 zones per system and up to 64 per interface.

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### Saving Configuration Changes to the Interface

Once the cable range, network address, zone(s) and AppleTalk routing are configured for the interface, the user saves the configuration to flash.

```
HP9300(config-if-2/3)# write mem
HP9300(config-if-2/3)# end
HP9300# reload
```

---

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

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## USING THE WEB MANAGEMENT INTERFACE

This section addresses enabling AppleTalk on the router as well as configuring the cable range, network address and zones for an AppleTalk seed router.

To enable AppleTalk on the router, the user would follow these steps:

1. Select the [system](#) link from the main menu.
2. Enable the **AppleTalk** routing protocol.
3. Select the **apply** button to assign the changes.

To configure an interface as a seed router, the user would follow these steps:

1. Select [AppleTalk interface](#) from the AppleTalk configuration sheet and the panel shown in **Figure 13.2** will appear.

---

**NOTE:** If at least one AppleTalk is defined on the system, a summary panel will appear first. The user will then need to select the [configure AppleTalk interface](#) link.

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2. Select the **slot/port** to be configured from the pull down menu(s).
3. Modify the **ARP age** value from the default value of 10 minutes, if desired. Possible values are 1 to 240 minutes.
4. Enable the **routing** option.
5. 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**.
6. Enter the AppleTalk **address** for the port. It should be a two decimal number, and the first number should be within the network range entered in step 5 above.
7. Enter a **zone name** for the port.

---

**NOTE:** To enter multiple zone names for a port, the user would select the [configure zone name](#) link found at the bottom of the entry panel. A separate entry panel for that interface will appear. The user should then 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 13.3**).

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**NOTE:** If no values other than zero are entered into the network range or address field, and the zone name field is empty, the router will be a non-seed router by default.

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8. Select the **apply** button to assign the changes.

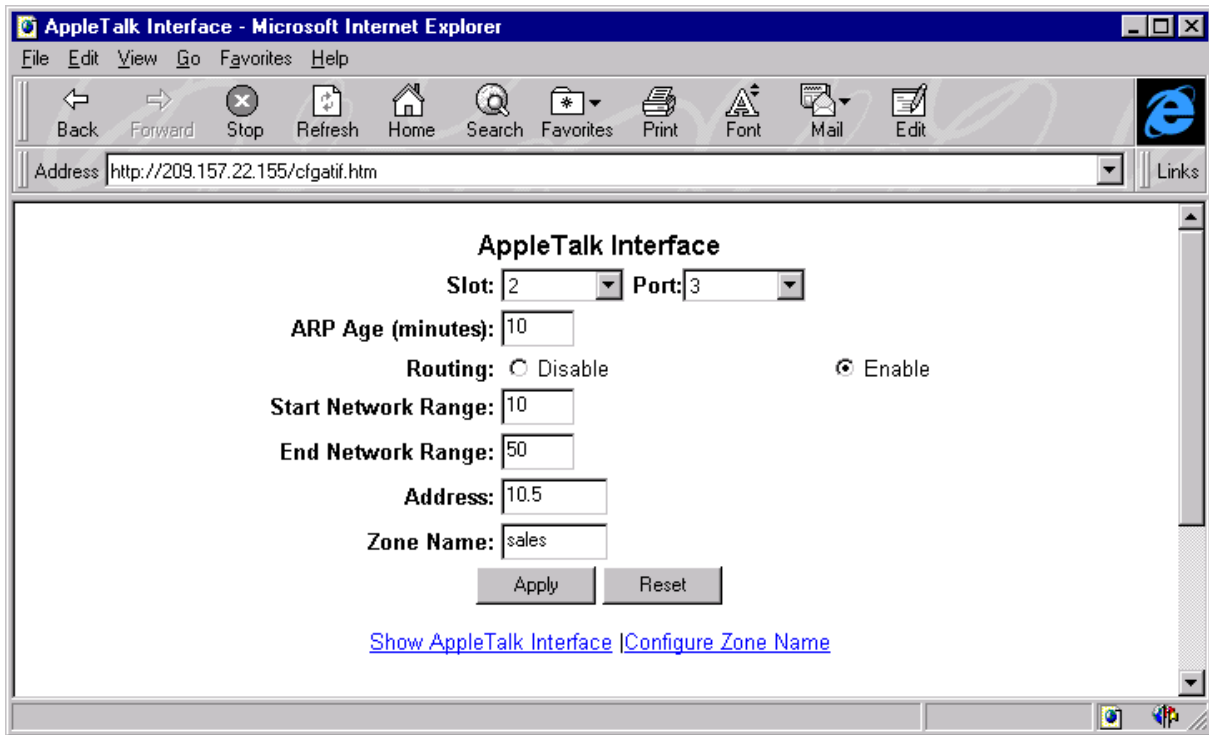


Figure 13.2 Configuring an AppleTalk interface as a seed router

## Configuring a Non-seed AppleTalk Router

This section provides an overview of configuring a non-seed router using the CLI or the Web management interface.

To configure a non-seed router, the user would do the following:

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

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

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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 router, the user would do the following:

### USING THE CLI

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

### USING THE WEB MANAGEMENT INTERFACE

1. Select the [system](#) link from the main menu.
2. Enable **AppleTalk**.
3. Select the **apply** button to assign the change.

## Enable AppleTalk Routing on an Interface

To enable AppleTalk on an interface (e.g. interface 5 on slot 2), the user would do the following:

### USING THE CLI

```
HP9300(config)# int e 2/5
HP9300(config-if-2/5)# appletalk routing
HP9300(config-if-2/5)# 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 information is entered into these fields, the router is a seed router.

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**NOTE:** Once configured as a non-seed router, the router 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 router.

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## USING THE WEB MANAGEMENT INTERFACE

To configure an interface as a non-seed router:

1. Select AppleTalk interface from the AppleTalk configuration sheet. The entry panel shown in **Figure 13.4** will appear.
2. Select the **slot/port** to be configured from the pull down menus.
3. Modify the **ARP age** value from the default value of 10 minutes, if desired. Possible values are 1 to 240 minutes.
4. Enable the **routing** option.
5. Select the **apply** button to assign the changes.

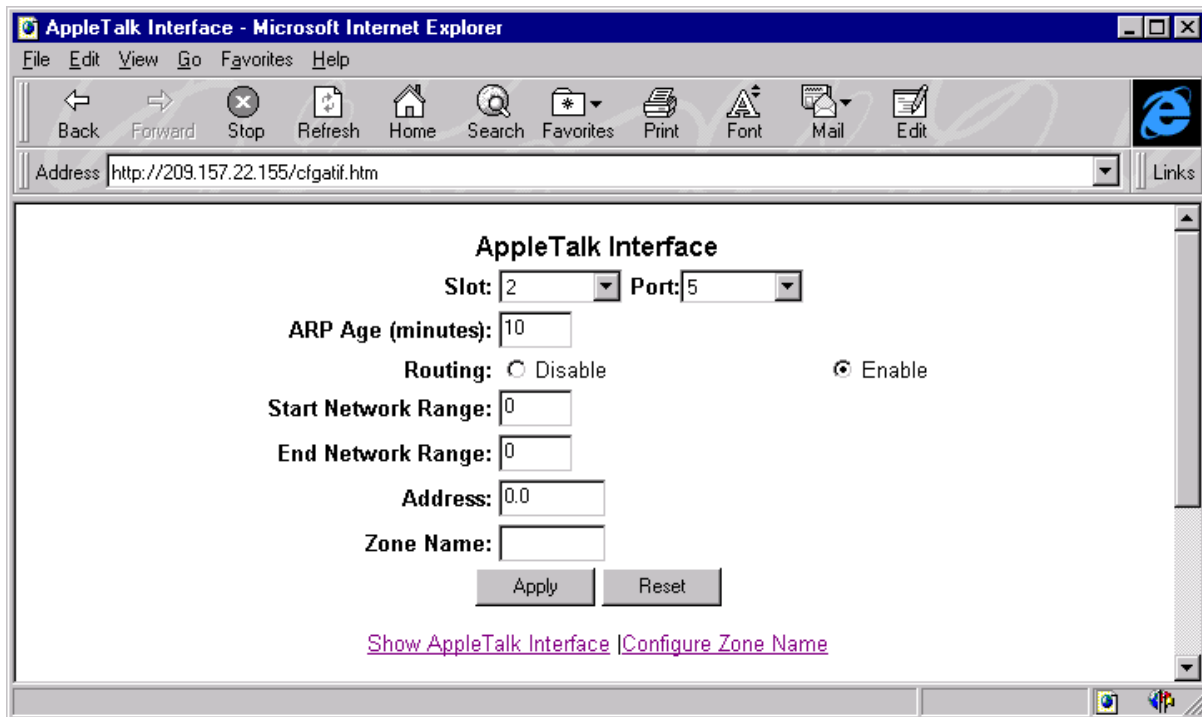


Figure 13.3 Configuring an AppleTalk interface as a non-seed router

## Modifying AppleTalk Interface Configurations

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

EXAMPLE: The user wants to expand the network numbers supported on interface 3, slot 2 of a module from 10 to 50 to 10 to 100. Additionally, the user wants to add engineering and human resource zones to the interface. To do so, the user would enter the following:

### USING THE CLI

```
HP9300(config)# int e 2/3
HP9300(config-if-2/3)# no appletalk routing
HP9300(config-if-2/3)# appletalk cable 10-100
HP9300(config-if-2/3)# appletalk zone engineering
HP9300(config-if-2/3)# appletalk zone humanresource
HP9300(config-if-2/3)# appletalk routing
HP9300(config-if-2/3)# end
HP9300# write mem
```

### USING THE WEB MANAGEMENT INTERFACE

1. Select [AppleTalk interface](#) from the AppleTalk configuration sheet.
2. Select the **slot/port** to be configured from the pull down menus.
3. Disable the **routing** option.
4. Modify 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**, if desired. In this example, the user would enter 10 and 100, respectively.
5. Enter the AppleTalk **address** for the port. It should be a two decimal number, and the first number should be within the network range entered in step 4 above.
6. Enter a new zone name or modify the existing zone name for the port, if desired. In this example, the user would enter engineering and then add the humanresource zone by selecting the [configure zone name](#) link found at the bottom of the entry panel. The [configure zone name](#) link is used when assigning multiple zone names at one time.
7. Enable the **routing** option.
8. Select the **apply** button to assign the changes.

## Filtering AppleTalk Zones and Networks

### Defining Zone Filters

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

By eliminating the need to enter separate numbers for each device or network segment, overall system administration of an AppleTalk network is improved. For example, if a new device such as a server or laser printer is added to an existing zone, all users in that zone will 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.

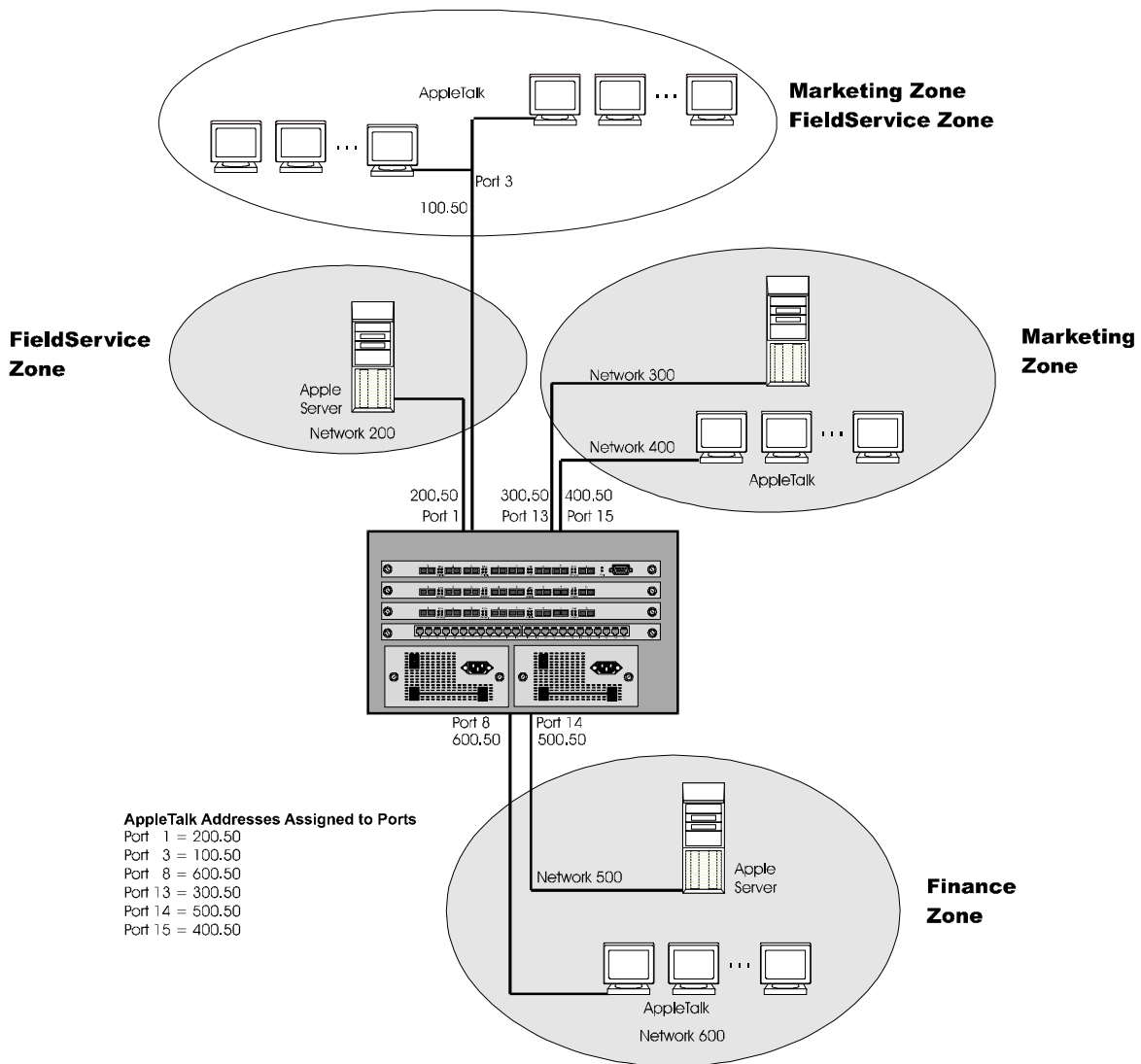


Figure 13.4 AppleTalk zones in a network

EXAMPLE: A user wants to deny access to the Finance server to users within the Marketing and Field Service zones on the network, as shown in **Figure 13.5**. To define this filter, the user would enter the following:

#### USING THE CLI

```
HP9300(config)# interface e 2/1
HP9300(config-if-2/1)# appletalk deny zone finance
HP9300(config-if-2/1)# int e 2/3
HP9300(config-if-2/3)# appletalk deny zone finance
HP9300(config-if-2/3)# int e 2/13
HP9300(config-if-2/13)# appletalk deny zone finance
HP9300(config-if-2/13)# int e 2/15
HP9300(config-if-2/15)# appletalk deny zone finance
```

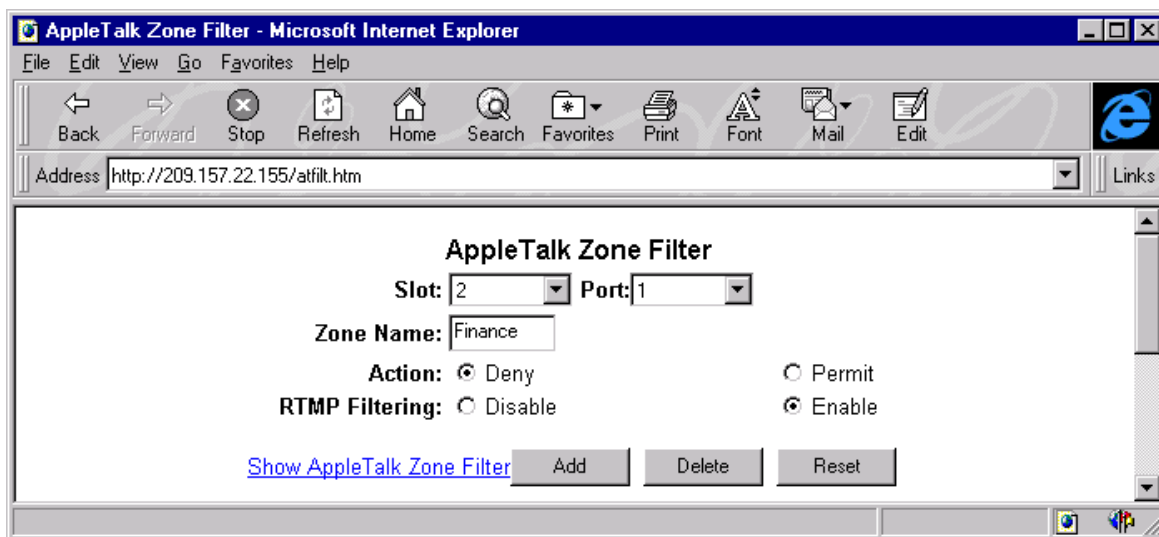
#### USING THE WEB MANAGEMENT INTERFACE

1. Select zone filter from the AppleTalk configuration sheet. The panel shown in **Figure 13.5** will appear.
2. Select the interface for which a zone filter is to be defined, from the **slot/port** pull down menus. In this example, a zone filter should be defined for interfaces 1, 3, 13 and 15, all of which have membership in either or both of the Marketing and Field Service zones.
3. Enter the name of the zone to which access is to be permitted or denied. In this case, enter Finance.
4. Select either **deny** or **permit**. Deny would be selected in this example for interfaces 1, 3, 13 and 15.
5. Enable **RTMP filtering** to filter on a network basis. When this filter is enabled on an interface, the denied network numbers will be removed from the RTMP packet before it is transmitted out of the interface. In this example, RTMP filtering is desired, so this option is enabled.
6. Select the **add** button to assign the filter.

---

**NOTE:** To view a summary of all the defined zone filters, select the show AppleTalk filter link seen on the AppleTalk zone filter entry panel.

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**Figure 13.5** AppleTalk zone and network filter entry panel

## Defining Additional Zone Filters

When defining AppleTalk zone filters, the user 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, the user does 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: Sales, Human Resources (HR), Engineering and Training zones will be added to the network in the next month. The system administrator knows in advance that the only other zone that will be allowed access to the Finance zone is the HR zone.

Given that, the system administrator can write **permit zone filters (Figure 13.7)** for ports 8 and 14 that will allow the HR zone to have access to the finance zone and deny access to all others with a **deny additional zone filter (Figure 13.7)**. 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 8 and 14 on slot 2 of the system, the user would do the following:

```
HP9300(config)# interface e 2/8
HP9300(config-if-2/8)# no appletalk routing
HP9300(config-if-2/8)# appletalk permit zone HR
HP9300(config-if-2/8)# appletalk routing
HP9300(config-if-2/8)# int e 14
HP9300(config-if-2/14)# no appletalk routing
HP9300(config-if-2/14)# appletalk permit zone HR
HP9300(config-if-2/14)# appletalk routing
HP9300(config-if-2/14)# write mem
```

---

**NOTE:** The user 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.

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### USING THE WEB MANAGEMENT INTERFACE

To define the permit and deny filters discussed above, the user would do the following:

1. Select **zone filter** from the AppleTalk configuration sheet.
2. Select the interface for which the zone filter is to be defined from the **slot/port** pull down menus. In this example, a permit zone filter for HR should be defined for interfaces 10 and 14, which have membership in the Finance zone.
3. Enter the **zone name** to which access is to be permitted or denied. In this case, it would be HR.
4. Select either **deny** or **permit**. Permit would be selected in this example for interfaces 10 and 14 of a module on slot 2.
5. Enable **RTMP filtering** to also filter on a network basis.

---

**NOTE:** When this filter is enabled on an interface, the denied network numbers will be 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.

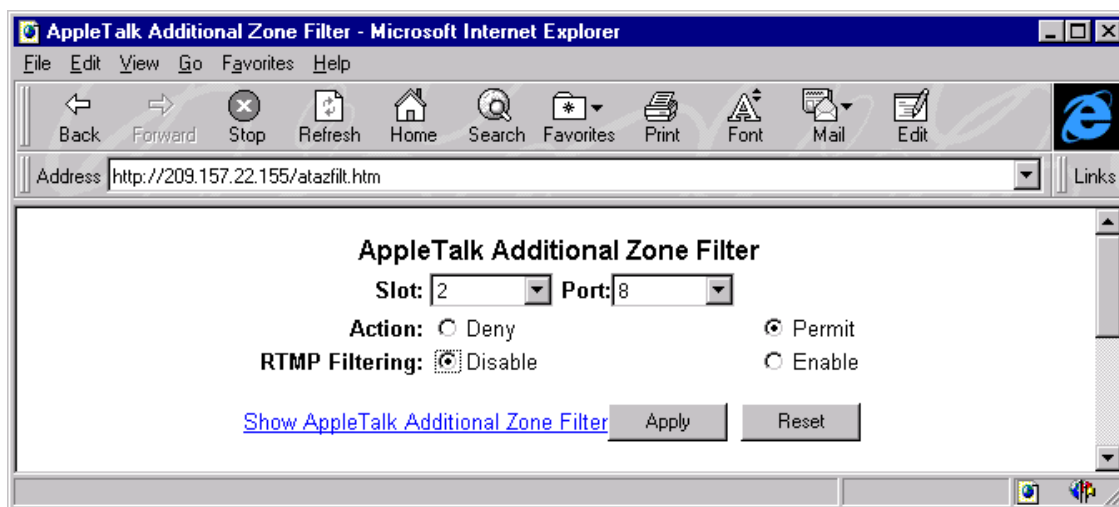
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6. Select the **add** button to assign the filter.
7. Select additional zone filter from the AppleTalk configuration sheet and the panel shown in **Figure 13.6** will appear.
8. Select the interface for which the zone filter is to be defined, from the **slot/port** pull down menus. In this example, a deny zone filter for interfaces 8 and 14 should be defined to deny all other zones not specified in the permit zone filter (steps 1 through 6 above).
9. Select either **deny** or **permit**. Deny would be configured for interfaces 8 and 14 in this example.
10. Disable **RTMP filtering**.
11. Select the **apply** button to assign the additional zone filter.

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**NOTE:** To view a summary of the newly defined zone filters, select the show AppleTalk additional zone filter link seen on the Additional Zone filter entry panel.

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**Figure 13.6** Defining an AppleTalk permit filter for port 8

## 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 3 (**Figure 13.5**), the user would enter the following:

### USING THE CLI

```
HP9300(config-if-3)# appletalk deny zone finance rtmp-filtering
```

### USING THE WEB MANAGEMENT INTERFACE

To enable RTMP filtering on an interface, the user would define the filter as usual and then enable the RTMP filtering option on the AppleTalk zone filter entry panel shown in **Figure 13.7**.

## Routing between AppleTalk VLANs Using Virtual Interfaces

In addition to supporting AppleTalk VLANs, HP routing switches support routing between AppleTalk VLANs via virtual interfaces. These virtual interfaces are logical interfaces that provide VLANs access to the router functions. 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 1: In **Figure 13.8**, AppleTalk traffic is terminating on ports 1 through 4. The user wishes to group all of these interfaces into an AppleTalk protocol VLAN and route traffic to VLANs on other routers.

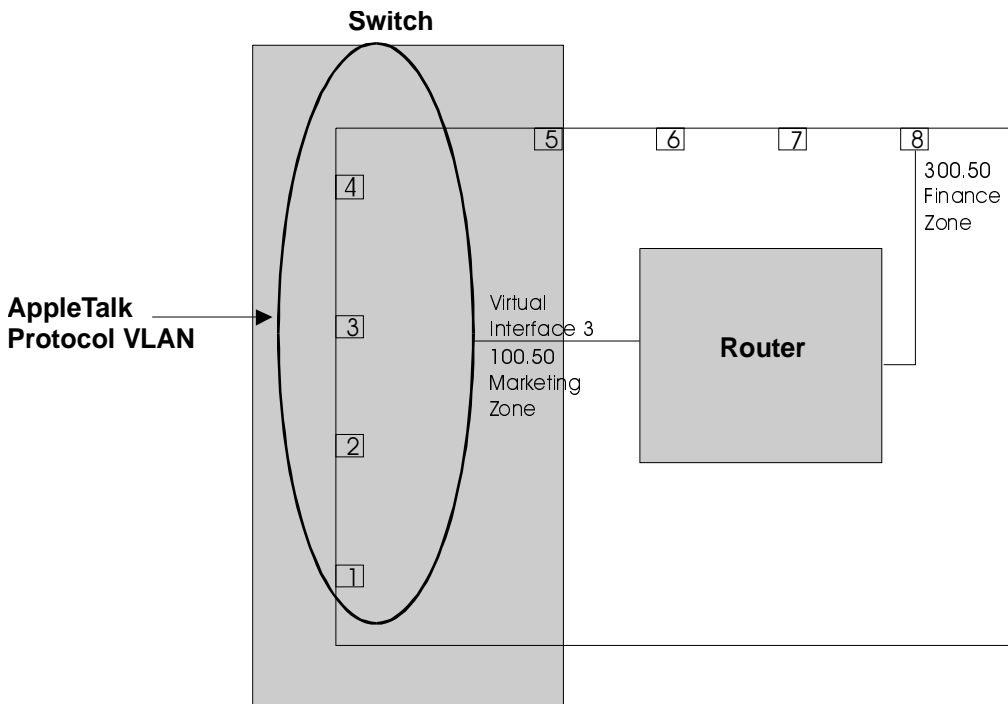
To do so, the user would:

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

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**NOTE:** By supporting assignment of VLANs on interfaces, the HP9300 is functioning as a virtual switch.

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**Figure 13.7** Virtual interface provides a routing interface to an AppleTalk VLAN

## USING THE CLI

To configure the AppleTalk VLAN as seen in **Figure 13.8**, the user would enter the following commands:

```
HP9300 (config)# router appletalk
HP9300 (config)# vlan 1
HP9300 (config-vlan-1)# atalk-proto
HP9300 (config-vlan-ataalk-proto)# static e 2/1 to 2/4
HP9300 (config-vlan-ataalk-proto)# router-interface ve 3
```

To configure the physical interface (e8) to which all outgoing traffic will be forwarded, the user would enter the following commands:

```
HP9300 (config-vlan-ataalk-proto)# int e 2/8
HP9300 (config-if-8)# appletalk address 300.50
HP9300 (config-if-8)# appletalk cable-range 300 - 300
HP9300 (config-if-8)# appletalk routing
HP9300 (config-if-8)# appletalk zone-name Finance
```

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

```
HP9300 (config-if-8)# int ve 3
HP9300 (config-vif-5)# appletalk address 100.50
HP9300 (config-vif-5)# appletalk cable-range 100 - 100
HP9300 (config-vif-5)# appletalk routing
HP9300 (config-vif-5)# appletalk zone-name Marketing
```

## USING THE WEB MANAGEMENT INTERFACE

To configure the AppleTalk VLAN shown in **Figure 13.8**, the user would do the following:

1. Enable **L3 protocol VLANs** on the System configuration sheet, if not already enabled.
2. Select the **VLAN** link from the main menu. The VLAN configuration sheet will appear.
3. Select the **protocol VLAN** link from the VLAN configuration sheet. The protocol VLAN entry panel shown in **Figure 13.9** will appear.
4. Select **AppleTalk** as the protocol type.
5. Assign ports 1, 2, 3 and 4 as **static**.
6. Select v3 to be the virtual **router interface** for the VLAN.
7. Select the **add** button to create the VLAN.

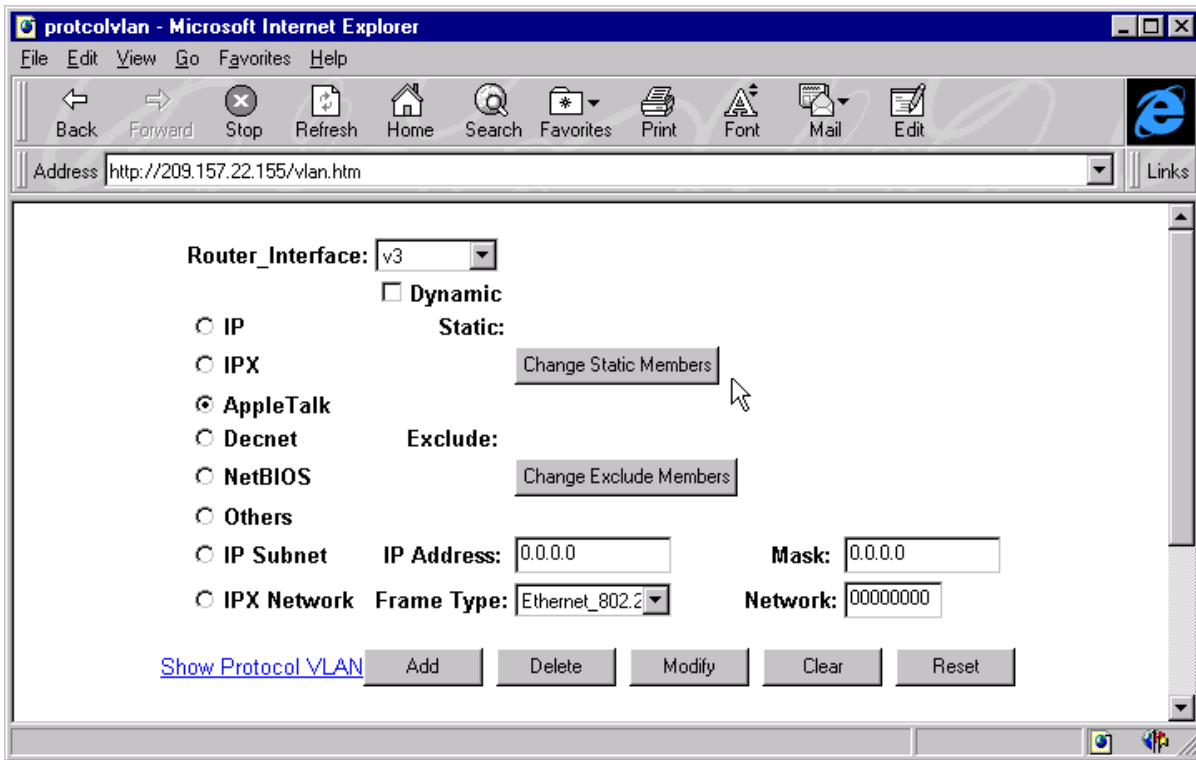


Figure 13.8 Defining physical and virtual interfaces for an AppleTalk protocol VLAN (1 of 2)

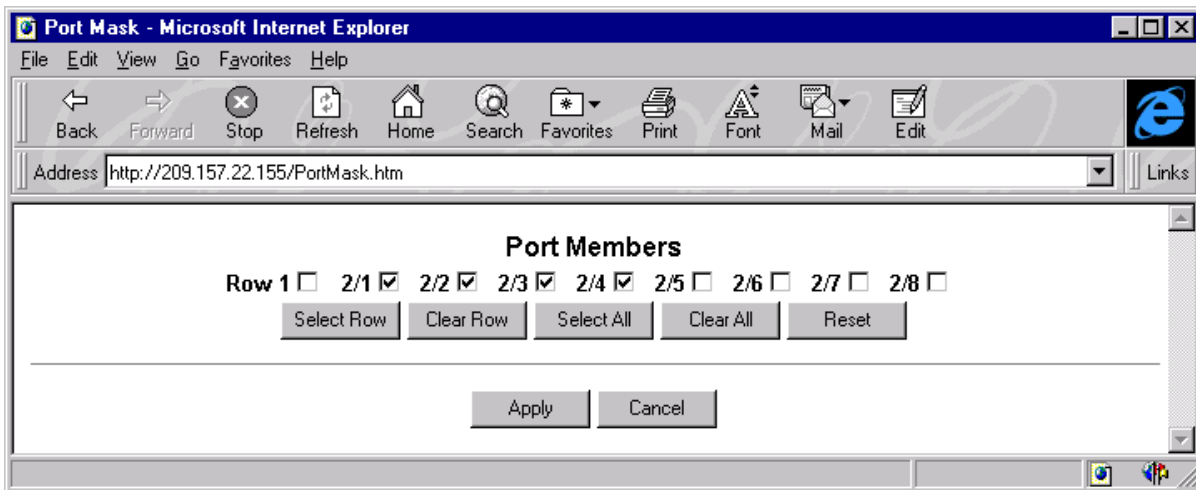


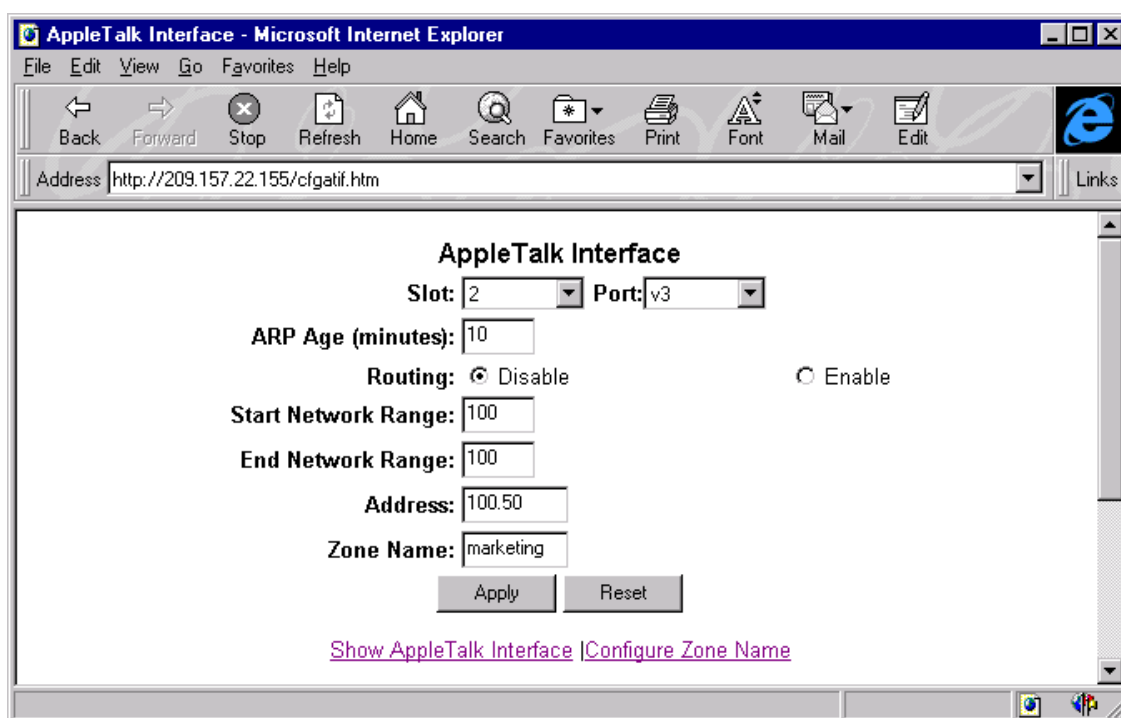
Figure 13.9 Defining physical and virtual interfaces for an AppleTalk protocol VLAN (1 of 2)

### Configuring the Virtual Router Interface

Once a router interface is assigned to a VLAN, it must also be configured with a network range, an AppleTalk address and a zone name. The same will also need to be done for any physical interface that will be forwarding routes to remote AppleTalk VLANs.

To configure virtual router interface 3 shown in **Figure 13.8**, the user would do the following:

1. Select the [AppleTalk](#) link from the menu. The AppleTalk configuration sheet will appear.
2. Select the [AppleTalk interface](#) link on the AppleTalk configuration sheet. A summary panel of all configured interfaces will appear.
3. Select the **modify** button next to the **v3** entry. The AppleTalk interface panel will appear as seen in **Figure 13.10**.
4. Modify the **ARP age** value, if desired.
5. Enable **routing**.
6. Enter 100 in the **start network range** field.
7. Enter 100 in the **end network range** field.
8. Enter 100.50 as the AppleTalk **address**.
9. Enter marketing in the **zone name** field.
10. Select **apply** to assign the changes for virtual interface 3.



**Figure 13.10** AppleTalk interface configuration panel for virtual interface, v3

### Configuring a Physical Interface for Remote Access

To support routing between the local AppleTalk VLAN and remote AppleTalk VLANs, a physical interface that will forward outgoing traffic should be defined.

To configure interface 8 as shown in **Figure 13.8**, the user would do the following:

1. Select the [AppleTalk Interface](#) link from the AppleTalk configuration sheet. A summary panel of all interfaces and their configurations will appear.
2. Select the **modify** button next to the entry for port 8. The AppleTalk interface entry panel for interface 8 shown in **Figure 13.11** will appear.
3. Modify the ARP age default value of 10 minutes if desired. Possible values are 1 to 240 minutes.

4. Enable **routing**.
5. Enter 300 as the **start** and **end network range**.
6. Enter 300.50, the AppleTalk **address** for the interface, in the address field.
7. Enter finance in the **zone name** field.
8. Select the **apply** button to assign the changes.

**NOTE:** Should the user modify the configuration after assigning the changes, he or she must first disable routing on an interface before entering the changes and then re-enable routing when the changes are complete.

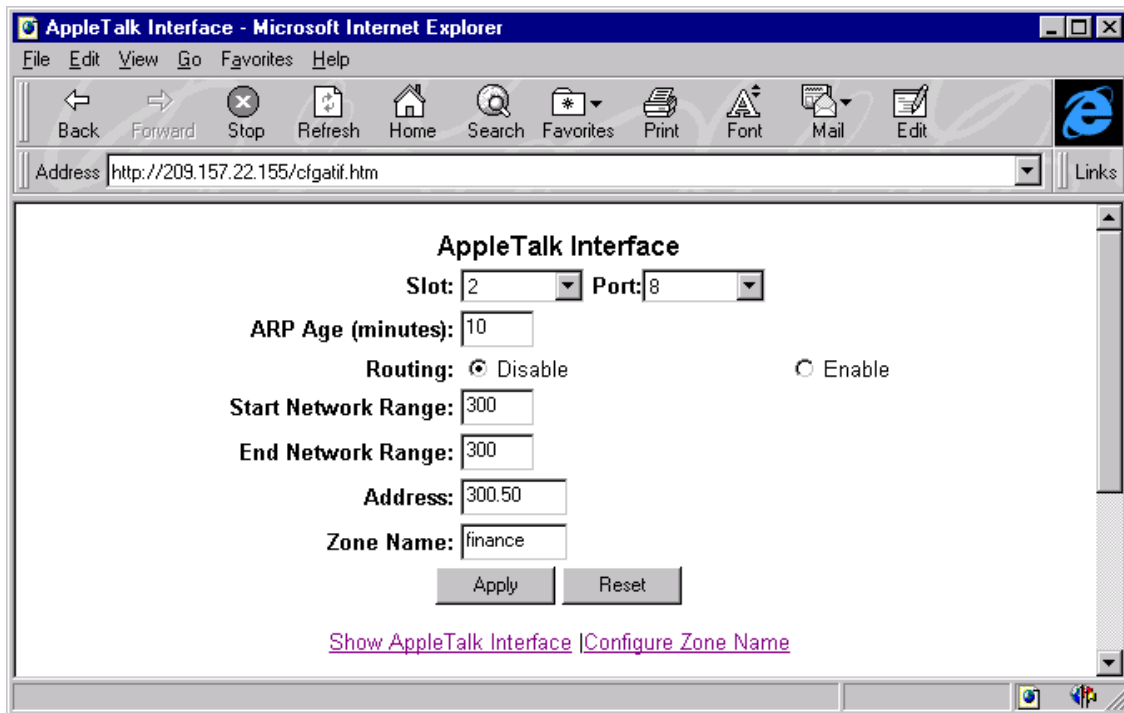


Figure 13.11 AppleTalk interface entry panel for physical interface 8

## Routing between Protocol VLANs within Port-based VLANs

In **Figure 13.12**, AppleTalk traffic is terminating on ports 1 through 4 on two separate networks, 100 and 200. The user wishes to assign these networks to two separate VLANs but would also like to route traffic between the two VLANs and externally to the router.

To get the above configuration the user would do the following:

1. Create port-based VLANs 2 and 3.

---

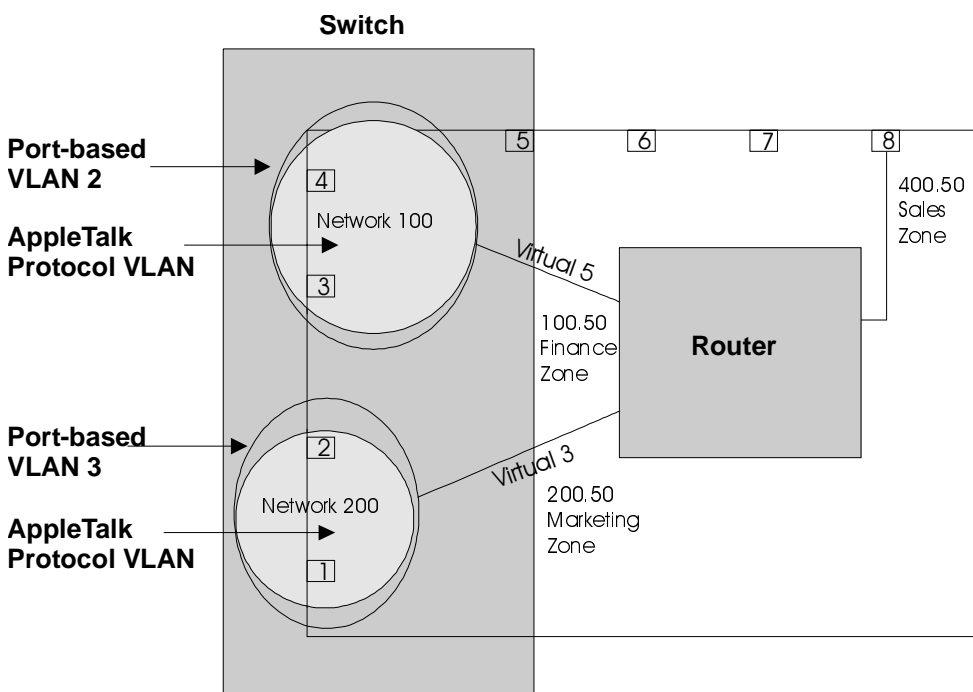
**NOTE:** Whenever port and protocol VLANs operate on a system together, a port-based VLAN must first be created before a protocol VLAN can be created and overlaid on a port-based VLAN. Protocol VLANs must always be within the boundaries of a port-based domain.

---

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 steps is described in the following sections.

---



**Figure 13.12 Routing between AppleTalk VLANs**

### USING THE CLI

```
HP9300 (config)# vlan 2 by port
HP9300 (config-vlan-2)# untag e 2/3 to 2/4
HP9300 (config-vlan-2)# atalk-PROTO
HP9300 (config-vlan-ataK-PROTO)# static e 2/3 to 2/4
HP9300 (config-vlan-ataK-PROTO)# router-interface ve 5
HP9300 (config-vlan-ataK-PROTO)# end
```

```
HP9300(config-vlan-2)# vlan 3 by port
HP9300 (config-vlan-3)# untag e 2/1 to 2/2
HP9300 (config-vlan-3)# atalk-proto
HP9300 (config-vlan-ataalk-proto)# router-interface ve 3
```

To configure the physical interface (e8) to which all outgoing traffic will be forwarded, the user would enter the following commands:

```
HP9300 (config-vlan-ataalk-proto)# int e 2/8
HP9300 (config-if-2/8)# appletalk address 400.50
HP9300 (config-if-2/8)# appletalk cable-range 400 - 400
HP9300 (config-if-2/8)# appletalk routing
HP9300 (config-if-2/8)# appletalk zone-name sales
```

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

```
HP9300 (config-if-2/8)# int ve 5
HP9300 (config-vif-5)# appletalk address 100.50
HP9300 (config-vif-5)# appletalk cable-range 100 - 100
HP9300 (config-vif-5)# appletalk routing
HP9300 (config-vif-5)# appletalk zone-name finance
HP9300 (config-vif-5)# int ve 3
HP9300 (config-vif-3)# appletalk address 200.50
HP9300 (config-vif-3)# appletalk cable-range 200 - 200
HP9300 (config-vif-3)# appletalk routing
HP9300 (config-vif-3)# appletalk zone-name marketing
HP9300 (config-vif-3)# end
HP9300# write mem
```

### USING THE WEB MANAGEMENT INTERFACE

To create port-based VLANs 2 and 3:

1. Verify that both **port-based** and **L3 VLANs** are enabled on the System configuration sheet.
2. Select the VLAN link. The port VLAN configuration sheet (**Figure 13.13**) will appear.

---

**NOTE:** If port or protocol VLANs are already configured on the system, the show port VLAN panel will appear and the user will need to select the add port VLAN link to reach the Port -based VLAN configuration sheet.

---



---

**NOTE:** If any protocol VLANs are defined on the system, they will need to be deleted before any port-based VLANs can be configured. When both port and protocol VLANs are to operate on a system together, port-based VLANs must be defined first.

---

3. Enter the value of 2 into the **VLAN ID** field and enter a name, if desired. Assigning a name for the VLAN is an option, but a VLAN ID must be entered.
4. Select a value between 0 (low priority) and 7 (high priority) from the **QOS** pull down menu. In this example, no change is required, so the default value of 0 remains unchanged.

5. Assign a **router interface** if routing to another port-based VLAN is desired. In this example, a router interface is not assigned to the port-based VLAN but will be assigned at the protocol VLAN level.
6. Select 3 and 4 as **port members**.
7. Select the **add** button to create the port-based VLAN 2.
8. Enter the value of 3 into the **VLAN ID** field and select 1 and 2 as its members.
9. Repeat steps 4 and 5 above.
10. Select the **add** button to create the port-based VLAN 3.

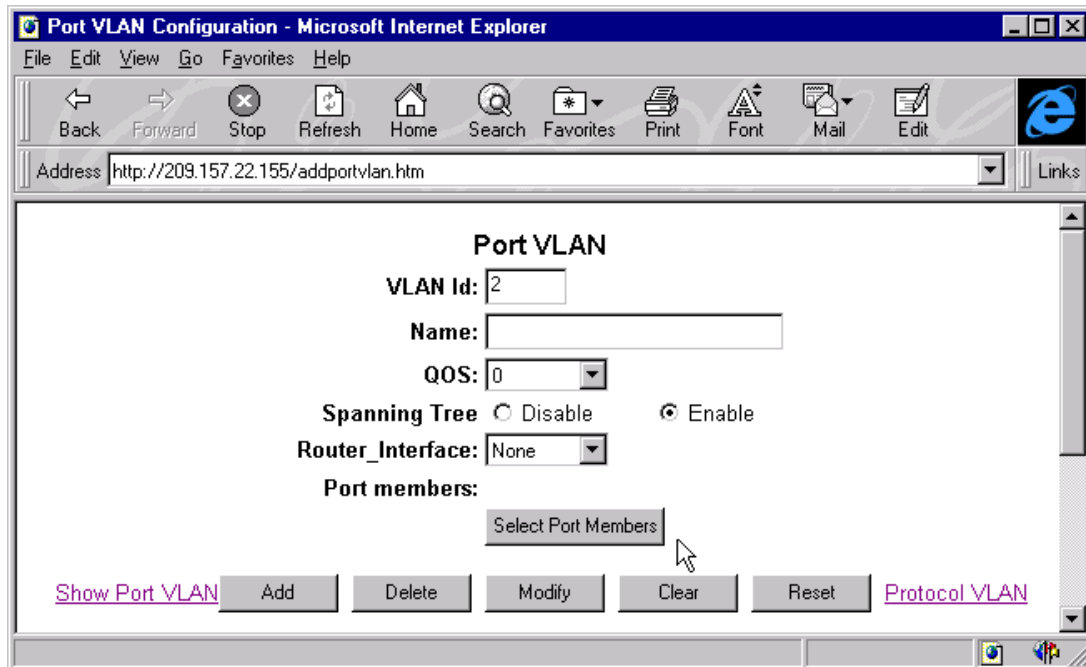


Figure 13.13 Creating port-based VLAN 2

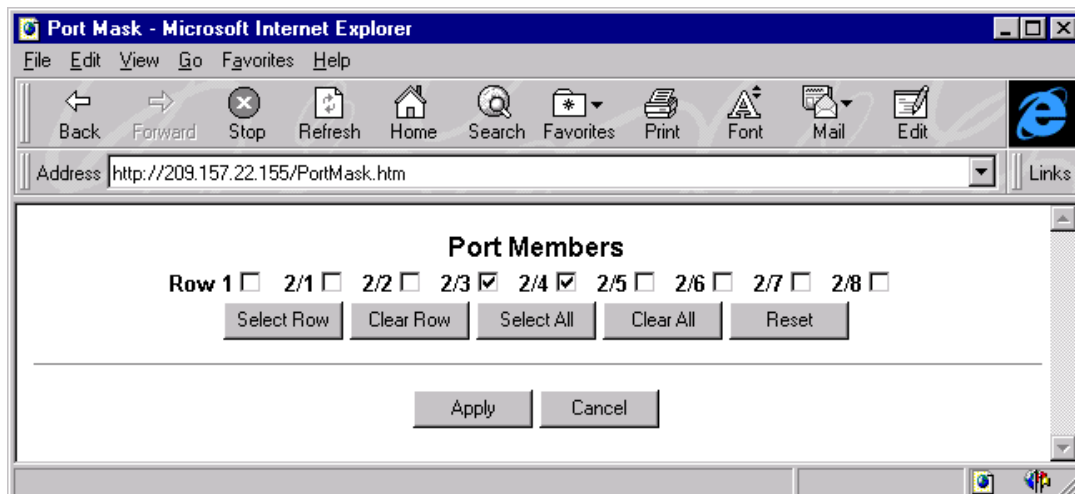


Figure 13.14 Assigning ports to port-based VLAN 2

## Creating AppleTalk Protocol VLANs

Once the port-based VLANs 2 and 3 are created, the AppleTalk protocol VLANs can be assigned. To assign the two protocol VLANs seen in **Figure 13.12**, the user would enter the following:

1. Select the [protocol VLAN](#) link from the port VLAN panel and the protocol VLAN configuration panel will appear, as seen in **Figure 13.15**.
2. Enter 2 into the **VLAN ID** field.
3. Select **AppleTalk** as the protocol.
4. Assign ports 3 and 4 as **static**.
5. Assign v5 as the virtual interface by selecting that value from the **router interface** pull down menu.
6. Select **add** to create an AppleTalk protocol VLAN within port-based VLAN 2.
7. Enter 3 into the **VLAN ID** field.
8. Select **AppleTalk** as the protocol.
9. Assign ports 1 and 2 as **static**.
10. Assign v3 as the virtual interface by selecting that value from the **router interface** pull down menu.
11. Select **add** to create an AppleTalk protocol VLAN within port-based VLAN 3.

**NOTE:** The user is now ready to configure the virtual (v3 and v5) and physical interfaces (port 8).

The screenshot shows a web browser window titled "protocolvlan - Microsoft Internet Explorer". The address bar shows "http://209.157.22.155/pvlan.htm". The main content area displays the configuration for a protocol VLAN. The "VLAN Id:" field contains the number "2". Under "Port\_members:", the "Router\_Interface:" dropdown menu is set to "v5". There are radio buttons for "Dynamic" (unchecked) and "Static" (checked). The "Static:" field contains "2/3,2/4". Below this are radio buttons for "IP", "IPX", "AppleTalk" (selected), "Decnet", "NetBIOS", "Others", "IP Subnet", and "IPX Network". There are buttons for "Change Static Members" and "Change Exclude Members". At the bottom, there are input fields for "IP Address:" (0.0.0.0), "Mask:" (0.0.0.0), and "Network:" (00000000). A "Frame Type:" dropdown menu is set to "Ethernet\_802.2". At the bottom of the form, there are buttons for "Add", "Delete", "Modify", "Clear", and "Reset", along with a link "Show Protocol VLAN".

Figure 13.15 Creating an AppleTalk protocol VLAN within port-based VLAN 2

## Configuring the Router Interfaces

Once a router interface is assigned to a VLAN, it must also be configured with a network range, AppleTalk address and a zone name. The same will also need to be done for those physical interfaces that will be forwarding routes to remote AppleTalk VLANs.

To configure virtual router interfaces 3 and 5 shown in **Figure 13.12**, the user would do the following:

1. Select the [AppleTalk](#) link from the menu. The AppleTalk configuration sheet will appear.
2. Select the [AppleTalk interface](#) link on the AppleTalk configuration sheet. A summary panel of all configured interfaces will appear.
3. Select the **modify** button next to the v3 entry. The AppleTalk interface panel (**Figure 13.16**) will appear.
4. Modify the **ARP age**, if desired.
5. Enable **routing**.
6. Enter 200 in the **start network range** field.
7. Enter 200 in the **end network range** field.
8. Enter 200.50 as the AppleTalk **address**.
9. Enter marketing in the **zone name** field.
10. Select **apply** to assign the changes for virtual interface 3.
11. Select the [show AppleTalk interface](#) link. The summary panel of all AppleTalk interfaces will appear.
12. Select the **modify** button next to the v5 entry. The AppleTalk interface panel will appear.
13. Modify the **ARP age**, if desired.
14. Enable **routing**.
15. Enter 100 in the **start network range** field.
16. Enter 100 in the **end network range** field.
17. Enter 100.50 as the AppleTalk **address**.
18. Enter finance in the **zone name** field.
19. Select **apply** to assign the changes for virtual interface 5.

---

**NOTE:** After initial configuration, the user will need to disable routing on an AppleTalk interface before making any changes to the network range values, AppleTalk address or zone name of that interface.

---

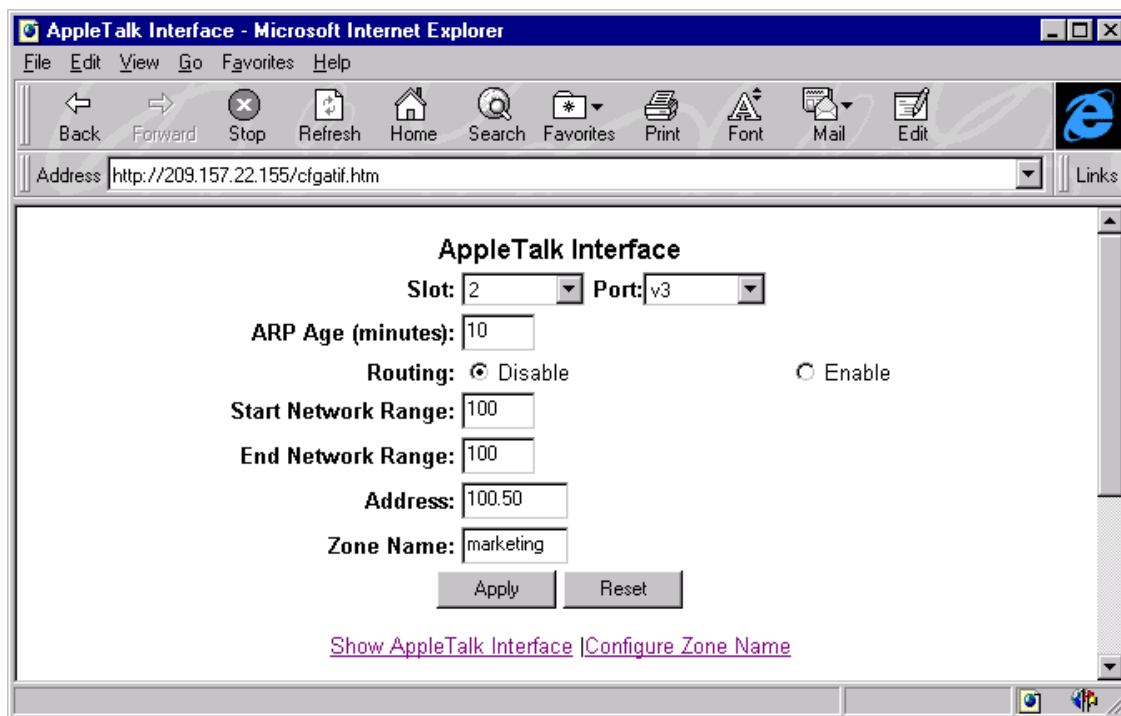


Figure 13.16 Configuring virtual interface, v3

### Configuring the Physical Interface for Remote Access

Physical interface, 8, will be the path for forwarding routes to remote AppleTalk VLANs, so it must be configured in addition to the virtual router interfaces.

To configure interface 8 shown in **Figure 13.12**, the user would do the following:

1. Select the [AppleTalk](#) link from the menu. The AppleTalk configuration sheet will appear.
2. Select the [AppleTalk interface](#) link. A summary panel of all interfaces will appear.
3. Select the **modify** button next to the 8 entry. The AppleTalk interface panel will appear.
4. Modify the **ARP age**, if desired.
5. Enable **routing**.
6. Enter 400 in the **start network range** field.
7. Enter 400 in the **end network range** field.
8. Enter 400.50 as the AppleTalk **address**.
9. Enter sales in the **zone name** field.
10. Select **apply** to assign the configuration.

---

## Modifying AppleTalk Global Parameters

The following parameters can be modified for AppleTalk at the global level:

- 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

An overview of each of these global parameters, along with their possible and default values, is summarized in the following sections.

### AppleTalk ARP Retransmit Count

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

If no response is received before the count number expires, no additional packets will be sent. Possible values are between 1 and 10, with a default value of 2.

EXAMPLE: To modify the number of times packet requests will be sent out for ARP updates from the default value of 2 to 8, the user would enter the following:

#### USING THE CLI

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

**syntax:** appletalk arp retransmit-count <1-10>

#### USING THE WEB MANAGEMENT INTERFACE

1. Select AppleTalk from the main menu. The configuration sheet shown in **Figure 13.17** will appear.
2. Enter a new **ARP retransmit count** between 1 and 10. For this example, the user would enter 8.
3. Select the **apply** button to assign the new value.

### AppleTalk ARP Retransmit Interval

The user can modify the interval between the transmission of ARP packets. Possible values are between 1 and 120 seconds with a default value of 1 second.

EXAMPLE: To modify the ARP retransmission interval from the default value of 1, to 15 seconds, the user would enter the following:

#### USING THE CLI

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

**syntax:** appletalk arp retransmit-interval <1-120>

#### USING THE WEB MANAGEMENT INTERFACE

1. Select AppleTalk from the main menu. The configuration sheet shown in **Figure 13.17** will appear.
2. Enter a new **AppleTalk ARP Retransmit Interval** between 1 and 120. For this example, the user would enter 15.
3. Select the **apply** button to assign the new value.

## AppleTalk Glean Packets

When the glean packet parameter is enabled on an AppleTalk router, it will try to learn the MAC address from the packet versus, sending out an ARP request. This parameter is disabled by default.

EXAMPLE: To enable glean packets on an AppleTalk router, the user would enter the following:

### USING THE CLI

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

**syntax:** appletalk glean-packets

### USING THE WEB MANAGEMENT INTERFACE

1. Select AppleTalk from the main menu. The configuration sheet shown in **Figure 13.17** will appear.
2. Enable **glean packet**.
3. Select the **apply** button to assign the new value.

## AppleTalk QoS Socket

The user can use the QoS socket parameter to assign a higher priority to specific AppleTalk sockets. Possible values are zero (0) to seven (7) for systems.

EXAMPLE: To assign a high priority to socket 123, the user would enter the following:

### USING THE CLI

```
HP9300 (config)# appletalk qos socket 123 priority 1
```

**syntax:** appletalk qos socket <number> priority <0-7>

### USING THE WEB MANAGEMENT INTERFACE

1. Select the socket QOS link from the AppleTalk configuration sheet. The panel shown in **Figure 13.18** will appear.
2. Enter the number of the socket to be assigned a higher priority. For example, to assign a higher priority to all web traffic, the number 80 is entered into this field as seen in **Figure 13.178**.
3. Select a value between 0 and 7 from the QOS pull down menu.
4. Select the **apply** button to assign the higher priority to the selected socket. Selecting the **apply to all sockets** will assign the higher priority to all AppleTalk sockets on the router.

## AppleTalk RTMP Update Interval

The user can use this parameter to modify how often RTMP updates are sent out on AppleTalk interfaces. Possible values are between 1 and 3600 seconds, with a default value of 10 seconds.

EXAMPLE: To change the value to 50 seconds from a default value of 10 seconds, the user would enter the following:

### USING THE CLI

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

**syntax:** appletalk rtmp-update-interval <1-3600>

### USING THE WEB MANAGEMENT INTERFACE

1. Select [AppleTalk](#) from the main menu. The configuration sheet shown in **Figure 13.17** will appear.
2. Enter a new **RTMP update interval** between 1 and 3600. For this example, the user would enter 50.
3. Select the **apply** button to assign the new value.

#### AppleTalk ZIP Query Interval

This command is used to modify how often ZIP query messages are retransmitted. Possible values are between 1 and 1000 seconds with a default value of 10 seconds.

EXAMPLE: To change the ZIP query interval to 30 seconds from a default value of 10 seconds, the user would enter the following:

### USING THE CLI

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

**syntax:** appletalk zip-query <1-1,000>

### USING THE WEB MANAGEMENT INTERFACE

1. Select [AppleTalk](#) from the main menu. The configuration sheet shown in **Figure 13.17** will appear.
2. Enter a new **ZIP query interval** between 1 and 1000. For this example, the user would enter 30.
3. Select the **apply** button to assign the new value.

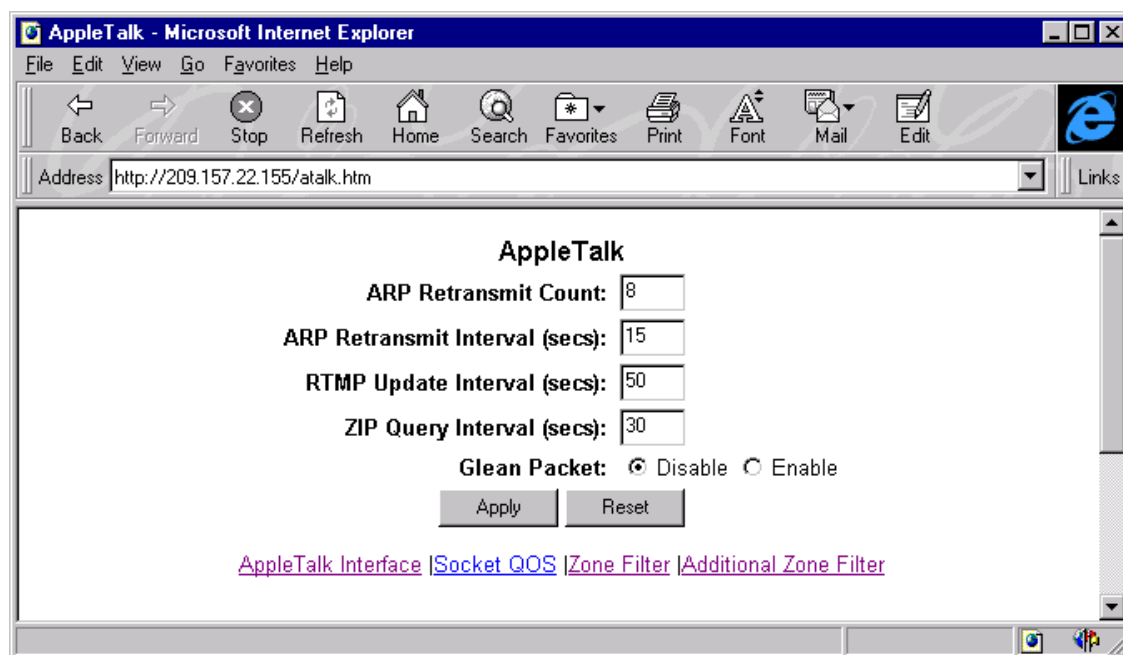


Figure 13.17 AppleTalk configuration sheet

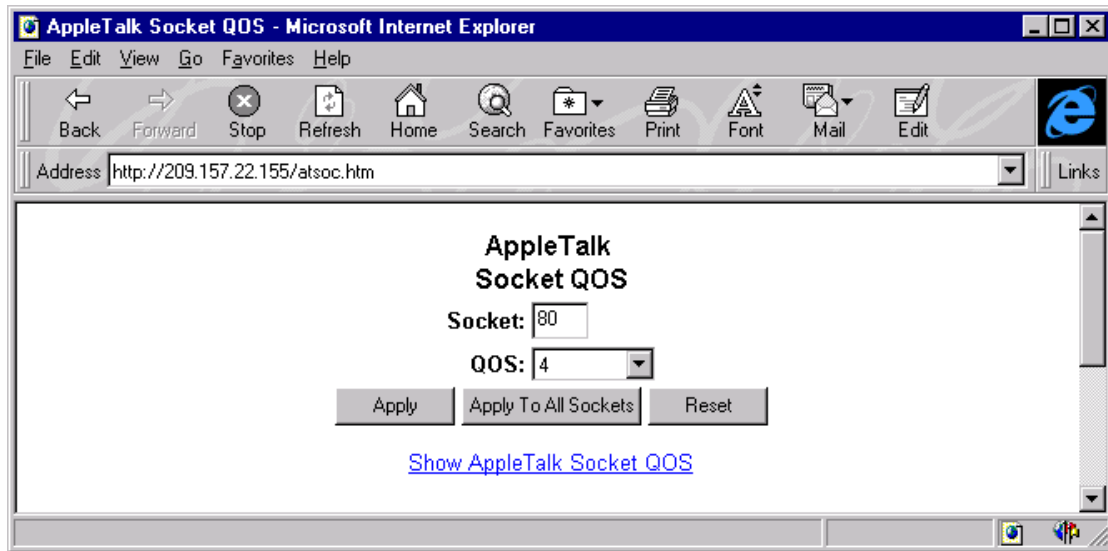


Figure 13.18 Defining a higher priority for a socket

## Show Commands for AppleTalk

The user can view a number of AppleTalk configuration details via the show commands.

### USING THE CLI

When using the CLI, the user can access information about AppleTalk by entering the following CLI show commands. A description of the displays is also provided.

---

**NOTE:** For more details on these commands, please refer to **Appendix B**.

---

- ***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

When using the Web management interface, the user can access information about AppleTalk by selecting the [Show](#) link from the main menu, displaying the panel shown in **Figure 13.19**. The AppleTalk show options will be visible only when AppleTalk routing is enabled on the router.

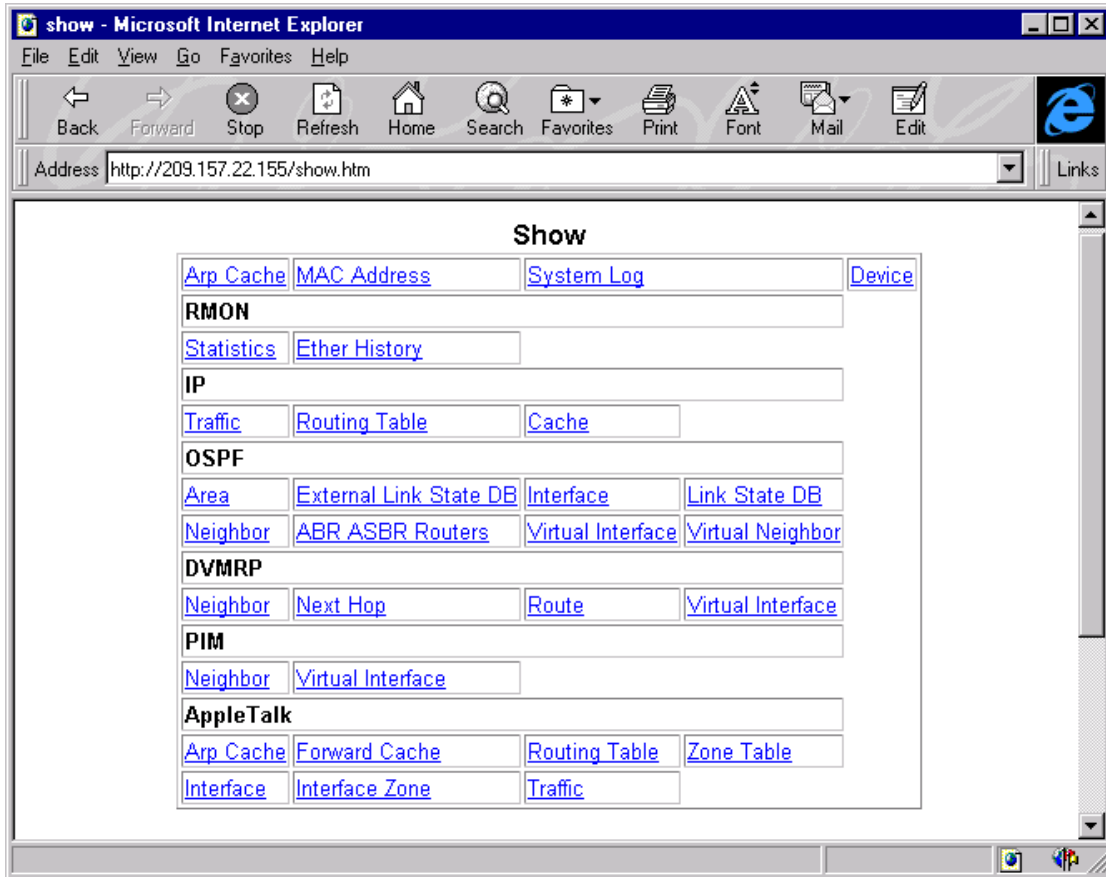


Figure 13.19 Show command options for AppleTalk

**NOTE:** To erase all data regarding AppleTalk routes, traffic or information stored in the AppleTalk ARP or cache, the user can use the *clear appletalk...* commands, summarized in the **Clear Commands for AppleTalk** section.

## Clear Commands for AppleTalk

### USING THE CLI

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

- ***clear appletalk arp cache***: Erases all data currently resident 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 (i.e. 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 router. A summary of the statistics to be erased, can be seen by entering the ***show appletalk traffic*** command.

**NOTE:** For more details on these commands, please refer to **Appendix B**.

### USING THE WEB MANAGEMENT INTERFACE

The user can clear AppleTalk data by selecting the appropriate link from the [Clear](#) panel (**Figure 13.20**). The AppleTalk clear options will only be visible when AppleTalk routing is enabled on the router.

The user can reach the clear panel by selecting the [clear](#) link from the main menu.

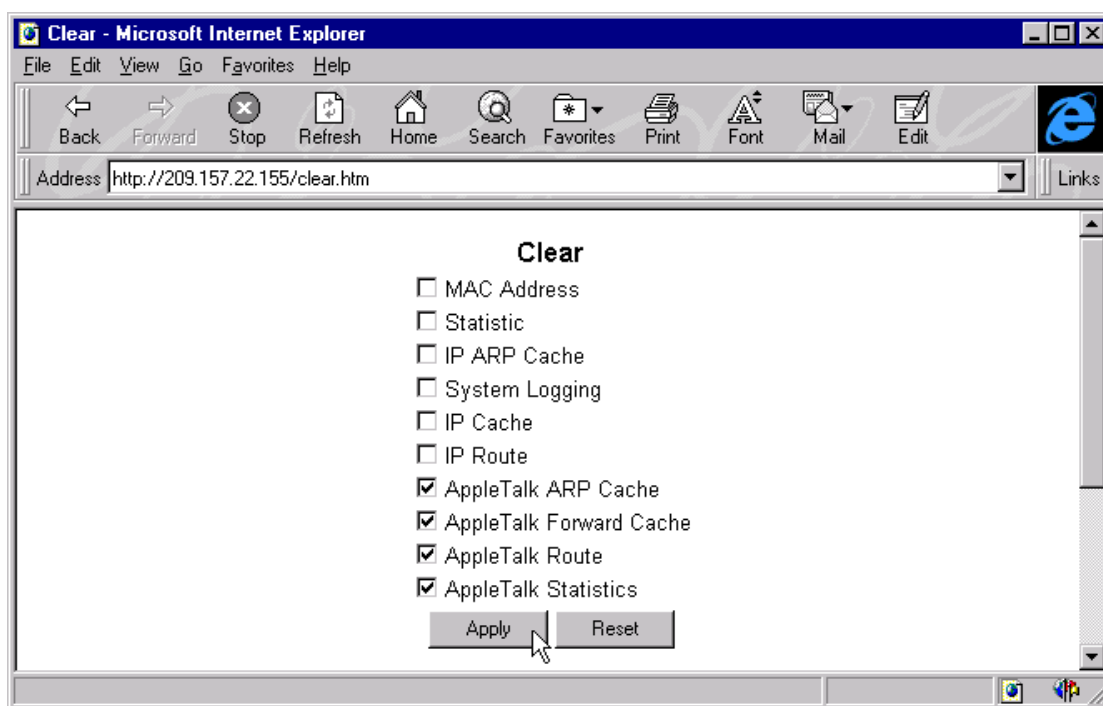


Figure 13.20 Clear panel noting AppleTalk commands

