3

Configuring Ethernet Interfaces

Contents

Ethernet Interfaces

The ProCurve Secure Router includes two Ethernet ports on the front panel, allowing you to connect two LAN segments to your WAN. You can also use the Ethernet ports to connect to a cable or Digital Subscriber Line (DSL) modem. Most companies will connect the router to a switch on the LAN segment. (See Figure 3-1.)

To connect a LAN segment to an Ethernet port, you use unshielded 10Base-T or 100Base-T cabling with an RJ-45 connector that meets the EIA/TIA-568-A or 568-B standards. For a 10-Mbps connection, use a Category 3 cable or better. For a 100-Mbps connection, use a Category 5 cable or better.

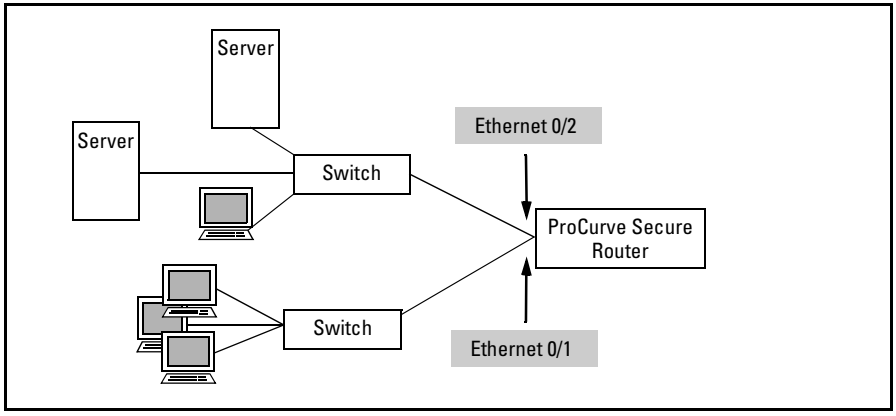

Figure 3-1. Connecting LAN Segments to the ProCurve Secure Router

Like the uplink ports on ProCurve switches, the Ethernet ports on the ProCurve Secure Router support auto MDIX, which automatically reverse transmit and receive signals as needed; even in situations in which you would normally need a crossover cable, you can still use a straight-through cable. For example, you can connect a PC to an Ethernet interface on the ProCurve Secure Router with a straight-through cable.

After you connect your LAN segments to the ProCurve Secure Router, you can enable the built-in firewall and configure access control policies to protect your internal network from unauthorized access or network attacks. (For more information about enabling the firewall, see the *Advanced Management*

and Configuration Guide, *Chapter 4: ProCurve Secure Router OS Firewall—Protecting the Internal, Trusted Network*; for more information about access controls, see the *Advanced Management and Configuration Guide*, *Chapter 5: Applying Access Control to Router Interfaces*.)

Configuring the Ethernet Interface

The Ethernet interface is the only interface on the ProCurve Secure Router that you configure to control both the Physical and the Data Link Layers of a connection. To configure an Ethernet interface, you must access the appropriate interface. Like the physical WAN interfaces on the ProCurve Secure Router, the Ethernet interfaces are referred to by their slot and port number.

For Ethernet interfaces, the slot number is always 0. The port number for the bottom Ethernet port is 1, so the interface for that port is referred to as Ethernet 0/1. The port number for the top port is 2, so the interface for that port is referred to as Ethernet 0/2. (See Figure 3-2.)

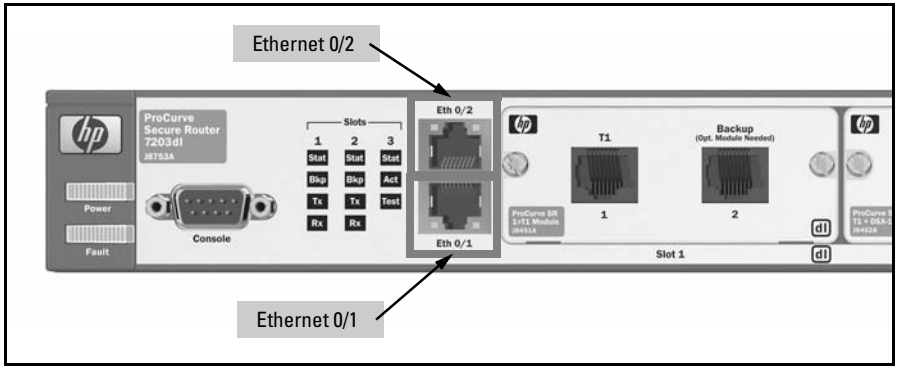

Figure 3-2. Ethernet Ports on the ProCurve Secure Router

To access the Ethernet configuration mode context in the command line interface (CLI), enter the following command from the global configuration mode context:

Syntax: interface ethernet 0/<port>

For example, if you want to configure the bottom Ethernet port, enter:

```
ProCurve(config)# interface ethernet 0/1
```

You can also use a truncated reference for both interface and Ethernet, as shown below:

```
ProCurve(config)# int eth 0/1
```

When you truncate a command, you only need to enter enough of the command to distinguish it from other commands.

After you enter the **int eth 0/1** command, the prompt will show that you are in the Ethernet 0/1 interface configuration mode context:

```
ProCurve(config-eth 0/1)#
```

Enabling the Ethernet Interface

By default, all the interfaces on the ProCurve Secure Router are administratively down. You must activate the Ethernet interface before you can establish a connection to it. From the Ethernet interface configuration mode context, enter:

```
ProCurve(config-eth 0/1)# no shutdown
```

After you activate the interface, a message is displayed on the CLI, reporting that the interface is administratively up. Then when the Ethernet interface establishes a valid connection to the endpoint device, another message is displayed, reporting that the interface is up.

If the Ethernet interface cannot establish a valid connection, the status of the interface changes to down. You need to continue configuring the interface, or you need to attach a cable to the interface and establish a connection with another device such as a switch.

These interface status messages are displayed on the CLI by default. To stop these messages from being displayed, enter the following enable mode command:

```
ProCurve# no events
```

To enable the display of these messages again, enter:

```
ProCurve# events
```

Configuring an IP Address

To assign the Ethernet interface an IP address, you must be at the Ethernet interface configuration mode context:

```
ProCurve(config-eth 0/1)#
```

You then have several options for assigning an IP address to an Ethernet interface:

- You can assign the Ethernet interface a static IP address.
- You can configure the Ethernet interface as a Dynamic Host Configuration Protocol (DHCP) client.
- You can configure the Ethernet interface as an unnumbered interface.

Assigning a Static IP Address

To assign the Ethernet interface a static IP address, use the following command syntax:

Syntax: ip address <*A.B.C.D*> <*subnet mask* | /*prefix length*>

For example, you might enter:

```
ProCurve(config-eth 0/1)# ip address 192.168.1.1 255.255.255.0
```

Because the ProCurve Secure Router supports Classless Inter-Domain Routing (CIDR) notations, you could also enter:

```
ProCurve(config-eth 0/1)# ip address 192.168.1.1 /24
```

Note

You must include a space between the IP address and the / symbol in front of the prefix length.

Configuring the Ethernet Interface as a DHCP Client

If you are using DHCP to assign IP addresses to the clients on your network, you may also want to have the DHCP server assign an IP address to the Ethernet interface. To enable the DHCP client for the Ethernet interface, you use one of the following commands:

Syntax: ip address dhcp {client-id [ethernet 0/<*port*> | HH:HH:HH:HH:HH:HH:HH] | hostname <*hostname*>} [track <*name*>] [<*administrative distance*>]

Syntax: ip address dhcp [hostname <*hostname*> | no-default-route | no-domain-name | no-nameservers] [track <*name*>] [<*administrative distance*>]

In addition to enabling the DHCP client, this command allows you to configure the settings shown in Table 3-1.

Table 3-1. DHCP Client Settings

Option	Meaning	Default Setting
client-id	configures the client id displayed in the DHCP server's table	media type and interface's MAC address
hostname	configures the hostname displayed in the DHCP server's table	router hostname
no-default-route	specifies that the DHCP client should not accept the default route obtained through DHCP	accept default route from the DHCP server
no-domain-name	specifies that the DHCP client should not accept the domain name included with the other lease settings that the DHCP server sends	accept the domain name setting from the DHCP server
no-nameservers	specifies that the DHCP client should not accept the DNS setting included with the other lease settings that the DHCP server sends	accept DNS settings from the DHCP server
track	attaches a network monitoring track to the DHCP client	(none)
<administrative distance>	specifies the administrative distance to use when adding the DHCP gateway into the route table	1

Before you enable the DHCP client, you must decide whether or not you want to configure the settings listed in Table 3-1, and you must then include the settings in the same command you enter to enable the DHCP client. After you enable the DHCP client, it immediately begins to search for a DHCP server and negotiate a lease. You cannot impose settings on that lease after it is established.

Accepting the Default Settings. If you want to use default DHCP settings for Ethernet interface, you can simply enter:

```
ProCurve(config-eth 0/1)# ip address dhcp
```

The DHCP client on the Ethernet interface will immediately begin to send DHCP discovery messages to find a DHCP server. When a DHCP server responds, the client will negotiate an IP address.

The DHCP client will send DHCP discovery messages whether or not the Ethernet interface is activated or a valid Ethernet connection has been established. It will continue to send DHCP discovery messages until a DHCP server responds.

You should ensure that the DHCP client receives an IP address so that these requests do not consume router resources or bandwidth on your Ethernet link. To determine if the Ethernet interface has been assigned an IP address, enter:

```
ProCurve(config-eth 0/1)# do show int eth 0/1
```

Note

The **do** command allows you to enter enable mode commands from any context (except the basic mode context).

Configuring a Client Identifier. By default, the Secure Router OS populates the DHCP client identifier with the Ethernet interface's media type and media access control (MAC) address. You can specify that the DHCP client uses the MAC address of the other Ethernet port, or you can change the client identifier to a customized MAC address.

To configure a client identifier when you enable the DHCP client, enter:

Syntax: ip address dhcp client-id [ethernet 0/<port> | HH:HH:HH:HH:HH:HH]

When you configure the client-identifier, you can also configure a hostname, as explained in the next section.

Configuring a Hostname. The Secure Router OS uses the hostname configured for the router as the Ethernet interface's default DHCP client hostname. If you want to override this name when you enable the DHCP client, enter the following command:

Syntax: ip address dhcp hostname <*hostname*>

For example, you might want to specify that the hostname is *RouterB*. In this case, you would enter:

```
ProCurve(config-eth 0/1)# ip address dhcp hostname RouterB
```

When you specify the hostname, you can also configure a client-identifier at the same time, as shown below.

```
ProCurve(config-eth 0/1)# ip address dhcp client-id ethernet 0/2 hostname RouterB
```

If you enter this command, the DHCP client will use the MAC address of the Ethernet 0/2 interface as its client identifier. The DHCP client will also use the hostname RouterB.

Alternatively, you can specify the hostname and configure the client to ignore the settings received from the DHCP server. These commands are described in the following sections.

Overriding Settings Received from the DHCP Server. If the DHCP server is configured to provide a default-route, a domain name, or a domain name server (DNS), the DHCP client for the Ethernet interface will accept and use these settings. If you do not want to use any of these settings, enter:

Syntax: ip address dhcp [hostname <*hostname*> | no-default-route | no-domain-name | no-nameservers]

For example, if you do not want the DHCP client to use the route settings and name (DNS) server settings that it receives from the DHCP server, enter:

```
ProCurve(config-eth 0/1)# ip address dhcp no-default-route no-nameservers
```

If you do not want the DHCP client to use any of the default settings, enter:

```
ProCurve(config-eth 0/1)# ip address dhcp no-default-route no-domain-name
no-nameservers
```

Attaching a Network Monitoring Track to the DHCP Interface. As a part of the network monitoring feature, you can attach a network monitoring track to the DHCP client, in order to monitor the default route received from a DHCP server. A track uses probes to test routes and servers, with the goal of either removing failed routes or logging poor performance.

You can use the **track** option with the **ip address dhcp** command to configure the ProCurve Secure Router to add the default route as a monitored route. You can combine the **track** option with any of the other options for the **ip address dhcp** command (except **no-default-route**—the router cannot monitor a route that the interface does not accept).

For example, to attach the track named DHCPDefault, enter:

```
ProCurve(config-eth 0/1)# ip address dhcp track DHCPDefault
```

Before entering the command, you should create the track named DHCPDefault. Also, you should create a probe to test the route. For example, the probe could test connectivity to the default gateway listed in the DHCP default route. If the probe fails to reach the gateway, the track determines that the default route has failed and removes it.

For more information about network monitoring and configuring tracks and probes, see *Chapter 9: Network Monitoring* in the *Advanced Management and Configuration Guide*.

Setting the Administrative Distance. In any of the variations of the **ip address dhcp** command, you can specify the administrative distance to use when adding the DHCP gateway into the route table. The ProCurve Secure Router uses the administrative distance to determine the best route when multiple routes to the same destination exist. The router assumes that the smaller the administrative distance, the more reliable the route is. The range is 1 to 255; the default value is 1.

For example, to set an administrative distance of 5, enter:

```
ProCurve(config-eth 0/1)# ip address dhcp 5
```

Releasing or Renewing an IP Address. If you want to manually force the Ethernet interface to release or renew an IP address, enter these commands from the Ethernet interface configuration mode context:

```
ProCurve(config-eth 0/1)# ip dhcp release
ProCurve(config-eth 0/1)# ip dhcp renew
```

Remove the DHCP Client Setting. If you decide that you no longer want the Ethernet interface to be a DHCP client, enter:

```
ProCurve(config-eth 0/1)# no ip address dhcp
```

Changing a Setting for the DHCP Client. If you want to change a setting for the DHCP client, you must first disable the client. Then you can enter the command to enable the client with the setting that you want to change.

Before you disable the client, you should release the IP address obtained through DHCP. This will prevent the DHCP server from holding the IP address and allow it to assign the IP address to another client.

For example, if you enabled the DHCP client with all the default settings and later determined that you wanted the router to function as the DNS server for the Ethernet interface, you would enter:

```
ProCurve(config-eth 0/1)# ip dhcp release
ProCurve(config-eth 0/1)# no ip address dhcp
ProCurve(config-eth 0/1)# ip address dhcp no-nameservers
```

Configuring the Ethernet Interface as an Unnumbered Interface

To conserve IP addresses on your network, you may want to create the Ethernet interface as an unnumbered interface. When you assign the Ethernet interface an IP address, that IP address cannot overlap with the IP addresses assigned to other interfaces on the router. As a result, each interface on the router that has an IP address represents an entire subnet. Depending on the subnetting scheme you use, this could use more IP addresses than you can spare.

You can configure the Ethernet interface (and other interfaces on the ProCurve Secure Router) as an unnumbered interface. The Ethernet interface will then use the IP address of the interface you specify. The Secure Router OS uses the IP address of the specified interface when sending route updates over the unnumbered interface.

Before configuring the Ethernet interface as an unnumbered interface, you should be aware of a potential disadvantage: if the interface to which the IP address is actually assigned goes down, the Ethernet interface will be unavailable. For example, suppose you configure the Ethernet 0/1 interface as an unnumbered interface that takes its IP address from the Frame Relay 1.16 subinterface. If the Frame Relay 1.16 subinterface goes down, the Ethernet 0/1 interface will be unavailable as well.

To minimize the chances of the interface with the IP address going down, you can assign the IP address to a loopback interface, which typically does not go down.

To configure an Ethernet interface as an unnumbered interface, enter the following command from the Ethernet interface configuration mode context:

Syntax: ip unnumbered <*interface*>

Valid interfaces include:

- Asynchronous Transfer Mode (ATM) subinterfaces
- the other Ethernet interface or Ethernet subinterfaces
- demand interfaces
- Frame Relay subinterfaces
- High-level Data Link Control (HDLC) interfaces
- loopback interfaces
- PPP interfaces

If you configure the Ethernet interface to support virtual LANs (VLANs), you can specify an Ethernet subinterface.

For example, you would enter the following commands to configure a loopback interface and then configure the Ethernet 0/1 interface to use the IP address assigned to that loopback interface:

```
ProCurve(config)# interface loopback 1
ProCurve(config-loop 1)# ip address 10.1.1.1 /24
ProCurve(config-loop 1)# interface ethernet 0/1
ProCurve(config-eth 0/1)# ip unnumbered loopback 1
ProCurve(config-eth 0/1)# no shutdown
```

Note

You do not have to enter **no shutdown** to activate a loopback interface. The status of a loopback interface automatically changes to up after you enter the **interface loopback *<interface number>*** command.

Setting the Speed and the Duplex Settings

By default, the Ethernet interfaces automatically negotiate both the line speed and duplex setting, as outlined below:

- When an Ethernet interface is enabled and the cable is connected to an endpoint, the interface first tries to negotiate the speed at 100 Mbps with full-duplex. If the endpoint device can operate at 100 Mbps with full-duplex, the Ethernet link is established.
- If the endpoint device cannot operate at 100 Mbps with full-duplex, the Ethernet interface attempts to establish the speed at 10 Mbps with full-duplex. If the endpoint device can operate at this speed with full-duplex, the link is established with these settings.
- If the endpoint device cannot operate at 10 Mbps with full duplex, the Ethernet interface attempts to establish the speed at 10 Mbps with half-duplex. If the endpoint device accepts these settings, the link is established.

If you have manually configured a setting for duplex on the interface, the negotiated setting for duplex is ignored.

Unless the router experiences problems negotiating the speed with the device at the other end of the Ethernet link, you should keep the default setting of **auto**. However, if you need to set the speed of the link for the Ethernet interface, use the following command syntax:

Syntax: speed [10 | 100 | auto]

For example, you might enter:

```
ProCurve(config-eth 0/1)# speed 100
```

Note

If you configure a default setting for speed, the Ethernet interfaces still negotiate the duplex setting—either full-duplex or half-duplex. Some Ethernet devices cannot negotiate duplex if the speed is manually set. To avoid possible problems, you may want to manually configure the duplex setting if the speed is manually set. (Manually configuring the duplex setting is described in the next section.)

You can enter one of the following commands to return to the default setting for speed:

```
ProCurve(config-eth 0/1)# speed auto
```

or

```
ProCurve(config-eth 0/1)# no speed
```

Configuring the Line for Half-Duplex or Full-Duplex

The Ethernet modules support both full-duplex and half-duplex. By default, the Ethernet modules operate at full-duplex. If you need to change this setting, enter:

```
ProCurve(config-eth 0/1)# half-duplex
```

To return to the default setting, you can enter one of the following commands:

```
ProCurve(config-eth 0/1)# full-duplex
```

or

```
ProCurve(config-eth 0/1)# no half-duplex
```

Setting the MTU

The maximum transmission unit (MTU) defines the largest size that an Ethernet frame can be. If a frame exceeds the MTU, it must be fragmented. By default, the MTU for Ethernet interfaces is 1500 bytes.

For most environments you should keep the default MTU size. However, you may need to adjust the MTU if the interface is connected to another device that uses a different MTU size and you have enabled Open Shortest Path First (OSPF) routing on the ProCurve Secure Router. OSPF routers cannot become

adjacent if their MTU sizes do not match. You should ensure that the MTU on the device at the far end of the Ethernet connection is using the same MTU as the interface you are configuring.

If routers and switches have different MTU sizes in a TCP/IP network, transmissions and routing may be affected. For example, if a switch has a smaller MTU and your router sends a frame that exceeds that size, the switch will fragment the frame. If the forwarded frame is tagged with the "do not fragment" field, then the switch cannot send the frame onto its destination. In this case, the switch must return an Internet Control Message Protocol (ICMP) message to notify the router that the frame cannot be fragmented. The router, in turn, must send the packet back to the originator, and the originator must remove the "do not fragment" field and resend the frame. If possible, you should ensure that the switches and routers on your network are using the same MTU.

Note

The MTU size refers to the Ethernet payload.

To change this setting, enter:

Syntax: mtu <*size*>

Replace <*size*> with a number between 64 and 1500.

Adding a Description

You can add a description to the interface if you want to document information about it. For example, you might want to use a description to differentiate between the two Ethernet interfaces: you could document which LAN segment connects to each interface. You might also want to use a description if you have had to troubleshoot a problem and want to document why you changed a particular setting.

Syntax: description <*line*>

Replace <*line*> with up to 80 characters. For example, you might enter:

```
ProCurve(config-eth 0/1)# description Attached to building 1
```

The description you enter is displayed only when you enter the following command from the enable mode context:

```
ProCurve# show running-config
```

```
interface eth 0/1
  description Attached to building 1
  ip address 192.168.1.1 255.255.255.0
  no shutdown
```

You can also view the description by entering:

```
ProCurve# show running-config interface eth 0/1
```

This command displays the running-config settings for only the Ethernet 0/1 interface.

Summary of Ethernet Configuration Settings

Table 3-2 shows the main settings for configuring an Ethernet interface.

Table 3-2. Ethernet Interface Configuration Options

Setting	Description	Default	Page
description	include information about the interface that can be viewed when you enter **show running-config**	no default	3-13
encapsulation 802.1q	configures the interface to support VLANs	no default	3-16
full-duplex or half-duplex	defines whether the connection uses full-duplex or half-duplex	full-duplex	3-11
ip address <A.B.C.D> <subnet mask | /prefix length>	assigns a static IP address to the interface	no default	3-5
ip address dhcp	configures the interface as a DHCP client that receives its address from a DHCP server	no default	3-5
ip unnumbered <interface>	uses the IP address assigned to another interface on the router	no default	3-5
mtu <size>	sets the maximum size that an Ethernet frame can be before it is fragmented	1500	3-12
no shutdown	activates interface	shutdown	3-4
speed [10 | 100 | auto]	defines the speed at which data is transmitted over the connection	auto	3-11

In addition to configuring these settings, you can:

- assign access control policies (ACPs) or access control lists (ACLs) to the interface
- enable bridging
- assign crypto maps to enable virtual private networks (VPNs)
- configure settings for routing protocols
- configure quality of service (QoS) settings

These settings are discussed in other chapters, as shown in Table 3-3.

Table 3-3. Additional Configurations for the Ethernet Interface

Settings	Configuration Guide	Page
access controls to filter incoming and outgoing traffic	Advanced	5-19
bridging	Basic	10-6
VPNs	Advanced	10-46
routing commands for OSPF, RIP, or BGP	Advanced	15-1
quality of service settings	Advanced	8-58

After you configure one Ethernet interface using the CLI, you can enable the HTTP server and use the Web browser interface to configure the other Ethernet interfaces, see *Chapter 14: Using the Web Browser Interface for Basic Configuration Tasks*.

Ethernet subinterfaces are used to enable VLAN support. To configure VLAN support and the Ethernet subinterfaces, you will configure these settings from the Ethernet subinterface configuration mode context. (VLAN support is discussed in the next section.)

Configure VLAN Support

VLANs enable you to group users by logical function rather than physical location. Creating VLANs on your network provides several advantages:

- VLANs allow you to segment your network into smaller broadcast domains. In networks that have large broadcast domains, broadcast storms can disrupt network traffic.
- VLANs enhance your network security. Because each VLAN is a separate broadcast domain, members of a particular VLAN cannot "see" traffic from other VLANs.
- VLANs simplify network management. For example, you can use VLANs to grant users access to network resources.

ProCurve Networking devices support the IEEE 802.1Q standard for VLAN tagging. When you define a VLAN on an 802.1Q-compliant device, it inserts a four-byte tag into the Ethernet frame. This tag identifies the packet's VLAN membership. The 802.1Q tag contains:

- the tag value, which identifies the data as a tag
- the VLAN ID

As per the 802.1Q specification, the default tag value is 8100 (hexadecimal). The VLAN ID is determined by the VLAN on which the packet is being forwarded.

Figure 3-3 shows the format of Ethernet frames that contain the 802.1Q tag.

Note

Because a VLAN tag is inserted into the Ethernet frame, it is called *VLAN tagging* in a ProCurve environment. (In a Cisco environment, VLAN tagging is referred to as VLAN trunking.)

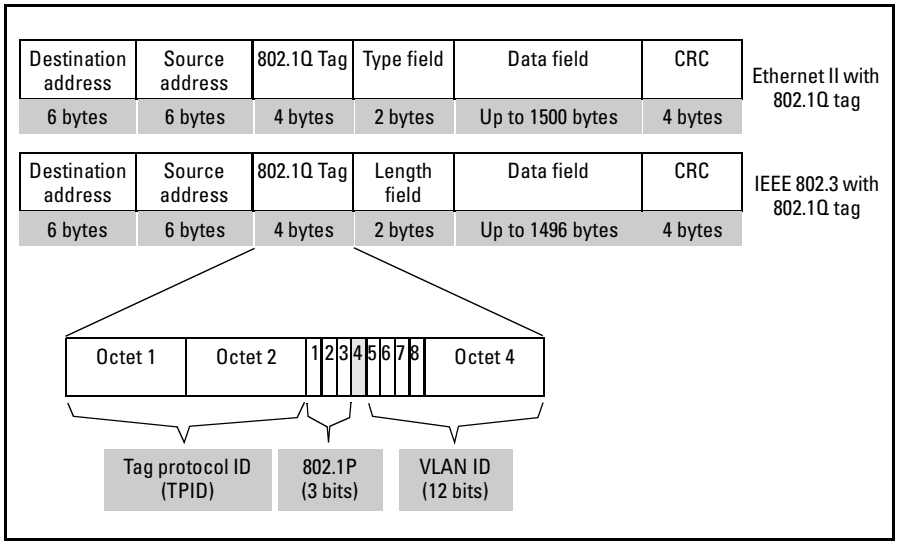

Figure 3-3. The 802.1Q Tag

A VLAN is comprised of multiple ports operating as members of the same subnet (or broadcast domain). Ports on multiple devices can belong to the same VLAN, and traffic moving between ports in the same VLAN is bridged (or "switched").

Traffic moving between different VLANs, on the other hand, must be routed. If a switch supports IP routing, it can internally route IP (IPv4) traffic between VLANs. If a switch is not configured to route traffic internally between LANs, an external router must forward traffic between VLANs. The router, of course, must support 802.1Q. (See Figure 3-4.)

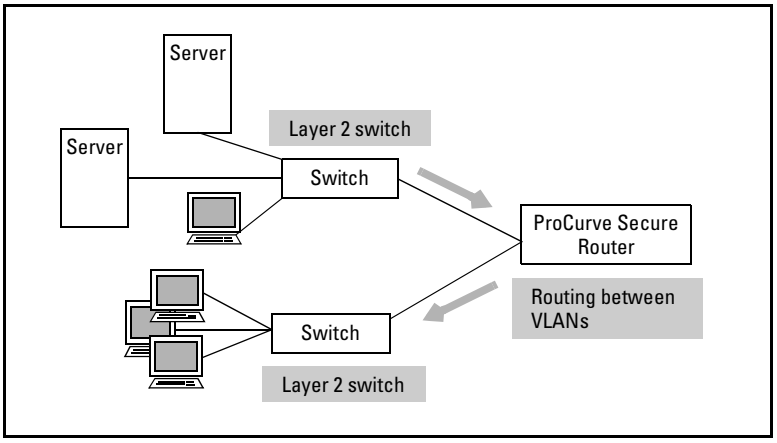

Figure 3-4. Routing VLAN Traffic Between Layer 2 Switches

If your company is using Layer 2 switches, you may want to enable VLAN support on the ProCurve Secure Router and configure it to route the VLAN traffic on your internal network.

You may also want to enable VLAN support on the ProCurve Secure Router so that you can use VLANs to apply network access controls. By using VLANs, you can tailor access controls for the users who are members of different VLANs. For example, you can apply different access controls to the marketing department, which is part of VLAN12, than the access controls you apply to the executives of your company, which are part of VLAN 20. (For more information about access controls on router interfaces, see the *Advanced Management and Configuration Guide*, *Chapter 5: Applying Access Control to Router Interfaces*.)

You can also use VLANs to grant groups of users access to VPNs. (For more information about VPNs, see the *Advanced Management and Configuration Guide*, *Chapter 10: Virtual Private Networks*.)

Configuring VLAN Support

Configuring VLAN support on the ProCurve Secure Router involves four steps:

1. Enable the ProCurve Secure Router to read IEEE 802.1Q tags.
2. Create Ethernet subinterfaces.
3. Associate each Ethernet subinterface with a VLAN ID.
4. Assign the Ethernet subinterfaces an IP address.

Enabling VLAN Support. To configure the ProCurve Secure Router to recognize the IEEE 802.1Q tag and route traffic accordingly, enter the following command from the Ethernet interface configuration mode context:

```
ProCurve(config-eth 0/1)# encapsulation 802.1Q
```

After you enter this command, the ProCurve Secure Router immediately recognizes that it must route traffic through this Ethernet interface to multiple VLANs with separate IP addresses. You will no longer be able to assign an IP address to the Ethernet interface. Instead, you must assign an IP address to the Ethernet subinterfaces.

Creating Subinterfaces. Because each VLAN represents a subnet with a unique network IP address, you must create one Ethernet subinterface for each VLAN. To create an Ethernet subinterface, move to the Ethernet interface mode configuration context and enter the following command:

Syntax: interface eth 0/<*port number.subinterface number*>

Replace ***<port number>*** with 1 for the bottom Ethernet port and with 2 for the top port. Replace ***<subinterface number>*** with a number that uniquely identifies this subinterface.

For example, to create the Ethernet subinterface 0/1.1, enter:

```
ProCurve(config-eth 0/1)# interface ethernet 0/1.1
```

The router prompt shows that you are at the configuration mode context for the Ethernet subinterface that you just created:

```
ProCurve(config-eth 0/1.1)#
```

Setting the VLAN ID. Next, you must associate the subinterface with a particular VLAN on your network. To create this association, enter the following command from the Ethernet subinterface configuration mode context:

Syntax: vlan-id <*vlan id*> [native]

Replace <*vlan id*> with the number of the VLAN. Use the **native** option if you want the traffic to leave the subinterface untagged. If you do not include this option, the traffic will remain tagged.

Assigning an IP Address

You must assign the Ethernet subinterfaces a static IP address. From the Ethernet subinterface configuration mode context, enter:

Syntax: ip address <*A.B.C.D*> <*subnet mask* | /<*prefix length*>

For example, if you are configuring a subinterface for VLAN 2 and VLAN 2 encompasses the subnet 192.168.115.0 255.255.255.0, you might enter:

```
ProCurve(config-eth 0/1.1)# ip address 192.168.115.5 /24
```

Viewing the Status of Ethernet Interfaces or Subinterfaces

After you configure an Ethernet interface or subinterface, you may want to view the configuration settings you have entered, or you may want to determine the status of the interface—is the interface up, down, or administratively down? You can use the following commands to view the configuration and status of Ethernet interfaces and subinterfaces:

- **show interfaces** command
- **show running-config** commands

show interfaces Command

To view the status of an Ethernet interface, move to the enable mode context and enter:

Syntax: show interfaces ethernet 0/<*port*>

For example, to view the status of the Ethernet 0/1 interface, enter:

```
ProCurve# show interfaces ethernet 0/1
```

If you are not at the enable mode context, you can use the **do** command. Enter:

```
ProCurve(config-eth 0/1)# do show interfaces ethernet 0/1
```

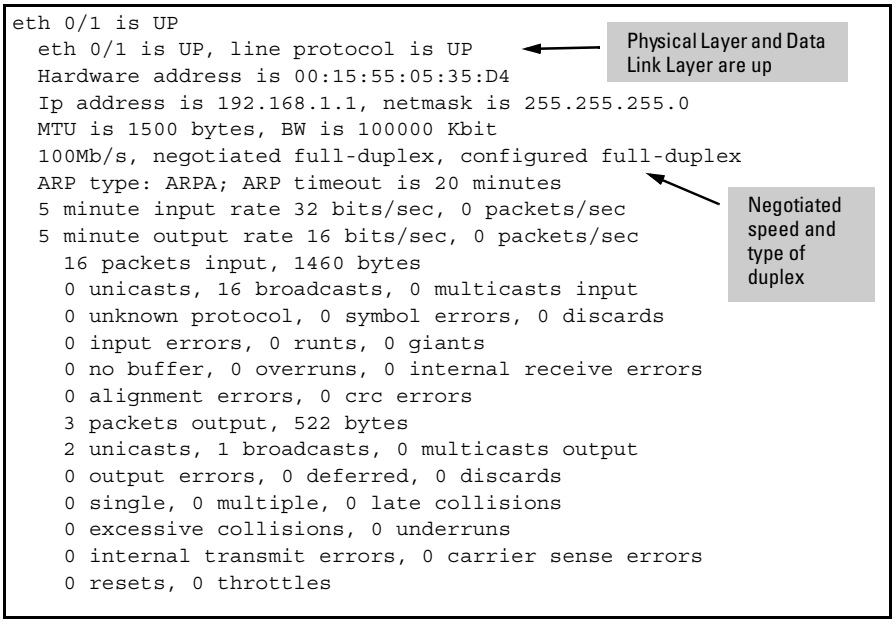

Figure 3-5. Interpreting the Output from a show interfaces ethernet Command

The Ethernet 0/1 interface shown in Figure 3-5 is up, and the line protocol is up. You can also see that the IP address and subnet mask have been configured and the speed of the connection is 100 Mbps with full-duplex.

If you have created Ethernet subinterfaces to support the VLANs on your network, enter:

Syntax: show interfaces eth 0/<*port number.subinterface number*>

For example, to view the status of the Ethernet 0/2.5 subinterface, enter:

ProCurve# show interfaces ethernet 0/2.5

You can view the status information for the Ethernet interfaces in real-time by adding the **realtime** option to the **show interfaces** command. (See Figure 3-6.)

Syntax: show interfaces eth 0/<*port number.subinterface number*> [realtime]

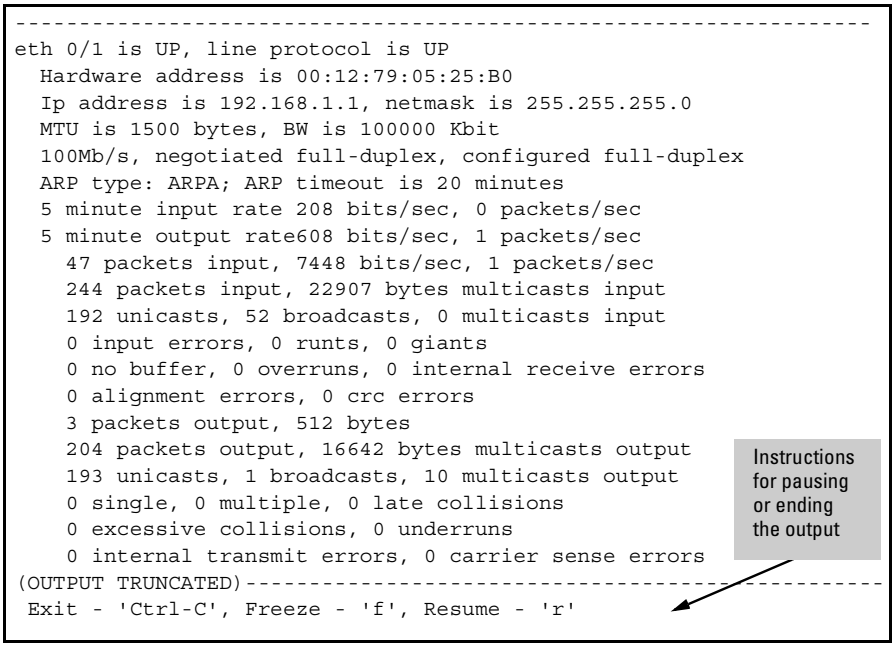

Figure 3-6. Results of the show interface ethernet realtime Command

To end the realtime display of the **show interface ethernet** command, enter **Ctrl+C**. To suspend the updates and maintain the current display, enter **f**. To view the updates again, enter **r**.

show running-config Commands

Located in RAM, the running-config file includes the configurations that are currently running on the router—this includes the configurations that were read from the startup-config when the ProCurve Secure Router was booted, and any configurations that you have subsequently entered. The running-config is cleared every time the ProCurve Secure Router is powered down, and any changes that have not been saved to the startup-config file are lost.

Note

To save the running-config to the startup-config file, you must enter one of the following commands from the enable mode context:

write memory

copy running-config startup-config

Viewing the Configurations That Have Been Entered

To view the settings that have been entered manually and are currently being used by the ProCurve Secure Router, move to the enable mode context and enter:

ProCurve# show running-config

This command displays the current configurations for the router. You must browse the output to find the configurations for the Ethernet interfaces, which are listed under the headings **interface eth 0/1** or **interface eth 0/2**. If you have configured Ethernet subinterfaces, the configurations for each are listed under their respective ports.

If you do not want to browse through the entire running-config, you can enter:

ProCurve# show running-config interface eth 0/<*port*>

This command displays the manually entered configurations for only the Ethernet interface that you specify.

Likewise, you can view the configuration settings you have entered for the Ethernet subinterfaces by entering:

Syntax: show running-config interface eth 0/<*port number.subinterface number*>

Figure 3-7 shows the portion of the **show running-config** output that is related to the Ethernet 0/1.1 subinterface.

```
interface eth 0/1.1
  ip address  192.168.1.1  255.255.255.0
  no shutdown
```

Figure 3-7. Viewing the show running-config Command for an Ethernet Subinterface

Viewing All the Configuration Settings Including Defaults

The **show running-config** command displays only the settings that you have configured for the ProCurve Secure Router. It does not display the default settings, which are automatically applied to the router. To view all the settings that are currently applied to the router, enter the following command from the enable mode context:

ProCurve# show running-config verbose

The display shows the current running-config file, including any default settings. Again, you will need to browse for the information relating to the Ethernet interface or subinterface you are checking.

Alternately, you can enter the following command to display only information about a particular Ethernet interface or subinterface:

Syntax: show running-config interface eth 0/<*port number.subinterface number*> verbose

Figure 3-8 shows the output for the Ethernet 0/2.1 interface.

```
interface eth 0/2.1
  description
  alias
  native
  no shutdown
  ip address  192.10.10.1  255.255.255.0
  ip proxy-arp
  ip ospf authentication-key
  ip ospf authentication null
  ip ospf message-digest-key 1 md5
  ip ospf message-digest-key 2 md5
  ip ospf cost 0
  ip ospf retransmit-interval 5
  ip ospf transmit-delay 1
  ip ospf priority 1
  ip ospf hello-interval 10
  ip ospf dead-interval 40
  no ip mcast-stub helper-enable
  ip igmp version 2
  ip igmp last-member-query-interval 1000
  ip igmp query-interval 60
  ip igmp query-max-response-time 10
  ip igmp querier-timeout 120
  no ip igmp immediate-leave
  mtu 1500
  bandwidth 0
  ip route-cache
  ip split-horizon
  no crypto map
  no dynamic-dns
  no qos-policy out
  max-reserved-bandwidth 75
```

Figure 3-8. Using the show running-config verbose Command

To understand the difference between the **show running-config** command and the **show running-config verbose** command, compare Figure 3-7 to Figure 3-8. For example, if you entered the IP address, a description, and the **no shut** command to configure the Ethernet interface, only those settings are listed when you enter the **show running-config** command.

When you enter **show running-config verbose**, other default settings that you have not altered are also displayed. For example, the **running-config verbose** command displays settings such as the Ethernet interface's MTU, speed and duplex settings, MAC address, as well as settings for OSPF routing and Link Layer Discovery Protocol (LLDP).

Troubleshooting an Ethernet Interface

The first step in troubleshooting problems with any interface is to enter the **show interfaces** command. This command allows you to determine, at a glance, if the connection is up.

If the interface has not been activated, the following status is displayed:

```
eth 0/1 is administratively down
```

You should then move to the Ethernet interface configuration mode context and enter the **no shutdown** command.

Two error messages indicate problems with the interface:

- "eth 0/1 is DOWN" indicates that the Physical Layer is not active. This problem may be caused by:
  - loose or bad connection
  - bad cabling
  - no cabling
- "line protocol is DOWN" indicates that the software processes that handle the line protocol consider the interface down. Whether due to faulty hardware, incompatible configurations, or problems at the other end of the line, the ProCurve Secure Router cannot negotiate a link on the interface.

Depending on the error messages displayed, you should check the cabling or the configuration settings for the Ethernet interface. If the "eth 0/1 is DOWN" message is displayed, substitute a different 10Base-T or 100Base-T cable and make sure the connectors are securely seated in the Ethernet port on both the router and the far-end device.

If the "line protocol is DOWN" message is displayed, check your configuration. Ensure that the Ethernet interface can successfully negotiate the speed and duplex settings for the line.

show event-history Command

Another useful tool for troubleshooting problems on the Ethernet interface is the **show event-history** command. By default, the ProCurve Secure Router logs events such as changes in the status of interfaces and ports. To display this information, enter the following command from the enable mode context:

```
ProCurve# show event-history
```

To isolate problems, you can clear the event history, reproduce the problem, and then display the event history again. To clear the event history, enter the following command from the enable mode context:

```
ProCurve# clear event-history
```

The event history is automatically cleared when the router is rebooted.

debug interface ethernet Command

If you check the configurations and basic hardware used for the Ethernet connection and still cannot resolve the issue, you can use the **debug interface** command to display information about the interface in real-time.

Syntax: debug interface <*interface*>

Replace <*interface*> with Ethernet.

For example, if you cannot establish an Ethernet connection, you may want to enter this command to determine if the Ethernet interface is successfully negotiating the speed and the duplex setting. Figure 3-9 shows the debug messages for an Ethernet interface that was successfully established.

```
2005.08.27 15:31:53 ETHERNET_INTERFACE.eth 0/1 auto-negotiation in progress
2005.08.27 15:31:55 ETHERNET_INTERFACE.eth 0/1 auto-negotiation complete
2005.08.27 15:31:56 ETHERNET_INTERFACE.eth 0/1 link up
2005.08.27 15:31:56 ETHERNET_INTERFACE.eth 0/1 speed is 100Mbps, full duplex
2005.08.27 15:31:56 INTERFACE_STATUS.eth 0/1 changed state to up
```

Figure 3-9. debug interface ethernet Messages

To end the display of debug messages, enter:

Syntax: no debug interface <*interface*>

ProCurve# no debug interface ethernet

Quick Start

This section provides the commands you must enter to quickly configure Ethernet interfaces. Only a minimal explanation is provided.

If you need additional information about any of these options, see "Contents" on page 3-1 to locate the section and page number that contains the explanation you need.

Configuring the Ethernet Interface

To configure the Ethernet interface, complete these steps:

1. Use a 10Base-T or 100Base-T cable to connect the Ethernet port on the ProCurve Secure Router to the appropriate device on your LAN. In most cases, you will connect the router to a switch.
2. Establish a terminal session with the ProCurve Secure Router. You are automatically at the basic mode context.

   ProCurve>
3. Move to the enable mode context. If you have configured a password for the enable mode context, enter that password when you are prompted to do so.

   ProCurve> enable
   Password:

4. Move to the global configuration mode context.

   ProCurve# configure terminal

5. Access the Ethernet configuration mode context:

   Syntax: interface ethernet 0/<*port*>

   For example, if you want to configure the bottom Ethernet port, enter:

   ProCurve(config)# interface ethernet 0/1

6. Assign the Ethernet interface an IP address.

   Syntax: ip address <*A.B.C.D*> <*subnet mask* | /*prefix length*>

   For example, if you want to assign the Ethernet interface the IP address 192.168.1.1 /24, enter:

   ProCurve(config-eth 0/1)# ip address 192.168.1.1 /24

7. Activate the interface

   ProCurve(config-eth 0/1)# no shut

8. View the status of the Ethernet interface you just configured.

   ProCurve(config-eth 0/1)# do show interface ethernet 0/<*port*>

Note

The **do** command allows you to enter enable mode commands (such as **show** commands) from any context (except the basic mode context).