

Chapter 18

Routing PUP

18

This chapter describes routing configuration using the Xerox PARC Universal Protocol (PUP). Monitoring and debugging commands are also described.

Cisco's Implementation of PUP

PUP was developed at Xerox's Palo Alto Research Center in the mid-1970s. PUP originally ran on the experimental three-megabits per second (mbps) Ethernet, the precursor to the IEEE 802.3 and Ethernet standards. The protocol is still used today by some Xerox workstations. The Cisco Systems routers support routing the PUP and provide a minimal set of PUP host functions, primarily the PUP Echo server and client. PUP packets can be routed over all Cisco-supported media. The Cisco PUP implementation uses the PUP GWINFO routing protocol to maintain routing information across a PUP network.

PUP Addresses

PUP addresses are 16-bit quantities written as two octal numbers separated by a pound sign (#). The following is an example of a PUP address:

```
10#371
```

The most significant eight bits of the address constitute the PUP network number, and the least significant eight bits constitute the PUP host number. In the example case, the network number is 10, and the host number is 371 (both in octal).

Configuring PUP Routing

PUP routing is enabled and disabled with the **pup routing** global configuration command, which has this simple syntax:

```
pup routing  
no pup routing
```

When you start the PUP router process, the router begins routing PUP packets and sending out PUP routing updates.

PUP routing is enabled on a per interface basis by the **pup address** interface subcommand. The syntax of this command follows:

```
pup address address  
no pup address
```

The argument *address* is the desired PUP address of the interface.

PUP routing can be disabled per interface by using the **no pup address** subcommand.

The default state is for PUP routing to be disabled.

PUP Mapped to IP

The following describes PUP support in versions of the Cisco router software prior to Release 8.0. PUP addresses are automatically configured by the system. The PUP addresses are calculated from the subnet and host addresses of the interfaces connected to the IP network onto which the PUP network is mapped. The PUP network number is the least significant eight or fewer bits of the subnet address of an interface on the mapped network, and the PUP host number is the least significant eight or fewer bits of the host address of the interface. As a result of this, all of the PUP networks must be mapped onto one subnetted IP network.

To configure the mapping, use the global configuration command:

```
pup map address
```

The argument *address* is the network number of the major network over which the PUP network is overlaid.

All PUP routes acquired via the GWINFO routing protocol are entered into the IP routing table and labeled with a G. The reverse is *not* true; IP routes are not propagated into the PUP routing table.

PUP Miscellaneous Services

The Cisco PUP support allows broadcasts to the PUP Miscellaneous Services socket to be forwarded to another network (the helper address) where the appropriate servers can be found. This function is available in either mode of routing operation. To set the helper address, use the **pup helper-address** interface subcommand, which has this syntax:

```
pup helper-address address  
no pup helper-address
```

The argument *address* is the PUP address of the desired server in the format described above.

The PUP Ping Command

The privileged EXEC command **ping** sends PUP Echo packets when the keyword **pup** is specified as the protocol. The ping menu also prompts you for a PUP protocol address; enter an address to begin the exchange.

Monitoring PUP

Use the EXEC commands described in this section to display statistics about the PUP network.

show pup arp

The command **show pup arp** displays PUP-specific ARP entries.

show pup route

The command **show pup route** displays routing entries obtained from the PUP routing protocol.

show pup traffic

The command **show pup traffic** displays statistical summaries of PUP packets when PUP routing is enabled.

Debugging PUP

Use the EXEC commands described in this section to display reports about activity on the PUP network. For each **debug** command, there is a corresponding **undebug** command that turns message logging off.

debug pup-packet

The command **debug pup-packet** enables logging of PUP routing activity to the console terminal.

debug pup-routing

The command **debug pup-routing** enables logging of PUP GWINFO routing exchanges to the console terminal.