

Overview

This chapter provides an overview of the Cisco 805 router, sample networks in which the router is commonly used, and router configuration options.

Cisco 805 Router Overview

The Cisco 805 router is designed for small professional offices and runs a subset of Cisco IOS software. This router includes one 10BaseT Ethernet port and one serial port, which can connect EIA/TIA-232, EIA/TIA-449, EIA/TIA-530, EIA/TIA-530A, X.21, and V.35 data terminal equipment (DTE) or data communications equipment (DCE).

You can connect a hub, server, PC, or workstation to the Ethernet port. The device that you connect to this port and the devices that are in turn connected to this device comprise your LAN.

A channel service unit/data service unit (CSU/DSU) and an asynchronous modem are the devices most commonly connected to the serial port. Both of these devices are DCE devices. The device that you connect to this port and the devices that are in turn connected to this device comprise your WAN.

Connect a CSU/DSU if you want to use a synchronous leased line, Frame Relay, or X.25, which are constantly active. Connect an asynchronous modem if you want your serial line to be a *dial-up line*. A dial-up line activates only when you need to access your WAN or when the router needs to send updates to other networking devices.

Note Because a dial-up line is not constantly active, it is typically less expensive than a leased line, Frame Relay, or X.25. However, some protocols (IP, User Datagram Protocol [UDP], IPX, and Simple Network Time Protocol [SNTP]), send updates that can cause the dial-up line to be activated excessively. For information on preventing this situation, refer to “Controlling Dial-up Line Activation” in Chapter 5, “Advanced Features.”

For more details on connecting Ethernet and serial devices, refer to the *Cisco 805 Router Hardware Installation Guide*.

Sample Network Overview

Figure 1-1 and Figure 1-2 show sample networks in which the Cisco 805 router is commonly used.

Figure 1-1 Remote Office to Corporate Office

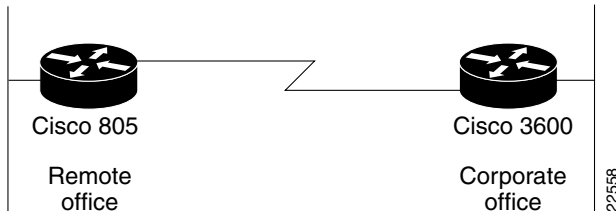
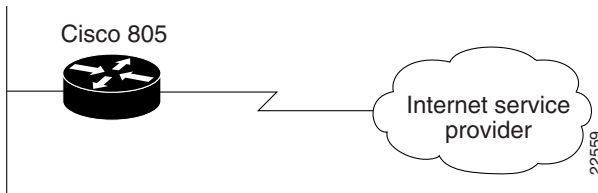


Figure 1-2 Small Office to ISP



In the remote-office-to-corporate-office sample network, the remote office is typically a small professional office that is part of a larger corporation, such as a real estate office. Although a majority of its data might exist at the remote office itself, the remote office might also need to exchange data with its larger corporate office. As a result, the remote office needs a connection to the corporate office.

In the small-office-to-Internet Service Provider (ISP) sample network, the small office is typically a small, independent professional office, such as an architectural firm. This type of office needs to access information from the Internet; therefore, it needs a connection to an ISP.

This guide presents several variations of these two sample networks. See Table 1-1 for a summary of the remote-office-to-corporate-office networks and Table 1-2 for a summary of the small-office-to-ISP networks presented in this guide.

The sample networks are ordered from simple to more complex in terms of concepts and configuration: remote-office-to-corporate-office network number 1 is the simplest, while network number 5 is the most complex.

Table 1-1 Remote-Office-to-Corporate-Office Networks

| No. | WAN Options | WAN Encapsulation | Routed Protocols | Other Features |
|-----|---------------------------|-------------------------------------|------------------|--|
| 1 | Synchronous leased line | High-Level Data Link Control (HDLC) | IP | Dynamic IP routing |
| 2 | Synchronous leased line | Point-to-Point Protocol (PPP) | IP, IPX | Dynamic IP and IPX routing |
| 3 | X.25 | X.25 | IP, IPX | Dynamic IP and IPX routing |
| 4 | Asynchronous dial-up line | PPP | IP, IPX | <ul style="list-style-type: none"> • Static IP and IPX routes • Easy IP (Phase 2) – DHCP server |
| 5 | Frame Relay | Frame Relay | IP, IPX | <ul style="list-style-type: none"> • Partially meshed Frame Relay topology • Subinterfaces • Dynamic IP and IPX routing • Easy IP (Phase 2) – Dynamic Host Configuration Protocol (DHCP) relay |

Table 1-2 **Small-Office-to-ISP Networks**

| No. | WAN Options | WAN Encapsulation | Routed Protocols | Other Features |
|-----|---------------------------|-------------------|------------------|---|
| 1 | Synchronous leased line | PPP | IP | Static IP route |
| 2 | Asynchronous dial-up line | PPP | IP | <ul style="list-style-type: none">• Static IP route• Easy IP (Phase 1) – Network Address Translation (NAT) and PPP/IP Control Protocol (IPCP)• Firewall |
| 3 | Frame Relay | Frame Relay | IP | <ul style="list-style-type: none">• Static IP route• NAT overload• Firewall |

How to Use Sample Networks

The sample networks are provided as models after which you can pattern your network. They cannot, however, anticipate all of your network needs. You can choose not to use features presented in the sample networks or add or substitute features that better suit your needs.

Deciding Which Sample Network to Use

To determine which sample network best suits your needs, you must decide which WAN options (synchronous leased line, asynchronous dial-up line, Frame Relay, or X.25) to use. If you decide to use a synchronous leased line or an asynchronous dial-up line, you must also decide which WAN encapsulation protocol to use.

The following sections provide information to help you decide which WAN options and encapsulation to use.

WAN Options

The most important factor in determining which sample network you use is the WAN option you choose (synchronous leased line, asynchronous dial-up line, Frame Relay, or X.25). Use the following criteria to help you decide which WAN option to use:

- Bandwidth requirements
- Cost
- Availability

To determine bandwidth requirements, you must consider the amount of data that will pass through your network and its speed. In general, an asynchronous modem (dial-up line) provides the least bandwidth, while a synchronous leased line provides the most bandwidth.

An asynchronous modem/dial-up line would probably suffice for a small professional office that needs to access the Internet a few times a day. However, a small office that needs to exchange large amounts of data with its corporate office throughout the day would probably need the higher throughput provided by a synchronous leased line or Frame Relay.

The monthly cost associated with your WAN options is an important factor. You can place the available WAN options into two categories:

- Lines that are constantly active, such as a synchronous leased line, a Frame Relay line, or an X.25 line
- Lines that are active on an as-needed basis, such as a dial-up line

In general, a dial-up line is the cheapest because it is not constantly active. Of the WAN options that offer constantly active lines, Frame Relay is the cheapest, then synchronous leased lines, then X.25 lines.

Note Because a dial-up line is not constantly active, it is typically less expensive than a leased line, Frame Relay, or X.25. However, some protocols (IP, UDP, IPX, and SNMP), send updates that can cause the dial-up line to be activated excessively. For information on preventing this situation, refer to “Controlling Dial-up Line Activation” in Chapter 5, “Advanced Features.”

Not all countries and regions have infrastructures for all WAN technologies. Therefore, your selection of WAN options might be limited by what is available. For example, X.25 might be the only WAN option supported in your country. If you are uncertain about your WAN options, contact the WAN service provider in your area.

WAN Encapsulation

If you decide to use a synchronous leased line or an asynchronous dial-up line, you must also decide what type of WAN encapsulation to use. *Encapsulation* is the wrapping of data in a particular protocol header. The type of router that you are connecting to the Cisco 805 router determines the type of WAN encapsulation. If the router you are connecting is a Cisco router that runs IOS software, use HDLC. If the router you are connecting is a Cisco router that does not run IOS software or is a non-Cisco router, use PPP.

Other Features

This section discusses the features used in the sample networks. You can choose not to use features presented in the sample networks or add or substitute features that better suit your needs.

Routed and Routing Protocols

In general, the remote-office-to-corporate-office sample networks use IP and IPX as the routed protocols. The exception is network 1 (synchronous leased line, HDLC), which is the simplest sample of this network type and uses IP only.

In general, the remote-office-to-corporate-office sample networks use the dynamic routing protocols IP RIP and IPX RIP to learn the route to the corporate office network. (Instead of using IP RIP, you can use IP EIGRP. IPX EIGRP is not supported.) The exception is network 4 (asynchronous dial-up line, PPP), which uses *static IP and IPX routes*, which are user-defined routes to reach the corporate office network.

The small-office-to-ISP networks use IP as the only routed protocol. Instead of using a dynamic routing protocol such as RIP to learn the route to the ISP, these networks use a static IP route to reach the ISP. In this situation, a dynamic routing protocol would advertise the small office network routes to the Internet, which is undesirable.

Easy IP (Phase 1)

Small-office-to-ISP network 2 (asynchronous dial-up line, PPP) uses the Easy IP (Phase 1) feature. Easy IP (Phase 1) combines NAT and PPP/Internet Protocol Control Protocol (PPP/IPCP).

For cost-effectiveness, this sample network assumes that the small office wants to buy as few registered IP addresses as possible from the Network Information Center (NIC) or the ISP. Instead, it will use private, nonregistered IP addresses everywhere except on the serial interface, which needs a registered IP address to access the ISP.

With PPP/IPCP, the Cisco 805 router automatically negotiates a globally unique (registered or public) IP address for the serial interface from the ISP router. With NAT, the Cisco 805 router translates the nonregistered IP addresses used by the small office network hosts into the globally unique IP address used by the serial interface when they access the Internet or vice versa.

For more information, see “Configuring Easy IP (Phase 1)” in Chapter 5, “Advanced Features.”

Easy IP (Phase 2)

Remote-office-to-corporate-office networks 4 and 5 (asynchronous dial-up line, PPP and Frame Relay, respectively) use the Easy IP (Phase 2) feature. Easy IP (Phase 2) combines Dynamic Host Configuration Protocol (DHCP) server and relay.

As an option, remote-office-to-corporate-office network 4 configures the Cisco 805 router as a DHCP server. The DHCP server assigns IP addresses to DHCP clients on the remote office network, thereby automating IP address administration.

Remote-office-to-corporate-office network 5 assumes that your corporate office network has a workstation or PC configured as a DHCP server and that DHCP clients on the remote office network need to access the DHCP server. If this situation applies to you, you can configure the DHCP relay feature on the Cisco 805 router. With this feature configured, the router can relay IP address requests from the LAN interface, over the serial or dialer interface, and to the DHCP server.

For more information, see “Configuring Easy IP (Phase 2)” in Chapter 5, “Advanced Features.”

Firewall

To configure a firewall, you must have one of the Cisco 805 software images that contain the firewall feature. For information on the firewall features that the Cisco 805 router supports, refer to the release notes that ship with the Cisco 805 router.

Small-office-to-ISP networks 2 and 3 (asynchronous dial-up line with PPP and Frame Relay, respectively) use the firewall feature to block undesired traffic from the ISP. To configure a firewall in these sample networks, you can use either the Cisco 805 Fast Step application (recommended for inexperienced network administrators) or the Cisco IOS software command-line interface (CLI) (recommended for more experienced network administrators).

If you want to configure a firewall in a remote-office-to-corporate-office network, you must use the Cisco IOS CLI.

For information on how to use the Cisco 805 Fast Step application, refer to the application online help. For information on how to configure a firewall using the CLI, refer to the *Cisco IOS Firewall Feature Set* feature module, which appears on Cisco Connection Online (CCO) only. This feature module also provides conceptual information on the firewall feature.

NAT Overload

Small-office-to-ISP network 3 (Frame Relay) uses the NAT overload feature. For cost-effectiveness, this sample network assumes that the small office wants to buy as few registered IP addresses as possible from the NIC or the ISP. Instead, it will use private, nonregistered IP addresses everywhere except on the serial interface, which needs a registered IP address to access the ISP.

You must buy one registered IP address for the serial interface from the ISP, then using NAT overload, all hosts in this sample network can use this registered IP address when accessing the Internet.

For more information, refer to the “Configuring NAT Overload” section in Chapter 5, “Advanced Features.”

Configuration Options

You can configure the router software using the following options:

- Cisco 805 Fast Step software
- Cisco ConfigMaker software
- Cisco IOS software

Cisco 805 Fast Step Software

Note Cisco recommends that inexperienced network administrators use the Cisco 805 Fast Step software to configure their routers.

The Cisco 805 Fast Step software is a Windows 95, Windows 98, and Windows NT based application that performs a basic configuration of your router. The Cisco 805 Fast Step software walks you through each step of the router configuration.

The Cisco 805 Fast Step software ships with the router; it is also available on Cisco Connection Online (CCO).

You can configure some of the sample networks described earlier in this chapter with Cisco 805 Fast Step. For more information, refer to Table 3-1 and Table 4-1.

Note The Cisco 805 Fast Step software might configure the sample networks differently than is described in this guide.

Cisco ConfigMaker Software

The Cisco ConfigMaker software is a Windows 95, Windows 98, and Windows NT based graphical application that can configure a small network of Cisco routers from a single PC, including the Cisco 805 router, switches, hubs, and other network devices. The Cisco

ConfigMaker software is designed for resellers and network administrators of small- to medium-size businesses who are familiar with LAN fundamentals and basic network design.

You can access a free copy of the Cisco ConfigMaker software at this location:

<http://www.cisco.com/cgi-bin/tablebuild.pl/configmaker>

Cisco IOS Software

The Cisco 805 router runs a subset of Cisco IOS software. Cisco recommends using the command-line interface (CLI) to configure your router if one of the following applies:

- You have previous experience configuring network devices.
- You have previous experience with Cisco IOS software.

You can configure all of the sample networks described earlier in this chapter by using the CLI.

If you need a refresher on how to use Cisco IOS software, go to Chapter 2, “Cisco IOS Basic Skills.” If you are ready to configure your router, go to Chapter 3, “Configuring Remote Office to Corporate Office Networks” or Chapter 4, “Configuring Small Office to ISP Networks.”

Network Management Support

The CiscoView software supports the Cisco 805 router. This software provides dynamic status, statistics, and comprehensive configuration information for Cisco switches, routers, concentrators, and adapters. It graphically displays a physical view of Cisco devices. This software also provides configuring and monitoring functions and offers basic troubleshooting.