Chapter 1
Router Product Overview

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This chapter provides a product overview of the Cisco Systems router products. You will find the following information in this chapter:

■ Router products capabilities

■ Network protocols supported by Cisco routers

■ Routing protocols supported by Cisco routers

■ Media supported by Cisco routers

Capabilities of the Router

Complex internetworks have grown past the point where they can depend on equipment from a single vendor. Virtually all organizations connecting local area networks and creating wide area networks today have major commitments to hardware and software from many different vendors. Therefore, current and future internetworking requires products that support multiprotocol, multimedia, and multivendor networks.

Routers from Cisco Systems help LANs and WANs achieve interoperability and connectivity. They operate with equipment from all vendors over most available media. This section describes Cisco-supported protocols and media, as well as the capabilities of Cisco Systems routers for routing, network management, and network security.

Support for Multiple Network Protocols

Large organizations need the flexibility that multiprotocol networks give them to communicate with diverse hardware and software from many vendors. Cisco Systems routers support many networking protocols, as well as several specific routing protocols for compatibility with other networks. Included are protocols based on open standards and proprietary protocols from a variety of vendors.

One Cisco Systems router can forward packets concurrently from any combination of the following networking protocols:

■ TCP/IP

■ DECnet Phase IV

■ XNS (Xerox Network Service)

- Novell IPX

- Ungermann-Bass

- AppleTalk (Phase 1 and Phase 2)

- ISO Connectionless Network Services (CLNS) and Connection Mode Network Services (CMNS)

- Apollo Domain

- Banyan VINES

- Xerox's Universal Protocol (PUP)

- CHAOSnet

- X.25 protocols

- DDN protocols, as used with the DDN X.25 Standard, 1822-LH/DH, and HDH (1822-J) attachments

- Frame Relay serial encapsulation

- Switched Multimegabit Data Service (SMDS) protocol

- Point-to-Point Protocol (PPP)

Dynamic Network Routing

The Interior Gateway Routing Protocol (IGRP™), developed by Cisco Systems for TCP/IP and ISO CLNS (referred to as ISO-IGRP), monitors the network to determine the status of each route and selects the best route for each data packet. Network traffic, path reliability, and path speed all influence route selection. Cisco Systems specifically designed IGRP to address the problems of routing on complex networks with many alternative routes, built of media with diverse bandwidth and delay characteristics.

While running IGRP or ISO-IGRP, Cisco Systems routers can concurrently receive and understand messages from other network segments sent using different routing protocols. For example, IP routing protocols supported by Cisco Systems, in addition to IGRP, include:

- Open Shortest Path First (OSPF)—the link state based interior gateway protocol defined by RFC 1247.

- Routing Information Protocol (RIP)—the interior routing protocol used by the routing process on Berkeley-derived UNIX systems.

- Exterior Gateway Protocol (EGP)—the routing protocol used by all routers attached to the Defense Data Network (DDN). The Cisco Systems implementation maintains contact with multiple EGP-speaking routers, preserving routing information when the DDN core routers do not respond.

- Border Gateway Protocol (BGP) is a replacement protocol for EGP. BGP is defined by RFC 1163.

Similarly, Cisco routers support concurrent operation of ISO-IGRP and the ISO-standard intermediate system-to-intermediate system (IS-IS).

All Cisco Systems routers support the native dynamic routing protocols used by the various supported network protocols, such as DECnet, Novell IPX, and AppleTalk. This allows compatibility with other vendor's routers. Multiple network protocols and their dynamic routing protocols operate concurrently, sharing the same router and media.

Support for Standard Media

For convenient access to existing networks, Cisco Systems network servers support these industry-standard networking media:

■ Ethernet—IEEE 802.3 and Type II

■ Token Ring—IEEE 802.5

■ FDDI—single and dual mode

■ Synchronous serial—V.35, RS-232, and RS-449

■ High-Speed Serial Interface (HSSI)—T3 rates

■ UltraNet