

Cisco 1600 Series Routers: Next-Generation Internet and Intranet Access for Small Offices

Market Overview

Companies seeking competitive advantage through the strategic use of information technology are increasingly confronted by a bewildering array of products and rapidly changing technologies. In such a world of constant change, small offices require flexible and affordable Internet and intranet access solutions. They also require advanced end-to-end security to safeguard their data, along with end-to-end quality of service to take advantage of emerging multimedia applications that integrate data, voice, and video. And they need access solutions that are easy to use, deploy, and manage.

Until now, most products targeted at the small office Internet/intranet access market either were designed for larger environments, making them too full-featured and costly, or were designed for home use, thereby lacking important features and flexibility for the small office. Customers need solutions designed specifically for small offices, offering flexibility, end-to-end security, end-to-end quality of service, low cost, and ease of use, deployment, and management. To meet these needs, Cisco Systems developed the Cisco 1600 series, defining the next generation of Internet/intranet access routers.

Figure 1 The Cisco 1600 Series Router



Modularity for Flexibility and Investment Protection

Cisco 1600 series routers connect small offices with Ethernet LANs to the Internet and to company intranets using several wide-area-network (WAN) technologies: Integrated Service Digital Network (ISDN), asynchronous serial, and synchronous serial such as Frame Relay, leased lines, Switched 56, Switched Multimegabit Data Service (SMDS), and X.25. The Cisco 1600 series consists of four models, each of which has an Ethernet port, a built-in WAN port, and a slot for an optional second WAN port:

- Cisco 1601: one Ethernet, one serial, one WAN interface card slot
- Cisco 1602: one Ethernet, one serial with integrated 56-kbps data service unit/channel service unit (DSU/CSU), one WAN interface card slot
- Cisco 1603: one Ethernet, one ISDN Basic Rate Interface (BRI) (S/T interface), one WAN interface card slot
- Cisco 1604: one Ethernet, one ISDN BRI with integrated Network Termination 1 (NT1) (U interface), one S-bus port for ISDN phones, one WAN interface card slot

Figure 2 Rear View of Cisco 1600 Series Router with WAN Interface Card and Flash Memory PC Card



The WAN interface card slot allows customers to change and/or add WAN interface cards as their WAN requirements change or as service-provider WAN offerings and pricing change. Thus, the Cisco 1600 series offers more flexibility and investment protection than other products in this class.

End-to-End Security

Extensive end-to-end security and data privacy features in the Cisco 1600 series ensure the safety of customers' information throughout and across their networks. This includes advanced features not commonly available in small-office routers: firewall, router/route authentication, Lock and Key, generic routing encapsulation (GRE) virtual private network (VPN) tunneling, and 40- and 56-bit encryption¹.

End-to-End Quality of Service

A new breed of interactive and time-sensitive applications, such as distance learning and desktop videoconferencing, which integrate data, voice, and video on the same network, is emerging. This new type of traffic requires *end-to-end* quality of service (QoS), such as guaranteed bandwidth and delay contracts, to ensure that all the required information arrives in time to be useful. The Cisco 1600 series routers, with key Cisco Internetwork Operating System (Cisco IOS™) features such as Resource Reservation Protocol (RSVP)¹, Weighted Fair Queuing (WFQ), IP Multicast, and AppleTalk Simple Multicast Routing Protocol (SMRP), provide the end-to-end QoS and multimedia support not offered by any other small-office routers today.

1. Encryption RSVP, NAT, and IPeXchange features are available on the Cisco 1600 series with Cisco IOS™ software Release 11.2 in Q1'97. For export restrictions on encryption, please refer to Cisco IOS software release 11.2 documents.

Enhanced Internet/Intranet Access Features

The Cisco 1600 series enhances Internet/intranet access for the small office with several unique leadership features. Network Address Translation (NAT)¹ allows a privately addressed network to access public registered networks such as the Internet without requiring a registered subnet address. This eliminates the need for host renumbering and allows the same IP address range to be used in multiple intranets. IPeXchange¹ IPX-to-IP gateway allows all users on a NetWare LAN to access the Internet without having to install IP on each PC or workstation. Both the NAT and IPeXchange features require only a single IP address, thereby conserving address space. GRE tunneling enhances the creation of VPNs and intranets over the public Internet by tunneling traffic between networks.

Ease of Use and Deployment

The Cisco 1600 series routers are designed to be "plug-and-play" devices: nontechnical personnel can install the products easily and quickly while ongoing administration can be performed through a central site. Preconfigured software can be stored on a Flash memory PC card (formerly known as PCMCIA card) at a central site and then sent to remote sites, where users can simply insert the Flash card into the router. ClickStart™ initial configuration and monitoring software enables users to quickly install and configure the Cisco 1600 router using any Web browser. The AutoInstall feature allows software upgrades and configuration modifications to be downloaded over the WAN from a central site.

Establishing ISDN Service

Establishing ISDN service can be a time-consuming and unwieldy process. Cisco's ISDN Support provides a single point-of-contact for setting up your Cisco equipment with an ISDN connection. Support representatives, serving as a single-point-of-contact, work closely with you to capture information for your Internet Service Provider and long distance carrier, while helping to make the transition to ISDN easy. This service is provided free-of-charge.

WAN Optimization: Reduced Cost of Ownership

Recurring WAN costs typically account for the majority of the total cost of ownership over the lifetime of an access router. The Cisco 1600 series provides best-in-class WAN-optimization features to reduce WAN costs, with features such as dial-on-demand routing (DDR), bandwidth-on-demand (BOD), Open Shortest Path First (OSPF)-on-demand circuit, Snapshot Routing, compression, filtering, and spoofing.

Efficient Network Management

The Cisco 1600 series supports a wide range of platforms and applications to monitor and manage company-wide data networks. CiscoWorks™ and CiscoView™ applications, running on Windows 95, Windows NT, and UNIX platforms, provide leadership capabilities in configuration and security management, as well as performance and fault monitoring. The Cisco 1600 series allows for centralized administration and management via Simple Network Management Protocol (SNMP), Telnet, or through the console port.

The combination of features described above—ease of use and deployment, WAN optimization, and network management—give the lowest total cost of ownership (the sum of deployment costs, administrative costs, and WAN costs) in this class of products.

Features at a Glance:

The Cisco 1600 series consists of four models, each supporting the following interfaces

Model	Ethernet LAN	Built-in WAN Port	Supported Optional WAN Card
Cisco 1601	10BaseT (RJ-45) - AUI (DB-15)	- Serial, async and sync – Async: EIA/TIA-232 – Sync: EIA/TIA-232, V.35, X.21, EIA/TIA-449, EIA-530; (60-pin connector)	- Serial, async and sync - ISDN BRI S/T - ISDN BRI U with integrated NT1
Cisco 1602	10BaseT (RJ-45) - AUI (DB-15)	Sync serial with integrated 56-kbps four-wire DSU/CSU; (RJ-48S connector)	- Serial, async and sync - ISDN BRI S/T - ISDN BRI U with integrated NT1
Cisco 1603	10BaseT (RJ-45) - AUI (DB-15)	ISDN BRI S/T; (RJ-45 connector)	Serial, async and sync
Cisco 1604	10BaseT (RJ-45) - AUI (DB-15)	ISDN BRI U with Integrated NT1; (RJ-45 connector); S-bus port for ISDN phone/fax; (RJ-45 connector)	Serial, async and sync

Modular WAN Interface Cards

- One external slot for optional modular WAN interface card
- Three types of WAN interface cards are available: serial (asynchronous and synchronous), ISDN BRI S/T, and ISDN BRI U with integrated NT1, supported by the various models as shown in Table 1
- The serial WAN interface card also is supported by the Cisco 3600 series; the ISDN WAN interface cards will also be supported by the Cisco 3600 series in the first half of 1997

Serial Interfaces Supported by the Cisco 1601 Router and Serial WAN Interface Cards

- Asynchronous serial up to 115.2 kbps over analog basic telephone service
 - Point-to-Point Protocol (PPP), Serial Line Interface Protocol (SLIP) encapsulations
- Synchronous serial up to 2.048 Mbps
 - Digital leased line, Frame Relay, SMDS, Switched 56, X.25, High-Level Data Link Control (HDLC), Link Access Procedure, Balanced (LAPB), and PPP

Serial Interfaces Supported by the Cisco 1602 Router Integrated 56-kbps 4-Wire DSU/CSU

- Synchronous serial for permanent and switched 56 kbps
 - Digital Data Service (DDS), Frame Relay, SMDS, X.25, HDLC, LAPB, PPP

ISDN Interfaces Supported by the Cisco 1603 Router, Cisco 1604 Router, and All ISDN WAN Interface Cards

- ISDN switched, semipermanent, and permanent connections
- PPP compression (4:1) and BOD with load balancing for links up to 128 kbps, giving an effective throughput of up to 512 kbps

Features Common to All Cisco 1600 Series Models

- One console port with RJ-45 connector
- One external PC card (formerly PCMCIA card) slot for Flash memory card (included)

- IP, IPX, and AppleTalk routing options (exception: AppleTalk is not supported over asynchronous serial)
- Transparent bridging (exception: not supported over asynchronous serial)
- DDR over circuit switched WAN services
- Security features: firewall, Challenge Handshake Authentication Protocol (CHAP), Password Authentication Protocol (PAP), packet filters, Lock and Key, extended access lists, NAT², 40- and 56-bit encryption¹
- QoS (multimedia) support: RSVP,¹ WFQ, IP Multicast, AppleTalk SMRP
- IPX and SPX spoofing
- Snapshot routing
- Ease-of-use and deployment features: ClickStart, AutoInstall, and Flash memory PC Card for storing preconfigured software
- Network management and monitoring via SNMP, Telnet, and through the console port

Choice of Software Feature Sets

The Cisco 1600 series is available in four Basic feature sets and four Plus feature sets as shown in Tables 2 and 3. Plus feature sets include everything offered in the corresponding Basic feature set, plus the features listed in the Plus table.

2. These features are offered in Cisco 1600 series with Cisco IOS Release 11.2 in Q1 '97

Basic Feature Set

Category	Basic Protocols/Features	Basic Feature Sets			
		IP	IP/IPX	IP/AT	IP/IPX/AT
LAN	Transparent bridging	X	X	X	X
	IP	X	X	X	X
	IPX, NetBIOS access lists, name caching		X	—	X
	AppleTalk phases 1 and 2			X	X
WAN	Leased lines, Frame Relay, Switched 56, SMDS, HDLC	X	X	X	X
	PPP, PPP compression	X	X	X	X
	Async, SLIP	X	X	X ¹	X ¹
	X.25, X.25 PAD, LLC2, LAPB	X	X	X	X



Category	Basic Protocols/Features	Basic Feature Sets			
		IP	IP/IPX	IP/AT	IP/IPX/AT
IP Routing	RIP, RIPv2, IGRP®, Enhanced IGRP, GRE	X	X	X	X
	IP-policy routing	X	X	X	X
	GRE tunneling	X	X	X	X
Other Routing	IPX-RIP	—	X	—	X
	RTMP (AppleTalk)	—	—	X	X
Security	PAP, CHAP, local password	X	X	X	X
	Firewall, Lock and Key, GRE tunneling	X	X	X	X
Quality of Service	WFQ, custom queuing, priority queuing	X	X	X	X
WAN Optimization	BOD, DDR	X	X	X	X
	IPX and SPX spoofing	—	X	—	X
	Snapshot routing	X	X	X	X
Ease of Use	Web browser install (ClickStart)	X	X	X	X
	AutoInstall for leased line and Frame Relay	X	X	X	X
Management	SNMP, Telnet, console port	X	X	X	X

1. AppleTalk routing and bridging are not supported for asynchronous interfaces.

PLUS Feature Sets— Additional Features

Category	Additional Protocols/Features in PLUS	Plus Feature Sets			
		IP	IP/IPX	IP/AT	IP/IPX/AT
WAN	Frame Relay SVC ¹	11.2	11.2	11.2	11.2
IP Routing	OSPF, on-demand OSPF, NHRP	X	X	X	X
Other Routing	NetWare Link Services Protocol (NLSP)	—	X	—	X
	AppleTalk AURP, ATIP	—	—	X	X
Security	Encryption (40- and 56-bit payload) ^{1, 2}	11.2	11.2	11.2	11.2
Quality of Service	RSVP ¹	11.2	11.2	11.2	11.2
	IP multicast (Protocol Independent Multicast or PIM)	X	X	X	X
	AppleTalk SMRP (multicast)	—	—	X	X
Enhanced Internet/Intranet Access	NAT ¹	11.2	11.2	11.2	11.2
	IPeXchange IPX-IP gateway ¹	11.2	11.2	11.2	11.2

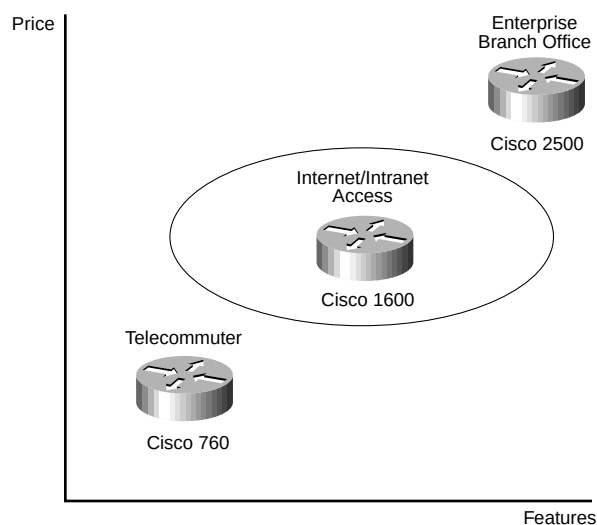
1. These features are offered in Cisco IOS Release 11.2 in Q1 '97.

2. Encryption is available in special encryption feature sets in Cisco IOS Release 11.2 in Q1 '97. Export restrictions apply to encryption technology. See Cisco IOS Release 11.2 documents for more details.

Cisco 1600 Series Positioning

The Cisco 1600 series of small-office Internet/intranet access routers expands on the success of the Cisco 1000 series, providing additional functionality and flexibility at a lower price. The Cisco 1600 series is positioned between the Cisco 760 series and the Cisco 2500 series.

Figure 3 Positioning of the Cisco 1600 Series



The Cisco 760 series is a low-cost solution designed specifically for dial-up telecommuters/teleworkers and very small offices. It offers IP/IPX routing and bridging over ISDN as well as basic telephone service interfaces for analog

connections over ISDN. The Cisco 1600 series is designed for small offices of, for example, up to 20 users, where their Internet and intranet access requires the additional functionality and flexibility of the Cisco 1600 series.

The Cisco 2500 series complements the Cisco 1600 series and is intended for larger enterprise branch offices, offering a range of features such as integrated hubs, up to ten serial ports, and dual LAN ports (Ethernet and Token Ring) that extend beyond the small-office suite of features offered in the Internet/intranet access class of products. Also, the Cisco 2500 series supports a number of additional LAN protocols such as Virtual Integrated Network Service (VINES), DECnet, and IBM legacy protocols.

Preliminary Availability by Country

Table 4 represents preliminary information. Complete telecom network certification information, including country-by-country status, is available online on Cisco Connection Online (CCO) for registered users only under "Product Approval Status" at the following URL: <http://warp/customer/508/index.shtml>. Please review this data for the most recent updates regarding country availability, including certification/registration numbers.

Country	Cisco 1601	Cisco 1602 (US/Canada Only)	Cisco 1603	Cisco 1604 (US/Canada Only)	Serial WAN Interface Card	ISDN BRI S/T WAN Interface Card	ISDN BRI U WAN Interface Card
Australia	11/96	Not sold here	12/96	Not sold here	11/96	12/96	Not sold here
Austria	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Belgium	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Canada	11/96	11/96	11/96	11/96	11/96	11/96	11/96
China	11/96	Not sold here	Distributor	Not sold here	11/96	Distributor	Not sold here
Columbia	2/97	Not sold here	Local ¹	Not sold here	11/96	Local ¹	Not sold here
Denmark	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Finland	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
France	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Germany	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Greece	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here



Country	Cisco 1601	Cisco 1602 (US/Canada Only)	Cisco 1603	Cisco 1604 (US/Canada Only)	Serial WAN Interface Card	ISDN BRI S/T WAN Interface Card	ISDN BRI U WAN Interface Card
Hong Kong	11/96	Not sold here	12/96	Not sold here	11/96	12/96	Not sold here
Iceland	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Ireland	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Italy	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Japan	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Luxembourg	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Mexico	11/96	Not sold here	12/96	Not sold here	11/96	1/97	Not sold here
Netherlands	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
New Zealand	11/96	Not sold here	12/96	Not sold here	11/96	12/96	Not sold here
Norway	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Portugal	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Singapore	11/96	Not sold here	12/96	Not sold here	11/96	12/96	Not sold here
South Korea	11/96	Not sold here	Distributor	Not sold here	Distributor	Distributor	Not sold here
Spain	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Sweden	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Switzerland	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
Taiwan	11/96	Not sold here	12/96	Not sold here	11/96	12/96	Not sold here
UK (CE MARK)	11/96	Not sold here	11/96	Not sold here	11/96	11/96	Not sold here
United States	11/96	11/96	11/96	11/96	11/96	11/96	11/96

1. *Notes:* Local indicates that homologation is supported by local sales office. Distributor indicates that homologation is completed by the Cisco distributor in that country.

Note: For the following countries, either homologation testing does not apply, testing requirements are being developed, or local distributors arrange for homologation testing: Albania, Argentina, Armenia, Azerbaijan, Belarus, Bolivia, Brazil, Bulgaria, Chile, Costa Rica, Czech Republic, El Salvador, Equador, Estonia, Finland, Georgia, Guatemala, Hungary, Iceland, India, Indonesia, Israel, Jamaica, Kazakhstan, Kyrgyz, Latvia, Lebanon, Malaysia, Morocco, Panama, Paraguay, Peru, Philippines, Poland, Puerto Rico, Russia, Saudi Arabia, Slovak Republic, Slovenia, South Africa, Thailand, Turkey, United Arab Emirate, Uruguay, Venezuela.

Availability and Orderability

The Cisco 1600 series is now orderable and will ship in November 1996.

Other Product Information

See the Cisco 1600 series Product Line Brochure for:

- Applications
- Cisco 1600 Series Features and Benefits Summary Table

See the Cisco 1600 Series Data Sheet for:

- Technical Specifications

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