Access Servers

This chapter provides information on Cisco's access server products. The information is organized into the following sections:

- Product Overview
- Standard Features
- Interface Options
- Access Server Models
  - Cisco 2500 Series Access Servers
  - Cisco AS5100 Access Server
  - Cisco AS5200 Universal Access Server
  - Hardware Options for All Access Servers
- Software Options
  - LAT Terminal License
  - CiscoRemote Software
  - CiscoSecure UNIX Server

Note Documentation for the Cisco access servers is available in two forms: on a CD-ROM called Cisco Connection Documentation, Enterprise Series and printed books. A CD and hard-copy installation documentation ship with each chassis, and a configuration note ships with each component ordered. All configuration notes are available on the CD. Additional CDs and a subscription CD update service are also available.

You can also access Cisco technical documentation on the World Wide Web URL http://www.cisco.com. For more information, see the chapter "Documentation."

Product Overview

Cisco access servers include the following products:

- Cisco 2500 series access servers

  The Cisco 2500 series access servers support 8 or 16 asynchronous ports, one Ethernet or Token Ring port, and two synchronous ports. The Cisco 2500 series access servers consist of the following models:

  — Model 2509 and 2509 DC

  — Model 2510

  — Model 2511 and 2511 DC

  — Model 2512

- Cisco AS5100 access server

  — 17 card slots

  — Up to 16 network application cards (NACs), which include the following:

  Access Server cards

  Quad modem cards

  Dual-channelized T1 card

  — All NACs support hot swapping, which allows you to insert and remove cards while the power is on

  — Two power supplies: one main supply and one redundant supply, which are accessible at the front of the chassis

  — AC or DC power supplies

- Cisco AS5200 universal access server

  — Modular chassis that contains three feature card slots and a high-speed, multilayer backplane

  — Up to three feature cards that provide either channelized T1, PRI, or modem support

  — One Ethernet LAN port

  — Two synchronous ports

  — AC or DC power supply

The following software applications are used to enable Internet traffic to pass through access servers, use Internet applications, establish remote connections, and control access to networks:

- Cisco IOS Releases
- LAT Terminal License
- CiscoRemote Software
- CiscoSecure UNIX Server

Standard Features

This section compares the features of the Cisco access servers. Table 158 lists the features of Cisco access servers. Table 159 lists the environmental specifications for the Cisco access servers.

Table 158 Cisco Access Server Series Summary of Features

Characteristic	Cisco 2500 Series Access Servers	Cisco AS5100 Access Server	Cisco AS5200 Access Server
Supported network interfaces	Ethernet Synchronous serial Asynchronous serial Token Ring	Ethernet Synchronous serial Asynchronous serial	Ethernet Synchronous serial PRI/T1
Maximum asynchronous connections	8 or 16	48	48
Slots available for network interface cards	–	16	3
Choice of software feature sets			
Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2	IP Routing IP Routing with IBM base functionality IP/IPX Routing IP/IPX Routing with IBM base functionality IP/IPX with IBM base functionality and APPN[1] Desktop Desktop with IBM base functionality Enterprise (includes IBM base functionality) Enterprise/APPN[1] Remote Access Server RMON[2]	IP Routing IP Routing with IBM base functionality IP/IPX Routing IP/IPX Routing with IBM base functionality Desktop Desktop with IBM base functionality Enterprise (includes IBM base functionality) Remote Access Server RMON[2]	IP Routing IP/IPX Routing Desktop Enterprise RMON[2]

Characteristic	Cisco 2500 Series Access Servers	Cisco AS5100 Access Server	Cisco AS5200 Access Server
Cisco IOS Release 11.2	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/APPN/Plus IP/APPN/Plus 40 IP/APPN/Plus 56 Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/APPN/Plus IP/APPN/Plus 40 IP/APPN/Plus 56 Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56	IP IP Plus IP Plus 40 IP Plus 56 Desktop (IP/IPX/Appletalk/DEC) Desktop (IP/IPX/Appletalk/DEC) Plus Desktop (IP/IPX/Appletalk/DEC) Plus 40 Desktop (IP/IPX/Appletalk/DEC) Plus 56 IP/APPN/Plus IP/APPN/Plus 40 IP/APPN/Plus 56 Enterprise Enterprise Plus Enterprise Plus 40 Enterprise Plus 56 Enterprise/APPN Plus Enterprise/APPN Plus 40 Enterprise/APPN Plus 56
Flash memory	All Cisco 2500 series access server models include a minimum of 4 MB of Flash memory; however, depending on the Cisco IOS release level shipped with the system, they might require more memory. Refer to Table 175, later in this chapter, for the minimum Flash memory required for each feature set.	All Cisco AS5100 access server models include a minimum of 4 MB of Flash memory; however, depending on the Cisco IOS release level shipped with the system, they might require more memory. Refer to Table 175, later in this chapter, for the minimum Flash memory required for each feature set.[3] Each access server card (AS51-16A-E) has one Flash SIMM socket; Cisco 2500 series access servers have two Flash SIMM sockets.	4-MB boot Flash 8-MB system Flash
Memory expandability	All models include the minimum DRAM required by the Cisco IOS release level shipped with the system. Refer to Table 175, later in this chapter, for the minimum DRAM required for each feature set.	All models include the minimum DRAM required by the Cisco IOS release level shipped with the system. Refer to Table 175, later in this chapter, for the minimum DRAM required for each feature set.[3]	All models include the minimum DRAM required by the Cisco IOS release level shipped with the system. Refer to Table 176, later in this chapter, for the minimum DRAM required for each feature set.
Dimensions (H x W x D)	1.75 x 17.5 x 10.56" (4.44 x 44.45 x 26.82 cm)	7 x 19 x 18.5" (17.78 x 48.26 x 47.21 cm)	3.5 x 17 x 15" (two rack units)
Weight (average shipping)	10 lb (4.5 kg)	54.5 lb (24.4 kg)	25 lb (11.4 kg)
Standard components	Power supply and cord Console cable RJ-45-to-DB-25 and RJ-4-to-DB-9 adapters Rack-mount /wall-mount kit	Power supply and cord Console cable RJ-45-to-DB-25 adapter Rack-mount /wall-mount kit	Power supply and cord Console cable 2 RJ-48 cables
Processor type	20-MHz 68030	20-MHz 68030	20-MHz 68030

1. This feature set is available with Cisco IOS Release 11.0 and later releases.
2. This feature set is available with Cisco IOS Release 11.1 and later releases.
3. There are three access server cards (AS51-16A-E) in each fully configured chassis. DRAM and Flash memory are required for each of the three cards.

Table 159 Cisco Access Server Series Environmental Specifications

Description	Cisco 2500 Series Access Servers	Cisco AS5100 Access Server	Cisco AS5200 Access Server
Power	40W (135.5 Btu/hour)	Input: Maximum: 475W (1621 Btu/hour), 4A (AC) or 9.9A (DC) Typical[1]: 325W (1105 Btu/hour), 2.7A (AC) or 6.8A (DC) Output: 325W +5V, 45A –5V, 2A +12V, 3.5A –12V, 3.5A	180W (maximum), 135.5 Btus/hour
AC Input	110 to 220 VAC 50 to 60 Hz 1.0 to 0.5A	Strap selectable: 120V (90 to 132 VAC), 47 to 63 Hz or 240V (180 to 264 VAC), 47 to 63 Hz	100 to 240 VAC 50 to 60 Hz 1.5 to 3.0A
DC Input	–48 VDC (Cisco 2509-DC and Cisco 2511-DC only)	–48 VDC (–42 to –60 VDC)	–48 VDC (–48 to –60 VDC)
Operating temperature range	32 to 104 F (0 to 40 C)	32 to 104 F (0 to 40 C)	32 to 104 F (0 to 40 C)
Nonoperating temperature range	–40 to 185 F (–40 to 85 C)	–40 to 185 F (–40 to 85 C)	–40 to 185 F (–40 to 85 C)
Humidity (noncondensing)	5 to 95%	0 to 95%	5 to 95%

1. Configured with a T1 card, NMC, 3 AS51 cards, and 12 V.34 quad modem cards.

Interface Options

Table 160 lists the interfaces available for the Cisco access servers.

Table 160 Cisco Access Server Interfaces

Model	Ethernet	Token Ring	Serial	Asynchronous	PRI/T1
2509	1	0	2	8	0
2510	0	1	2	8	0
2511	1	0	2	16	0
2512	0	1	2	16	0
AS5100	3	0	3	48[1]	0
AS5201	1	0	2	0	2

1. You can choose between 48 individual basic telephone service connections or two channelized T1 connections.

Access Server Models

This section describes the available Cisco access servers that you can order.

Cisco 2500 Series Access Servers

The Cisco 2500 series access servers provide a variety of models designed for small office and remote site environments. Each model is a fixed-configuration router that supports at least two interface types. Each access server comes standard with Flash EPROM technology for simplified software maintenance. For software, the Cisco 2500 series access servers offer a wide choice of feature sets, so you can select the appropriate protocol set for your network environment. These feature sets range from IP and bridging-only to a feature set containing the full array of Cisco's software functionality. Table 161 lists the product numbers for the Cisco 2500 series access servers.

Table 161 Cisco 2500 Series Access Server Product Numbers

Model	Description	Product umber
Cisco 2509	1 Ethernet port, 2 serial ports, 8 asynchronous ports, AC power supply	CISCO2509
Cisco 2509-DC	1 Ethernet port, 2 serial ports, 8 asynchronous ports, DC power supply	CISCO2509-DC
Cisco 2510	1 Token Ring port, 2 serial ports, 8 asynchronous ports, AC power supply	CISCO2510
Cisco 2511	1 Ethernet port, 2 serial ports, 16 asynchronous ports, AC power supply	CISCO2511
Cisco 2511-DC	1 Ethernet port, 2 serial ports, 16 asynchronous ports, DC power supply	CISCO2511-DC
Cisco 2512	1 Token Ring port, 2 serial ports, 16 asynchronous ports, AC power supply	CISCO2512

Figure 80 Cisco 2509 Rear Panel

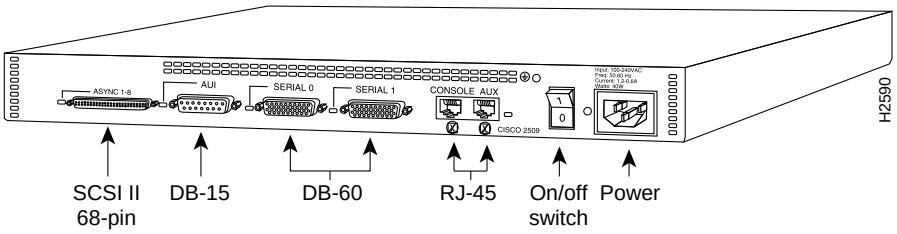


Figure 81 Cisco 2510 Rear Panel

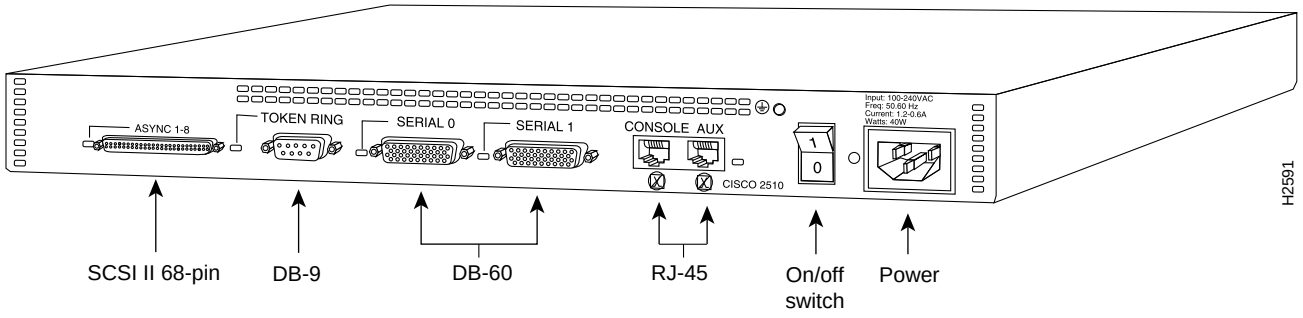


Figure 82 Cisco 2511 Rear Panel

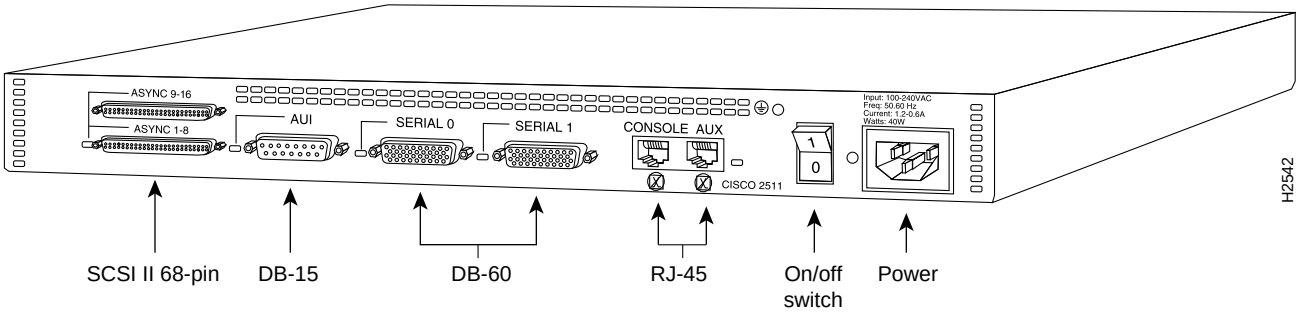
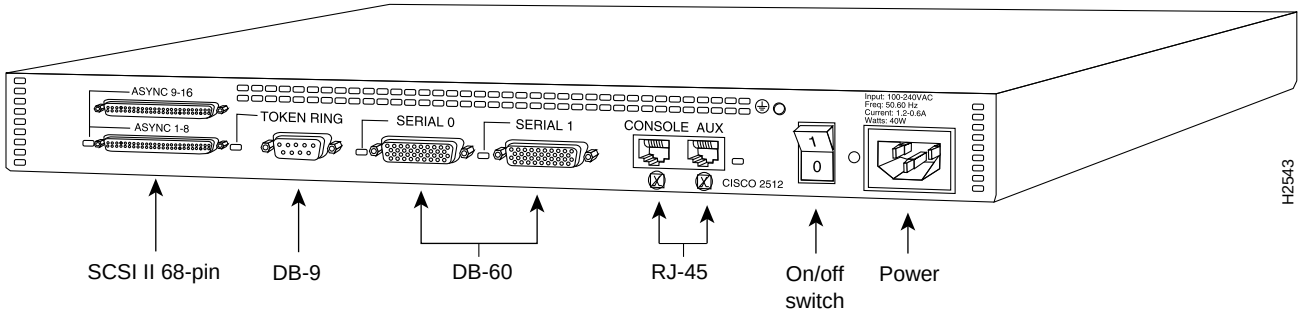


Figure 83 Cisco 2512 Rear Panel



Cisco AS5100 Access Server

The Cisco AS5100 access server is a versatile data communications platform that combines in one chassis the functions of a Cisco access server with analog and digital modems, CSUs, and T1 channel banks.

The Cisco AS5100 access server provides the greatest benefit for organizations that need to centralize processing capabilities for remote offices and LANs. It enables organizations to aggregate their modem traffic onto analog or digital telephone lines and route it through the Public Switched Telephone Network (PSTN).

The Cisco AS5100 access server is optimized for high-speed modem access, and is ideally suited for all traditional dial-up applications, such as access to a host, electronic mail, file transfer, and dial-in access to a LAN.

The Cisco AS5100 access server is available with the following modems:

- Quad V.32*bis* Plus modems, which connect at rates up to 21.6 kbps
- Quad V.34 modems, which connect at rates up to 28.8 kbps.

Each of the V.32 or V.34 modems is available as digital, analog, or analog/digital.

Figure 84 Cisco AS5100 Access Server Front Panel

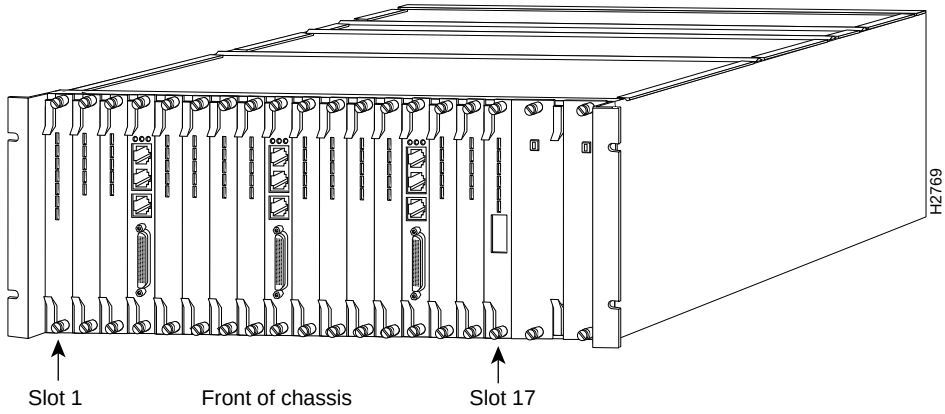
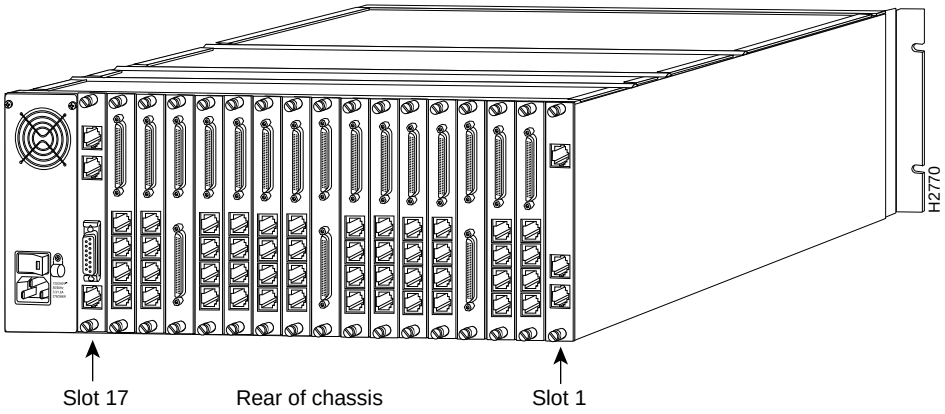


Figure 85 Cisco AS5100 Access Server Rear Panel



The Cisco AS5100 access server consists of the following components:

- One 19-inch chassis with 17 card slots and a high-speed, multilayer midplane that spans the length of the chassis.
- Up to 16 NACs that are inserted into the front of the chassis. The NACs are paired with associated NICs that are inserted into the rear of the chassis.
- One management NAC (always in slot 17) and its associated NIC.
- One or two power supplies inserted into the front of the chassis. The second power supply provides redundancy in case of failure.

Chassis/Chassis Midplane

The Cisco AS5100 access server is built around a three-bus chassis that can be managed by optional SNMP management software.

The midplane design supports a wide array of NACs and NICs that can be configured and installed in the chassis to meet diverse connectivity needs. The chassis provides 17 connectors in front for NACs, and 17 connectors in the rear for NICs. All NACs and most NICs can support hot-swapping, which allows you to insert and remove cards while the power is on.

Power Supply

Optional AC or DC-powered chassis are available. DC power is supplied to the installed NICs and NACs via connectors in the midplane. All configured chassis from Cisco Systems include two power supplies. One unit provides sufficient power to a fully loaded chassis, and the second provides full redundancy.

T1 Cards

The T1 NIC provides a four-wire T1 interface to the Cisco AS5100 access server, and the T1 NAC provides mapping of individual DS0s to the quad modem NACs across the Time Division Multiplexer (TDM) bus.

The T1 NIC is available as a dual-trunk version, which handles up to 48 DS0 channels from two trunks. Each channel carries either a pulse code modulation (PCM)-encoded voice channel or digital data. The T1 NAC supports 64-kbps clear channel operation for data channels, and supports Feature Group B for voice channels. Again, each of the DS0 channels connect to other NACs via the midplane.

The T1 NIC provides RJ-48 connector(s) to terminate the trunk(s). It also provides an RJ-45 connector for the EIA/TIA-232 interface port. The T1 NIC performs all CSU functions including auto equalization and auto gain functions to support 6000 feet of 24-gage shielded cable. This card complies with all Bell Core standards relating to T1 alarms, loopbacks, error detection, and so forth. The T1 NIC is compatible with an external CSU if desired, and provides a serial interface to the T1 NAC.

The T1 NAC allows you to use dial number identification string (DNIS) and automatic number identification (ANI) information provided by the public 950 services, Feature Groups B and D, and enhanced 800 services to route data. Using this call information, the Cisco AS5100 access server chassis can independently configure the specific modems according to the dialed number requirements.

The T1 cards support the following features:

- Dual T1 interface supports up to 48 DS0s
- D4 or ESF frame formats
- AMI or B8ZS line coding
- Integral CSU
- Internal and loop timing source from either span line

- Automatic fallback to alternate timing source
- Configurable E&M Type II signaling support
- Supports ground start and loop start supervision
- Supports MF and DTMF addressing
- LEDs for Run/Fail, Carrier, Loopback, and Alarm status
- Bantam monitor jacks for span lines on T1 NIC

Management Cards

The network management NAC and NIC cards act as proxy agents for the T1 and modem cards in the chassis. The NAC and NIC cards communicate with the T1 and modem cards over a dedicated management bus on the midplane. An SNMP console communicates with the management cards via a serial console port or over a LAN interface. Total Control Manager (TCM) software provides users with easy and immediate access to configuration/management of the modem and T1 card sets.

Access Server Cards

The access server NAC and associated NIC cards function as a communications server system with 16 asynchronous serial ports, one synchronous serial port, and one 10BaseT Ethernet port. Up to three access server cards can be installed in each Cisco AS5100 access server chassis. Each one is functionally equivalent to a standalone Cisco 2511, with the following exceptions:

- Each of the two 68-pin asynchronous serial ports supports eight EIA/TIA-232 serial ports.
- A supplied breakout cable splits each 68-pin port into two 50-pin connectors, which each support a quad modem card connected at the modem NIC.

Modem Cards

Each chassis houses up to 48 high-speed analog or digital modems. Digital modems connect to the phone system by a direct T1 link through the T1 NIC. Modems can be managed with software ranging from a simple terminal interface menu system for device configuration or via SNMP using the network management card.

The quad modem cards provide four dial-up modems on a single card. Each modem is capable of supporting V.32 or V.34 and MNP-5 or V.42/V.42*bis* error correction and data compression.

The modem can also make use of the DNIS and ANI information provided by the public 950 services, Feature Groups B and D, and enhanced 800 services to customize the configuration of the modem before answering a call. For example, the dialed phone number can be associated with specific applications, and the same modem pool can be dynamically configured on a call-by-call basis to adjust to the requirements of the application.

The Quad EIA/TIA-232 NIC provides the physical interface for four EIA/TIA-232 ports via a 50-pin connector on the rear of the card.

Each EIA/TIA-232 port supports the full complement of EIA/TIA-232 signals necessary for synchronous or asynchronous operation. The ports support operation at speeds up to 115.2 kbps, and provide four serial interfaces to the quad modem NAC.

The modem cards support the following features:

- DTE interface:
  - Supports standard DTE rates up to 115,200 bps
  - Asynchronous and synchronous operation
  - Physical interface is a SCSI-II 50-pin connector converted by a supplied cable to four EIA/TIA-232, 25-pin female connectors
- Error correction (ITU-T V.42 and MNP 2-4 error control)
- Data compression (ITU-T V.42 and MNP 2-4 data compression)
- Modulation:
  - ITU-T V.34 and V.FC at 28,800 bps
  - V.32terbo at 19,200 bps
  - ITU-T V.32*bis* at 14,400; 12,000; 9600, 7200, and 4800 bps
  - ITU-T V.32 at 9600 and 4800 bps
  - ITU-T V.22*bis* at 2400 bps
  - ITU-T V.22 at 1200 bps
  - ITU-T V.32 at 1200/75 bps
  - ITU-T V.21 at 300 bps
  - Bell 208B at 4800 bps
  - Bell 212A at 1200 bps
  - Bell 103 at 300 bps
  - QuickConnect technology
  - ASL

Cisco AS5100 Access Server Network Management Products

The Cisco AS5100 access server uses two network management products:

- Total Control Manager/SNMP (AS51-NMSW-1)

  Total Control Manger/SNMP is a Windows-based SNMP host software package that runs on any IBM-compatible 486 PC. This package communicates with the management card in each Cisco AS5100 access server chassis to perform all network management functions for the modem and T1 cards.

- CiscoWorks Windows (CWPC-x.x-OV or UPG-CWPC-x.x)

  CiscoWorks Windows includes the Configuration Builder application. The Configuration Builder application allows you to create configuration files for your access server without requiring you to remember complicated command-line language or syntax. For more information, refer to "CiscoWorks Windows" in the chapter "Internetwork Management" earlier in the catalog.

Cisco AS5100 Access Server Product Numbers

This section contains tables that list Cisco AS5100 access server product numbers. For document product numbers, see the chapter "Documentation" later in this catalog.

Table 162 Cisco AS5100 Access Server Systems

Description	Product Number
Complete chassis, AC, Ethernet network management card, and console cable	AS5101-A
Complete chassis, DC, Ethernet network management card, and console cable	AS5101-D

Table 163 Cisco AS5100 Access Server System Spares or Options

Description	Product Number
AS5100 16-slot AC chassis	AS51-CHAS-A=
AS5100 16-slot DC chassis	AS51-CHAS-D=
AS5100 AC-45A power supply	AS51-PWR-A=
AS5100 DC-45A power supply	AS51-PWR-D=
AS5100 AC fan tray[1]	AS51-FAN-A=
AS5100 DC fan tray[1]	AS51-FAN-D=
Cables	See Table 169

1. You should purchase a fan tray with any fully populated unit.

Table 164 Cisco AS5100 Access Server Interface Card Sets

Description	Product Number
AS5100 Ethernet network management card set	AS51-NMCS-E=
AS5100 dual T1 card set	AS51-2T
Quad V.34 digital modem set	AS51-4V34D
Quad V.34 analog modem set	AS51-4V34A
Quad V.34 analog/digital modem set	AS51-4V34AD
Access Server card set—16A, 1E, 1T[1]	AS51-16A-E

1. Includes two CAB-AS51-8 (spare 8A cable from the AS5100 access server card set to two quad modem card sets).

Cisco AS5100 Access Server Bundled Systems

Although the Cisco AS5100 access server is a modular chassis that can be customized for your particular networking needs, it is also available in five different bundled systems (fixed hardware configurations) for North America only.

Table 165 describes the Cisco AS5100 access server bundled systems. Enterprise software can be ordered for bundled systems ending in "EN," and Remote Access Server software can be ordered for bundled systems ending in "RAS."

Table 165 Cisco AS5100 Access Server Bundled Systems

Description	Included Items	Bundled System Product Number
48-port digital V.34 modem system with AC power supply and Cisco IOS Enterprise software feature set	1 17-slot AC chassis (AS51-CHAS-A=) 2 45A power supplies (AS51-PWR-A=) 1 fan tray (AS51-FAN-A=) 1 Ethernet network management card set (AS51-NMCS-E=) 1 console cable (ACS-2500ASYN) 1 U.S. power cord (AS-KIT-US) 1 dual T1 card set (AS51-2T) 12 quad V.34 digital modem card sets (AS51-4V34D) 3 access server card sets (AS51-16A-E), which include 6-MB DRAM (2 MB soldered and 4 MB on SIMM) and 8-MB Flash memory on each access server card set 3 CiscoRemote Plus software user licenses	AS51AC-48V34D-EN
48-port digital V.34 modem system with DC power supply and Cisco IOS Enterprise software feature set	1 17-slot DC chassis (AS51-CHAS-D=) 2 45A power supplies (AS51-PWR-D=) 1 fan tray (AS51-FAN-A=) 1 Ethernet network management card set (AS51-NMCS-E=) 1 console cable (ACS-2500ASYN) 1 U.S. power cord (AS-KIT-US) 1 dual T1 card set (AS51-2T) 12 quad V.34 digital modem card sets (AS51-4V34D) 3 access server card sets (AS51-16A-E), which include 6-MB DRAM (2 MB soldered and 4 MB on SIMM) and 8-MB Flash memory on each access server card set 3 CiscoRemote Plus software user licenses	AS51DC-48V34D-EN

Description	Included Items	Bundled System Product Number
48-port digital V.34 modem system with AC power supply and Cisco IOS Remote Access Server software feature set	1 17-slot AC chassis (AS51-CHAS-A=) 2 45A power supplies (AS51-PWR-A=) 1 fan tray (AS51-FAN-A=) 1 Ethernet network management card set (AS51-NMCS-E=) 1 console cable (ACS-2500ASYN) 1 U.S. power cord (AS-KIT-US) 1 dual T1 card set (AS51-2T) 12 quad V.34 digital modem card sets (AS51-4V34D) 3 access server card sets (AS51-16A-E), which include 6-MB DRAM (2 MB soldered and 4-MB on SIMM) and 4-MB Flash memory on each access server card set 3 CiscoRemote Plus software user licenses	AS51AC-48V34D-RAS
16-port digital V.34 modem system with AC power supply and Cisco IOS Enterprise software feature set	1 17-slot AC chassis (AS51-CHAS-A=) 2 45A power supplies (AS51-PWR-A=) 1 fan tray (AS51-FAN-A=) 1 Ethernet network management card set (AS51-NMCS-E=) 1 console cable (ACS-2500ASYN) 1 U.S. power cord (AS-KIT-US) 1 dual T1 card set (AS51-2T) 4 quad V.34 digital modem card sets (AS51-4V34D) 1 access server card set (AS51-16A-E), which includes 6-MB DRAM (2 MB soldered and 4 MB on SIMM) and 8-MB Flash memory 1 CiscoRemote Plus software user license	AS51AC-16V34D-EN
16-port digital V.34 modem system with AC power supply and Cisco IOS Remote Access Server software feature set	1 17-slot AC chassis (AS51-CHAS-A=) 2 45A power supplies (AS51-PWR-A=) 1 fan tray (AS51-FAN-A=) 1 Ethernet network management card set (AS51-NMCS-E=) 1 console cable (ACS-2500ASYNC) 1 U.S. power cord (AS-KIT-US) 1 dual T1 card set (AS51-2T) 4 quad V.34 digital modem card sets (AS51-4V34D) 1 access server card set (AS51-16A-E), which includes 6-MB DRAM (2 MB soldered and 4 MB on SIMM) and 4-MB Flash memory 1 CiscoRemote Plus software user license	AS51AC-16V34D-RAS

Cisco AS5200 Universal Access Server

The Cisco AS5200 universal access server is a versatile data communications platform that provides the functions of an access server, a router, and digital modems in a single modular chassis. The Cisco AS5200 is intended for Internet Service Providers (ISPs), telecommunications carriers, and other providers that offer managed Internet connections, as well as small- to medium-sized sites that provide both digital and analog access to users on an enterprise network. By terminating both analog and digital calls on the same chassis simultaneously, the Cisco AS5200 provides you with a clear, simple, and easy migration path from today's predominantly analog dial-in services to tomorrow's digital dial-in services.

Note Customers with homogenous or segregated dial-up requirements might choose to implement central-site solutions with other Cisco Systems products such as the Cisco AS5100 access server for asynchronous modem dial in, or the Cisco 4000 or Cisco 7000 series for ISDN dial in.

Figure 86 Cisco AS5200 Access Server Front Panel

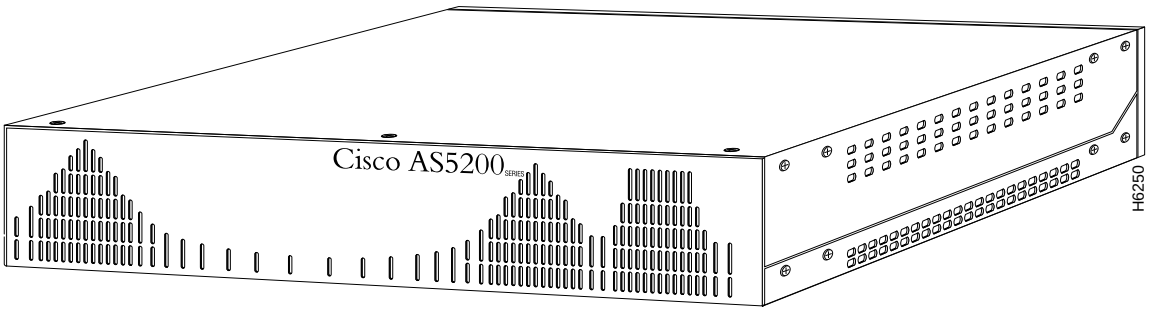
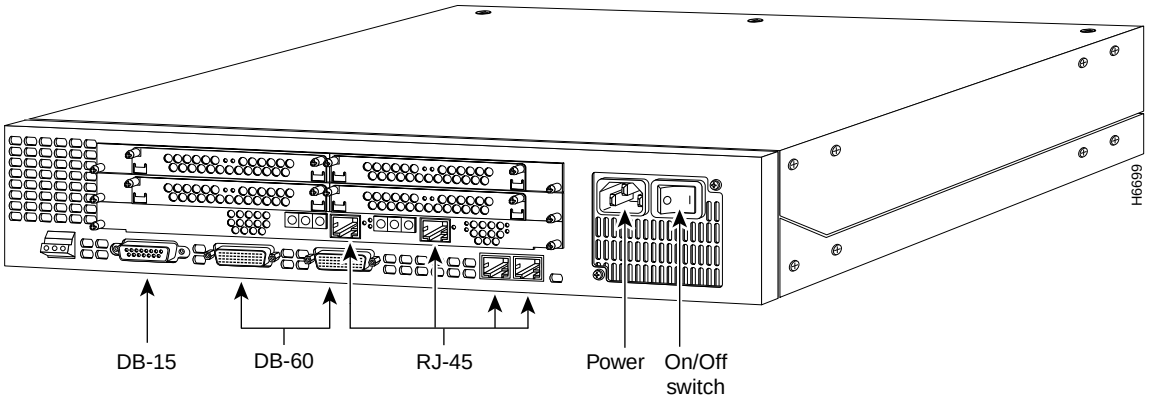


Figure 87 Cisco AS5200 Access Server Rear Panel



Cisco AS5200 Access Server Summary of Benefits

The unique combination of Cisco IOS software and the Cisco AS5200 access server mixed-media platform results in a host of benefits for network managers.

Universal Access

The Cisco AS5200 universal access server is the first product in an entire line of universal access solutions offered by Cisco Systems. Universal access is more than just providing connections from ISDN or asynchronous modems; it is also the ability to perform the following:

- Host remote node sessions in all of today's popular protocols (such as IP, IPX, and AppleTalk)
- Support legacy terminal services
- Route packets over synchronous and asynchronous media

The Cisco AS5200 access server provides universal access for small- to medium-sized dial-in sites. This access enables you to save money by using one trunk line, instead of two, for all calls, which reduces the number of system components and operational costs. The Cisco AS5200 access server also supports the widest array of networking and routing protocols available in the industry. Not only does the Cisco AS5200 access server support remote node and remote LAN dial-in protocols, but it also supports all of the Cisco IOS-supported routing protocols.

Scalability

The scalability and manageability of a network are a concern for all network managers. With Cisco IOS Software Release 11.2, the Cisco AS5200 access server will support call aggregation among multiple chassis. Using multichassis, Multilink PPP, Cisco Systems has developed the means to aggregate multiple calls terminated on multiple servers. Network managers will have the ability to stack multiple AS5200 access servers for high-density applications.

Another important feature of scalability is managing the components of a growing network. The Cisco AS5200 access server supports both the command line interface and the CiscoWorks graphical user interface (GUI). Network managers can collect statistics from the modems, upgrade your modem software, group modems for configuration, soft- or hard-busy-out modems, and even monitor call-in-progress signals from individual modems, all from the same platform they already use to manage their routers.

Security

Cisco IOS software provides tight security in the core network, and with the Cisco AS5200 access server, extends that core security to mixed-media dial-in sites. Some of the features supported by the Cisco IOS are access lists, violation logging, Terminal Access Controller Access Control System (TACACS+), and RADIUS.

WAN Optimization

Cisco offers a wide array of WAN optimization features, including compression, routing filters, snapshot, bandwidth-on-demand, and dial-on-demand routing. These features help control WAN costs—the largest single cost of operating an internetwork.

Single Vendor Support

With the Cisco AS5200 access server, the router, access server, integrated CSUs, and modems are all supported by Cisco's world class 7-days-a-week, 24-hours-a-day global support team.

Compatibility

With the CSU, modems, routers, and access server components integrated in one chassis, the Cisco AS5200 access server has been designed to avoid incompatibility concerns that plague multibox, multivendor installations, and for seamless interoperability among its integrated components. Fewer individual pieces of equipment reduce configuration and incompatibility issues.

Cisco AS5200 Access Server Feature Cards

The following feature cards are available for the Cisco AS5200 access server. These cards are not hot swappable.

- Dual T1/PRI card
- Carrier card
- Microcom Select V.34 12-port module
- Microcom Reliable V.34 12-port modem
- Carrier card with two Microcom modules

Dual T1/PRI Card

Each Cisco AS5200 access server must have one dual T1/PRI card installed in the chassis. The system does not support more than one of these cards. This card provides the channelized interface necessary to handle digital and analog calls that are terminated in the unit. The card is software switchable between channelized T1 and ISDN PRI. You can configure the card so that both ports are channelized T1, or both ports are ISDN PRI, but not one of each. If you configure the card to support ISDN PRI, it can terminate analog modem calls and ISDN BRI calls. The card determines which type of call is coming in by reading the Q.931 signaling in the ISDN D channel associated with each PRI line. In dual PRI mode, the card can handle 23 B channels plus one D channel on each line, for a total of 46 B channels and 2 D channels. The ability to combine more than one PRI line's signaling into one D channel (47B + 1D), which is known as NFAS, is not currently available.

Carrier Card

The carrier card can hold up to two 12-port modem modules. You can configure a Cisco AS5200 access server to support up to two carrier cards. If you order a Cisco AS5200 access server with modems, it must have one carrier card for each two modem cards ordered.

Microcom Select V.34 12-Port Module

The Select modem module contains 12 manageable modems. These modems are Flash based, so you can upgrade their microcode remotely. You can order up to two of these modules with a carrier card. These modems support real time call-in-progress monitoring. No additional memory is required to support this feature.

The Cisco AS5200 access server supports multiple modem technology and provides centrally managed modem capabilities—key requirements for service providers and enterprises building large dial-in pools. The Cisco AS5200 access server features an open modem architecture of Microcom modems. This enables you to maximize modem coverage with higher performance while leveraging your installed technology base. The Cisco AS5200 access server offers the most complete modem management capabilities, providing network managers with one solution at a central management location. For example, the same management platform is used to manage both routers and modems, significantly streamlining network management. In addition, incoming modem calls can be managed in progress rather than after the call. This allows for fast troubleshooting and analysis.

Microcom Reliable V.34 12-Port Module

The reliable modem module contains 12 unmanageable modems. These modems are Flash based, so you can upgrade their microcode remotely. These modems are not upgradable to Select modems. You can order up to two of these modules with a carrier card. These modems cannot support real time call-in-progress monitoring—the ability to determine the state of a modem at any point in time.

Carrier Card with Two Microcom Modules

You can order a carrier card with two Select or Reliable modem modules.

Table 166 lists the product numbers for the Cisco AS5200 access server.

Table 166 Cisco AS5200 Access Server Product Numbers

Description	Product Number
Ethernet AS5200 chassis with AC power supply	AS5201
Ethernet AS5200 chassis with DC power supply	AS5201-DC
Ethernet AS5210 bundled system includes an Ethernet (AS5201) chassis with AC power supply, 48 Reliable modems, a dual T1 card, and IP only software	AS5210
Ethernet AS5210 bundled system includes an Ethernet (AS5201) chassis with DC power supply, 48 Reliable modems, a dual T1 card, and IP only software	AS5210-DC
Dual T1/PRI card	AS52-2CT1
Carrier card	AS52-MC1
Carrier card with two Microcom Select modules	AS52-24B-MCOM-V34/R
Carrier card with two Microcom Reliable modules	AS52-24B-MCOM-V34
Microcom Reliable V.34 12-port module	AS52-12-MCOM-V34
Microcom Select V.34 12-port module	AS52-12-MCOM-V34/R
AS5210 Reliable modem upgrade to Microcom Select modems	AS5210-MCOM-SEL-UPGD
AS5210 upgrade to IP/IPX software	AS5210-IP/IPX-UPGD
AS5210 upgrade to DT software	AS5210-DT-UPGD
AS5210 upgrade to enterprise software	AS5210-ENT-UPGD
AS5210 upgrade to IP/modem software	AS5210-IP/RM-UPGD
AS5210 upgrade to IP/IPX/modem software	AS5210-IP/IPX/RMN-UPGD
AS5210 upgrade to DT/modem software	AS5210-DT/RM-UPGD
AS5210 upgrade to enterprise/modem software	AS5210-ENT/RM-UPGD
AS5210 upgrade to enterprise/RMON/modem software	AS5210-ENT/ARM-UPGD

Hardware Options for All Access Servers

The Cisco access server series supports the hardware options listed in the following tables. If a product number ends with an equal sign (=), the item can be ordered only as a spare. If a product number does not end with an equal sign, the item can be ordered as a spare or as a configurable part of a system order.

Note For options that apply to most systems, refer to "Cables and Transceivers" or "Power Cords" in Part 7.

Table 167 Cisco Access Server Series Hardware Options—Cisco 2500 Series and Cisco AS5100 Access Servers

Option	Cisco 2500 Series Access Servers	Cisco AS5100 Access Server
19" rack-mount kit	ACS-2500RM-19=	–
24" rack-mount kit	ACS-2500RM-24=	–
Boot ROM upgrade	BOOT-2509/12=	–
4-MB DRAM	MEM-1X4D	–
4-MB DRAM (spare)	MEM-1X4D=	MEM-1X4D=
8-MB DRAM	MEM-1X8D	–
8-MB DRAM (spare)	MEM-1X8D=	–
16-MB DRAM	MEM-1X16D	MEM-1X16D
16-MB DRAM (spare)	MEM-1X16D=	MEM-1X16D=
4-MB Flash SIMM	MEM-1X4F	–
4-MB Flash SIMM (spare)	MEM-1X4F=	MEM-1X4F=
4- to 8-MB Flash SIMM upgrade	MEM-1X8F-U[1]	MEM-1X8F-DFB-U[1, 2]
8-MB Flash SIMM	MEM-1X8F	MEM-1X8F
8-MB Flash SIMM (spare)	MEM-1X8F=	MEM-1X8F-DFB=[2]
8-MB Flash SIMM	MEM-1X8F-U	–
Dual-sided 16-MB Flash SIMM	–	MEM-1X16F-DFB[3]
Dual-sided 16-MB Flash SIMM (spare)	–	MEM-1X16F-DFB=[3]

1. Applies to Cisco IOS Release 11.x feature sets that require 8-MB Flash memory.
2. Dual-bank Flash memory is required for AS5100 access servers because these models contain only one slot for Flash memory. It can operate as either two banks of 4 MB for dual-Flash bank operation or as 8 MB contiguous.
3. Dual-bank Flash memory is required for AS5100 access servers because these models contain only one slot for Flash memory. It can operate as either two banks of 8 MB for dual-Flash bank operation or as 16 MB contiguous.

Table 168 Cisco AS5200 Access Server Hardware Options

Option	Product Number
Memory Upgrades	
4-MB shared DRAM upgrade (for total of 8 MB)	MEM-8S-52=
12-MB shared DRAM upgrade (for total of 16 MB)	MEM-16S-52=
4-MB main DRAM upgrade (for total of 8 MB)	MEM-8M-52=
12-MB main DRAM upgrade (for total of 16 MB)	MEM-16M-52=
4-MB boot Flash upgrade (for total of 8 MB)	MEM-8BF-52=
Spares	
Dual T1/PRI card	AS52-2CT1=
Carrier card with two Microcom Select modules	AS52-24B-MCOM-V-34/R=
Carrier card with two Microcom Reliable modules	AS52-24B-MCOM-V-34=
Carrier card	AS52-MC1=
Microcom Select V.34 12-port module	AS52-12-MCOM-V34/R=
Microcom Reliable V.34 12-port module	AS52-12-MCOM-V34=
AS5200 modem blank panel	AS52M-BLANK=
AS5200 blank panel	AS52-BLANK=
Options for the AS5210 Bundled System	
AS5210 modem upgrade to Microcom Select module	AS5210-MCOM-SEL-UPGD

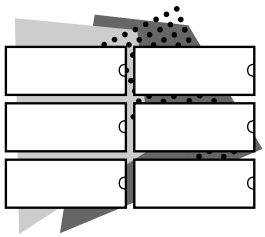
Table 169 Cisco Access Server Cables

Cables[1]	Product Number
Synchronous serial[2]	
EIA/TIA-232 male DTE interface, 10' (3 m)	CAB-232MT
EIA/TIA-232 female DCE interface, 10' (3 m)	CAB-232FC
EIA/TIA-449 male DTE interface, 10' (3 m)	CAB-449MT
EIA/TIA-449 female DCE interface, 10' (3 m)	CAB-449FC
EIA-530 male DTE interface, 10' (3 m)	CAB-530MT
V.35 male DTE interface, 10' (3 m)	CAB-V35MT
V.35 female DCE interface, 10' (3 m)	CAB-V35FC
X.21 male DTE interface, 10' (3 m)	CAB-X21MT
X.21 female DCE interface, 10' (3 m)	CAB-X21FC
Auxiliary/console port cable kit[2]	ACS-2500ASYN
Asynchronous serial	
8-lead octal cable and 8 male DB-25 modem connectors	CAB-OCTAL-KIT
8-lead octal cable (68-pin to 8 male RJ-45 connectors)	CAB-OCTAL-ASYNC
8-lead octal cable and 8 female DB-25 terminal connectors	CAB-OCTAL-FDTE
8-lead octal cable and 8 male DB-25 modem connectors	CAB-OCTAL-MODEM

Cables[1]	Product Number
Male DB-25 modem connector	CAB-25AS-MMOD
Female DB-25 terminal connector	CAB-25AS-FDTE
8 female RJ-45 to female RJ-45 adapters	CAB-ADPTRS-RJ45
Cisco AS5100 cables	
8A cable from card set to two quad modem cards[3]	CAB-AS51-8=

1. For cable illustrations, refer to the section "Specifications" in the chapter "Cables and Transceivers" later in this catalog.
2. These cables can also be used with the Cisco AS5200 access server.
3. Two cables are included with each card.

Note The Cisco AS5200 access server can be ordered with any of the current power cables offered from the Cisco 2500 series access servers. It can also be ordered with up to two of the serial cables offered with the Cisco 2500 series access servers.



Software Options

This section describes the Cisco IOS software releases and other software options available for Cisco access servers.

- Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 feature sets for the Cisco 2500 series and AS5100 access servers (see Table 170)
- Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 Remote Access Server (RAS) feature set for the Cisco 2500 and AS5100 access server (see Table 171)
- Cisco IOS Release 11.2 and 11.1 for the Cisco AS5200 access server (see Table 172)
- Cisco IOS Release 11.1 RMON for the Cisco 2500 and AS5100 access server (see Table 173)
- LAT Terminal License (see Table 182)
- CiscoRemote Software (see Table 183)
- CiscoSecure UNIX Server (see Table 185)

Note that all Cisco AS5100 access server cards (AS51-16A-E) must use the same Cisco IOS release level and feature set.

Note The Cisco AS5200 access server supports Cisco IOS Release 11.1 and later releases only.

With the introduction of Cisco IOS Release 11.2, feature sets have been updated to make it easier to select the exact feature sets you need. Feature sets names are simplified and are more consistent across Cisco hardware platforms. In addition, you can add options to the standard feature set offerings. These options provide additional features and value based on the hardware platform selected. Cisco also continues to offer specialized feature sets for key applications.

Cisco access servers offer the following types of feature sets:

- Basic. The basic feature set for the hardware platform.
- Plus. The basic feature set plus additional features.
- Plus 40. The basic feature set, plus feature set, and 40-bit data encryption.
- Plus 56. The basic feature set, plus feature set, and 56-bit data encryption.

Cisco IOS images with 40-bit Data Encryption Standard (DES) support may legally be distributed to any party eligible to receive Cisco IOS software. 40-bit DES is not a cryptographically strong solution and should not be used to protect sensitive data.

Cisco IOS images with 56-bit DES are subject to International Traffic in Arms Regulations (ITAR) controls and have a limited distribution. Images to be installed outside the U.S. require an export license. Orders may be denied or subject to delays due to U.S. Government regulations. Contact your sales representative or distributor for more information, or send e-mail to export@cisco.com.

The new feature set tables use the following conventions to identify features:

- : the feature is offered in the basic feature set
- – : the feature is not offered in the feature set
- Plus: the feature is offered in the Plus feature sets
- Encrypt: the feature is offered in the Encryption feature sets

Table 170 Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 Feature Sets—Cisco 2500 Series and AS5100 Access Server Feature Sets

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
LAN Support																				
Apollo Domain	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
AppleTalk 1 and 2[4]	–	–	–	–	–		–	–	–	–										
Banyan VINES	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Concurrent routing and bridging				–	–				–	–				–	–				–	–
DECnet IV	–	–	–	–	–	–	–	–	–	–										
DECnet V	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
GRE																				
Integrated routing and bridging (IRB)[5]		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
IP																				
LAN extension host																				
Multiring					–					–					–					–
Novell IPX[6]	–	–	–	–	–															
OSI	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Source-route bridging[7]	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
Transparent and translational bridging[7]																				
XNS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
WAN Services																				
Combinet Packet Protocol (CPP)		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Dialer profiles		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
Frame Relay																				
Frame Relay SVC Support (DTE)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Frame Relay traffic shaping	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Half bridge/half router for CPP and PPP		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
HDLC																				

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
IPXWAN 2.0	–	–	–	–	–															
ISDN[8]																				
Multichassis Multilink PPP (MMP)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
PPP[9]																				
SMDS																				
Switched 56																				
Virtual Private Dial-up Network (VPDN)	–	–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
X.25[10]																				
WAN Optimization																				
Bandwidth-on-demand																				
Custom and priority queuing																				
Dial backup																				
Dial-on-demand																				
Header[11], link and payload compression[12]																				
Snapshot routing																				
Weighted fair queuing				–	–				–	–				–	–				–	–
IP Routing																				
BGP																				
BGP4[13]		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
EGP																				
Enhanced IGRP																				
Enhanced IGRP Optimizations		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
ES-IS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
IGRP																				
IS-IS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Named IP Access Control List		–	–	–	–		–	–	–	–		–	–	–	–		–	–	–	–
Network Address Translation (NAT)	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
NHRP					–					–					–					–
On Demand Routing (ODR)		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
OSPF																				
OSPF Not-So-Stubby-Areas (NSSA)		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
OSPF On Demand Circuit (RFC 1793)		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
PIM																				
Policy-based routing				–	–				–	–				–	–					
RIP																				
RIP Version 2			–	–	–			–	–	–			–	–	–			–	–	–
Other Routing																				
AURP	–	–	–	–	–	–	–	–	–	–										
IPX RIP	–	–	–	–	–															
NLSP[14]	–	–	–	–	–					–					–					–
RTMP	–	–	–	–	–	–	–	–	–	–										
SMRP	–	–	–	–	–	–	–	–	–	–				–	–				–	–
SRTP	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Multimedia and Quality of Service																				
Generic traffic shaping		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
Random Early Detection (RED)		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
Resource Reservation Protocol (RSVP)		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
Management																				
AutoInstall																				
Automatic modem configuration[15]			–	–	–			–	–	–			–	–	–			–	–	–
HTTP Server		–	–	–	–	–	–	–	–	–		–	–	–	–		–	–	–	–
RMON events and alarms[16]	Plus		–	–	–			–	–	–	Plus		–	–	–	Plus		–	–	–
RMON full	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–	Plus	–	–	–	–

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
SNMP																				
Telnet																				
Security																				
Access lists																				
Access security																				
Extended access lists																				
Kerberized login	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–			–	–	–
Kerberos V client support	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		–	–	–	–
Lock and key		–	–	–	–	–	–	–	–	–	–	–	–	–	–			–	–	–
MAC security for hubs[17]			–	–	–			–	–	–			–	–	–			–	–	–
MD5 routing authentication				–	–				–	–				–	–				–	–
Network layer encryption (export controlled 40-bit and 56-bit DES)[18]	Encrypt	–	–	–	–	–	–	–	–	–	Encrypt	–	–	–	–	Encrypt	–	–	–	–
RADIUS			–	–	–			–	–	–			–	–	–			–	–	–
Router authentication	Encrypt	–	–	–	–	–	–	–	–	–	Encrypt	–	–	–	–	Encrypt	–	–	–	–
TACACS+[19]																				
IBM Support (Optional)																				
APPN (optional)[3]	–	–	–	–	–				–	–	–	–	–	–	–				–	–
BAN for SNA Frame Relay support	Plus			–	–				–	–	Plus			–	–				–	–
Bisync[20]	Plus			–	–				–	–	Plus			–	–				–	–
Caching and filtering	Plus										Plus									
DLSw+[21]	Plus				–					–	Plus				–					–
Downstream PU concentration (DSPU)	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–
Frame Relay SNA support (RFC 1490)	Plus										Plus									
Native Client Interface Architecture (NCIA) Server	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–		–	–	–	–
NetView Native Service Point	Plus			–	–				–	–	Plus			–	–				–	–
QLLC[20]	Plus			–	–				–	–	Plus			–	–					

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Response Time Reporter (RTR)	Plus	–	–	–	–	–	–	–	–	–	Plus	–	–	–	–		–	–	–	–
SDLC integration	Plus				–					–	Plus				–					
SDLC transport (STUN)	Plus				–					–	Plus				–					
SDLC-to-LAN conversion (SDLLC)	Plus				–					–	Plus				–					
SNA and NetBIOS WAN optimization via local acknowledgment	Plus										Plus									
SRB/RSRB[22, 23]	Plus									–	Plus									–
SRT	Plus				–					–	Plus				–					–
TG/COS	–	–	–	–	–	–	–	–	–	–	–	–	–		–					
TN3270	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Protocol Translation																				
LAT	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Rlogin	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
Remote Node[24]																				
ARAP 1.0/2.0	–	–	–	–	–	–	–	–	–	–										
Asynchronous master interfaces				–	–				–	–				–	–				–	–
ATCP[25]	–	–	–	–	–	–	–	–	–	–					–					–
CPPP																				
CSLIP																				
DHCP					–					–					–					–
IP pooling				–	–				–	–				–	–				–	–
IPX and ARAP on virtual asynch interfaces	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–				–	–
IPXCP[11]	–	–	–	–	–															
MacIP	–	–	–	–	–	–	–	–	–	–										
NASI[26]	–	–	–	–	–			–	–	–				–	–				–	–
NetBEUI over PPP				–	–			–	–	–				–	–				–	–
PPP																				

	Cisco 2500 Series and AS5100 Access Server Feature Sets																			
Features	**IP Routing**					**IP/IPX/ IBM/ APPN[1]**	**IP/IPX Routing[2]**				**Desktop (IP/IPX/Appletalk/DEC)**					**Enterprise[3]**				
Cisco IOS Release	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
SLIP																				
Terminal Services[24]																				
LAT[27]	–	–	–			–	–	–	–	–	–	–	–	–	–					
Rlogin																				
Telnet																				
TN3270	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					
X.25 PAD																				
Xremote	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–					

1. IP/IPX/IBM/APPN is a new feature set in Cisco IOS Release 11.2. This feature set has no additional options. It offers a low-end APPN solution for this set of hardware platforms.
2. The IP/IPX feature set was discontinued in Cisco IOS Release 11.2. All features in this feature set prior to Cisco IOS Release 11.2 are now available in the Desktop (IP/IPX/Appletalk/DEC)/IBM feature set, including APPN.
3. Enterprise is available with APPN in a separate feature set. Use the product numbers that specify APPN. In Cisco IOS Release 11.2, APPN includes APPN Central Registration (CRR) and APPN over DLSw+.
4. AppleTalk load balancing is available in Cisco IOS Release 11.2.
5. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
6. In Cisco IOS Release 11.2, the Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
7. See the feature category “IBM Support” for information about source-route bridging (SRB) in Cisco IOS Release 10.3 and later releases.
8. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
9. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
10. X.25 includes X.25 switching.
11. IPX header compression (RFC 1553) is available in the feature sets that support IPX in Cisco IOS Release 11.1(1) and later releases.
12. X.25 payload compression is supported in Cisco IOS Release 10.2 and later releases. X.25 and Frame Relay payload compression are supported in Cisco IOS Release 11.0(4) and later releases.
13. BGP4 includes soft configuration, multipath support, and prefix filtering with inbound route maps.
14. NLSP is supported with the Desktop option in Cisco IOS Release 10.3(2) and later releases.
15. Automatic modem configuration is available for all features sets in Cisco IOS Release 11.1(2) and later releases. For the Enterprise feature set, automatic modem configuration is available in Cisco IOS 11.1(1) and later releases.
16. The RMON events and alarms groups are supported on all interfaces in Cisco IOS Release 11.1 and later releases. Separate enhanced RMON feature sets are also available with Cisco IOS Release 11.1. In Cisco IOS Release 11.2, RMON full is available with the plus feature sets
17. MAC security for hubs is applicable to the following Cisco 2500 series Ethernet hub models: Cisco 2505, Cisco 2507, Cisco 2516, and Cisco 2518.
18. For more details, see the description of the new data encryption options in the section “Software Options” on page 375 in this chapter,
19. With Cisco IOS Release 11.2, TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.
20. QLLC and Bisync are available in IP/IBM in Cisco IOS Release 11.0(3) and later releases, and in IP/IPX/IBM and Desktop/IBM base in Cisco IOS Release 11.0(2) and later releases.
21. Cisco IOS Release 11.2 introduces several DLSw+ enhancements available in the Plus, Plus-40, and Plus-56 feature sets. See the section “IBM Support” in the chapter “Cisco IOS Software” for more details.
22. In Cisco IOS Release 10.2, RSRB was supported in all feature sets. In Cisco IOS Release 10.3 and later releases, SRB/RSRB is supported in all feature sets.
23. With Cisco IOS Release 11.2, SRB/RSRB is fast switched. This enhancement is on by default, but can be disabled.
24. Supported on access severs (with limited support on router auxiliary ports).
25. ATCP and DHCP proxy client is supported in Cisco IOS Release 10.3(3) and later releases.
26. NASI is supported in Cisco IOS Release 11.1(2) and later releases.

27. Use of LAT requires terminal license (FR-L8-10.X= for an 8-user license or FR-L16-10.X= for a 16-user license).

Table 171 Cisco IOS Release 11.2, 11.1, 11.0, 10.3, and 10.2 Remote Access Server Feature Set—Cisco 2500 Series and AS5100 Access Servers

	Cisco 2500 Series and AS5100 Remote Access Feature Set				
Features	Remote Access Server				
Cisco IOS Releases	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Platforms Supported					
Cisco 2509-2512 AS5100 access server					
LAN Support					
AppleTalk 1 and 2[1]		–	–	–	–
DECNet IV	–	–			
GRE					
Integrated routing and bridging (IRB)[2]		–	–	–	–
IP					
Multiring					
Novell IPX[3]					
Source-route bridging	–	–	–	–	
WAN Services					
Combinet Packet Protocol (CPP)		–	–	–	–
Dialer profiles		–	–	–	–
Frame Relay					
Frame Relay traffic shaping		–	–	–	–
Half bridge/half router for CPP and PPP		–	–	–	–
HDLC					
IPXWAN 2.0					
Multichassis Multilink PPP (MMP)		–	–	–	–
PPP[4]					
Switched 56					
Virtual Private Dial-up Network (VPDN)		–	–	–	–
X.25[5]					
WAN Optimization					
Bandwidth-on-demand[6]					
Custom and priority queuing					
Dial backup					
Dial-on-demand					
Header[7], link and payload compression[8]					
Header[8] and link compression	–	–	–	–	–

	Cisco 2500 Series and AS5100 Remote Access Feature Set				
Features	**Remote Access Server**				
Cisco IOS Releases	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Snapshot routing					
Weighted fair queuing				–	–
IP Routing					
BGP	–	–			
EGP	–	–			
Enhanced IGRP					
Enhanced IGRP Optimizations		–	–	–	–
IGRP					
NHRP	–	–			–
On Demand Routing (ODR)		–	–	–	–
OSPF	–	–			
PIM					
Policy-based routing				–	–
RIP					
RIP Version 2			–	–	–
Other Routing					
AURP					
IPX RIP					
RTMP					
Multimedia and Quality of Service					
Generic traffic shaping		–	–	–	–
Random Early Detection (RED)		–	–	–	–
Resource Reservation Protocol (RSVP)		–	–	–	–
Management					
AutoInstall					
Automatic modem configuration[9]			–	–	–
HTTP Server		–	–	–	–
RMON events and alarms[10]			–	–	–
SNMP					
Telnet					
Security					
Access lists					
Access security					
Extended access lists					
Lock and Key			–	–	–

	Cisco 2500 Series and AS5100 Remote Access Feature Set				
Features	**Remote Access Server**				
Cisco IOS Releases	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
MD5 routing authentication				–	–
RADIUS			–	–	–
TACACS+[11]					
Protocol Translation					
LAT					
PPP					
Rlogin					
Telnet					
TN3270					
X.25					
Remote Node[12]					
ARAP 1.0/2.0					
Asynchronous master interfaces				–	–
ATCP					–
CPPP					
CSLIP					
DHCP					–
IP pooling				–	–
IPX and ARAP on virtual asynch interfaces				–	–
IPXCP[13]					
MacIP					
PPP					
SLIP					

	Cisco 2500 Series and AS5100 Remote Access Feature Set				
Features	**Remote Access Server**				
Cisco IOS Releases	**11.2**	**11.1**	**11.0**	**10.3**	**10.2**
Terminal Services[12]					
LAT[14]					
Rlogin					
Telnet					
TN3270					
X.25 PAD					
Xremote					

1. Appletalk load balancing is available in Cisco IOS Release 11.2.
2. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
3. In Cisco IOS Release 11.2, the Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
4. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
5. X.25 Includes X.25 switching.
6. Bandwidth-on-demand means two B channel calls to the same destination.
7. IPX header compression (RFC 1553) is available in the feature sets that support IPX.
8. X.25 and Frame Relay payload compression.
9. Automatic router configuration is supported in all feature sets for Cisco IOS 11.1(2). Supported only in Enterprise for Cisco IOS 11.1(1).
10. RMON events and alarms is supported on all interfaces.
11. With Cisco IOS Release 11.2, TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.
12. Remote node and terminal services supported on access servers (with limited support on router auxiliary ports).
13. IPX header compression (RFC 1553) is available in the feature sets that support IPX.
14. Use of LAT requires terminal license (FR-L8-10.X= or FR-L16-10.X=).

Table 172 Cisco IOS Release 11.2 and 11.1—Cisco AS5200 Access Server Feature Sets

	Cisco AS5200 Access Server Feature Sets					
Features	**IP Routing**	**IP or IP/Modem**	**Desktop**	**Desktop or Desktop/ Modem**	**Enterprise[1]**	**Enterprise or Enterprise/ RMON/Modem**
Cisco IOS Release	**11.2**	**11.1**	**11.2**	**11.1**	**11.2**	**11.1**
LAN Support						
Apollo Domain	–	–	–	–		
AppleTalk 1 and 2[2]	–	–				
Banyan VINES	–	–	–	–		
Concurrent routing and bridging						
DECnet IV	–	–				
DECnet V	–	–	–	–		
GRE						
Integrated routing and bridging (IRB)[3]		–		–		–
IP						
LAN extension host						
Multiring						
Novell IPX[4]	–	–				
OSI	–	–	–	–		
Source-route bridging (SRB)	–	–	–	–		
Transparent and translational bridging[5]						
XNS	–	–	–	–		
WAN Services						
ATM LAN emulation: Rate queues for SVC per subinterface	–	–	–	–		–
Combinet Packet Protocol (CPP)		–		–		–
Dialer profiles		–		–		–
Frame Relay						
Frame Relay SVC Support (DTE)	–	–	–	–		–
Frame Relay traffic shaping	–	–	–	–		–
Half bridge/half router for CPP and PPP		–		–		–
HDLC						
IPXWAN 2.0	–	–				
ISDN[6]						
Multichassis Multilink PPP (MMP)		–		–		–
PPP[7]						
SMDS						
Switched 56						
Virtual Private Dial-up Network (VPDN)	–	–		–		–

	Cisco AS5200 Access Server Feature Sets					
Features	**IP Routing**	**IP or IP/Modem**	**Desktop**	**Desktop or Desktop/ Modem**	**Enterprise[1]**	**Enterprise or Enterprise/ RMON/Modem**
Cisco IOS Release	**11.2**	**11.1**	**11.2**	**11.1**	**11.2**	**11.1**
X.25[8]						
WAN Optimization						
Bandwidth-on-demand						
Custom and priority queuing						
Dial backup						
Dial-on-demand						
Header[9], link and payload compression[10]						
Snapshot routing						
Weighted fair queuing						
IP Routing						
BGP						
BGP4[11]		–		–		–
EGP						
Enhanced IGRP						
Enhanced IGRP Optimizations		–		–		–
ES-IS	–	–	–	–		
IGRP						
IS-IS	–	–	–	–		
Named IP Access Control List		–		–		–
Network Address Translation (NAT)	Plus	–	Plus	–	Plus	–
NHRP						
On Demand Routing (ODR)		–		–		–
OSPF						
OSPF Not-So-Stubby-Areas (NSSA)		–		–		–
OSPF On Demand Circuit (RFC 1793)		–		–		–
PIM						
Policy-based routing						
RIP						
RIP Version 2						
Other Routing						
AURP	–	–				
IPX RIP	–	–				
NLSP	–	–				
RTMP	–	–				
SMRP	–	–				
SRTP	–	–	–	–		

	Cisco AS5200 Access Server Feature Sets					
Features	**IP Routing**	**IP or IP/Modem**	**Desktop**	**Desktop or Desktop/ Modem**	**Enterprise[1]**	**Enterprise or Enterprise/ RMON/Modem**
Cisco IOS Release	**11.2**	**11.1**	**11.2**	**11.1**	**11.2**	**11.1**
Multimedia and Quality of Service						
Generic traffic shaping		–		–		–
Random Early Detection (RED)		–		–		–
Resource Reservation Protocol (RSVP)		–		–		–
Management						
AutoInstall						
Automatic modem configuration[12]						
HTTP Server		–		–		–
Modem Management	Plus		Plus		Plus	
RMON events and alarms[13]	Plus		Plus		Plus	
RMON full	Plus	–	Plus	–	Plus	–
SNMP						
Telnet						
Security						
Access lists						
Access security						
Extended access lists						
Kerberized login	–	–	–	–		
Kerberos V client support	–	–	–	–		–
Lock and key						
MAC security for hubs						
MD5 routing authentication						
RADIUS						
TACACS+[14]						
IBM Support (Optional)						
BAN for SNA Frame Relay support	Plus	–	Plus	–		
Bisync	Plus	–	Plus	–		
Caching and filtering	Plus	–	Plus	–		
DLSw+ [15]	Plus	–	Plus	–		
Downstream PU concentration (DSPU)	–	–	–	–		
Frame Relay SNA support (RFC 1490)	Plus	–	Plus	–		
Native Client Interface Architecture (NCIA) Server	Plus	–	Plus	–		–
NetView Native Service Point	Plus	–	Plus	–		
QLLC	Plus	–	Plus	–		

	Cisco AS5200 Access Server Feature Sets					
Features	**IP Routing**	**IP or IP/Modem**	**Desktop**	**Desktop or Desktop/ Modem**	**Enterprise[1]**	**Enterprise or Enterprise/ RMON/Modem**
Cisco IOS Release	**11.2**	**11.1**	**11.2**	**11.1**	**11.2**	**11.1**
Response Time Reporter (RTR)	Plus	–	Plus	–		–
SDLC integration	Plus	–	Plus	–		
RFC 1795	Plus	–	Plus	–		
SDLC transport (STUN)	Plus	–	Plus	–		
SDLC-to-LAN conversion (SDLLC)	Plus	–	Plus	–		
SNA and NetBIOS WAN optimization via local acknowledgment	Plus	–	Plus	–		
SRB/RSRB[16]	Plus	–	Plus	–		
SRT	Plus	–	Plus	–		
TG/COS	–	–	–	–		
TN3270	–	–	–	–		
Protocol Translation						
LAT	–	–	–	–		
Rlogin	–	–	–	–		
Remote Node[17]						
ARAP 1.0/2.0						
Asynchronous master interfaces						
ATCP	–	–				
CPPP						
CSLIP						
DHCP						
IP pooling						
IPX and ARAP on virtual asynch interfaces	–	–	–	–		
IPXCP[11]	–	–				
MacIP	–	–				
NASI[18]						
NetBEUI over PPP						
SLIP						

	Cisco AS5200 Access Server Feature Sets					
Features	**IP Routing**	**IP or IP/Modem**	**Desktop**	**Desktop or Desktop/ Modem**	**Enterprise[1]**	**Enterprise or Enterprise/ RMON/Modem**
Cisco IOS Release	**11.2**	**11.1**	**11.2**	**11.1**	**11.2**	**11.1**
Terminal Services[17]						
LAT[19]	–	–	–	–		
Rlogin						
Telnet						
TN3270	–	–	–	–		
X.25 PAD						
Xremote	–	–	–	–		

1. Enterprise is available with APPN in a separate feature set. Use the product numbers that specify APPN. In Cisco IOS Release 11.2, APPN includes APPN Central Registration (CRR) and APPN over DLSw+.
2. AppleTalk load balancing is available in Cisco IOS Release 11.2.
3. IRB supports IP, IPX, and AppleTalk; it is supported for transparent bridging, but not for SRB; it is supported on all media-type interfaces except X.25 and ISDN bridged interfaces; and IRB and concurrent routing and bridging (CRB) cannot operate at the same time.
4. In Cisco IOS Release 11.2, the Novell IPX feature includes display SAP by name, IPX Access Control List violation logging, and plain-English IPX access lists.
5. See the feature category “IBM Support” for information about source-route bridging (SRB) in Cisco IOS Release 10.3 and later releases.
6. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
7. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, and PPP compression. Multilink PPP is available in Cisco IOS Release 11.0(4) and later releases.
8. X.25 includes X.25 switching.
9. IPX header compression (RFC 1553) is available in the feature sets that support IPX in Cisco IOS Release 11.1(1) and later releases.
10. X.25 and Frame Relay payload compression are supported.
11. BGP4 includes soft configuration, multipath support, and prefix filtering with inbound route maps.
12. Automatic modem configuration is available for all features sets in Cisco IOS Release 11.1(2) and later releases. For the Enterprise feature set, automatic modem configuration is available in Cisco IOS 11.1(1) and later releases.
13. The RMON events and alarms groups are supported on all interfaces in Cisco IOS Release 11.1 and later releases. Enhanced RMON feature sets are also available in Cisco IOS Release 11.1. In Cisco IOS Release 11.2, RMON full is available with the plus feature sets.
14. With Cisco IOS Release 11.2, TACACS+ Single Connection and TACACS+ SENDAUTH enhancements are supported.
15. Cisco IOS Release 11.2 introduces several DLSw+ enhancements available in the Plus, Plus 40, and Plus 56 feature sets. See the section “IBM Support” later in the chapter “Cisco IOS Software” for more details.
16. In Cisco IOS Release 10.2, RSRB was supported in all feature sets. In Cisco IOS Release 10.3 and later releases, SRB/RSRB is supported in all feature sets.
17. Supported on access severs (with limited support on router auxiliary ports).
18. NASI is supported in Cisco IOS Release 11.1(2) and later releases.
19. Use of LAT requires terminal license (FR-L8-10.X= for an 8-user license or FR-L16-10.X= for a 16-user license).

The Remote Monitoring (RMON) MIB (RFC 1757) allows you to monitor all nodes and their interaction on a LAN segment. Standard Cisco IOS Release 11.1 feature sets provide support for RMON events and event groups only. If you prefer more network management support, you can order an enhanced RMON feature set that includes full support for the following nine groups: statistics, history, alarms, hosts, hostTopN, matrix, filter, capture, and events. Table 173 describes the contents of the enhanced IP/RMON, IP/IPX/RMON, and Enterprise/RMON feature sets.

In Cisco IOS Release 11.2, the feature RMON full is available in the Plus feature sets.

Table 173 Cisco IOS Release 11.1—RMON Platform-Specific Feature Sets

	RMON Platform-Specific Feature Sets[1]		
Features	**IP/RMON Routing**	**P/IPX/RMON Routing**	**Enterprise/ RMON**
Cisco IOS Releases	**11.1**	**11.1**	**11.1**
Platforms Supported			
Cisco 2500 series routers: Ethernet models 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2514, 2516, 2518, 2520, 2522, 2524 AS5100 access server			
LAN Support			
Apollo Domain	–	–	
AppleTalk 1 and 2	–	–	
Banyan VINES	–	–	
Concurrent routing and bridging			
DECnet IV	–	–	
DECnet V	–	–	
GRE			
IP			
LAN extension host			
Multiring			
Novell IPX	–		
OSI	–	–	
Transparent and translational bridging[2]			
XNS	–	–	
WAN Services			
Frame Relay			
HDLC			
IPXWAN 2.0	–		
ISDN[3]			
PPP[4]			

	RMON Platform-Specific Feature Sets[1]		
Features	**IP/RMON Routing**	**P/IPX/RMON Routing**	**Enterprise/ RMON**
Cisco IOS Releases	**11.1**	**11.1**	**11.1**
SMDS			
Switched 56			
X.25[5]			
WAN Optimization			
Bandwidth-on-demand			
Custom and priority queuing			
Dial backup			
Dial-on-demand			
Header[6], link and payload compression[7]			
Snapshot routing			
Weighted fair queuing			
IP Routing			
BGP			
EGP			
Enhanced IGRP			
ES-IS	–	–	
IGRP			
IS-IS	–	–	
NHRP			
On Demand Routing (ODR)	–	–	–
OSPF			
PIM			
Policy-based routing			
RIP			
RIP Version 2			
Other Routing			
AURP	–	–	
IPX RIP	–		
NLSP	–		
RTMP	–	–	
SMRP	–	–	
SRTP	–	–	
Management			
AutoInstall			
Automatic modem configuration			
RMON nine-group Ethernet[8]			

	RMON Platform-Specific Feature Sets[1]		
Features	**IP/RMON Routing**	**P/IPX/RMON Routing**	**Enterprise/ RMON**
Cisco IOS Releases	**11.1**	**11.1**	**11.1**
SNMP			
Telnet			
Security			
Access lists			
Access security			
Extended access lists			
Kerberized login	–	–	
Lock and key			
MAC security for hubs[9]			
MD5 routing authentication			
RADIUS			
TACACS+			
IBM Support (Optional)[10]			
BAN for SNA Frame Relay support			
Bisync			
Caching and filtering			
DLSw+			
Downstream PU concentration (DSPU)	–	–	
Frame Relay SNA support (RFC 1490)			
NetView Native Service Point			
QLLC			
SDLC integration			
SDLC transport (STUN)			
SDLC-to-LAN conversion (SDLLC)			
SNA and NetBIOS WAN optimization via local acknowledgment			
SRB/RSRB			
SRT			
TG/COS	–	–	
Protocol Translation			
LAT	–	–	
PPP	–	–	
Rlogin	–	–	
Telnet	–	–	
TN3270	–	–	

	RMON Platform-Specific Feature Sets[1]		
Features	**IP/RMON Routing**	**P/IPX/RMON Routing**	**Enterprise/ RMON**
Cisco IOS Releases	**11.1**	**11.1**	**11.1**
X.25	–	–	
Remote Node[11]			
Asynchronous master interfaces			
ATCP	–	–	
CPPP			
CSLIP			
DHCP			
IP pooling			
IPX on virtual asynch interfaces	–		
IPXCP[6]	–		
MacIP	–	–	
NASI[12]	–		
NetBEUI over PPP			
PPP			
SLIP			
Terminal Services[11]			
LAT[13]	–	–	
Rlogin			
Telnet			
TN3270	–	–	
X.25 PAD			
Xremote	–	–	

1. In Cisco IOS Release 11.2, RMON is available in the Plus feature sets. It is listed as “RMON full” in the appropriate hardware platform tables. RMON is only available as a separate platform-specific feature set in Cisco IOS Release 11.1.
2. See the category “IBM Support” for information about source-route bridging (SRB).
3. ISDN support includes calling line identification (ANI), X.25 over the B channel, ISDN subaddressing, and applicable WAN optimization features.
4. PPP includes support for LAN protocols supported by the feature set, address negotiation, PAP and CHAP authentication, PPP compression, and Multilink PPP.
5. X.25 Includes X.25 switching.
6. IPX header compression (RFC 1553) is available in the feature sets that support IPX with Cisco IOS Release 11.1(1) and later releases.
7. X.25 and Frame Relay payload compression.
8. The RMON events and alarms groups are supported for all interfaces; however, the full none groups are supported for Ethernet interfaces only. For security reasons, packet capture only captures packet headers, not data.
9. MAC security for hubs applies to the following Cisco 2500 series Ethernet hubs: 2505, 2507, 2516, and 2518.
10. IBM support is available as a separate Cisco IOS feature set with the IBM base option: IP/IBM base, IP/IPX//IBM base.
11. Remote node and terminal services are supported on access servers (with limited support on router auxiliary ports).
12. NASI is available on Cisco IOS Release 11.1(2) and later releases.
13. Use of LAT requires terminal license (FS-L8-10.X= for an 8-user license or FS-L16-10.X= for a 16-user license).

Memory Options and Software Product Numbers

Table 174 lists the software feature set product numbers and minimum memory requirements for the Cisco 2500 series and AS5100 access servers for Cisco IOS Release 11.2. Table 175 lists the software feature set product numbers and minimum memory requirements for the Cisco 2500 series and AS5100 access servers for Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2. For additional details about how to order software updates and upgrades, see the section "Cisco IOS Feature Set Upgrades" later in this chapter.

Note All models include a minimum of 4-MB Flash memory; however, depending on the Cisco IOS release feature set that you order with the system, it might require more memory. Refer to Table 174 and Table 175 for the minimum Flash memory required for each feature set. Refer to Table 176 for ordering information.

Table 174 Cisco IOS Software Product Numbers and Minimum Memory Requirements for Cisco IOS Release 11.2—Cisco 2500 Series and AS5100 Access Server

	Product Numbers and Minimum Memory Requirements			
	Cisco IOS Release 11.2			
Feature Set	**Product Number[1]**	**Access Server Model**	**Flash**	**Total DRAM**
IP	SF25C-11.2.1 SW25C-11.2.1=	2500 series	4 MB	2 MB[2]
		AS5100	–	–
IP Plus	SF25CP-11.2.1 SW25CP-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
IP Plus 40	SF25CW-11.2.1 SW25CW-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
IP Plus 56	SF25CY-11.2.1 SW25CY-11.2.1	2500 series	8 MB	4 MB
		AS5100	–	–
Desktop	SF25B-11.2.1 SW25B-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Desktop Plus	SF25BP-11.2.1 SW25BP-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Desktop Plus 40	SF25BW-11.2.1 SW25BW-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Desktop Plus 56	SF25BY-11.2.1 SW25BY-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Enterprise	SF25A-11.2.1 SW25A-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Enterprise Plus	SF25AP-11.2.1 SW25AP-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–

	Product Numbers and Minimum Memory Requirements			
	Cisco IOS Release 11.2			
Feature Set	Product Number[1]	Access Server Model	Flash	Total DRAM
Enterprise Plus 40	SF25AW-11.2.1 SW25AW-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Enterprise Plus 56	SF25AY-11.2.1 SW25AY-11.2.1=	2500 series	8 MB	4 MB
		AS5100	–	–
Enterprise/APPN Plus	SF25ANP-11.2.1 SW25ANP-11.2.1=	2500 series	16 MB	8 MB
		AS5100	–	–
Enterprise/APPN Plus 40	SF25ANW-11.2.1 SW25ANW-11.2.1=	2500 series	16 MB	8 MB
		AS5100	–	–
Enterprise/APPN Plus 56	SF25ANY-11.2.1 SW25ANY-11.2.1=	2500 series	16 MB	8 MB
		AS5100	–	–
ISDN	SF25I-11.2.1 SW25I-11.2.1=	2500 series	4 MB	2 MB
		AS5100	–	–
CFRAD	SF25F-11.2.1 SW25F-11.2.1=	2500 series	4 MB	2 MB
		AS5100	–	–
LANFRAD	SF25LF-11.2.1 SW25LF-11.2.1=	2500 series	4 MB	2 MB
		AS5100	–	–

1. Substitute the release number for xx.x.x in the product number (for example, SW25C-11.2.1=).
2. The Cisco 2522 and Cisco 2523 require 4-MB DRAM. All other models require 2-MB DRAM.

Table 175 Cisco IOS Software Product Numbers and Minimum Memory Requirements for Cisco IOS Release 11.1, 11.0, 10.3, and 10.2—Cisco 2500 Series and AS5100 Access Servers

	Product Numbers and Minimum Memory Requirements									
		Cisco IOS Releases								
			11.1		11.0		10.3		10.2	
Feature Set	Product Number[1]	Access Server Model	Flash	Total DRAM	Flash	Total DRAM	Flash	Total DRAM	Flash	Total DRAM
IP	SF25C-xx.x.x SW25C-xx.x.x=	2500 series	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB
		AS5100	4 MB	6 MB	4 MB	6 MB	4 MB	6 MB	4 MB	6 MB
IP with IBM base	SF25CS-xx.x.x SW25CS-xx.x.x=	2500 series	8 MB	4 MB	8 MB	4 MB	4 MB	4 MB	4 MB	4 MB
		AS5100	8 MB	6 MB	8 MB	6 MB	4 MB	6 MB	4 MB	6 MB
IP/IPX	SF25D-xx.x.x SW25D-xx.x.x=	2500 series	8 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB
		AS5100	8 MB	6 MB	4 MB	6 MB	4 MB	6 MB	4 MB	6 MB

	Product Numbers and Minimum Memory Requirements									
		Cisco IOS Releases								
			11.1		11.0		10.3		10.2	
Feature Set	Product Number[1]	Access Server Model	Flash	Total DRAM	Flash	Total DRAM	Flash	Total DRAM	Flash	Total DRAM
IP/IPX with IBM base	SF25DS-xx.x.x SW25DS-xx.x.x=	2500 series	8 MB	4 MB	8 MB	4 MB	8 MB	4 MB	4 MB	4 MB
		AS5100	8 MB	6 MB	8 MB	6 MB	8 MB	6 MB	4 MB	6 MB
IP/IPX with IBM base and APPN[2]	SF25DSN-xx.x.x SW25DSN-xx.x.x	2500 series	8 MB	8 MB	8 MB	8 MB	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
Desktop	SF25B-xx.x.x SW25B-xx.x.x=	2500 series	8 MB	4 MB	8 MB	4 MB	4 MB	4 MB	4 MB	4 MB
		AS5100	8 MB	6 MB	8 MB	6 MB	4 MB	6 MB	4 MB	6 MB
Desktop with IBM base	SF25BS-xx.x.x SW25BS-xx.x.x=	2500 series	8 MB	4 MB	8 MB	4 MB	8 MB	4 MB	4 MB	4 MB
		AS5100	8 MB	6 MB	8 MB	6 MB	4 MB	6 MB	8 MB	6 MB
Enterprise	SF25A-xx.x.x SW25A-xx.x.x=	2500 series	8 MB	6 MB	8 MB	6 MB	8 MB	6 MB	8 MB	6 MB
		AS5100	8 MB	6 MB	8 MB	6 MB	8 MB	6 MB	8 MB	6 MB
Enterprise with APPN[2]	SF25AN-xx.x.x SW25AN-xx.x.x=	2500 series	16 MB	8 MB	8 MB	8 MB	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
Remote Access Server	SW25E-xx.x.x=	2500 series	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB	4 MB
		AS5100	4 MB	6 MB	4 MB	6 MB	4 MB	6 MB	4 MB	6 MB
IP and RMON[2, 3]	SF25CR-xx.x.x SW25CR-xx.x.x	2500 series	4 MB	4 MB	–	–	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
IP with IBM and RMON [2, 3]	SF25CSR-xx.x.x SW25CSR-xx.x.x	2500 series	8 MB	4 MB	–	–	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
IP/IPX and RMON[2, 3]	SF25DR-xx.x.x SW25DR-xx.x.x	2500 series	8 MB	4 MB	–	–	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
IP/IPX with IBM and RMON[2, 3]	SF25DSR-xx.x.x SW25DSR-xx.x.x	2500 series	8 MB	4 MB	–	–	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–
Enterprise and RMON[2, 3]	SF25AR-xx.x.x SW25AR-xx.x.x	2500 series	8 MB	6 MB	–	–	–	–	–	–
		AS5100	–	–	–	–	–	–	–	–

1. Substitute the release number for xx.x.x in the product number (for example, SW25C-11.2.1=).
2. Not available for the Cisco AS5100 access server.
3. An Ethernet segment with 50 nodes and 10 hosts or more requires more memory, particularly when promiscuous rather than native mode is chosen. In native mode, only the packets traversing the router are monitored. In promiscuous mode, everything on the Ethernet segment is monitored.

Table 176 lists the software feature set product numbers and minimum memory requirements for the Cisco AS5200 access server for Cisco IOS Releases 11.2 and 11.1.

Note Depending on the Cisco IOS release feature set that you order with the system, it might require more memory than comes standard with the system. Refer to Table 176 for the minimum Flash memory required. Refer to Table 168 for ordering information.

Table 176 Cisco IOS Software Product Numbers and Minimum Memory Requirements—Cisco AS5200 Access Server

	Product Numbers and Minimum Memory Requirements								
		Cisco IOS Releases							
		Cisco IOS 11.2				Cisco IOS 11.1			
Feature Set	Product Number[1]	Boot Flash	Main DRAM	System Flash	Shared DRAM	Boot Flash	Main DRAM	System Flash	Shared DRAM
IP	SF52C-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX	SF52D-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
Desktop	SF52B-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
Enterprise	SF52A-xx.x.x	4 MB	8 MB	8 MB	4 MB	4 MB	8 MB	8 MB	4 MB
IP/Modem	SF52CR-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
IP/IPX/Modem	SF52DR-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
Desktop/Modem	SF52BR-xx.x.x	4 MB	4 MB	8 MB	4 MB	4 MB	4 MB	8 MB	4 MB
Enterprise/Modem	SF52AR-xx.x.x	4 MB	8 MB	8 MB	4 MB	4 MB	8 MB	8 MB	4 MB
Enterprise/RMON/ Modem	SF52ARM-xx.x.x	4 MB	8 MB	8 MB	4 MB	4 MB	8 MB	8 MB	4 MB

1. Substitute the release number for xx.x.x in the product number (for example, SW-25C-11.2.1=).

There are two types of DRAM memory in the Cisco 2500 series and AS5100 access servers: primary and shared (packet). Primary memory is used to store the operating configuration, routing tables, caches, queues, and packets. Shared memory is used to store incoming and outgoing packets. In Table 177 and Table 178, the physical configuration column lists the amount of fixed DRAM and DRAM SIMM memory supported. The system usage column lists how the system allocates the total DRAM memory installed.

Table 177 Recommended Shared and Primary DRAM Memory—Cisco 2500 Series Access Servers

Total DRAM Memory	Physical Configuration		System Usage	
	Fixed DRAM[1]	DRAM SIMM	Shared DRAM Memory	Primary DRAM Memory
4 MB	–	4 MB	2 MB	2 MB
6 MB	2 MB	4 MB	2 MB	4 MB
8 MB	–	8 MB	2 MB	6 MB
10 MB	2 MB	8 MB	2 MB	8 MB
16 MB	–	16 MB	2 MB	14 MB
18 MB	2 MB	16 MB	2 MB	16 MB

1. Fixed DRAM is soldered on the system card. Depending on the Cisco IOS feature originally ordered, the system may or may not include fixed DRAM.

Table 178 Recommended Shared and Primary DRAM Memory—Cisco AS5100 Access Servers

Total DRAM Memory	Physical Configuration		System Usage	
	Fixed DRAM[1]	DRAM SIMM	Shared DRAM Memory	Primary DRAM Memory
6 MB	2 MB	4 MB	2 MB	4 MB
10 MB	2 MB	8 MB	2 MB	8 MB
18 MB	2 MB	16 MB	2 MB	16 MB

1. Each AS5100 card (AS51-16A-E) ships with 2 MB of fixed DRAM memory soldered on the card.

Cisco IOS Feature Set Upgrades

Cisco IOS Release 11.2 for the Cisco access servers allows software upgrades that cross multiple feature sets. This will require you to order multiple feature set licenses. The following is an example:

You have a Cisco 2511 access server running the Cisco IOS Release 11.2 IP Routing feature set. You want to upgrade to the Cisco IOS Release 11.2 Enterprise Plus 40 feature set. You are crossing two feature sets: one to get from IP to Enterprise, and one to get to the Plus 40 feature set. To complete the upgrade, use the following guidelines:

- If you subscribe to SMARTnet Maintenance, you need to do the following:
  - Order FL25-CA= (IP to Enterprise upgrade license, charged item)
  - Order FL25-W= (Plus 40 upgrade license, charged item)
  - Order DRAM (if you do not have the minimum required DRAM for the new feature set)
  - Download the new software feature set from CCO
- If you do not subscribe to SMARTnet Maintenance, you need to do the following:
  - Order FL25-CA= (IP to Enterprise upgrade license, charged item)
  - Order FL25-W= (Plus 40 upgrade license, charged item)
  - Order DRAM (if you do not have the minimum required DRAM for the new feature set)
  - Order SW25AW-11.2.1= (Cisco 2500 Enterprise Plus 40 software on diskette, charged item)

Feature sets for Cisco IOS Releases 11.2 can be upgraded as described in Table 179. Adding a feature set may require you to purchase additional memory. The minimum memory requirements for Cisco 2500 series, AS5100, and AS5200 access servers are listed in Table 177 and Table 178. The minimum memory requirements listed were chosen for typical branch and remote office applications. If your network is very large, using complex routing protocols, or using RMON, you may need more memory. Configuration analysis and testing are encouraged.

Table 179 Cisco IOS Upgrades for Cisco IOS Release 11.2— Cisco 2500 Series and AS5100 Access Servers

Feature Set Upgrade	Product Number[1, 2]
Plus	FL25-P= and
with Enterprise	SW25AP-xx.x.x=
with Desktop(IP/IPX/AT/DEC)	SW25BP-xx.x.x=
with IP	SW25CP-xx.x.x=
Plus 40	FL25-W= and
with Enterprise	SW25AW-xx.x.x=
with Desktop(IP/IPX/AT/DEC)	SW25BW-xx.x.x=
with IP	SW25CW-xx.x.x=
Plus 56	FL25-Y= and
with Enterprise	SW25AY-xx.x.x=
with Desktop(IP/IPX/AT/DEC)	SW25BY-xx.x.x=
with IP	SW25CY-xx.x.x=

Feature Set Upgrade	Product Number[1, 2]
Plus and APPN with Enterprise with IP/IPX/IBM	FL25-APPN= and SW25ANP-xx.x.x= SW25DSN-xx.x.x=
Plus 40 and APPN with Enterprise	FL25-APPN=, FL25-W=, and SW25ANW-xx.x.x=
Plus 56 and APPN with Enterprise	FL25-APPN=, FL25-Y=, and SW25ANY-xx.x.x=
CFRAD to IP	FL25-FC= and SW25C-xx.x.x=
CFRAD to Desktop (IP/IPX/AT/DEC)	FL25-FB= and SW25B-xx.x.x=
CFRAD to Enterprise	FL25-FA= and SW25A-xx.x.x=
LAN FRAD to IP	FL25-LFC= and SW25C-xx.x.x=
LAN FRAD to Desktop (IP/IPX/AT/DEC)	FL25-LFB= and SW25B-xx.x.x=
LAN FRAD to Enterprise	FL25-LFA= and SW25A-xx.x.x=
ISDN to IP	FL25-IC= and SW2525C-xx.x.x=
ISDN to Desktop (IP/IPX/AT/DEC)	FL25-IB= and SW25B-xx.x.x=
ISDN to Enterprise	FL25-IA= and SW25A-xx.x.x=
IP to Desktop (IP/IPX/AT/DEC)	FL25-CB= and SW25B-xx.x.x=
IP to Enterprise	FL25-CA= and SW25A-xx.x.x=
Desktop (IP/IPX/AT/DEC) to Enterprise	FL25-BA= and SW25A-xx.x.x=
IP/IPX to Desktop (IP/IPX/AT/DEC)	FL25-DB= and SW25B-xx.x.x=
IP/IPX to Enterprise	FL25-DA and SW25A-xx.x.x=

1. For Cisco IOS Release 11.2, substitute the release number for xx.x.x in the product number (for example, SW25A-11.2.1=).
2. If you subscribe to SMARTnet Maintenance, you only need to order the upgrade license (FL25 number). If you do not subscribe to SMARTnet Maintenance, you also need to order the upgrade media product number. Use the appropriate SW- or SF- product numbers shown that end with an equal sign (=). See the example in the section "Cisco IOS Feature Set Upgrades" earlier in this chapter.

Feature sets for Cisco IOS Release 11.1, 11.0, 10.3, and 10.2 can be upgraded for the Cisco 2500 series and AS5100 access servers as described in Table 180. To order an upgrade, you must use two product numbers; one represents the upgrade license, and the other represents the software. For example, to upgrade from an IP feature set to an IP feature set with IBM base functionality, order product number FR25-CCS= (the upgrade license) and SW25CS-xx.x.x= (the software). To upgrade to a feature set with APPN, you must first purchase the upgrade license for the desired feature set and then purchase the upgrade license and upgrade software for the APPN feature set.

Table 180 Cisco IOS Release 11.1. 11.0, 10.3, and 10.2 Software Upgrades—Cisco 2500 Series and AS5100 Access Servers

Feature Set Upgrade	Product Number[1]
IP to IP with IBM base functionality	FR25-CCS= and SW25CS-xx.x.x=
IP to IP/IPX	FR25-CD= and SW25D-xx.x.x=
IP to IP/IPX with IBM base functionality	FR25-CDS= and SW25DS-xx.x.x=

Feature Set Upgrade	Product Number[1]
IP to IP/IPX with IBM base functionality and APPN[2]	FR25-CDS=, FR25-APPN=, and SW25DSN-xx.x.x=
IP to Desktop	FR25-CB= and SW25B-xx.x.x=
IP to Desktop with IBM base functionality	FR25-CBS= and SW25BS-xx.x.x=
IP to Enterprise	FR25-CA= and SW25A-xx.x.x=
IP to Enterprise and APPN[2]	FR25-CA=, FR25-APPN=, and SW25AN-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality	FR25-CSDS= and SW25DS-xx.x.x=
IP with IBM base to IP/IPX with IBM base functionality and APPN[2]	FR25-CSDS=, FR25-APPN=, and SW25DSN-xx.x.x=
IP with IBM base to Desktop with IBM base functionality	FR25-CSBS= and SW25BS-xx.x.x=
IP with IBM base to Enterprise	FR25-CSA= and SW25A-xx.x.x=
IP with IBM base to Enterprise and APPN[2]	FR25-CSA=, FR25-APPN=, and SW25AN-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality	FR25-DDS= and SW25DS-xx.x.x=
IP/IPX to IP/IPX with IBM base functionality and APPN[2]	FR25-DDS=, FR25-APPN=, and SW25DSN-xx.x.x=
IP/IPX to Desktop	FR25-DB= and SW25B-xx.x.x=
IP/IPX to Desktop with IBM base functionality	FR25-DBS= and SW25BS-xx.x.x=
IP/IPX to Enterprise	FR25-DA= and SW25A-xx.x.x=
IP/IPX to Enterprise and APPN[2]	FR25-DA=, FR25-APPN=, and SW25AN-xx.x.x=
IP/IPX with IBM base to Desktop with IBM base functionality	FR25-DSBS= and SW25BS-xx.x.x=
IP/IPX with IBM base to Enterprise	FR25-DSA= and SW25A-xx.x.x=
IP/IPX with IBM base to Enterprise and APPN[2]	FR25-DSA=, FR25-APPN=, and SW25AN-xx.x.x=
IP/IPX with IBM base to IP/IPX with IBM base and APPN[2]	FR25-APPN= and SW25DSN-xx.x.x=
Desktop to Desktop with IBM base functionality	FR25-BBS= and SW25BS-xx.x.x=
Desktop to Enterprise	FR25-BA= and SW25A-xx.x.x=
Desktop to Enterprise and APPN[2]	FR25-BA=, FR25-APPN=, and SW25AN-xx.x.x=
Desktop with IBM base to Enterprise	FR25-BSA= and SW25A-xx.x.x=
Desktop with IBM base to Enterprise and APPN[2]	FR25-BSA=, FR25-APPN=, and SW25AN-xx.x.x=
IP to IP/RMON	FR25-R= and SW25CR-x.x.x=
IP to IP/IBM/RMON	FR25-CCS=, FR25-R=, and SW25CSR-x.x.x=
IP to IP/IPX/RMON	FR25-CD=, FR25-R=, and SW25DR-x.x.x=
IP to IP/IPX/IBM/RMON	FR25-CDS=, FR25-R=, and SW25DSR-x.x.x=
IP to Enterprise/RMON	FR25-CA=, FR25-R=, and SW25AR-x.x.x=
IP/RMON to IP/IBM/RMON	FR25-CCS= and SW25CSR-x.x.x=
IP/RMON to IP/IPX/RMON	FR25-CD= and SW25DR-x.x.x=

Feature Set Upgrade	Product Number[1]
IP/RMON to IP/IPX/IBM/RMON	FR25-CDS= and SW25DSR-x.x.x=
IP/RMON to Enterprise/RMON	FR25-CA= and SW25AR-x.x.x=
IP/IBM to IP/IBM/RMON	FR25-R= and SW25CSR-x.x.x=
IP/IBM to IP/IPX/IBM/RMON	FR25-CSDS=, FR25-R=, and SW25DSR-x.x.x=
IP/IBM to Enterprise/RMON	FR25-CSA=, FR25-R=, and SW25AR-x.x.x=
IP/IBM/RMON to IP/IPX/IBM/RMON	FR25-CSDS= and SW25DSR-x.x.x=
IP/IBM/RMON to Enterprise/RMON	FR25-CSA= and SW25AR-x.x.x=
IP/IPX to IP/IPX/RMON	FR25-R= and SW25DR-x.x.x=
IP/IPX to IP/IPX/IBM/RMON	FR25-DDS=, FR25-R=, and SW25DSR-x.x.x=
IP/IPX to Enterprise/RMON	FR25-CSA=, FR25-R=, and SW25AR-x.x.x=
IP/IPX/RMON to IP/IPX/IBM/RMON	FR25-DDS= and SW25DSR-x.x.x=
IP/IPX/RMON to Enterprise/RMON	FR25-DA= and SW25AR-x.x.x=
IP/IPX/IBM to IP/IPX/IBM/RMON	FR25-R= and SW25DSR-x.x.x=
IP/IPX/IBM to Enterprise/RMON	FR25-DSA=, FR25-R=, and SW25AR-x.x.x=
IP/IPX/IBM/RMON to Enterprise/RMON	FR25-DSA= and SW25AR-x.x.x=
Desktop to Enterprise/RMON	FR25-BA=, FR25-R=, and SW25AR-x.x.x=
Desktop/IBM to Enterprise/RMON	FR25-BSA=, FR25-R=, and SW25AR-x.x.x=
Enterprise to Enterprise/RMON	FR25-R= and SW25AR-x.x.x=

1. For Cisco IOS Releases 11.1, 11.0, 10.3, and 10.2, substitute the release number for xx.x.x in the product number (for example, SW25D-11.2.1=).
2. Not available for the Cisco AS5100 access server.

Table 181 lists the feature set upgrades for Cisco IOS Release 11.2 and 11.1 and corresponding product numbers for the AS5200 access server. The AS5200 access servers upgrades are ordered as a bundled system that comes with an IP feature set.

Table 181 Cisco IOS Software Upgrades—Cisco AS5200 Access Server

Feature Set Upgrade	Product Number
IP to IP/IPX	AS5210-IP/IPX-UPGD
IP to Desktop	AS5210-DT-UPGD
IP to Enterprise	AS5210-ENT-UPGD
IP to IP/Modem	AS5210-IP/RM-UPGD
IP to IP/IPX/Modem	AS5210-IP/IPX/RM-UPGD
IP to Desktop/Modem	AS5210-DT/RM-UPGD
IP to Enterprise/Modem	AS5210-ENT/RM-UPGD

LAT Terminal License

A LAT terminal license is required to use with each asynchronous interface to which a LAT terminal is connected. Table 182 lists the licenses available and the corresponding product numbers.

Table 182 Optional LAT Terminal Licenses

Description	Cisco Access Server 2500 Series	Cisco Access Server AS5100
8-user LAT terminal license	FS-L8-10.X=	FS-L8-10.X=
16-user LAT terminal license	FS-L16-10.X=	FS-L16-10.X=
48-user LAT terminal license	–	FS-L48-10.X=

CiscoRemote Software

CiscoRemote is a scalable and comprehensive solution for remote access client software. There are two types of CiscoRemote software: CiscoRemote Lite and CiscoRemote Plus. Both products are optimized for easy installation and tuned for operation with Cisco access servers. CiscoRemote extends the benefits of Cisco IOS software capabilities to the desktop and provides a complete solution when used with Cisco access servers or remote node products (such as the Cisco 201 and Cisco 202).

CiscoRemote Lite provides basic remote node connectivity to an enterprise network. This basic connectivity package includes an installer, dialer, modem discovery, TCP/IP VxD stack, PPP or SLIP over IP or IPX. You can use CiscoRemote Lite with Windows 3.1, Windows for Workgroup, or Windows 95. CiscoRemote Lite is available free of charge on CCO (Cisco Connection Online, URL http://www.cisco.com) for an unlimited number of clients, provided that it is used to dial in to a Cisco device. The software is not licensed for use with any other vendor's hardware.

CiscoRemote Plus combines a complete set of applications for dial-up remote computing in one software package—a complete solution for enterprise network, remote access, and Internet communications. All applications are optimized, tested, and supported by Cisco Systems. CiscoRemote Plus links PCs with other computing resources within an enterprise network or across the Internet. Using CiscoRemote Plus, you can browse the World Wide Web, transfer files, log on to remote hosts, access Internet news groups, or share documents in real-time collaborative sessions.

Table 183 provides a comparison of CiscoRemote Lite and CiscoRemote Plus features. CiscoRemote Plus includes dial-up remote applications such as Remote node accelerator (Powerburst), Remote control (Timbuktu), E-mail (Beyond Mail), Netscape Navigator Browser, Version 2.0, and Document conferencing (DataBeam) that are not provided with CiscoRemote Lite.

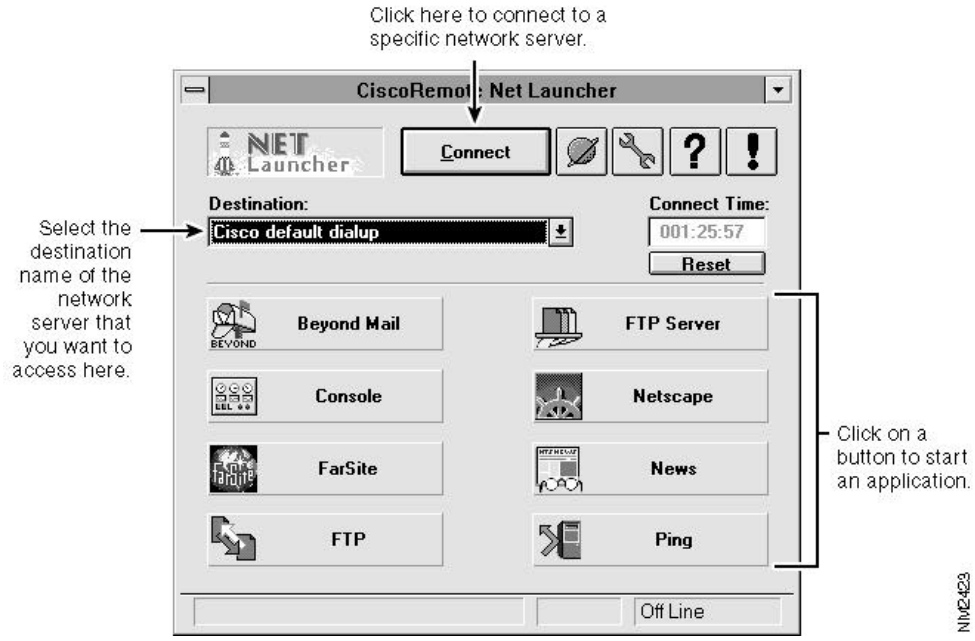
Table 183 CiscoRemote Lite and CiscoRemote Plus—Comparison of Features

Feature	CiscoRemote Lite (Version 2.0)	CiscoRemote Plus (Version 2.0)
Windows 3.1, Windows for Workgroups, and Windows 95 support[1]		
One-step installation		
Windows-based dialer		
TCP/IP protocol (VxD)		
PPP/SLIP		
Automatic modem detection		
LAN driver (NDIS / ODI) for ISDN	–	
PAP/CHAP		
Windows sockets and NetBIOS (APIs)		
Telnet and ping		
DHCP support		
SNMP (MIB II)		
Callback RFC 1570		
VJ header compression		
Remote node accelerator (Powerburst)	–	
Remote control (Timbuktu)	–	
E-mail (Beyond Mail)	–	
Netscape Navigator Browser, Version 2.0	–	
Document conferencing (DataBeam)	–	
ITU T.120 compatibility	–	
TN3270	–	
TFTP server	–	
FTP client and server	–	
Software and user guide on CD	–	

1. Cisco 201 and Cisco 202 remote node router cards support CiscoRemote Plus if they are installed in a PC running the Windows 95 operating system.

Figure 88 shows a sample net launcher dialog box from CiscoRemote Plus software.

Figure 88 CiscoRemote Plus Net Launcher Dialog Box



The software also provides the industry's first remote-node accelerator for dramatically improving dial-up performance. CiscoRemote Plus also has LAN support for attached Ethernet devices such as the Cisco 753 router. CiscoRemote Plus provides all these features at a fraction of the cost of the individual components. CiscoRemote Plus is designed for the demands of an enterprise network, yet its ease of use makes it equally well suited to connect an individual at home to the Internet.

Note CiscoRemote is licensed and sold on a per-user basis.

Table 184 CiscoRemote Plus Product Numbers

Description[1]	Product Numbers
CiscoRemote Plus for Windows, 1-user license	CISCOREMOTE-V2.0
CiscoRemote Plus, 500-user license	CRPLUS-500-V2.0
CiscoRemote Plus, 1000-user license	CRPLUS-1K-V2.0
CiscoRemote Plus, 5000-user license	CRPLUS-5K-V2.0
CiscoRemote Plus, 10,000-user license	CRPLUS-10K-V2.0
AirSoft software for the PowerBurst Server	PBAGENT-1-V1.0

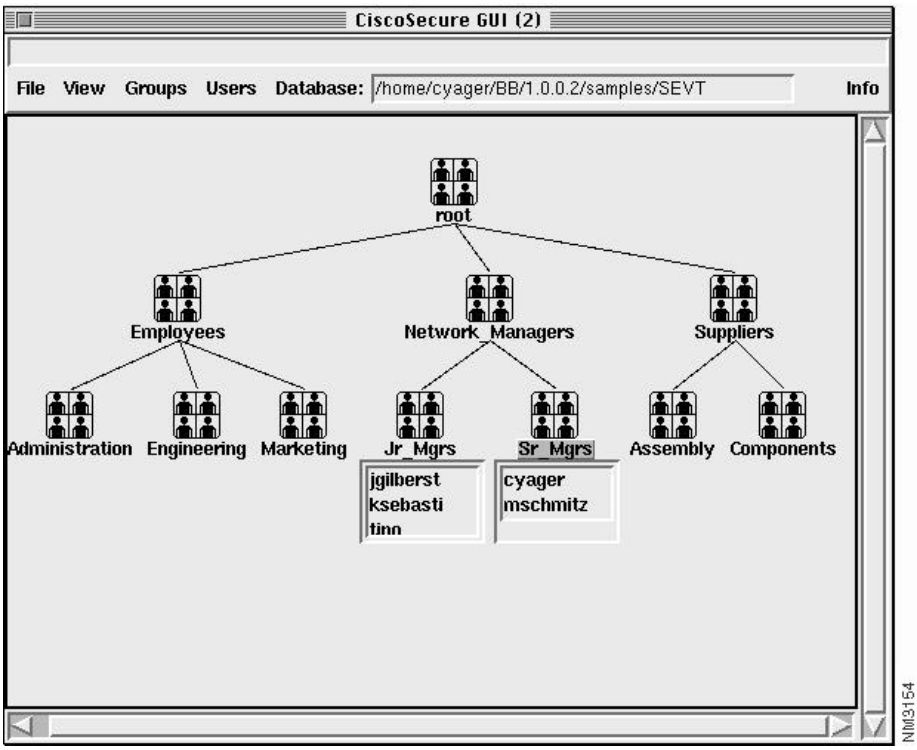
1. Cisco 201 and Cisco 202 remote node router cards support CiscoRemote Plus if they are installed in a PC running the Windows 95 operating system.

CiscoSecure UNIX Server

CiscoSecure UNIX Server is a network security server that controls and secures access to a network via dial-up modems or ISDN. It can also secure internal or external access to routers within a network. Network Access security involves three sets of requirements: authentication, authorization, and accounting, referred to as AAA. CiscoSecure utilizes a central database storing user and group profiles of authentication and authorization information. When a user attempts to login to a network, the router communicates with CiscoSecure using the TACACS+ security protocol. CiscoSecure authenticates the user and sets the authorization parameters to determine the user's privilege levels. At the same time it stores accounting information that can be used for security audits or account billing.

Figure 89 displays a view of users and groups in the authentication and authorization (AA) database.

Figure 89 Users and Groups Displayed in the AA Database



Using CiscoSecure, a network administrator can control the following:

- Who can log in to the network
- What privileges each user has in the network
- What accounting information is recorded in terms of security audits or account billing

Table 185 provides CiscoSecure UNIX Server specifications.

Table 185 CiscoSecure UNIX Server Specifications

Description	Specifications
Hardware requirements	UNIX SPARCstation 32-MB RAM 64-MB swap Minimum of 200 MB of free disk space per 1000 users One 3.5-inch floppy drive
Software requirements	SunOS 4.1.3/4.1.4 Solaris 2.5 Cisco IOS Release 10.3 or later

Table 186 lists the CiscoSecure UNIX Server product numbers. Note that *ports/sessions* means the number of ports when using modems or B channels when using ISDN.

Table 186 CiscoSecure UNIX Server Product Numbers

Description	Product Number
CiscoSecure UNIX Server base unit—16 ports/sessions	CSUS-1.0-B16
CiscoSecure UNIX Server base unit—48 ports/sessions	CSUS-1.0-B48
CiscoSecure UNIX Server base unit—192 ports/sessions	CSUS-1.0-B192
CiscoSecure UNIX Server base unit—1024 ports/sessions	CSUS-1.0-B1024
CiscoSecure UNIX Server add-on—16 ports/sessions	CSUS-1.0-A16
CiscoSecure UNIX Server add-on—48 ports/sessions	CSUS-1.0-A48
CiscoSecure UNIX Server add-on—192 ports/sessions	CSUS-1.0-A192
CiscoSecure UNIX Server add-on—1024 ports/sessions	CSUS-1.0-A1024