Product Overview

This chapter provides an overview of the communication server and protocol translator product lines.

Communication Server Overview

You will find the following information in this section:

- Communication server functionality

- Supported protocols

- Supported interfaces and connections

- Supported communication servers

Communication servers connect terminals, modems, microcomputers, and networks over serial lines to local-area networks (LANs) or wide-area networks (WANs). They provide network access to terminals, printers, workstations, and other networks. For example, a user can use SLIP or PPP and dial into a communication server at a remote office. (See Figure 1-4). This function is called *telecommuting*, and is just one of the four functions of a communication server. The following section, "Communication Server Functionality," describes each of these functions.

Communication Server Functionality

Your communication server supports four types of server operation (see Figure 1-1):

- Terminal services—Connecting asynchronous devices to a LAN or WAN through network and terminal-emulation software such as Telnet, rlogin, TN3270, and Local Area Transport (LAT). See Figure 1-2.

- Telecommuting services—Connecting devices over a telephone network using XRemote (NCD's X Windows terminal protocol), Serial Line Internet Protocol (SLIP), or Point-to-Point Protocol (PPP). See Figure 1-3 and Figure 1-4.

- Protocol translation services—Converting one virtual terminal protocol into another protocol. See Figure 1-6, as well as the section "Protocol Translator Overview," later in this chapter.

- Routing services—Full-featured Internet Protocol (IP) and Internet Packet Exchange (IPX) routing. This is the same routing functionality found on the AGS+ and IGS router platforms. See Figure 1-5.

Figure 1-1 illustrates the four types of server functionality available on the communication server.

- Terminal service is shown between the terminals and hosts running the same protocol (LAT or TCP).

- Telecommuting service is demonstrated by the remote PC connection running SLIP, PPP, or XRemote.

- Protocol translation service supported between the terminals and hosts running dissimilar protocols (LAT-to-TCP or TCP-to-LAT).

- Asynchronous IP or IPX routing is shown by the PC running SLIP or PPP, and between the two communication servers.
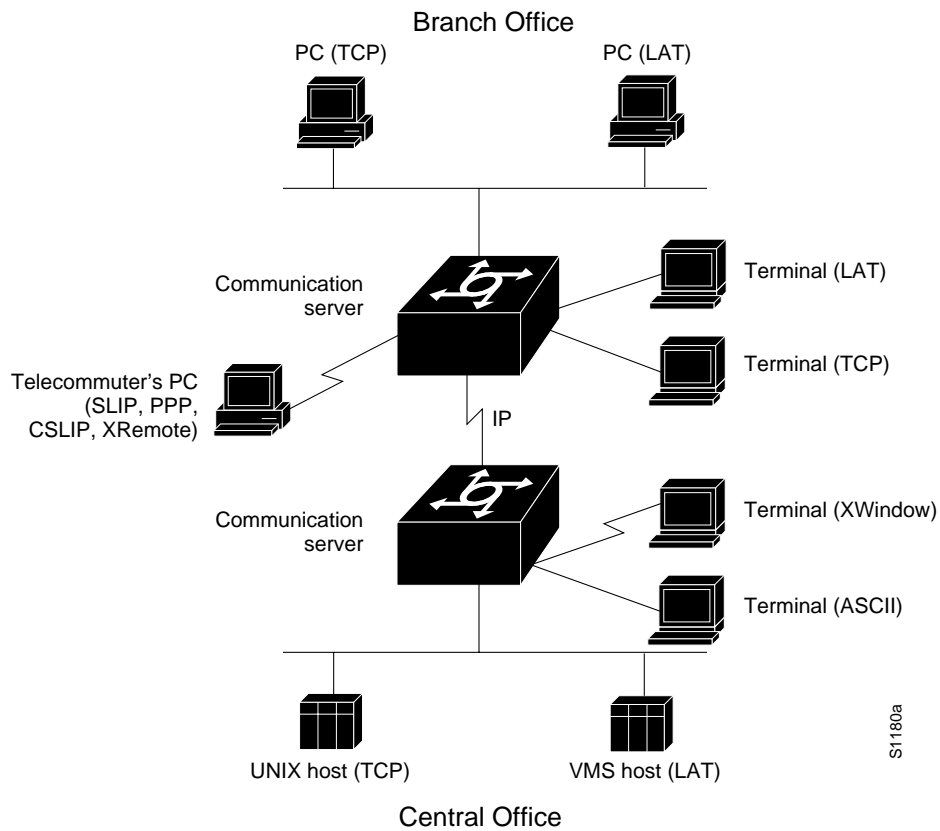

Figure 1-1   Functions of the Communication Server

LANs and WANs

On LANs, terminal services support the following types of connections:

- Telnet and rlogin connections using Transmission Control Protocol/Internet Protocol (TCP/IP) to UNIX machines

- TN3270 connections using TCP/IP to IBM machines

- LAT connections to Digital Equipment Corporation (Digital) machines

You can use the protocol translation services of the communication server to make connections between different hosts and resources running different protocols including connections to X.25 machines using X.25 PAD. Refer to the section "Protocol Translator Functionality" later in this chapter.

Telecommuting services support WAN connectivity with XRemote, SLIP, and PPP. Other WAN services include X.25, Switched Multimegabit Data Service (SMDS), and Frame Relay. Full IP and IPX routing services are also supported. Communication servers are network-compatible with routers, which you can use to extend your network to any size you need.

Terminal Services

The communication server provides terminal-to-host connectivity using virtual terminal protocols including Telnet, LAT, TN3270, rlogin, and X.25 PAD on serial lines. Modems can be set up for rotary connections, allowing you to connect to the next available modem. A host can also connect directly to a communication server. In IBM environments, TN3270 allows a standard ASCII terminal to emulate a 3278 terminal and access an IBM host across an IP network. In Digital environments, LAT support provides a terminal with connections to VMS hosts.

X.25 PAD enables terminals to connect directly to an X.25 host over an X.25 network through the communication server. X.25 PAD eliminates the need for a separate PAD device. This connection requires a synchronous serial interface. For more information, refer to the section "Protocol Translator Overview."

Figure 1-2 illustrates terminal-to-host connections using a communication server.
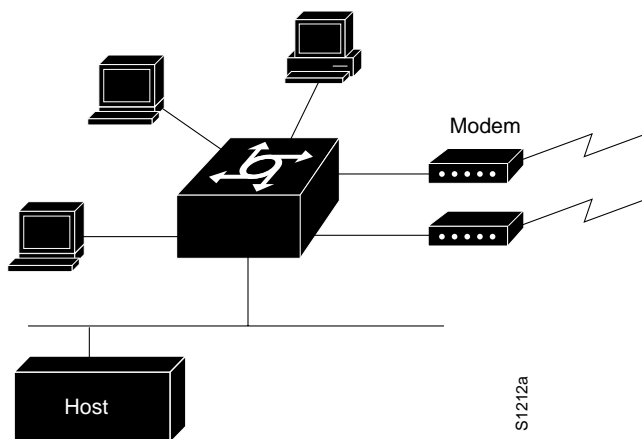
Figure 1-2   Terminal-to-Host Connectivity

Telecommuting

Using SLIP or PPP, you can run TCP/IP applications including Telnet, Simple Mail Transfer Protocol (SMTP), and File Transfer Protocol (FTP) over serial lines. You can get remote connectivity with the same functionality as a PC attached to a local network. Another option is to use the XRemote protocol over asynchronous lines, because the communication server can provide network functionality to remote X display terminals.

Figure 1-3 illustrates an XRemote connection using a communication server. See the *Communication Server Configuration Guide* for additional possible XRemote configurations.
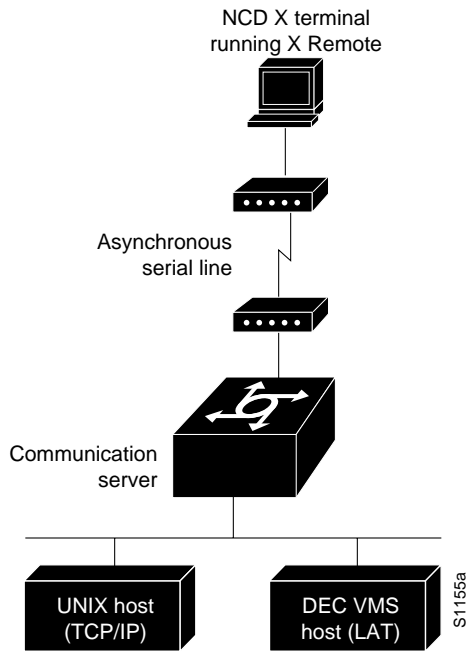

Figure 1-3   XRemote Connection

Figure 1-4 illustrates telecommuting connections where remote users dial into a communication server and connect to network services.
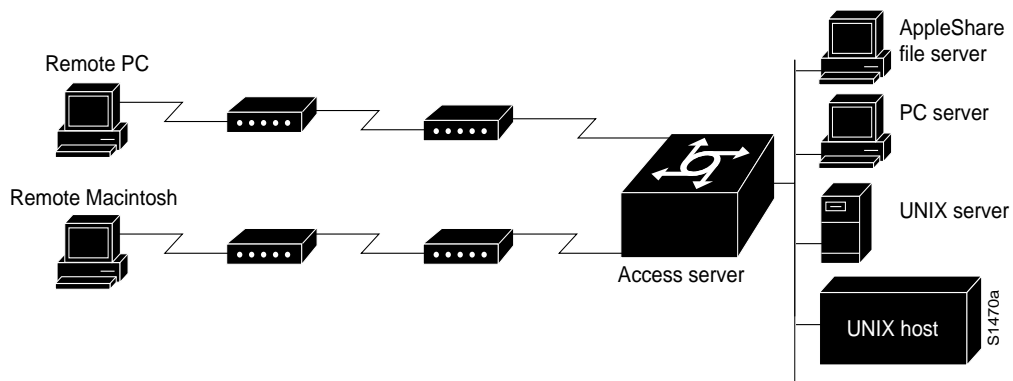

Figure 1-4   Telecommuting Connection

Protocol Translation on the Communication Server

The communication server can translate virtual terminal protocols to permit devices running dissimilar protocols to communicate. Protocol translation on the communication server supports Telnet, LAT, and X.25. There are two ways to make connections using the protocol translator. The one-step method enables you to perform bidirectional translation between any of the following protocols:

- X.25 and TCP (on the ASM-CS)

- X.25 and LAT (on the ASM-CS)

- LAT and TCP

The two-step method enables connection to IBM hosts from LAT, Telnet, rlogin, and X.25 PAD environments. Users must first connect to the communication server, then use the TN3270 facility to connect to the IBM host. Figure 1-6 later in this chapter illustrates LAT-to-TCP protocol translation.

IP Routing

Routing is the process of determining the most efficient path for sending data packets to a destination address outside the local network. The communication server gathers and maintains routing information to enable the transmission and receipt of such data packets. Routing information takes the form of entries in a routing table, with one entry for each identified route. The communication server can create and maintain the routing table dynamically to accommodate network configuration changes when they occur.

Communication servers allow you to route IP and IPX packets over synchronous and asynchronous lines. Asynchronous routing provides low-cost operation over normal dial-up telephone networks. The communication server's routing capabilities provide remote home and sales offices with cost-effective access to a central site. For example, traffic from PCs and UNIX workstations can be routed through the communication server, eliminating multiple phone lines and modems. Routing over asynchronous lines also provides significant phone-line savings for small offices by allowing dial-up telephone lines to be used rather than more costly leased lines.

All of the IP and IPX routing protocols and special features that are implemented on routers are available on your communication server. Routing protocols include Open Shortest Path First (OSPF), Interior Gateway Routing Protocol (IGRP), Routing Information Protocol (RIP), Exterior Gateway Routing Protocol (EGP), and Border Gateway Protocol (BGP). Special routing features include route filtering, priority queuing, access lists, and more.

Figure 1-5 illustrates an IP routing configuration across asynchronous serial lines. In this configuration, the host is connected to an Ethernet network and forms a routing connection with communication servers at remote sites.
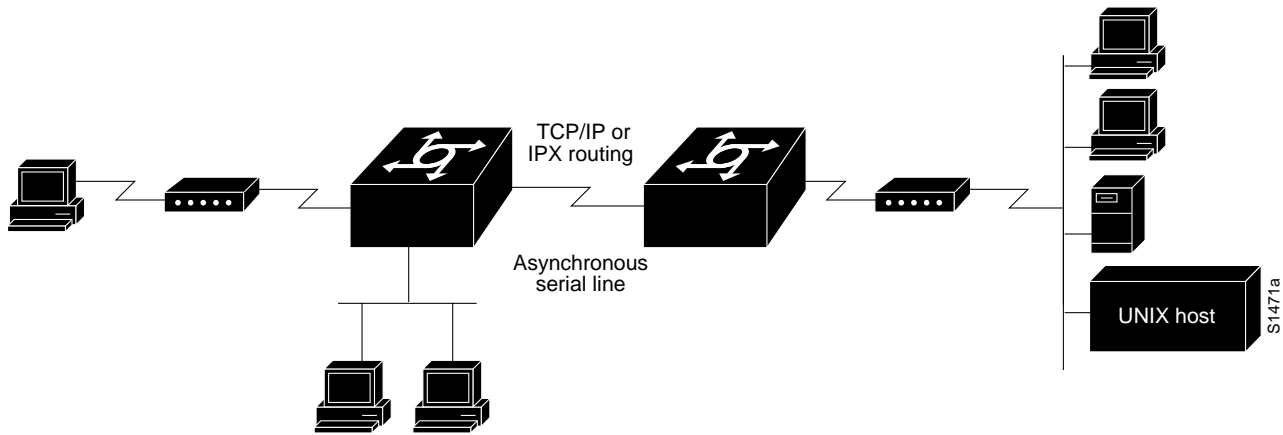
Figure 1-5   Asynchronous Routing Connectivity

Supported Protocols

A user can dial in and use a port for any of the following types of connections:

- Telnet
- LAT
- rlogin
- X.25 (on the ASM-CS only)
- TN3270
- XRemote
- SLIP and PPP connections to a single PC
- IP and IPX routing

This range of functionality is possible because multiple roles can be assigned to each asynchronous interface. Each asynchronous line can be used as a network interface for IP routing, as a source of data for terminal-server communications (using Telnet, LAT, rlogin, and so forth), for protocol translation, and for telecommuting (using XRemote and SLIP).

The following descriptions summarize the protocols and connection services supported by the available communication server models.

- TCP/IP is the most widely implemented protocol suite on networks of all media types. TCP/IP is today's standard for internetworking, and is supported by most computer vendors, including all UNIX-based workstation manufacturers.

- SLIP is an inexpensive means of connecting a personal computer or workstation to a network using asynchronous dial-up modems.

- LAT protocol is Digital's proprietary terminal connection protocol used with Digital minicomputers.

- The X.25 specification permits cost-effective, as-needed access to major public networks in the United States and Europe.

- IBM 3278 terminal emulation provides TN3270-based connectivity to IBM hosts over serial lines.

- Network Computing Devices Inc. XRemote terminal facility allows for remote X Window operation.

Supported Interfaces and Connections

Communication servers handle multiple device interfaces. They multiplex asynchronous RS-232 serial lines onto a high-speed network interface. ASCII terminals, modems, printers, and host serial ports are among the devices you can connect to the communication servers. You can use a number of methods to connect serial devices, including RJ-11, RJ-45, and 50-pin Telco connectors. The 500-CS supports RJ-45 connectors only. The ASM-CS supports Telco and RJ-11 connectors.

The network interfaces for the communication servers provide easy connectivity. The network interface is typically Ethernet, but can also be synchronous serial lines and Token Rings (on the ASM-CS only).

Using communication servers, any RS-232-compatible device, such as a serial laser printer, film recorder, or plotter, can become a shared resource to your organization over a local network.

Supported Communication Servers

Part of the power and flexibility of your communication server components is derived from their physical configuration options. You can choose from single-board systems or card-based chassis configurations that offer processor, back-panel connector mountings, and communications interfaces best suited to your network.

Communication Server Models

The following communication server models are available:

- The ASM-CS model is built on the 9-slot A chassis and can support from 16 to 112 asynchronous lines. Network interfaces include synchronous serial, Ethernet, or Token Ring.

- The 500-CS model can support 8 or 16 asynchronous lines. Network interfaces include synchronous serial and Ethernet.

Microprocessors

The ASM-CS offers a choice of an MC68020 microprocessor with 4 MB of memory or an MC68040 microprocessor with 16 MB of memory. The 500-CS is based on the MC68331 processor, which comes with 2 MB of RAM and is expandable to 4 MB or 10 MB of RAM, and offers both RS-232 and RS-423 serial connectors, as well as hardware and software flow control. All system microprocessors contain onboard RAM, system ROM holding all operating system, bootstrap, and diagnostic software.

The communication server also includes nonvolatile memory that retains configuration information despite power losses or system reboots. With the nonvolatile memory option, the terminal and network servers need not rely on other network servers for configuration and boot service information.

Protocol Translator Overview

This section provides an overview of the protocol translator product line. Functions supported on the standalone protocol translator are also supported on the communication server and router with the protocol translation option. You will find the following information in this section:

- Protocol translator functionality
- Supported transmission protocols and services
- Supported interfaces and connections
- Supported protocol translators

Protocol Translator Functionality

Protocol translators are high-performance application-level gateways that can provide connectivity among systems running differing protocols over a variety of media.

As part of their software capability, protocol translators provide distributed network management facilities to assist in performance monitoring, run-time error logging, and support SNMP. These features enable the network manager to examine and adjust the protocol translators for optimum performance.

Protocol translators translate virtual terminal protocols to allow devices running dissimilar protocols to communicate. The protocol translation software supports Telnet, LAT, and X.25. One-step protocol translation software performs bidirectional translation between any of the following protocols:

- Telnet (TCP) and LAT
- Telnet and X.25
- LAT and X.25

Note Telnet is a terminal emulation protocol that is part of the Transmission Control Protocol/ Internet Protocol (TCP/IP) protocol suite. In the configuration syntax of the protocol translation software, Telnet is called TCP.

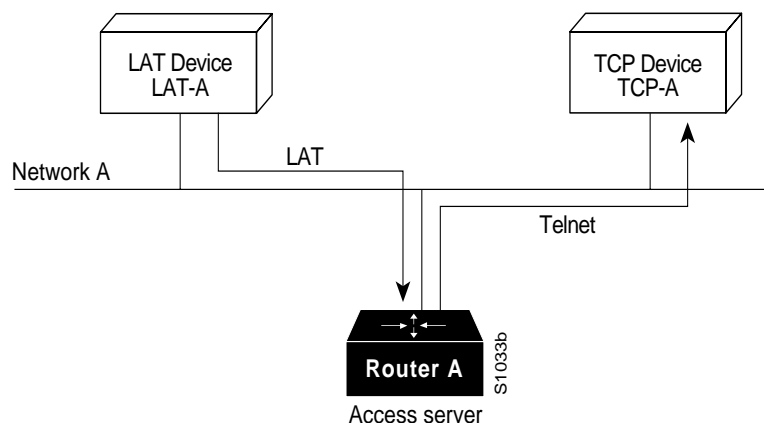Figure 1-6 illustrates LAT-to-TCP protocol translation.

Figure 1-6   LAT-to-TCP Protocol Translation

Note TN3270 and XRemote are also supported by the protocol translation software. However, to translate between these and other supported protocols, you must use the two-step method. Refer to Chapter 4, "Connecting to a Host through a Protocol Translator," for information concerning two-step translations in general. Refer to the *Protocol Translator Configuration Guide* for information about TN3270 and XRemote.

Supported Transmission Protocols and Services

Protocol translators provide a flexible set of capabilities for making connections between hosts and resources running different protocols across different media. The following descriptions summarize the protocols and connection services supported by the protocol translators:

- TCP/IP protocols—The most widely implemented protocol suite on networks of all media types. TCP/IP is today's standard for internetworking, and is supported by most computer vendors, including all UNIX-based workstation manufacturers.

- LAT—Digital's proprietary terminal connection protocol used with Digital minicomputers. Router/bridges support bridging of the LAT protocol. Protocol translators translate LAT packets to X.25, Telnet, or TN3270.

- X.25 PAD protocols—Permit cost-effective, as-needed use of major public networks in the United States and Europe. Protocol translators support the X.25 protocol and the X.3, X.28, and X.29 specifications.

- IBM 3278 terminal emulation—Provides TN3270-based connectivity to IBM hosts over serial lines.

- Network Computing Devices Inc. XRemote terminal facility—Allows for remote X Window operation using your NCD terminal.

Supported Interfaces and Connections

In addition to supporting Ethernet (IEEE 802.3), protocol translators support synchronous serial circuits at many speeds. A protocol translator can be connected to up to ten serial lines. Protocol translator serial interfaces are capable of transmitting and receiving data at up to four megabits per second, and support connectivity to WAN services such as SMDS, Frame Relay, and X.25.

A broad line of media adapters are also available for your convenience, including RS-232, V.35, X.21, and RS-449.

Supported Protocol Translators

Part of the power and flexibility of the protocol translator's components is derived from its physical configuration options. You can choose from single-board systems or card-based chassis configurations that offer processor, back-panel connector mountings, and communications interfaces best suited to your network.

Protocol Translator Models

The protocol translation capability is supported on all standalone protocol translators, and as an option on communication servers and routers. The following models that support protocol translation are available:

- The CPT model is built on the C chassis, a compact two-slot chassis. Connection options include one Ethernet and one or two synchronous serial connectors. This model is best suited as a central-site protocol translator.

- The Cisco 3000 is a two-port multiprotocol router in a fixed configuration with Ethernet, Token Ring, serial, and basic rate interface (BRI) interface options. It runs software that includes protocol translation. The Cisco 3000 comes standard with Flash EPROM and is ideal for use in branch office or remote environments. Protocol translation is provided as a software option, thereby supporting concurrent routing, bridging, and protocol translation capability.

- The IGS/L, IGS/R, and IGS/TR models are single-board routers with two network interfaces—either Ethernet and synchronous serial or Token Ring and synchronous serial. Protocol translation is provided as a software option, thereby supporting concurrent routing, bridging, and protocol translation capability.

- Protocol translation is also supported on all 500-CS and ASM-CS communication servers as part of the basic software image.

Microprocessors

Your protocol translator products use either the MC68020, MC68030, or MC68040 microprocessor for high-speed operation. All microprocessors contain onboard RAM, system ROM holding all operating system, bootstrap, and diagnostic software, and hardware and software support for a control console.

Protocol translators also provide optional nonvolatile memory that retains configuration information despite power losses or system reboots. With the nonvolatile memory option, the terminal and network servers need not rely on other network servers for configuration and boot service information.