

CTIX™ TCP/IP

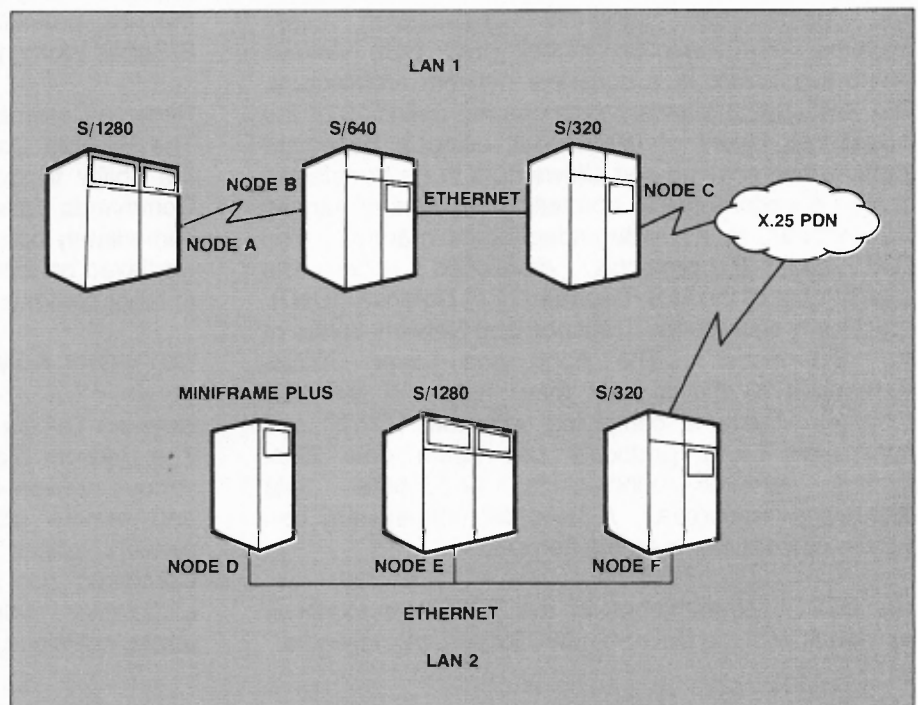
- **Network software for Ethernet-based LANs**
- **Supports SLIP for asynchronous networking**
- **Supports X.25 for PDN access**
- **Allows CTIX-based systems to communicate with each other and with non-Convergent systems supporting the TCP/IP protocols**
- **Provides file transfer, remote logon, network status, and network management**
- **Enhanced network management capability**
- **Compatible with Department of Defense TCP/IP protocols**

The Convergent™ TCP/IP software package allows users of the CTIX operating system (Convergent's version of UNIX System V) to configure networks that provide an efficient means of exchanging information and sharing resources among diverse computing systems. CTIX TCP/IP can provide a media-independent networking system that can employ a number of link-level media protocols. Currently, the following media are supported:

- Ethernet
- Serial Line Internet Protocol (SLIP)
- X.25 Public Data Network (PDN)

With this media independence, two or more networks can be welded together to form a larger network. This internetworking linkage is invisible at the command interface level, so that the system appears to the network user as a single network.

An example of the internetworking capabilities of CTIX TCP/IP is shown in the accompanying figure. LAN 1 consists of nodes B and C, and LAN 2 consists of nodes D, E, and F. These LANs are internally connected via Ethernet. Node A is remotely connected to LAN 1 by an RS-232 link. LAN 1 and LAN 2 are connected via an X.25 PDN. A user on any node has the same CTIX TCP/IP networking capabilities. Thus, a user on node A can access files on node F with no appreciable difference in performance.



TCP/IP allows users to share peripherals, data, and software programs over the network. Programs and data can be managed by a single operator at a central site, by operators at individual sites, or both. Users can transfer files between nodes in the network, establish remote terminal connections, and perform network diagnostics without additional programming effort.

ARCHITECTURE

The CTIX TCP/IP package consists of five major components:

Socket Interface -- the 4.2 BSD standard programmatic interface to the kernel networking software.

Transmission Control Protocol (TCP) -- provides the user program interface to send or receive data.

Internet Protocol (IP) -- provides the ability to move packets of data through an interconnected set of networks.

Application Layer Utilities -- provide standard functions including file transfer, remote logon via virtual terminal facilities, and remote command execution.

Network Manager -- provides a tool to manage the Local Area Network. Functions include the ability to add and delete nodes in the network, to modify the definition of hosts on the network, and to grant or deny permission to access certain network resources.

The International Standards Organization Open Systems Interconnection model (ISO OSI) defines seven key layers in a complete network architecture. The IEEE 802.3 standard provides the definition of the lowest two layers of this model, using a baseband transmission scheme that allows data to be transferred at high speeds between computing systems of varying architectures, in a vendor-independent manner. The TCP and IP protocols, developed under the sponsorship of the U.S. Department of Defense (DoD), specifically address the Transport and Network layers of the ISO model. The Application Layer Utilities correspond to the highest three layers of the ISO scheme. Systems complying with the TCP/IP and Application Layer protocols can share data files, printers, terminal connections, and other data processing resources. A user on one system can access other systems on the network.

The CTIX implementation of the TCP/IP protocols is consistent with the DoD Standard for all DoD networks.

APPLICATION LAYER UTILITIES

The Application Layer Utilities within the CTIX TCP/IP software package support the following functions:

File Transfer Program

The File Transfer Program allows users to manipulate files on multiple systems. It provides both a user command interface to initiate file transfers and an implementation of the standard File Transfer Protocol (FTP). The File Transfer Program can also be used to perform the following operations on a remote node:

- Create a directory
- Delete a directory
- Delete a file
- Rename a file
- List the directory
- Append a remote file to a local file

Virtual Terminal Facility

The Virtual Terminal Facility allows any terminal user on the network to log in remotely to any other system in the network. This allows the remote user to have the same access to programs and resources on a system as do users with terminals directly attached to that same system. The Virtual Terminal Facility allows the physical terminal characteristics to be controlled by the system to which the terminal is physically attached, so the remote system does not need to worry about these issues. Thus, for example, a user of a PT or GT terminal attached to an S/Series Workgroup Server™ can log in remotely to another machine that is not aware of the physical characteristics of the PT and GT terminals or of the line protocols they use in conjunction with the S/Series Workgroup Server.

Remote Command Execution

The Remote Command Execution facility gives users the ability to execute commands on a remote node. Commands are executed on the remote node immediately upon receipt. The resulting output can be displayed on local or remote terminals or used as input to other commands.

NETWORK ADMINISTRATION

Network Status

The Network Status Command allows users to display various network-related data structures, including local and remote addresses, queue sizes, and internal network status information. The Network Status Command can also be used to display a table of cumulative statistics including packets transferred, errors, collisions, and the status of available routes.

Network Management

The CTIX TCP/IP package provides the network manager with a tool to control and manage the network effectively. It includes the ability to add or delete a host from the network and to modify a host's definition on the network. It can be used to grant or deny to individual users or to all users of specific systems permission to access network resources. The Network Management Facility is menu driven and easy to use.

SYSTEM CONFIGURATION

S/320 and S/640

The TCP/IP implementation on the S/320 and S/640 Workgroup Servers is media independent and operates over Ethernet, RS-232, and X.25 public data networks, thus providing the capability to create local area networks that will traverse geographically dispersed areas. A maximum transmission rate of 19.2 Kbps can be obtained using an RS-232 connection. Requirements for installation are as follows:

SOFTWARE

- CTIX 5.0 or higher
- TCP/IP software (SNC-1040)
- TCP/IP - X.25 interface (optional)

HARDWARE

- S/320 or S/640 with 1 MB RAM (minimum) and either of the following:
- VME cage, Ethernet expansion board, Ethernet cables and transceivers, or
- RS-232 cable and modem

S/1280

The S/1280 TCP/IP implementation is media independent and operates over the Ethernet and RS-232 at a maximum transmission rate of 19.2 Kbps. Requirements for installation are as follows:

SOFTWARE

- CTIX 5.0 or higher
- TCP/IP software (SNC-1050)

HARDWARE

- Two-enclosure S/1280
- TP or CP with a memory expansion board
- Ethernet controller board, Ethernet cables and transceivers
- Either Multibus adapter or RS-232 cable and modem

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