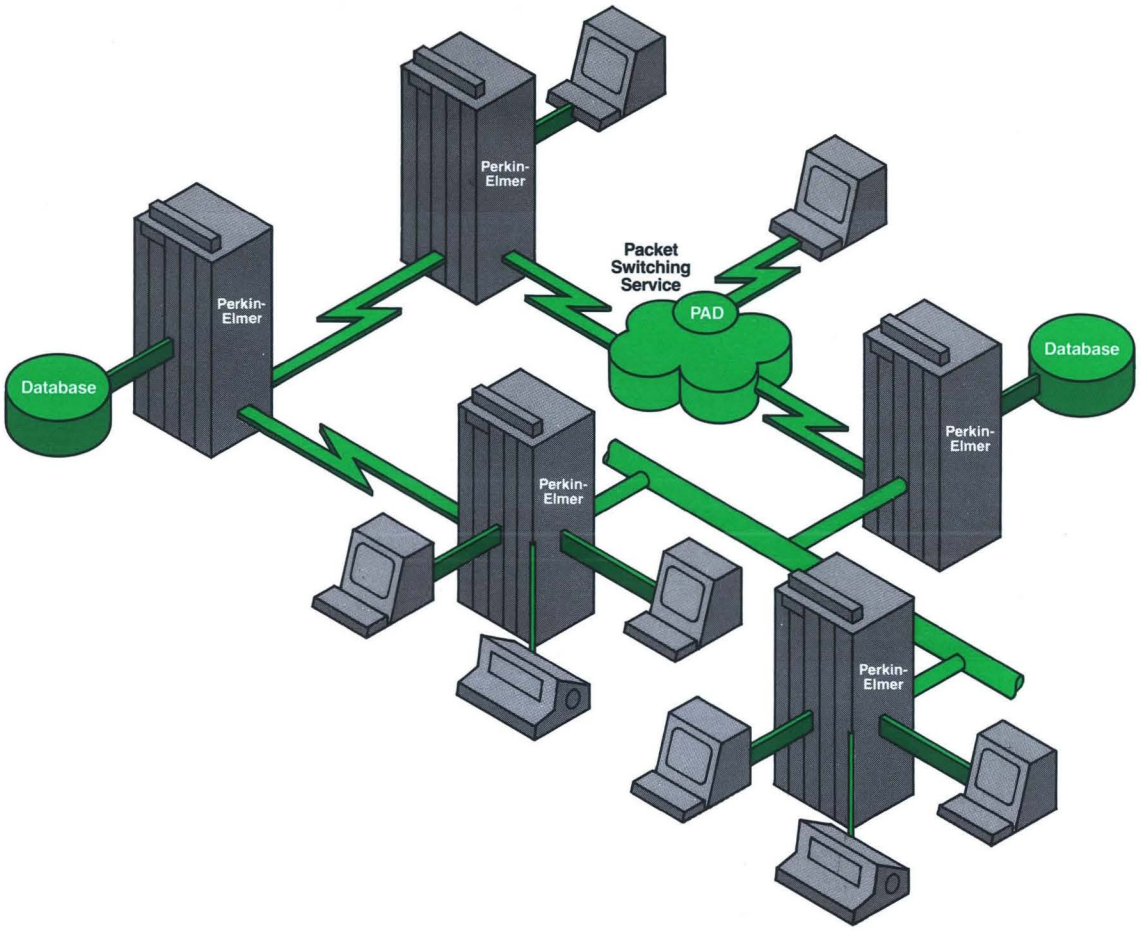
PERKIN-ELMER

Series 3200

PENnet Plus

Open Systems Networking Wide Area CCITT X.25 and Local Area IEEE 802.3 (Ethernet)



Overview

Perkin-Elmer offers an extensive set of powerful networking products which enable Perkin-Elmer Series 3200 computer systems to be easily linked together, and to support simple, yet flexible, co-existence with IBM-compatible systems. These products can be used in any combination on a single Series 3200 computer system.

Perkin-Elmer's networking capabilities are provided by:

- PENnet Plus–a general-purpose, open networking environment (for use with Perkin-Elmer Series 3200 computer systems) that provides both wide area networking (via CCITT X.25 and X.29) and local area networking (via IEEE 802.3 Ethernet) based on the ISO-OSI Model.
- SNA Gateways–a set of gateway products for connection to IBM SNA networks, including direct or program-controlled emulation of IBM 3270 devices and 3770 Remote Job Entry stations.
- BSC Gateways–a complementary set of products for interconnection with Bisynchronous-based systems, including direct or program-controlled emulation of 3270 devices, HASP RJE stations, and 2780/3780 RJE stations and communications lines.

Description

PENnet Plus is a general-purpose, open networking environment that provides both wide area networking via CCITT X.25 and X.29 and local area networking via IEEE 802.3 (Ethernet).

The PENnet Plus Open Systems Network is designed in accordance with the International Standards Organization's model for Open Systems Interconnection (ISO-OSI) which facilitates the efficient linking of various computer systems that comply with the standard.

Designed from the outset to comply with the ISO's OSI model, PENnet Plus is an excellent basis for implementing distributed applications within an organization, anywhere in the world.

PENnet Plus enables users to effectively distribute computer resources in multiple local areas via local area networks, and in geographically dispersed sites via wide area networks.

The PENnet Plus Open Systems Network:

- Requires no special skills to install or use.
- Has easy-to-use utility programs for installation, control and operation of the network.
- Provides extensive network security, controlled by the local node whose resources are to be accessed.
- Allows expansion by additional communications lines, more computer resources, or gateways to other networks, as required.

PENnet Plus is simple to install, manage and use. It provides transparent connections between users and computer system resources distributed throughout the network. No specialized knowledge is required, saving the need for expensive recruitment or retraining of staff (an important consideration in selecting a distributed processing network).

To protect against unauthorized access to a distributed network, PENnet Plus supports and enhances the high level of access control provided by Perkin-Elmer's user interface monitors–Reliance Plus, Multi-Terminal Monitor and 3270 Emulator.

Additional communications links and computer resources can be easily added to a PENnet Plus network when and as needed, providing virtually unlimited growth capabilities.

PENnet Plus Includes The Following Features:

- ISO-OSI based to reap benefits of industry standardization
- CCITT X.25 packet-switched network protocol to provide reliable data transfer worldwide
- CCITT X.29 remote terminal access via packet-switching services to support standard asynchronous terminals
- IEEE 802.3 (Ethernet Version 2) local area network support for efficient connection of multiple local systems
- User Facilities
  - **Interactive Terminal Facility** for terminal access across the network
  - **Network Printing** for printing on any printer in the network
  - **File Transfer** for copying data files between systems on the network
  - **User Program Interface** to the ISO-OSI Transport Level for user-written network applications
  - **Network Management and Control** for easy installation, management and control of the network and user access security

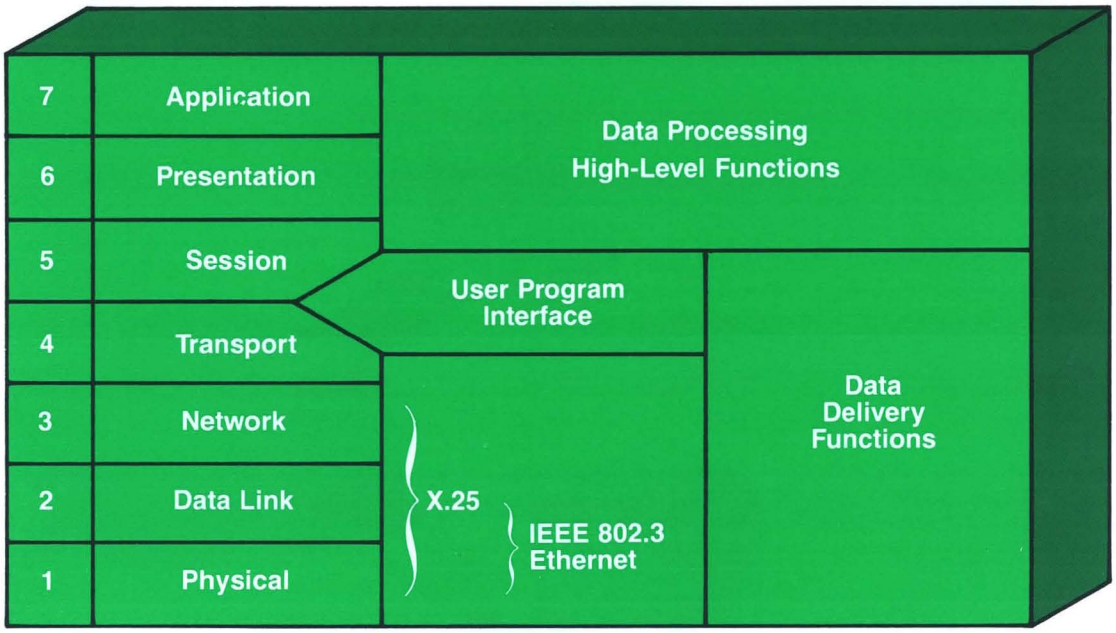
For electronic mail applications, Perkin-Elmer provides Network Electronic Mail Service (NEM/32) which interfaces with PENnet Plus and Reliance to provide on-line electronic mail transfer across a local or wide area network.

ISO-OSI

PENnet Plus conforms to the ISO's OSI model, a layered approach to providing comprehensive services required for a modern, reliable and effective distributed processing network. The merits of this approach are:

- Ability to utilize additional protocols as they become accepted standards.
- Ability to make use of intelligent workstations, other computer systems, etc., as they are developed to comply with the standard.
- User investment in ISO OSI-compatible networks protected, since this international standard cannot be modified unilaterally.

ISO-OSI MODEL



CCITT X.25

The international CCITT X.25 standard for data communications provides a worldwide accepted, reliable means of transferring data between multiple computer systems in units known as "packets". These packets contain address information to enable a single communications line to carry a mixture of active connections simultaneously.

Generally, X.25 connections are provided by packet-switching services in the country of operation, with international connections managed by these services. It is also possible to use this protocol over dedicated lines, making special manufacturer-dependent communications protocols unnecessary.

One local connection to a packet-switching service is normally all that is required to enable data to be sent and received across even the most complex network.

PENnet Plus X.25 interface is certified for operation on the major public packet-switching networks around the world:

Telenet (U.S.A.)
TYMNET (U.S.A.)
PSS (U.K.)
DATEX-P (West Germany)
DATAPAC (Canada)

In addition, PENnet Plus is in the process of being certified for operation over the Austpac service in Australia and Transpac in France.

PENnet Plus supports direct leased lines as well as packet-switching networks.

The major benefits provided by the use of X.25 are:

- Users can choose either private lines, public packet-switching services, or a mixture of both to suit throughput requirements and minimize communications charges.
- Users can easily implement, modify and expand a network both nationally and internationally. For example, as workloads increase, a general-purpose single connection can be enhanced by adding dedicated communications lines– completely transparent to users.

Remote Terminal Access (RTA)

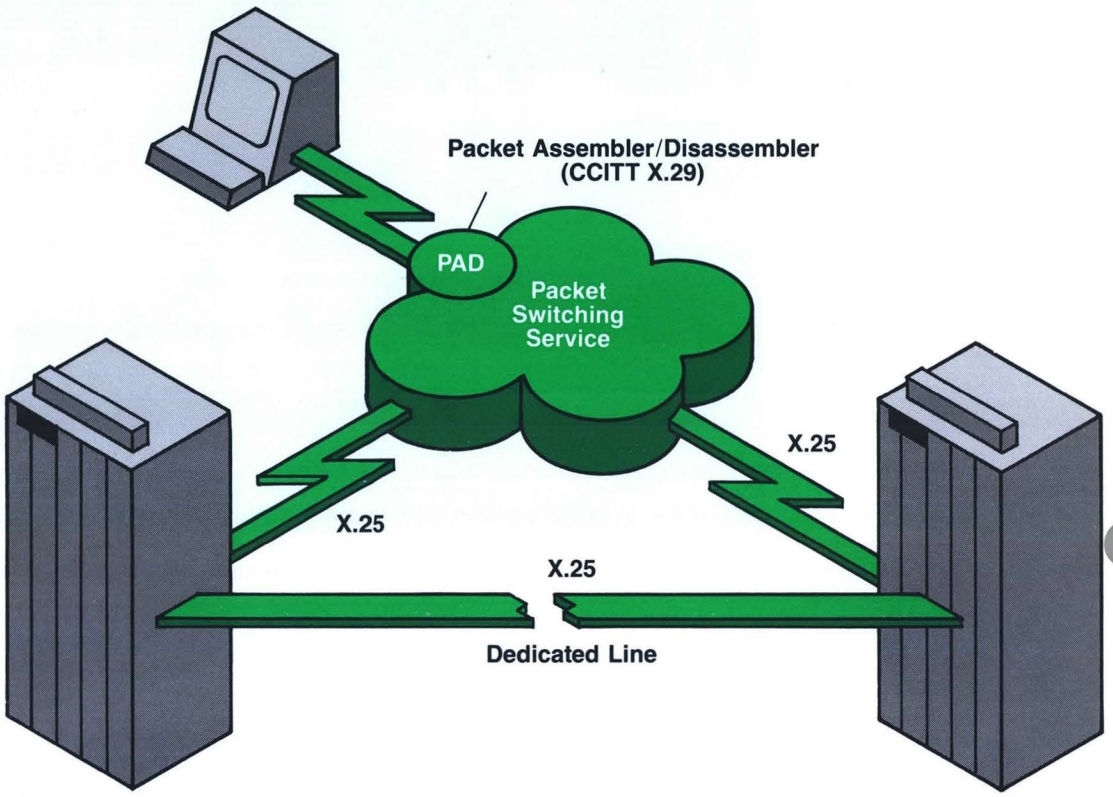
PENnet Plus supports remote asynchronous terminals in accordance with CCITT X.29 standard protocol. Such terminals interface to a packet-switching service via a Packet Assembler-Disassembler (PAD) provided by the service.

This provides a simple, transparent and flexible means of supporting remote asynchronous terminals, even when located in a different country.

The use of packet-switching services ensures highly reliable connections and data transfers, in marked contrast to commonly used dial-up facilities.

Terminals connected via X.29 can be identified by a previously defined terminal address or by a password to assure system security. One practical benefit of this terminal identification is the prevention of unauthorized "collect calls" (reverse charges) by remote users.

CCITT X.25 and X.29 Connections



IEEE 802.3/Ethernet

PENnet Plus utilizes the widely accepted IEEE 802.3 (Ethernet Version 2) standard for local connection between Perkin-Elmer Series 3200 systems. This allows resource sharing between a large number of local computer systems which can communicate with each other over a single coaxial cable.

The Ethernet cable bandwidth is 10 million bits per second, a far higher rate than the normal communications line speed of 9,600 or 19,200 bits per second.

Each Ethernet interface from a Perkin-Elmer Series 3200 computer system is provided by an Ethernet Data Link Controller (EDLC) which performs the assembly and disassembly of data packets.

The IEEE 802.3 (Ethernet) protocol operates either in place of, or in conjunction with, the X.25 wide area network protocol within PENnet Plus. All the higher level facilities of PENnet Plus are available over either (or both) interfaces.

PENnet Plus provides a transparent bridge between local Ethernet and wide area X.25 network connections on Perkin-Elmer Series 3200 systems.

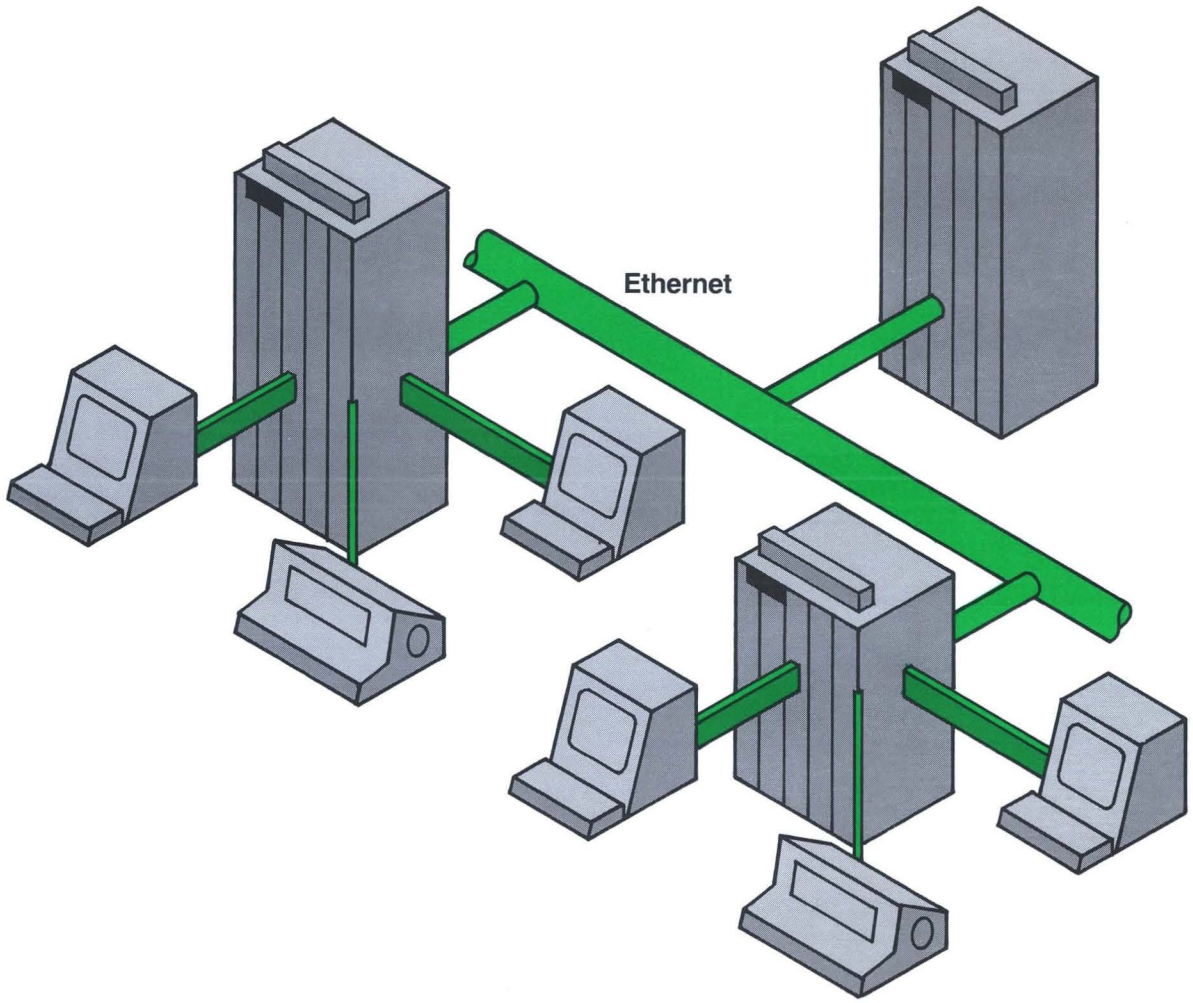
Major advantages of the use of the IEEE 802.3 Ethernet protocol are:

- Local computer systems can be easily and efficiently connected together. Large numbers of direct connections are replaced by a single coaxial cable.
- Support can easily be provided for new products as they are developed to the IEEE 802.3 standard.

IEEE 802.3 Ethernet Features Include:

- Carrier Sense Multiple Access with Collision Detection (CSMA/CD) local area connection
- Bandwidth of 10 megabits per second
- Maximum station access throughput of up to 2 megabits per second, at the hardware access level
- Up to 1024 addressable stations
- Up to 5 connected cable segments (Perkin-Elmer does not currently offer inter-segment connectors, the connectors are available from other suppliers)
- Coaxial cable segments up to 500 meters in length
- Up to 2500 meters maximum station separation
- Up to 100 stations per coaxial cable segment
- Up to 45 meters of cable between a Series 3200 system and the connection to the coaxial cable (known as a transceiver)
- On-board, self-test diagnostic capability provided with the Perkin-Elmer Ethernet Data Link Controller (EDLC)

IEEE 802.3/Ethernet Connection



User Facilities

Interactive Terminal Facility

Full terminal access across the network is provided by the Interactive Terminal Facility (ITF). ITF enables terminals connected to any system in the network, and terminals connected via Remote Terminal Access (X.29), to interact with any monitor program executing in any other system. Access is controlled by the network administrator and by the controller of the relevant monitor program on the system to be used.

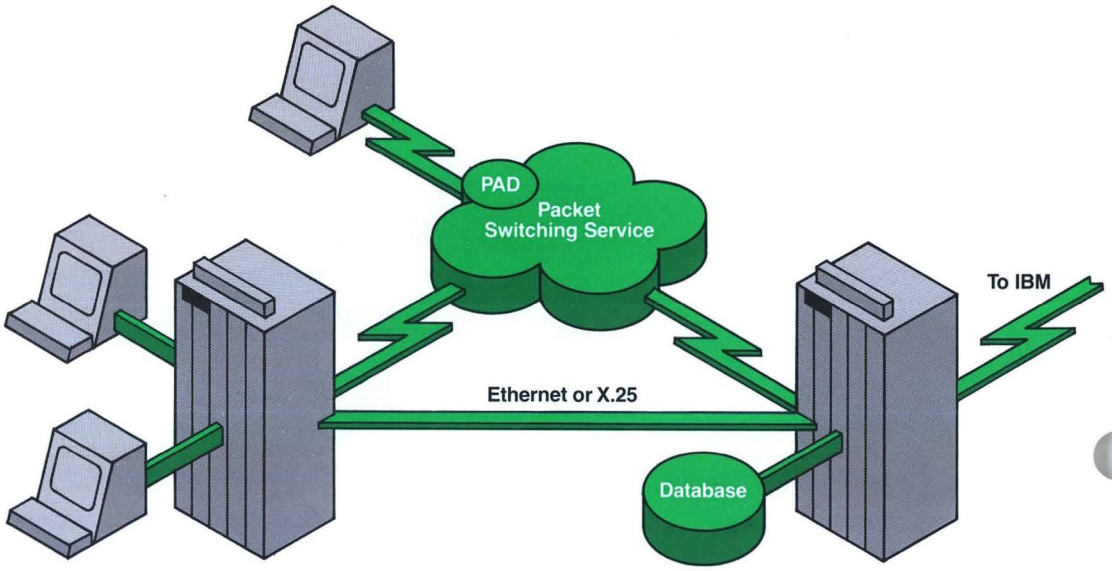
The standard Perkin-Elmer Environment Control Monitor (ECM) provides a simple interface to either a single Series 3200 system or a distributed network.

Available monitor programs include:

- Reliance for transaction processing and relational database access
- Multi-Terminal Monitor for timesharing and program development
- 3270 Emulator for interactive connection to remote IBM-compatible systems

ITF provides users with completely transparent connections to any system from any authorized terminal. Users do not have to learn any new skills and are fully productive immediately upon implementation of a network.

Interactive Terminal Facility



Network Printing

Network Printing allows output to be produced on any printer in a network, without any special commands or user programming. This is normally used for routing output back to the location of the user who initiated the print. By operating transparently, this facility removes any need for the user or the programs to know the physical configuration of the network.

File Transfer

File Transfer allows Multi-Terminal Monitor users to transfer on-line files of any length, disk to disk, between systems on a network. Users can initiate the copying of each file interactively or in batch mode. To preserve system data security, users are required to sign on to the system where the file resides.

User Program Interface

The Transport Service Programming Interface provides an interface to the OSI Transport Layer within PENnet Plus for direct program-to-program communication across a network. Multiple connections can be set up between programs, each providing data transfer in either (or both) direction.

Interfaces are provided for user programs written in COBOL, FORTRAN or Assembler (CAL/MACRO).

User facilities provided by this interface include:

- Registration of a Transport Service Access Point by a user task
- Identification of connections to be made through each access point
- Establishment of a connection to another user task executing on the network (including within the same system)
- Initiation of a variable length data transfer with the connected task

Data transfers between user tasks can be one-way, two-way alternate or two-way simultaneous.

Network Management and Control

PENnet Plus provides simple-to-use utility programs to define and control the distributed network. No specialized knowledge is required to install or modify the network configuration. The network administrator specifies the connections in the network, alternative routes to be used within the network, and control parameters for indirect routes (i.e., routes via intermediate systems) to the Network Definition Utility. A single command can then generate a PENnet Plus configuration for the network defined. A second simple command then loads and starts a PENnet Plus network.

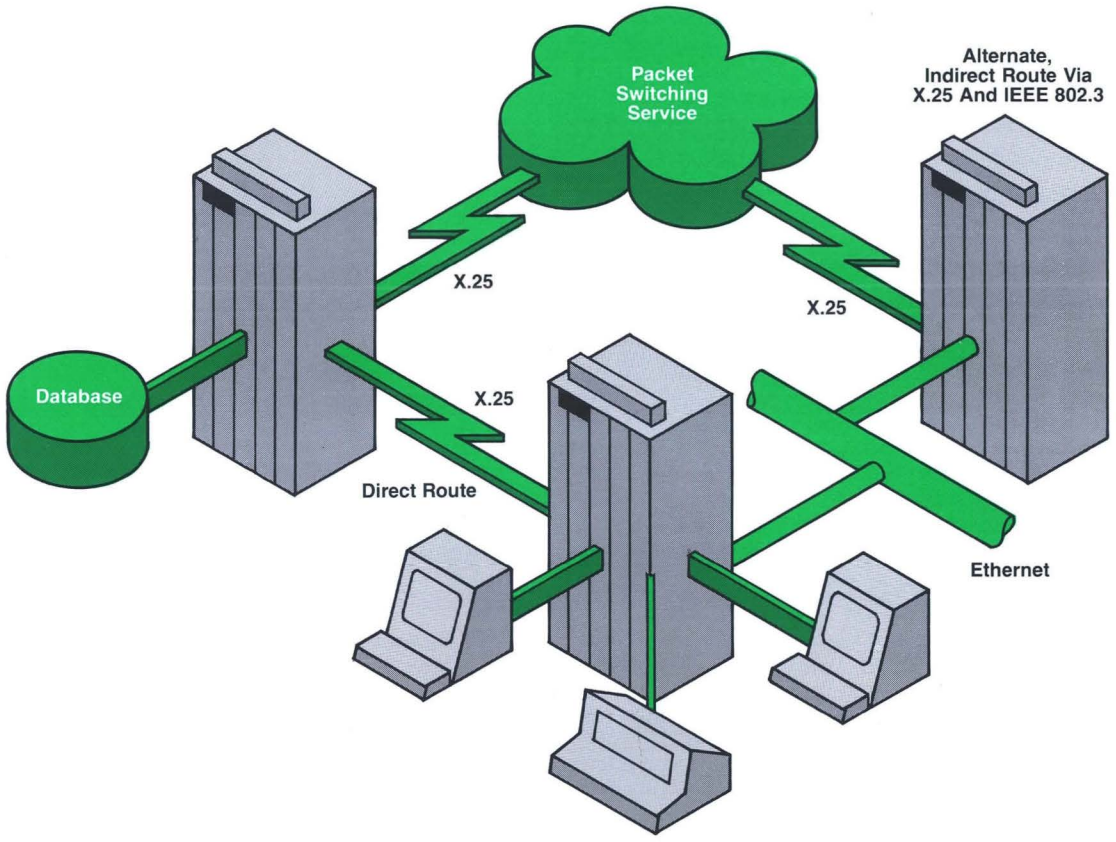
The Flexible Routing capability within PENnet Plus includes both indirect routing and alternate routing. This routing can be easily controlled to make optimum use of available types of connections (packet-switching services, leased lines or IEEE 802.3/ Ethernet). PENnet Plus automatically balances connections over equally preferred multiple routes.

PENnet Plus provides comprehensive facilities for controlling and operating the network, including monitoring the status of all network activity. A log of all significant events is maintained to assist in the identification and correction of any faults in the network.

Access to system resources is controlled by the Perkin-Elmer interface monitor programs: Reliance Plus, Multi-Terminal Monitor, and 3270 Emulator. In addition, the network administrator can specify which computer systems and monitor programs each terminal may access.

These important facilities ensure that the distributed network is easy to administer, install and operate and that the security of each node is maintained.

PENnet Plus X.25 and IEEE 802.3 Routing



Network Electronic Mail Service

Network Electronic Mail (NEM/32) is an optional product giving Reliance users on PENnet Plus distributed networks the ability to send mail to one or more other users on the network. NEM/32 supports the concepts of mail receipt confirmation and private tray storage to provide a simple, secure, and convenient means of communicating within an organization. Multiple-addressed mail and broadcast facilities are also provided.

See the NEM/32 Product Bulletin for further details of this facility.

System Requirements

Minimum Hardware Requirements

Any Perkin-Elmer 32-bit system with a minimum of 1 megabyte of memory.

For X.25 support a High Speed Data Handling Option and either a Quad Synchronous Adaptor (QSA) with Line Conditioning Module (LCM) or Single Synchronous Adaptor (SSA) must be included with ZBID option.

Perkin-Elmer also provides data transmission cables for the QSA/LCM or SSA interfaces for X.25 operation.

An Ethernet Data Link Controller (EDLC) to a Selector Channel must be included for IEEE 802.3 (Ethernet Version 2) support.

A range of cables connection cables and Ethernet coaxial cables are available from Perkin-Elmer to form a local area network.

Minimum Software Requirements

OS/32 Revision 6.2 for X.25 support.

OS/32 Revision 7.2 for IEEE 802.3 (Ethernet) support.

Reliance (or Reliance PLUS) Revision 6 for NEM/32 support.

Product Numbers

S7n-051–PENnet Software and Documentation Packages.

Note: n indicates the type of package required, please contact your local Perkin-Elmer sales office for ordering details.

M47-160–Ethernet Data Link Controller. Includes interface, internal cable, three-meter transceiver cable, transceiver unit, and user manual.

M47-161–Optional transceiver cable, 15 meters in length

M47-162–Optional transceiver cable, 45 meters in length

M47-163–Ethernet Local Area Network Coaxial Cable. 25 meters. Includes two segment terminators and one barrel connector.

M47-164–Same as M47-163, except length is 50 meters

M47-165–Same as M47-163, except length is 100 meters

Documentation

48-069–PENnet Networking Overview

48-070–PENnet User Guide

48-071–PENnet Systems Administration Manual

48-062–Ethernet Data Link Controller Installation Manual

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The information contained herein is intended to be a general description and is subject to change with product enhancement.

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PERKIN-ELMER

Data Systems Group
2 Crescent Place • Oceanport, N.J. 07757
(201) 870-4712 • (800) 631-2154

October 1983
PB322103
Printed in U.S.A.