

Hewlett-Packard Overview

Background

Hewlett-Packard's three lines of minicomputers are:

- *The HP 3000 Series of general purpose business computers includes products ranging from the four-user Model 37 to the 400-user Model 70.*
- *The HP 9000, used primarily in scientific and engineering computation, includes products ranging from UNIX system and BASIC workstations to the 100-user Model 850.*
- *The HP 1000 Series is used primarily for real-time monitoring and instrument control.*

Hewlett-Packard (HP) is a \$10 billion international company with 50 years of experience in scientific instrumentation and 20 years of experience in computer products. The company is headquartered in Palo Alto, California, and has manufacturing, sales, and service offices throughout the world. HP manufactures three major lines of minicomputers, as well as a large number of hand-held and desktop calculator products. Approximately 60 percent of HP's revenues are derived from its three lines of minicomputers.

In 1986, Hewlett-Packard introduced its first HP Precision Architecture (HP-PA) computer—HP's implementation of RISC architecture, the HP 9000 Model 840. It was followed in 1987 by two new members of the HP 9000 family (Models 825 and 850) and the first two HP-PA members of the HP 3000 family (Models 930 and 950).

HP offers a wide range of data communications products that permit the construction of networks connecting systems within the same HP computer family, systems from different HP families, and computers from other vendors. The earliest of these products, Distributed Systems (DS), consists of networking software for the interconnection of HP 3000s or HP 1000s. HP's networking products have since expanded to include proprietary Network Services (NS), software for the interconnection of HP 3000s or HP 9000s, and ARPANET and Berkeley network services under HP-UX, HP's implementation of the UNIX operating system for the interconnection of HP 9000s and other UNIX-based machines. HP data communications products also include an X.25 network, a Systems Network Architecture (SNA) gateway, IEEE 802.3 and Ethernet services. HP's hardware, software, and service products for data communications and networking are all incorporated under the name HP AdvanceNet.

HP intends to adhere to the developing OSI model and evolving industry standards in its network software and hardware products.

HP Terminal Types

The HP 700 family of terminals is HP's fourth generation of terminals. These terminals offer value-packed functionality, more standard memory, and a choice of green, amber, or soft-white screen color. Superior ergonomics on these terminals include sharp character definition, excellent keyboard feel, and 72 Hz, flicker-free operation.

The Environment

The HP 700/92, /93, /94, /97 are the HP block-mode terminals. These terminals have local-storage capability to receive transfers of blank forms in advance of data to be transmitted as update information, which improves the throughput speed of the devices. The 700/93 and /97 are also graphic terminals.

The HP 700 family of terminals also offer terminals for the ASCII, ANSI, and IBM markets. The 700/41 and /43 are ASCII terminals. Terminals in this market segment connect to a variety of computer systems including microcomputers, minicomputers, and mainframes.

The 700/22, /32, and /44 are ANSI terminals. Digital has chosen the ANSI standard as the basic communication protocol for DEC terminals. Also, UNIX-based computer systems are popular hosts for ANSI terminals. The 700/71 terminal is an IBM-3270-type terminal. These terminals are designed to work with IBM mainframes such as the 3090, 4300, and 9370.

Connectivity Between HP Systems

Terminal Connections

Terminals, and microcomputers that emulate terminals, are connected to HP computers through RS-232 or RS-422 ports. Both hard-wired and dial-up connections are supported. Recently, both HP and third-party suppliers have provided direct terminal connections from microcomputers via an Ethernet LAN.

Network Services

The NS/3000 software product is an implementation of OSI layers six and seven. This software family permits communications between HP 3000s with a wide variety of services.

A subset of these services is supported over point-to-point, X.25, or satellite network links, as well as in communications between HP 3000s and other HP computers.

Similar products (NS/1000 and NS/9000) exist for the HP 1000 and HP 9000 computer lines. A subset of network services is provided between the different HP computer product lines.

Distributed Systems Network Services

The Distributed Systems (DS) products provide extensive networking capabilities among HP 3000s and between HP 3000s and HP 1000s. Connection may be made

The NS/3000 software family provides thin-wire Ethernet between HP 3000s for the following functions:

- Remote database access
- Remote file access
- Remote device access
- Network file transfer
- Virtual terminal access
- Program-to-program communications
- Remote process management
- Network interprocess communications

The Environment

using bisync and X.25 protocols, hard-wired local connections, dialed and leased telephoned lines, and X.21 and X.25 public data networks. Network database access, file access, device access, file transfer, and interprogram communications are supported among HP 3000s, and a subset of these services is supported between HP 3000s and HP 1000s. The DS products are older products that have been superseded by the NS products.

X.25 Packet-Switched Networks

HP NS and DS products can be used over both public and private X.25 packet-switched networks. The principal communications capabilities provided include system-to-system communications, system-to-dial-up-terminal communications, and system-to-leased-line, remote terminal cluster communications.

SNAGateway

The IBM System Network Architecture (SNA) link permits an HP 3000 or an HP 9000 to connect to an IBM System 370-compatible host processor in a SNA environment. This facility emulates the functions of the lower three SNA layers and supports SNA/IMF and SNA/NRJE concurrently.

ARPA Services

HP 9000 Series 800 computers running HP-UX can communicate in a multivendor environment using the networking services defined by the Department of Defense Advance Research Project Agency (ARPA) and the Berkeley Software Distribution (BSD) UNIX 4.2 system. ARPA services are the de facto standard throughout the scientific and engineering communities, and they provide protocols for electronic mail, file transfers, and terminal access over local and wide area networks. Similar services are available on the HP 9000 Series 300 and Series 500 computers, and interconnectivity with Digital's VAX (running BSD 4.2 or 4.3, or VMS), UNIX, and IBM PC AT compatibles running MS-DOS or PC-DOS is also possible.

Ethernet Alternatives

Ethernet is an industry-standard, high-speed networking media system that transmits data at 10 Mbps. Several products are available for connecting Macintosh computers to Ethernet. All of these products make use of Apple's EtherTalk software, which allows use of AppleTalk Phase 2 network system protocols on high-speed Ethernet media. For more information on these products, see the *Network Environments* and *AppleTalk Communications* chapters of this Guide.

The Environment

Microcomputer Connections

HP provides AdvanceLink, a software product for its own Touchscreen and Vectra (IBMPCAT compatible) personal computers that enable these microcomputers to connect to and communicate with HP systems and other computers.

The following section details the products that enable the Macintosh personal computer to function within the HP communications environment.