

HP 9000 SERIES 500 COMPUTERS

Introduction

The HP 9000 Series 500 based on a proprietary 32 bit microprocessor, is Hewlett Packard's first 32 bit computer. The HP 9000 is intended for customers with technical applications. Key to the position of the HP 9000 is the concept of the engineering productivity network or EPN. The EPN consists of a collection of engineering workstations linked together over a high speed local area network. The workstations can be either HP 9000 Series 500 or Series 200 computers. The workstations based on the Series 500 provide the highest computational performance. These workstations can be either single or multiuser systems and offer a performance range based on single, double, or triple CPU's.

Overview

The HP 9000 Series 500 product line consists of three models and three performance ranges. The Model 20 is an integrated workstation, the Model 30 is a rack-mountable box computer, and the Model 40 houses the computer in a standalone cabinet. All models are based on the same hardware and offer identical performance.

Model 20

- Memory/processor module
- 13" color or monochrome CRT
- 256 Kb integral flexible disk
- 10 Mb internal Winchester disk (optional)
- Built-in 80 column thermal printer (optional)
- 4 slots for HP-CIO interfaces
- Choice of BASIC or HP-UX operating systems

Model 30

- Memory/processor module
- 7 slots for HP-CIO interfaces
- HP-UX operating system

Model 40

- Memory/processor module
- 7 slots for HP-CIO interfaces
- Roll around pod
- HP-UX operating system

Each of the models of the HP 9000 is available as a 1 CPU, 2 CPU's, and 3 CPU's. Two operating systems are available for the Model 20, the BASIC Language System and HP-UX; the Models 30 and

40 support only HP-UX. HP-UX is a UNIX* based operating system offered in either single user or multiuser versions.

It is most appropriate to describe HP 9000 growth paths in terms of building networks of engineering workstations rather than describing just an HP 9000 growth path. And then there are many growth paths.

For example:

Start with a single CPU Series 500 add processors to enhance performance, and other 9000's Series 500 or 200 computers in a local network. Further, add datacomm connections to HP 1000's or 3000's or add gateways to existing mainframe computers.

Start with HP 9000 Series 200 computers, providing a very low cost entry into HP family of engineering workstations. Add other HP Series 200 computers using Shared Resource Manager, and ultimately add Series 500 to focus on computationally intensive problems.

Product Positioning

The HP 9000 is a price performance family of HP engineering workstations. It is intended for users with technical applications in engineering and science.

The Series 500 Model 20 with the BASIC language system, provides a growth path for users of Series 200 products as well as earlier generations of HP desktop computers. The BASIC language system offers the traditional advantages of BASIC such as quick program development, easy debugging, and powerful statements plus new enhancements including a run-time compiler and multiprogramming. It also features I/O capabilities similar to those of the Series 200 Computers. HP-UX provides an effective environment for generating large programs in FORTRAN, PASCAL, or C languages. HP-UX systems provide an alternative to large timesharing systems based on mainframe or supermini computers for solving scientific or engineering problems which require the power of a 32 bit computer.

In many cases, a program which is consuming extensive resources on a timeshare machine can be offloaded to an HP 9000 Series 500 system, improving the response time of user on the timeshare system and providing dedicated computational power to the program. A network of HP 9000 Series 500 and Series 200 computers provides predictable response time to all users and offers an effective growth path with the addition of new work-

* UNIX is a trademark of Bell Laboratories, Inc.

stations as the number of users increases. HP 9000 family of computers offer a complete price and performance range so that the computer per task concept becomes financially attractive. For less demanding tasks, a low cost Series 200 computer can be added; for large programs, a Series 500 may be required.

The multi-user HP-UX Operating system is suitable for transaction intensive jobs, such as text editing and program development. Single user and multi user systems can be mixed on the same network if desired.

In HP's Manufacturer's Productivity Network (MPN), the HP 9000 family is intended to be used most often in the Computer Aided Engineering quadrant.

Features Comparison

Since the essential hardware for all models and series is the same, the most useful features comparison is that of the BASIC Language System vs. HP-UX.

HP-UX	BASIC
Multi-user or single-user	Single-user, multi-programming
Time share	Event driven
Virtual memory	Memory resident programs
Hierarchical file system, LIF utility	Hierarchical file system, LIF utility, 9845 format utility
FORTRAN 77, PASCAL, C	BASIC
AGP/DGL graphics	2D/3D graphics
Local area network	
Asynchronous terminal emulator	Asynchronous terminal emulator
RJE	
HP Distributed systems network over point to point links	
Full screen editor	Editing and debug commands



Solutions

Hewlett-Packard application software is available in three particular areas--electrical engineering, mechanical engineering, and software engineering. The present EE software is HP Spice, a circuit simulation package. The HP-UX operating system provides an effective software development environment. These three application areas will be further enhanced with additional HP software in the future.

In addition to the HP proprietary software, HP has an aggressive program in place to ensure that third party software suppliers with appropriate high quality products will move their software to the HP 9000.

Markets

The Marketplace for the HP 9000 is among the engineering and scientific research organizations of industry, education, and government. In particular, the 9000 market is most predominantly among large companies who manufacture discreet products with a high technology content.

In this marketplace the growing requirement to do large simulation and modeling programs makes the HP 9000 particularly attractive because it promises to put such computational capability in the hands of almost every engineer. Additionally, the EPN strategy of combining 9000's and other, lower cost HP computers into an interactive network matches the emerging trend toward decentralized, distributed systems. The HP 9000 is best suited to electronic engineering and mechanical engineering applications where the typical engineering problems are complex enough to warrant a computer like the 9000.

A substantial secondary market exists among consultants and designers in civil engineering and architecture. Generally these are smaller companies, and the HP 9000 appeals as a total engineering solution. It's price and performance make are a good match with the computer needs and purchasing power of companies in this market. The HP 9000's participation in this market is heavily dependent upon the acquisition of substantial amounts of application software from third party software suppliers and OEM's.

Typical HP 9000 sales situations will be management level interactions with large companies' technical management staffs. A group within the customer's company will be concerned with engineering productivity and will be considering ways to provide more and better engineers. In those situations the overall HP technical computer strategy and the 9000's participation in that strategy will be as much of an issue as the 9000 itself. In

fact, the 9000 is often of interest only as an element of an overall strategy.

The term "engineering workstation" is often central to the customer's description of their computer requirements. They will be seeking a product, or family of products, that fits comfortably within an engineer's environment and will satisfy most, if not all, of the engineers computer needs. And they'll call this product the engineering workstation. The HP 9000 and its close association with the HP EPN strategy are our best response, with the HP 9000 appearing as our "flagship engineering workstation."

Most Frequently Asked Questions

Experience so far suggests that the most frequently asked questions regarding the 9000 are strategy questions and not specifically aimed at details. Most of those are answered with descriptions of the concepts and plans for the engineering productivity network, as outlined in other sections of the reference service. Of these strategy questions, the most often asked are about application software strategies and data communications strategies.

Application Software Strategies: Our application strategy has three elements; proprietary software, software acquired through third parties through the HP PLUS program, and software made available through relationships with OEMs. HP's primary application focus is on EE, ME, and software engineering tools and utilities. We are developing proprietary software in EE and ME and enhancing it with selected offerings from third parties. Software offerings in markets outside of ME and EE will come strictly from OEMs.

Data Communications Strategies: Datacomm strategies focus primarily on a high speed, broad band local area network, HP's implementation of the IEEE 802 network standard. Another important focus is on the HP 9000's participation in HP distributed systems protocols, particularly oriented toward communications with the HP 1000 and HP 3000. Still another is on the concept of the Shared Resource Manager concept, which allows a number of small computers to share HP peripherals. The final dimension of the HP 9000 datacomm strategy is the development of gateways and other communication tools to communicate with non-HP computers, with particular emphasis on DEC and IBM.



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General Questions and Answers

Q. Could you explain the benefits of your local network and its concept as applied to CAE?

A. There are fundamentally three benefits of the local area network concept. These benefits are a predictable response time for the individual user, ease of system expansion, and the redundancy and reliability offered. Since the individual engineer is using a dedicated system, the response of the system to him is not subject to the effects of other users running on the same computer. The second benefit relates to the ease of expansion. If additional tasks are to be added to the system, it's a matter of adding a workstation to the network. This will not affect the response of other users in the network since each of the other users is also using a dedicated system. The net results is that the network can be expanded in small increments with the response time for each user maintained constant. The benefit of reliability and redundancy is obvious. If a dedicated workstation should fail, it is only the individual engineer who is affected. Other workstations in the system can continue to function normally. In the case of a traditional multi-user computer system, a computer failure would affect all users on the system.

Q. Does the system offer floating point hardware?

A. No. The floating point routines are coded in the microcode of the HP 9000 processor. The 9000 will perform a 32 x 32 bit multiply in 1.8 microsec. and a 64-bit floating point multiply in 30.4 microsec. This offers adequate performance at present and multi-CPU configurations will, in most cases, considerably enhance it. Generally, adding a second or third CPU effectively doubles or triples the floating point performance. This provides the equivalent of floating point hardware with the added benefit of improving other performance as well.

Q. Will the multi-user system require a system operator?

A. No. The HP 9000 is designed to be used in an environment with cooperating users; no computer operator, as such, is required. HP-UX systems do offer a special form of access called "super-user." The super-user configures the software, establishes the file system, assigns user numbers and ID's and, in general, is responsible for operation of the system. This access can be granted only to one person who acts as system manager or it can be shared among all users. The choice is made by the user community.

Q. What kind of terminals can you add to your system...?

- A. The supported terminals are HP terminals. The HP-UX operating system, since it is based on UNIX, will support generic ASCII terminals. It should be possible to connect virtually any type of an ASCII terminal to the HP 9000. Since Hewlett-Packard does not have the resources or desire to test all of them, the only terminals that will be formally supported by HP will be HP terminals.
- Q. Will all HP computers from now on have UNIX capabilities?
- A. We expect to offer UNIX capabilities on most future HP computers. A major reason for this is the increased acceptance of the UNIX operating system in a broad variety of application areas ranging from the technical to the business community. In some cases, the HP-UX operating system will be the primary operating system for the computer and in others it will be an environment layered on top of a specialized operating system.