HP WORLD ’96

HP's Vision for Enterprise Networking

Presentation Number 2008

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Not so long ago, traversing a network in search of information was a daunting task. Even if a brave user knew what material existed, he would have to know where it was located and how to reach it; every time connections were reconfigured, the path to enlightenment would be littered with new obstacles. Now, even though the actual construction of a network may be incredibly complex, users (and many applications) demand transparent access to the data, applications, and services that may be found "somewhere" in their organization - and their experiences with the Internet have taught them that such demands are completely reasonable.

How did we get here?

Enterprise networking has its roots in the emergence of distributed systems as an alternative to monolithic, mainframe-based information systems. As small, inexpensive "minicomputers" became practical to deploy, system networking became important. At the outset, communication from one system to another was the technical challenge facing the first real network designers.

In more recent years, networking standards have evolved to the point that physical connectivity is rarely an issue. Instead, many companies struggle with coordination among numerous well-designed subnetworks: for example, connecting between SNA and TCP/IP-based configurations, or establishing control over many discrete workgroups.

Today, the construction of true "Enterprise Networks" has moved to a new level. Acceptance of open systems concepts and technology standardization have removed many of the original roadblocks to network design. A true Enterprise Network may be positioned as an "information utility" -- mobile devices, legacy systems, and the latest access tools simply make a connection via the network for information exchange. Major concerns are no longer with making computers communicate with each other - that much is expected. Instead, business organizations and network designers look for ways to leverage their existing equipment while planning to take advantage of the wealth of new applications and information available.

How will business embrace technological advances?

Today, the possibilities for information technology seem endless, limited only by the imagination. Decision makers must temper their enthusiasm, however, with considerations for the expense and effort required for taking advantage of state-of-the-art advances. Few organizations are fortunate (or foolhardy) enough to discard their entire infrastructure in favor of the latest technologies; instead, it makes sense to continue using existing equipment while it serves its purpose, and evolve toward new

technologies as the need arises. *Hewlett-Packard's philosophy is to assist our customers in growing from where they are now, toward where they want to be in the future, as smoothly and cost-effectively as possible.* For example, HP can offer roadmaps to future developments in networking for data centers, work groups, remote users and the corporate backbone:

Data Center evolution. The Data Center frequently forms the core of a business' information technology, with applications and data that are critical for the entire company. For robust, high-speed communication among powerful servers in today's data centers, many organizations rely on *FDDI*: it's fast, immune to electrical interference, and lends itself to highly available configurations. For even greater capacity, *FibreChannel* has emerged as a powerful data center enabler: it is well suited for system to mass storage data transfers as well as system to system communication, delivers up to 1 Gigabit/second throughput, and can be extended over distances that are measured in kilometers. In the near term, HP's Enterprise Parallel Servers are based on FibreChannel technology; over the next few years, HP expects FibreChannel to form the basis of true Data Center clusters.

Workgroup evolution. Workgroups were originally established to allow groups of end users to share expensive peripherals, but have become self-contained business-critical units of processing power. Today, most local workgroups are configured using combinations of *ethernet and token ring.* These are still fine technologies, but as desktop processors have become more powerful and applications have become more demanding, these LANs have not always provided adequate capacity. In most cases, it makes sense to keep ethernet and token ring for traditional applications, but extend their usefulness by connecting subnetworks through high-speed backbones or switches. When higher speed is required, *100BaseT (fast ethernet) or 100VGAnyLAN (for multimedia)* deliver greater capacity to the desktop. Long term, *ATM* may emerge as the preferred workgroup solution - but unless an organization needs it sooner, HP would recommend waiting a few years for costs to drop.

Remote access evolution. Few technical areas lend themselves better to the imagination than remote access. From mobile office workers to service personnel in the field, end users stand to benefit from the flexibility that new technologies afford. As portable devices and wireless communications proliferate, many organizations can expect to support a variety of communications, ranging from *traditional dial-up connections* over modems, to *cellular or radio access,* and to *infrared devices* (see NetBeam IR article, page xx). As exciting and visible as these devices are, all can be integrated with the rest of the Enterprise Network.

Network backbone evolution. When network designers strike a balance between centralized processing and distributed computing, the main decision points come from the capacity and cost-effectiveness of the network backbone. Traditionally, wide area

backbones have been based on combinations of *X.25 and leased lines*, with communication depending on TCP/IP or SNA. While TCP/IP and SNA are still the base technologies of choice, the backbone itself is rapidly being transformed: In the United States, *Frame Relay* has nearly replaced X.25, while in Northern Europe, Japan and Australia, *ISDN* is widely deployed. Frame Relay and ISDN are fine technologies in and of themselves, but they have succeeded for practical usage by offering great capacity, support for needed services, and reasonable prices. Long term, *ATM* is expected to offer the wide-area backbone of choice, but even years from now, business will continue to use Frame Relay and ISDN for wide area subnetworking.

What does it take to build an Enterprise Network?

An Enterprise Network is much more than a collection of interface cards and wires: *it is the conduit to all information within an organization and beyond, and enables every automated process that keeps business going.* When considering such a critical business resource, decision makers must take the entire value chain into account, from initial consultation through ongoing maintenance. Hewlett Packard is uniquely positioned to deliver all aspects of this Enterprise Networking value chain:

Consultation. What equipment is already in place? What are the needs of the organization? How will the demands on the network change over time? HP and its partners can provide the right planning and design (see PSO consulting services article, page xx).

Products and services. The core product offering starts with system networking (interfaces, applications) and infrastructure components (hubs, routers, switches) from Hewlett-Packard and best-in-class partner organizations. To provide a complete Enterprise Network, HP will continue to evaluate and endorse products from the best sources in the industry. (see "HP-Cisco Collaboration" article, page xx).

Integration. Rather than a bewildering array of individual products, an Enterprise Network is a seamless information source. HP and partner integrators can merge existing equipment with phased installations of new technologies from all sources, and can get the network up and running.

Management. Actual information and processing power may be distributed around the world, but with the right system and network management, the Enterprise Network can be centrally managed, audited and controlled. HP's OpenView family of system and network management products leads the industry in enterprise solutions (see OpenView Network Management article, page xx).

Ongoing support and maintenance. Delivering the Enterprise Network doesn't stop when the contract is signed, or even when content from a variety of sources is added. HP can keep the multivendor network running smoothly (see WCSO article, page xx).

From start to finish, and into the future, Hewlett-Packard and its partners stand ready to deliver the Enterprise Network, with industry-leading products, services and expertise.

What is Hewlett-Packard's role?

With the right products, technologies, expertise and partnerships, Hewlett-Packard is industry's best choice for delivering true Enterprise Networking:

- HP has the right vision for future technologies, as well as practical considerations for implementation;

- HP offers the right products, services and technologies for every step of the value chain;

- HP extends its own prodigious offering with partnerships with the industry's best networking companies.

Hewlett-Packard has the know-how to help enterprise networking evolve from the infrastructure of today to the information utility of tomorrow.