LOCAL AREA NETWORKING: ISSUES AND ANSWERS

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Introduction

Probably everyone in the computer industry agrees that by the end of the 1980's, there will be a powerful computer-based workstation on your's and everone else's desk. To illustrate my point, think back 10 years ago when the pocket calculator was just becoming popular. Because of its costs though, the pocket calculator could only be cost-justified by certain specialists such as Accountants and Mathematicians. As we know, advances in technology have allowed us to put this capability into everyones' hands today. Computer-based workstations are at the same stage as pocket calculators were 10 years ago and so it is only a matter of time until technology makes this capability available to everyone.

Technology, however, isn't the only factor driving this trend in computing. Today we're seeing an explosion in computer-based services such as data base libraries, office systems which include word processing, electronic mail and graphics, and computer-based applications which assist the specific profession or job at hand. Therefore, the other key factor is the need to increase the productivity of each individual within your organization by providing access to these information services and resources. This will make the computer-based workstation a tool as necessary as our telephone is today. As Joel Birnbaum, Director of HP's Computer Research Labratories, states, "The future belongs to machines that attach to your telephone ... success will depend on communications links, not computer technology".

Recent studies have shown that up to 80 percent of all communi- cations traffic takes place within a building or local complex. And that, of course, underlines and emphasizes the requirement for local area networks.

Strictly speaking, the term "local area network" is a generic term which includes any interconnection device that is situated in a local environment and which connects together information processing equipment. A "local environment" may be a building, or a complex of buildings.

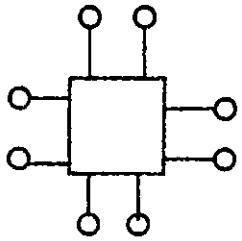
The other term in the phrase is "network". A network may be as simple as one system connected to many terminal and peripherals. However, the term "Local Area Network" (LAN) usually refers to more than two intelligent devices which are logically connected together and which can transmit information back and forth. The intelligent devices may be mainframes, minicomputers, personal computers, workstations (intelligent terminals) and other peripheral resources.

Other characteristics of LAN's are that they are generally owned and operated by a single organization, its distance usually does not exceed 6 kilometers, and it is tailored for maximum performance in a limited area. In other words, it trades long distance capability for high speed and transmission accuracy.

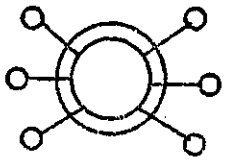
What is NOT a local area network? An Anaheim-to-New York connection is not local. There are methods to communicate remotely, such as Public Data Networks, leased lines and dial-up lines. A local network can be connected to a remote environment using these transmission methods.

When considering a local area network, what are the key differentiating factors? There are several factors involved such as access methods, capacity, reliability, security, etc.. The primary differentiating factor, however, in providing a network to improve your organization's access to information is topology. The three types of network topology are shown below:

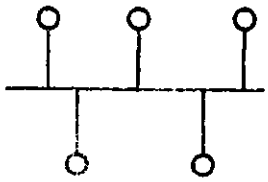
NETWORKING TOPOLOGIES



STAR



RING



BUS

The "star" network is primarily implemented today in the form of a Private Branch Exchange (PBX). This network is important because it exists in every building today in the form of twisted pair wiring attaching your telephones to a central switching device. PBX's are considered a type of local area network although the primary form of information transmitted today is voice. Recent developments in PBX technology now allow data to be transmitted as well.

The "bus" and "ring" networks are recommendations for what the industry has been calling "Local Area Networks". These "cable" based networks have taken a competitive position to the digital PBX as the central communications hub. One of the major advantages is that these networks represent the beginning stages of universal connectivity for all information processing equipment. LAN's were primarily developed for data transmission however new developments make it now possible to transmit other forms of information such as voice and video signals.

Local Area Networks Vs.
Private Branch Exchanges

Because all of these networking concerns are evolving to common capabilities of handling all forms of information, which one is best suited for your organization's needs? here are no hard and fast rules today to determine whether an LAN or PBX is right for your organization, but here are a some points to consider:

- o) If your organization's PBX equipment is old and you see significant addition voice requirements in the years to come, a new digital PBX with data commuications capability may be less expensive than purchasing a new voice system and adding a LAN at the same time.

- o) If the number of systems to be connected are small and there is no immediate need to replace existing voice systems, a new digital PBX system will probably not be economical. New PBX systems must still be cost-justified based on its voice capabilities today. Costs are still relatively high to connect data processing equipment.

- o) Where very high data speeds are involved (over 56 Kbps), will be difficult to find a PBX today supporting higher speeds. An LAN would be the best solution.

- o) If you have many terminals to connect to a system, or especially, many systems (i.e. office application) PBX offers

higher overall bandwidth, switching and ease of interconnecting (via existing telephone wiring).

o) LAN economy is most obvious when the users are clustered in computer or terminal rooms throughout a facility. Office automation users are not necessarily placed so conveniently.

o) It is easier to supply centralized services such a gateway access, security, etc. through a centralized system such as a PBX, rather than a more distributed LAN. Of course, by relying on a single system, your risk of downtime is much greater. Therefore, the choice will depend greatly on your application.

Local Area Network Trends

As mentioned earlier, technology is evolving to make these choices simpler and more economical. There are several new developments which should be available in the near future:

1) Further integration of computer and PBX systems will make the PBX alternative much more cost-effective

2) New switching systems will front-end the older archictectur PBX systems offering a virtual voice/data network. These new switching systems will allow you to front-end your PBX, splitting voice and data signals to the respective PBX and computer processing systems. This will give you all of the major advantages of a digital PBX system without the huge intial investment since you will be leveraging off your existing voice network.

3) Vendors are developing interfaces which allow the PBX and LAN to link together. This hybrid approach will allow you to select the best networking topology for you application while still being able to integrate all of you information systems into a single network.

Conclusion

As we all know, it is a very competitive environment today and it will become even more so in the future. You know that the computer industry has and will continue to develop the tools to help you manage all forms of information and make all areas of your business more productive. What you might not have considered is that within your industry, major competitors will be on the same level of computer automation in such key areas as accounting, manufacturing, computer aided engineering and office automation. Therefore, one of the key differentiating factors which will distinguish the leaders from the followers, is how effectively you exploit networking technology. Every effort today in planning to integrate all your information systems will put you into a better competitive position tomorrow.

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Jim previously was a Regional Marketing Engineer, consulting with specific sales regions to assist them in achieving their sales objectives. Previous to HP, Jim worked as a Software Developer for Two Pi, Inc. of Santa Clara, a maker of IBM 370 plug-compatible systems.

Jim graduated from the University of California at Berkeley with a Computer Science degree.