FIVE STEPS TO NETWORKING YOUR ESTIMATING SYSTEM

By Jack McCormick
Published in Electrical Contractor Magazine, March, 1991

One of the most important benefits of a computer is to quickly store, recall, and use information. With the large amount of data now used in our industry, second, third, and fourth computers are becoming a necessary. Along with the addition of computers comes the need to share on-line information.

It was not long ago that the easiest way to share information between computers was by using a "tennis shoe" network. This means that information from one computer was backed up onto a diskette, walked to another computer, and restored. This worked, but it was slow and data could easily get lost. Today there is the need for more than one computer to use the same data at the same time. This is accomplished via networking. Because of the different types of networks on the market today, choosing the correct one for your application can be very confusing. In this article, we will learn that you should:

1. Choose hardware based on your most important application

2. Choose a network operation system according to the number of users and how you intend to connect them

3. Match network topology (tying the computers together) to your physical environment.

4. Get the best medium your money can buy to connect users

5. Look past the immediate future.

BASE HARDWARE ON THE MOST DEMANDING APPLICATION

The computers buyer's rule of thumb is to base all hardware decision around the application software, particularly mission critical applications. This is doubly true for computer networks.

In the contractor business, one of the mission critical applications is the estimating program. Before you network your entire estimating operation, make sure your company will benefit. Key questions to ask are:

1. Do at least two or more estimators work from the same type of database?

2. How do you maintain your database?

3. Do you have to tennis shoe between computers?

4. Do you have need for two or more estimators to work on the same job?

5. Does management have the need to review the estimator's work in its office?

6. Is there a need for the estimator to access the accounting software?

With a network in place, your estimators can all work from a common database that is maintained from a common source. All estimators can then work on their own jobs or, if the need arises, all estimators can work on the same job, pulling from the same database and writing to a common job file. In addition, management can then review estimates in its own offices and have access to the accounting functions of the company.

After you have determined that a computer network will be of benefit, consider how your existing estimating program will handle the transition. Check with your vendor to find out if it can indeed be used on a network, and, if so, the types of networks and operating systems it will operate on. Some estimating systems operate on PCs driven by LAN operating

systems. Others run on minicomputers driven by the UNIX operating system.

If you are not currently using an estimating program or are unhappy with your existing program, now is a good time to take a look at the programs on the market. A few of the capabilities to look for in an estimating package for network use are:

1. Whether it has multi-user, multi-tasking capabilities. These computer buzzwords simply mean that users can perform more than one task at a time and can access information at the same time as other users. Having these capabilities is a must as without them, the estimator may find himself "locked" out of an area of the program that he wishes to work in.

2. It must meet industry standards.

3. It should have the ability to use third party pricing services and that you are sure that they are on a compatible platform.

CHOOSE THE NETWORK OPERATING SYSTEM

Choose a network operating system according to the number of users and the physical location of the computers in your office.

Your network software is critical as it determines how you connect users so that they can all access the same working software. Choosing the wrong network operating system can be disastrous, so you'l want to spend some time going over your options.

Currently, the two most common types of operating systems for networking are UNIX and LAN operating systems. For each of these, there are a number of products on the market. A derivative on UNIX, for example, is XENIX, and Novell NetWare, LAN Manager, and Lantasic are just four of the many LAN software programs available.

The distinctions between UNIX and LAN operating systems are the number of users possible, the availability of application software, and how the network is set up. Generally, UNIX systems accept a larger number of users than LAN systems and the hardware generally costs less. Keep in mind that there are fewer "off-the-shelf" programs that run in this environment. This ties you to your main vendor for most of your software purchases and can, in some cases, drive up the cost of additional software.

Also, as you add users, UNIX, may run slower, as all processing is done at one place and not at the individual workstation. If you have an existing minicomputer or mainframe and plan to stay on it, you should consider UNIX, otherwise, you might want to consider the more popular options, LANs.

The most common network today for our market is PCs tied together in a LAN. Some LAN operating systems are intended for server-based networking where only the file server's software can be accessed by all. Other networks are intended to be used peer-to-peer, where all computers can access each other's computer. As a general rule, peer-to-peer networks are easier to install and less expensive.

Unfortunately, not all software vendors support them and there are limitations. The server-based network is faster and is better at supporting a larger number of PC users than the peer-to-peer network. If you do decide on a server-based network, it's a good idea to get the most powerful file server you can find. If you don't use the power today, chances are your company will grow into it.

CONSIDER THE TOPOLOGY OF THE NETWORK

Considering the topology or the way the information is transferred in a network environment is critical to the way users will communicate and send information over the network. "Star" topology is found primarily in the mainframe world, where dummy terminals are connected to the central mainframe computer in a star configuration. This is the only way to connect users in a mainframe network, since each terminal is virtually useless without a direct connection to the mainframe. One of the more popular interconnects of this topology is "10 Base T", which allows you to use standard twisted pair telephone wire. This cuts installations costs without affecting the speed on the network.

UNIX also operates in a star topology. However, instead of going to a mainframe, it ties to a minicomputer. Dumb terminals are most common although smart stations can be used.

PCs in LAN, on the other hand, can be connected by star, ring, or bus topology. There are several hardware implementations of the ring topology, the most popular being IBM's Token Ring, which expands on the traditional ring topology by designating one computer to oversee all communication and exchange of data in the group.

If large blocks of information are sent over the network, a bus-based LAN network, such as Ethernet, is normally faster. In the Bus topology, the network cable normally is coax. This cable acts as a broadcast medium which sends messages to the PCs connected in the network. Another way to think of the buss topology is how knob-and-tube house wiring where a main wire went down the center of the attic and all the lights and devices were tapped into this feed.

Another LAN medium that is becoming more popular is peer-to-peer. With this type of network, a dedicated file server is not always required, as each other user's hard disk can act as a file server.

With this is place, and person on the net can access any other person's hard disk, retrieving, using, and storing common data. This is a very inexpensive network to set up and does have certain advantages as well as limitations.

DON'T CUT COSTS ON THE WIRING BETWEEN COMPUTERS

The wire medium between computers is truly the guts of your network. It will determine if information being sent from point A to point B is delivered fast, or not so fast. Moreover, it is normally not easy to replace, which is another good reason to get the best money can buy. As most of us have to live within a budget, the choices in wiring media are likely to be standard coaxial or twisted-pair. If your building had been pre-wired for computers along with your telephone system, this should be considered for your network.

Most new installations use coaxial cable. Coax is resistant to electrical interference and can support data rates up to 100 megabits-per second. Chances are you LAN will not be able to run at what you coax can support, but it very likely will in the near future.

Before making a selection based on budget alone, find out the recommended wiring for your network topology. Ethernet, for example, can run on a variety of media, including infrared and radio waves.

Most Ethernets run on RG-58 coax for installations up to about 1,000 feet. For longer distances between installations, additional special hardware will be required.

Fiber-optic cable is this decade's preeminent networking medium. Not only is it interference proof, it can support incredibly fast data speeds of upwards of 500 megabytes-per-second. But, it is expensive and, in most cases, not practical for the normal user.

LOOK PAST THE IMMEDIATE FUTURE

One guarantee in life is that technology will change. Usually faster than desirable. Even so, it's not a bad idea to start thinking about how far your network will grow within the next several years. This forethought could save many hours of work for you and everyone in your company.

For example, do you foresee having to interconnect with other computer networks in your company? What abut hooking into networks outside your company, or perhaps in a different state? Or will you want estimators to tap into the network while they are in the field?

Depending on what it is you want to do, there are any number of existing technologies that can help you do it. If it's just a simple communication link between your in-house LAN and estimators in the field using a laptop PC, then the technology of choice might be a 9600 baud modem or an Ethernet adapter card for field computers. If it's interconnection between, say, your corporate mainframe and a 20-user PC LAN, you will need to consider a gateway link. If it's interconnection between two LANs in your company or elsewhere, you will be giving some thought to the use of a bridge in the future. Gateway are used to connect LANs with larger systems like mainframes. Bridges are used primarily to connect two or more LANs. Both are simply hardware and software mediators to facilitate communication between several networks.

The best advice is that if there is any possibility of interconnecting your network with others in the future, either with another LAN or with a larger computer system, it is wise to set up a server-based LAN now. It is much easier to have file servers as the connecting point than it is when your PCs are in a peer-to-peer network. Even if the foreseeable future holds none of the above for you, keep an eye on new developments. A few of the exciting trends to follow are ISDN standards and the new Apple and IBM alliance. The former promises to bring computer communications to virtually every home or office, and the latter promises a faster, better computer.