THE CRITICAL ROLE OF LOCAL AREA NETWORKS IN THE STRATEGIC PLANNING PROCESS

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ABSTRACT

In a rapidly changing technological environment, Local Area Networks help an organization gain a competitive edge, both domestically and internationally. The correct installation and software is essential to accomplish this goal. Major benefits of Local Area Networks (LANs) will include reducing organizational cost and increasing productivity. LANs improve information sharing locally and wide area networks enhance information sharing globally. Teamwork, using workgroup solutions, is encouraged and essential when using LANs. Electronic data interchange exchanges networked information electronically with vendors and customers. Downsizing brings business information from the mainframe environment to the LAN platform to reduce development and maintenance costs of systems. Client/server technology takes the benefits of downsizing to new technological heights.

Changes in technology, the environment of organizations, and the growing role of information is challenging firms, both large and small, to
incorporate computer-based information technology as part of management's strategic plan. Management who do not plan consciously for this technology run the risk of not surviving in future years.

The term Local Area Network, or LAN, has become a familiar one, but few understand the role the LAN plays in a competitive business or industry. Traditional core information systems are found on mainframes or minicomputers with many terminals attached. These systems, more often than not, have minimal flexibility when it comes to retrieving the information that they contain. The information that a user needs is often either not available or securely too late to satisfy the need.

LANs, however, provide a framework on which an organization can quickly develop flexible applications that can have positive impacts on the bottom line. Users have discovered that they could build their own business applications in hours or days. They no longer needed to wait weeks, months, or even years for the data-processing department to write a mainframe program to produce a simple report. They could do their own end-user computing.¹

Information is the backbone of an organization. LANs allow information sharing to a far greater extent than ever before. They put the users in control of their own information and do it at much less expense than the larger systems. The restriction of where and who has the information is eliminated. Information is no longer controlled by connecting machines, but rather by connecting people inside and outside the corporate boundaries.

Implementing LANs into the strategic direction of an organization may mean parting with the past. It requires that people gain new skills and improve others. Hands-on users are provided with the opportunity to enhance such skills as their writing, speaking, and thinking abilities. Today's system developers and programmers will need to be retrained in their programming methodology. This new computer-based technology will also change the way people work together. People will now work together as a team, or workgroup, to achieve the common goal of the organization.

Classifications of Local Area Networks

When implementing a Local Area Network as part of a strategic plan, one of the most critical decisions is the type of LAN to install to
ensure the success of the organization. These networks can range from simplistic to complex (Figure 1).

A simple peer-to-peer LAN provides every PC or workstation with an equal connection to the others and eliminates the need for a dedicated server. These networks are appropriate for small locations or cost-conscious workgroups. They enable people on the network to share resources freely on their individual PCs. Sometimes this topology can be inappropriate since it is very dependent on the functionality of each computer.

A client-server LAN provides an environment where one or more servers act as network resource managers for the clients, or personal computers. The server typically handles files, applications, communications, and shared printing. The server is the center of the network activity. This topology is the most common and reliable in the networking arena. The benefits which will be presented throughout this paper will be based on this environment.

Figure 1: Classifications of Local Area Networks
A Wide Area Network connects other client-server networks together across states, countries, or even continents to provide access to information outside the limit of the corporate boundary to provide global connectivity.

**Local Area Network Benefits**

Through the use of effective PC software, the information a user or workgroup needs can be retrieved quickly and in the format desired at a reduced cost and a gain in productivity. Information sharing is improved by connecting computers together using local area networks or wide area networks.

Dynamic working relationships within organizations are constantly forming and dissolving as tasks are completed and organizational objectives evolve. To be successful, organizations and the people who work within them must be flexible enough to respond quickly when goals and objectives change. Workgroup solution supports the way people actually work together in a group. Few restrictions are placed on the way workgroup members connect to each other and are not limited to what can be done with shared information.

Electronic Data Interchange can eliminate errors, improve customer service, and reduce costs by replacing costly paper forms with electronic documents that travel from a customer's computer to the vendor's computer.

In the past, organizations have created and maintained computer applications on mainframe computers. Many of these applications have fallen behind the expectations of modern users, along with the needs of modern organizations. In an effort to reduce costs, increase sales, and improve access to information, the strategic direction of today's organization is to bring mainframe applications down to the personal computer platform using Local Area Networks. Client/server technology is changing the way relational database management systems reside on a Local Area Network. This technology, along with the SQL computer language, can eliminate network bottleneck and provide users with access to a multitude of information simultaneously.
Local Area Network Software

Part of implementing the Local Area Network in a strategic plan requires the availability of the right software as productive tools. Load up the LAN with productivity-improving applications - not just a spreadsheet and word processing software. Other applications should include E-Mail, graphics software, electronic calendars, database or filer software, project management, and work-flow helpers. Other software can also be added that is job specific.

LAN software should be open and flexible allowing users to work interactively with different software packages at the same time. Most people are capable of doing several things simultaneously to increase productivity. LAN software should provide this capability. They should also provide a standardized user interface across all applications so that users can perform functions the same way in each application. LANs provide the path for the entrance of that interface using a graphical display. Windows and OS/2 are the most popular PC operating systems in the networking industry today to provide a true graphical user interface, or GUI.

By implementing network versions of software, a cost savings can be realized by an organization. Typically, a network only needs to license the number of users that will concurrently access the software, which reduces the cost of purchasing software for either individual PCs or, even more, reduces the cost of purchasing mainframe software. Since most software is installed only on the file server of the network, it is possible to ensure that everyone is using the current levels of software, both programs and operating systems. This keeps file incompatibility to a minimum.

Information Sharing

Unconnected personal computers, whether they are desktop units or mobile computers, are useless to a business environment. All they do is create islands of information. The flow of information in the office will grind to a near halt because it is too difficult to share. Creating a system in which information, files, or work with coworkers and colleagues can be easily passed is imperative.
Without such a system, people start collecting redundant data files, they duplicate expensive resources, and waste tons of time walking floppy disks around the office or retyping information when they want to share information.

Information focused strategy can derive from the use of a single statement of a principle: make information immediately available to all levels of the organization, and to its customers and vendors, in an easy-to-use format. This principle has helped companies decrease late deliveries and user dissatisfaction, and at the same time increase business results.

Local Area Networks provide the vehicle for true information sharing. Information resides in specified locations on the network accessible by authorized users. This contributes to more current and accurate information to amplify the decision-making process.

Information is usually different for each user. Upper management will use information for different reasons than the hands-on or beneficial user. But no matter who the user of information is, the information must be available immediately. Local Area Networks provide the framework to accomplish this task.

Wide Area Networks

Electronic networking eliminates barriers imposed by distance. Providing information to employees who may be physically distant from the home office becomes much easier to do. Now these formerly out-of-the-loop employees can share information and contribute ideas back to the home office which may have never been known.

Networks are designed to connect people as well as machines. Because information knows no corporate boundaries, having ready access to data that resides both inside and outside the corporate corridors is important. People in the company will need to connect to information that exists outside the company.

Connecting local area networks together to create wide area networks improves an organization's ability to achieve a global competitive advantage. They increase the capability of responding to customer needs or competitors' initiatives anywhere on the globe instantaneously.
The objective is to create a technology architecture that enables people to connect to just about any piece of information on the globe. Workgroups

The traditional workgroup consisted of a few people who worked in the same immediate area. Today, workgroup members aren't necessarily all physically housed together. They can be separated by a few floors or by many miles. Workgroup members might not even belong to the same company. An increased number of organizations are pulling together special teams of expertise, such as suppliers or consultants. The common need is for a connection to each other. LANs, because they are relatively flexible can easily accommodate these connections, along with changes within the workgroups.

Workgroup technology provide individuals with the capability to share whatever live data they want, whenever they want, with whomever they want, wherever they are located over the Local Area Network. It supports the way people actually work together in groups and places few restrictions on the way workgroup members connect to each other. It does not limit what can be done with shared information.

Network workgroup computing provide users with the ability of managing the production of group-written documents on-line. It provides an electronic path for information that replicates manual systems, such as routing forms and documents. The risk of having important documents sit on someone's desk can be eliminated. Any user can have access to multiple versions of information simultaneously, while keeping a version history for tracking or analysis. This local access to shared information gives recipients complete freedom to use that information in whatever manner is necessary to complete their tasks.

With workgroup solutions, the right information finds the right people at the right time. It provides the ability to target precisely who needs updates to shared information and when to issue new versions to them. It improves the management of distributing information within the workgroup.

Being a member of today's workgroup, individuals gain a greater awareness of their group's objective and functions, and are able to help
one another and take over each other's work without slowing or interrupting work flow. Local Area Networks establish a common framework for the workgroup participants and create an opportunity to develop common interests in problem solving and new, automated work-process flows. The outcome is better group cooperation and more effective corporate management decisions.

**Electronic Data Interchange**

A Local Area Network provides organizations with the ability to replace costly paper forms with electronic documents that travel from a customer's computer to the vendor's equipment. The process of exchanging information for business purposes to drastically reduce the time associated with a variety of business transaction is labelled Electronic Data Interchange, or EDI.

An organization may adopt EDI as a way to improve or maintain relationships with customers by improving customer service. Other reasons include improving operating efficiency by increasing productivity and reducing financial exposure or keeping up with the competition by gaining a competitive advantage in the marketplace. Using high-volume transactions for EDI will reduce paper flow volume and time required to process transactions. The most important goal of EDI is to gain that competitive advantage through barriers to entry for competitors or product differentiation.\(^4\) Once a firm links with its customers in an EDI system, the costs of changing links act as a deterrent to competition. In highly competitive markets, the company that can deliver its product faster gains substantial advantages. EDI can compact the time required for ordering, delivery, and payment. Initial EDI applications are usually directed toward customers, including invoicing, payment and purchase orders, and purchase order acknowledgments.\(^5\)

EDI users communicate typically with a central value-added network, or VAN, carrier sending messages to EDI mailboxes. Trading partners then download their messages for internal processing. This processing can take place at any PC desktop on a Local Area Network connected to the VAN. Each EDI trading partner relationship requires two, and reaping big rewards from EDI means having most of your suppliers or customers on-line.
EDI has saved a company such as R.J. Reynolds Tobacco an estimated $5 million a year in inventory cost, which places more than 80,000 orders with 2,300 world-wide suppliers a year. Through a network, the company inputs all orders into an electronic purchase order and sends these order through the value-added network to its suppliers. The cost of placing an order has decreased from $75 or more per document to 93 cents to do an EDI order. Suppliers provide electronic acknowledgements of orders to them, along with electronic sales catalogs. This process has drastically increased the purchasing process cycle. This technology has also given R. J. Reynolds the advantage of integrating other business functions into the purchasing procedure. All information inputted into the electronic purchase order also feed other in-house applications, such as the accounting system. This decreases the chance of input error and improves accuracy.

With EDI, you can eliminate errors, improve customer service, reduce costs, and gain that competitive advantage over your competition. Local Area Networks provide the framework to reach these goals. They can be configured easily for the adoption of EDI within an organization at a reduced cost. Local Area Networks will also be the framework for the

![Figure 2: Downsizing](Image)
developing technology called "electronic commerce" which integrates EDI, fax, and e-mail.\textsuperscript{8}

Downsizing

Companies can achieve a competitive edge in a marketplace by displaying an ability to respond quickly to customers' desires with changes in product and services. With this goal comes the ability for systems to be developed quickly. One or two year development cycles are no longer adequate to meet the need for quick responsiveness to customer demands or competitor initiatives. The requirement for aggressive cost reduction is also being felt.

This pressure has created a major movement to initiate efforts to downsize mainframe computers to Local Area Networks using a personal computer platform. The advantages of personal computers include the low initial cost, an abundance of readily available software packages, and compatibility with other low-end systems.\textsuperscript{9} Software programs presently on the mainframe are often 5, 10, or even 20 years old. They are difficult and costly to maintain. They are usually outdated in terms of an organization's current operational practices.

Downsizing is not nearly as simple as just replacing an expensive old system with inexpensive new one. Companies can replace their current mainframe systems by purchasing a PC-based application package that performs substantially the same application function as the mainframe application. This approach has a cost benefit in the development and support area, but has a downfall in that the functionality of the system may no longer meet user or the organization's requirements.

Reengineering a mainframe system will mean rewriting, and possibly redesigning, the current mainframe system for the microcomputer environment. The benefit to this approach is to implement a system which will provide the necessary user functionality and achieve the goals of the organization. The downfall is that most programmers/analysts of today will need to be retrained. The technology and the tools are different. That means people need new kinds of knowledge and expertise.

Cost-saving benefits attained from downsizing can dramatically affect development and support costs. Support costs are reduced as aging
systems, which are difficult to maintain, are replaced by new applications. Productivity increases since personal computers, with the right software, can be used to accomplish many different functions. Management can see a substantial reduction in costs, which can contribute significantly to competitiveness.

The ability to change or implement new information systems in response to operational requirements can prove to be a significant competitive advantage. This improved ability to respond to competitors’ initiatives carrier over to operating management as perhaps the most important benefit of downsizing. Applications that previously took years to develop now take only months. Backlogs that formerly numbered into several months now amount to days. Systems can easily be modified to conform to changes in current operating practices.

Users also benefit from this migration. They feel more involved and in control of their information. Developers now have more time to interact with the user in defining system requirements. Prototyping can now be a part of the development phase with user feedback on-the-spot. In many cases, users can even develop and generate their own reports from the new system or perform their own on-line ad-hoc queries. Not only can the users gain better access to the data they need, but they can make better use of it.

As a business responds to the improved availability of information, it can streamline its organization, cultivate its ability to respond to changing business conditions, make better use of its resources, and respond more quickly to changes in the competitive situation.

The term downsizing may no longer be correct in today’s industry. The key to successful computer system downsizing is to match the size of the system to the size of the job, otherwise known as rightsizing.

Downsizing does not mean that the mainframe is dead, but is evolving into a new role within a downsized environment. A key role for the mainframe will be as a corporate data repository of information.

**Client/Server Technology**

As the downsizing movement began to evolve and new front end computer products were introduced, so came the evolution of client/server
technology. The traditional networking environment was not equipped to deal with concurrent updates or multiple uses of the same data known to database applications. When a user requested information from a database, the entire database was shipped over the network causing bottlenecks. The response was to move the database operations to a separate dedicated database server and use computer language called SQL.

The objective is to make use of both hardware and software resources by splitting the functions between two systems, the database server and front-end client workstations. True client/server technology should be seen as two complementary systems which have been designed to work in conjunction with one another.

Client/server technology allows for the storage of large databases on dedicated servers connected to the organizations’ LAN. The server processes the SQL query sent by the client. Only the response is sent back to the client over the network, not the entire database file, which limits network traffic and improves responsiveness.

Traditional programming languages issue procedural instructions for retrieving data that meet the user's specifications. SQL only transmits the specifications. It is up to the database manager to determine what it must do to meet those specifications and return the results to the user. The user can then feed the results directly into any application program running on their PC to produce reports or graphs.

Conclusion

Local Area Networks and the effect of technology today is best expressed by Currid:14

"Close your eyes. Image a company where the people, the process, and the technology are all working together for the same objective. Image that the technology is appropriately applied, that the quality is built into the processes which are constantly being refined for better service and speed-to-market time. Imagine, too, that in this company the people have the freedom to express themselves and to make decisions to support a specified goal. Now - image this company as your competitor."
Bower and Cardinali: Local Area Networks

NOTES


3. Currid. The Electronic Invasion., p. 52.


5. Ibid., p. 50.


7. Ibid., p. 108.


10. Ibid., p. 32.


REFERENCES


