

IMPLICATIONS OF THE STRATEGIC INITIATIVE

Implementation of IS goals outlined for [REDACTED] will have a profound effect on the flow of information through the company. This *Research Note* reviews some of the key elements of this plan and explores the options available to address them.

INTRODUCTION

In a time of intensifying global competition, lower margins and a myriad of regulatory challenges, business searches for ways to perform at higher, more productive levels. The quality process now in place at [REDACTED] and at companies throughout the world is in response to this environment. In addition, business now realizes the power of information. More precisely, it is an understanding that the control and dissemination of that information is a strategic weapon in the fight to stay competitive in a compressed economy.

Key Issue

Develop a World-Class architecture, which gives all knowledge workers access to data anywhere on the enterprise network.

Assumptions

There will be increasing pressure to provide easy access to information in multi-media formats, from a variety of internal and external sources.

An Information Management System, based on a graphical user interface will be required to provide this easy access, combining data from a central repository with text & images from a document management system.

LAN's will replace the existing Data Switch Network now utilized throughout the [REDACTED] Houston campuses.

In August of this year, Information Services management outlined a strategic vision to create a world class information system for [REDACTED] America group before the end of this decade. To achieve this, IS must position itself as an integral component of the company's competitive scheme and develop a migration strategy that reflects current and future business priorities.

WHAT MUST CHANGE?

To achieve a world class system, management has identified three components of the business that must be improved: (1) the hardware and software infrastructure, (2) information management, and (3) the workflow process. A world class system may be viewed as an enterprise network based on an open architecture, allowing the free flow of data throughout a company. This open architecture provides for application and data portability, which would assist [REDACTED] in its quest for a common framework between business and technical computing.

The Open Systems Interconnect(OSI) model was created to define open system architecture, but only a few OSI standards have caught on, such as Ethernet and the X.400 electronic mail standard. The full adoption

of OSI has been slowed by the increasing acceptance of quasi-proprietary standards such as TCP/IP. At present there are disappointingly few OSI applications, while a growing list of vendors support TCP/IP. Due in part to its widespread acceptance, TCP/IP is quickly becoming the *de facto standard*. The HP systems used at Solvay are compatible with this protocol, as are Lan Manager and Netware.

The short term goal: standardize on the HP platform and migrate from the Gandalf network to LAN's, determine a LAN topology, and review mass storage requirements such as RAID's, and Jukeboxes. Figures 3 and 4 explore possible future network schemes.

A number of secondary issues must be reviewed in this phase. Analysis of LAN operating systems (Lan Manager, Netware, Windows NT) is required to select a package (or packages) that will fit [redacted] needs through the 1990's. The traffic throughput levels associated with text/image retrieval technology may determine the strategy of LAN topology at the [redacted] campus - 10Base-T, 100Base-T, FDDI or FDDI (UTP)? The spread of Windows applications - as a general implementation or to support EIS's, information management applications or groupware applications - will impact workstation configurations, network traffic and other application selection.

The long term goal: implement a common vehicle for exchange of data throughout North America (through Email or groupware products); connect all major sites via an enterprise network; install front end packages for network management and analysis.

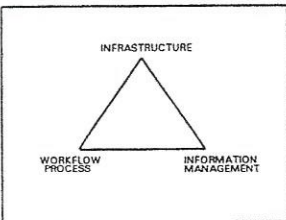
THE INFORMATION RESOURCE

At the [redacted] Houston campuses, information is available in: (1) electronic form, stored in 'live' databases on three hardware platforms, (2) in databases located on personal computers, (3) electronically created documents (Wordperfect, Lotus, etc.), and (4) manually created documents. Employees at both campuses manually track approximately 500,000 pages of documents, with an annual growth rate of 50,000 pages. This includes invoices, bills of lading, specification sheets, procedures, MSDS's, test reports, CAD drawings and letter and memo's.

Electronic data is stored on IBM, HP, and LIMS platforms. At the heart of this data is the Customer Order System (COS), which stores information across six databases and directly or indirectly feeds data to over fifty databases found in approximately fifteen major applications.

True strategic advantage resides not in simply layering new technology upon old process, but on re-engineering the work process and using systems integration to pull multi-vendor and custom elements into a single solution. Implementing an information management plan at [redacted] involves: (1) combining disparate points of data into a common repository for ease of access, (2) replacing custom in-house supported applications with a third party integrated application

Figure 1. Triad of Change in the [redacted] Strategic Plan.



(such as SAP), and (3) document management of electronically and manually stored text and drawings.

The short term goals: document the function of existing applications and the paths of data interchange; select a third party integrated package; define the content and users of a central repository; identify a text/image management product to service most if not all of the Houston groups.

The long term goals: replacement of custom applications with an integrated package along with required enhancements; development and testing of a central repository, implementation of a document management system as an extension of the overall repository.

Secondary issues abound for each group of goals. The selection of an appropriate DBMS, be it Oracle, Sybase, or SQL server, etc. will impact capability issues with hardware and software on the enterprise network. Is a centralized database made up of two copies practical? Or should we supplement a central repository with secondary PC based DBMS's residing on various servers on the LAN?

What kind of information is the knowledge worker going to need - summarized or detailed line-by-line data? If the knowledge worker is an executive who is downloading data to manipulate on his PC to make decisions, summarized information could be extracted from one of the two database copies mentioned above. On the other hand if the

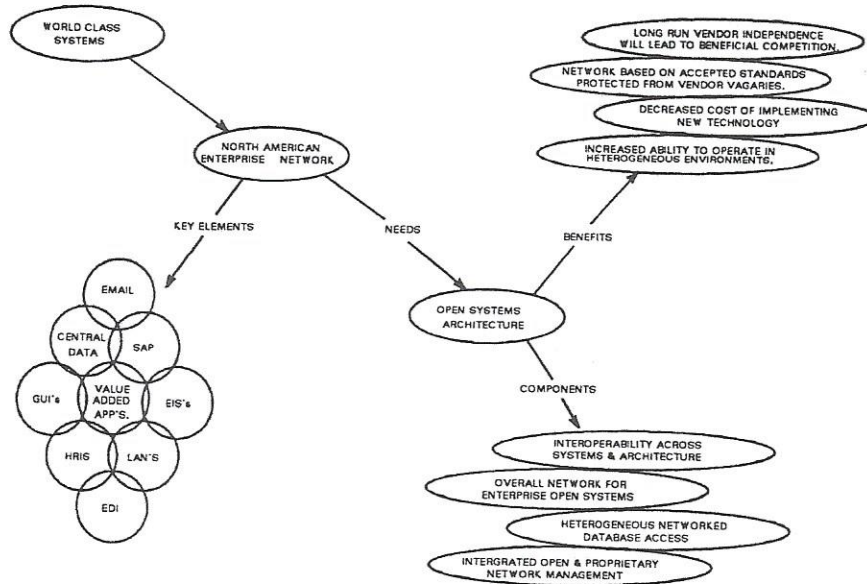


Figure 2. Elements Of A World Class System

knowledge worker requires up-to-date information, such as order entry applications or inventory, a query tool could be used to pull information from a 'live' database, with no update capability.

The notion of tying in a text and image retrieval management system raises topics such as the ability of DBMS's to support Binary Large Object technology (BLOB), and Dynamic Data Exchange (DDE). Text/Imaging systems have matured from stand alone applications, to products capable of using established DBMS's such as Filent's package for Oracle, and Plexus for Informix. BLOB's make it possible for users to store images in the same databases used to support other applications. The leading SQL database vendors, such as Oracle, Sybase and Informix, have all added support for BLOB technology.

THE IMPLEMENTATION CHALLENGE

The realities of budgetary and infrastructure constraints will require a multi-phase implementation plan to realize the short and long term goals. One might envision a four phase plan, with phase one combining elements of the short term goals of infrastructure and information handling.

Some of the work to be done in this phase has already begun. The informatics of current application architecture is underway, as are studies of workflow processes (i.e. the Logistics Project). A coordinated multi-faceted research effort is required in this phase to study long range hardware and software solutions for a LAN environment.

Multi-Processor Servers

The growth of LAN's and the Enterprise Network will provide pressure to simplify network design with multi-processor servers. Both Netware 4.0 and Windows NT will support this capability.

EXAMPLE: Issues revolving around high traffic rates on the network backbone due to data portability and multimedia applications containing voice and video must be evaluated at this stage of network architecture design. The 10Mbps capacity of Ethernet now installed may be insufficient in two years. If that is true, should the backbone grow in stages or should 100Mbps capacity be installed up front?

Transfer rates of 100Mbps are normally associated with FDDI. While multimedia requirements may approach those transfer rates, FDDI is not the best carrier. *Isochronous networks*, which are synchronized to a real-time clock, are better for carrying voice and video traffic, because they produce less delay than 100Mbps FDDI. *ATM networks* (asynchronous transfer mode) would bring sufficient bandwidth to the desktop to support multimedia and voice, and function at SONET speeds (2.488G bps). ATM - though not in widespread use at the present time - may signify that the time for FDDI is finished.

The implementation of Email, the widespread use of GUI's, the potential of client-server applications, data exchange from a central repository, and the selection of the LAN operating system most

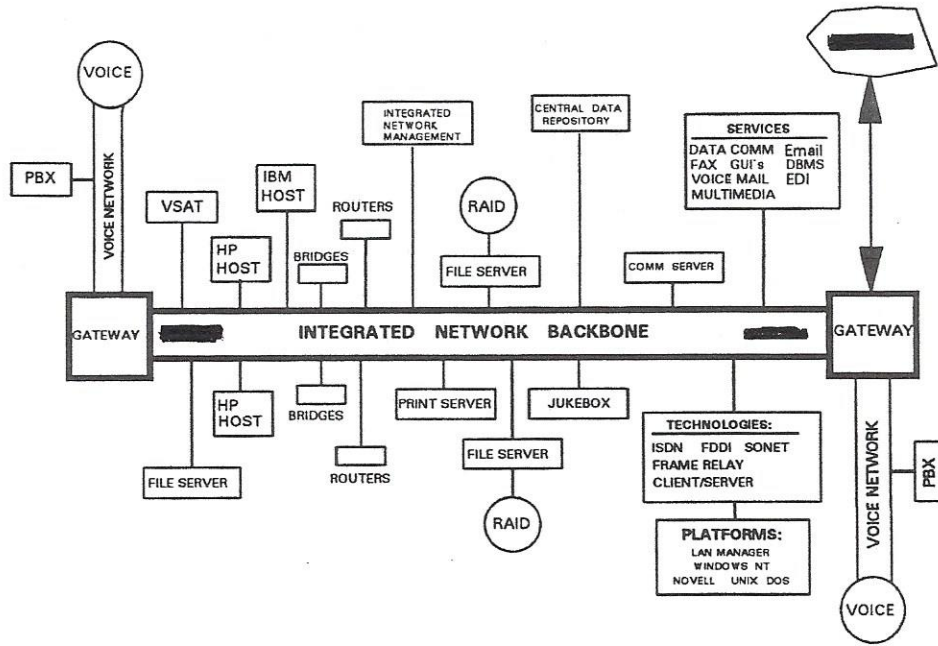


Figure 3. An Enterprise Network Scheme

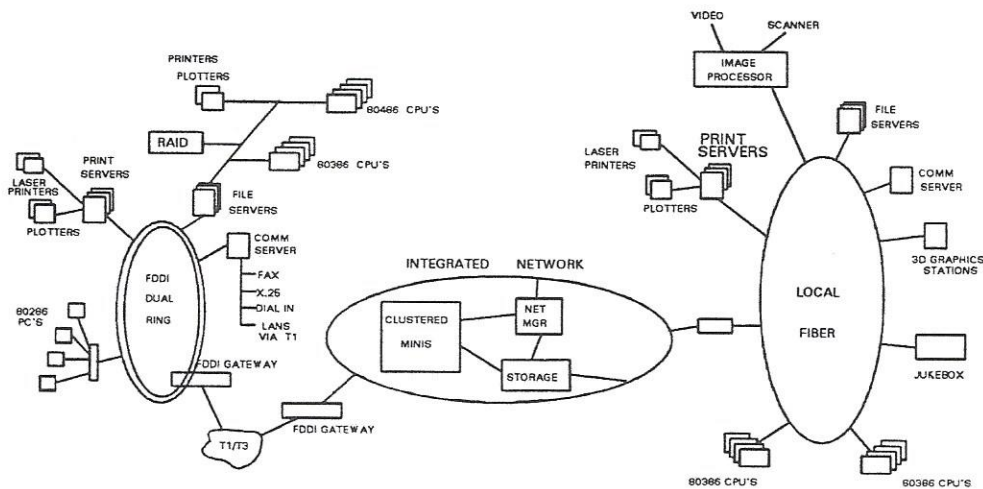


Figure 4. A Future PC Environment Scheme

appropriate for our business needs would impact the example given above. To be effective, research must be done on a number of fronts, in a coordinated fashion.

Though security will be important in the initial phase of implementation, protection issues will become paramount in the later phases. Some level of access will be required by all knowledge workers, but only a specific group may have rights to print documents, or alter drawings in real time.

A knowledge worker's screen during the second phase of implementation should begin to show the versatility of the system, by displaying a scanned image in one window with associated database records, or word processing based procedures in other windows.

The third phase would advance to include electronic files which are not scanned images and establish indexing methods for R&D files. These might include for example lab notebooks. When a page image is called up, an index topic would link a user to binary files such as databases, AutoCad images, or real time lot allocation quantities.

In the final phase, firmer links would be completed between live data, scanned images and supporting binary files. Hypertext would alert a user to related documents or chains of documents available on the network. Icons or bells would alert analysts to real-time news reports via a connected newswire, that may impact their decision making process.

MANAGING THE CHANGE

The IS strategic plan is an extension of [REDACTED] strategic alignment vision - harmonizing the overall business strategy with the supporting information systems. The issues outlined in the IS plan are closely related to the five strategic elements of any business: Technology, Processes, Strategy, Structure, and People. As the plan is implemented, it will have a profound effect on each of these elements. However, by making the user's an integral part of both the planning and the implementation - as the Quality process has done - the inevitable disruption to the company culture should be minimized.

Information Services strategic plan also has implications for the IS group itself, as witnessed by the recent reorganization of the department at the Houston campuses. As new systems and applications are brought into the business process, the skills of IS staff members will change. Members will require planning, teamworking and business skills. Project management and technical planning will be essential to implementing the major, long term goals outlined.

Deciding which systems should be built and which applications integrated is a complex, highly specialized task. It may be prudent for certain aspects of the strategic plan to be handled by third party

Need More Information?

If you would like to obtain further information on issues discussed in this report, please contact the author at [REDACTED] offices.

experts. In this scenario, the IS staff issues a Request For Proposal(RFP) to a select group of consultant's, and awards a contract to the best proposal. This allows IS to study multiple approaches to a problem, and benefit from the consultant's experience.

Whatever approach is used, however, it is clear that the establishment of a world class information system is only the beginning. With the new system in place it will be possible to restructure the entire organization so that complete processes can be performed by individuals or teams. Even further, the tasks performed within those processes can be simplified in ways not possible with the former systems.