INTERACTIVE SYSTEMS: INTERFACING WITH THE HP3000

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Summary

The interactive system, interfacing large-scale and small-scale computers in the office environment, is in its infancy of development today, but is rapidly shaping the direction of future development. Research concerning interfacing and networking PC's and large systems is at the forefront of today's state-of-the-art designing. Our current methods of information management are inadequate for maintaining efficient and compatible interactive systems. A management scheme that considers the time line of technological advancement as well as the abilities and techniques of management practices must be developed now to insure the successful future of the interactive system environment.

The introduction of the personal computer into the office environment is changing our methods of information processing and information management. The relationship between personal computers and the larger systems they must interact with affects our strategies for information systems management, our utilization of hardware and software technology, as well as the directions of future development. The office of the future will be a haphazard collection of non-interactive systems unless we strategize for the implementation and management of successful interactive systems.

The interactive systems environment, resulting in offices with a distributed data base, presents many advantages that have influenced its popularity in the corporation. The use of personal computers presents a cost efficient method of providing additional intelligent terminals to tap into the large-scale system, either a mini or mainframe. The personal computer, less expensive than most intelligent terminals, provides an additional data input station to share the costs of utilizing the expensive peripherals already available as part of the mini or mainframe system. In most cases, for about one-quarter of the cost of an intelligent terminal, a personal computer can be used to interface with the office's large-scale system, either directly through a port, utilizing terminal emulation, or using a modem and telephone line.

The advantages of using a PC in the office environment are not limited to its role as an effective intelligent terminal communicating directly with the office mainframe. The personal computer provides the added advantage of acting as a stand-alone

work station. Processing on a personal computer can provide the user with a less intimidating situation in which to develop computer skills. Applications programs written for the PC accomplish complicated tasks with a user-friendly approach. The user has a direct line communication with a personal computer, knowing that the computer is functioning for them alone.

The personal computer provides the flexibility of a mobile work station. Access to computing power may be sought from different locations, most often the office, but also from home and during business travel. The personal computer and the more portable lap computer provide a work station with enough mobility to carry on processing away from the office desk.

Numerous software packages have been written specifically for the personal computer. These are not packages that were first developed for large systems, and then scaled down for use on the PC. Rather, the software has been designed directly for the PC, taking advantage of the PC's dedicated processing, while at the same time freeing the large-scale system for the tasks best conducted on a large computer. Throughput time is increased on the large-scale system as more and more applications and tasks are run at the corporation's stand-alone work stations. Huge data base processing requiring the resources of a large system can be run without the added CPU burden of maintaining several other smaller tasks simultaneously. The large system is freed up to process exactly the kind of large-scale computing tasks it was designed to conduct.

The more sophisticated software development becomes, as it already has developed today, the simpler the system can appear to the end user. With the proliferation of the home computer and the recent introduction of the personal computer into the office environment, microcomputer software applications programs have been developed with the ability to conduct almost any complicated task previously reserved for the computing power of the larger systems. The inexperienced personal computer user is able to find user-friendly software to assist in the most sophisticated of tasks. These complex applications programs designed for the PC are increasingly requiring less computing knowledge on the part of the user, while at the same time performing more sophisticated functions.

The personal computer brings computing power to a wider audience. The easy-to-use applications available for the microcomputer have brought computer tools closer to the user so that the user has immediate access and control over their work. In addition, users are able to customize their tools. The PC as a stand-alone system allows the user to develop custom software to conduct any specialized tasks.

But the personal computer goes beyond functioning as a stand-alone work station. Interfacing to the larger systems has introduced recent computer users to the power of the mini and

mainframe as well. The personal computer in the office environment, networked to the larger systems, has provided the missing link necessary to successfully introduce the inexperienced user to the large-scale computer. The relatively new user is now able to tap into the complex resources available on the mini or mainframe, but perhaps with the disability of not possessing the more sophisticated computing knowledge required in the mini or mainframe environment.

Further advantages are gained with the introduction of the personal computer into the larger context of the corporate computing environment. Off-site stations are able to perform computing tasks using a personal computer and then uploading the data via modem to the main site's mini or mainframe. The idea of the distributed data processing system becomes expanded when the stand-alone work station, away from the corporate large-scale computer system, can interface from absolutely anywhere a telephone line can be installed. Corporate branches can share the master data base of the main branch while still conducting their computing tasks at the local level.

Experience tells us that problems arise with the introduction of any technological information processing advancement into the work environment. Problems with information management occur from the end user's point of view as well as from the vantage point of system management.

From the end user's standpoint, data downloaded from the large-scale system and manipulated on the PC may be obsolete before the user has an opportunity to upload the processed information back to the main system. As the PC user is manipulating information at the stand-alone work station, others may be conducting further processing on that same data, with none of the parties aware of the other's actions. Not only does this waste the computing time of the users involved, but data rapidly becomes obsolete and incompatible. We have quickly lost all the advantages gained by the technology of a shared large-scale system. The possibility occurs of having the same or similar data maintained and updated in several different locations with no method to insure its logical coordination.

Hardware and software problems exist that effect the efficiency at both the end user and the management level. With the introduction of more and more personal computers into the office, problems of hardware and software compatibility arise. In the past, purchasing hardware or software within the confines of a single large-scale system necessitated the purchasing of compatible equipment. New acquisitions had to be compâtible with the existing large-scale system. But the purchasing of personal computers in the office environment can be done without regard for the compatibility with the large-scale system, until the time comes to network and interface. Then the problem becomes a crucial one. Software packages developed for use on PC's are sometimes incompatible with their counterparts on the larger system.

Files developed at the stand-alone work station simply may not be able to be uploaded to the larger system. But we are still left with slow processing time and multiple steps involved in using these software programs.

Emulation and conversion software is most often complicated and time consuming to use. Emulation software considerably reduces the response time on each process. In many cases, the emulation software itself requires a fairly knowledgeable user to conduct the several keystroke steps involved. Conversion software often requires several phases of conversion before the data is actually ready for transmission. Emulation and data conversion work, but within the confines of current software's capabilities.

Problems of hardware compatibility also occur. If a modem is not the networking tool, then the personal computer must be networked directly to the larger system. More and more personal computers bought for the office environment are being purchased with emulation boards already installed. Selecting the networking protocol must consider the compatibility of all the system's hardware and software involved. The definition of "the system" is expanded to include not only the mini or mainframe and its peripherals, but all the different designs of personal computers networked to the large-scale computer.

Many more problems are cropping up with the introduction of personal computers into the office environment. Management Information System (MIS) departments throughout companies are having to reassess their approaches to system management. The function of MIS, to manage the hardware and software of the corporation's mini or mainframe, and maintain an accurate data base, has become further complicated with the introduction of the personal computer. MIS functions have expanded from maintaining one large-scale system, to maintaining the large-scale system and the many stand-alone stations accessing the larger system. MIS is no longer managing a single centralized system, but is now trying to grab the tail of a decentralized computer network before the technology takes off beyond management's ability to regulate it.

Up until the introduction of the personal computer into the mainframe environment, MIS was able to control the flow of information in the large-scale system. The available technology provided adequate methods of regulating access to data through security measures activated by software. With the introduction of the PC networked to the larger system, MIS departments are losing control of the flow of information between the large-scale system and the PC user. A PC user networked to the company's mini or mainframe can download any information available at his security level from the large system down to the PC. Once this information resides on the PC, MIS has lost control over regulating the security of the data. Any other user can come along and access the data directly off of this same PC, or via a network, the information can move from PC to PC.

In addition, PC users can develop their own programs. Data originally downloaded from the large-scale system can be manipulated at the stand-alone station using custom designed programs without the supervision and control of the MIS department. This data can then be uploaded back to the mini or mainframe, thus corrupting the integrity of the data base of the large-scale system. The flow of information is out of the hands of a regulating MIS department, and cast into the hands of end users who lack the experience and the coordination to successfully regulate the flow of data.

The advent of hardware and software able to interactively network large-scale and small-scale systems has introduced the personal computer into the office environment at an exponential rate. Specific hardware and software problems had hardly been addressed before the personal computer began taking its stronghold in the corporate environment. The relatively inexperienced PC user has found himself having to learn a variety of applications packages specific to the personal computer quickly, and in most cases, on his own. In addition, networking the PC to the company's large-scale system, has forced this same PC user to learn emulation programs, networking software, communications packages, and conversion programs. Overnight, the office PC user has been forced to learn a vast amount of software packages with very little, if any, training assistance.

In addition, the PC user is finding that these software packages are more complex. Emulation programs generally take the user through a series of ten to twenty steps in order to begin passing data back and forth between the personal computer and the mini or mainframe. Users are finding, sometimes by hit and miss, that files created at their stand-alone work stations are incompatible with the larger system. In some instances, this means a complete duplication of work, or seeking out conversion programs that can handle the task.

Networking interactive small-scale and large-scale systems together is in its infancy of development. The software and compatible hardware necessary to insure successful interactive networks is slowly appearing on the market now. Many successful integrations of personal computers with the HP3000 are currently in use in many corporations. IMAGE/3000 data base extraction techniques are used to download data to a spreadsheet package on a PC for "what-if" analysis. Data can be extracted from personal computer data base applications and uploaded to the HP3000 for input to IMAGE/3000 based applications.

The Data Interchange Format (DIF) allows various unrelated applications to exchange data. Output from one application is formatted so that it may be processed and utilized by another applications program.

Command features of DSN/LINK can be used to set up a variety of time and keystroke saving routines. These routines can then

be used for data transfer without user interaction. This eliminates the complex strings of commands sometimes necessary during data transfer applications between nodes in a network.

Development is still underway for future packages that will provide simple solutions to incompatibility and emulation problems. Future software for interactive systems must be able to link small-scale and large-scale systems regardless of the structure of the DBMS. Centralized batch data entry can be eliminated. We must be able to interchange data simply and efficiently between applications packages. Current networking and software emulation limitations must be overcome. But we are still looking to the future for technology to catch up with the complex of interactive networked systems already existing in many office environments.

Networking and interfacing technology has quickly advanced beyond the ability of our managerial skills to deal with issues of system compatibility, data base integrity and security. Future technology is not catching up soon enough with tools for regulating the security and compatibility of data on complexes of networked systems. Problems of data security, system management, and system compatibility must be solved, during the interim, while the technological tools catch up to our present day needs. MIS departments are at risk having to invent security measures for regulating their data bases and maintaining security on the growing network of systems, or risk losing their reign over the computer system.

From the viewpoint of the end user, the advantages of personal computers in the office environment far out weigh any disadvantages. The personal computer within the context of a networked system has taken hold within the corporation. The issue is not whether or not the personal computer can successfully integrate into the mini or mainframe environment. The issue is whether or not the mini or mainframe can adapt to the growing PC environment of the office.

MIS departments must catch up with the technology and begin strategies for information management within the context of networked systems, stand-alone work stations and distributed data bases. The first issue that must be addressed is providing training to the growing number of users tapping into the more easily accessible computing network. The introduction of personal computers into the office environment has brought many new and less experienced users on-line with the larger systems. Personal computer users are frantically trying to keep up with the latest in emulation, networking and communications software, as well as the myriad of applications packages available for the stand-alone work station.

In response to this growing need, information centers, support centers, or training centers are appearing in many corporations. In the broadest sense, the role of these centers in the

office context is to insure the user's involvement in the corporations larger data processing environment. The proliferation of stand-alone work stations creates a situation in which the end user is able to isolate from the larger data processing environment. There is less communication between users within a corporation. The one time hope of computers eliminating the duplication of work between divisions within a corporations is lost as the information becomes isolated on the personal computer. The end user must still be involved with the larger system to insure communication between personal computers within a corporation and between PC's and the large-scale office computer.

The functions of an information center within a corporation can vary greatly. Essentially, the information center must provide a sharing of data processing skills. Foremost of these is acquainting the user with issues and methods of data security. With the growing number of personal computers in the office, acquainting the user with issues of data security becomes even more pressing. Users must be encouraged to maintain good habits of information management themselves. Issues that were once the realm of MIS departments are now spread to the user who becomes his own small-scale version of an MIS department managing the security of data on the personal computer.

The PC user is required to conduct his own daily or weekly backup of files. In the large-scale system environment, the MIS department conducts a disk to tape backup on a regular basis to insure the safety of files against gliches, or hardware failures. The PC user must be trained to conduct his own backups, either to a floppy disk, a tape backup or to the larger system itself. The latest version of the 2622 emulator allows the PC user to interface with the HP3000 to upload an entire disk for backup. The PC data backup process is directly linked to the larger system. Information Centers should encourage good data management practices and provide the necessary training to PC users.

These Information or Support Centers often provide training for the office's personal computer users on a drop-in basis. The personal computer user, exposed to the vast marketplace of PC applications programs needs guidance on issues of purchasing, compatibility, as well as training. Users can work with the Information Center staff to identify the most efficient and compatible applications, with consideration given to cost factors.

The growing concern of company's starting up their own information centers is under who's authority should they reside. There are arguments urging that the information center is necessarily a part of MIS. There are just as convincing a set of arguments on the other side that insist the information center should be independent of MIS. The question should really begin with an understanding of the role of the personal computer in the office environment. Is it something that can come under MIS control at all. Our traditional methods of information management would insist that it does. But the personal computer assumes a

different role entirely in the office than does the large-scale system.

MIS and the users need to define the role of the personal computer in the large-scale system environment. Areas of great security risk are best left on the mini or mainframe. There are areas of data processing that are best suited for application on the personal computer. Some accounting tasks are more efficiently performed on the PC, rather than the company mini or mainframe. Spreadsheet applications requiring large amounts of memory to load are best used on the PC where processing is dedicated and the mini or mainframe is unburdened. Spreadsheet packages are CPU intensive, slowing down the entire system in performing other tasks simultaneously. Spreadsheet analysis is best conducted on a PC using the dedicated processor, relinquishing the mini or mainframe processor to conduct other activities.

Custom programs geared to the specific needs of a user can be made available at the PC level for individuals, as long as these programs are catalogued and maintained by the Information Center. The cataloguing of custom as well as standard applications programs should be maintained by the Information Center, thus insuring the legal handling of software duplication as well as software maintenance.

The personal computer is an element in current data processing that defies our previous management definitions and abilities. In order for the Information Center to keep a handle on their job, the role of PC's in the office environment must be defined. The Information Center must keep the presence of different manufacturers of personal computers in the office to a minimum. By restricting the variety of models and the applications programs used, the Information Center can maximize the sharing of information between users on the PC network. This reduces the strain on the Information Center's resources.

With a strategic plan to guide the manager of the office computer network, fewer purchases of "state-of-the-art" software and hardware will occur. Implementation of a strategic interactive systems management plan would actively direct the purchase of only those technologically advanced tools that are in keeping with the direction of the office's future development. The office system network will begin to take on a cohesive and planned direction. It is up to management to redefine its role as information managers, and develop new methods of information management to include the role of the personal computer in the office.

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