

Kent State University Network and Information Systems Study

EXECUTIVE SUMMARY

Kent, like most universities, is being challenged to work smarter, to do more work with fewer resources. At the same time, Kent must continue to improve the quality of service and support to its stakeholders in order to remain competitive with peer institutions. In her State of the University address, delivered in November 1992, President Carol A. Cartwright stated:

"We're at a point in higher education when we can either create a few temporary safety nets to bring us through this crisis, or we can seize the moment to bring about meaningful and fundamental change. Quite frankly, I'm eager to get on with the next phase of development and provide leadership for these changes."

Computing and information technology are expected to play an important and strategic role as Kent State University responds to this challenge by developing and implementing new and creative approaches to sustain academic programs and support operations.

Kent State University has made steady progress in the use of computing and information technology in the past decade. Thus, students, faculty, and staff have become more conversant with using technology to fulfill their scholarship, research, support, and administrative needs. However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to adequately address computing and information technology demands. Therefore, over the years, studies have been undertaken periodically to focus on specific computing and information technology concerns.

In September 1992, President Carol A. Cartwright, Provost Myron Henry and Vice President Lawrence Kelley commissioned a Committee to build on these previous studies and conduct a University wide analysis of network communications and information systems with:

the goal of establishing an integrated infrastructure to facilitate the access and use of computing and information technology by students, faculty, and staff.

The objectives of the study are best described in its charge:

to assess network and information system needs, in part, by interviewing and gathering information from Kent students, faculty, and staff from all divisions of the University;

to develop a plan that defines network communications and institutional information system requirements, objectives, issues, recommendations, and implementation priorities.

The nine-member team included representatives from the faculty, Provost's Office, Library, Regional Campuses, and offices of Student Affairs, Business and Finance, Business Affairs, and Computer Services. In addition, IBM Corporation assisted with the study by providing Kent with the use of its Application Transfer Study (ATS) methodology as well a consultant/facilitator to

serve on the team. Three other IBM professionals also were assigned to the study to provide additional assistance.

Using the IBM ATS methodology, the team executed the following five phases: planning, data gathering, problem/strength analysis, recommendation/benefits analysis, and implementation planning. The team began the study process with an orientation and planning meeting on October 7, 1992.

During the data gathering process, the team solicited information from students, faculty, and staff through interviews, questionnaires, and written reports. Twenty interview sessions were held, and approximately 100 individuals were interviewed. Over 3,000 questionnaires were mailed to all full-time faculty and staff and a random sample to 300 students. In addition, questionnaires were circulated to students utilizing the computer laboratory sponsored by undergraduate student senate located in the student center, and more were circulated by leaders of the undergraduate and graduate student governments.

A total of 905 completed questionnaires were returned with 285 from faculty, 76 from students, 294 from classified staff, and 249 from administrative staff.

The team analyzed the information provided during the data gathering process and prepared strength and problem statements. Next, the team conducted an in-depth review of these statements and prepared a series of recommendations and an implementation plan. The following is a summary of key recommendations:

- **Mission.** The University should develop a statement that reflects the strategic importance of information technology. Furthermore, this statement should articulate the role that information technology plays in support of the achievement of the University's mission and strategic plans for the future.
- **Peer Institutions.** The University should identify a peer group of institutions which would serve as benchmarks against which comparisons could be made on information technology and network communications development.
- **Technology Policy Advisory Committee.** A broad-based committee should be established to advise the Vice President of Business and Finance on policy matters related to information technology and network planning, standards, and priorities. The committee should include representatives from faculty and staff.
- **University wide Planning Process.** A University wide plan for information technology and network communications should be maintained and updated on a biannual basis. Therefore, plans for all units (including Regional Campuses) should be shared biannually and integrated with University wide plans.
- **Data Access/Authorization.** The University needs to develop and implement a more flexible and uniform approach to authorizing data access. In the context of migration towards an integrated administrative data base, common standards for data access are

needed. The University should develop procedures and policies which facilitate appropriate levels of authorized access to needed information.

- **University wide Network.** The University should recognize that a University wide network is becoming a required utility (like water or heat) for the survival of a modern campus. The network should be ubiquitous, reliable, and provide adequate capacity to support voice, data, and interactive video communications.

The existing network plan, completed in September 1992, endorsed by the Academic Support Systems Task Force, provides the University with a realistic blueprint for a campus wide backbone. In order to provide for interactive video, the plan should be enhanced to include single-mode fiber in the backbone and from the backbone to the Office of Teleproductions. This enhancement will provide the network infrastructure to support the establishment of fully mediated classrooms and distance learning programs.

The network should permit evolution to integrated campus-wide access by students, faculty, and staff to University facilities such as the Library and other information resources, computing resources, and student information systems. This would include improved access from student laboratories and dormitories, faculty and staff work areas, and off-campus locations.

- **Electronic Mail.** Convenient access to an easy-to-use electronic mail system is of strategic importance to the University. This system should include an electronic directory and allow all users to communicate within and beyond the campus in a seamless manner.
- **University wide Systems Implementation Perspective.** The University should establish an approach to systems implementation that considers both University-wide and departmental needs, while at the same time, supporting database and systems integration. Student information should be implemented as one integrated system in order to enhance competitiveness and better support the achievement of enrollment goals. Therefore, the existing software for student information systems should be replaced with an integrated system.
- **Systems Infrastructure.** The database infrastructure for an integrated information system should be installed. It should consist of a relational database management system with a data dictionary and user-friendly query and reporting capabilities; and integrated and seamless support for distributed computing and document imaging technologies.
- **Need for Training.** The University must recognize the importance of appropriate training as it migrates into a more integrated information systems environment. The University should provide better overall coordination and systematic strategies to meet existing and future training needs.
- **Document Handling and Process Flow Evaluation.** The University should recognize that technology alone will not provide the break-through solutions that are envisioned for

administrative operations. Therefore, the University should review existing office work flow processes and determine where document handling and duplicating can be automated, streamlined, integrated, or possibly eliminated.

- **University wide Information System.** The University should implement user-friendly access points such as kiosks or touch-tone phones to University information systems. The purpose would be to allow various users to gain direct access to general information about the University and to allow students to access specific information about themselves.
- **On-Going Hardware/Software Resources.** The University needs to plan for on-going budget resources to address the need to support, upgrade, maintain, and replace hardware and software. One should recognize that the appropriate level of technology varies widely from department to department. In addition, planning should incorporate the migration of equipment from users with high-end work station needs to users with low-end work station needs. Note that there is a base level below which it is not cost effective to retain old equipment because of operating and maintenance costs.
- **Mainframe Computer Upgrade.** The University should plan to upgrade its mainframe computing capacity to support the data base, integration and access, requirements of the proposed information systems and network. This upgrade should include replacing the existing "water cooled" mainframe computer system with a more energy efficient "air cooled" system. A detail analysis of capacity requirements should be performed and used to select an appropriate mainframe processor that will serve current and future needs (i.e. three to five years).

If current technology trends continue, this may be the last mainframe processor that the University will have to acquire because systems are being re-engineered to run on smaller down-sized and net-worked computers. These systems are expected to be widely available in the later part of this decade.

- **Academic Computing Plan.** With the exception of the network and information systems infrastructure, the scope of this study did not include academic computing. The IBM consultant cautioned against making the study too broad and recommended that a separate study be undertaken to address the needs of academic computing. Members of this team believe that the full potential benefits of this study cannot be realized without an institutional plan for academic computing and an overall instructional and classroom support plan which integrates research and instructional technology with the overall strategic infrastructure proposed here. Further, the plan should include an evaluation of the concept of a student computer usage fee to help fund academic computing requirements. Therefore, the University should conduct a follow-up study to address these academic issues.

- **Regional Campuses.** Regional Campus information systems need to be more homogeneous among campuses and better integrated with University information systems and Regional Campus strategic plans. Regional Campus enrollment is expected to continue to grow at a steady rate, and its operating environment is expected to become more complex. Therefore, an evaluation of Regional Campus computing and information technology requirements should be conducted to define goals and objectives, identify strengths and issues, develop recommendations and create a five-year implementation plan.

The team hopes that the recommendations in this report will provide a strategy and blueprint that Kent State University can use to develop and implement the integrated network and systems infrastructure that it needs to take full advantage of new technologies in the nineties and beyond. With this infrastructure in place, the University will be in a better position to enhance the quality of its instruction, research, and support programs, and thereby provide better quality service to its students, faculty, and staff as well as help the University remain competitive with peer institutions.

Kent State University Network and Information Systems Study

ACKNOWLEDGMENTS

The team owes special recognition to President Carol A. Cartwright, Provost Myron Henry, and Vice President Lawrence Kelley for authorizing this network and information systems study.

We extend a special thanks to IBM Corporation for assigning several of its staff members to assist and participate in this study. In particular, we would like to thank Sue Splitgerber, IBM consultant and application transfer specialist, for providing us with needed guidance, expertise, and encouragement. We also appreciate the extra efforts of Vince Santangelo, IBM Marketing Representative, for coordinating education day.

The team acknowledges and appreciates the time and efforts of all who helped make this study a success. We especially appreciate the consideration and effort given to this study by members of the University community who participated in interviews, submitted written statements, completed questionnaires, and provided words of encouragement. It was this information that enabled the team to compile a report that (1) presents the current status of information systems and network communications at Kent and (2) recommends a plan that outlines the future direction that information systems and network communications should take at Kent.

The team also appreciates the fine editing advice provided by Ramona Stamm of University Publications.

Finally, the team acknowledges the excellent clerical and logistical support provided by Kathi Brown whose activities ranged from scheduling meetings and interviews to capturing interview notes and making copies.

Kent State University Network and Information Systems Study

INTRODUCTION

Kent, like most universities, currently is being challenged to work smarter, to do more work with fewer resources. At the same time it must improve the quality of service and support to a variety of stake holders, i.e. students, faculty, staff, alumni, parents, and friends of the University. Computing and information technology are expected to play an important and strategic role as Kent State University responds to this challenge by developing and implementing new and creative approaches to meeting its service and support responsibilities.

Also, Kent's Managing For The Future Task Force, (which was commissioned by the Ohio Board of Regents to study ways to improve productivity), emphasized the strategic role of technology in this effort with a recommendation that the University "upgrade systems wherever possible to realize all efficiencies."

Over the years, Kent State University has made a significant investment in computing and information technology to sustain its academic programs and support operations. As a result, Kent students, faculty, and staff have become increasingly active in the use of technology to fulfill their scholarship, research, support, and administrative needs. However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to meet demands.

Studies and plans have been undertaken and completed periodically to respond to specific computing and information technology needs; e.g., recent studies include the campus wide network plan and the Academic Support Systems Task Force (ASSTF) report. The campus wide network plan primarily addressed inter-building communication network issues, while the ASSTF report identified key communication connectivity concerns, as well as student information system issues, and recommendations for improvement.

President Cartwright along with Provost Henry and Vice President Kelley asked that the University build on these reports by organizing a committee to conduct a University wide analysis of communication networking and information systems with the:

goal of establishing an integrated infrastructure to facilitate the access and use of computing and information technology by students, faculty, and staff.

The objectives of the study are best described in its charge:

to assess network and information system needs, in part,

by interviewing and gathering information from Kent students, faculty, and staff from all divisions of the University;

to develop a plan that defines communication network and institutional information system requirements, objectives, issues, recommendations, and implementation priorities.

IBM offered Kent the use of its Application Transfer Study (ATS) planning methodology as well as a consultant to assist with this analysis and planning effort. IBM advised that the study committee be limited to no more than nine individuals and cautioned against making the scope of the study too broad.

The IBM consultant served as a facilitator for the study. The ATS methodology has been used extensively by Universities (with IBM assistance) to establish computing and information plans. Since 1978, IBM indicates that they have successfully facilitated over 400 ATS studies in higher education.

The Network and Information Systems Study (NISS) Committee was appointed in September 1992 and charged to complete the work by March 1993.

The Committee members are:

Rosemary Du Mont - Dean and Professor for Library and Information Science

Paul Farrell - Director of Departmental Computing and Associate Professor of Mathematics and Computer Science

James Jones - University Budget Director

William McKinley - Director of Information Services

Illee Rhimes - Committee Chair and Associate Vice President for Business and Finance

Gregory Rogers - Director of Office for Academic Assessment and Evaluation Services

Gregory Seibert - Director of Computer Resources for Business Affairs

Michael Sperko - Director of Student Information and Records - Regional Campuses

Don Tolliver - Dean and Professor for University Libraries and Media Services

STUDY METHODOLOGY

The Application Transfer Methodology (ATS), which was used to conduct this study, consisted of the following five major steps:

1. Planning. The purpose of this step was to brief senior management and the project team on the study process, develop the project work plan, draft the faculty, student and staff survey instruments, and prepare an interview schedule.

2. Data Gathering. During this step, members of the University community were surveyed and interviewed. This effort included gathering information on problems, strengths and benefits.
3. Problem/Strength Statements. Survey and interview results were examined during this step and root problem statements were developed from problem symptoms. Strengths also were defined in this step to provide balance to the study document.
4. Recommendations/Benefits. During this step, problems statements were analyzed and recommendations were developed to address them. The benefits expected to result from implementing these recommendations also were defined during this step.
5. Implementation Plan. During this step, recommendations were analyzed and a project implementation plan was developed with time and cost estimates.

The team met for the first time on October 7, 1992, to begin the study process and develop a project schedule and work plan. The following schedule and work plan was developed and followed:

Study Schedule

November 03-05 (8:00 a.m. - 5:00 p.m.)

November 12-13 (8:00 a.m. - 5:00 p.m.)

November 17-19 (8:30 a.m. - 4:30 p.m.)

November 20 (8:30 a.m. - 12:00 noon)

November 24 (8:30 a.m. - 12:00 noon)

December 01-03 (8:30 a.m. - 4:30 p.m.)

December 08-10 (8:30 a.m. - 4:30 p.m.)

December 15-17 (8:30 a.m. - 4:30 p.m.)

January 15 (8:30 a.m. - 12:00 noon)

January 22 (8:30 a.m. - 12:00 noon)

January 26 (8:30 a.m. - 2:00 p.m.)

Planning Session - October 7

Charge to Team

Overview Study Process

Review Study Schedule

Develop Questionnaire

Prepare Interview Schedule

Interview:

- Director of Information Systems
- Director of Computer Resources for Business Affairs
- Dean of University Libraries and Media Services

Week #1 - November 03 - 05

Peer Group Interviews (4 - 6 persons per group)

Four One-hour Interviews Per Day

Questionnaire Results Tabulated

Week #2 - November 12 - 13

Peer Group Interviews (4 - 6 persons per group)

Four One-hour Interviews Per Day

Week #3 - November 17 - 20

Assimilate and Categorize Information

Formulate Problem Statements

Distinguish Root Problems and Consequences

Review Each Morning for Consensus

Assign Categories for Writing-

Team members write narratives to explain and document the root problems which have been identified.

Education Day - Administrative System Trends and Technology

Week #4 - November 24

Problem Analysis Completed

Education Day - Communications & Networking

Week #5 - December 01 - 03

Progress Review

Conceptual Solutions

Recommendations

Week #6 - December 08 - 10

Finalize Recommendations

Implementation Plan w/Action Items, Costs and Benefits

Week #7 - December 15 - 17

Finalize Implementation Plan

Assemble Document

Begin Preparation for Final Presentation

Final Document Preparation - December 21- February 26

During this time, all sections of the document were finalized, and all appendices put in place. Before the document was printed, final approval was obtained from all members of the team.

January 15, 1993 - Subcommittee presentation of implementation plan to team.

January 22. 1993 - Team document review meeting.

January 29. 1993 - Team document review meeting.

February 5. 1993 - Team document review meeting.

February 12. 1993 - Team document review meeting.

February 19. 1993 - Team document review meeting.

Presentation - Week of March 29, 1993

The study concluded with a formal presentation on March 30, 1993 to the President, provost, vice presidents, as well as IBM management. The team met with the IBM consultant the day before the presentation to review the timing, visuals, and flow of presentation.

CURRENT ENVIRONMENT

The computing environment at Kent State University spans eight campuses and consists of a wide variety of data processing, video, voice, and communications resources that serve a community of over 33,000 students and 6,000 full-time and part-time faculty and staff. In order to portray the depth and breadth of this environment, it is best to describe the facilities and functions on the Kent Campus and within the Regional Campuses separately.

Kent Campus Environment

At the center of the Kent Campus computing and data processing environment is the Office of Computer Services which supports the large-scale computing resources (mainframes, central databases) for academic and administrative data processing as well as provide. a hub for data communications. Computer Services also provides many of the technical and consultative resources for both academic and administrative computing. The Computer Center is located on the first floor of the Library and consists of the central equipment room, office suites for academic and administrative services, and a major user laboratory.

In 1992, Computer Services had over 1,400 authorized student and faculty accounts on its VAX instructional systems, over 2,000 authorized accounts on its IBM academic (VM) system, over 3,000 enrollments in its academic seminar, and more than 10,000 users of its central lab in the Library. On the administrative side, the IBM MVS/ESA system supports more than 8,000,000 transactions per month including those for the Library's NOTIS system as well as those for on-line applications in the financial, human resource, and student records areas. Access to the secured administrative systems is confined to 1,140 authorized accounts while general system

access for unsecured application. (such as the NOTIS Library system) reaches almost the entire University community.

In the equipment room, Computer Services maintains two large-scale computer systems: the IBM 3090/200S which runs MVS/ESA with 128 megabytes of central memory and 64 megabytes of extended memory, and 32 data channels; and the IBM 4381-R24 which runs VM with 32 megabytes of memory. These systems share 134 gigabytes of disk storage with both IBM 3880 and 3990 storage controllers. Other key peripherals include 2 IBM 7171 protocol converters, an IBM 3725 communications controller, 21 IBM 3174 and 3274 controllers, 6 fiber optic channel extenders, an automatic tape library (ATL) robotics system with 18-track 38k BPI cartridge transports, and 2 IBM 3827 "laser" system printers (page printers), 2 IBM 4245 "impact" line printers, and 5 remote Xerox laser printers.

Complementing the Computer Center are numerous resources in various other offices and departments. In virtually every departmental office, networked and free-standing PC work stations support day-to-day office functions related to word processing, in-house record keeping, and in many cases, in-house tracking and monitoring systems for specialized departmental needs. There are currently over 40 Local Area Networks (LAN) installed in various locations on the Kent campus and Regional Campuses. Some of these networks, such as those in the College of Business Administration and College of Education, serve over 100 separate user/nodes and have central connections (gateways) to the campus network and other extramural resources.

Campus resources in support of academic programs consist of a wide variety of equipment ranging from a LAN-based network of four parallel processors, 80 Sun and Hewlett Packard work stations, and several HP RISC systems in the Department of Mathematics and Computer Science, to the networked UNIX/RISC complex in the Scientific Computing Laboratory in the Liquid Crystals Institute, to other powerful mini/RISC systems in Physics, Geology, Technology, Architecture, and numerous other departments. Academic departments support student and faculty computing resources in shared "public" and restricted-access facilities in over 23 separate buildings and 50 different sites.

The Office of Information Services

The Office of Information Services consists of three different departments--Computer Services, Computer Equipment Services, and Resource Analysis and Planning. Computer Services is organized in three major areas--Academic Services, Systems Applications, and Systems Support. Systems Applications provides application development and support for a large number of administrative offices focusing on financial records systems, human resource systems, and student record systems. Almost all systems are online, transaction processing applications supporting a direct-link (SNA) network to users of the IBM 3090/200S. Since the 3090/200S is

channel-attached to the IBM 4381-R24, the SNA network also accommodates academic users who have access through several laboratory locations. There currently are over 600 direct connections--over both fiber and coax trunk lines with unshielded twisted pair and coax connections--to individual work stations and terminals.

The Systems Support area provides technical assistance for several major operating environments--MVS/ESA, VM, VMS, and UNIX. Since the key administrative applications run under MVS/ESA, a vast majority of effort from this group is in aid of the large IBM system, but considerable time is dedicated to supporting VM on the 4381-R24 and VMS running on DEC VAX machines located on each of the eight campuses. UNIX support is limited to the IBM/RISC/6000 systems in the School of Architecture and the Liquid Crystals Institute. Other software under the purview of Systems Support includes the IDMS/R database system as well as more than 40 other separate packages for a wide variety of academic and administrative functions. Controlling access and providing security for the University systems is also the responsibility of the systems support group.

Computer Equipment Services (CES) is the end-user support and maintenance branch of Information Services. Most of the activities of CES are associated with the installation, repair, and maintenance of user work stations, both terminals and personal computers. Complementing this service is a field engineering program that maintains the DEC/VAX systems on all eight campuses as well as a wide variety of specialized equipment such as Sun work stations and other RISC systems, parallel processors, and Novelle LANS currently installed in over 40 different University offices.

The Office of Resources Analysis and Planning (RAP) is the institutional studies arm of Information Services. In addition to developing specialized management information applications for student tracking and productivity studies, RAP is responsible for coordinating federal and state reporting, decision support systems, and numerous ad hoc projects for such activities as accreditation studies.

The Office of Academic Services is the principal link between the Computer Center and the faculty and student body of the University. Staffed by seven full-time professionals, Academic Services provides extensive consultation on the use of the aforementioned computing resource. (IBM, DEC, PCs, etc.) particularly as it relates to the use of specialized software packages (SAS, BMDP, SPSS, etc.) and the use of computing resources for instructional and research activities. Each academic period, Academic Services offers a series of seminars ranging from courses in beginner-level use of the personal computer through personal computer applications for word processing, spreadsheets, database programming, graphics, and desk top publishing; from introductions to mainframe use through advanced application of statistical packages for research projects; and from beginning to advanced use of the University's E-Mail system including

Internet and BITNET facilities.

The Department of Computer Resources

The Department of Computer Resources supports an ancillary Computer Center for the Business Services and Auxiliaries operations including such operating units as the University Bookstore, Campus Bus Service, Food Services, Telephone Communications, Mail Services, Purchasing, and the Supply Center.

Networked users at the Supply Center, the Kent Student Center, Eastway Center, and other buildings are supported by a Motorola RISC system, while a Zilog system serves the Campus Bus Service at its central facility. Both systems run UNIX software and support over 200 terminals and personal computers and 350 users.

Some of the major applications that have been developed include inventory control and client billing for Food Services, Ground Transportation, Telephone Communications, Mail Room, and Purchasing. The system for the University Bookstore supports point-of-sale capabilities for 15 cash registers. The point-of-sale system for Food Services and the Book Store also support the use of debit cards. The comprehensive transit management system for Campus Bus Service includes many features such as charter management and maintenance management.

The Regional Campuses

Each Regional Campus has at least one DEC VAX/7xx machine with a connection to the Kent VAX system and, using the Ethernet link, to all Kent Campus network facilities. On several Regional Campuses, the VAX systems support local administrative and instructional applications; but the bulk of computing power in the regional system is based on personal computer work stations in networked and stand alone environments. Instructional facilities in the regional system are available to its student BODY through numerous general and special-purpose labs. Administrative computing support is coordinated through the Office of Student Information and Records located on the Kent Campus in the Regional Campus administrative offices for registration and various other central mainframe record keeping systems; but several campuses supplement this support with advanced personal computer LAN environments with electronic mail and shared software facilities.

All official records and systems for the Regional Campuses related to the University's financial, human resource, and student records systems are supported by the Computer Center on the Kent Campus. Local records and those records maintained in the Regional Campus central office for day-to-day management of the seven campuses are supported by well-integrated LANs that were installed in the mid-1980s. These records are submitted to the Kent system after they have been

created on local systems.

Libraries

During the mid-1980s, Kent State University significantly increased support for library automation through the selection of an on-line integrated system. This process began at Kent in 1986 with the purchase of the Northwestern On-line Total Integrated System (NOTIS) originally developed at Northwestern University. The NOTIS system was installed on the University's mainframe system which it shares with various administrative computing systems. As the Library put different parts of the system into operation over a period of two years, the new system made new efficiencies possible. It streamlined cataloging by eliminating the card catalog and several other paper files; it transformed ordering and management of the materials budget from an entirely manual process to an automated one; it replaced an antiquated and inefficient circulation system; and it provided a better environment for serials control than the previous remote system. Further, it had a major impact on library users, for the on-line catalog provided more complete information than the card catalog by tracking materials from the pre-order process through cataloging to current circulation status. The catalog is now available in its entirety via 150 terminals located in the main, branch, and Regional Campus libraries, in labs and offices, and in the homes of faculty and students via modem. During a typical day over 45,000 transactions are recorded on the system.

Today the public also enjoys easy electronic access to the journal literature and other large bodies of information. This major revolution has come about because of the introduction of PC-based CD ROM technology. The main library at Kent introduced CD ROMs in 1987 and has witnessed a steady growth in their popularity and importance. Currently there are 15 CD ROM titles included on a local area network with several others available on request. Numerous other CD ROMs are available in other departments and in branch and Regional Campus libraries.

Through the support of the Ohio Board of Regents, library automation is entering its next phase through a system called OhioLINK. When fully implemented the OhioLINK system will permit its member universities to access over 18 million volumes. Currently OhioLINK is developing a statewide central electronic catalog and creating a distribution system for timely sharing of library materials across the state. While the statewide catalog will serve as the centerpiece, users will also be able to access citation and full text databases through the OhioLINK central system. Implementing OhioLINK at Kent State University in 1994 will be a major undertaking. Issues to be managed include networking, installation and support of hardware and software, and data migration. The local OhioLINK system will consist of two DEC 5900 processors, 8 disk drives, and 3 tape units. OhioLINK is using the INNOPAC software, which is a product of Innovative Interfaces, Inc. of Berkeley, California, as a system on which the statewide catalog and other cooperative functions are based. To date the first six OhioLINK libraries have installed new

hardware and software on their campuses and their records are being merged into the statewide central system located at Wright State University.

One of the major issues that Kent State University must deal with is the installation of a suitable network infrastructure in order to make OhioLINK accessible outside of the walls of the main library, at sites such as the branch libraries on the Kent Campus, the Regional Campus libraries, and remote on-campus and off-campus dial-in users. In summary, OhioLINK offers promise for information users through the 1990s and into the next century.

The Campus Network

The current campus network has been pieced together over the past ten years starting with the IBM SNA network that grew up around administrative applications and early attempts to link select academic areas to the Computer Center and to regional and national networks such as Internet and BITNET. Other pieces of the network include IBM and DEC systems connections through JNET software which includes a Xyplex broadband link between the IBM 7171 protocol converter and the Xyplex network for about 96 DEC devices; the Ohio Bell Datakit network supported by data-over voice multiplexers; the Ohio Supercomputer Center (OSC) link running through a Proteon router from the Computer Center to OSC in Columbus over T-1 leased lines, and the campus Ethernet connections running from the Computer Center to several buildings in the science complex.

A great deal of effort has been expended in the past year to design a true fiber "backbone" which could serve the entire Kent Campus. Emanating from this proposed backbone would be seven distinct nodes which would, in turn, serve local building complexes. The backbone would consist of a 72 fiber trunk and 24 fiber building links. Within buildings, unshielded twisted pair wiring would reach from wiring closets to rooms and work stations. Further, current links to the Regional Campuses would be upgraded to 56Kbs digital-based leased phone lines. Finally, a management and monitoring system would be implemented to operate and maintain this network. Thus far, 12 strand, 62.5 micron fiber has been pulled for the campus Ethernet and SNA network from the Computer Center to the Student Services Center, Business Administration, the Old Administration complex, Merrill Hall, and, finally, to White Hall.

In addition, 12 strand fiber has been installed between the Kent Student Center and Tri-Tower residence hall complex with 6 strand fiber continuing on to the University Supply Center and Eastway complex. A final 12 strand fiber link currently is being installed between the Computer Center in the Library and the Kent Student Center. Completion of this final link will integrate all of Business Service and Auxiliary Office computers and terminals with the University network.

Kent State University

Network and Information Systems Study

INTRODUCTION

Kent, like most universities, currently is being challenged to work smarter, to do more work with fewer resources. At the same time it must improve the quality of service and support to a variety of stake holders, i.e. students, faculty, staff, alumni, parents, and friends of the University. Computing and information technology are expected to play an important and strategic role as Kent State University responds to this challenge by developing and implementing new and creative approaches to meeting its service and support responsibilities.

Also, Kent's Managing For The Future Task Force, (which was commissioned by the Ohio Board of Regents to study ways to improve productivity), emphasized the strategic role of technology in this effort with a recommendation that the University "upgrade systems wherever possible to realize all efficiencies."

Over the years, Kent State University has made a significant investment in computing and information technology to sustain its academic programs and support operations. As a result, Kent students, faculty, and staff have become increasingly active in the use of technology to fulfill their scholarship, research, support, and administrative needs. However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to meet demands.

Studies and plans have been undertaken and completed periodically to respond to specific computing and information technology needs; e.g., recent studies include the campus wide network plan and the Academic Support Systems Task Force (ASSTF) report. The campus wide network plan primarily addressed inter-building communication network issues, while the ASSTF report identified key communication connectivity concerns, as well as student information system issues, and recommendations for improvement.

President Cartwright along with Provost Henry and Vice President Kelley asked that the University build on these reports by organizing a committee to conduct a University wide analysis of communication networking and information systems with the:

goal of establishing an integrated infrastructure to facilitate the access and use of computing and information technology by students, faculty, and staff.

The objectives of the study are best described in its charge:

to assess network and information system needs, in part,

by interviewing and gathering information from Kent students, faculty, and staff from all divisions of the University;

to develop a plan that defines communication network and institutional information system requirements, objectives, issues, recommendations, and implementation priorities.

IBM offered Kent the use of its Application Transfer Study (ATS) planning methodology as well as a consultant to assist with this analysis and planning effort. IBM advised that the study committee be limited to no more than nine individuals and cautioned against making the scope of the study too broad.

The IBM consultant served as a facilitator for the study. The ATS methodology has been used extensively by Universities (with IBM assistance) to establish computing and information plans. Since 1978, IBM indicates that they have successfully facilitated over 400 ATS studies in higher education.

The Network and Information Systems Study (NISS) Committee was appointed in September 1992 and charged to complete the work by March 1993.

The Committee members are:

Rosemary Du Mont - Dean and Professor for Library and Information Science

Paul Farrell - Director of Departmental Computing and Associate Professor of Mathematics and Computer Science

James Jones - University Budget Director

William McKinley - Director of Information Services

Illee Rhimes - Committee Chair and Associate Vice President for Business and Finance

Gregory Rogers - Director of Office for Academic Assessment and Evaluation Services

Gregory Seibert - Director of Computer Resources for Business Affairs

Michael Sperko - Director of Student Information and Records - Regional Campuses

Don Tolliver - Dean and Professor for University Libraries and Media Services

STUDY METHODOLOGY

The Application Transfer Methodology (ATS), which was used to conduct this study, consisted of the following five major steps:

1. Planning. The purpose of this step was to brief senior management and the project team on the study process, develop the project work plan, draft the faculty, student and staff survey instruments, and prepare an interview schedule.
2. Data Gathering. During this step, members of the University community were surveyed and interviewed. This effort included gathering information on problems, strengths and benefits.
3. Problem/Strength Statements. Survey and interview results were examined during this step and root problem statements were developed from problem symptoms. Strengths also were defined in this step to provide balance to the study document.
4. Recommendations/Benefits. During this step, problems statements were analyzed and recommendations were developed to address them. The benefits expected to result from implementing these recommendations also were defined during this step.

5. Implementation Plan. During this step, recommendations were analyzed and a project implementation plan was developed with time and cost estimates.

The team met for the first time on October 7, 1992, to begin the study process and develop a project schedule and work plan. The following schedule and work plan was developed and followed:

Study Schedule

November 03-05 (8:00 a.m. - 5:00 p.m.)

November 12-13 (8:00 a.m. - 5:00 p.m.)

November 17-19 (8:30 a.m. - 4:30 p.m.)

November 20 (8:30 a.m. - 12:00 noon)

November 24 (8:30 a.m. - 12:00 noon)

December 01-03 (8:30 a.m. - 4:30 p.m.)

December 08-10 (8:30 a.m. - 4:30 p.m.)

December 15-17 (8:30 a.m. - 4:30 p.m.)

January 15 (8:30 a.m. - 12:00 noon)

January 22 (8:30 a.m. - 12:00 noon)

January 26 (8:30 a.m. - 2:00 p.m.)

Planning Session - October 7

Charge to Team

Overview Study Process

Review Study Schedule

Develop Questionnaire

Prepare Interview Schedule

Interview:

- Director of Information Systems
- Director of Computer Resources for Business Affairs
- Dean of University Libraries and Media Services

Week #1 - November 03 - 05

Peer Group Interviews (4 - 6 persons per group)
Four One-hour Interviews Per Day
Questionnaire Results Tabulated

Week #2 - November 12 - 13

Peer Group Interviews (4 - 6 persons per group)
Four One-hour Interviews Per Day

Week #3 - November 17 - 20

Assimilate and Categorize Information
Formulate Problem Statements

Distinguish Root Problems and Consequences

Review Each Morning for Consensus

Assign Categories for Writing-

Team members write narratives to explain and document the root problems which have been identified.

Education Day - Administrative System Trends and Technology

Week #4 - November 24

Problem Analysis Completed

Education Day - Communications & Networking

Week #5 - December 01 - 03

Progress Review

Conceptual Solutions

Recommendations

Week #6 - December 08 - 10

Finalize Recommendations

Implementation Plan w/Action Items, Costs and Benefits

Week #7 - December 15 - 17

Finalize Implementation Plan

Assemble Document

Begin Preparation for Final Presentation

Final Document Preparation - December 21- February 26

During this time, all sections of the document were finalized, and all appendices put in place. Before the document was printed, final approval was obtained from all members of the team.

January 15, 1993 - Subcommittee presentation of implementation plan to team.

January 22, 1993 - Team document review meeting.

January 29, 1993 - Team document review meeting.

February 5, 1993 - Team document review meeting.

February 12, 1993 - Team document review meeting.

February 19, 1993 - Team document review meeting.

Presentation - Week of March 29, 1993

The study concluded with a formal presentation on March 30, 1993 to the President, provost, vice presidents, as well as IBM management. The team met with the IBM consultant the day before the presentation to review the timing, visuals, and flow of presentation.

CURRENT ENVIRONMENT

The computing environment at Kent State University spans eight campuses and consists of a wide variety of data processing, video, voice, and communications resources that serve a community of over 33,000 students and 6,000 full-time and part-time faculty and staff. In order to portray the depth and breadth of this environment, it is best to describe the facilities and functions on the Kent Campus and within the Regional Campuses separately.

Kent Campus Environment

At the center of the Kent Campus computing and data processing environment is the Office of Computer Services which supports the large-scale computing resources (mainframes, central databases) for academic and administrative data processing as well as provide. a hub for data communications. Computer Services also provides many of the technical and consultative resources for both academic and administrative computing. The Computer Center is located on the first floor of the Library and consists of the central equipment room, office suites for academic and administrative services, and a major user laboratory.

In 1992, Computer Services had over 1,400 authorized student and faculty accounts on its VAX instructional systems, over 2,000 authorized accounts on its IBM academic (VM) system, over 3,000 enrollments in its academic seminar, and more than 10,000 users of its central lab in the Library. On the administrative side, the IBM MVS/ESA system supports more than 8,000,000 transactions per month including those for the Library's NOTIS system as well as those for on-line applications in the financial, human resource, and student records areas. Access to the secured administrative systems is confined to 1,140 authorized accounts while general system access for unsecured application. (such as the NOTIS Library system) reaches almost the entire University community.

In the equipment room, Computer Services maintains two large-scale computer systems: the IBM 3090/200S which runs MVS/ESA with 128 megabytes of central memory and 64 megabytes of extended memory, and 32 data channels; and the IBM 4381-R24 which runs VM with 32 megabytes of memory. These systems share 134 gigabytes of disk storage with both IBM 3880 and 3990 storage controllers. Other key peripherals include 2 IBM 7171 protocol

converters, an IBM 3725 communications controller, 21 IBM 3174 and 3274 controllers, 6 fiber optic channel extenders, an automatic tape library (ATL) robotics system with 18-track 38k BPI cartridge transports, and 2 IBM 3827 "laser" system printers (page printers), 2 IBM 4245 "impact" line printers, and 5 remote Xerox laser printers.

Complementing the Computer Center are numerous resources in various other offices and departments. In virtually every departmental office, networked and free-standing PC work stations support day-to-day office functions related to word processing, in-house record keeping, and in many cases, in-house tracking and monitoring systems for specialized departmental needs. There are currently over 40 Local Area Networks (LAN) installed in various locations on the Kent campus and Regional Campuses. Some of these networks, such as those in the College of Business Administration and College of Education, serve over 100 separate user/nodes and have central connections (gateways) to the campus network and other extramural resources.

Campus resources in support of academic programs consist of a wide variety of equipment ranging from a LAN-based network of four parallel processors, 80 Sun and Hewlett Packard work stations, and several HP RISC systems in the Department of Mathematics and Computer Science, to the networked UNIX/RISC complex in the Scientific Computing Laboratory in the Liquid Crystals Institute, to other powerful mini/RISC systems in Physics, Geology, Technology, Architecture, and numerous other departments. Academic departments support student and faculty computing resources in shared "public" and restricted-access facilities in over 23 separate buildings and 50 different sites.

The Office of Information Services

The Office of Information Services consists of three different departments--Computer Services, Computer Equipment Services, and Resource Analysis and Planning. Computer Services is organized in three major areas--Academic Services, Systems Applications, and Systems Support. Systems Applications provides application development and support for a large number of administrative offices focusing on financial records systems, human resource systems, and student record systems. Almost all systems are online, transaction processing applications supporting a direct-link (SNA) network to users of the IBM 3090/200S. Since the 3090/200S is channel-attached to the IBM 4381-R24, the SNA network also accommodates academic users who have access through several laboratory locations. There currently are over 600 direct connections--over both fiber and coax trunk lines with unshielded twisted pair and coax connections--to individual work stations and terminals.

The Systems Support area provides technical assistance for several major operating environments--MVS/ESA, VM, VMS, and UNIX. Since the key administrative applications run under MVS/ESA, a vast majority of effort from this group is in aid of the large IBM system, but

considerable time is dedicated to supporting VM on the 4381-R24 and VMS running on DEC VAX machines located on each of the eight campuses. UNIX support is limited to the IBM/RISC/6000 systems in the School of Architecture and the Liquid Crystals Institute. Other software under the purview of Systems Support includes the IDMS/R database system as well as more than 40 other separate packages for a wide variety of academic and administrative functions. Controlling access and providing security for the University systems is also the responsibility of the systems support group.

Computer Equipment Services (CES) is the end-user support and maintenance branch of Information Services. Most of the activities of CES are associated with the installation, repair, and maintenance of user work stations, both terminals and personal computers. Complementing this service is a field engineering program that maintains the DEC/VAX systems on all eight campuses as well as a wide variety of specialized equipment such as Sun work stations and other RISC systems, parallel processors, and Novelle LANS currently installed in over 40 different University offices.

The Office of Resources Analysis and Planning (RAP) is the institutional studies arm of Information Services. In addition to developing specialized management information applications for student tracking and productivity studies, RAP is responsible for coordinating federal and state reporting, decision support systems, and numerous ad hoc projects for such activities as accreditation studies.

The Office of Academic Services is the principal link between the Computer Center and the faculty and student body of the University. Staffed by seven full-time professionals, Academic Services provides extensive consultation on the use of the aforementioned computing resource. (IBM, DEC, PCs, etc.) particularly as it relates to the use of specialized software packages (SAS, BMDP, SPSS, etc.) and the use of computing resources for instructional and research activities. Each academic period, Academic Services offers a series of seminars ranging from courses in beginner-level use of the personal computer through personal computer applications for word processing, spreadsheets, database programming, graphics, and desk top publishing; from introductions to mainframe use through advanced application of statistical packages for research projects; and from beginning to advanced use of the University's E-Mail system including Internet and BITNET facilities.

The Department of Computer Resources

The Department of Computer Resources supports an ancillary Computer Center for the Business Services and Auxiliaries operations including such operating units as the University Bookstore, Campus Bus Service, Food Services, Telephone Communications, Mail Services, Purchasing, and the Supply Center.

Networked users at the Supply Center, the Kent Student Center, Eastway Center, and other buildings are supported by a Motorola RISC system, while a Zilog system serves the Campus Bus Service at its central facility. Both systems run UNIX software and support over 200 terminals and personal computers and 350 users.

Some of the major applications that have been developed include inventory control and client billing for Food Services, Ground Transportation, Telephone Communications, Mail Room, and Purchasing. The system for the University Bookstore supports point-of-sale capabilities for 15 cash registers. The point-of-sale system for Food Services and the Book Store also support the use of debit cards. The comprehensive transit management system for Campus Bus Service includes many features such as charter management and maintenance management.

The Regional Campuses

Each Regional Campus has at least one DEC VAX/7xx machine with a connection to the Kent VAX system and, using the Ethernet link, to all Kent Campus network facilities. On several Regional Campuses, the VAX systems support local administrative and instructional applications; but the bulk of computing power in the regional system is based on personal computer work stations in networked and stand alone environments. Instructional facilities in the regional system are available to its student BODY through numerous general and special-purpose labs. Administrative computing support is coordinated through the Office of Student Information and Records located on the Kent Campus in the Regional Campus administrative offices for registration and various other central mainframe record keeping systems; but several campuses supplement this support with advanced personal computer LAN environments with electronic mail and shared software facilities.

All official records and systems for the Regional Campuses related to the University's financial, human resource, and student records systems are supported by the Computer Center on the Kent Campus. Local records and those records maintained in the Regional Campus central office for day-to-day management of the seven campuses are supported by well-integrated LANs that were installed in the mid-1980s. These records are submitted to the Kent system after they have been created on local systems.

Libraries

During the mid-1980s, Kent State University significantly increased support for library automation through the selection of an on-line integrated system. This process began at Kent in 1986 with the purchase of the Northwestern On-line Total Integrated System (NOTIS) originally developed at Northwestern University. The NOTIS system was installed on the University's

mainframe system which it shares with various administrative computing systems. As the Library put different parts of the system into operation over a period of two years, the new system made new efficiencies possible. It streamlined cataloging by eliminating the card catalog and several other paper files; it transformed ordering and management of the materials budget from an entirely manual process to an automated one; it replaced an antiquated and inefficient circulation system; and it provided a better environment for serials control than the previous remote system. Further, it had a major impact on library users, for the on-line catalog provided more complete information than the card catalog by tracking materials from the pre-order process through cataloging to current circulation status. The catalog is now available in its entirety via 150 terminals located in the main, branch, and Regional Campus libraries, in labs and offices, and in the homes of faculty and students via modem. During a typical day over 45,000 transactions are recorded on the system.

Today the public also enjoys easy electronic access to the journal literature and other large bodies of information. This major revolution has come about because of the introduction of PC-based CD ROM technology. The main library at Kent introduced CD ROMs in 1987 and has witnessed a steady growth in their popularity and importance. Currently there are 15 CD ROM titles included on a local area network with several others available on request. Numerous other CD ROMs are available in other departments and in branch and Regional Campus libraries.

Through the support of the Ohio Board of Regents, library automation is entering its next phase through a system called OhioLINK. When fully implemented the OhioLINK system will permit its member universities to access over 18 million volumes. Currently OhioLINK is developing a statewide central electronic catalog and creating a distribution system for timely sharing of library materials across the state. While the statewide catalog will serve as the centerpiece, users will also be able to access citation and full text databases through the OhioLINK central system. Implementing OhioLINK at Kent State University in 1994 will be a major undertaking. Issues to be managed include networking, installation and support of hardware and software, and data migration. The local OhioLINK system will consist of two DEC 5900 processors, 8 disk drives, and 3 tape units. OhioLINK is using the INNOPAC software, which is a product of Innovative Interfaces, Inc. of Berkeley, California, as a system on which the statewide catalog and other cooperative functions are based. To date the first six OhioLINK libraries have installed new hardware and software on their campuses and their records are being merged into the statewide central system located at Wright State University.

One of the major issues that Kent State University must deal with is the installation of a suitable network infrastructure in order to make OhioLINK accessible outside of the walls of the main library, at sites such as the branch libraries on the Kent Campus, the Regional Campus libraries, and remote on-campus and off-campus dial-in users. In summary, OhioLINK offers promise for information users through the 1990s and into the next century.

The Campus Network

The current campus network has been pieced together over the past ten years starting with the IBM SNA network that grew up around administrative applications and early attempts to link select academic areas to the Computer Center and to regional and national networks such as Internet and BITNET. Other pieces of the network include IBM and DEC systems connections through JNET software which includes a Xyplex broadband link between the IBM 7171 protocol converter and the Xyplex network for about 96 DEC devices; the Ohio Bell Datakit network supported by data-over voice multiplexers; the Ohio Supercomputer Center (OSC) link running through a Proteon router from the Computer Center to OSC in Columbus over T-1 leased lines, and the campus Ethernet connections running from the Computer Center to several buildings in the science complex.

A great deal of effort has been expended in the past year to design a true fiber "backbone" which could serve the entire Kent Campus. Emanating from this proposed backbone would be seven distinct nodes which would, in turn, serve local building complexes. The backbone would consist of a 72 fiber trunk and 24 fiber building links. Within buildings, unshielded twisted pair wiring would reach from wiring closets to rooms and work stations. Further, current links to the Regional Campuses would be upgraded to 56Kbs digital-based leased phone lines. Finally, a management and monitoring system would be implemented to operate and maintain this network. Thus far, 12 strand, 62.5 micron fiber has been pulled for the campus Ethernet and SNA network from the Computer Center to the Student Services Center, Business Administration, the Old Administration complex, Merrill Hall, and, finally, to White Hall.

In addition, 12 strand fiber has been installed between the Kent Student Center and Tri-Tower residence hall complex with 6 strand fiber continuing on to the University Supply Center and Eastway complex. A final 12 strand fiber link currently is being installed between the Computer Center in the Library and the Kent Student Center. Completion of this final link will integrate all of Business Service and Auxiliary Office computers and terminals with the University network.

Kent State University Network and Information Systems Study

INTRODUCTION

Kent, like most universities, currently is being challenged to work smarter, to do more work with fewer resources. At the same time it must improve the quality of service and support to a variety of stake holders, i.e. students, faculty, staff, alumni, parents, and friends of the University.

Computing and information technology are expected to play an important and strategic role as Kent State University responds to this challenge by developing and implementing new and creative approaches to meeting its service and support responsibilities.

Also, Kent's Managing For The Future Task Force, (which was commissioned by the Ohio Board of Regents to study ways to improve productivity), emphasized the strategic role of technology in this effort with a recommendation that the University "upgrade systems wherever possible to realize all efficiencies."

Over the years, Kent State University has made a significant investment in computing and information technology to sustain its academic programs and support operations. As a result, Kent students, faculty, and staff have become increasingly active in the use of technology to fulfill their scholarship, research, support, and administrative needs. However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to meet demands.

Studies and plans have been undertaken and completed periodically to respond to specific computing and information technology needs; e.g., recent studies include the campus wide network plan and the Academic Support Systems Task Force (ASSTF) report. The campus wide network plan primarily addressed inter-building communication network issues, while the ASSTF report identified key communication connectivity concerns, as well as student information system issues, and recommendations for improvement.

President Cartwright along with Provost Henry and Vice President Kelley asked that the University build on these reports by organizing a committee to conduct a University wide analysis of communication networking and information systems with the:

goal of establishing an integrated infrastructure to facilitate the access and use of computing and information technology by students, faculty, and staff.

The objectives of the study are best described in its charge:

to assess network and information system needs, in part,

by interviewing and gathering information from Kent students, faculty, and staff from all divisions of the University;

to develop a plan that defines communication network and institutional information system requirements, objectives, issues, recommendations, and implementation priorities.

IBM offered Kent the use of its Application Transfer Study (ATS) planning methodology as well as a consultant to assist with this analysis and planning effort. IBM advised that the study committee be limited to no more than nine individuals and cautioned against making the scope of the study too broad.

The IBM consultant served as a facilitator for the study. The ATS methodology has been used extensively by Universities (with IBM assistance) to establish computing and information plans. Since 1978, IBM indicates that they have successfully facilitated over 400 ATS studies in higher education.

The Network and Information Systems Study (NISS) Committee was appointed in September 1992 and charged to complete the work by March 1993.

The Committee members are:

Rosemary Du Mont - Dean and Professor for Library and Information Science

Paul Farrell - Director of Departmental Computing and Associate Professor of Mathematics and Computer Science

James Jones - University Budget Director

William McKinley - Director of Information Services

Illee Rhimes - Committee Chair and Associate Vice President for Business and Finance

Gregory Rogers - Director of Office for Academic Assessment and Evaluation Services

Gregory Seibert - Director of Computer Resources for Business Affairs

Michael Sperko - Director of Student Information and Records - Regional Campuses

Don Tolliver - Dean and Professor for University Libraries and Media Services

STUDY METHODOLOGY

The Application Transfer Methodology (ATS), which was used to conduct this study, consisted of the following five major steps:

1. Planning. The purpose of this step was to brief senior management and the project team on the study process, develop the project work plan, draft the faculty, student and staff survey instruments, and prepare an interview schedule.
2. Data Gathering. During this step, members of the University community were surveyed and interviewed. This effort included gathering information on problems, strengths and benefits.
3. Problem/Strength Statements. Survey and interview results were examined during this step and root problem statements were developed from problem symptoms. Strengths also were defined in this step to provide balance to the study document.
4. Recommendations/Benefits. During this step, problems statements were analyzed and recommendations were developed to address them. The benefits expected to result from implementing these recommendations also were defined during this step.
5. Implementation Plan. During this step, recommendations were analyzed and a project implementation plan was developed with time and cost estimates.

The team met for the first time on October 7, 1992, to begin the study process and develop a project schedule and work plan. The following schedule and work plan was developed and followed:

Study Schedule

November 03-05 (8:00 a.m. - 5:00 p.m.)

November 12-13 (8:00 a.m. - 5:00 p.m.)

November 17-19 (8:30 a.m. - 4:30 p.m.)

November 20 (8:30 a.m. - 12:00 noon)

November 24 (8:30 a.m. - 12:00 noon)

December 01-03 (8:30 a.m. - 4:30 p.m.)

December 08-10 (8:30 a.m. - 4:30 p.m.)

December 15-17 (8:30 a.m. - 4:30 p.m.)

January 15 (8:30 a.m. - 12:00 noon)

January 22 (8:30 a.m. - 12:00 noon)

January 26 (8:30 a.m. - 2:00 p.m.)

Planning Session - October 7

Charge to Team

Overview Study Process

Review Study Schedule

Develop Questionnaire

Prepare Interview Schedule

Interview:

- Director of Information Systems
- Director of Computer Resources for Business Affairs
- Dean of University Libraries and Media Services

Week #1 - November 03 - 05

Peer Group Interviews (4 - 6 persons per group)

Four One-hour Interviews Per Day

Questionnaire Results Tabulated

Week #2 - November 12 - 13

Peer Group Interviews (4 - 6 persons per group)

Four One-hour Interviews Per Day

Week #3 - November 17 - 20

Assimilate and Categorize Information

Formulate Problem Statements

Distinguish Root Problems and Consequences

Review Each Morning for Consensus

Assign Categories for Writing-

Team members write narratives to explain and document the root problems which have been identified.

Education Day - Administrative System Trends and Technology

Week #4 - November 24

Problem Analysis Completed

Education Day - Communications & Networking

Week #5 - December 01 - 03

Progress Review

Conceptual Solutions

Recommendations

Week #6 - December 08 - 10

Finalize Recommendations

Implementation Plan w/Action Items, Costs and Benefits

Week #7 - December 15 - 17

Finalize Implementation Plan

Assemble Document

Begin Preparation for Final Presentation

Final Document Preparation - December 21- February 26

During this time, all sections of the document were finalized, and all appendices put in place. Before the document was printed, final approval was obtained from all members of the team.

January 15. 1993 - Subcommittee presentation of implementation plan to team.

January 22. 1993 - Team document review meeting.

January 29. 1993 - Team document review meeting.

February 5. 1993 - Team document review meeting.

February 12. 1993 - Team document review meeting.

February 19. 1993 - Team document review meeting.

Presentation - Week of March 29, 1993

The study concluded with a formal presentation on March 30, 1993 to the President, provost, vice presidents, as well as IBM management. The team met with the IBM consultant the day before the presentation to review the timing, visuals, and flow of presentation.

CURRENT ENVIRONMENT

The computing environment at Kent State University spans eight campuses and consists of a wide variety of data processing, video, voice, and communications resources that serve a community of over 33,000 students and 6,000 full-time and part-time faculty and staff. In order to portray the depth and breadth of this environment, it is best to describe the facilities and functions on the Kent Campus and within the Regional Campuses separately.

Kent Campus Environment

At the center of the Kent Campus computing and data processing environment is the Office of Computer Services which supports the large-scale computing resources (mainframes, central databases) for academic and administrative data processing as well as provide. a hub for data communications. Computer Services also provides many of the technical and consultative resources for both academic and administrative computing. The Computer Center is located on the first floor of the Library and consists of the central equipment room, office suites for academic and administrative services, and a major user laboratory.

In 1992, Computer Services had over 1,400 authorized student and faculty accounts on its VAX instructional systems, over 2,000 authorized accounts on its IBM academic (VM) system, over 3,000 enrollments in its academic seminar, and more than 10,000 users of its central lab in the Library. On the administrative side, the IBM MVS/ESA system supports more than 8,000,000 transactions per month including those for the Library's NOTIS system as well as those for on-line applications in the financial, human resource, and student records areas. Access to the secured administrative systems is confined to 1,140 authorized accounts while general system access for unsecured application. (such as the NOTIS Library system) reaches almost the entire University community.

In the equipment room, Computer Services maintains two large-scale computer systems: the IBM 3090/200S which runs MVS/ESA with 128 megabytes of central memory and 64 megabytes of extended memory, and 32 data channels; and the IBM 4381-R24 which runs VM with 32 megabytes of memory. These systems share 134 gigabytes of disk storage with both IBM 3880 and 3990 storage controllers. Other key peripherals include 2 IBM 7171 protocol converters, an IBM 3725 communications controller, 21 IBM 3174 and 3274 controllers, 6 fiber optic channel extenders, an automatic tape library (ATL) robotics system with 18-track 38k BPI cartridge transports, and 2 IBM 3827 "laser" system printers (page printers), 2 IBM 4245 "impact" line printers, and 5 remote Xerox laser printers.

Complementing the Computer Center are numerous resources in various other offices and departments. In virtually every departmental office, networked and free-standing PC work stations support day-to-day office functions related to word processing, in-house record keeping, and in many cases, in-house tracking and monitoring systems for specialized departmental needs.

There are currently over 40 Local Area Networks (LAN) installed in various locations on the Kent campus and Regional Campuses. Some of these networks, such as those in the College of Business Administration and College of Education, serve over 100 separate user/nodes and have central connections (gateways) to the campus network and other extramural resources.

Campus resources in support of academic programs consist of a wide variety of equipment ranging from a LAN-based network of four parallel processors, 80 Sun and Hewlett Packard work stations, and several HP RISC systems in the Department of Mathematics and Computer Science, to the networked UNIX/RISC complex in the Scientific Computing Laboratory in the Liquid Crystals Institute, to other powerful mini/RISC systems in Physics, Geology, Technology, Architecture, and numerous other departments. Academic departments support student and faculty computing resources in shared "public" and restricted-access facilities in over 23 separate buildings and 50 different sites.

The Office of Information Services

The Office of Information Services consists of three different departments--Computer Services, Computer Equipment Services, and Resource Analysis and Planning. Computer Services is organized in three major areas--Academic Services, Systems Applications, and Systems Support. Systems Applications provides application development and support for a large number of administrative offices focusing on financial records systems, human resource systems, and student record systems. Almost all systems are online, transaction processing applications supporting a direct-link (SNA) network to users of the IBM 3090/200S. Since the 3090/200S is channel-attached to the IBM 4381-R24, the SNA network also accommodates academic users who have access through several laboratory locations. There currently are over 600 direct connections--over both fiber and coax trunk lines with unshielded twisted pair and coax connections--to individual work stations and terminals.

The Systems Support area provides technical assistance for several major operating environments--MVS/ESA, VM, VMS, and UNIX. Since the key administrative applications run under MVS/ESA, a vast majority of effort from this group is in aid of the large IBM system, but considerable time is dedicated to supporting VM on the 4381-R24 and VMS running on DEC VAX machines located on each of the eight campuses. UNIX support is limited to the IBM/RISC/6000 systems in the School of Architecture and the Liquid Crystals Institute. Other software under the purview of Systems Support includes the IDMS/R database system as well as more than 40 other separate packages for a wide variety of academic and administrative functions. Controlling access and providing security for the University systems is also the responsibility of the systems support group.

Computer Equipment Services (CES) is the end-user support and maintenance branch of

Information Services. Most of the activities of CES are associated with the installation, repair, and maintenance of user work stations, both terminals and personal computers. Complementing this service is a field engineering program that maintains the DEC/VAX systems on all eight campuses as well as a wide variety of specialized equipment such as Sun work stations and other RISC systems, parallel processors, and Novelle LANS currently installed in over 40 different University offices.

The Office of Resources Analysis and Planning (RAP) is the institutional studies arm of Information Services. In addition to developing specialized management information applications for student tracking and productivity studies, RAP is responsible for coordinating federal and state reporting, decision support systems, and numerous ad hoc projects for such activities as accreditation studies.

The Office of Academic Services is the principal link between the Computer Center and the faculty and student body of the University. Staffed by seven full-time professionals, Academic Services provides extensive consultation on the use of the aforementioned computing resource. (IBM, DEC, PCs, etc.) particularly as it relates to the use of specialized software packages (SAS, BMDP, SPSS, etc.) and the use of computing resources for instructional and research activities. Each academic period, Academic Services offers a series of seminars ranging from courses in beginner-level use of the personal computer through personal computer applications for word processing, spreadsheets, database programming, graphics, and desk top publishing; from introductions to mainframe use through advanced application of statistical packages for research projects; and from beginning to advanced use of the University's E-Mail system including Internet and BITNET facilities.

The Department of Computer Resources

The Department of Computer Resources supports an ancillary Computer Center for the Business Services and Auxiliaries operations including such operating units as the University Bookstore, Campus Bus Service, Food Services, Telephone Communications, Mail Services, Purchasing, and the Supply Center.

Networked users at the Supply Center, the Kent Student Center, Eastway Center, and other buildings are supported by a Motorola RISC system, while a Zilog system serves the Campus Bus Service at its central facility. Both systems run UNIX software and support over 200 terminals and personal computers and 350 users.

Some of the major applications that have been developed include inventory control and client billing for Food Services, Ground Transportation, Telephone Communications, Mail Room, and Purchasing. The system for the University Bookstore supports point-of-sale capabilities for 15

cash registers. The point-of-sale system for Food Services and the Book Store also support the use of debit cards. The comprehensive transit management system for Campus Bus Service includes many features such as charter management and maintenance management.

The Regional Campuses

Each Regional Campus has at least one DEC VAX/7xx machine with a connection to the Kent VAX system and, using the Ethernet link, to all Kent Campus network facilities. On several Regional Campuses, the VAX systems support local administrative and instructional applications; but the bulk of computing power in the regional system is based on personal computer work stations in networked and stand alone environments. Instructional facilities in the regional system are available to its student BODY through numerous general and special-purpose labs. Administrative computing support is coordinated through the Office of Student Information and Records located on the Kent Campus in the Regional Campus administrative offices for registration and various other central mainframe record keeping systems; but several campuses supplement this support with advanced personal computer LAN environments with electronic mail and shared software facilities.

All official records and systems for the Regional Campuses related to the University's financial, human resource, and student records systems are supported by the Computer Center on the Kent Campus. Local records and those records maintained in the Regional Campus central office for day-to-day management of the seven campuses are supported by well-integrated LANs that were installed in the mid-1980s. These records are submitted to the Kent system after they have been created on local systems.

Libraries

During the mid-1980s, Kent State University significantly increased support for library automation through the selection of an on-line integrated system. This process began at Kent in 1986 with the purchase of the Northwestern On-line Total Integrated System (NOTIS) originally developed at Northwestern University. The NOTIS system was installed on the University's mainframe system which it shares with various administrative computing systems. As the Library put different parts of the system into operation over a period of two years, the new system made new efficiencies possible. It streamlined cataloging by eliminating the card catalog and several other paper files; it transformed ordering and management of the materials budget from an entirely manual process to an automated one; it replaced an antiquated and inefficient circulation system; and it provided a better environment for serials control than the previous remote system. Further, it had a major impact on library users, for the on-line catalog provided more complete information than the card catalog by tracking materials from the pre-order process through cataloging to current circulation status. The catalog is now available in its

entirety via 150 terminals located in the main, branch, and Regional Campus libraries, in labs and offices, and in the homes of faculty and students via modem. During a typical day over 45,000 transactions are recorded on the system.

Today the public also enjoys easy electronic access to the journal literature and other large bodies of information. This major revolution has come about because of the introduction of PC-based CD ROM technology. The main library at Kent introduced CD ROMs in 1987 and has witnessed a steady growth in their popularity and importance. Currently there are 15 CD ROM titles included on a local area network with several others available on request. Numerous other CD ROMs are available in other departments and in branch and Regional Campus libraries.

Through the support of the Ohio Board of Regents, library automation is entering its next phase through a system called OhioLINK. When fully implemented the OhioLINK system will permit its member universities to access over 18 million volumes. Currently OhioLINK is developing a statewide central electronic catalog and creating a distribution system for timely sharing of library materials across the state. While the statewide catalog will serve as the centerpiece, users will also be able to access citation and full text databases through the OhioLINK central system. Implementing OhioLINK at Kent State University in 1994 will be a major undertaking. Issues to be managed include networking, installation and support of hardware and software, and data migration. The local OhioLINK system will consist of two DEC 5900 processors, 8 disk drives, and 3 tape units. OhioLINK is using the INNOPAC software, which is a product of Innovative Interfaces, Inc. of Berkeley, California, as a system on which the statewide catalog and other cooperative functions are based. To date the first six OhioLINK libraries have installed new hardware and software on their campuses and their records are being merged into the statewide central system located at Wright State University.

One of the major issues that Kent State University must deal with is the installation of a suitable network infrastructure in order to make OhioLINK accessible outside of the walls of the main library, at sites such as the branch libraries on the Kent Campus, the Regional Campus libraries, and remote on-campus and off-campus dial-in users. In summary, OhioLINK offers promise for information users through the 1990s and into the next century.

The Campus Network

The current campus network has been pieced together over the past ten years starting with the IBM SNA network that grew up around administrative applications and early attempts to link select academic areas to the Computer Center and to regional and national networks such as Internet and BITNET. Other pieces of the network include IBM and DEC systems connections through JNET software which includes a Xyplex broadband link between the IBM 7171 protocol converter and the Xyplex network for about 96 DEC devices; the Ohio Bell Datakit network

supported by data-over voice multiplexers; the Ohio Supercomputer Center (OSC) link running through a Proteon router from the Computer Center to OSC in Columbus over T-1 leased lines, and the campus Ethernet connections running from the Computer Center to several buildings in the science complex.

A great deal of effort has been expended in the past year to design a true fiber "backbone" which could serve the entire Kent Campus. Emanating from this proposed backbone would be seven distinct nodes which would, in turn, serve local building complexes. The backbone would consist of a 72 fiber trunk and 24 fiber building links. Within buildings, unshielded twisted pair wiring would reach from wiring closets to rooms and work stations. Further, current links to the Regional Campuses would be upgraded to 56Kbs digital-based leased phone lines. Finally, a management and monitoring system would be implemented to operate and maintain this network. Thus far, 12 strand, 62.5 micron fiber has been pulled for the campus Ethernet and SNA network from the Computer Center to the Student Services Center, Business Administration, the Old Administration complex, Merrill Hall, and, finally, to White Hall.

In addition, 12 strand fiber has been installed between the Kent Student Center and Tri-Tower residence hall complex with 6 strand fiber continuing on to the University Supply Center and Eastway complex. A final 12 strand fiber link currently is being installed between the Computer Center in the Library and the Kent Student Center. Completion of this final link will integrate all of Business Service and Auxiliary Office computers and terminals with the University network.

Kent State University Network and Information Systems Study

INTRODUCTION TO STRENGTH AND PROBLEM STATEMENTS

The Network and Information System Study Team for Kent State University began by soliciting information from faculty, students, and staff concerning their experience and opinions of current information systems and network facilities. The following two sections summarize the strengths and concerns that were heard during this information gathering effort.

Twenty interview sessions (including one open session) were held over a five-day period during the first two weeks in November 1992. After each session, team notes were captured and entered into a lap-top computer. The study team also received a number of written reports from interview participants. This interview process included discussions with approximately 99 individuals.

The interview sessions resulted in over eighty pages of notes summarizing the discussions. Note that even though this study was not focused on academic and instructional computing, issues and strengths were raised in these areas. The key strengths and issues raised are summarized respectively in the strength and problem statement sections of this report under the category of "Other Information Technology".

In addition, over 3,000 questionnaires were mailed to all full faculty and staff and a random sample to 300 students. Also, questionnaires were circulated to students utilizing the computer laboratory sponsored by undergraduate student senate located in the student center, and more were circulated by leaders of the undergraduate and graduate student governments.

A total of 905 completed questionnaires were returned with 285 from faculty, 76 from students, 294 from classified staff, and 249 from administrative staff.

The team analyzed the information provided in the interviews, in the reports prepared by interview participants, and in the questionnaires. The team then prepared strength and problem statements which were organized into the following six categories:

Management, Organization, Policies and Planning; Institutional Information and Access; Training and Support; Communications and Networking; Resources and Equipment; Other Information Technology Strengths/Issues.

Kent State University Network and Information Systems Study

STRENGTH STATEMENTS

The Network and Information systems Study team identified many strengths as well as problems during the process of soliciting information from students, faculty, and staff. This section of the report presents a series of strength statements for each of the categories along with a list of associated consequences. The next section outlines the major problems.

MANAGEMENT, ORGANIZATION, POLICIES, PLANNING

1. **Kent State University has made steady progress in the support and implementation of information technology during the past decade.** As a result:

Members of the University community are increasingly using information technology to fulfill their scholarship, research, instruction, support, and administrative requirements.

A mixture of software package and in-house developed systems has been implemented to address complex and growing internal, state, and federal reporting and accountability requirements.

Mainframe technology has been updated to support expanding demands for administrative systems, academic support, and research activities.

An internal Computer Equipment Services group has been established to service and maintain University computer equipment.

A backbone communications network plan has been developed and partially implemented.

The NOTIS library system has been implemented to provide greater public access to Library resources as well as the integration of ordering, cataloging, managing, and circulation of materials.

Computer literacy-among students, faculty, and staff has increased steadily.

The University successfully converted all administrative and academic systems from Honeywell and Burroughs mainframe computers to IBM and Digital Equipment computers.

2. **Kent has developed an environment of excellent staff cooperation across and -tong departments.** As a result:

In many offices, this spirit of cooperation is demonstrated by individuals communicating and working together to complete projects and support common efforts.

Individuals with strong experience in technology are generally willing to help colleagues with lesser experience.

Individuals are generally willing to learn new applications.

INSTITUTIONAL INFORMATION AND ACCESS

3. **Many University departments have successfully installed local "PC-based systems" to satisfy information technology needs.** As a result:

Information access has improved because local systems supplement the mainframe computer and provide easy access and manipulation of local information.

PC-based word processing, spreadsheet, and data base products have improved productivity in many University departments.

University departments are developing a better understanding of how technology can help them perform their jobs more effectively.

Many in-house systems produce vitally needed information.

4. **The Regional Campus staff have been innovative in their use of technology and have developed administrative systems that are responsive to local needs.** As a result:

Regional Campus computing is distributed between the Regional Campuses and Office of Student Information and Records in the Lincoln building.

The distributed environment for Regional Campus computing allows each campus to meet local student and program needs while maintaining information in the central and official University student information system data base.

Each Regional Campus has a student information system designed to meet its particular needs which, in turn supports personalized advising.

The Geauga faculty and staff use electronic communications extensively on their campus and actively promote the concept of a paperless environment.

Most Ashtabula faculty and staff use computers with connections to their local area network. This has increased communication, reduced paper, and become a part of the campus culture.

Ashtabula offers distance learning capabilities through its support of interactive television between the Ashtabula Campus and area high schools.

5. **The Department of Computer Resources within the Business Services area has implemented a number of very effective systems to support its internal operations as well as the AUXILIARY unit.** As a result:

A debit card system has been developed and installed to provide students with an efficient means of paying for food service and book store purchases.

Systems have been developed and installed to address auxiliary requirements for specialized information, e.g. inventory control, personnel management, invoicing, purchasing, etc. resulting in improved student service and increased staff productivity.

A comprehensive transit management system (including bus routing, fleet management and charter management) has been developed and installed for Campus Bus Service.

6. **The Human Resource System (HRS) is a successful application that is used to facilitate much of the administrative work in the personnel, payroll, and budget areas.** As a result:

Most personnel staff feel they can readily access needed information.

Staff are provided with more and better information through HRS than they were able to get through the previous system.

Ad hoc reports are easier to produce in the complex personnel database environment where new reports are frequently required.

7. **A system has been implemented for the Office of Student Financial Aid that automates the student loan process.** As a result:

The system automatically looks at student need, academic status, prior loan history, and other information required by state and federal agencies.

The system automated a previously manual process of over 15,000 loan applications per year.

8. **The new Alumni Development System, installed in fall 1992, is expected to meet the needs of Institutional Advancement for the next two to three years.** As a result:

Institutional Advancement has the system infrastructure and tools to maintain a comprehensive and accurate data base for alumni, students, parents, and friends of the University.

The Alumni office has the potential of consolidating many of the alumni name and address data bases.

Fund-raising efforts may be enhanced because of a more comprehensive support system.

9. **The Career Planning and Placement Center "Touch Tone Telephone Interview Sign-up System"" was the first in the nation. The system, which uses GPA and Major in its scheduling algorithm, allows students to register for interviews without coming to campus.** As a result:

Approximately 700 staff hours and 15,000 student hours are saved each semester.

Students do not have to stand in line (from two to four hours several times a year) to sign up for interviews.

The University has received acclaim for this system in local newspapers as well as the Chronicle of Higher Education.

10. **The Career Planning and Placement Center "Touch Tone Telephone Job Search System" allow alumni to search vacancies by interest and geographic area.** As a result:

Relationships with alumni are strengthened and alumni support for University efforts is

enhanced.

Alumni can search Job vacancies in specific occupations within a specified geographic region.

11. **The "Student Flow Model" (Student Tracking System), developed by the Office of Resource Analysis and Planning, has been recognized as one of the most comprehensive student tracking systems in the country by American College Testing (A.C.T.). Many other universities have used this system as a model for developing their own tracking systems. The model tracks nine cohort populations (including new freshmen, transfers, conditional admitted freshmen, etc.) over a seven-year period to monitor retention, college mobility, academic progression, and graduation rates. As a result:**

Many cohort populations such as athletes can be tracked for academic progress and other NCAA requirements.

Special retention activities such as EASS can be assessed for impact on academic performance and retention.

Retention data on students from any given high school can be obtained and used for planning and feedback.

High risk student populations can be monitored to determine when early advising and intervention is necessary.

12. **The implementation of the energy management automated system at Kent is considered to be one of the most effective in any university in the country. As a result:**

Classroom occupancy is monitored, allowing for equipment shut down when rooms are not in use. Class schedule data is downloaded directly from the student information system to the energy management system to provide the necessary data.

Monthly electrical charges are minimized through the energy demand limiting program which prevents campus electrical demand from exceeding predetermined "peak capacity" guidelines.

COMMUNICATIONS AND NETWORKING

13. **Many effective Local Area Network (LAN) environments have been developed across the University System. As a result:**

Numerous LANs are operating successfully throughout academic and administrative areas.

Electronic mail on these networks has helped reduce paper flow and improve communications.

Many local area networks allow access to important resources in a shared environment.

14. **A portion of the University wide Network Plan has been implemented and satisfies many of the communication needs of key academic areas and selected administrative offices.** As a result:

The University has installed significant sections of a communications network backbone.

The science complex has high speed access to important external resources such as the Ohio Supercomputer Center, Internet, Bitnet, etc.

The Schwartz Center has a fiber link directly to Computer Services that supports over 200 administrative terminals for student service systems.

The College of Business Administration has a gateway from its PC-based local area network to the University network.

15. **"Corporate Tie," a user-friendly software system for transmitting files to-and-from the computer, is available on the IBM SNA network.** As a result:

File uploading and down loading is more widely used.

Data can be transferred directly to the mainframe from personal computer word processing, database, and spreadsheet files.

TRAINING AND SUPPORT

16. **Computer Services has a dedicated staff that is committed to providing effective service and technical support.** As a result:

Departmental demands for support from Computer Services staff exceed the availability of technical resources.

The expertise and technical support provided by Computer Services staff is considered a strength by most departments.

17. **Computer literacy and sophistication of computer applications is improving within the Kent environment.** As a result:

There are several experts around campus who can be called upon for assistance when problems arise.

Many departments have technically competent individuals to operate their local systems.

Individuals seem more willing to look beyond the present environment and consider new ways of doing things.

There is a strong core of individuals who hold considerable network expertise.

RESOURCES AND EQUIPMENT

- 18. The Kent State University mainframe computing environment is current and uses mainstream technology.** As a result:

The mainframe computing software environment can support a wide variety of mainstream educational and administrative software products that are available for higher education.

Individuals with the technical skills required to operate and maintain the current computing technology are available.

The Computer Center staff is proficient with using and supporting current software and hardware technology.

- 19. Departments with work stations connected to the University network can communicate to the Office of Sponsored Programs and the National Science Foundation.** As a result:

Faculty are able to submit proposals in electronic format to agencies such as the National Science Foundation.

Faculty can receive on-line information on grant opportunities.

OTHER INFORMATION TECHNOLOGY STRENGTHS

- 20. Steady progress has been made in the implementation of system support for academic programs.** As a result:

Many of the classrooms and large lecture halls are equipped with data projectors which can be used with portable computers.

The Library's on-line system has been well received and also has demonstrated the value of an integrated approach to online system applications.

The Library maintains work-station access to the Internet.

Kent State University Network and Information Systems Study

PROBLEM STATEMENTS

This section of the report presents a series of problem statements for each of the categories along with a list of associated consequences. The problem statements are prioritized by their order of importance within each category.

MANAGEMENT, ORGANIZATION, POLICIES, PLANNING

1. **The role that information technology and network communications should play in supporting Kent State University in the achievement of its mission is not clearly articulated.** As a result:

Information technology and network communications systems are not systematically designed, implemented, and integrated in a manner that is consistent with the University mission.

The information technology and network communications infrastructure is evolving and developing through individual initiatives without consistent understanding of and coordination with the University mission.

2. **The University has not clearly identified institutions that it considers peers or competitors. Bench marks from such institutions will provide the University with valuable comparative data. For example , how does Kent compare with Bowling Green, Miami, and Ohio universities?** As a result:

The level of services that Kent must maintain to remain competitive in the recruitment and retention of students, faculty, and staff is not clear.

The extent that Kent needs to enhance its existing information technology and network communications infrastructure to be competitive with its peers is not clear.

3. **Computing and information technology plans are not developed, maintained and coordinated from a University wide perspective.** As a result:

The few plans in existence are fragmented and not updated systematically.

Planning decisions often are made without considering the overall information technology needs of the University.

Computing hardware, software, and local area networks are being planned and implemented without a University wide strategy for information technology. This practice inhibits hardware, software, and data integration on a University wide basis.

Purchase of expensive hardware or software may take place without considering overall University needs.

Private sector partnerships and grant opportunities are more difficult to develop and coordinate. This may result in missed opportunities.

4. **While there are many excellent departmental initiatives, the University does not have a coordinated plan for academic computing.** As a result:

There is no overall strategy for promoting the incorporation technology into the instructional process.

There is no overall instructional or classroom strategy for integrating research and instructional technology with the network infrastructure.

5. **There is no formal process for involving and obtaining feedback from members of the University community when developing or establishing information technology plans, standards, and priorities.** As a result:

Members of the University community are not informed about plans, standards, or priorities under review or to whom they should present additional recommendations.

Advice from members of the University community is not consistently incorporated into the development of plans, standards, or priorities.

Academic and administrative computing support and service priorities do not consistently reflect University community issues and needs.

Information technology plans, standards, and priorities are not well communicated or understood by the University community.

Broad University community commitment and advocacy is lacking.

6. **The ability to gain access to needed information is hindered by the lack of a clear policy on data use and authorization.** As a result:

Many faculty and staff do not know how to request access to needed information.

Many faculty and staff cannot readily get security clearance to access needed information.

Faculty and staff do not have a formal route of appeal if requested information access is refused.

The University's ability to provide information to support a distributed computing environment is impeded.

7. **There are no formal standards or policies that identify the products (e.g. local area network and work station hardware, software) that are supported by Computer Services. In addition, there are no published University network connectivity standards.** As a result:

Hardware and software purchases are being made that may not be readily integrated with the University wide network.

Hardware and software are being purchased by members of the University community (who expect computer services support) that may not be supportable by the computer services staff.

8. **There is no comprehensive University wide disaster recovery or database backup and recovery plan. Although there is a plan in existence for the Computer Services operation, it does not include departmental or Regional Campus needs.** As a result:

The entire University (i.e. Kent as well as Regional Campuses) would be exposed to disruptions in service if a disaster occurred in any one of the data centers or communication facilities.

Regional Campuses would be exposed to disruptions in service if a disaster occurred at their location.

University departments with mini-computers or local area networks would be exposed to disruptions in service if a disaster occurred at their location.

There is no coordinated plan or procedure for data base backups, off-site saves, or disaster recovery for user-based systems.

INSTITUTIONAL INFORMATION AND ACCESS

9. **The systems for Admissions, Registration, Student Accounts, Student Financial Aid, Housing and other student systems were developed in-house using the IDMS data base management system without full consideration for the system integration needs of the broad University community.** As a result:

Student satisfaction with University service suffers because of a lack of timely access to accurate, up-to-date, and integrated student information.

In some cases, these systems serve the primary office well but do not meet the information needs of related offices or Regional Campuses.

Many departments have developed Personal Computer based shadow systems to automate functions that are unavailable on the mainframe systems.

10. **The lack of an integrated student information system makes it difficult to respond to prospective student admission, financial aid, and housing requests in a timely manner as do competitor institutions.** As a result:

More students are lost to other institutions because of the inability to confirm financial aid and housing in a timely manner.

The admission and financial aid application processing workload is increasing because more and more students must be recruited and processed in order to reach enrollment goals.

11. **The University has not decided on a data base management system that is needed to facilitate the integration of its information systems. The IDMS data base management system, which was acquired approximately eight years ago, is being used to develop some modules in the student information system area. Also, there are not many application software packages available that run under IDMS.** As a result:

Three of the largest systems (e.g. Human Resources, Financial Resources, and Alumni Development) have been installed without using the IDMS data base management system.

Users experience delays in getting the information they need when integrated access to data is required.

More complex programming is required to respond to new and changing needs.

12. **Many departments find University in-house developed systems lacking in functionality and flexibility. They are not user-friendly enough to allow nontechnical users to write their own programs to satisfy ad hoc reporting and decision support requirements in a timely manner.** As a result:

Most basic mainframe ad hoc report requests must be submitted to computer services for scheduling and completion because of the high level of technical knowledge required.

Computer Services has a long backlog of user requests for system modifications (as much as two years in some areas).

Many departments have developed their own data bases and systems duplicating work and increasing the potential for data and reporting inconsistencies.

Local decision support systems are being developed and integrated at the departmental level using personal computers.

Staff productivity suffers because access to more efficient technological tools are not widely available.

13. Some major areas of the University use outdated work flow processes and inefficient manual paper-driven systems to perform critical tasks. As a result:

It is difficult for the University to compete with the responsiveness of peer institutions that have efficient automated systems.

The ability of the University to respond to the information needs of students, faculty, and staff in an efficient and timely manner is impeded.

Some staff resources are not utilized as efficiently as they could be because of the use of labor intensive and inefficient manual systems.

The work flow processes and document handling procedures in many offices are outmoded and need to be re-engineered to effectively utilize current technology.

14. The lack of adequate on-going data entry and maintenance support for some departments (e.g. alumni development and admissions) results in some data bases not being updated on timely and systematic basis. As a result:

Some data base information is inaccurate, outdated, or missing.

Some opportunities may be lost because of the lack of data accuracy and availability.

In the Admissions Office, a significant amount of data on prospective student contacts has not been entered into the computer system. This situation inhibits the University's ability to respond to prospective students in a timely manner.

The new Alumni Development System is not fully implemented because of the need for data entry support to complete the data conversion effort.

15. Some critical data is entered in multiple systems because of the lack of an integrated database. As a result:

Data entry resource requirements are higher than they need to be because the same data must be entered and maintained multiple times.

The probability of data inconsistency increases because of data re-entry.

16. The ability for faculty and staff to access up-to-date database information when needed is hindered by the lack of a coordinated schedule for maintenance and

updating. As a result:

Some departments who need access to data complain that they cannot get it in a timely manner.

Departments input and maintain their own data using shadow systems.

17. **Regional Campus information systems needs are not adequately met by University information systems. Regional Campus system needs are more customer-driven.** As a result:

Local Regional Campus student information systems have been developed.

Regional Campus student data is maintained in local data bases and forwarded to the Kent central regional office for re-entry into the University student information system.

Regional Campuses have developed a technical support staff to handle the operating and maintenance needs of local systems.

18. **Local departmental and regional systems have been developed that do not necessarily interface with each other or central University systems.** As a result:

The information is not accessible to other systems or departments.

Data is re-entered into departmental systems and therefore increases the chances for errors or data inconsistencies.

19. **There is no single point that controls and maintains demographic information (e.g., names and addresses, etc.) for all individuals in the University community.** As a result:

Individuals with name and address changes must go to multiple units to make corrections and changes.

Data is entered and maintained in multiple systems and is not always consistent from system to system.

The Alumni development system does not include names and addresses of all Kent State University alumni.

20. **University systems currently implemented or under evaluation require that students, faculty, and staff use multiple identification cards:** As a result:

Duplication of equipment and personnel is required to issue and manage multiple cards.

Students, faculty, and staff are inconvenienced by having to use multiple identification cards.

Security of identification card systems is more difficult to manage in a multiple card environment.

21. **The informal methodology used to develop and install information systems does not promote a University wide prospective, nor does it consistently consider all the necessary tasks for installing and maintaining a system.** As a result:

Project resource and time forecasts tend to be underestimated.

Estimates are not consistently considered for on-going operating resources.

Requests often are made for additional funding after project approval to complete system implementations.

Departmental systems do not tend to consider University wide integration issues.

Project team membership tends to be departmental rather than University wide in scope.

COMMUNICATIONS AND NETWORKING

22. **The current status of the University wide communications and network infrastructure does not facilitate quality instruction, research and sharing of institutional information among faculty, staff, and students. This is exacerbated by the lack of funding for the implementation of plans which already exist.** As a result:

The University may not be as competitive in attracting and retaining students, faculty, and staff as peer institutions.

Faculty may be hampered in their ability to incorporate innovative teaching methods and technology.

The use of current technologies, such as video conferencing within classrooms or among campuses, is limited.

Access to institutional data by various persons and offices is impaired.

Certain departments have no adequate access to University systems.

There is limited ability to communicate electronically among departments of various areas.

There is limited access to external resources such as the Internet.

There is limited access to the Library system and other important internal resources.

There is limited connectivity (i.e dial-up) from the dorms.

Some departments with local area networks cannot afford to connect them to the University network.

23. **Although the University can access satellite broadcasts, it lacks the facilities to support necessary distance learning capabilities.** As a result:

The ability to attract and support nontraditional students is diminished.

Faculty expertise cannot be utilized to the extent that would otherwise be possible.

Distance learning capabilities that are available at competitor universities are not accessible at Kent.

The University cannot take advantage of opportunities to offer specialized courses to local and regional industries.

24. **The current status of the university wide network does not facilitate the sharing of hardware or software resources.** As a result:

Some needed specialized or expensive resources, which could be cost justified on a shared basis, are not acquired because they cannot be justified on an individual basis.

The University cannot take advantage of significant cost saving opportunities that are possible if software is shared over a network using a site license.

25. **Convenient access to the library's electronic data base services, such as CD-ROMs, is not available outside the Library building.** As a result:

Scholarship and research productivity is not maximized.

Members of the University community do not make optimal use of library resources.

26. **As communication needs increase, departmental work station users are being connected using Local Area Networks (LANs) without formal standards, support, or guidance.** As a result:

Many departmental LANs are inadequately planned in terms of hardware, software, and staff support.

LANs are purchased independently without realizing potential benefits from volume discounts.

Productivity is lost because solutions to common issues are not being shared University wide.

27. **The University does not provide dial-up access to local area networks in departments. Dial-up access to the central University system is constrained by the low number of available ports.** As a result:

Work that would have been accomplished is not completed in a timely manner and productivity suffers.

Use of computing facilities, by faculty, staff, and students, from off campus locations is cumbersome and not dependable.

28. **Access to voice mail is not available on a University wide basis** As a result:

Potential productivity gains from the use of voice mail are not being realized.

Voice mail is not available as an alternative or complement to electronic mail.

29. **The University lacks an adequate high-speed connection between the Regional Campuses and the Kent Campus.** As a result:

There is inadequate connectivity between the main Library and libraries on the Regional Campuses.

The current system is unable to handle the higher traffic rates required in the future.

30. **The current status of University wide communications and network infrastructure does not facilitate communication among members of the University community. In particular, the absence of a user-friendly environment for integrated electronic mail from the desk-top to the campus and the world discourages widespread use. The lack of an electronic mail directory hinders widespread use.** As a result:

Communication is reduced and productivity suffers.

Paper and phone usage is increased.

The usefulness of LANs is reduced.

FAX is often substituted for electronic mail.

It is sometimes easier to communicate with external colleagues than ones on campus.

It is cumbersome for Regional Campuses to access the Internet.

TRAINING AND SUPPORT

31. **There is no overall coordinated strategy for providing students, faculty, and staff with timely orientation, training, and support on using existing facilities.** As a result:

Sufficient training opportunities are not available to faculty and staff.

Many units have developed redundant programs to support internal operations.

There is no orientation program for faculty and staff on available facilities.

Faculty, students, and staff do not know what training is available to them.

Faculty and staff are unaware of the information systems data that are available to them for support purposes.

32. **There is no formal policy for training faculty and staff on how to use/access information systems that are owned and maintained by other offices, The growing need for integrated access exacerbates this issue.** As a result:

Authorization to access a system that is owned and maintained by another office is not always followed up with training.

Often users do not know how to use the full capabilities of their systems effectively.

The movement to integrate information system access is impeded by the lack of training and support.

33. **Many faculty and staff do not understand how information technology can be utilized to improve the quality and productivity of their jobs.** As a result:

Currently available information technology resources are under utilized.

The quality of service to the University community is not what it could be.

Faculty and staff resources are not as productive as they could be.

Faculty and staff are not enjoying the full benefits of the current information technology.

34. **There is no central source for on-site follow-up training available for faculty and staff.** As a result:

Faculty and staff do not have the benefit of training reinforcement on actual problems in their work environment.

The effectiveness and value of training is diminished and opportunities may be lost to significantly improve productivity.

There are no self-paced instructional programs available to learn or reinforce training.

There is little opportunity for hands-on application during training.

35. Some staff who need training do not attend the sessions offered. As a result:

Productivity may suffer because some staff who need critical training do not receive it.

Opportunities offered by information technologies are not implemented to full potential.

36. There is no hands-on facility for training users on personal computer software (e.g. WordPerfect, lotus 123, etc). As a result:

Training sessions are not as effective as they could be.

After attending training sessions, attendees need more follow-up support when they return to their work locations.

37. There is no centralized office or policy that promotes personal computer or network software site licensing. As a result:

The total dollar amount expended on software may be greater than it should be because site license quantity discounts are not negotiated.

Some departments need access to certain software but cannot afford to purchase individual copies.

Current attempts at negotiating site licenses are not timely and are difficult to coordinate.

38. There is a lack of adequate, complete, and accessible systems documentation for users throughout the University. As a result:

User productivity suffers because many users are self-taught and unaware of the full capabilities of the technological tools they are using to do their jobs.

Support staff productivity suffers because many devote more time than needed to answering basic questions from users.

Local and departmental systems documentation is inconsistent and in some cases, nonexistent.

39. There is no formal system for networking important human resources to facilitate information technology support and training. As a result:

Peer-to-peer support and training is not facilitated or supported.

Individuals who want to share their expertise with others have no established procedure for doing so.

The breadth and depth of information technology expertise is not understood and utilized.

Human resources are not utilized as effectively as they could be.

RESOURCES AND EQUIPMENT

40. **Lack of staff assigned to key functions such as data entry, database maintenance, equipment service, and support is an issue.** As a result:

Critical data is not been entered into some existing on-line administrative systems in a timely manner. This results in some unreliable and incomplete databases.

Some departments needing access to these databases are obliged to create duplicate in-house records and systems which significantly reduce overall University productivity.

Computer Equipment Services has a backlog in service requests that tend to extended the down time of some departmental systems and provide an inadequate level of centralized support.

41. **The existing level of staffing for information technology and network communications is challenged in its effort to support the current environment.** As a result:

Some important information technology and network communications needs remain unmet despite the excellent efforts of current staff.

The time to complete some projects is longer than normal because only minimal technical staff can be assigned.

42. **The existing IBM mainframe computer does not have the capacity to accommodate the data base, integration, and access requirements of the proposed network and institutional information systems.** As a result:

System response time will deteriorate as components of the new integrated information system are installed.

Providing users with access to system information on a University wide basis through kiosks, touch-tone telephones, and personal computers will be severely restricted.

43. **There is an increasing demand for hardware maintenance because of the age and number of systems in use.** As a result:

Maintenance costs and down time are increasing.

Up-to-date software cannot be utilized on some of the obsolete equipment. This renders some systems within the same departments incompatible.

44. There is no overall plan/strategy for funding equipment maintenance or replacing obsolete equipment. As a result:

A few academic departments are directly passing on some of the costs to students for the use of equipment and software.

There is no central coordination or formal procedure for recycling used computer hardware to appropriate areas.

Ad hoc funding from state and federal grants has provided the vast majority of support for the development of academic computer facilities.

There is no program for systematic amortization or maintenance of equipment obtained from ad hoc sources.

45. Many departments in the University do not have funds to acquire the additional work stations and peripheral equipment they need to function effectively. As a result:

Office productivity suffers as employees struggle to work without modern computers and without adequate peripherals such as laser printers, scanners, plotters, FAX machines, and other devices.

Funds are reallocated from other critical budget lines such as personnel, research travel/colloquia, and maintenance in order to acquire needed equipment.

46. The DEC VAX hardware and software environment is obsolete and over burdened during peak periods. As a result:

Maintenance expenditures may be higher than necessary.

Taking advantage of new software applications is impeded.

Response time is slow when these systems are needed the most.

Kent State University Network and Information Systems Study

RECOMMENDATIONS

INTRODUCTION

The team conducted an in-depth review of the problem statements detailed in the previous session and prepared a series of recommendations to address the issues. In preparation for developing recommendations, the team not only reviewed problem statements, supporting interview documentation, and questionnaires, but also considered the strengths of the current information technology environment at Kent State University. Furthermore, the team participated in an education day (sponsored by IBM) on the current trends and directions of technology in the University environment. Education day presentations included administrative systems, enrollment management, network communications, and local area network-based electronic mail. In addition, the team reviewed the Academic Support System. Task Force report and the Campus wide Network Communications Plan.

MANAGEMENT, ORGANIZATION, POLICIES, PLANNING

1. **Mission.** The University should develop a formal statement that reflects the strategic importance of information technology. This statement should articulate the role that information technology plays in support of the achievement of the University mission and strategic plans for the future.

Following is a recommended formal statement:

Information technology and network communications are expected to play a vital and strategic role as Kent State University fulfills its mission. Kent encourages the creative and innovative use of technology to improve the quality of instruction; research; information processing, access, and reporting; system integration; and administrative support.

Kent State University should utilize technology to successfully compete with peer institutions for quality students, faculty, and staff. At a minimum, Kent should be current with peer institutions in its use of technology.

Kent State University should seek alternate methods of funding such as vendor partnerships and grants to overcome budget constraints and minimize the up-front monies necessary to move into new technologies.

2. **Peer Institutions.** The University should identify a peer group of institutions which would serve as benchmarks against which comparisons could be made on information technology and network communications development. The team understands that the University currently is involved in a benchmarking project with approximately ninety-seven other institutions. This project is sponsored by the National Association of College and University Business Officers ((NACUBO)) and coopers Lybrand and Company. Data from this project should help facilitate the benchmark comparison process for institutions participating in the NACUBO study that are identified as peers of Kent. Also, this project should help provide the University with the definition of criteria or categories for measurement.

A beginning list of possible peer institutions should be identified by the Technology Policy Advisory Committee.

3. **Technology Policy Advisory Committee.** We recommend that a broad-based committee be established to advise the vice president of Business and Finance on policy matters related to information technology and network communications planning, standards, and priorities. The committee, appointed by the vice president for Business and Finance (in consultation with the other executive officers), should include representatives from faculty, and staff with a maximum of nine members.

We recommend that the director for Information Services serve as an ax-officio member of the committee. We also recommend that the associate vice president for Business and Finance serve as chairperson.

The committee should be empowered to establish subordinate committees for administrative systems, research and instructional technology, networking, and other committees as appropriate. We also recommend that the committee be given the responsibility for articulating the role of technology in support of the University mission.

4. **University wide Planning Process.** We recommend that the associate vice president for Business and Finance be given the responsibility for coordinating the development and maintenance of University wide strategic plans and standards for information technology and network communications. In consultation with the Technology Policy Advisory Committee, the associate vice president for Business and Finance should update this plan biannually.

Information technology planning should be an integral part of the on-going planning process for all units (including Regional Campuses) of the University. Biannual unit plans should be shared with the as associate vice president for Business and Finance for integration with University wide plans. Furthermore, the associate vice president for Business and Finance should be given the responsibility for monitoring and coordinating the implementation of initiatives recommended in this planning report.

5. **Supported Software/Hardware.** The Information Services director should coordinate the development of a list of software and hardware that will be supported and maintained by the Computer Services staff. This list should be reviewed, approved, and disseminated by The Technology Policy Advisory Committee. This list should include supported local area networks, personal computers, operating systems, and software packages.
6. **Disaster Recovery Plan.** The Information Services director should coordinate the development of a disaster recovery plan that includes the central facility, departmental facilities, local area networks, and the University network. In the current and future environment, increasing amounts of crucial data will be held in departmental local area networks, personal computers, and other distributed systems. Thus, this plan also should include procedures for departmental as well as central site database backups and off-site storage. These procedures should be tested and monitored on a periodic basis to ensure that off-site backup and regular save procedures are working as planned.

7. **Coordinated Database Update Schedule.** Information Services should coordinate the development of a schedule for entering and updating University databases. This schedule should ensure that the data is accurate and available when required by users or interfacing systems.
8. **Data Access/Authorization.** The associate vice president for Business and Finance with the assistance of the Technology Policy Advisory Committee should be charged with establishing data access and authorization standards. The University needs to develop and implement a more flexible and uniform approach to authorizing data access. In the context of migration toward an integrated administrative data base, common standards for data access are needed. The University should develop procedures and policies which facilitate appropriate levels of authorized access to needed information. Authorized access to data should be permitted without regard to the medium by which it is either provided or requested. In particular, data available through print should be available in electronic form.

INSTITUTIONAL INFORMATION AND ACCESS

9. **University wide Systems Implementation Perspective.** In order to operate effectively, and remain competitive, the University must develop systems reflecting a University wide perspective that respond to student expectations, maximize the use of resources, increase efficiency and accuracy, and enhance quality. To do so, the University should establish an approach to systems development that considers both University wide and departmental needs, while at the same time, supports database and systems integration.

Computer Service analysts should be available to consult with University organizational units to help ensure that computing and information technology is used to the maximum benefit of the University. Student information systems, human resource systems, financial record systems, and others must be integrated to respond to local needs as well as support University wide functions.

10. **Student Information Systems.** Student information must be implemented as one integrated system in order to enhance competitiveness and support the achievement of enrollment goals. We recommend that the existing systems for the entire student information systems area be replaced with an integrated system. This includes student financial aid, admissions, registration, housing, and bursar accounts receivable and cashiering.

We recommend that commercially available software packages be considered. In-house development should be attempted only if it can be cost justified or provide superior capability. Also, the future ability to migrate to a distributed processing environment should be a consideration in the software selection process.

11. **Systems Infrastructure.** The infrastructure for an integrated information system should consist of a relational database management system with a data dictionary and user-

friendly query and reporting capabilities. Seamless support for distributed computing and imaging technologies also should be included. Integration should support automatic on-line interchange of data between the individual administrative subsystems as well as the ability to extract information (in both data and report formats) in response to particular ad hoc queries. This feature should support user friendly access for faculty for the purpose of advising.

We recommend that the director of Information Services (in consultation with the Technology Policy Advisory Committee) assess University database requirements; evaluate database management software products (including the currently installed IDMA product); and select the relational database management system that the University will use as the infrastructure for its integrated information systems.

12. **Document Handling and Process Flow Evaluation.** The University should understand that technology alone will not provide the break-through solutions that are envisioned for administrative operations. The executive officers should consider coordinating the review of office work flow processes in their respective areas and should determine to what extent document handling and duplicating can be automated, streamlined, integrated, or possibly eliminated. The use of document imaging technologies should be considered where cost effective and appropriate. For example, the following document intensive systems are prime candidates for examination: payroll, personnel, purchasing, admissions, registration, financial aid, housing, billing, graduation, and alumni/development.
13. **University wide Information System.** The director of Information Services should coordinate the implementation of user-friendly access points (such as kiosks, touch-tone phones, work stations, and local area networks) to University information systems. The purpose would be to allow various users to gain direct access to general information about the University and to allow students to access specific information about themselves.

General information could be accessible by anyone, including parents, applicants, and other visitors. This information would provide an overview of Kent State University as well as on-line information pertaining to the following:

- Academic Calendar
- Admission, Financial Aid, Registrar's, and Bursar's Offices
- Course descriptions

- Faculty and staff office phone and electronic mail

directories

Specific information would be accessible by students, faculty, and staff with authorized security clearance. For example, students could look up information (via a secured path) regarding their own class schedules, admissions, registration, academic records, financial aid, and billing. This type of access should result in shorter, less frequent inquiries at the Registrar's, Financial Aid, and Bursar's offices. More importantly, access to such systems should lead to a much more satisfied student population.

- 14. Health Services System.** Information Services should coordinate the interface of the local area network system in Health Services to the existing student information system in order to eliminate the need to use printed reports to verify student enrollment. In addition, it is recommended that Health Services acquire a basic computerized system to handle day-to-day operating needs and more easily comply with federal and state reporting and monitoring regulations.
- 15. Departmental Systems Coordination.** The associate vice president of Business and Finance should be assigned the responsibility for establishing formal communication links between those responsible for departmental computer systems in order to achieve better coordination and synergy. A technical committee of departmental system administrators or other persons with comparable responsibilities should meet on a regular basis. The committee, consisting of representatives from academic and administrative departments, should be appointed by department heads. The responsibility for coordinating departmental systems support should be assigned to a staff member who also should be given ex-officio status on the committee.
- 16. Demographic Information.** The associate vice president for Business and Finance, working with the Technology Policy Advisory Committee, should review and recommend changes to procedures and policies associated with the maintenance of demographic information for all individuals associated with the University community. These changes should allow individuals to change their demographic information at a single location with automatic update, when appropriate, to other databases.
- 17. University ID Card.** The University should implement a University wide all-campus identification card (Kent Card) for faculty, staff, and students. It would serve as an ID card, debit card, security access card, library card, health services card, etc. Video imaging technology should be used to capture and store identification pictures.
- 18. Regional Campuses.** Regional Campus information systems need to be more homogeneous among campuses and better integrated with University information systems and Regional Campus strategic plans. Regional Campus enrollment is expected to continue to grow at a steady rate and its operating environment is expected to become more complex. Therefore, an evaluation of Regional Campus computing and information

technology requirements should be conducted to define goals and objectives, identify strengths and problems, develop recommendations, and create a five-year implementation plan.

19. **Application System Priorities.** All new systems and major system enhancement requests should be submitted to the Technology Policy Advisory Committee for prioritization. Along with each request, Information Services should provide an estimate of resources required to complete the project. Further, when necessary, Information Services should assign an analyst to assist the committee with clarifying request requirements or developing cost/benefits analysis. Project priorities should be submitted to the vice president for Business and Finance in the form of recommendations.
20. **System Development Methodology.** The director of Information Services should implement a methodology for institutional systems development that promotes consistency and ensures that user expectations and project deliverables are congruent. It also is essential that this methodology facilitate the development of implementation plans that identify all technical, human, and financial resources required to implement a project in an efficient manner. The plan should include project task/activities, resource and time estimates, responsibilities, deliverables, and documentation requirements.

COMMUNICATIONS AND NETWORKING:

21. **Network as a Utility.** The University should recognize that a University wide network is a required utility (like water or heat) for the survival of a modern campus. The network should be ubiquitous, reliable, and provide an adequate capacity to support voice, data, and interactive video communications.
22. **Existing Network Plan Implementation.** The existing network plan, completed in September 1992, endorsed by the Academic Support Systems Task Force, provides the University with a realistic blueprint for a campus wide backbone. In order to support interactive video and distance learning, the plan should be enhanced to include single-mode fiber in the backbone and from the backbone to the Teleproductions Office. The plan also should be expanded to include detailed standards for intra-building connections including classroom, laboratory, local area network, and desk-top access. Funding should be provided for full implementation.

In order to provide all departments with the level of connectivity that is enjoyed by the Science Complex and the College of Business, the backbone should be expanded as quickly as possible to other campus buildings in an incremental manner that is consistent with the overall plan. This expansion should initially involve extending the network backbone to Korb, Music & Speech, Nursing, and Taylor. Any partial implementation should be consistent with the overall plan.

In addition, in order to realize as quickly as possible communications gains inherent in the existing segments of the backbone, Computer Services should, concurrent with the

expansion of the backbone, connect all department LANs and selected work stations in a manner that permits communication among the LANs and access to Internet resources.

The director of Information Services should package the plan for wider dissemination to the University community including academic leadership, executive officers, and the Board of Trustees.

23. **Network Service Requirements.** Information Services should develop a network infrastructure that provides a conduit for high-speed and user-friendly files, software, and specialized hardware sharing; laboratory and dormitory connectivity; campus mail; personal computer and mainframe links; Regional Campus high-speed connectivity; access to Library catalogs and CD-ROM and on-line databases; integrated voice mail and voice communications with a consistent user interface; electronic mail with access to national and international networks. The network also should have the capacity to support interactive video and distance learning initiatives. The network should serve the needs of students, faculty, researchers, staff, and administrators.

The network should include tools that facilitate the management and maintenance of central and distributed (voice, video, and data) communications systems through integrated access, monitoring, and administration from all locations.

24. **Financial Support for Network.** In order to achieve these above goals, the University needs to provide the funding to implement existing network plan. for a campus backbone and improved connectivity for the Regional Campuses. Additional funding should be provided when necessary to meet the standards established in the plan to avoid interim throwaway efforts. Plans for new capital projects or renovations also should incorporate the cost of implementing networking requirements. Furthermore, there is a need for a continuing financial commitment to manage and support the network as well as respond to future needs and requirements.

25. **Remote Access.** The quality and capacity of remote (dial-up, etc.) access to the University network should be enhanced. In particular, Information Services should evaluate how the existing modem banks -(including departmental local area networks) can be expanded and reconfigured to provide more dial-in ports at higher communication speeds (e.g. 9600 baud).

26. **Electronic Mail.** Convenient access to an easy-to-use electronic mail system is of strategic importance to the University. Information Services should coordinate the establishment of standards for electronic mail that will allow all users to communicate within and beyond the campus in a seamless manner. Strong consideration should be given to moving electronic mail from primarily a mainframe-based system to a user-friendly local area network system.

Further, Information Services should develop an electronic mail directory to enhance the utilization of the electronic mail system. Also, a desirable feature for the electronic mail system would be direct work station/fax capabilities.

27. **Campus Telephone System/Voice Mail.** The University should examine campus telephone system needs to determine if the current system adequately fulfill current/future needs as well as accommodates changing technological requirements. Strong consideration should be given to implementing a central switch for voice communications. This would facilitate the implementation of voice mail on a campus wide basis. Voice mail currently is installed in a few departments within the University. With a central switch, Business Services could establish standards and provide for the evolutionary integration of electronic mail and voice mail.
28. **Student access.** The University network should permit evolution to integrated campus wide access by students to University facilities (e.g., library and other information resources, computing resources, and student information systems). This would include improved access from student laboratories and dormitories, dial-in, touch-tone telephones, and possibly kiosk systems. The network should provide students with a means of communicating with other students and faculty (on/off campus), access to bulletin boards, and to distance learning from other locations.
29. **Classroom Access.** The University network should permit the establishment of fully mediated classrooms. For example, classrooms need to be wired for different kinds of applications and equipment, such as networked computers with a control console, computer projection monitor systems, and access to multimedia devices and products.
30. **Distance Learning.** The University network should have the capacity and flexibility to support the use of multiple classrooms in a distance learning context and permit easy interchange of classes between mediated classrooms.

TRAINING AND SUPPORT

31. **Need for Training.** The University should recognize the importance of participating in appropriate training programs as the University moves into a more integrated and technology driven information environment.
32. **Training Strategies.** The University should provide overall coordination and systematic strategies to better meet existing and future training requirements. Within this context, the University should establish a formal system for identifying and sharing individual expertise at all levels.

An orientation for new faculty and staff should be instituted. It should include an introduction to University computing and information technology services and resources.

New training and support applications should incorporate the University wide electronic mail system to address issues related to feedback, hands-on training and consultation, and training follow-up. Training and support programs should be developed to meet the specialized need of personnel who are responsible for the University wide network and the growing number of LANs.

Self-paced instructional programs (e.g., computer-based training software modules) should be utilized to support training where appropriate.

33. **Training Assessment.** Information Services should reassess training topics and methods periodically to determine if user needs are being met adequately.
34. **Training and Support for Administrative Systems.** Unit heads should develop and offer orientation and training programs for authorized users of their systems. Users should also be provided with updates and opportunities for retraining as new features or changes are implemented.
35. **User Systems Documentation.** Information Service. should survey user documentation needs to determine the scope of the issue. User systems documentation standards should be developed and presented to the Technology Policy Advisory Committee for review, endorsement, and prioritization. User departments, with assistance from Information Services, should develop needed documentation.
36. **Broaden Existing Help Desk.** Information Services should broaden support through the existing help desk facility to include all referral services related to departmental and mainframe systems, work stations, network access, connectivity, voice, and video communications.
37. **Standards for Vendors.** Information Services and purchasing should develop hardware and software performance, service and reliability standards for vendors and discontinue dealing with those that cannot consistently meet those standards.
38. **Peer Consultant Support.** Information Services should establish an electronic bulletin board that individuals can use to post technology questions and receive responses from local experts. Furthermore, Information Services should coordinate the publication of a manual which would contain the names and areas of expertise of individuals who volunteer to be peer consultants. In addition, this manual should be available electronically for access by individuals with network connections.

Kent State University Networking and Information Systems Study

BENEFITS

In the previous section, the recommendations were presented. Implementing these recommendations has the potential of providing the University with numerous benefits. The team reviewed the recommendations and developed the following benefits based on interview comments, questionnaire comments, and individual opinions. The benefits are described in this section.

BENEFITS FOR THE STUDENTS

- The student recruitment process will be enhanced because of better systems support for prospecting, identifying, and contacting potential students. Furthermore, students will receive more timely feedback on information requests.
- Faculty and staff will have ready access to more comprehensive and integrated information to respond to student advising needs in a more timely manner.
- The availability of network access in laboratories, dormitories, through dial-in, telephone touch-tone, and possibly kiosk systems will improve the quality of service to students.
- Students will be able to access their own financial aid, academic record, current class schedule, and billing information as well as other general information such as a. directories, etc. This will significantly reduce the time that students currently wait in line to get general information and free up staff to work with students who have more complex issues.
- Student support office staff will be able to access student information with speed and accuracy, thus improving student satisfaction with the quality service.
- More instructional computing resources will be accessible over the network and have faster response times.
- Easy access to library information and services directly from their work or study environment will allow student research and study activities to be conducted in a more efficient manner.
- Continuing education opportunities will be enhanced with distance learning capabilities because professional audiences could be reached at many sites simultaneously. This will permit the offering of a wider range of courses which would otherwise not be cost effective due to low enrollment at individual sites.
- Electronic interaction and collaboration of students, faculty, administrators, and staff across the Kent Campus and seven Regional Campuses will be supported.
- Student exposure to modern technology will be increased, thus leading to improved employment options.
- A modern technological environment will be more attractive to students because a large percentage expect such an environment when they get to college.
- Current versions of popular software will be utilized on a University wide basis without concern for equipment capacity functionality. Incompatible software and hardware (from laboratory to laboratory) will be minimized.

BENEFITS FOR THE FACULTY

- Faculty access to an integrated student information system will provide better information for advising, planning, and course scheduling.
- Faculty will have the capability to more fully utilize technology in instruction, classroom management, etc.
- Faculty recruitment and retention will be enhanced.
- Faculty will have improved access to expertise through the use of electronic bulletin boards, electronic mail, electronic list services, data bases, etc.
- The ability of the network to support interdisciplinary collaborations and sharing of resources will lead to improved competitiveness in developing and submitting proposals for funded research. The network also will allow proposals to be developed and submitted electronically.
- Increased network and remote access by faculty will improve research and teaching productivity.
- The network infrastructure will provide faculty with the possibility of developing mediated classrooms which will enhance the University's image with students, as well as, prospective faculty, employers, and funding agencies.
- Faculty will be able to save valuable time through the use of distance learning capabilities.
- A more effective training program on computing and information technology will provide faculty with the skills to better use computing in class management, instruction, and research.
- Easy access to library information and services directly from their work or study environment will allow faculty to conduct research and study activities in a more efficient manner.
- Faculty representation on the Technology Policy Advisory Committee will provide them with a forum to share their technology related ideas, concerns, and priorities.

BENEFITS FOR THE STAFF

- Information systems data will be available when needed, and database updating will occur in a timely fashion enabling offices to increase their operating efficiency and eliminate duplicate record keeping.

- Staff productivity and morale will improve because of easy access to information and services directly from their work environment.
- Productivity of staff and accuracy of information will increase by minimizing the time and cost of re-keying data.
- Staff recruitment and retention will be enhanced.
- An integrated information systems data base coupled with more user friendly and powerful data base and information retrieval tools will enhance the ability of staff to respond to decision support and planning needs in a timely manner.
- The ability for nontechnical staff to design and produce ad hoc reports for their departments will be promoted. This will allow ad hoc reports to be produced quicker, with less resources and be more responsive to departmental needs.
- The ability of staff to respond to local, state, and federal reporting needs will be enhanced using an integrated student information system.
- Departmental users of data will become more self-sufficient and knowledgeable. Operational dependence on technical staff will be reduced.
- More staff would be able to remotely access the extensive available resources, such as distributed systems, as they become available on the network.
- A more effective training program on computing and information technology and application systems should provide staff with the tools and knowledge to be more productive.

BENEFITS FOR THE INSTITUTION

- A statement that articulates the role that computing and information technology should play in supporting the achievement of the University mission will help provide consistency and direction.
- Identifying institutions that the University considers peers or competitors will allow Kent to identify the level of services that it must maintain to remain competitive in the recruitment and retention of students, faculty, and staff.
- The Technology Policy Advisory Committee will help ensure broad-based University participation in computing and information technology plans, priorities, and standards.
- The acceptance of the network as a utility presumes reliability, consistency across campus, interoperability, uniform quality, and easy accessibility.

- University computer equipment will be able to be connected to an integrated University network. The network will provide University wide access to various services such as E-Mail, mainframe database. and services, library databases and services, and others.
- Integrated electronic mail/fax capabilities will save paper resources and time currently expended in printing and faxing electronic documents.
- The electronic mail directory will allow anyone, with access to the network, to easily obtain an E-Mail address for a Kent student, faculty, or staff member.
- The University will be capable of developing and distributing distance learning instructional programs.
- Implementation of a central telephone switch will allow voice mail to be provided on a University wide basis.
- A policy of centrally coordinating the procurement of software as well as officially supporting specifically approved software will help prevent the acquisition of incompatible software and ensure that the same version of software is in use University wide.
- There would be a significantly improved environment for supporting administrative services, student support services, instruction, and research.
- Where possible, site licensing of software will save money through volume discounts.
- All members of the University community will be able to more fully utilize computer hardware and software if it is universally available with minimum functionality standards.
- The recruiting process will improve because of better capabilities for identifying, contacting and responding to potential student requests with timely and accurate information, thus enhancing the yield rate and maximizing enrollment.
- The integration of information systems will provide data which is both easily and widely accessible. Similar reports containing conflicting information will be reduced. Flexibility will be enhanced, as well as the ability to expand to meet future needs.
- An integrated and common name, address, and demographic data base will result in more accurate information on students, alumni, and University employees. Better relationships with these cohorts will result in higher satisfaction and possibly greater donations to the University.
- The institution will have information systems which will be better able to respond to the increasing and changing demands from governmental bodies and accrediting agencies.

- The development of a University wide disaster recovery plan will reduce the risk of extended disruptions in computer and network operations if a disaster occurs in the University.
- A more effective training program will help ensure that existing hardware/software capacity is better utilized by staff. Training should increase staff productivity, computing skills, and job satisfaction.
- Training and support programs for local area networks and the planned University wide network will help develop personnel resources necessary to support the communication requirements for a University wide integrated information system.
- Many current faculty and staff have developed expertise which should benefit a University wide training program. Networking of these skilled individuals will increase cooperation and expertise within the University community.
- A coordinated orientation program will ensure that new faculty and staff have a clearer understanding of existing University information technology resources and services.
- A self-paced approach for selected training programs will make more efficient use of limited staff trainers and will provide an opportunity for trainee review of key applications.
- An expanded central help desk facility, with appropriate referral to other University experts, will provide better coordination and dissemination of available resources and services.
- Standards for vendor support and service and application development standards will increase the quality and consistency of the University's investment in Computing and Information Technology.
- Up-to-date hardware and software will be available to support efficient and productive operations.

Kent State University Network and Information Systems Study

CONCLUSION

The Network and Information Systems Study Team has attempted to complete its charge as thoroughly and objectively as possible within the tight project schedule.

The content of this report is the result of the team's analysis of interview comments, questionnaires, and written statements provided by members of the University community. Furthermore, the process of going through this study promoted involvement and input from a variety of students, faculty, and staff, and we hope that it has resulted in a broad commitment and ownership for plans and recommendations.

The need to complete the University wide network appears to be the number one priority item because it was consistently raised by members of the University community during interviews and in questionnaires. The need for an integrated information system was the next major item that was consistently raised.

The team understands that technology alone will not provide the breakthrough solutions that are envisioned for administrative operations. Existing office work flow processes and document handling procedures also need to be reviewed and re-engineered (where necessary) to make more effective use of new technologies.

The team hopes that the recommendations in this report will provide a strategy and blueprint that Kent State University can use to develop and implement the integrated systems and network infrastructure that it needs to take full advantage of new technologies in the nineties and beyond. With this infrastructure in place, the University will be in a better position to enhance the quality and productivity of its instruction, research, and support programs and, therefore, to provide better service to its stake holders as well as remain competitive with peer institutions in the recruitment and retention of students, faculty, and staff.

Kent State University Computing Planning/Application Transfer Study The Rationale September 21, 1992

Over \$250 million dollars has been cut from Ohio's public education budget during the past 16 months. Along with this decrease in subsidy, Ohio's state supported universities have been publicly challenged by the Governor to work smarter - i.e. to do more with less resources while maintaining or improving the quality of service and support.

Computing and information technology is expected to play an important role at Kent State University responds to the Governor's challenge by developing and implementing new and creative approaches to meeting its service and support responsibilities. Also, Kent's Managing

For The Future Task Force, (which was commissioned by the Ohio Board of Regents to study ways to improve productivity), recognized the important role of technology in this effort with a recommendation that the University "upgrade systems wherever possible to realize all efficiencies."

Over the years, Kent State University has made a significant investment in computing and information technology to sustain its academic programs and support operations. As a result, Kent students, faculty and staff have become increasingly active in the use of technology to fulfill their scholarship, research, support and administrative requirements.

However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to meet demands. This situation is exacerbated by the current need to make more effective use of technology in response to the Governor's challenge to do more with less resources.

In time, like these, a good computing plan--with input and consensus from primary stake holders--is extremely important in identifying priorities. Implementation of such a plan should allow Kent to continue to make productive use of scarce resources by allocating them to the "right things., i.e. the high priority activities.

Therefore, it appears to be both timely and prudent, to proceed with the development of a plan for computing and information technology at Kent State University. The primary purpose of this plan would be to identify technology issues and reach a consensus on goals, objectives, recommendations and priorities.

Furthermore, this plan would build on the work of the Academic Support Systems Task Force (ASSTF) which was commissioned in May 1991 to "review the effectiveness of Kent's academic computer support systems." The issues and recommendations outlined in ASSTF's May 1992 report should provide valuable input to this planning process.

IBM has offered to provide a consultant to assist a small working group of Kent State University individuals with this analyst. and planning effort. Furthermore, IBM has offered to provide this consulting service to Kent at no charge or obligation on Kent's part to purchase any additional equipment or services. After this calendar year, IBM indicates that it plans to charge all clients for this consulting service.

This analysis and planning effort, which IBM refers to as an Application Transfer Study (ATS), is designed to help organizations review their computing and information technology requirements, identify issues, develop appropriate recommendations and action plane, and establish priorities. IBM ha. successfully facilitated over 400 ATS studies in higher education

since 1978. The study usually takes six to eight weeks to complete.

A successful ATS should provide a document that represents a consensus on the future direction and priorities for computing and information technology at Kent. In addition, the process of going through this study should promote involvement and input by a variety of students, faculty and staff, and result in a broad commitment or "buy in" to recommendations and plans.

In a preliminary meeting to discuss ATS, IBM cautioned against making the scope of the study too broad. Based on recommendations in the ASSTF report as well as comments from students, faculty and staff, the primary areas of concern are campus-wide communication networking and institutional information systems. Therefore, the recommendation is to focus the ATS study on these two areas and refer to it as "A Campus-wide Communications Network and Information Systems" study.

IBM also advised that the committee be liaised to six to eight individuals. It is recommended that the committee consist of one representative from the following areas: Provost's office, Regional Campus, Student Affairs, Library Faculty, Financial Affairs, Information Services, and Business and Finance. The recommended chair of the committee would be the Associate Vice President for Business and Finance because he has overall responsibility for computing and information technology.

Kent State University Network and Information Systems Study APPENDIX B

INTER-DEPARTMENTAL CORRESPONDENCE KENT STATE UNIVERSITY V. P. FOR BUSINESS and FINANCE

TO: Rosemary Du Mont
James Jones
William McKinley
Gregory Rogers
Gregory Seibert
Michael Sperko
Olaf Stackelberg
Donald Tolliver

FROM: Lawrence R. Kelley **DATE:** 09/29/92

SUBJECT: Computer Planning Study

Computing and information technology is expected to play an important role as Kent State University responds to the Governor's "do more with less" challenge by developing and implementing new and creative approaches to meeting its service and support responsibilities .

Over the years, Kent State University has made a significant investment in computing and information technology to sustain its academic programs and support operation. However, like most universities, Kent has been challenged in its effort to maintain a sufficient level of resources to meet demands.

Studies and plans have been undertaken and completed periodically to respond to specific requirements, e.g. recent studies include the campus-wide network plan and the Academic Support Systems Task Force (ASSTF) report. The campus-wide network plan primarily addressed inter-building and backbone connectivity issues while the ASSTF report identified key communication and student information system issues and recommendations.

President Cartwright has asked that we build on these reports by organizing a committee to conduct a university-wide analysis and establish an integrated and comprehensive direction for networking and information systems.

The committee's charge will be to assess network and information system needs, in part, by interviewing and gathering information from Kent students, faculty and staff from all divisions of the University. In addition, the committee will be charged with developing a plan that defines network and information system objectives, issues, recommendations and implementation priorities.

IBM has offered to provide a consultant to assist the committee with this data gathering and planning effort. Furthermore, IBM will provide this consulting service at no charge or obligation on Kent's part to purchase any additional equipment or services. Thus, we are pleased to accept IBM's offer to assist us with this effort.

The consultant will serve as facilitator as we utilize the IBM Application Transfer Study (ATS) methodology to complete this analysis and planning effort. The ATS methodology has been used extensively by Universities (with IBM assistance) to establish computing and information technology plans. Since 1978, IBM has successfully facilitated over 400 ATS studies in higher education. The study usually takes six weeks to complete and will require the equivalent of at least three days each week.

We write at this time to confirm your participation on this committee. Your name was suggested by either Provost Henry or me for participation. This is an opportunity to examine how well computing and information technology at Kent supports the University's networking and information system objectives and to explore ways to enhance this support.

IBM has advised that the committee be limited to six to eight individuals. Therefore, the committee will consist of one representative from each of the following area-: Provost's office,

Regional Campuses, Student Affairs, Library, Faculty, Financial Affairs, Information Services, and Business and Finance. Ilee Rhimes, Associate Vice President for Business and Finance, has agreed to chair the committee since he has overall responsibility for computing and information technology.

I understand, that Ilee has already contacted you and confirmed a planning meeting on October 7, 1992 from 9:00 a.m. to 4:00 p.m. in the Urban Conference Room on the 2nd floor of the Library. He will be in touch with each of you again shortly regarding the agenda. For your information and future planning, the six-week review will begin sometime during the week of November 2, 1992.

The computer planning study on networking and information systems is an extremely important initiative for the University and I am pleased that you have agreed to be a part of this process. If you are unable to serve or have any questions about the study, please contact me as soon as possible.

cc: President Cartwright
Provost Henry
Ilee Rhimes
Susan Splitgerber (IBM)
Vincent Santangelo, Jr. (IBM)

Kent State University Network and Information Systems Study APPENDIX C

INTER-DEPARTMENTAL CORRESPONDENCE KENT STATE UNIVERSITY V. P. FOR BUSINESS & FINANCE

TO Members of the Faculty, Students and Staff
FROM Lawrence R. Kelley **DATE** 10/20/92
SUBJECT Networking and Information Systems Questionnaire

Kent State University is conducting an examination of its computing needs in the areas of networking and information systems. The Application Transfer Methodology (ATS), which was developed by IBM, will be used to conduct this examination. ATS has been used extensively by Universities (with IBM assistance) to review computing and information technology operations. IBM will provide a consultant to facilitate us through this study at no charge or obligation to purchase equipment or services. This study is scheduled to be completed by mid-January.

A study group of nine faculty and staff, chaired by Ilee Rhimes, Associate Vice President for Business and Finance, has been appointed to conduct this review and prepare a report. The other members of the study group are:

1. Rosemary Du Mont, Dean & Professor of Library and Information Science
2. James Jones, University Budget Director
3. William McKinley, Director of Information Services
4. Gregory Rogers, Director of Office of Academic Assessment & Evaluation Services
5. Gregory Seibert, Director of Computer Resources for Business Affairs
6. Michael Sperko, Director of Student Information and Records - Regional Campuses
7. Olaf Stackelberg, Chairperson & Professor of Mathematics and Computer Science
8. Donald Tolliver, Dean University of Libraries & Media Services

The study group has been charged with conducting a university-wide analysis of communication networking and administrative information system needs for all divisions, in part, by interviewing and gathering information from Kent students, faculty and staff. Furthermore, they are charged with preparing a report that defines networking and administrative information system objectives, issues, recommendations, and implementation priorities.

In carrying out this ambitious task, the study group will obtain information from all segments of the University community. To gather some of the required information, the study group has prepared the attached questionnaire for your completion. In addition, they will be conducting interviews with faculty, students and staff on November 3, November 4 and November 5, 1992. While most interview sessions will be scheduled, there will be an open interview session on November 5, 1992 (from 2:45 to 3:35) in the Urban Conference Room, 2nd floor library.

One inevitable risk in conducting this study is that expectations may be raised beyond the capability of University resources. The intent of this study is not to develop a wish list of equipment and services but to establish a plan for optimizing the use of existing resources and defining a general direction for communication networking and administrative information systems. In these tight budget times, it is especially important that we expend the available computing resources to our best advantage.

Please complete the enclosed questionnaire and return it to Ilee Rhimes, Office of Vice President for Business and Finance, 2nd Floor, library by Friday, October 30, 1992. Thank you in advance for your participation.

Enclosure cc: ATS Study Group

Kent State University
Network and Information Systems Study
APPENDIX D

INTER-DEPARTMENTAL CORRESPONDENCE
KENT STATE UNIVERSITY
V. P. FOR BUSINESS & FINANCE

TO

FROM Ilee Rhimes

DATE 10/08/92

SUBJECT Networking and Information Systems Study Interviews

As you are aware, Kent State University has formed a study group to conduct an examination of its computing needs in the areas of networking and administrative information systems. By now, you should have received a questionnaire with a cover letter which indicated that personal interviews would also be conducted with select groups of faculty, students and staff. Based on recommendations from senior staff and faculty, you have been selected to be interviewed.

Interviews will be conducted on November 3rd, November 4th, November 5th, November 12th and November 13, 1992. Each group is scheduled to be interviewed for one hour. **Your group is scheduled to be interviewed from 1:00-2:00 p.m. on Tuesday, November 2, 1992 in the Urban Conference Room, 2nd Floor of the library.**

Following are five key questions to that you will be asked to comment on during the interview:

1. Describe the information flow and processing needs of your current environment.
2. What are the strengths of this environment?
3. What are the weaknesses of this environment?
4. If these weaknesses could be resolved, what would be the benefits?
5. What do you see as the key future needs in your environment in the next two to five years.

We plan to use the results of these interviews along with completed questionnaires to develop problem statements. Please make every effort to attend this important meeting.

Thank you in advance for your participation.

Student Questions

Describe your interaction with the college administrative offices that are computerized:

- a. Admissions process
- b. Financial Aid
- c. Billing
- d. Grading
- e. Advising
- f. Other

What are the strengths?

What problems are you experiencing?

If these problems could be solved, what would be the benefits?

**Kent State University
Network and Information Systems Study
Interview Schedule**

Day 1 November 3, 1992:

Place - Urban Conference Room, 2nd Floor, Library

8:30 - 9:30	Group 1	Executive Officers
10:15 - 11:15	Group 2	President
1:00 - 2:00	Group 3	Associate Provost; Vice Provost, Regional Campuses; Vice Provost Student Affairs; Vice Provost and Dean, Research and Graduate Studies; and Associate Vice President, Academic Affairs
2:45 - 3:45	Group 4	Academic Deans

Day 2 November 4, 1992:

Place - Urban Conference Room, 2nd Floor, Library

8:30 - 9:30	Group 5	Department Chair.
10:15 - 11:15	Group 6	Regional Campus Deans
1:00 - 2:00	Group 7	Bursar; Registrar; Admissions; Student Financial Aid; and Residence Services
2:45 - 3:45	Group 8	Career Planning and Placement Medical Services

Day 3 November 5, 1992:

Place - Urban Conference Room, 2nd Floor, Library

8:30 - 9:30	Group 9	Faculty
10:15 - 11:15	Group 10	Faculty
1:00 - 2:00	Group 11	Students
2:45 - 3:45	Group 12	Open Session

Day 4 November 12, 1992:

Place - Urban Conference Room, 2nd Floor, Library

8:30 - 9:30	Group 13	Human Resources
10:15 - 11:15	Group 14	Financial Affairs, University Auditing, Resource Analysis
1:00 - 2:00	Group 15	Facilities Planning and Operations
2:45 - 3:45	Group 16	Development and Alumni Relations

November 13, 1992:

Place - Urban Conference Room, 2nd Floor, Library

8:30 - 9:30	Group 17	Administrative Assistants, Secretarial and Clerical 1
10:15 - 11:15	Group 18	Administrative Assistants, Secretarial and Clerical
1:00 - 2:00	Group 19	Audio Visual, Teleproductions and Library
2:45 - 3:45	Group 20	Purchasing, Food Services, Campus Bus Services, Bookstore, Airport, Telephone Communications

Kent State University

Network and Information Systems Study

Appendix - E

Department of Computer Resources
Business Services and Auxiliaries

The Department of Computer Resources serves various Business Services and Auxiliaries operations. It operates a network of approximately 150 vt220 type terminals and 25 PC's of various types. A backbone fiber network with 2 Cisco AGS++ routers and various 10BaseT hubs, terminal servers, and modems connect several buildings on campus with the computing center at the University Supply Center. A Zilog Minicomputer with 30 vt220 type terminals serves the Campus Bus Service at their facility on East Main Street. A staff of 6 full-time and 10

to 15 student employees develop software applications and operate and maintain the various systems. Unix and X-windows, Novell Netware 3.11, and Windows 3.1 are used as operating environments. WordPerfect is the word processor of choice. Access 2020 on the Unix-based systems and Quatro Pro on PC-based systems are the spreadsheets that are supported. Pegasus Mail on the PC networks along with Elm and the standard Unix mailx are the E-mail systems that are available. Internet access is presently provided through an outside third party, but a fiber link currently being installed between the Student Center Cisco router and the Proteon router at Computer Services will offer direct access to OARNET and the Internet. Database applications are developed in Unify/Accell which is a relational database with 4GL and SQL interfaces. An intelligent query and reporting language is also supported. Some of the major database applications that have been developed include inventory control and client billing applications for Food Service, Ground Transportation, Telephone Communications, Mail Room, and the University Supply Center. A system for producing and tracking purchase orders is available for the Purchasing Department which also produces reports that are required by various federal, state, and local agencies. An inventory and retail management system for the University Bookstore which interfaces to an automated point of sale system with 15 cash registers is currently being completed. A comprehensive transit system management package is in place at the Campus Bus Service which includes personnel and inventory control, charter management, and maintenance management. Various other database applications are presently available and are developed and modified as required. An equipment listing of various locations follows.

Department of Computer Resources
Business Services and Auxiliaries
Computer Equipment Listing

Department: Bookstore

21 Televideo vt220 Compatible Terminals

1 Dot Matrix Printer - To print shelf tags

1 Epson FX5000 Line Printer - To print purchase order.

1 Griffin Dot Matrix Printer - To print Bookstore Server Reports

1 HP LaserJet III/si Laser Printer - To print inventory reports

3 Zebra Barcode Printers- To label books and merchandise

3 Dot Matrix Slave Printers - To print various reports

2 Barcode scanning guns with wedges

1 IBM PC AT with printer used to run the PubNet EDI software

1 PC used to communicate with the Series/5 debit card system

1 PC based Point of Sale Register System with 15 POS Terminals and barcode scanners

1 PC based Manager Workstation networked to the POS Server

1 Logging Card Reader used to add money to patron debit account

Department: Student Center

33 Televideo vt220 Compatible Terminals

1 HP LaserJet II -To print WordPerfect and 20/20 spreadsheet files

5 Dot Matrix Printers - To print memos, mail and WordPerfect Documents

2 Macintosh PC's

2 Access Readers

Department: Food Service

15 Retail Data Terminals

37 Televideo vt220 Compatible Terminal.

2 HP LaserJet II Laser Printers

1 CIE 300 Line Per Minute Line Printer

3 Dot Matrix Printers

1 Logging Card reader used to add money to patron debit accounts

1 HP LaserJet IIIsi Printer

9 IBM Compatible PC's on Novell Network 3.11-Combination of 286's, 386's, and 486's

1 Debit Card Encoder/Verifier- To create new debit cards

Department: University Conference Bureau.

5 Televideo vt220 Compatible Terminals

Department: Banquet Sales

3 Televideo vt220 Compatible Terminals

1 Dot Matrix Printer

Building: Eastway

Department: Flash Card Office

3 Access Readers

Novell Network version 3.11

9 PC's - Combination of 286s,386s, and 486s

1 HP Optical Scanner

1 Fax Modem

1 HP LaserJet III/si Laser Printers

2 Epson DFX 5000 300 Line per Minute Printers

4 Stand Alone Personal Computers 3 Dot Matrix Printers 11 Televideo vt220 Compatible Terminals 1 Logging Card Reader- To add money to patron accounts 1 400 Line per Minute Printer 1 Debit Card Encoder/Verifier-To create new debit cards

Department: Food Service/Recreation

2 Televideo vt220 Compatible Terminals

1 AMF Personal Computer used to track Bowling leagues

2 Dot Matrix Printers

9 Retail Data Terminals

Building: Tri Towers

Department: Food Service

2 Televideo vt220 Compatible Terminals

2 Dot Matrix Printers

2 Datakit VDMs-- for network connections

8 Retail Data Terminals

Kent State University Network and Information Systems Study GLOSSARY

ATL(Automatic Tape Library): A mechanical device used in conjunction with software to automatically mount and manage cartridge tapes for the administrative and academic systems.

Backbone: (1) A high speed link by which computer systems are connected to other computer systems for purposes of down loading, uploading and electronic transfer of information; (2) the underlying nodes (substructure) of a multilevel distributed network that provide communication services for the rest of the network (hosts).

BITNET: A worldwide network of mostly academic institutions created for the electronic exchange of information. BITNET is based on the NJE protocol for file transfers that IBM originated.

BMDP: A program for statistical analysis. Originally developed for Bio-Medical applications but now used as a general package.

CD ROM: High capacity read only memory in the form of an optically read compact disk.

Communications controller: A device used to support communications between the mainframe computers and the end user devices such as terminals, personal computers and printers.

Corporate Tie: Proprietary software used for file transfer in the administrative environment. Files uploaded to the mainframe are used as input to production batch jobs.

Data Base or Database: (1) A collection of interrelated data stored together with controlled redundancy according to a scheme to serve one or more applications; (2) a collection of data stored together with controlled redundancy, specifically, related computerized file(s) stored on magnetic disk, drums or other storage media; (3) a set of logically related files organized in such a way that data access is improved and redundancy or duplication is minimized.

Data channel: A functional unit that handles data transfer between internal and peripheral equipment such as disk or tape as opposed to terminals.

DEC(Digital Equipment Corporation): One of the largest manufacturers of computers, especially the PDP range (Programmed Data Processor).

Distance Learning Education: Any experience linking teacher and students in different locations simultaneously using technology that allows for live and interactive instruction.

Distributed Computer Processing or Distributed Processing: A method of data processing in which application transaction programs distributed among interconnected processors cooperate to perform applications for end users of a network. Two types of distributed data processing are job networking and distributed transaction processing.

Download: To transfer data from a main frame computer to an attached device such as a personal computer.

E-Mail or Electronic Mail: The exchange of information over electronic networks in the forms of letters or files. E-Mail may be passed between computers in the same department or around the world.

Ethernet: A data communications system defining the physical and data link layers for the Open Systems Interconnection model. A method of sharing one of various wiring topologies between data communication devices.

Fiber optic channel extender: A device used to extend the distance allowed to connect to mainframe peripheral equipment. Fiber optic cable is used between the two extenders.

IBM: International Business Machines. The largest manufacturer of mainframe computers and operating system software in the world.

IDMS/R Database: A database system capable of hierarchical and relational structures that is sold by Computer Associates and is currently used by Computer Services for the majority of the in-house developed systems.

Interactive Video: An operating environment in which a video display system utilizing a computer and human input from a keyboard, touch sensitive screen or voice conduct a dialog; a mode of working in which there is a response to operator instructions as they are input.

Integrated Systems: Combined systems or groups of computers that work together to handle interrelated applications or activities.

Internet: A worldwide electronic network of computers comprised of all types of institutions - commercial, educational and governmental.

JNET: Software sold by Joiner Associates (now Wingra) which enables a VAX/VMS system to participate in an RSCS network (BITNET)

Job Networking: A type of distributed processing in which batch jobs submitted at one processor may be sent to another processor for execution; results may be returned to the originating processor.

LAN: Abbreviation for Local Area Network.

Local Area Network. A communications network - a collection of devices and communication channels that connect a group of computers and peripheral devices together so that they may communicate with each other. Three parts are involved: (a) computers and peripheral devices;(b) interface units;; and (c) communications cables or wires that connect the other components together. Generally, local area networks are distributed over a maximum distance of about six miles, although more frequently, they are located within a single building or office area.

Megabyte: A unit of measure for storage capacity; the storage capacity of either a computer or a particular storage medium such as disk, diskette or magnetic tape. One megabyte equals 1,048,576 bytes.

Multiplexer: A device that takes several input signals and combines them into a single output signal in such a manner that each of the input signals can be recovered.

MVS/ESA: The proprietary operating system running on the IBM administrative mainframe.

Mediated Classroom: A classroom prepared to use a wide variety of media as an integral part of the presentation of instruction. This would include wiring for access to computers, computer projection systems and access to video presentations from CD-ROM or tape.

Networking: Communications techniques involved with establishing and operating a communications network (network is a configurations of data processing devices and software connected for information exchange).

NOTIS (Northwestern Online Total Integrated System): Comprehensive library materials management system that integrates a variety of library functions including but not limited to: acquisitions, serials control, cataloging, authority control and database management, circulation and online public catalog.

OHIOLINK (Ohio Library and Information Network): Computer network of libraries and electronic information resources. It will link seventeen of Ohio's university libraries and the State Library of Ohio. Its primary goal is to provide rapid access to and delivery of library, materials to users anywhere in the state.

Online: Pertaining to a user's ability to interact with a computer either by inquiring against current files or updating those files in a transaction by transaction mode with instant verification of the update returned to the user. The contrast to this is batch processing where an entire set of transactions are applied to a file at one time and the result of a transaction is not instantly available.

Protocol: A set of semantic and syntactic rules that determine the behavior of functional units in achieving communication.

Protocol converter: A device used to translate one protocol to another for communications across computer platforms using different protocols.

Proteon Router: A device, manufactured by Proteon, that routes traffic from one network to another.

Relational Database: A database that is organized and accessed according to relationships between items. Interdependencies among the data are expressed by data values rather than by pointers or by the location of the data items in memory providing users with a flexible approach to storing and retrieving data.

Relational Model: A model that permits the definition of(a) data structures, (b) storage and retrieval operations on them and (c) integrity constraints that are to be maintained on them.

Remote Access: (1) Term that relates to the procedures involved in establishing communications between a computer and components of a computer system that are remote from the computer;(2) gaining access to a computer from a point that is physically distant from the

computer through use of a communications channel ('dialing up' via a modem/phone line) to connect the computer to other components of the computer system, especially peripheral devices.

RISC (Reduced Instruction Set Compute): A modern computer design that facilitates very fast processing in a relatively small machine.

SAS (Statistical Analysis System): A packaged software system that provides data manipulation and report generation as well as virtually all types of statistical analysis.

Seamless Systems: Integration into a system of different brands/models of computers, example Macintosh and IBM PC hardware.

SNA Network: The part of a user application that conforms to the formats and protocols of Systems Network Architecture. It enables the reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations.

SPSS (Statistical Package e for the Social Sciences): A statistical package that has wide spread use at the University. There is a mainframe version and a version that runs under DOS on PCs.

T-1: A 1.544 Mbit communications circuit provided by long distance communication carriers for voice; data and video transmission. T-1 lines are typically divided into 24 channels of 64 kbit each.

Twisted Pair A transmission medium that consists of two insulated conductors twisted together to reduce noise.

UNIX: A version of computer system operating system software than can be used to control a wide variety of machines ranging from PCs to mainframe computers. Like DOS for PCs, UNIX is not limited to being used on equipment designed by one manufacturer but rather can be used on equipment from many different suppliers.

Upload: To transfer data from a device such as a personal computer to a mainframe computer.

VAX (Super Minicomputer): A line of super minicomputers introduced by Digital Equipment Corporation (DEC) in 1977. VAX is an acronym for Virtual Address Extended.

Virtual Machine (VM) : An IBM proprietary operating system that simulates the concurrent execution of multiple virtual computer on a single computer system.

VMS: One of two operating systems (the other is UNIX) that run on Digital Equipment computers. VMS is very easy to use and manage and can also support BITNET via the JNET software.

XYPLEX: A set of hardware and soft software manufactured by XYPLEX which allows asynchronous terminals to connect to VAX/VMS systems through a broadband coaxial cable.

