Networking Needs Subcommittee
of the
Campus-wide Information Systems Committee

Report to the
Obtaining Maximum Benefits from Technology Steering Group
January 10, 1996

Overview

The vision of UAB as an institution comprised of collaborative partnerships and responsibility centers must serve as the foundation for decisions regarding our information technology. A collaborative electronic communication and information management environment can be used to maximum benefit if standards for electronic communications are adopted, and if the necessary hardware, software, and technical staff exist to support this environment. In other words, “the system” must be clearly understood to include support staff, maintenance, training, and planning for upgrades and replacements.

The new student information system and other improvements in UAB’s information systems will require large investments in hardware and software technology. In some cases this investment will be considerable. This investment will not achieve the full, desired result without a concomitant investment in the full range of support services — technical staff, user support, management, and training — many of which are hidden from the end-user. While it is difficult to predict the overall costs of this effort, especially since many of the current expenses in information technology at UAB are hidden, at the very least, UAB’s investment in this effort should result in increased productivity and efficiency, if not also in an actual reduction in overall costs.
Membership of the Subcommittee

Ms. Jeanne Alexander  
The University Computer Center
Ms. Mary Lynn Anderson  
Purchasing
Mr. Rodney Champion  
Health Information Systems
Ms. Jill Gemill (Co-Chair)  
Neurobiology Research Center
Prof. David Green  
Engineering
Dr. Tim Heaven  
Dentistry
Ms. Stacey Holloway  
Office of the Provost
Ms. Joyce Iannuzzi (Staff Representative)  
University Data Communications Support/Network Services
Dr. Charles Katholi  
Public Health
Dr. Elliot Lefkowitz (Co-Chair)  
Joint Health Sciences
Ms. Sheila Sanders  
University Communications Services
Dr. David Shealy  
Natural Sciences and Mathematics
Mr. Rick Teer  
Health Information Systems
Ms. Sandra Wood  
Health Information Systems

History of the Subcommittee

In the Spring of 1995, the Campus-wide Information Systems Subcommittee on Networking Needs (CISCnet) began an evaluation of UAB’s networking infrastructure to ensure that the goals envisioned for the role of information systems in everyday campus activities would be supported. To serve the needs of strategic planning and the Information Systems/Technology Task Force, this analysis evaluated the following aspects of networking infrastructure:

- Central Information Services and User Support
- Present and Future Physical Network Infrastructure
- Remote Access from Off-Campus
- Financing
- World-Wide Web and Client-Server Technology

Following the second strategic planning retreat, several items related to this network infrastructure were identified as requiring immediate attention and action. Therefore the CISCnet subcommittee undertook an in-depth evaluation of these topics with the goal of arriving at a series of recommendations for the proposal of standards, policies, procedures, and action plans to deal with these particular needs:

- Institutional Remote Access
- Email and Desktop Collaborative Services
- Institutional World-Wide Web Services
- Technical Support

These topics are summarized on the next two pages and followed by more detailed analysis.
Summary of Problems, Status and Recommendations

Institutional Remote Access

**Problem:** Dial-up access to UAB’s campus network and Internet suffers from busy phone lines, slow connections, and inadequate support. Demand for these services far exceeds the capabilities of current staff and equipment.

**Status:** The current campus modem pool for dial-up access has been expanded and upgraded. Bids have been received from outside vendors to out-source remote access services, with direct billing to individuals and/or departments.

**Recommendations:** Award a contract to the outside vendor offering the most efficient, reliable, and cost effective remote access service to the UAB community, as soon as possible.

Email and Desktop Collaborative Services

**Problem:** Electronic communication via Email, and the exchange of electronic documents for collaborative purposes is too often a frustrating process due to incompatibilities among the numerous Email systems and software (word processing, spreadsheet, presentation graphics), that result in inefficient communication. There is no electronic campus directory.

**Status:** Data Communications/Network Services (DC/NS) has recently acquired new equipment, to be brought on-line in January. This upgrade will serve current campus Email needs for the near future. Meetings have been held with UAB computer system administrators, and there is now a consensus that standards for campus Email delivery and document exchange are necessary and should be adopted. DC/NS is also in the process of implementing a campus directory server.

**Recommendations:** Purchase and manage site licenses for Email, word processing, and spreadsheet software that will work on PC’s, Mac’s, and UNIX computers. Continue the process of creating a single electronic directory that can be managed at various levels. Purchase additional hardware and software as necessary for “behind the scenes” support of these services; provide adequate staff from “behind the scenes” to the desktop to keep services running, answer questions, install hardware, software and network connections, and to solve problems. Provide training to achieve “computer literacy”. Develop document exchange standards for collaboration with people at other institutions.

Institutional World-Wide Web Service

**Problem:** At the time of Retreat II, UAB had no policies regarding use of World-Wide Web. Many departments were using the Web as their own initiative and local resources allowed, for purposes of recruitment and teaching; however, no institutional hardware or staff had been designated as resources for these efforts. Standards in place for UAB stationary and publications were not applied to the use of the Web. Students had limited on-campus access to the Web.

**Status:** At the direction of the President and the Provost, the Office of Marketing (Creative Services) and Lister Hill Library have been working in recent months to establish a new “Front Door” that will provide UAB with an organized presence on the Web. The Office of Marketing is responsible for the overall organization and design of the “Front Door”, and for
approving Web pages developed by other UAB units. Lister Hill Library has purchased a high speed computer designated as an institutional Web server, and employs one full time “WebMaster” who is responsible for maintaining the server and for mounting Web pages that have been developed and approved by other UAB units. The “Front Door” project has a target starting date of February 1, and is approximately 50% complete as of January 9. Some classes in HTML (how to make a Web page) are offered by the Office of Development and Training.

The World-Wide Web is a technology which holds great and varying promise for UAB. There are yet many “unexplored waters”; the WWW is a piece of software that runs identically on a very wide variety of hardware and computer systems; it provides reliable transfer of documents and could perhaps be used to replace electronic mailing lists or paper document distribution. The Web has built in Email and will soon be a way to run programs that aren’t even on your computer (JAVA). The Web has indexing and searching capabilities, and can be used to organize vast amount of institutional data and make them accessible. The Web has built in forms and can connect to large databases; it could be used for purchasing supplies, reporting information, etc. etc. Finally, the Web could serve as the communications platform for computer-based learning projects.

Recommendations: The most basic technical support and overall direction for publication on the Web are now in place; however, there other aspects missing. There should be a Web page development service available in addition to the “do it yourself” option. All units at UAB, especially those not currently involved, should be informed about campus Web services. Some additional staff should be designated at the institutional level to explore projects that could benefit from use of the Web where programming and interfacing with other computer systems is involved.

Technical Support

Problem: The ability of the central service organizations to provide necessary end-user technical assistance is extremely limited. To alleviate this problem, some of the larger departments on campus have hired their own computer staff or consulting firm, though they are still usually limited in their ability to cover all needs at each location. Many users have no support at all. This is an uneven and inefficient use of people. Support services are a critical component of a networking infrastructure; without it, we cannot make full use of information technologies and collaborative services.

Status: Very little has been accomplished in this important area. Two former computer and printer repair offices have been combined into the “Computer and Electronic Repair” service center.

Recommendations: A major effort needs to be initiated to change current organizational and staffing patterns, including hiring additional staff, so that adequate levels of end-user support are available. Technical support needs to be provided for hardware, system software, networking, application, and collaborative services.
Conclusions and Further Recommendations

Information technology changes at a rapid pace. Development of appropriate standards must become an ongoing process, supported with adequate funding and staff, and organized so that administrative computing, clinical computing, teaching, research, and collaboration needs are all considered. Overall coordination must be a two way street — the needs within the units must be considered when setting standards and priorities; standards and priorities must be communicated back to the units, explaining the reasons for these decisions and what attendant benefits can be derived. Such coordination cannot be accomplished on a volunteer committee basis, although contributions from such committees are vital. Coordination must therefore proceed at the institutional level with clear lines of responsibility identified.

Remote Access

Objectives

Faculty, students, and staff today want the ability to access campus computing facilities including E-mail, and Internet services such as World-Wide Web pages from their homes and other off-site locations. They want to be able to use the same Email software at home that they use on campus.

Possible Solutions and Recommendation

Following the assumption that part of UAB’s mission is to provide these constituents with remote access, various options for provision of this service were reviewed in the last CISCnet report. These options included: UAB directly providing the service with some method for charging; establishing a vendor/University partnership for provision of remote access services; and having individual users directly contract for service from outside vendors. A recommendation was made to prepare bids for outside vendors to provide dial-in service to the campus network and the Internet in cooperation with the University.

Current Progress

In November, 1995, bids were received from three companies for the provision of remote access services to the UAB campus network and the Internet. Negotiations are in currently in progress and service is expected to begin by March, 1996. The vendor will provide for all initial and future capital hardware purchases and provide for operational costs such as a 24 hour/day support staff and all outside line costs. The service will be monitored and adjustments made on an as needed basis to provide a low ratio of busy signals to its users. All marketing costs will be borne by the vendor. The service will be billed either to individuals at their homes or to departments on campus through the telephone billing system. The cost to the users will be at a rate comparable to or lower than outside servers could provide.
Email and Desktop Collaboration

Objectives

Our goal is to have an Email system which allows any faculty, staff, or student at UAB to easily and simply send messages and documents to each other by selecting software which can work well on the wide variety of personal and departmental computer systems at UAB. The Email package should be simple to use. Formatted documents should arrived in readable condition. The same Email system should also allow us to communicate and collaborate with colleagues outside of UAB.

Possible Solutions

We identified three components which, if standardized, will provide an immediate and highly satisfactory Email system. The specific components are:

1. Select a single Email software package that can be used on all computers at UAB and meets certain minimal standards, or, select a very few Email software packages which are known to be compatible with each other.

2. Select a standard word-processor, spreadsheet, and presentation software package. For anyone not using this package, define a document interchange format such as PC WordPerfect 5.1 (for word processing) for use in collaborations, although it should be noted that this approach should be expected to have varying and unpredictable degrees of success.

3. Create a single electronic directory for locating Email addresses and other information such as phone number, campus address, etc.

In discussions among system managers, computer users and students, it is now clear that a “critical mass” of opinion in favor of adopting such standards now exists. We believe that adherence to international standards will work in UAB’s varied hardware, operating system, and networking environment. By agreeing to use the same software packages wherever possible, and proven compatible software otherwise, a satisfactory and functional communication system can be implemented. This approach has the advantage of including communication with students and collaborators on the Internet as part of the messaging architecture design. This approach can be compatible with a more complex messaging architecture, such as the one currently being recommended for the hospital and Health Services Foundation.

Recommendations

1. We recommend Internet style Email, using the same software packages where possible and proven compatible software otherwise, should be adopted as the standard for UAB Email and document exchange. More business-like office systems can and should still be chosen; however, they should be selected so that the three key components listed above: the Email package, the word processor, and the “people” directory will coordinate with the overall standard in a seamless way (at least as it appears to the end-user).

2. UAB should pursue, along with Health and Information Services of the Clinic and Hospital, the purchase of a site license for an inexpensive Email package, a comprehensive messaging system, and a standard suite of office applications.
World Wide Web

Objectives

Our objective is to use World-Wide Web technology to maximum benefit for UAB. The World Wide Web (WWW) is fast becoming THE source of electronic information exchange. It provides opportunities for electronic publishing of any type of information that can be expressed using text, graphics, and even sound and video. It can be used internally at UAB as an interface for both administrative and research computer systems and it can be used in presentation, tutoring, and testing for educational purposes. It can also be used externally as the means to disseminate information about UAB and its various education, research, medical and service programs to potential students, fellows, faculty, patients, and community members. Numerous departments on campus have already set up and maintain their own Web sites and are responsible for the information content of those sites (currently well over 30 individual departmental/unit UAB Web sites exist).

Possible Solutions

In recent months, at the direction of the President and the Provost, the Office of Marketing (Creative Services) and Lister Hill Library, and with the assistance of Data Communications/Network Services, have initiated efforts to establish a new Front-Door for UAB’s Web site. The Office Marketing reports that the Front-Door project is approximately 50% complete. This effort should provide the initial step in meeting the objectives outlined above. This effort includes:

- the purchase and maintenance of the necessary computer equipment and software;
- technical support to design and create UAB’s front-door;
- the establishment of campus-wide standards designed to maintain an overall quality and consistency among departmental Web pages;
- training designed to familiarize UAB personnel with the techniques involved in publishing Web pages.

Recommendations

(1) As technology advances, and Web use increases, Web development activities, and resources committed to those activities must keep pace. For example, we cannot predict the future of Computer-based Education at UAB. But if Computer-based technology becomes widely integrated into the curricula, the use of the Web to as a platform for this technology could increase exponentially along with the necessary hardware, software, training, and staffing resources required to support its use. Ways should also be investigated to provide security for network connections and data access as needed.

(2) The most important feature of any web page is the information it provides. If this information is incomplete or incorrect, the usefulness of that Web page is severely impacted. Each unit that provides information to the institutional Web server should assign an employee to continually review that information and update it as necessary.

(3) The Office of Marketing has established a structure in which departmental links to UAB’s Front-Door will go through an application and review process. Each Web home page will be scrutinized for adherence to published guidelines and appropriate information content. Currently, all departments may not be aware of this new service and the proper application procedures. Revisions and updates to these Web pages also need to be reviewed under these criteria. This process must be clearly defined and publicized to the UAB community.
(4) Departments will need to have assistance with the approval process and the design of their Web home pages. A central, fee-for-service, or partially subsidized Web design program should be established to support departments without the required resources.

(5) The Office of Development and Training offers classes on a regular basis that teach the language used in creating Web pages (HTML). These classes are important to provide the necessary skills, knowledge, and resources for UAB departments to create their home pages. Support of these classes and the personnel and hardware required for their presentation must continue, and these classes should be periodically reviewed for effectiveness.

**Technical Support**

**Objectives**

To establish an administrative and support structure to provide accurate, efficient, and timely assistance to the UAB community in the use of information services. In this context, it must be noted that there are two intrinsic levels of support which have to be considered. The first is the operation and maintenance of the networking hardware infrastructure as represented by the campus-wide “backbone”. This level of support is the responsibility of a combination of University Communication Services, The University Computing Center, Health Information Systems, and Data Communications/Network Support. The second is providing hardware and software support to the individual user.

**Possible Solutions**

In what follows, four models for providing end-user support will be considered: (1), the **Totally Centralized** model; (2), the **Totally Decentralized** model; (3), the **Centralized-Distributed** model; and (4), the **Tiered model**.

(1). The Totally Centralized Model:

In this approach a single campus wide staff supplies technical support at all levels to all desktops on the campus.

**Advantages:**
This model reduces the duplication and redundancy in technical personnel with specialized knowledge; simplifies standardization and site licensing; and reduces the impact from unanticipated staff turnover.

**Challenges:**
Problems with this model include determining how costs are allocated to individual units and users; centralized decisions often ignore the real needs of the end-user; and an extensive financial commitment by the university central administration would be required for starting such a group. It would also require that many administrative units currently utilizing their own personnel endorse and join in the effort. To be successful, everyone must participate.
(2). The Totally Decentralized Model:

This might be the best description of what is currently in place at UAB. In this model, each unit supports that level of technical expertise that it deems necessary and for which it is willing to pay. There is no sharing of resources among administrative units.

Advantages:

In this model, each unit is responsible for its own costs and can choose hardware and software products which best meet their needs. Small units which are well funded and managed can provide excellent, cost effective service that is frequently better than that provided by large information technology organizations.

Challenges:

Analysis of the current situation at UAB indicates that this model can lead to duplication of technical staff with specialized skills. Individual units are heavily impacted by unanticipated staff turnover. There is usually little overall standardization with the end-user being responsible for much of his/her own hardware and software tools. Finally, this approach tends to widen the gap between those who “have” and those who “have not”. Support level is uneven among the units.

(3). The Centralized-Distributed Model:

In this model, staff is centrally administered but teams of specialists are housed with the units which they serve. Technicians with specialized skills which are needed less often are house centrally.

Advantages:

This model facilitates central planning and standardization. Local “gurus” provide input into major hardware and software decisions. Existing staff can be readily integrated into the new administrative structure and this lessens the impact of unexpected staff attrition because staff can be loaned between units to handle the short term consequences.

Challenges:

To be successful, units which now do their own service must agree to participate in this effort. Administration in this model is more complex and upper level administrative staff must be chosen with care. They must be considerate of the needs of all clients and they will be required to do a lot of public relations work. This administrative staff must then balance the benefits of standardization against the actual needs of the individual units served.

(4). A Tiered Approach to Support:

In this model we try to combine some of the advantages of the above models, while minimizing the challenges. This tiered model of support would feature several levels of technical support distributed around campus in different units to meet the various software and hardware needs of faculty, staff, and students. This tiered structure would consist of DC/NS supporting departmental information managers, who in turn directly support the end-user. As warranted, central support of widely-used information systems such as administrative applications would continue, allowing those directly responsible for creation and maintenance of these important systems to directly provide end-user assistance.
Advantages:

The local support staff need not be proficient in every computer system and software package in existence. They can concentrate on what is being used in their particular units, while relying on the central support staff for technical information and assistance with complex hardware, networking, and systems support. Standards are developed, and site licences are purchased by the central administrative staff, while the local staff ensures that these standards satisfy local needs.

Challenges:

This support model must provide assistance to all members of the UAB community. Departments and units currently without local support must be provided with such support. While a certain amount of sharing of personnel can take place (and will be desirable to buffer unexpected staff turnover), the ratio of recommended support personnel to end-users (see below) needs to be maintained.

There is one additional issue which impacts on support no matter which model is adopted. That is the question of the ratio of support personnel to end-users. This is a very complex question for which there are no easy answers. A number of things must be considered in this context. The number of users which a technical support staff person can service depends heavily on the types of service being provided, the complexity of the systems being managed, and the level of sophistication of the users. It also depends on the tools available to the technician for performing the tasks. Estimates range anywhere from a support personnel to end-user ratio of 1:15 in a complex computing environment of power users, to a ratio of 1:150 for more casual users with routine support service needs. These varying personnel requirements need to be accommodated in whichever model is adopted.

Recommendation:

The description of the above models is currently not adequate enough to serve as the basis for the design of a campus support system. We recommend that additional consideration be given to refining these ideas and then discussing any proposal with some of the affected personnel to better design an adequate, efficient, support system that meets the majority of needs.

Never-the-less, we do feel that UAB should move towards a model of technical support that combines useful aspects of the Centralized-Distributed model and the Tiered model. Consolidation of computer and machine repair groups into one entity is one example of how centralization can result in a more cost-efficient solution that better serves the user. Providing for a tiered approach to the provision of support for operating systems, networking, and applications should provide similar benefits for all UAB personnel.

With some careful planning involving representatives from all segments of the user community, an excellent solution can be provided. However, a commitment by the central administration to launching this effort will be essential. In the process of implementing such a system there should be a strong effort made to combine existing staff resources and expertise into the new infrastructure rather than starting from scratch with a new group while throwing away all the knowledgeable staff which currently exists. Retaining historical knowledge and perspective of decisions made in the past should be a goal, because “lessons unlearned must be repeated”.

The recommendations contained herein for Remote Access, Email and Desktop Collaboration, and World Wide Web Services, along with other recommendations concerning the development of a student records system, a new “user-friendly” administrative applications systems, and educational
systems making use of video technology, enhanced library systems and perhaps distance learning, will all require their own investment in hardware and software technology. In some cases this investment will be considerable. **MUCH OF THE MONEY SPENT ON THE DEVELOPMENT OF INFORMATION SYSTEMS AT UAB WILL BE WASTED WITHOUT A CONCOMITANT INVESTMENT IN THE PEOPLE REQUIRED TO INSTALL AND MAINTAIN THOSE SYSTEMS, AND TRAIN OTHERS IN THEIR USE.** Computers and information systems are developed by people for the use of people. The majority of the costs involved in providing those systems is supporting the people using them.