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# **Strategic Planning First-Level Unit Plan**

Office of Information Technology  
The University of Iowa

*December 1, 1989*

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Iowa City, Iowa 52242

Office of Information Technology  
319/335-3548

December 1, 1989



Edward Lawler, Chair  
University Strategic Planning Committee  
c/o Department of Sociology  
W143 SSH

Dear Ed:

It is my pleasure to forward the unit plan for the Office of Information Technology to the University Strategic Planning Committee. In this plan, the OIT staff has refined and extended our planning to reflect feedback from faculty and staff who have reviewed earlier drafts. All of the financial scenarios requested by the Committee are now included as well.

In developing our goals, objectives, and strategies, we have established basic infrastructure and support for the general benefit of the University community as our first priority. In other areas, the goals and objectives address special interests within the University community, and these priorities may change as the University refines its areas of focus and proceeds with implementation. We will continue to work closely with other first- and second-level units of the University to develop implementation plans that are well integrated with those of other units and refine our strategies and resource requirements accordingly. We look forward to doing so with the University Strategic Planning Committee as you consider implementation issues in the coming months.

Pursuing the goals and strategies contained in the OIT plan will involve substantial financial investment. Moreover, from our perspective, the critical issue is not priorities but timing. In order for the University to maintain its current levels of teaching and research activities and to avoid falling further behind other universities, some of the strategies in this plan must be funded now. In order for the University to enhance those activities, to position itself for attaining "top ten" status, and to ensure the competitive, effective use of its most precious resource — its faculty, staff, and students — all of the strategies must be considered high priority and funded. The rate at which this occurs in the next few years will determine our success.

Finally, I urge the University Strategic Planning Committee to consider the issue of a larger role and scope of the Office of Information Technology. Especially important are multimedia services, which hold promise for the broader, more cost effective maintenance and

dissemination of information and which are changing rapidly with the convergence of related technologies. The basic hierarchy of organizational options are cooperation, coordination, and consolidation. In a climate of rising demand and almost revolutionary change, the Committee may wish to suggest a preferred choice for the University.

Sincerely,



Fred H. Harris  
Associate Vice President and Director

c: Vice President Hubbard  
Acting Vice President Montgomery  
Vice President Phillips  
Acting Vice President Vernon

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# Strategic Planning First-Level Unit Plan

Office of Information Technology  
The University of Iowa

December 1, 1989

## Executive Summary

The first-level unit plan for the Office of Information Technology (OIT) envisions an information technologies environment that will provide faculty, staff, and students with the computing, telecommunications, and information resources to accomplish and surpass their expectations for excellence in research, instruction, service, and administration.

It is impossible to have a first-rate university without a first-rate library and, increasingly, the same is said of its computing and telecommunications facilities, services, and related applications. Accordingly, the specification of our goals and objectives has been driven by the University's long-term aspiration to be among the top ten public institutions and by the special areas of focus developed by the University Strategic Planning Committee.

To enable the University to achieve its aspiration, we must provide:

- Universal access to a solid core of facilities and services;
- A responsive, focused support organization;
- Excellence in support services of strategic importance to the University;
- Innovative applications in teaching, research, and administration;
- General computer literacy.

A broader base of funding than that now available to us will be required to reach these goals and objectives and to integrate this technology into all facets of the University's operation, and this requirement is included in our plan as well.

The demand for information access is growing across all disciplines, and the consequential need for distributed computing (specifically intelligent desk-top workstations with well-integrated telecommunications networks) and access to specialized processing capabilities and databases is significantly greater than currently provided. The University faces a disadvantaged, noncompetitive future if we fail to grasp the significant, far-reaching effects of stagnation at our current level of support. At best, limited progress is being made, but pressing needs remain to be addressed. The University has submitted special askings to the Regents for the past three years for projects which are still unfunded. The University must find the will and means to address these needs if we are to be responsive to the core resource role which was identified in the 1987 institutional self-study, *Building on Strength*, and which is reflected

throughout other first-level plans. Without an essential infrastructure of facilities and professional staff support, the University will be sorely hampered in reaching its goals.

OIT's plan reflects both our internal vision of the University in the next decade and our understanding of other units' needs for substantially enhanced information systems support and more timely access to information for research, instruction, service, and administrative tasks alike. Digital microelectronics is one of the few technologies where price performance is expected to continue to improve at 15-20 percent per year. This continuing downward trend in the unit cost of information technologies, versus the increasing cost of labor, argues strongly for a renewed focus on the productivity of individuals and departmental units. Empowering the campus community with appropriate information resources can provide a significant competitive advantage in attracting and keeping talented faculty, staff, and students.

The determination of resource requirements within this report has two aspects: (1) it is OIT's responsibility to set priorities and obtain funding for those strategies within the purview of OIT and (2) for some strategies, OIT plays a participative and supportive role, but it is up to the primary unit to determine priorities and obtain funding. For these strategies, we will support the unit's efforts in obtaining funding.

The financial scenarios reflect the priorities and financial analysis that were developed for the FY 1991 and FY 1992 Essential Operating Needs and submitted to the Board of Regents Office as part of next year's budget process. The funds requested would allow the University to embark upon an essential and aggressive program of enhanced computer services and information access. These priority requests, discussed in more detail in the Financial Scenarios section, include networking infrastructure, expansion of student, faculty, and staff workstations, additional databases, integration of instructional software into the curriculum, and additional resources for advanced research computing. Equally as important, much needed funds are also requested by the University for library automation and enhancements to management and financial information systems.

The staff of OIT is committed to proactive support of the University community as we move forward into the decade of the 90s and position the University for the next century. We must view the requisite funding as a much needed investment to reduce gaps in the existing infrastructure, to improve our competitive position, and to accelerate the attendant gains in intellectual productivity and effectiveness.

## **I. Mission Statement**

The Office of Information Technology supports University of Iowa students, staff, and faculty by providing leadership in the application of information technologies and by effectively managing and operating computing, telecommunications, and related resources in an ever-changing environment. In fulfilling this mission, the Office thereby supports and enhances the University's teaching, research, and service missions.

In furtherance of this mission and to improve the creativity and productivity of the University community, the Office:

- Provides and manages essential core facilities, related information resources, and supporting services;
- Evaluates the effectiveness of technological resources and makes enhancements where appropriate;
- Establishes and monitors the observance of standards relevant to information technology;
- Researches and evaluates emerging technologies and innovative applications and, where applicable, encourages and supports their use;
- Educates the University community in the use of supported technologies through consultation and instruction;
- Enhances the integration and application of related technologies by fostering cooperation with other University units through coordination and leadership;
- Represents the University's interests in information technology and its application at the state, national, and international levels.

A high technology turnover rate, almost constant gains in price performance, and the resulting rapid rate of applications innovation make change the only real constant in our environment. Managing and adapting to such change is an ongoing challenge. These changes are expected to continue unabated, and responding advantageously to them holds enormous potential for benefiting the University community.

## **II. Unit Description**

The Office of Information Technology provides the necessary infrastructure for the University community to use computing and communications technology in research, instruction, and administration. The Office operates computing and communications facilities and provides leadership in appraising new technological resources. It provides instruction and consultation to the University community on the use of technological tools and helps the various units integrate these tools into their daily work. It recommends, establishes, and monitors adherence to standards of technology use that maximize long-term benefits and minimize difficulties in information sharing.

The OIT is currently organized in three primary units: Administrative Data Processing, the Office of Telecommunications, and Weeg Computing Center.



Administrative Data Processing (ADP) provides computing services that support administrative functions throughout the University. ADP maintains numerous databases and a network of computer terminals that handle information in various administrative areas, including accounting, payroll, personnel, student records, and purchasing. ADP staff are available to design, develop, and implement systems for University departments. They also provide training and consulting services to end-users.

The Office of Telecommunications operates and maintains the voice communications system for the entire University. This office is also responsible for installing, operating, and maintaining campus data communications services.

Weeg Computing Center provides a comprehensive range of computing and networking facilities and services to meet the research and instruction needs of University faculty, staff, students, and off-campus users. Weeg offers interactive and batch computing on a variety of mainframe systems and supports numerous software packages on Apple Macintosh, IBM, and IBM-compatible personal computers. It also provides training and consulting in the use of computing hardware and software; personal computer sales and support services; design and implementation of instructional computing materials; and various networking services.

The OIT staff (as of September 1989) is comprised of professional and scientific and merit employees. In the table below, management includes directors, assistant directors, and first-level managers; supervisory includes second-level managers; professional includes programmers and other end-user support staff; technical includes operators and technicians; clerical includes both secretarial and clerical support staff; and support includes van drivers, data entry staff, and mailing service staff.

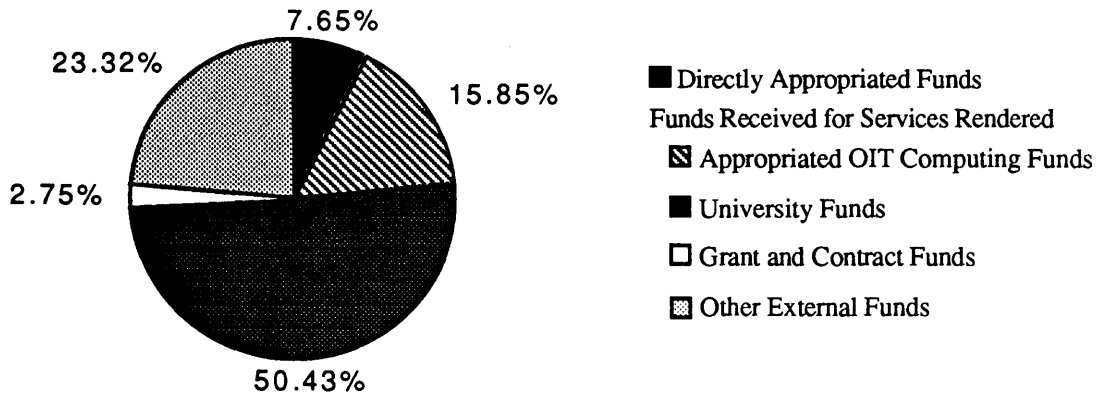
	OIT Admin	ADP	Telecom	Weeg	Total
Management	1	15	3	17	36
Supervisory	0	9.5	2	6	17.5
Professional	0	27.5	4	43	74.5
Technical	0	6	13	14	33
Clerical	1	3	14	9	27
Support	0	18	0	3	21
Total	2	79	36	92	209

In addition to the full-time staff described above, OIT employs approximately 65 students in a variety of part-time positions, including programmers, consultants, technicians, and clerks.

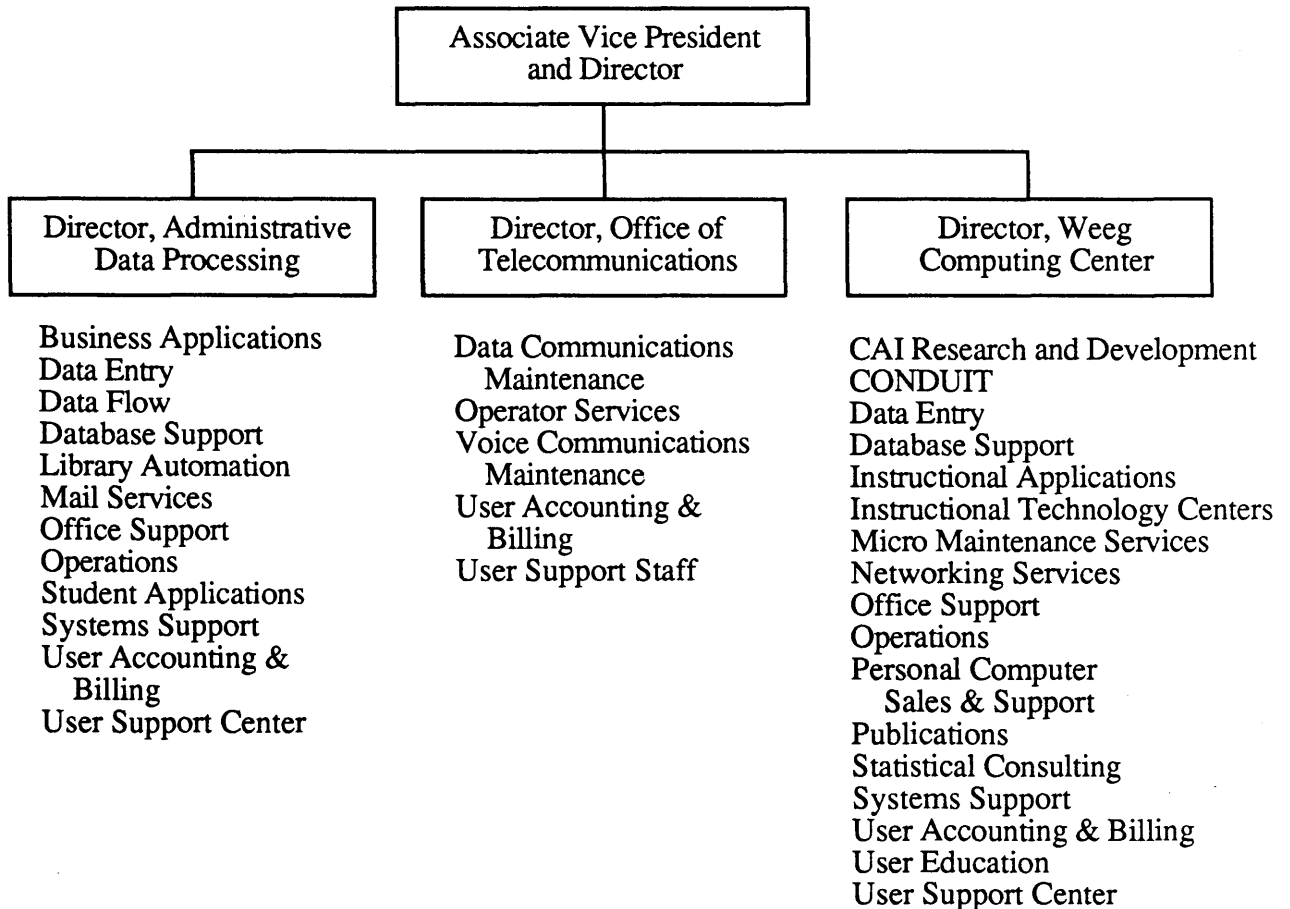
The total OIT budget for 1989-90 is approximately \$20 million. This figure does not include the approximately \$7 million worth of personal computing equipment sold through Weeg. All three subunits operate on a charge-back basis, where service revenues may be derived from user department general expense budgets, grants, contracts, or other external sources. OIT also receives appropriated funds which are used as follows:

1. Computing funds allocated to OIT are distributed to departments under the guidance of the Academic Computer Services Committee. These funds are used by departments to buy computing services for instruction and research from Weeg.
2. Appropriated funds in salary and general expense accounts are allocated to OIT to support the OIT administrative office and two Weeg services for which there are no direct charges: personal computing support and instructional services.

## Sources of OIT Funds (FY88-89)



## Office of Information Technology Organization



### III. Aspirations

Our vision of the future is ubiquitous, convenient, and appropriate access by faculty, students, and staff to personal workstations and services, with full connectivity to state-of-the-art computing and information resources across the campus, the state, the nation, and the world, supported by relevant standards and capable staff, and funded for ongoing operation and development.

We are persuaded that such pervasive access to robust, core resources within the University is essential if the University is to achieve its long-term aspiration to be among the top ten public institutions.

### IV. Environment

In developing the unit plan for the Office of Information Technology, the staff has focused on wide-reaching external factors which will affect the direction the University will take in the coming years. Trends and factors that we must be responsive to are:

- Education is the most important area affecting America's future
- Education & training is expanding throughout society
- New technologies will greatly facilitate training
- Improved pedagogy will revolutionize learning
- Education costs will continue to rise
- Demand for accountability in expenditure of public resources is growing
- Rise of knowledge industries and a knowledge-dependant society
- Centrality and increasing dominance of technology in the economy and society
- High technology turnover rate
- Development of mass media in telecommunication & printing
- Growth in information industries
- Movement toward 2nd & 3rd careers, midlife changes
- Typical large business will be information-based
- Growth in the do-it-yourself movement

Source: World Future Society

We have identified key technological trends that we believe will enhance the University's support of its faculty, staff, and students. We have already made significant strides toward improving networking and communications, instructional software and related systems, and multimedia and interface technologies. Areas that require additional attention include electronic data interchange, text and document management and dissemination, visualization and supercomputing, and systems design and development tools.

OIT's plan reflects both our vision of the University's direction in the next decade and our understanding of its growing need for timely access to information sources for research, instruction, service, and administration. The unit cost of information technologies is decreasing at the rate of 15-20 percent annually. This improvement in price performance, when viewed in light of increasing labor costs, argues strongly for enhancing individual and departmental productivity through improvements in information technology. Empowering the campus community with appropriate information resources can also provide a significant competitive advantage in attracting and keeping talented faculty, staff, and students.

The North Central Association evaluation team's recent judgment that this campus has a "strong" computer system is based on outdated standards for assessing the adequacy of computing (and telecommunications) equipment, facilities, and supporting staff resources. We believe that their evaluation does not show an appreciation for the increasing need for distributed computing on campus, specifically intelligent desk-top workstations with well-integrated telecommunications networks — a need that is felt by all disciplines.

Essential facilities and services for computing and communications were identified in *Future of Computing at The University of Iowa: A Five Year Plan*, a 1987 report jointly prepared by the Academic Computer Services Committee, Computer Operations Working Committee, and the Computer-Based Education Committee. Although some limited progress has been made, the increasingly serious need for additional computing capabilities has been the basis for special budget askings submitted to the Regents by the University administration in the past three years. High priorities for funding now include library automation, the campus networking infrastructure, workstations for students and faculty, integration of instructional technology into the curriculum, and advanced research computing support. These will require our attention if we are to halt the widening gap between this University and the top institutions in the country. The effects of stagnation at our current level of support will be significant and far-reaching. If the University fails to grasp this fact, a disadvantaged, noncompetitive future is imminent. It would be unfortunate indeed if the North Central Association's review was interpreted as conclusive evidence that present levels of support are sufficient and we were to drift into the future without much-needed improvements. Without an essential infrastructure of facilities and professional staff support, the University is unlikely to fulfill the core resource role identified in the 1987 institutional self-study *Building on Strength* and reflected in other first-level planning documents.

There are no generally agreed-upon metrics for comparing the computing facilities and services of different institutions. Currently used measures such as institutional expenditures on computing, computing staff size, etc., do not adequately measure the quality of the resulting services. Moreover, such measures are subject to misinterpretation due to differences in institutional character and organization, and they provide no sense of the "hidden" investment that most institutions make in information technology. Nonetheless, we have made a general comparison of our facilities with those of major research institutions and we find ourselves lagging behind in the areas of library automation, convenient access to electronic databases, supercomputing, and person-to-person connectivity.

Up-to-date information technology can benefit the University greatly in the coming decade. The rapidly advancing technologies associated with computers, video, telecommunications, multimedia systems, and the information explosion will assist us all, directly or indirectly, in supporting the University's principal missions. The growing convergence of these technologies and the increasing focus on multimedia systems will have a profound effect on teaching and research, as highlighted in the working assumptions in the *Planning Framework for the University of Iowa*. Equally important, these technologies and the extent of their use will also affect administrative costs and University assets in the coming decade.

If the University is to achieve excellence, organizational changes must be considered. The OIT recommends expanding its responsibilities to include the following units, which are concerned

primarily with handling information and which are being increasingly affected by progress in digital electronics:

- Video telecommunications (in addition to voice and data)
- Printing and graphic services
- Audiovisual and related media services
- Institutional research and planning

If we define information technology as including those technologies that predominantly involve the input, storage, processing, transfer, and output of information — but not the essential creation and end uses of information, a basis emerges for collecting such a group of University core facilities and services under the auspices of OIT. As technology advances, we will see increasing overlap in functions among these areas and OIT subunits Weeg, ADP, and Telecommunications. Better integration would create opportunities for providing more effective and economical support services.

While the University Libraries could be considered a logical component of this grouping, their long-standing tradition and role as a core resource argues clearly for strengthening already-established coordination and cooperation, rather than possible merger, with OIT.

The accelerating convergence of computing, telecommunications, and multimedia technologies holds great promise for innovative applications in the coming years, and a broader overview would aid in early awareness and development of these applications. As Clark Kerr has stated, "The major test of a modern American university is how wisely and how quickly it adjusts to important new possibilities."\*

\*Clark Kerr, Academic Strategy, 1986, p. 40.

## V. Goals

It is impossible to have a first-rate university without a first-rate library and, increasingly, the same is said of computing and telecommunications facilities, services, and related applications. Accordingly, the specification of our goals and objectives has been driven by the University's long-term aspiration to be among the top ten public institutions.

To enable the University to reach this overriding goal, OIT believes the following goals are important:

1. Universal access to a solid core of facilities and services
2. A responsive, focused support organization
3. Excellence in support services of strategic importance to the University
4. Innovative applications in teaching, research, and administration
5. General computer literacy
6. Broader base of funding

From our perspective, OIT goals 1, 2, and 3 are essential to supporting the academic and intellectual life of the campus and deserve the highest priority. Moreover, enhancements to essential administrative applications systems will ultimately save funds through productivity gains and effective stewardship of existing resources. Goals 4 and 5 are highly desirable because they will excite the community toward creativity and excellence, on the one hand, and broaden general capability on the other. Goal 6 is also highly desirable, for we must broaden our base of funding to include new sources of support as well.

OIT will largely determine the allocation priorities for the individual objectives and strategies (presented in the next section) for goals 1, 2, 5, and 6. The relative importance to other units and the University should largely dictate priorities for the individual objectives and strategies for goals 3 and 4.

We are convinced that in every instance, there is strong correlation between OIT's goals and those of the University (as presented in the *Planning Framework for the University of Iowa*, page 9). A solid core of computing and communications facilities with strong organizational support is critical to instruction, research, administration, and service.

The presentation of goals, objectives, and strategies which follows in the next section has been revised to reflect feedback from faculty and staff who have reviewed earlier drafts. Goals 1 through 5, along with their associated objectives and strategies, are presented in relative priority order. Goal 6, expanded funding, is, of course, an underlying, facilitating one and is necessary to achieve OIT's other goals.

## **VI. Goals, Objectives, and Strategies**

### **Goal 1: Universal Access to a Solid Core of Facilities and Services**

**Objective A:** Increase interoperability, utility, and flexibility of facilities and services

- Strategies:**
1. Adopt and monitor observance of standards for networks and associated applications interfaces
  2. Implement additional identification, password and security provisions to facilitate greater faculty, staff, and student access to University systems

**Objective B:** Enhance networks and complete connectivity in an integrated manner

- Strategies:**
1. Connect all Instructional Technology Centers to high-speed campus computing network
  2. Complete high-speed campus computing network
  3. Expand fiber optic network
  4. Connect all computer equipment-based services to the high-speed campus computing network
  5. Provide for local area network service to residence hall rooms
  6. Provide departmental guidelines for interconnectivity to campus and external services
  7. Provide connectivity and appropriate gateways to all external networks which are consistent with the University's missions

**Objective C:** Enhance portfolio of end-user applications tools and integrate associated staff support

- Strategies:**
1. Expand and integrate electronic mail systems across all campus networks
  2. Integrate and enhance office support services
  3. Enhance end-user database and query software
  4. Enhance end-user statistical analysis and reporting software
  5. Enhance end-user graphics and presentation facilities
  6. Enhance end-user document production capabilities by improving interfaces and integrating document processing, graphics, and printing applications across all campus services
  7. Provide voice processing and mail system

**Goal 1: Universal Access to a Solid Core of Facilities and Services  
(continued)**

**Objective D: Substantially increase individual access to personal workstations**

- Strategies:**
1. Expand Instructional Technology Centers and number of student workstations to achieve a ratio of 20 students per workstation by 1994
  2. Increase number and maintain currency of faculty and staff workstations
  3. Establish an Instructional Technology Center in each residence hall
  4. Expand availability of adaptive devices to assist persons with disabilities in the use of computing and information resources
  5. Enhance microcomputer sales and support program



## **Goal 2: A Responsive, Focused Support Organization**

**Objective A:** Assure consultation and dialogue with University community

- Strategies:**
1. Redirect current oversight committees to focus on strategic planning, policy, and major resources
  2. Establish functionally oriented user groups for technical/operational advice and consultation
  3. Encourage and support faculty computer committees in major academic units
  4. Designate a senior staff member from OIT to be liaison for each major academic and administrative unit, and to be responsible for identifying issues and resolving questions relating to that unit

**Objective B:** Assure effective and efficient resource structures

- Strategies:**
1. Organize staff resources along functional support lines (e.g., telecommunication and networking, office automation and personal productivity support)
  2. Consolidate Weeg and ADP mainframe resources
  3. Assure compatibility of our resources with national academic trends (e.g., institute three-year program to shift emphasis from Prime's Primos to UNIX and DEC's VMS)
  4. Pursue interinstitutional opportunities to share resources and development activities

**Objective C:** Assure a well-trained and motivated Office of Information Technology staff

- Strategies:**
1. Formalize and expand professional development opportunities, including staff seminars, rotating assignments, and a program for paid developmental leaves
  2. Provide competitive working environment and benefits

### **Goal 3: Excellence in Support Services of Strategic Importance to the University**

#### **Objective A: Increase access to academic information resources**

- Strategies:**
1. Complete circulation module of library automation project, incorporate electronic message services, and fund for ongoing operation
  2. Expand access to bibliographic and full text databases
  3. Develop and support access to online catalogs of resource materials (e.g., videotapes for instructional use)

#### **Objective B: Accelerate use of instructional technology in the curriculum**

- Strategies:**
1. Establish an Instructional Technology Support Center and consolidate existing support groups
  2. Increase OIT professional staff support for joint development projects with faculty
  3. Equip additional classrooms for computer-aided instruction
  4. Replicate successful applications, including proactive efforts to import successes from other campuses
  5. Develop workshops on uses of instructional technology for faculty
  6. Encourage deans and academic department heads to include consideration of faculty accomplishments with instructional technology in performance, promotion, and tenure decisions
  7. Establish a faculty instructional technology award for exceptional contributions, to be given biannually

#### **Objective C: Improve access to advanced research computing resources**

- Strategies:**
1. Augment on-campus high-speed computing with addition of a mini-supercomputer
  2. Provide on-campus "state-of-the-art" graphics and visualization systems necessary for the analysis of data from complex computations and simulations
  3. Expand access to national supercomputing centers through acquisition of blocks of time at national centers for reallocation to faculty and students on a peer review basis
  4. Form alliances with other institutions, industry, and government to establish a state-wide supercomputer resource within Iowa
  5. Add professional staff support for coordination, consultation, and software and applications assistance

### **Goal 3: Excellence in Support Services of Strategic Importance to the University (continued)**

**Objective D:** Enhance the value and effectiveness of existing administrative systems through expanded access

- Strategies:**
1. Provide faculty and staff with online access to information and services of the Division of Sponsored Programs
  2. Provide students with online access to information and services of the Office of Student Financial Aid
  3. Provide students with online access to information and services of the Registrar's Office
  4. Provide the Office of Admissions with enhanced support for expanded recruiting activities

**Objective E:** Enhance the effectiveness and efficiency of essential administrative systems

- Strategies:**
1. Provide integrated management and financial information systems
  2. Provide integrated student information systems
  3. Provide integrated human resources information systems
  4. Provide integrated executive information and decision support systems

## **Goal 4: Innovative Applications in Teaching, Research, and Administration**

**Objective A:** Identify opportunities with willing user champions to serve as "change agents" and initiate joint projects with high-impact potential

- Strategies:**
1. Establish toll-free services for external community access to key University information services
  2. Focus on interdisciplinary applications consistent with University priorities (e.g., geographic information systems/geographic analysis support and global studies)
  3. Focus on interinstitutional applications consistent with University priorities (e.g., integrated support for Admissions: outreach, articulation with the external community, and application processing using image systems and electronic data interchange)

**Objective B:** Encourage faculty, staff, and student initiatives

- Strategies:**
1. Provide additional professional staff support during conceptual and planning stages of development
  2. Increase faculty release time for development
  3. Establish recognition program
  4. Establish program for student participation in research and development projects

## **Goal 5: General Computer Literacy**

**Objective A:** Expand programs to inform faculty, staff, and students about available resources

- Strategies:**
1. Integrate sessions on computing and information resources into faculty, staff, and student orientations
  2. Initiate and support departmental avenues for providing information to faculty, staff, and students
  3. Publicize case studies of illustrative computing applications

**Objective B:** Expand learning opportunities for faculty, staff, and students

- Strategies:**
1. Offer computer instruction on videotapes
  2. Expand advice and consultation role of Instructional Technology Center monitors
  3. Improve coordination with Iowa Student Computer Association, Graduate Student Senate, and other student groups and assist in expanding their outreach services
  4. Offer workshops on computing and personal productivity tools

## **Goal 6: Broader Base of Funding**

**Objective A:** Expand base of funding

- Strategies:**
1. Establish closer liaison with Division of Sponsored Programs and seek additional sources of direct external support
  2. Seek and promote joint, interdisciplinary proposals for external funding
  3. Establish campus-wide student fee, consistent with substantially increased facilities, use, and benefits
  4. Develop joint venture projects with equipment and software vendors in areas of special strengths

**Objective B:** Establish pricing and funding strategies consistent with University goals and objectives

- Strategies:**
1. Establish principle of central funding for strategic services
  2. Evaluate feasibility of marginal-cost transfer pricing for other services

## VII. Resources

The accompanying table summarizes our approximations of aggregate resource requirements — in terms of dollars, by goal and objective, on a cumulative basis — for the five-year period of this plan. The aggregate operating budgets for OIT will approach \$20 million in FY 1990, excluding the cost of microcomputer goods sold by Weeg Computing Center, which is about \$7 million. For the planning period, therefore, the existing annual investment in computing, telecommunications, and related support services will exceed \$100 million, exclusive of personal and departmental purchases of microcomputers through Weeg. These estimates include some opportunity costs and potential for internal reallocation of effort, however marginal. Nevertheless, the additional resources required over five years to address the goals and objectives identified by the Office of Information Technology are substantial, totaling almost \$60 million.

In each instance, the needed resources typically include additional computing equipment, software or its development, and the professional staff support to ensure effective delivery. In addition, expanding the number of student workstations and Instructional Technology Centers to a competitive level within five years (Goal 1, Objective D) will require 25,000 net square feet of space; the associated capital and operating costs are reflected in our estimate.

In certain instances, the bases for these estimates are firm and reflect a detailed identification of cost components from previous work. Examples of such firm estimates include all of the objectives under Goal 1; Goal 3, Objective A; and the management and financial information systems component of Goal 3, Objective E — all of which have been the subject of repeated special askings over the past several years. Other estimates are preliminary ones for planning purposes and are provided to emphasize the scale of resources needed to achieve the identified objective.

The figures presented reflect total costs: capital and ongoing operating and overhead costs, including the opportunity costs associated with reallocation of existing staff. We present the resource requirements in this manner because support must be provided on a recurring basis so that future services will have a solid foundation. The intent, given the rapid evolution of technology, is to accelerate the availability of benefits to the end users, but to do so on a firm financial basis.

Corresponding resource requests will inevitably appear in the plans of other units. Areas of significant potential redundancy include individual access to personal workstations (Goal 1, Objective D); academic information resources, especially related to library automation (Goal 3, Objective A); and administrative systems (Goal 3, Objectives D and E). A first order approximation of the resource requirements which may appear both in OIT's plan and in the plans of other units is \$19 million, and the Committee should be alert for such redundant requirements when consolidating the respective first-level unit plans. However, the Committee is also cautioned to consider carefully the life-cycle cost implications of computing equipment items where only capital equipment costs are identified. Failure to do so in the past has substantially aggravated the present shortage in operating funds for computer equipment purchased over the past several years.

As the development of individual strategies proceeds, we will refine these resource estimates. In doing so, we also will identify the potential for refocusing or reallocating existing resources, particularly staff effort, which exists with several of OIT's strategies. For example, in the estimates for implementing major administrative systems, the opportunity costs associated with the use of existing staff may be significant, but cannot be known without more detailed project planning. A first approximation of this potential totals \$7 million. Note, however, especially

with respect to administrative systems (Goal 3, Objectives D and E), there may be substantial overlap between the redundancy and the refocusing components.

There is no question within the University about the priority of library automation activities, which are included in Goal 3, Objective A, and represent a major part of the \$5 million earmarked for increasing access to academic information resources. Thus, major shortfalls in needed additional resources will have the greatest effect on the other objectives with the largest resource requirements: student and faculty access to personal workstations at \$20 million, advanced research computing resources at \$6 million, and improvements in major administrative systems at \$10 million. While sources of funding for different objectives and component strategies will vary, the majority of funds must come from University resources, primarily state appropriations.

Increased support for advanced research computing, especially supercomputing and associated visualization requirements, has been discussed and reviewed at some length in the past year. Clearly, a growing number of faculty in various of disciplines must have adequate access to supercomputing resources in order to pursue their innovative and computer-intensive research activities. However, after discussions with faculty, advisory committees, and administrators, we have concluded that it would be impractical for the University to pursue acquisition of a supercomputer at this time. To do so would require an estimated \$20 million to \$30 million over the next five years for equipment, facilities, additional staff, and operational support. Such an investment would be unwise in view of the other, more pressing needs addressed in this report.

Thus, rather than include the acquisition of a supercomputer system in this plan, we have identified enhancements and strategies for advanced research computing, namely improved access to national supercomputing resources, acquisition of a mini-supercomputer as an intermediate capability, and forming an alliance with other institutions, industry, and government agencies to determine if a shared system for the state is feasible.

The extent to which increased student support should come from tuition revenues or from the establishment of a separate student computer fee (or preferably, a more general instructional technology fee) is a policy matter. There appears to be a strong preference on the part of the University administration and the Board of Regents to avoid new fees, and support for computerization is being budgeted under tuition increases for FY 1991. The outcome may ultimately determine the degree of our expansion of Instructional Technology Centers and the corresponding extent of computer literacy among a diverse student body.

Fees have been established for the Colleges of Business Administration, Engineering, and Law, and formal criteria for student computer fees have been established by the Computer-Based Education Committee and the Academic Computer Services Committee. Serious consideration of a University-wide student fee, however, must be coupled with a clear commitment to this plan and preceded by substantial progress toward its implementation.

## Resource Requirements for Five Year Plan (\$M)

- Goal 1: Universal access to a solid core of facilities and services** **\$29.5**
- Objectives:
- A. Increase inter-operability, utility, and flexibility of services (\$.5 M)
  - B. Enhance networks and complete connectivity in an integrated manner (\$6 M)
  - C. Enhance portfolio of end-user applications tools and associated staff support (\$3 M)
  - D. Substantially increase individual access to personal workstations (\$20 M)
- Goal 2: A responsive, focused support organization** **\$ 2.5**
- Objectives:
- A. Assure consultation and dialogue with University community (\$.5 M)
  - B. Assure effective and efficient resource structures
  - C. Assure a well-trained and motivated OIT staff (\$2 M)
- Goal 3: Excellence in support services of strategic importance to the University** **\$24.25**
- Objectives:
- A. Increase access to academic information resources (\$5 M)
  - B. Accelerate use of instructional technology in the curriculum (\$2 M)
  - C. Improve access to advanced research computing resources (\$6 M)
  - D. Enhance the value and effectiveness of existing administrative systems through expanded access (\$1.25 M)
  - E. Enhance the effectiveness and efficiency of essential administrative systems (\$10 M)
- Goal 4: Innovative applications in teaching, research, and administration** **\$ 2.25**
- Objectives:
- A. Identify opportunities with willing user champions to serve as "change agents" and initiate joint projects with high-impact potential (\$2 M)
  - B. Encourage faculty, staff, and student initiatives (\$.25 M)
- Goal 5: General computer literacy** **\$ 1**
- Objectives:
- A. Expand programs to inform faculty, staff, and students about available resources (\$.25 M)
  - B. Expand learning opportunities for faculty, staff, and students (\$.75 M)
- Goal 6: Broader base of funding** **\$ .25**
- Objectives:
- A. Expand base of funding (\$.25 M)
  - B. Establish pricing and funding strategies consistent with University goals and objectives



## VIII. Financial Scenarios

The University Strategic Planning Committee has requested the inclusion of several financial scenarios in the unit plans. In consultation with the Chairman, we determined that it was appropriate to add an additional scenario. Given the parallel work on the present budget cycle, our initial effort was devoted to a scenario based on OIT's request for Essential Operating Needs for FY 1991 and 1992. The scenarios associated with the 5 percent changes in resources (in real terms) and their potential impact are presented thereafter.

### A Scenario for Essential Operating Needs

The financial scenario which follows is based on OIT's Essential Operating Needs request for FY 1991 and 1992, a four-year program for computing for instruction and research with annual funding increments of \$3 million on a recurring basis, a total of \$30 million.

The allocation of the requested funds (see table on page 23) reflects the relative priority from past special askings and the addition of curriculum development and advanced research computing, two important areas that arose from OIT's strategic planning activities in the past year. In addition, the University also requested funds for library automation and for a management and financial information system. Resource requirements include staff, equipment, and operating expenses such as maintenance and supplies, and funding levels are presented on a recurring basis to reflect the ongoing nature of the support costs.

#### Networking (Goal 1, Objective B)

Expansion of on-campus broadband networking is needed to provide University-wide access to high-speed communication systems interconnecting departmental local area networks, major campus computing and information resources (e.g., libraries), and connections to off-campus networks. In addition, funds are needed for a fiber research network connecting computer-intensive research facilities (e.g., engineering, laser center, human biology research laboratories, physics) with each other and with central University resources.

Support is needed to maintain and augment network linkages to off-campus computing/information resources, including supercomputer facilities, peer institutions, specialized national laboratories, etc. Such development is being funded partially through NSF and is being developed as a cooperative regional network involving the CIC universities. With the requested funds, OIT will:

- Connect additional 15 buildings to campus-wide area network in FY 91
- Expand high-speed fiber optic cable network to additional 5 buildings in FY 91, 15 buildings in FY 92, 30 buildings in FY 93, and 50 buildings in FY 94 (thereby completing connections necessary to satisfy anticipated needs)
- Support access to regional and national networks on recurring basis
- Expand capacity of connections to regional and national networks in FY 92 to support increased use

### Student workstations (Goal 1, Objective D, Strategy 1)

Additional funding is necessary for developing, expanding, and maintaining computer clusters for student use. The model envisioned is similar to that used for faculty/staff workstations involving a cluster-based local area network connected with the campus-wide network, and incorporates the needed equipment, software, network interfaces and supporting services. With the requested funds, OIT will:

- To achieve a ratio of 20 students per workstation by 1994, expand number of Instructional Technology Centers (clusters) and student computer workstations by installing 400 workstations per year (the current ratio at the UI is 40 to 1; by comparison, the ratios at Illinois and Michigan already are, respectively, 24 to 1 and 26 to 1)
- Upgrade or replace 400 per year thereafter (a 4-year replacement cycle)

### Faculty and staff workstations (Goal 1, Objective D, Strategy 2)

Support is needed to equip faculty and staff with workstations based upon a model involving local area networks within departments which interconnect the workstations and allow intercommunications and sharing of resources. The local area networks will in turn be connected to the campus-wide system and, through it, to off-campus networks, allowing access to local, campus, or off-campus resources. With the requested funds, OIT will:

- Equip 80 percent of faculty with computer workstations by FY 94 by installing 400 workstations per year\*
- Upgrade or replace 400 per year thereafter (a 4-year replacement cycle)\*
- Equip 80 percent of relevant staff with computer workstations by FY 94

### Academic databases (Goal 3, Objective A, Strategy 2)

Additional funding is necessary for the expanded access to and use of databases by faculty and students for instruction and research. The quality and quantity of information available and accessible in electronic form is rapidly increasing, and such databases are necessary in a growing number of academic disciplines.

\*Refer to preliminary results of faculty computer workstation inventory survey on page 25.

### Curriculum development (Goal 3, Objective B)

Support is needed to accelerate the development and use of instructional technology in the curriculum. The requested funds will support the establishment and subsequent expansion of an Instructional Technology Support Center to assist faculty in integrating existing instructional software into the curriculum, provide training in instructional design techniques and authoring tools, assist faculty in developing technology-based curriculum materials, and provide for appropriately equipped classrooms. With the requested funds, OIT will:

- Support additional half-time faculty release positions in each year as follows: 2 in FY 91, 7 in FY 92, and 10 per year thereafter
- Equip 2 additional classrooms for computer-aided instruction in FY 92 and 5 per year thereafter

### Advanced research computing (Goal 3, Objective C)

Additional funds are needed to expand equipment and support for advanced research computing at The University of Iowa and to facilitate faculty and graduate student use of national research facilities, such as supercomputing centers. Advanced high-speed computing visualization systems and graphics workstations are needed to support scientific research and to extend scientists' capabilities in studying complex physical phenomena and communicating research results. With the requested funds, OIT will:

- Increase staff support to assist faculty in using national supercomputers
- Install visualization hardware and software in FY 91
- Upgrade existing mini-supercomputer systems to latest hardware and software releases and expand disk memory in FY 91
- Expand computing capacity with additional mini-supercomputer in FY 93

The measures described above will permit significant enhanced development of computing and communications systems which is essential if the University is to remain effective, efficient, and competitive in the marketplace of ideas.

Funding is required and requested on a recurring basis to ensure ongoing access to the resources identified and the attendant benefits to instruction and research programs. The rate of development and associated change in computing equipment, software, and applications continues to accelerate, and the effective useful life is, typically, only four to five years. Within that period, equipment and software values depreciate to zero for all practical purposes. Thus, it is essential to provide funds on a recurring basis for upgrading and replacing the basic tools needed for effective access to instructional and research computing resources.

**Computing for Instruction and Research  
A Four Year Program of Special Askings (in \$000)**

		FY 91	FY 92	FY 93	FY 94	Total
Networking	FY 91	345	345	345	345	
	FY 92		285	285	285	
	FY 93			320	320	
	FY 94				455	
	Subtotal	345	630	950	1,405	3,330
Student Workstations	FY 91	960	960	960	960	
	FY 92		855	855	855	
	FY 93			855	855	
	FY 94				855	
	Subtotal	960	1,815	2,670	3,525	8,970
Faculty Workstations	FY 91	660	660	660	660	
	FY 92		660	660	660	
	FY 93			660	660	
	FY 94				660	
	Subtotal	660	1,320	1,980	2,640	6,600
Staff Workstations	FY 91	275	275	275	275	
	FY 92		360	360	360	
	FY 93			290	290	
	FY 94				275	
	Subtotal	275	635	925	1,200	3,035
Academic Databases	FY 91	150	150	150	150	
	FY 92		125	125	125	
	FY 93			100	100	
	FY 94				25	
	Subtotal	150	275	375	400	1,200
Curriculum Development	FY 91	250	250	250	250	
	FY 92		500	500	500	
	FY 93			250	250	
	FY 94				0	
	Subtotal	250	750	1,000	1,000	3,000
Advanced Research Computing	FY 91	360	360	360	360	
	FY 92		215	215	215	
	FY 93			525	525	
	FY 94				730	
	Subtotal	360	575	1,100	1,830	3,865
Total		<u>3,000</u>	<u>6,000</u>	<u>9,000</u>	<u>12,000</u>	<u>30,000</u>

## Plus 5 Percent Scenario

In preparing the plus 5 percent scenario, we have assumed that an additional \$1 million would be available to OIT over the next five years but in the context of direct funding for use by OIT. More specifically, changes in support from service revenues that are funded from the budgets of other units are not reflected in this or the following scenario. For such services, changes in underlying costs are (or should be) reflected in corresponding rate changes over reasonable periods of time. Changes in funding for those units will routinely drive corresponding increases or decreases in the demand for such services.

The essential operating needs presented in the previous scenario were re-examined within the constraint of only \$1 million in additional funding over the next few years, and placed in the following priority order:

1. Networking	\$500,000
2. Student Workstations and Curriculum Development	300,000
3. Advanced Research Computing	200,000
4. Faculty and Staff Workstations Academic Databases	0

This reflects our judgement of the best way to distribute a 1 percent per year increase over five years, but such increases are clearly insufficient if we are to make meaningful progress toward the goals and objectives presented in this plan.

## Minus 5 Percent Scenario

In considering a minus 5 percent scenario, we have assumed that direct funding for use by OIT would decrease by \$1 million over the next five years. We would absorb or offset this loss of funding in the following ways:

1. Consolidation of IBM mainframes with only nominal increase in combined capacity	\$500,000
2. Additional fees for administrative support services	200,000
3. Reduction of personnel through attrition	300,000

The savings from mainframe consolidation accrue from elimination of redundant software license fees, maintenance, and related operational support costs.

Weeg and ADP currently provide certain services, e.g. short courses, advice, and consultation, without charging a fee. These services are offered without charge in the interest of encouraging faculty, staff, and students to utilize these services to their — and the University's — benefit. If necessary, because of reduced funding, we believe that fees for such services will both reduce the demand and increase revenues from administrative users which include academic departmental staff.

Finally, savings from attrition in personnel, in the absence of requisite funding, would necessarily not be reallocated to expansion of other services or support.

## IX. Process

We prepared the OIT first-level unit plan in a collaborative, participatory process with faculty, staff, and students, and by discussing with and soliciting input from other units across the campus. An initial working set of goals, objectives, and strategies were compiled from existing committee reports and recommendations; industry and related professional society sources, with particular focus on higher education; ongoing initiatives within the major units of OIT; and University Planning Committee documents. Especially important in preparing this initial set were the existing reports from the Academic Computer Services Committee, Computer Operations Working Committee, Computer-Based Education Committee, Advanced Research Computing Advisory Committee, and Task Force on Financial Information System Enhancement Needs, and the ongoing planning of future projects by major administrative units.

The initial working set of goals, objectives, and strategies were significantly honed through a series of workshops with the senior staff of Administrative Data Processing, Weeg Computing Center, and the Office of Telecommunications; meetings of oversight committees of faculty, staff, and students representing a diverse spectrum of the University community; and discussions with other departments and units interested in computing and communications.

As a part of our planning process, a questionnaire was distributed to solicit broad, representative student insight, and the results from that survey were incorporated in subsequent planning sessions. The students were asked to rate the importance of 22 goals/strategies from OIT's Strategic Plan. The top six were:

- Sell low-cost personal computer software to U of I students
- Provide computing consulting and documentation
- Provide hands-on training in using computers
- Continue selling personal computers to U of I students
- Complete the conversion of the library catalog to the OASIS online catalog system and automate the library circulation system
- Increase the number of student workstations and Instructional Technology Centers

Ninety-four percent of the students thought every university student should have some knowledge of computers and how to use them and that using a computer would probably help them produce higher quality class work. Almost 84 percent of the students thought that if the professor made use of the computer, they might learn more from a course.

In addition, a survey of faculty workstations currently is being conducted jointly by Weeg Computing Center and the Academic Computer Services Committee. One of the strategies identified in OIT's strategic planning process is to increase and maintain faculty computer workstations. The working target was to equip 80 percent of the faculty with a workstation and then maintain that level on an ongoing replacement basis. To establish an accurate base line, an inventory survey was sent to all faculty members asking whether they had a workstation, and if they did, to respond to questions regarding the age, adequacy, networking

capabilities, and use of that equipment. With 80 percent of the responses received, the following has been learned from the survey:

- More faculty have workstations than we projected (we believe 75 to 80 percent of the faculty have at least one workstation)
- Twenty percent of the existing workstations are four years old or older
- Approximately two out of five faculty feel that their workstation is now inadequate for their needs
- A large number (64 percent) are isolated workstations (not connected to other computers through communication links)
- About half of those not having a workstation would like one and feel that their work would benefit if available

These results indicate that our efforts should be directed to increasing the connectivity of existing workstations and replacing inadequate workstations. They also indicate that our initial target of equipping 80 percent of the faculty is too low — 90 percent is a more appropriate target.

As a result of these interactions, the components of the plan have been revised to more clearly address the needs and opportunities that face the University and OIT. We will continue to work with key constituencies to further refine our objectives, strategies, requisite resources, and the timing with which we might hope to proceed with implementation based on agreed-upon priorities and the availability of requisite funding.

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