IV. OPERATIONS AND SUPPORT SERVICES STRATEGIES

This section is based on the earlier work of the Operations and Support Team[1], originally established by the Systemwide Internal Partnership (SIP) as part of the CETI program development activity. However, what follows has been substantially changed as a result of several discussions by the SIP team and the guidance from the Technology Steering Committee.

INTRODUCTION

The impetus behind the TII was a call on the part of the Chancellor and the Presidents to do the business of the CSU differently, meaning to seek ways of providing more comprehensive technology services to students, faculty, and staff as economically as possible. This call embodied several aspirations as well as concerns. One was that access to technology was essential to the successful conduct of the CSU's primary mission, that of promoting a high level of quality in teaching and learning. A second was that no organization, including educational institutions, is fully prepared to cope with the changes and the costs associated with the development of technology; new arrangements and mechanisms will be needed to cope with these costs and changes. A third is that promotion of equity of technology access across the campuses will be assured to meet the teaching and learning goals of students and faculty. Finally, there was an understanding behind the concept of doing the CSU's business differently that there will be increased competition for available resources, and that it will be important to achieve cost efficiencies in operational areas in order to provide sufficient resources to promote student access and academic program development.

Most recently, the Technology Steering Commission has re-emphasized the importance of pursuing new ways to provide adequate technology support to students, faculty, and staff. The Commission has gone on record regarding the necessity of identifying ways to greatly expand the quality technology resources in cost-effective ways through the unification of appropriate functions, common approaches to standards and services, reciprocal efforts across the campuses, and systemwide procurement arrangements that leverage the purchasing power of the CSU. This direction, in addition to the more campus-based orientation of the SIP representatives, will need to be reconciled if technology resources are to be extended and resources used wisely.

SIP realizes that readiness to provide appropriate support services to students, faculty and staff involves a significant change process, and that detailed implementation strategies must be developed to facilitate that process. It is believed that the changes can best be initiated by conducting campus needs assessments and engaging in both internal and external consultation processes. These activities will occur during the 1998/99 academic year.

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In order to provide a fresh external perspective during the development of strategies for operations and support services, a qualified consulting firm will be retained to: assist in analysis and planning processes; help formulate the service strategies that meet the target environment, goals and metrics; and, identify needed economies of scale.

The resultant operations and support services strategies will be selected to provide the 344,000 students, 18,600 full and part-time faculty and the 20,000 full and part-time staff the highest quality support services and the most technologically current infrastructure possible, within available financial resources.

ASSUMPTIONS

Development of these strategies is conditioned by certain basic assumptions:

- Given the cost of the telecommunications infrastructure, the State of California will expect appropriate assurances that the CSU will utilize the infrastructure to meet its educational mission, and that the system and its campuses have strategies to operate and maintain the currency of the state's investment.

- The Board of Trustees will share concerns similar to those of the State of California regarding the operations and currency of the infrastructure. Additionally, the Board will expect assurances that the CSU has a plan for appropriate and equitable technology service provision to students, faculty, and staff.

- Students, faculty, and staff require access to a growing array of information and technology resources that can be achieved only through a high level of integrated planning, resource sharing and cooperative action across the CSU.

- Resources may never be sufficient to provide all of the technology and services needed, requiring the CSU to leverage the size of the system in purchasing power and inter-campus cooperation to help meet service demands.

PRINCIPLES

The following principles serve to guide the general development, implementation and on-going support of the ITS-TII Plan.

1. The substantial financial outlay on the part of the State of California in support of the California State University telecommunications infrastructure is an investment in education and an incentive to the system and its campuses to provide the highest quality technology services to students, faculty and staff. The State of California will expect the CSU to be a good steward of its technology resources by maintaining standards, currency and service levels appropriate to the CSU's educational mission.

2. The successful achievement of the target environment requires the participation of all 23 campuses in the development, implementation and funding of the ITS-TII, as part of a systemwide internal partnership.

3. CSU students, faculty and staff require a seamless technology environment, from workstation to workstation, that is well maintained and supported to enable them to perform their respective roles in the university system.

4. The initial build-out of the intra-campus physical telecommunications infrastructure (media, pathways, spaces, terminal equipment) on the 23 campuses will be accomplished by a comprehensive systemwide effort.

SCOPE AND GOALS

SIP is seeking to formulate comprehensive services strategies based on standards and service performance metrics. The strategies are expected to combine any advantages inherent in campus-based service delivery, in multi-campus, regional or statewide clustering of services, and in bridging through systemwide coordination and shared leadership and management.

The operations and support services goals are to:

- Operate and maintain a seamless, integrated technology environment extending from one individual's workstation to another individual's workstation and to the wide range of information resource repositories anywhere across the CSU;
- Deliver quality of services over the network capable of responding to mission-critical CSU requirements and the differential needs and priorities of user groups;
- Allow this CSU environment to connect to the larger networked universe; and,
- Insure that the support services provided to the CSU academic community are cost-effective, dependable, ubiquitous and of the highest possible quality.

The scope of the core services envisioned in the operations and support services strategy embraces three areas:

1. **User Workstation Environment** -- Provide students faculty and staff workstation hardware, core applications software, development software tools, and systems management software tools; training; and, support services.
2. **Network Operations and Support Services** -- Provide support for all campus and systemwide data, voice and video systems, to the "faceplate".
3. **Infrastructure Support** -- Maintain and refresh the campus telecommunications physical plant (pathways, media and spaces) and electronics.

CURRENT ENVIRONMENT

Operations and support services on the 23 CSU campuses commonly encompass the following:

- An IT operated campus-wide data network and a data center;
- IT and school/department operated Local Area Networks (LANs);
- IT operated campus-wide PBX-based telephone services (only four campuses currently use Centrex);
- On-campus and off-campus video distribution systems and services operated either by IT, Media, Library or Extended Ed.; and,
- IT and school/department operated workstation support services including student computing laboratories.

With the exception of the California Maritime Academy, each CSU campus has a wide area data network, and most have LANs managed and operated by the IT unit. At many sites, subsidiary LAN and server environments have also been developed and operated by individual schools and departments. These independent LANs usually serve specific academic program needs (e.g., engineering and business schools and computer science departments), and are almost always attached to the campus wide area network.

All campuses have a fairly extensive telephone infrastructure. Eighteen campuses operate their own PBX installations. Chico, Hayward, Northridge and San Marcos currently contract for Centrex services rather than operate local PBXs. In most instances, the campus IT unit manages and operates the telephone facilities.

The development of campus owned/operated PBXs was the result of the CSU's desire to build-out campus telecommunications infrastructures in the mid-1980s. The primary local source of funds at that time was the redirection of dollars originally budgeted for Centrex to acquire and install a PBX, and to build as much associated campus infrastructure as possible. Basically, the CSU entered the telephone business in order to meet an emerging and growing need for data networking.

Many campuses have some on-campus video distribution capabilities, varying from rudimentary to quite sophisticated. In addition, some campuses have developed joint ventures with local cable and telecommunications providers to extend video and data communications services into the local community and the surrounding geographic region. The locus for managing and operating these video distribution systems varies widely from campus to campus. In some instances, the IT unit has the responsibility, while at others it might be Media Services, Library Services or Extended Education.

All 23 campuses provide workstation support services. In most instances, the management responsibility for support services is distributed between the campus IT unit and several academic and administrative departments. In part, this distribution reflects: the rapid development of the workstation environment over the past decade; the stress on scarce resources in the IT unit; and, the politics of the campus. A few campuses have made progress towards a campus-wide approach to providing and

refreshing faculty and staff workstations and student computing laboratories. However, most do not have the resources; fewer still have a sufficient number of IT staff to provide the necessary support services.

On the statewide, systemwide and regional levels CSU operates and participates in several networking activities. Most significant, CSU operates 4CNet, a statewide data/video network connecting nearly 200 sites, which includes the 23 CSU campuses, 106 California Community College (CCC) campuses, several off-campus sites of both systems and over 50 K-12 sites. 4CNet is managed and operated by the CSU systemwide office of Information Resources and Technology.

CSU, via 4CNet, is an active participant in the development of CENIC, the Corporation for Education Networking Initiatives in California. CENIC is composed of several institutions of higher education in California: the California Institute of Technology, the California State University, Stanford University, the University of California and the University of Southern California. CENIC's mission is to facilitate and coordinate the development, deployment and operation of a set of seamless and robust intercampus communications services capable of supporting advanced research and education applications in furtherance of California's leadership in higher education and research. CENIC's first project is CalREN-2, the California Research and Education Network. The CalREN-2 network will provide a cost-effective advanced communications infrastructure making possible key research and advanced learning applications. The CSU will have three campuses connected to CalREN-2 starting in the fall of 1998.

In addition to these statewide and systemwide endeavors, the CSU is involved in regional operations of Instructional Television Fixed Services (ITFS), a broadcast microwave services. Fourteen campuses have licenses to designated spectrum in a specific geographic area. These channels are used for distance education. Several campuses have arrangements with "wireless cable" operators to lease spare capacity on the spectrum in exchange for equipment, access to homes serviced by the wireless cable companies and/or dollars which can be used to develop additional distance programming. An example of these kinds of arrangements is the partnership among the five Los Angeles Basin CALNET campuses (L.A., Pomona, Dominguez Hills, Fullerton and Long Beach), CSU Northridge, USC, several local school districts and Pacific Bell Video Services. This partnership garners several million dollars annually to the CSU campuses.

The quality of operations and support services across the CSU varies significantly from campus to campus (including off-campus centers), and the quantity of the resources available to provide these functions is generally insufficient at nearly all campuses. Currently, the services available to the university community are a reflection of the campus' success in channeling scarce budgetary provisions to that end. Campuses of smaller size, or located at a great distance from technology centers, typically have neither the budgetary flexibility nor the opportunity to meet technology needs through such internal mechanisms. The CSU owes much of whatever success it has enjoyed over the years to the dedication of campus and system IT personnel who typically work long hours assuring that the systems are as dependable and available as possible.

Each institution must fund most demands for technology support from within its own limited resources. Therefore, activities having greater campuswide impact (such as network operations) are likely to receive priority for staffing and attention over those of localized or individual focus, such as help desk support. As a consequence, few CSU campuses have been able to mobilize truly effective help desk programs and the service levels in other functional service areas are often insufficient.

Most, if not all, CSU IT managers share several concerns; among these are how to:

- Provide quality help desk and support services to a growing end user base;
- Measure the quality of service offered to end-users;
- Expand patchwork systems to keep pace with demand for more computing and communications equipment and support;
- Find means to replace obsolete equipment to achieve technological currency;
- Provide training to end users; and,
- Attract, develop and retain IT professional staff.

These challenges demand strategies for operations and support services that can meet the requirements of a growing number of CSU students, faculty and staff users.

TARGET ENVIRONMENT

The CSU's target environment is one in which the operations and support services provided on all 23 campuses, whether large or small and regardless of location, to the 344,000 students, 18,600 faculty and 20,000 staff, is generally comparable in quality. The ability to develop and maintain a seamless integrated telecommunications system and to provide high quality support services will have direct impact on CSU's commitment to provide its future learners access to quality education at an affordable cost.

The implementation of effective operations and support strategies will involve close coordination and cooperation across the 23 campuses. The point of oversight and coordination will be the Commission on Technology Infrastructure described in Section V.

The scope of the services coordinated by the CTI will encompass three areas:

User Workstation Environment

- Standards and standardization development;
- Acquisitions -- hardware and software coordination and assistance;
- Adds, moves and changes -- hardware (workstations and telephones) and software installation, upgrades and changes;
- Core applications software suite consultation;
- User training;
- Asset management -- hardware and software inventory, configuration management and policy management;
- Hardware maintenance -- computers and telephones;

- Software maintenance -- anti-virus, backup and disaster recovery, event monitoring, software distribution, installation, resource utilization, directory management and inventory; and,
- Call center/help desk management and operations -- call management, automatic notification and escalation and incidents/trouble tickets generation (Also, see Network Operations).

Network Operations and Support Services
(all campus and systemwide data, voice and video services)

- Standards and standardization development;
- Systems/networking operations -- campus voice (telephone), data and video services and 4CNet;
- Network management -- server and PBX administration, performance monitoring, and workload management;
- Unified messaging system management;
- Help desk management and operations;
- Security and control/backup and disaster recovery; and,
- System refresh and improvements (network electronics)
  - Adds, moves and changes management and control.

Infrastructure Support
(campus physical plant—pathways, media and spaces)

- Standards and standardization coordination/development;
- Maintenance (routine and emergency)
  - Preventive
  - Problem management and work order tracking;
- Electronics refresh;
- Adds, moves and changes and problem management;
- Construction; and,
- Documentation & record maintenance; "As Built" drawing management.

As part of any service strategy, the CTI will oversee the provision of a defined set of basic "core" services in these three areas based on performance metrics.

The adopted service strategies will further provide for the development and implementation of "supplementary" support services, as options.

It should be emphasized that, under the selected strategies, the primary mission of the CTI would be to ensure the coordination and leadership is provided to assure that operations and support services available to campuses systemwide would demonstrate characteristics which are consistent with the intent of ITS-TII, including:

- Quality;
- Availability;
- Dependability;
- Consistency; and,

- Affordability

Essential Services

In any strategy for implementation, a systemwide Network Operations Center support will be included as an essential element of the core services. Another possibility that should be considered for central development and coordination is a systemwide call center/help desk function. Such services cut across the three support service areas. This suggests they could be organized to provide CSU students, faculty and staff one point of entry to seek assistance from anywhere and at any time.

Network Operations Center (NOC) – The NOC will work to integrate the management of the inter-campus (4CNet) and intra-campus networks (voice, video and data). The NOC will: monitor network performance; reroute traffic; manage the interface with other support vendors or contractors; and, keep the network operational. End users experiencing network difficulties will contact the NOC service desk as appropriate.

Systemwide Call Center/Help Desk – A 24x7 single point of entry accepting calls from all CSU and other eligible users. This systemwide call center, if implemented, would normally include a database containing pertinent information about users and their eligibility for support, and a contemporary technologic infrastructure facilitating its activities. It would coordinate with appropriate affiliated service providers, both internal and external to the CSU. The center itself might be a virtual unit having only a small central resource connected to a network of campus- and/or vendor-based nodes.

Call center staff would identify callers, verify eligibility, and provide the requested service through the appropriate mechanisms (which include first, second and third level support actions), either to resolve the problem or to implement the desired change. The center would: log and track support requests ("trouble tickets") through resolution; update the system database as appropriate; and, bill customers, when necessary, according to predetermined rate structures.

Escalation Procedures

Typically, support available from IT entities offering call-in assistance may be organized to escalate attention to more complex problems through several "tiers" or "levels" of personnel having increasingly specific knowledge bases. The NOC will be so organized. However, through similar but expanded coordination, the possible systemwide call center/help desk function might act in tandem with the NOC to provide a comprehensive service program to the CSU academic community. For example, the following three levels of support could be made available to authorized users:

Level-One Support would be afforded by staff coordinated or provided through multi-campus systemwide strategy, and might take place at the local campus. Level-one representatives are normally the primary interface with end users and are responsible for providing general user assistance, basic trouble shooting, priority assignment, tracking, and status reporting. When required, they refer problems or requests to appropriate level-two support;

Level-Two Support would typically take place at local campus help desks, repair depots or other appropriate on-site locations and might be provided through campus staff or contractors. Contractors could be selected CSU campuses, industry affiliates or providers. This support would probably include workstation trouble shooting and coordination with level-three service providers; and,

Level-Three Support would involve referral of a problem or request to a higher level of expertise, which might be utility-coordinated technicians or personnel from the vendors of the relevant products or technologies.

SERVICE DELIVERY

The delivery of core support services to all CSU campuses and clients should be consistent, in conformity with the ITS-TII intent to assure a seamless, high-quality, consistent and dependable resource for the CSU. However, the customization of supplementary services is implicit in their nature. To provide a logical framework for such customization, support offerings can be categorized into service types.

Services may be delivered in the modes or through the resources described below:

Remote Service – This mode of service provides the subscriber with quick, dial-in diagnosis and on-site work, when necessary. Either level-one or level-two support staff would perform the required tasks.

On-Site Service – This type of service is provided at the site of the equipment. Most commonly, on-site support staff or contract personnel would complete the work.

Repair Depot – A repair depot is a facility to which customers take or mail their equipment. A depot facility could be identified for each campus. The depot would coordinate upgrades or repairs to user hardware or software based on an annual agreement or on a T&M basis. The depot could manage established local vendor contracts, pertinent statewide service agreements and vendor parts repair and replacement agreements.

24 x 7 Service – Service available 24 hours per day, every day of the week.

Dedicated On-Site Service – It may be desirable to have an on-site staff available for the execution of defined tasks during a specified time of day. (An example of this service is the Network Operations Center that supports 4CNet.) From the campus perspective, such service may provide the most effective solution for supporting large telecommunications systems.

Maintenance – Maintenance is defined as the repair or replacement of defective hardware or software in any segment of the network. Maintenance normally includes level-one call center support, level-two technical expertise, level-three vendor product changes (such as bug fixes), on-site software and hardware support and repair depot availability. Maintenance is most often coordinated through a call center/help desk and performed either remotely, on site, or at a repair depot.

Hardware Warranty – This program protects the user against failure of a system or component purchased through a CSU-sponsored program. Advance replacement of mission critical components could be available to those subscribers requesting this feature. Service can be extended to legacy systems or machines that meet industry standards as determined under a qualifying process. Extended warranty and maintenance agreements with automatic renewal will be available.

Software Subscription – This service typically is system-based and often includes a one-year, value-added option giving the subscriber free operating system or productivity applications software upgrades for the period of the agreement on all originally-installed software. Vendor supported upgrades or "bug fixes" to the base software package are usually provided free of charge.

Adds, Moves & Changes – Software upgrades and package enhancements, physical relocation and expansion of systems or components may be included in this service. All changes would be subject to standards defined by the CTI in consultation with the campuses.

Construction – This service includes project management, project coordination, training and physical construction. An IRT-PP&D coordination team would arrange the large-scale, cost-effective provision of CSU-certified construction contractors capable of planning and installing products or technologies associated with CSU-sponsored programs. All such activities will be coordinated in advance with campus facilities planning management and information technology resources representatives.

Engineering Consulting Services - On request, the IRT-PP&D coordination team would recommend to CSU campuses qualified engineers available to provide consulting services. Such engineers would be familiar with CSU standards, policies and procedures. The list of recommended professionals would be maintained by PP&D.

PERFORMANCE METRICS FRAMEWORK

The reliable and effective delivery of support services is vital to the success of the ITS-TII. The CTI will coordinate the efforts through the campus Presidents and CIOs for assuring that requests from students, faculty and staff entitled to services are handled expeditiously and competently. To achieve the desired goals, services must be evaluated against agreed-upon performance metrics.

SIP has developed a metrics framework for measuring performance for each service offering by service level and by user group. The framework is shown below for packages applicable to: 1) the requirements of individual users; 2) the local campus cable plant, voice system, intra-campus applications or video system; and, 3) Intra and Inter-campus Network. Where applicable, three levels of possible service quality are indicated (i.e., "Minimum", "Standard", and "Full").

INDIVIDUAL SERVICES PACKAGE

Service Type	Performance Objective	Availability in California Time
Help Desk / Call Center	Minimum As needed Standard Answer calls within 45 sec / VM with call back within 30 min Full Answer calls live within 45 sec with no VM	N / A M-F 7-10 M-F 7-10 S / S 8-5
On Site	Minimum As needed Standard Answer calls within 45 sec / VM with call back within 30 min Full Answer calls live within 45 sec with no VM	M-F 8-5 M-F 8-5 M-F 7-10 S / S 8-5
Remote	Minimum As needed Standard Answer calls within 45 sec / VM with call back within 30 min Full Answer calls live within 45 sec with no VM	As needed M-F 7-10 M-F 7-10 S / S 8-5
Repair Facility	Minimum As needed Standard Answer calls within 45 sec / VM with call back within 30 min Full Answer calls live within 45 sec with no VM	All Categories: In conjunction with normal Bookstore hours, or as negotiated with the Bookstore
Hardware Warranty	All Categories: Standard contract provisions for all products and services	All Categories: As defined in standard contractual provisions
Disaster Recovery	Need to define category / definition separately from Hardware Warranty	TBD
Software Subscription	As needed / negotiated	TBD
Site Dedicated	As needed / negotiated	TBD
Construction	N / A	N / A
Change	Minimum As needed Standard Answer calls within 45 sec / VM with call back within 30 min Full Answer calls live within 45 sec with no VM	M-F 8-5 M-F 8-5 M-F 7-10 S / S 8-5
Application Development	Application dependent	
Consulting	Application dependent	

CAMPUS SERVICES PACKAGE

Service Type	Performance Objective	Availability
Call Center / Help Desk	Minimum: As needed. Standard: Answer calls in 45 sec or voice mail call back within 60 min. Full: Answer calls live in 45 sec with call back within 60 min.	N / A M-F 8-5 CA Time 24x7
On Site	Minimum: Next university business day if submitted by 12 PM. Standard: 4-hour response time from initial call. Full: -4-hour response.	M-F 8-5 CA Time M-F 8-5 CA Time 24x7

Remote	Minimum: As needed. Standard: 4-hour response. Full: 4-hour response.	As needed M-F 7-10 CA Time 24x7
Dedicated On Site	As needed / negotiated	TBD
Repair Depot	Minimum: 5 business days. Standard: 2 business days. Full: Immediate repair or on-site replacement.	All categories: In conjunction with normal bookstore hours, or as negotiated with the bookstore.
24x7	Critical components to be defined by individual campus contract.	24x7
Hardware Warranty	All categories: Standard contract provisions for all products and services.	All categories: As defined in standard contract provisions.
Software Subscription	Minimum: As needed / negotiated. Standard: As needed. Full: As needed.	All categories: As needed.
Construction	As needed / negotiated, site dependent	TBD
Change Management	Minimum: T&M MAC. Standard: 5 business days. Full: 4-hour software MAC and 1-day hardware MAC.	All categories: M-F 8-5 CA Time.
Application Dev.	As needed	As needed
Consulting	As needed	As needed

NETWORK SERVICES PACKAGE

Service Type	Performance Objective	Availability
Help Desk / Call Center	Minimum · As needed Standard · Answer calls within 45 sec/VM with call back within 60 min Full · Answer calls live within 45 sec/VM with back within 60 min	N / A 24x7 24x7
On Site	Minimum · Next university business day, if submitted by noon Standard · 4 hour availability response time from initial call Full · Immediate to 1 hour response	M-F 8-5 M-F 8-5 24x7
Remote	Minimum · N / A Standard · 4 hour response Full · Immediate to 1 hour response	N / A M-F 7-10 24x7
Repair Facility	Minimum · N / A Standard · 5 business days Full · Immediate repair or on-site replacement of hardware and software	All Categories: In conjunction with normal Bookstore hours, or as negotiated with the Bookstore
Hardware Warranty	All Categories: Standard contract provisions for all products and services	All Categories: As defined in standard contractual provisions
Disaster Recovery	Need to define Category / definition separately from Hardware Warranty	TBD
Software Subscription	As needed / negotiated	TBD
Site Dedicated	As needed / negotiated	TBD
Construction	As needed / negotiated, site dependent	TBD
Change	All Categories: Site specific and dependent on service level agreements / contracts	TBD
Application Development	As needed	As needed
Consulting	As needed	As needed

By November, SIP will establish performance metric goals to serve as the target service metrics for all 23 campuses. CTI with the assistance of a consulting firm and in consultation with the campuses will refine this framework and determine the actual performance metrics to be used starting next July 1999.

MANAGEMENT STRATEGIES

A wide range of management strategies has been reviewed by SIP as part of a preliminary analysis of the means by which the CSU can best implement the target environment support services. That range includes:

- Campus-Based, Decentralized;
- Campus-Based, Centralized;
- Systemwide, Distributed; and,
- Systemwide, Centralized

In an attempt to inform the Technology Steering Committee, SIP members have devoted considerable time and effort in providing their perspectives on the optimum solution for services delivery based upon the locus of decision making and the locus of accountability for provision. SIP concluded that it was necessary to hire a consultant to help the CSU think through the range of services options.

The results of that work have bounded the range as follows:

Campus Centric

This management strategy essentially represents the University's current situation in which each campus functions as an autonomous entity in: 1) developing and maintaining its intra-campus infrastructure; 2) providing the user hardware/software, training and support services; and, 3) providing campus-based network operations and services. In this management strategy, each campus has a central IT organization as well as IT personnel working and reporting to various departments and schools who provide the support services.

The demarcation point for the operations and support services is at the campus physical boundary. For instance, campus network operations and support for voice, video and data would be managed by each of the campuses. The network operations and support for 4CNet, the inter-campus data and video network is the responsibility of Information Resources and Technology. The campus' relationship to the 4CNet would involve service delivery metrics and standards developed by CTI. To assure equity of access for the systemwide academic community, each campus would necessarily need to subscribe to the attainment of systemwide standards and metrics established by CTI. Likewise, user workstation environment support services at each campus would comply with systemwide standards and metrics.

Multi-Campus or System Centric

This management strategy would represent a major shift in how many of the major functions in the TII would be carried out. A multi-campus or system technology services strategy would be responsible for: 1) refreshing and maintaining the intra-campus infrastructure on all campuses: 2) providing all network operations and services to all campuses from a central network operations center (NOC) to the faceplate in every room on all campuses; and, 3) providing the user workstation environment support services to students, faculty and staff on all campuses.

In this strategy, a multi-campus/system organization would possess a program management staff. However, strategic alliances, partnerships and service contracts might be formed with individual campuses or private industries to provide operations and support services across all the campuses. The quality of a multi-campus system

operations and services strategy would be judged by CTI using the same standards and metrics used for monitoring of a campus-centric strategy.

A primary purpose for implementing the multi-campus strategy would be to assure the creation and maintenance of a seamless, integrated telecommunications environment at an economy of scale.

SIP'S CURRENT PERSPECTIVE

As stated earlier, SIP made a significant effort to narrow the range of strategies for managing the functions that comprise operations and support services in ITS-TII. In fact, SIP's goal was to select an overall strategy model to pursue. As the charts on the following pages show, there was a great deal of consensus on the "Who Decides" and "Who Provides" on most functions. However, there were also significant differences among the SIP members about other functions.

The process SIP followed involved several steps. The first was to identify those functions associated with desired TII services. The next step was to identify the currently desired authority for organizing those services ("who decides"). The last step was to identify likely service providers ("who provides"). This sequence is considered not only as a reflection of preferences, but also the initial step in a discovery and assessment process that will be conducted during the 1998-99 academic year under the aegis of the Commission for Technology Infrastructure and will involve each of the campuses.

As a result of this process, SIP came to two important conclusions. First, there was agreement that several different strategies might be applied in different functions or clusters of functions.

Second, SIP agreed that an outside consulting firm should be engaged to assist the CSU in the next phase of implementation planning.

IMPLEMENTATION PLANNING

The Technology Steering Committee has endorsed SIP's recommendation to hire an outside consulting firm to assist the CSU in developing specific service strategies to achieve the following operations and support service goals:

- Integrated infrastructure (voice, video, data);
- Cost efficient and effective user support services for all students, faculty and staff;
- Technology currency;
- Systemwide network and workstation standards; and,
- High quality software and training.

SIP will issue an RFP in October. The charge to the selected consulting firm will include:

1. Current Environment

Understand the current environment on each CSU campus as well as system environment including:

- The functional alignment in place;
- The organizational structure in place;
- Service strategies in place;
- Service goals and metrics as they currently exist on each campus; and,
- Self assessment of campus effectiveness in meeting these service goals.

2. Current Campus Environment vs. CSU Target Service Goals

Compare the current environment on each campus to the CSU target service goals. Analysis shall identify:

- Functional gaps, organizational gaps, resource gaps and any other gaps in meeting the CSU target service goals;
- Recommendations to fill gaps for the campus in order to meet requirements of the CSU target services goals and metrics; and,
- Cost implications to fill gaps.

3. Service Strategy Considerations (At Least 66% of Engagement)

Using existing practices, SIP preferences, and alternatives for service delivery:

- Suggest changes to current practices that may better effect target service goals and metrics;
- Recommend service strategies that accomplish the requirements of the CSU target service goals and metrics;
- Estimate cost implications to meet the CSU target service goals and implement recommended services strategies; and,
- Develop an overall implementation plan for recommended services strategies detailing specific tasks and schedules for CSU to meet the target service goals.

It is anticipated the consulting firm will employ the following methods:

- Review existing CSU documents both system and campus (Required)
- Survey instruments (Optional)
- Conduct 1-2 day visit to each campus and system office (Required)
- Compare CSU strategies against those of other universities or comparable organizations (Optional)

The CSU is desirous of having the results of the consultation by mid-spring 1999.

Operations & Support Services
Current Perspective on "Who Decides, Who Provides"
The View of the Systemwide Internal Partnership

The Systemwide Internal Partnership (SIP) has rated the operations and support services by dividing its members into four groups, identified below as B, G, O and R. ® represents the red group's efforts to further refine the choices by indicating ® as role facilitation rather than specific authority where that symbol appears. See Notes at the end of the chart for definition of the categories.

	Locus of Decision Responsibility "Who Decides"				**Locus of Support Responsibility "Who Provides"**				
Functions	End-User	Dean or Department Head	President /CIO	TSC/ CTI	End-User	College /School or Department	Campus IT	CSU Co-Op	Out-source
IN SCOPE:									
Workstation Support									
Standards and standardization development				G, O, B, R			G, B	G, O, R	
Standards and standardization development – Centrally Funded				B				B	
Standards and standardization development – Campus Funded			B				B		
Acquisitions -- hardware and software coordination and assistance. *Decision* means arranging supply channels. *Support* means issuing purchase orders (against master contracts).			O, B, R	G, ®			**G**, O, R	O, B, ®	
Adds, moves and changes -- hardware (workstations and telephones) and software installation, upgrades and changes			G, O, B, R				G, O, B, R		

Operations & Support Services
Current Perspective on "Who Decides, Who Provides"
The View of the Systemwide Internal Partnership

	Locus of Decision Responsibility "Who Decides"				**Locus of Support Responsibility "Who Provides"**				
Functions	End-User	Dean or Department Head	President /CIO	TSC/ CTI	End-User	College /School or Department	Campus IT	CSU Co-Op	Out-source
Core applications software suite consultation. *Decision* means choosing a direction based on "consultation" with campuses. There needs to be a *manageable* degree of standardization; i.e., limitation of choices to assure interoperability.			R	G, O, B			O, B, R		
User Training *Decision* means responsibility for making adequate provisions for training.			G, O, B, R	B, ®			G, O, B, R	®	
Asset Management -- hardware and software inventory, configuration management, and policy management. *Decision* means how assets are to be managed; i.e., standards for management system, choice of software.			O, B, R	G			G, O, B, R		
Hardware maintenance -- computers and telephones			G, O, R	B, ®			G, O, R	B, ®	G, B
Software maintenance -- anti-virus, backup and disaster recovery, event monitoring, software distribution, installation, resource utilization, directory management, and inventory. Decision needs to be linked to standards ("core applications" and "asset management").			O, R	G, B, ®			G, O, B, R	®	
Campus-based general student labs			G, O, B, R				G, O, B, ®		
Level One: Support for Help Desk management and operations. (For further description see note at end of survey.)			G, R	G, O, ®			G, O, R	®	

Operations & Support Services
Current Perspective on "Who Decides, Who Provides"
The View of the Systemwide Internal Partnership

	Locus of Decision Responsibility "Who Decides"				**Locus of Support Responsibility "Who Provides"**				
Functions	End-User	Dean or Department Head	President /CIO	TSC/CTI	End-User	College /School or Department	Campus IT	CSU Co-Op	Out-source
Help Desk/Level 1: means point of first contact for requests related to the desktop only (hardware, operating system, core software.)			G	G			G		
Level Two: Support for Help Desk management and operations. (For further description see note at end of survey.)			G, O				G, O		
Level Three: Support for Help Desk management and operations. (For further description see note at end of survey.)			R	G, O, ®			G, R	O, ®	
Network Operations (all campus and systemwide data, voice and video services)									
Performance standards and metrics developed				G, O, B, R			G, O	B, R	
Systems/networking operations -- campus voice (telephone), data and video services and 4CNet. *Decision* refers to intra-campus network only (not 4CNet).			G, O, B, R	R-4CNet			G, O, B, R	R-4CNet	O–4CNet
Network management -- server and PBX administration, performance monitoring and workload management. *Decision* means setting minimum standards and expectations.			O, B, R	G, R-4CNet			G, O, R	B, R-4CNet	
Unified Messaging System management			O	G, O, B, R			O, B	O, R	G
Legacy Messaging Systems management			G, O, B, R				G, O, B, R		

Operations & Support Services
Current Perspective on "Who Decides, Who Provides"
The View of the Systemwide Internal Partnership

	Locus of Decision Responsibility "Who Decides"				**Locus of Support Responsibility "Who Provides"**				
Functions	End-User	Dean or Department Head	President /CIO	TSC/ CTI	End-User	College /School or Department	Campus IT	CSU Co-Op	Out-source
Call Center/Help Desk management and operations -- call management, automatic notification and escalation, and incidents/trouble tickets generation			G, O, B, R				G, O, R	B	
Security and control/backup and disaster recovery			G, O, R	B, ®			G, O, R	B, ®	
System refresh and improvements			O	G, B, R			G, O	B, R	O-4CNet
Adds, moves and changes management and control			G, O, B, R				G, O, B, R		
Dial-in Access			G	O, B, R			G	O, B, R	O
Intra-Campus Infrastructure Support (campus physical plant—pathways, media and spaces)									
Standards and standardization development				G, O, B, R			G,	O, B, R	
Maintenance (routine and emergency)			G, O, B, R				G, O, B, R		
Refresh of intra-campus electronics			G, O,	B, R			G, O	B, R	
Preventive			G, O, B, R				G, O, B, R		
Problem management and work order tracking			G, O, B, R				G, O, B, R		
Adds, moves and changes and problem management			G, O, B, R				G, O, B, R		
Construction			G, O	B, R			G, O	O, B, R	

Operations & Support Services
Current Perspective on "Who Decides, Who Provides"
The View of the Systemwide Internal Partnership

	Locus of Decision Responsibility "Who Decides"				**Locus of Support Responsibility "Who Provides"**				
Functions	End-User	Dean or Department Head	President / CIO	TSC / CTI	End-User	College / School or Department	Campus IT	CSU Co-Op	Out-source
Documentation & record maintenance; "As Built" drawing management			G, O, B	R			G, O, B, R	R	

Notes:

Locus of Decision Responsibility

Who decides? In this section SIP was asked to recommend which entity should be charged with the responsibility of deciding policy related to where authority and accountability should reside for the function described.

Locus of Support Responsibility

Who provides? Ultimately authority and accountability for providing day-to-day access, training and support will be assigned and in this section SIP was asked to recommend where such activities should reside. Please note, this is not to be confused with "how" these tasks should be carried out. The exact mechanism – self-operation, outsourcing, etc. – may be left up to the discretion of the responsible party.

When assigning the Locus of Decision Responsibility SIP considered the following scope of technology characteristics:

End-User Technology Characteristics:
- Unique, user-specified hardware systems.
- Unique, user-specified software applications.
- Highly customized versions of standardized environment used to address specific research needs.
- Benefits and costs of such an approach outweigh cost savings of incorporating support responsibilities into the standardized support model.

Dean or Department Head Technology Characteristics:
- Hardware, applications or services that are discipline-specific and have minimal application outside of the College or Department.
- Administrative hardware, systems and / or applications that have minimal application outside of the College or Department.
- Any part of the standardized environment must be customized to serve a relatively small subset of a campus community.
- Customization of standardized environment will be carried out at the expense of the College or Department.
- Benefits of school / department rendering service and support outweigh the costs of incorporating into standardized model.

President / CIO:
- Hardware and / or software applications that are unique to a particular campus.

- Service or application has strategic importance to a very unique set of needs of the campus.
- Benefits accrue only to local campus community.
- Campus-specific standards have been established.
- Benefits of campus-based service and support outweigh the costs of providing as part of the standardized model.

TSC/CTI Co-Op:

- Ubiquitous hardware, software applications and/or services that serve to define the CSU standardized environment.
- Benefits accrue directly to entire CSU community.
- Service has strategic importance to CSU.
- Standards adopted system-wide.
- Cost of redundancy outweighs service and support benefits gained by decentralized support services.

The matrix assumes that the Locus of Decision Responsibility and the Locus of Support Responsibility are not necessarily the same. In determining the Locus of Support Responsibility, SIP considered the following scope of support Characteristics/Qualifications:

- End-User: The individual faculty or staff member who may be responsible for his/her equipment/service under defined circumstances.
- College/School/Department: A campus administrative component under the direction of a responsible administrator. The person assigned the operational responsibility is an employee of that component.
- Campus IT: The campus central Information Technology organization under the purview of the CIO. Individuals assigned the operational responsibility are employees of that IT organization.
- CSU Cooperative: Under the jurisdiction of the CTI, the Cooperative is the systemic organization which determines how the responsibility for designated support services is addressed. Individuals who perform the work can be: campus IT personnel; personnel from industry participants with whom the CSU has developed special relationships; representatives of third-party contractors; or any functional combination of such staffing.
- When appropriate, the Cooperative would have the ability to form sub-sets of itself in the form of multi-campus consortia designed to achieve mutual goals.

Outsource: Under certain circumstances, the effective delivery of a support function may require contracting out beyond the sphere of the Locus of Decision Responsibility. Any individual/entity identified as the Locus of Decision Responsibility can decide to outsource to other campus loci. Should the individual/entity decide to outsource beyond the boundaries of the campus, the Cooperative would have the first right of refusal. The Cooperative may also outsource certain of its operations and support services when that approach is in the best interests of the CSU.