

## **III A. WORKSTATION ENVIRONMENT**

This section summarizes the recommendations of the Workstation Team,<sup>1</sup> a task group established by the Systemwide Internal Partnership.

### **SCOPE AND GOAL**

This plan recommends common standards to govern the acquisition and planned refresh of workstation resources (hardware/basic software) in anticipation that: 1) adoption of these standards will improve significantly the ability of CSU end-users to access and use effectively the telecommunications infrastructure to perform university-related tasks and activities; 2) CSU campuses will be able to provide more effective and efficient support services to the end-user; and, 3) the total cost of ownership will be reduced for the CSU.

There is research that the economies of scale usually found in centralized mainframe environments could be approximated if not duplicated in client/server, distributed computer environments, but only if a highly integrated approach to hardware, software, training and support was adopted. In practical terms, such integration usually implies some standardization of hardware platforms and software applications, automation of many management tasks, and linking workstation management to network platforms. The development of standards-based, integrated workstation environments is not limited to the private sector; several universities around the country are in the planning stages for similar systems.

Included in the scope of this plan are recommendations for: messaging standards and operating systems and client software to support them; software applications to enhance personal productivity and communication; programs to train end-users; and, management tools to support this environment. Appendix A provides end-user profiles indicating specific technology requirements of CSU students, faculty, staff, administrators, disabled persons and off-campus community members.

### **CURRENT ENVIRONMENT**

The work of this team revealed significant gaps separating the current state of technology access and user training and support in the CSU from the state

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<sup>1</sup> Contributors to this section include: Mike Mahoney (CSULB), Spencer Blank (CSU Fresno), Mark Crase (CSUN), Joe Grimes (SLO), Laura Guillory (CO-IRT), Dave Hill (CSUS), Cheryl Kwiatkowski (CO-IRT), Maithreyi Manoharan (CSU Stanislaus), Flor Buenafe-Oliva (SFSU), Walter Oliver (CSUSB), Shannon Ost, John Ostrowski (CSULB), Barry Pasternack (CSU Fullerton), Peter Quan (CSLA), William Trask (CSUN), and Kurt Webb (CSUN).

envisioned by stakeholders. Based on the analysis of input from the focus groups and interviews, several key needs emerged:

- The faculty should be better supported in applying information technology to teaching and learning;
- CSU needs to put a major focus on providing a “baseline” level of technology capability across all of the campuses;
- All stakeholders agree that the CSU needs more equipment, network access and support;
- CSU would benefit from more cross-campus coordination and partnering;
- More electronic databases are desirable;
- The campus community wants more and better support services and training; and
- Stakeholders outside the CSU want improved access and links to California’s K-14 educational institutions.

According to a 1996 survey, most CSU students, faculty and staff had a low level of access to workstation equipment and software and to the network. A workstation inventory prepared in connection with ITS planning estimated that of the approximately 16,500 workstations available for student use, over half were technologically obsolete (incapable, for example, of Web browsing). The situation with faculty and staff workstations was the same. Of the 9,000 plus faculty workstations, 5,534 were obsolete, as were 7,133 of the 14,280 staff workstations. According to this count, about 55% of faculty and 74% of staff had regular access to a personal computer.

The project team learned that the mix of technologies is extremely uneven across any given campus (even within schools and departments on the same campus). Incompatible platforms and software versions reduce the productivity of all individuals who must rely on university computing facilities. Great disparities exist among the campuses with respect to virtually all information technology resources, including training and support. The situation is likely to worsen as the number of faculty who wish to use technology in their teaching and scholarly efforts expands.

Student demand is also increasing as students become aware of the importance of information technology in the fields they are preparing to enter. It is estimated that over 50 percent of CSU students have acquired personal computers. These computers vary greatly in type and capability, however, and their usefulness as learning tools will be limited by the extent to which they can operate within the standards adopted by the campuses.

In November 1996, the Technology Steering Committee (TSC) issued a comprehensive set of campus guidelines for “baseline” hardware/software access, training and user support within the ITS framework. The “BATS” initiative (Baseline Access Training and Support) became the operational vehicle for implementing the CSU policy on 24-hour student access to computing and the

network (which was adopted in June 1995). It also provided a means for carrying out the recommendations of the CSU task force on information competency training for students, faculty and staff. The guidelines outlined the scope, standards, process and evaluation criteria to be used by the campuses in developing implementation plans for BATS and the associated 24-hour student access policy. Campuses submitted detailed plans for this initiative in January 1997. The program has been a major success.

Overwhelmingly, students, faculty and staff stressed the need for access to technologically current workstation equipment and software, to high-speed local area networks and to the Internet, and for user training and technical support. None of the goals associated with the Integrated Technology Strategy can be achieved without first providing access to a robust workstation computing and telecommunications environment for all CSU students, faculty and staff.

## TARGET ENVIRONMENT

Following the October, 1996 decision by the chancellor and the presidents to pursue the ITS-TII through establishment of an internal partnership, the Systemwide Internal Partnership (SIP) was formed and SIP project teams were created to begin detailed work on specific components of the plan. Members of the workstation team undertook the task of translating the ITS vision of anywhere, anytime access to information resources into concrete recommendations for workstation hardware, software, user training and network access.

The team began by developing profiles of CSU students, faculty, staff and other end-users, including persons with disabilities. Each profile lists common activities in which end-users engage as part of their university experience. Specific tasks were identified which end-users can perform electronically as part of these activities. These tasks were then analyzed to determine the technical requirements involved in performing them. These requirements guided the team in developing the software, hardware, messaging and other specifications for the CSU personal computing environment.

To enhance the personal productivity, collaboration and communication of students, faculty and staff, each individual must have access to a minimum "baseline" technology environment. This includes the following workstation resources:

- A fast, reliable personal computer system equipped with a modern operating system that supports the productivity and communication software required to perform the tasks described in *Information Technology Requirements of CSU End-Users* (See Appendix A);

- A telecommunications infrastructure that supports the communication and collaboration tools required to perform these tasks. CSU-wide standards for basic productivity and communications tools are essential for universal collaboration, document sharing and workflow;
- Training to use information technology; and,
- Operations and support to maintain these systems.

The 24-hour access policy of the CSU has encouraged students to purchase their own computers. It is estimated that over 50 percent of the 344,000 CSU students either have, or soon will have, access to a workstation computer with the hardware and software configurations that comply with baseline standards. The long-range goal is for every CSU student to own or have access to a personal computer. The plan does provide students with access to workstations on campus, with roughly 13,000 workstations for student lab use. A small loaner program consisting of about 3,500 workstations will be available for students with special hardships.

In addition, the plan currently calls for every CSU student to have a Personal Information Resources Kit (PIRK) consisting of a core software suite, full-scale, anytime network access to information resources from on-campus, basic dial-in network access from off-campus and access to core training and support services. Section III E provides more information on the development of the PIRK.

All full-time faculty members will receive a workstation computer and associated core software, in accordance with their stated need. In 1997, the full-time faculty headcount was 10,581. One workstation computer will be provided for every three of the 8,073 part-time faculty members.

Each professional, paraprofessional, clerical, and technical staff member will receive a computer, as will all managerial employees; these totals are 15,549 and 1,308, respectively. Estimates are that about five percent of the service and maintenance staff and approximately 10 percent of skilled craft employees will need computers.

The plan calls for refreshing the workstation environment for faculty and staff on a three-year cycle. The total number of personal computers needed for baseline hardware access is estimated at 47,506.

## **Standards**

By implementing software solutions that meet international standards, the CSU will enable its constituents to communicate and collaborate easily, and will also reduce its support and training costs. Based on the end-user profiles, the team recommended a set of standards to achieve the target environment. To keep pace with end-user requirements and technology advances, the group anticipates that the standards in this document will be updated regularly in accordance with the

standards review process (See Appendix B). To ensure that the standards remain current, oversight will be provided by the Commission on Technology Infrastructure. (Please see Section V.)

### A. Messaging Protocols

In order to help meet end-user requirements, the proposed CSU (server-based) messaging infrastructure will support multimedia mail, on-line directories (white pages), and other related applications and resources using several international standard messaging protocols as noted in the table below.

#### Standard Messaging Protocols

Protocol	Name	Service
<b>MIME</b>	Multimedia Internet Mail Extensions	Mail support for a variety of multimedia applications
<b>SMTP</b>	Simple Mail Transport Protocol	Outgoing mail
<b>POP 3</b>	Post Office Protocol	Incoming mail; mail stored on the client; difficult to use with more than one client
<b>IMAP 4</b>	Internet Message Access Protocol	Incoming mail; mail can be stored on the network; easy to use with many clients
<b>LDAP 3</b>	Lightweight Directory Access Protocol	Integrated people (and other) directory database (white pages)
<b>HTTP</b>	HyperText Transport Protocol	Primary World Wide Web protocol
<b>NNTP</b>	Network News Transport Protocol	Group discussions
<b>iCalendar, vCalendar</b>	Internet Calendaring (due in late 1998)	Personal and Group Scheduling and Calendaring
<b>SSL</b>	Secure Sockets Layer	Security (e.g., network password protection)

Campuses already support many of these protocols with their existing messaging infrastructures. Implementation of a planned unified messaging system across the CSU will facilitate efforts to standardize on these protocols. (See the Unified Messaging System section for more details.). The client workstation/notebook software recommended in the next section takes advantage of these messaging protocols to enhance productivity and collaboration between CSU end-users.

## **B. Software**

The client application software installed on all place-bound and mobile personal computers used in the CSU should support the requirements identified in the *End-User Requirements* document. Specifications for such software on the Windows/Intel (“Wintel”) platform and on the Macintosh platform are provided below, together with recommendations for operating systems and for cross-platform application software to support the productivity and communication end-user requirements of CSU students, faculty and staff.

### Operating Systems

For operating system software, the team proposes that Microsoft Windows 98 or NT Workstation 4.0 be used for Intel PC-based workstation computers. Microsoft Windows 98 is recommended for Intel notebook and home-based computers because it has better support for mobile and modem users than Windows NT 4.0. Microsoft (MS) has announced that both of these operating systems will eventually be upgraded to a future unifying version of Windows NT. For that reason Windows NT is the preferred operating system.

Mac OS 8 is recommended for the Macintosh platform including workstation and notebook (PowerBook) computers. The most recent incremental operating system upgrades (e.g., NT 4.0 Service Packs, Mac OS 8.1) should be installed. Windows 98 is currently being evaluated.

Desktop Unix workstations are powerful computers that are usually used to execute resource-hungry, discipline-specific applications such as computer-aided design (CAD). Unix systems are used most often in schools or colleges of engineering and the sciences. Usage of Unix workstations in the CSU is split among many types, with no dominant vendor. For these reasons, we do not recommend any Unix workstation standards at this time. However, if the demand for any single vendor’s Unix system grows large enough, then the CSU will recommend a “standard” Unix workstation system with options.

### Application Software

The task group recommends that *all* Wintel and Macintosh personal computers used in the CSU include installations of the latest versions of MS Office for basic productivity tools and the latest versions of both MS Internet Explorer/Outlook and Netscape Communicator Pro for communication and groupware access. Office is the predominant productivity suite on both the Wintel and Macintosh platforms. Office 97, which includes the Word, Excel, and PowerPoint applications, is the latest release for Windows. Office 98, which includes Macintosh versions of the same three applications, is the latest release for Macintosh.

MS Internet Explorer and Outlook/Outlook Express support the standard messaging protocols and integrate well with the other recommended MS software. Netscape Communicator/Navigator supports these same protocols and is currently the most

popular application in the CSU and in the world. Since Communicator is so popular, useful and free for education (except for the “Pro” version), the task group recommended its inclusion. End-users will be able to use either the Microsoft or Netscape clients for e-mail, web, discussion group and other communications.

Software Specifications

The table below provides a detailed list of recommended software for all workstation and notebook computers for both the Wintel and Macintosh platforms. Standardizing software across both major personal computer platforms will help facilitate productivity and collaboration and communication between CSU end-users. For example, end-users will be able to share standard format word processing, spreadsheet, presentation and other files using standardized e-mail attachments. The proliferation of end-user applications in these software categories makes this difficult to accomplish today in the CSU.

**Recommended Software for the  
Windows and Macintosh Platforms**  
(Installed on all workstation and notebook personal computers)

Application	Software
<b>Intel Operating Systems</b> Workstation (campus-based)  Workstation (home-based) Notebook <b>Macintosh OS (Workstation and Notebook)</b>	MS Windows NT Workstation 4.0, MS Windows 98 MS Windows 98 MS Windows 98 Mac OS 8
Word Processing	MS Word (latest Office)
Spreadsheet	MS Excel (latest Office)
Presentation Graphics	MS PowerPoint (latest Office)
Electronic Messaging (email)	MS Outlook/Express/Web Express (latest) Netscape Messenger (latest)
Scheduling Calendaring	MS Outlook Netscape Calendaring
World Wide Web Access and Support Discussion Groups	MS Internet Explorer (latest) Netscape Communicator Pro (latest) Acrobat - portable document format (latest) QuickTime - video player (latest) Real Player - streaming video (latest) Other common plug-ins
Virus Detection	Best available deal for a quality product
Management Software	Workstation Management Interface (DMI) compliant tools

Most of the software in this table either is bundled with the operating system or can be downloaded for free via the Internet. The exceptions are Office, Communicator Pro and virus protection software. Netscape's Communicator 4.0 standard edition, which includes Navigator, Messenger and other clients, is free for education. However, Communicator Pro, which adds calendaring and 3270 emulation clients to Communicator, costs a few dollars per client. Finally, the task group recommends that the CSU attempt to purchase a statewide site license for virus protection software. As new versions of these and other software packages are released, they will be considered for inclusion in the standard set of recommended software to be installed on all personal computers used in the CSU.

CSU end-users reserve the right to install any free or licensed software they wish on their personal computers. For example, some end-users may prefer to use an e-mail application not recommended here. This is not necessarily incompatible with the target environment because the planned unified messaging infrastructure will support standard international protocols such as SMTP, POP, IMAP and LDAP, and these protocols are (or soon will be) supported by virtually all e-mail clients. To enhance their technical support options and collaboration with others in the CSU, however, it is recommended that end-users utilize the e-mail clients and other software listed in the table above to insure the highest level of workstation management, compliance, operation and support. Users desiring to install other than CSU approved software will be advised to consult with campus technology personnel before taking any action.

## **End User Workstation Training Recommendations**

Availability of training on those data, voice and video technologies that make up the baseline technologies is a primary goal of the ITS-TII and essential to achieving the target technology environment. The Systemwide Internal Partnership appointed a task group to develop a user training plan. The recommendations of the task group are summarized below.

The training will be delivered by multiple methods. These include, but are not limited to, web-based self-training modules, self-paced instructional modules, on-line tutorials, CD-ROM, videotapes and traditional and distance classroom instruction. It is assumed that end-user and technical support staff training on baseline technologies will be needed immediately and that demand for such training will grow over time.

Baseline training program deliverables, to be designed in collaboration with constituent representatives, include the following:

- Identification of faculty, student and staff training needs;
- Definition of the roles of campus support groups/personnel;

- Utilization of existing tools, or procurement or development of additional training tools;
- Trainer development;
- Training of students, faculty and staff at appropriate levels and in multiple modes, on-site and over distance;
- Periodic evaluation of trainers and training tools;
- On-going assessment of the effectiveness of training programs; and,
- Continuous improvement of training programs.

A centralized Training Management System will be implemented to insure the effective and efficient operation of training programs. The Training Management System will be accessible and accountable to participants throughout the CSU. The principal components are:

- A database repository for all training products and services including, but not limited to, on-line and client-based, self-paced training tools and traditional training courses and class descriptions;
- Capability to publicize and advertise training products and services;
- Capability to enroll participants in training activities, including classroom-based instruction, and to support campus training coordinators in the delivery of training services;
- Mechanisms for tracking participants' enrollments and training histories;
- Capability for automatic billing for training products and services provided on a charge-back basis; and,
- Baseline training for end-users (students, faculty and staff) will be made available during the initial roll-out phase and will include training on basic, intermediate and advanced topics related to workstation and laptop personal computing technology and use of the network. Topics to be covered include instruction on how to use hardware, application software and operating systems on standard Windows and Macintosh workstation and laptop platforms.

## **IMPLEMENTATION SCHEDULE**

Following are the four phases and activities within each for implementing the workstation plan:

### **PHASE 1—SEPTEMBER THRU DECEMBER 1998**

- Negotiate a new agreement as part of renewing the systemwide license for the Microsoft software suite.
- Issue an RFP for Windows 98 and Windows NT computers.

- Negotiate with Apple for better pricing agreements.
- Set up procurement processes with major hardware or reseller providers.
- Establish procurement system with major providers to permit campuses and individuals associated with CSU to acquire CSU approved hardware and software.
- Issue an RFP and secure license for computer-based training program for end users and IT professional staff development.
- Develop the Student Personal Information Resources Kit.
- Plan pilot project for multi-campus call center/help desk with self-selected campuses.

*The pilot project to test the viability of a systemwide Help Desk will be implemented on self-selected campuses. The objective is to provide Help Desk services on a 7 x 24 basis. The project will have a steering committee which determines the "What Who, Where, When, and How." A formative and summative assessment will be conducted as a part of the project scope, and the evaluation will guide enhancement, modification or abandonment of the project. It will require, at minimum, one to one and a half years to operationalize the program, and over \$1 million to deploy it. The recommendation is that funding come from the BATS allocations to the campuses.*

#### **PHASE 2—JANUARY THRU MARCH 1999**

- Each campus develops a workstation environment plan based upon the standards and using their BATS plans as the foundation.
- Secure workstation license for Integrated Workstation Management System tools.
- Commence computer based training for end-users.
- Commence computer based training for IT professional development.
- Implement pilot, multi-campus call center/help desk project.

#### **PHASE 3—APRIL THRU JUNE 1999**

- Conduct pilot tests of the Integrated Workstation Management Systems.

#### **PHASE 4—JULY 1999**

- Launch campus-based implementation plans of the full workstation environment.
- Evaluate the initial phase of the pilot project for call center/help desk.