



CHABOT-LAS POSITAS COMMUNITY COLLEGE DISTRICT

INFORMATION TECHNOLOGY MASTER PLAN

ITS DETAILED SPECIFICATIONS

This document presents the current state of the Information Technology infrastructure at all three CLPCCD sites: the District Office, Chabot College and Las Positas College. This document has been assembled from the collective inputs of District ITS staff and College Computer Services departments. The information herein includes detailed descriptions of servers, desktops, network cabling, wireless, network switches and routers. Since the IT infrastructure is constantly evolving, this document also summarizes changes and new recommendations that have been recently developed as part of the IT Master Planning process. The new and future recommendations are identified in highlighting.

Given the level of detail that is presented, this information, if used improperly, could place CLPCCD in a vulnerable position with respect to viruses and other threats that could debilitate the IT infrastructure. As such, this document will be circulated to a limited set of District IT and College Computer Services staff, and is considered “For ITS Limited Distribution only” to those individuals who have a need to know this information in performance of their daily jobs. This document refers to a series of Appendices containing additional detailed information. Those Appendices are available for viewing, upon request to the Chief Technology Officer.

Issued: December 2004

Note: Selected Charts and tables are blanked out for security purposes.



Overview of Current IT Environment

Over the last five years, the District ITS department has aggressively moved towards delivering new or updated, high quality applications and services to the user desktop that empowers the user. Many of these services in the past have been inadequate, cumbersome to the users, or simply not available without engaging the District ITS staff, such as previous Banner reporting functions. As the District ITS department empowers the user, this decreases the dependencies on District ITS staff for the end-users' daily work related tasks. In turn, ITS staff has been able to work more efficiently and focus on delivering a higher quality of applications and further technology enhancements, while offering more specific support to end-user requests. The net result is a more efficient operating model for District ITS and the end-users.

1.0 District Office

The District Office is located at 5020 Franklin Drive in Pleasanton California.

Servers

The District ITS department manages CLPCCD's administrative servers. These servers provide: distributed file, print, World Wide Web, intranet, extranet, e-mail, collaboration, data archival, virus protection, business and student administrative services for the staff and faculty. The ITS department has chosen a heterogeneous networking strategy to leverage the strengths of each vendors' Network Operating System (NOS). This allows broad, robust and secure networking services to all of their end users. This strategy also creates a flexible foundation at the network core on which to construct the addition of future networking services.

Functionality and Purpose

The main goal of the servers and the applications that are deployed and managed by CLPCCD ITS department is to provide the administrative support and tools to the staff and faculty that are necessary for the ongoing business efforts of the colleges.

Hardware Configuration

The majority of the servers that are currently on the networks have been deployed with the purpose of fulfilling an immediate need, within a limited budget. Primarily clone servers have been deployed to meet those needs. The cost of the hardware has been the driving decision behind those cases, necessitating clone purchases, instead of the value added that comes from a higher cost "name" brand server purchase. Name brand servers include vendors such as IBM and HP/Compaq. Servers from these manufacturers can include benefits such as: increased server performance due to specialized engineering, increased reliability, extended onsite warranty and support, and usually greater options for server scalability. With the clone PC servers, ITS has been able to support greater than 99% scheduled uptime for its core PC servers, using only the in-house expertise of a single network systems specialist for problem solving and upgrades.

The exception to the clone server standards has always been the Enterprise servers, where standards are based on IBM RS/6000 Systems for the main Banner database server. PC clones are still used as support web servers for this system.

Currently ITS lists that standard for Intel based servers as the following: *See document: Administrative PC Servers (Appendix 3.4.A)*

- Intel Chipset on the motherboard



- Dual Processor (speed per availability)
- 4Gb RAM
- 10/100/1000 Copper NIC
- Ultra-SCSI disks
- 36Gb HDD's (minimum) configured in at least a RAID0 array, RAID5 is preferred when data storage is involved (storage needs will vary per server purpose).

With new servers purchased through the bond, ITS plans to be more proactive and methodical about server selection. Each server configuration will be evaluated for its intended purpose and its expected lifetime at the time of acquisition. A typical hardware standard has been recommended for low and high end servers, as shown below:

Low-End Server (for specialized/standalone application)

- rack mount
- dual power supply
- hardware raid 1
- hot swappable serial ATA disk drives
- dual CPU
- 2 Gb per processor
- 36 Gb usable space (2 x 36gb for raid 1)
- CD/DVD
- adequate backup (whether local or part of a more comprehensive network backup)
- 2 network cards (10/100/1000)
- floppy drive (3.5inch)
- 2 USB ports
- 8am-5pm contract services coverage, next day, M-F

High-End Server

- rack mount
- dual power supply
- hardware raid 5
- hot swappable serial ATA disk drives
- dual CPU
- 4 Gb per processor
- 72 Gb usable space (5 x 72gb for raid 5)
- CD/DVD
- adequate backup (whether local or part of a more comprehensive network backup)
- 2 network cards (10/100/1000)
- floppy drive (3.5inch)
- 2 USB ports
- 8am-5pm contract services coverage, next day, M-F

Some mission –critical servers should be purchased with 24 x 7 x 4 hardware support. These can be evaluated on a case-by-case basis. All servers should be placed on UPSes capable of providing battery power for one hour, with intelligent server shutdown for extended shutdown.

One of the options under discussion for high end servers is Storage Area Networking (SAN). SAN is desirable because of the current system disk requirements. District ITS has investigated adding SAN storage for file and mail data storage, but it has been cost prohibitive. For more information on this see the Storage/RAID section.



Operating Systems and Service Packs

As previously mentioned, the ITS staff leverages the inherent values of specific operating systems to exploit their strengths for delivered functionality, ease of management and integration, security, and cost effectiveness in their environment. This requires running a network based upon open-standards to ensure maximum integration and operability between the systems. ITS runs a mix of Novell Netware, IBM AIX, Microsoft Windows2000 & 2003 Server, Red Hat Linux, and MacOS (Intermapper) to deliver all of the core network services and applications that are required and in use on the network today.

Service Packs and patches are applied on a regular basis to ensure the systems maintain high security, integrity, and operability.

Software maintenance is included with all of the OS purchases to ensure the availability to upgrade to the latest release of OS when it is deemed necessary to increase server performance or provide other new added functionality. Since their acquisition by Novell, SUSE's Linux has been targeted by ITS for consideration as the next generation NOS for file and mail servers. This is based upon the direction set by Novell towards open systems. The SUSE/Novell implementation also presents enhanced integration between the Linux and Netware platforms.

Applications Supported

A. Administrative Applications

The following information was derived from the ITS Standard Six (*See Appendix 3.4.B*)

The core administrative applications is the SunGard SCT Banner Enterprise System, which supports Student Services, Academic Services, Financial Aid, Finance, Human Resources, and Payroll functions within the district. Several major Banner projects over the past few years have significantly expanded the capabilities of this system. These include: (1) the upgrade of the Banner Enterprise Server to the IBM P670 and software upgrade to Banner 6.0, (2) expansion of Banner Web Services, (3) migration to a totally web-based Banner using Internet Native Banner (INB), and (4) Crystal Enterprise for queries and reporting.

For background information on the Banner services upgrade process, see Critical IT Projects 2002-2004 document (*Appendix 3.4.C*) & CLPCCD ITS Projects Review, Accomplishments and Future Plans 9/2002 – 4/2004 (*Appendix 3.4.D*).

In addition, several third party software products that provide supplemental services to the Banner System are supported in partnership between the colleges and ITS. These include: (1) Sars-Trak and Stars which are products that track visits to Student Services as well as student contact hours for courses such as labs, learning resources, and tutoring to take attendance in these instructional areas, (2) Sars-Grid that tracks counseling and student scheduling contact hours, (3) ATI Filer software, which scans transcripts and stores the data for retrieval or updates, (4) GoPrint, a pay-for-print management system that has been installed at both colleges, primarily in the computer labs, libraries and resource centers and allows users to prepay for printed documents and provides management reporting of activity, and (5) Sirsi Library System that provides services to both campuses.

The following servers provide these distributed Banner services to all the district sites shown below: **Not provided for security purposes.**



* managed by Las Positas College Computer Services

^ managed by Chabot College Computer Services

A comprehensive listing of all server configurations and functions has been created for further reference in Appendix 3.4.U.

B. E-Mail/Collaboration

CLPCCD uses Novell GroupWise 6.5 as the e-mail and collaboration system. Users include the ITS department, faculty and administration at both Chabot and Las Positas campuses as well as the District staff. This e-mail system does not serve the student population, as the District has decided currently not to provide e-mail for students.

Various modules are implemented in the current setup including: Web-Access, Document Management (GWDMS), Instant Messaging (GWIM) and POP3 mail services. The ITS department is responsible for all systems maintenance, which includes but is not limited to: user mailbox management, message queue management, and enforcing the 90 day mail purge procedure which must be manually run and monitored. This latter process assures that adequate disk space is available on the mail servers for the next quarter's incoming and stored mail. *See document: Administrative PC Servers, Summary of Architecture, Functionality, Operations (Appendix 3.4.A)*

The GroupWise system consists of one primary domain named "Gwprime", one secondary domain named "LPC5domain", and one external domain named "Internet" which as the name implies, connects the system to the Internet. There are several post offices under the "Gwprime" and "LPC5domain" domains. These post offices are distributed geographically to store the mail on the network that lies closest to its specific end users. *Table below is extracted from CLPCCD GroupWise System Info (Appendix 3.4.E).*

Not provided for security purposes.

Post Office	Domain	User Count	Host Server	Location



GroupWise Post Offices

The GroupWise post offices use the Mail Transfer Agent (GWMTA) to transfer mail internally amongst the other GroupWise servers. The Internet Agent (GWIA) transfers messages via SMTP from a Linux based server running sendmail that is connected to the Internet (IServer). This gateway service adds an extra layer of security for e-mail exchange between GroupWise system and the Internet.

Guinevere is a third party product that is used to scan messages for viruses as they flow in and out of the GroupWise system. This product currently runs on a stand-alone Windows NT workstation, which maps a drive to the mail server in order to work properly. This solution introduces a single point of failure, as the outgoing mail is dependant upon this application being “up” and running. This workstation has been included in the current Server Datasheet because of its required relationship with the current GroupWise server. As a critical link to uninterrupted mail service, the Guinevere server is located within the office space of the network specialists for timely regular monitoring of uptime and continuous performance.

The Guinevere solution is targeted for replacement with a new third party product called GWGuardian that has already been purchased by ITS. This new software will provide both anti-virus and anti-spam filtering that integrates better with the existing GroupWise system. CLPCCD plans to upgrade to GWGuardian in December of 2004.

As of October 2004 there are 1,335 email users distributed among eight post offices. The highest number of users resides under the Chabot College Faculty “Ccfac” post office, totaling 390.

The Web access module has been implemented on GWServer. This enables users to access their e-mail via any web browser both internally or from the Internet. There are five to six hundred logins per day that access mail through the web. There are currently no plans to implement additional Web access servers in order to load balance user logins at this point, as the response times are adequate.

These distributed GroupWise services are provided across all three, district sites by the following servers shown below: **Not provided for security purposes.**

Server	Location	Make	OS	GroupWise Functionality



GroupWise Servers

C. WWW / Intranet

CLPCCD's Internet homepage can be found on the web at <http://www.clpccd.cc.ca.us/>. There are many internal web pages that are available for quick and easy reference by the staff and faculty containing internal operational information about the district. These can be accessed by entering "/info" into the browser url field from within the CLPCCD network.

The transition to web technology is very important at CLPCCD as it allows for an intuitive format to distribute both information and applications to a geographically dispersed staff with minimal replication of hardware, services and support staff. In the previous sections it was discussed how both the Banner systems and email have been shifted to a web-based focus and the plan is to continue making more services web-based to further empower the end-users. Two of these future upgrades, Web for Finance and Web for Faculty, were previously noted in the Administrative Applications Section, iFolder is also a new web-based technology for file sharing and storage. See *ITS Status Report 2002 (Appendix 3.4.F)* for more background information.

The District ITS staff has standardized on the Apache web-server, based upon its cross-platform availability. The following table summarized servers providing web/intranet information or application delivery:

¹ Scheduled for removal December 2004.



Server	Location	OS	WebServer	Web/Intranet Functionality

WEB Servers

D. Directory Services

Novell's eDirectory v8.62 is used for administrative authentication. This provides heightened security for all administrative network users as well as a platform for future systems integration. This system currently supports only secure authentication to Netware services. However, eDirectory was developed with the LDAP protocol and more closely parallels an industry standard LDAP implementation than other prevalent directory service implementations. The District ITS department would like to move users towards a "Single Sign-On" authentication solution. Novell's authentication services can be implemented on or integrated with any of the other platforms that support LDAP and help move CLPCCD towards the single sign-on environment.

Currently Chabot, Las Positas, & the District Office are configured as Organizational Units (OU) within a single tree. The tree has both geographical and functional organizations at the root. The college OU's are broken down into functional OU's at the next level of the tree. See document *Root view with OU's and Server Volumes (Appendix 3.4.G)* for more information on the tree structure.

District ITS performs directory service upgrades as needed for added functionality. District ITS is currently planning to move to 8.7.x when time allows. eDirectory is currently solely run upon the Netware platform; it was evaluated on Windows2000 Server in 2003 but there was not a need at the time it was tested to implement it..

The servers that are running Netware currently vary from version 4.11 through version 6.5. The single Netware 4.11 server cannot run IP natively and this is the only reason that the District and Chabot College networks continue to route the IPX protocol. The Netware 4.11 server currently runs Computer Associates Arcserve 6.6 backup software. The Arcserve software is targeted for replacement with Veritas Backup Exec version 9.1. An



open-file backup issue with the new Veritas software implementation is currently being investigated for resolution before full deployment.

ITS is aware of several areas that they would like to improve with respect to the current backup environment. Existing backup drives use DAT technology which provides a low capacity tape media, with respect to current disk sizes. ITS has plans to move to DLT or LTO technology tape drives for higher capacity tape storage. Tape autochangers will also be considered to offload the manual process of tape exchange. The bond funding will allow ITS to implement these technology advances. Tape rotation, media aging and off-site storage will also be enhanced from the current processes.

Netware has a configured Single Reference timeserver on Chabot_411. All other Novell servers act as “secondaries” and receive their time updates from this server. This is the default Novell configuration, and should function adequately with the current number of servers in this environment. When the 4.11 (IPX) server is decommissioned, it will be possible to change the time synchronization service to use the Network Time Protocol (NTP) instead. The implementation of this protocol would be compatible with the other platforms and devices on the network.

ITS reports that there have been no major issues with eDirectory or the tree health since they have completed the Directory Service (DS) upgrade to version 8.6.2. A health check is performed at least twice a month to ensure the DS information is replicating properly throughout the tree. The following table represents the partitioning and replica placement on the Novell servers:

Server	OU	Partition	Replica Placement

Novell Partitioning

E. Core Network Services



DDNS/DHCP - The IBM Enterprise server provides Domain Naming Resolution Services (DNS) of internal administrative servers and Dynamic Host Configuration Protocol (DHCP) services to the administrative PCs at Chabot campus. DHCP configurations are periodically copied to the server named Backup DHCP to keep it current. This server is kept in “stand-by” mode in case of a failure by the IBM server. If such a failure should occur, DHCP services would be manually started on the Backup DHCP server.

The Davis server provides secondary DNS for the Chabot instructional networks. Davis is queried if DNS entries are not found in the Chabot Instructional Windows ADS Domain Controllers.

At LPC the DNS is provided by multiple servers on the Instructional network. DHCP is served by Alice (primary) and Taz (Secondary). All desktops on the Instructional, Faculty and Administrative networks point to these servers.

Iserver/Porter provides external DNS services. As CLPCCD’s authoritative DNS server, this system updates the DNS servers at the ISP as to the District’s externally advertised systems. It is currently running BIND 9.2 which is a secure version of DNS patched against well-known DNS vulnerabilities.

NTP - There are currently no Network Time Protocol (NTP) configured time sources on the network. Occasionally the AIX servers are synchronized manually to an outside source. There are several key network routers and servers which do use NTP from an off campus source. It would be an improvement to have a single device on the network act as a “source” for all other on-campus devices using NTP. This would eliminate repetitive queries to time sources on the Internet, perform NTP synchronization in a secure fashion and ensure that all devices (servers, desktops, network equipment) on the network are synchronized to the same time. This is particularly helpful in troubleshooting virus/worm attacks that modify file contents and file time characteristics.

SYSLOG – The IBM server runs the syslog service to track system events for the AIX and Linux servers. These logs can be referenced for additional troubleshooting information in the event of systems issues. The EnVision network server receives syslogs from the PIX firewalls at both the LPC and Chabot campuses. The IBM server acts as a secondary syslog server to collect data from the PIX firewalls and selected network equipment. The EnVision network server is used to and creates graphical reports from the PIX syslog data, which is particularly helpful in virus/worm and other network performance troubleshooting.

File Sharing - The Novell servers handle the file sharing on the administrative network. Servers are located at all three sites to handle the local users home directories, as well as provide disk space for shared folders. The table below details the typical drive mapping for file sharing:

Drive Mapping	Folder Location



Standard Mapped Drives

Some users map to servers at other sites. A typical application is the use of SPMMS for work order submittal. This application is used by M&O and end-users access it to place their requests.

F. Help Desk

District ITS supports the use of the Tech Center module from the Web Center software application as the district-wide help desk application. This runs on a server called Track-IT. Support calls from the Chabot and District sites route to the District ITS Help Desk (x6966) at the Chabot campus. Support calls from LPC route to the LPC Help Desk (x4906). The hours of operation are:

Chabot and District: 8am to 7pm, Monday through Friday

LPC: 7am to 10pm Monday through Friday, 8am to 5pm Saturday

End user calls are documented in a trouble tickets which are queued to the technicians for resolution. Trouble tickets are available for viewing and updating by the technicians over the Intranet. When the calls are closed the tickets are updated in the ticketing software. This serves the dual purpose of creating a record for call tracking purposes and the data builds in a knowledge base for later reference. The Tech Center software is shared among the three IT support groups at each location. The call tracking process is well organized but some calls go untracked, particularly when technicians are “grabbed” by end-users in passing for immediate, quick assistance.

Storage / RAID

Providing ample disk space for network storage has presented issues in the past. The District ITS department has addressed these issues in several ways. The first issue was when Netware server disks were reaching maximum storage capacity. To gain increased storage capacity for short-term needs, on some of the servers, the RAID0 mirrors configured for data redundancy were broken. This effectively doubled the available storage, but at the sacrifice of redundancy in the event of a failure. In most cases, a new server had already been purchased with greater disk space as replacements for these older servers. In the meantime, however, the lack of RAID 0 (mirroring) introduced additional vulnerability on these older servers since they must rely on data recovery methods, such as tape backup/restore, in case of drive failure. For Chabot_411 the mirrored drives were maintained and new drives were added to increase the disk space. New hardware for the Chabot_411 server is in house and will be deployed in early 2005.

The second issue was with the GroupWise system, whereby a ninety-day purge policy was implemented to manage the size of user’s mailboxes. Basically, any mail older than ninety days is forcibly purged. This process is run four times per year.



The data volumes on the newer servers will be sufficient to support the current users' data needs through the addition of disk storage space with the new higher-density drive technologies. The Banner system, however, will continue to grow and stretch the needs for disk storage. Currently the existing P670 server has the capacity for massive disk expansion if it is deemed necessary. Up to 128 hot-swappable disk bays via seven additional 7140-61D I/O drawers that support up to 18.7TB of storage in increments of 36.4GB, 73.4GB and 146.8GB disk drives are available.

When implemented, the iFolder technology, which is currently in prototype, will require an extensive new disk storage requirement because critical data storage is moved off of the unprotected desktop hard drive to the fileserver. This could also strain the current data archival services as more data is required to be archived.

With the exception of the current Novell servers, most of the other critical network servers have some kind of drive redundancy. This redundancy is usually in the form of mirrored drives. In some cases, District ITS relies on the manual process of synchronizing data across servers, or keeping drives or entire servers available to be "hot-swapped" in case of a server outage. See *Server Back-Up and Recovery Architecture (Appendix 3.4.H)*. The current server storage capacity, RAID configurations, and archival information can be referenced from the *Server Datasheets (Appendix 3.4.U)*.

Server Locations

All critical servers are located within the existing Data Center on the Chabot Campus (Room #312). All of the other servers are kept in the adjacent office room with the system administrators. The District Office servers are kept in the District Data Room. At the LPC campus, servers are located in the Building 1900 MPOE/MDF building. All servers are located in climate controlled rooms. Some servers are protected with UPS protection and triggered shutdown in the event of an extended power outage. In all locations, generators are needed to provide continued access in the event of a prolonged power outage. New generators and UPS systems will be scoped and implemented as part of the bond projects.

Desktops

The administrative desktop systems are managed on a site-by-site basis. District ITS maintains the administrative desktops at the District Office. The administrative desktops at the colleges are supported by the respective College Computer Support staff. District ITS and the college teams work together to resolve more complex end user desktop issues, particularly where networking is concerned.

Functionality and Purpose

The basic functions of the desktop systems are to provide data processing and administrative support for the ongoing CLPCCD business efforts. With the email and business application improvements over the last few years, the users now have many new valuable services available on their desktop to help in their daily job functions.

In 2002, District ITS deployed ZENWorks 3.2 for Desktops for administrative desktop systems management (remote control and diagnostic purposes). These tools need upgrading to Version 6.5. This project is a high priority, because of several benefits. This package allows for "push" software deployment on both the application level and on the OS level. This is particularly useful for desktop patch management, given the frequency with which patches become available for Microsoft operating systems and applications. Two other strong desktop management features of this product are the hardware/software inventory and reporting tools. ZENWorks provides a remote desktop management module, which would allow District ITS Help Desk staff to provide remote troubleshooting assistance to distributed desktops. Current ZENWorks deployment has



been limited because of privacy issues related to the remote desktop management. However, the benefits of ensuring a securely patched desktop environment clearly support the ZENWorks deployment.

Hardware Configuration

A. Desktops

CLPCCD has established hardware standards for Administrative desktop systems. These standards are updated by the District ITS staff on a quarterly basis, or just prior to any planned bulk systems purchases. Unfortunately, due to budgetary restrictions, the replacement of these systems has been very slow at best. *See document: Purchase Standards for Computer Hardware 03-04 (Appendix 3.4.K) & Chabot College PC Inventory (//intranet/MIS)*

The current standard for administrative desktop hardware is as follows:

- Intel Pentium 4 CPU 2.8Ghz
- Intel Chip Set on the motherboard with integrated 10/100 NIC, AGP video, sound, 2 Ser/ 1 Par/ 2 USB / 2PS2 ports/ USB connections
- 512MB DDR PC2100 RAM
- 40GB IDE 7200 RPM hard drive
- DVD-CD/CDRW 16/48 ROM drive Internal
- 1.44M floppy drive
- Mini Tower case 5 Bay ATX/uATX Tower w/250W
- MS PS/2 optical mouse
- 101/104 keyboard
- Speakers
- 17" flat screen LCD monitor
- Windows 2000 Pro OS
- Minimum 3-year on-site parts and labor warranty

The District ITS department has the desire to bring operations up to the standards of the *Technology Plan II TCO model (Appendix 3.4.L)*. According to this plan, one third of the desktops will be replaced every year, effectively recycling through all systems every three years. The Bond budget has been developed with this model in mind, although industry trends are moving towards a four-year replacement cycle. The District ITS department is working with College Computer Support staff to evaluate this impact and new standards.

Recommendations for a new District “unified” desktop standard have been developed. The desktop standard will include name-brand desktop and laptop systems from the top tier manufacturers, HP/Compaq, Dell, and Gateway, to ensure greater quality of integration and compatibility, no variance in components, and vendor stability for product support.

The specifications for Intel Platform running Windows XP are recommended to be:

Processor: Intel 3.4 GHz, 915G processor.

Monitor: High-end 17” displays capable of support 1024x768 resolution.

Network Card: all NIC cards supporting 10/100/1000 Mbps over copper.

Disk Drive: 80 GB.

Headphones/Speaker outlets: Front-mounted connections.



Speakers: Admin computers only.
Headphones: Provided as needed in labs, or by students.
USB ports: 2 front and 2 rear (plus additional ports if USB mouse/keyboard is provided).
DVD-CD/CDRW: read-writable CD capability.
Floppy Drive: 1.44 MB.
RAM: 512 MB.
Keyboard: regular 101/104 keyboard. (If vendor provides USB keyboard, then additional USB ports are needed.)
Mouse: Optical mouse. (If vendor provides USB mouse, then additional USB ports are needed).
Operating System: Windows XP, applied with current, tested patches.
Mini-tower: with enough slots to accommodate above media peripherals and also an optional ZIP drive.
Power Supply: minimum 300 watts, higher power if required by hardware.
Power Strips: six plug surge protection power strips for monitor and CPU, not printer.
Support: 4 year hardware warranty on parts.

Macintosh systems will be provided for defined application areas where they are required to support the specific curriculum. The standard architecture shall include

Processor: G5 with dual 1.8 GHz
Monitor: 17" Apple Studio flat panel display with NVIDIA GeForce FX520 video card
Disk Drive: 80 GB serial ATA 7200 rpm.
DVD-CD/CDRW: all systems should come with burners
RAM: 512 MB
Keyboard/Mouse: Apple standard
Operating System: OS X Panther
Power Strips: Provide with surge protection power strip
Support: 3 year AppleCare warranty.

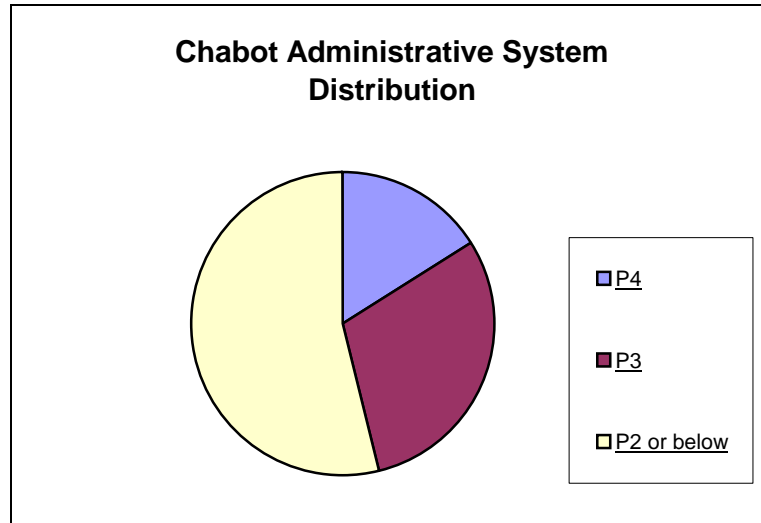
The specifications for Printer Standards are recommended to be:

HP as brand of choice
Ethernet network card
PCL5E/6
TCP/IP networking
Three tiers:
 Personal HP 1200
 Group HP 4000
 High Volume HP 8000

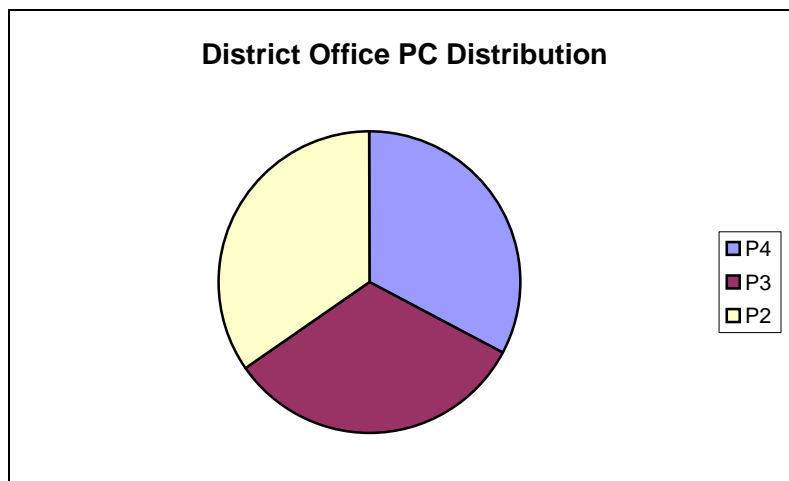
There are approximately 241 admin systems located on the Chabot campus. Of these systems, only about 16% (38) are current systems (with an Intel P4 CPU). Another 30% (72) are systems based on the P3 CPU. The remaining 54% of the existing systems in use are based on the P2 processor or older architectures and four are Macintosh. It is important to look at this distribution in context with respect to when these processors became available in the marketplace. The P2 processor was the mainstream processor in 1999/2000. The P3 processor replaced P2 technologies in 2001 and the P4 was



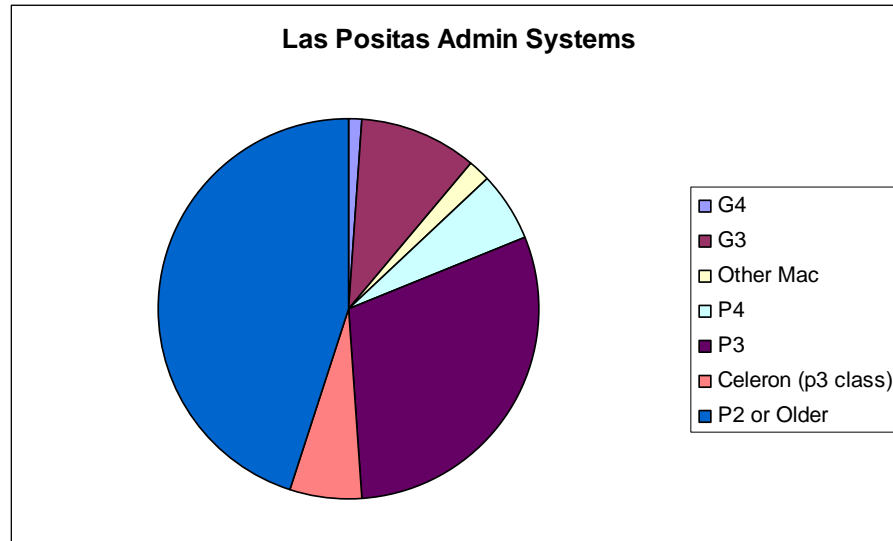
considered the mainstream processor in 2002. As such, the vast majority of the desktops are based on a technology that has been considered obsolete for 3 years. The Chabot Computer Services team has stated that the majority of their time is spent repairing “dying” hardware.



There are 54 admin systems at the District Office. There are an additional 20 P4 systems in the training room. 32% of these are current P4 systems. 32% of these are P3 systems, and 34% are P2 systems. Three of the 54 systems are currently not in use, or are available as “spare” systems.



There are 199 admin systems at the LPC Campus. 6% of these are current P4 systems. 36% of these are P3 systems, and 45% are P2 systems or older. The remaining systems (13%) are Macintosh.



B. Laptops

Currently very few laptops are deployed. These laptops do not have docking stations, and are not offered as substitutes for administrative workstations, except under extremely special circumstances. The systems are specified at the time of purchase according to what is currently available on the market. District ITS requires that these systems are purchased with standard three-year warranties on parts and labor. The systems are currently purchased from a preferred vendor after multiple quotes are obtained and examined.

The current Chabot inventory for administration shows: (2) P4 based Laptops, (2) P3 based Laptops and (1) P2 based Laptop for administrative users. The district currently has a small mix of Gateway & Sony laptops.

Recommendations for new District laptop and tablet standards have been developed. The specifications are detailed as follows:

Laptop Standard

- Processor:** 1.8 GHz Pentium M or 3.0 GHz Pentium 4.
- Memory:** 512 Mb memory.
- Disk:** 80 GB disk.
- Media:** floppy drive, as slot plug-in or separate unit.
- Media:** DVD/CD RW, as slot plug-in or separate unit.
- Network:** 10/100 RJ-45 LAN.
- Wireless:** 802.11 b/g wireless access card, integrated preferred.
- Serial:** DB-9 serial port.
- USB ports:** one.
- External Video:** DB-15 video connection.
- Mouse:** pad, with optional pointer.
- Operating System:** Windows XP.



Display: 15" display.
Battery: supplemental battery pack.
Carrying case: durable, drop-resistant, shoulder strap.
Support: 3 years accidental damage warranty.

Tablet Standard

Operating System: Microsoft® Windows® XP Tablet PC Edition.
Processor: Intel® Pentium® M Processor 715 (minimum 1.1GHz).
Memory: 256MB DDR SDRAM.
Hard Drive: 40GB 4200rpm Ultra ATA hard drive, expandable.
Screen: XGA TFT Active Matrix with 1024x768 resolution.
Digitizer Pens: included.
Speakers: Integrated speakers, headphone/speaker jack, and mic jacks.
Wireless Networking Adapter: Integrated 802.11b/g wireless networking card
Expansion Slots: (1) Type II PC card slot.
External Ports: (2) USB 2.0, RJ-45 (network), RJ-11 (modem), VGA.
Keyboard: Detachable Keyboard.
External Media: CD-RW and DVD combo, floppy drive.
Battery: Lithium ion battery with AC pack.
Warranty: 4 year part/labor/no on-site/4 year technical support.
Case: Carrying Case.

Operating System and Service Packs

Presently Windows2000 with SP4 is the standard operating system for the administrative systems. There currently is no system for automating service pack delivery, so critical patches are installed manually, usually in response to virus/worm outbreaks. The ZenWorks upgrade will provide necessary improvement for timely and comprehensive delivery of patches/upgrades.

Out of the 241 admin systems at Chabot College, 32% (77 systems) do not meet the Windows 2000 standard. The majority of the systems that do not meet this requirement are shown to be running Windows NT with a variety of service packs, although Windows 98/95 systems exist as well.

Of the 74 systems at the District Office, 71 or (96%) are installed with Windows 2000 as per the District ITS standard. Two systems are running WindowsNT, and the last has no OS currently installed.

It was decided to recommend the migration plan to WindowsXP Professional. Most software has been verified to work with this OS. See next section for application dependencies on OS upgrade. *See also Chabot College PC Inventory (//intranet/MIS) & District Office Computer Inventory (Appendix 3.4.M)*

Applications Supported

CLPCCD has a current standard suite of application software on the administrative desktops. Standard system builds are staged using Symantec's Ghost Software. There is currently no method for auditing software licenses on the systems, although ZenWorks can maintain a desktop inventory.

Standard Intel Platform (Administrative)



- Microsoft Office 2000 Pro
- Frontpage 2002 (Chabot only)
- Acrobat Reader 6.0
- UltimateZip
- GroupWise 6.5.1 Client
- Norton Anti-Virus Corporate Edition
- Macromedia Flashplayer
- Macromedia Shockwave
- Novell Client
- Banner

Other software may be added for specific needs with proper authorization from Chabot CS or District ITS.

The aforementioned upgrade to the OS standard has prompted the following software requirements as well:

- Microsoft Office 2003
- Java
- Any Existing Acrobat 5.0 will need to be upgraded to version 6 to support macro functionality.

Some old Access databases will need to be reviewed and ported for Office2003 compatibility.

Storage / Archival

The ITS procedure for critical data archival is to have the user save this data to a network drive. Therefore, the restoration of a failed desktop is based on reGhosting the machine. The restore process should be adequate to install the operating system, the required applications, and leave enough free space on the drive for swap space, and some file management. The local drives/files are not backed up by ITS.

Users are made aware of the need to back up to the server, but there are comprehension issues. Some of the faculty end-users at Chabot do not log onto the domain and are not able to map to network drives. As such, the default configuration for saving files to the local drives is left in place. It cannot be easily determined whether or not the users are effectively using the network drives to backup all of their critical files. However, file restore requests are minimal.

IFolder is a technology that ITS has in prototype development. IFolder seamlessly integrates with the OS to make sure critical files are replicated to the network drives, and thus be backed up in accordance with the data archival procedures.

Workstation Locations

The locations of the workstations are tracked for the Chabot campus in the Chabot College PC Inventory database (*//intranet/MIS*). IT groups from all three sites use a computer naming convention which includes the room number and campus. This allows each computer to be identified by workstation locations using nslookup or netbios lookup tools.

Asset management for depreciable items over \$1000 is tracked through the Purchasing department. IT assets that cost less than \$1000 are tracked on spreadsheets. ITS also maintains an entire inventory of PCs and peripherals on spreadsheets regardless of dollar value.



2.0 Chabot College Campus

The Chabot College Campus is located at 25555 Hesperian Way in Hayward.

Servers

In addition to the servers detailed in the proceeding section, the Chabot Computer Services department manages the Chabot College instructional and faculty servers. These servers provide: distributed file, print, World Wide Web, intranet, library and data archival services to the faculty and the student body. They have chosen a homogeneous networking strategy based on Microsoft operating systems and tools to leverage the strengths of the out-of-the-box interoperability and manageability that a single platform has to offer.

Functionality & Purpose

The main goal of the servers and the applications that are deployed and managed by CCS is to provide the support and tools to the faculty and students that are necessary for instruction and the administrative functions that are directly related to instruction. Besides minor interaction with the District servers for some core networking services and shared data with the Banner and the Groupwise systems, the CCS servers are autonomous from the District ITS servers.

The servers are maintained by a staff of three specialists. Unscheduled downtime is minimal, except for application issue on the Sirsi Library server and its web/proxy servers.

Hardware Configuration

Different server vendors have been evaluated in the past. There is currently a mix of clone, Micron, Dell & HP/Compaq servers in use at Chabot. Some server configurations were evaluated for its intended purpose and its expected lifetime at the time of planning for its purchase. Others were rapid deployments of lab prototypes on workstation hardware. The latter servers have not proven to be the most robust or high performing.

Currently CCS purchases systems with the following baseline configuration:

- HP/Compaq DL380 Rack mount server
- Dual Processor
- 2 Gb RAM (minimum)
- RAID5

Operating System and Service Packs

Service Packs and patches are applied on a regular basis to ensure the systems maintain high security, integrity, and operability. The Windows 2000 servers have all been patched to Service Pack 4.

Software maintenance is included with all of the OS purchases to ensure the availability to upgrade to the latest release of OS when it is deemed necessary to increase server performance or provide other new added functionality. Microsoft Windows Server 2003 is the current standard NOS. CCS has a migration plan to move all of the existing Windows 2000 servers to the new platform by July 2005.

The sole Linux server (for the Linux classes) runs on Red Hat 8 and is patched using the Hot Updates feature.

Applications Supported



A. Directory Services

CCS has implemented Microsoft's Active Directory Service (ADS) as their directory service. In the past, many departments had installed their own servers with unique domains. These domains were largely unmanaged, poorly configured and used minimally. CCS was tasked with the chore to consolidate these servers and domains. The result was the creation of the CHABOTCOLLEGE ADS domain.

The ChabotDC1 server acts as the Primary ADS Domain Controller, and ChabotDC2 acts as the secondary. There are currently fourteen servers active in this domain. The ADS is currently organized into OU's based upon the majors that are offered at the college. This method was chosen due to frequent departmental changes, and was considered the most static logical grouping of users.

B. Core Network Services

DDNS/DHCP - ChabotDC1 and ChabotDC2 handle DNS requests for the instructional and faculty systems. Dynamic DNS is configured for the workstations. ChabotDC1 handles DHCP in a backup role and it would have to be manually activated in case of failure.

File Sharing - When deployed, the new ChabotFile server will handle most of the file requirements for both storing the faculty folders and providing shared folders for the groups that need them. This server handles all of the file services for the Faculty, Mac Users, and Spectator (the school newspaper) groups. Additional files for the CNC program are stored on the CNC File-Server.

C. WWW/Intranet

The Chabot College Internet site can be found at <http://www.chabotcollege.com>. This site is hosted on the ChabotCollegeWeb server. The college also has its own internal web site that is hosted on the Intranet server. This site taps into GWExtranet, a service provided by ITS for web enabled Groupwise calendaring. This site is available while on the CLPCCD LAN at the url: /calendar.

Library services via the Sirsi server are also available via the browser from both college sites.

These services are hosted on the Microsoft IIS platform for seamless compatibility with the FrontPage web-design platform. The following table illustrates which servers provide www/intranet or web delivered applications:

Server	Location	OS	WebServer	Web/Intranet Functionality



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Chabot Web Servers

D. Instructional Servers

These servers host the application or provide services for the curriculum for specific classes offered at Chabot. The following table shows which servers these are, where they are used, and who maintains them:

Server	Location	OS	Functionality	Support

Chabot Instructional Servers

E. SMS

The System Management Server (SMS) desktop-management package for CCS also provides key features for managing and controlling computers in the infrastructure; integrates reporting and ADS, Asset management for hardware, software inventory, Web reporting and application deployment, as well as ADS integration and improved support for mobile computers. Most of the features in this software cannot currently be fully utilized due to the mix of older desktop operating systems on the network.

Storage/RAID

Adequate network storage has been an issue in the past. A new file server has been purchased and the data load will be distributed between the new and the old servers. The data volumes on the newer servers will be sufficient to support the current users' data needs. All of the servers that support the storage of college data are RAID5 and backed up regularly. As stated in the District Office section, additional storage technology and operational processes need to be implemented so that a more robust storage/archival system is used.



Server Locations

CCS houses all of the critical servers in the work center on the Chabot Campus (Room #310A). The three instructional servers that are maintained by the faculty are distributed around the campus.

Desktops

The Computer Services team manages the desktop systems at Chabot College. They not only support any instructional or faculty desktop systems, but also they support the administrative systems that are on site as well. District ITS and the college teams will work together to resolve more complex end user desktop issues, particularly where networking is concerned.

Functionality and Purpose

The basic functions of the desktop systems are to provide student labs, instructional aid and administrative support for the instructional efforts at the college. As discussed earlier, the College IT staff supports the day-to-day needs of the Chabot College administrative PCs. The remaining desktops at Chabot can basically be broken down into two categories, instructional & faculty.

The instructional systems are provided for students both in the classroom and around the campus for their out of class computing needs. The in-classroom systems are often organized in labs and will have specific course related software in addition to the standard application load set. The other systems, such as in the library, offer a standard suite of applications.

CCS has deployed Microsoft's Systems Management Server to aid with desktop management. A substantial effort is required to transform the desktop environment so that it conforms to the current requirements of SMS, so that SMS can be more helpful in the day-to-day management of their desktop systems. The largest obstacles are: (1) getting the desktops standardized on a manageable OS platform (such as Windows2000 or XP), and (2) getting the existing systems that are manageable converted from a local user account format, into the Windows ADS Domain structured accounts. These migration tasks require visits to the desktops to perform configuration changes, new computer hardware and new end-user logon practices.

Hardware Configuration

A. Desktop

Chabot CS has two existing standards for Instructional/Faculty systems, one for PC Hardware and one for Macintosh. The PC standard is scaled down for admin/faculty purchases. On a quarterly basis, or just prior to any planned bulk systems purchases, the CCS staff updates these standards. Unfortunately, due to budgetary restrictions, the replacement of these systems has been very slow at best. See documents: *Purchase Standards for Computer Hardware 03-04 (Appendix 3.4.K) & Chabot College PC Inventory (//intranet/MIS) and Appendix 3.4N.*

The current standard for purchasing instructional desktop hardware is as follows:

PC Architecture (Hardware is to be XP compatible)

- Intel Pentium 4 CPU 2.8Ghz
- Intel Chip Set on the motherboard with integrated 10/100 NIC, AGP video, sound, 2 Ser/ 1 Par/ 2 USB / 2PS2 ports/ USB connections, Front mounted Mic/ Headphone/ USB connections
- 512MB DDR PC2100 RAM
- 40GB IDE 7200 RPM hard drive



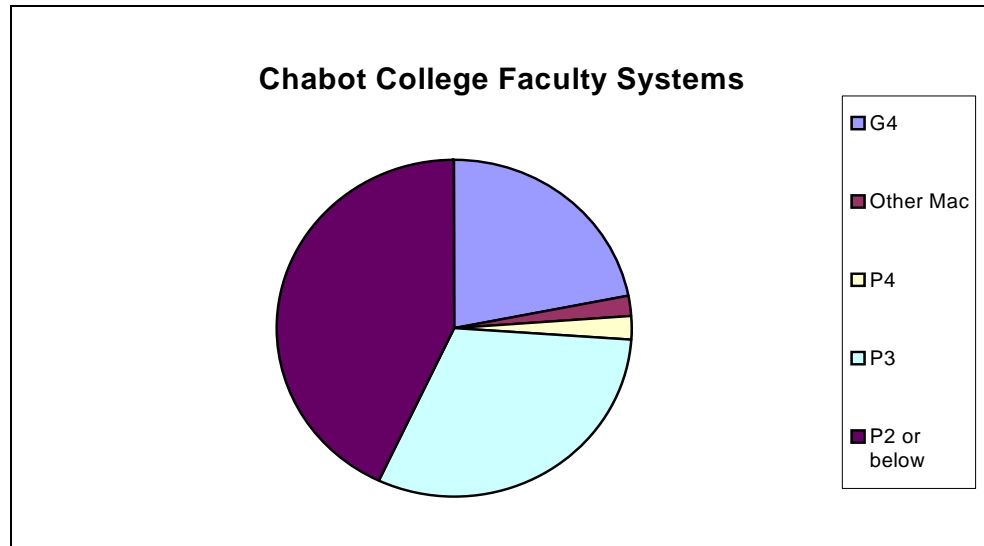
- DVD-CD/CDRW 16/48 ROM drive Internal
- 1.44M floppy drive
- Mini Tower case 5 Bay ATX/uATX Tower w/250W
- MS PS/2 optical mouse
- 101/104 keyboard
- Speakers (omit for labs)
- Windows 2000 Pro OS
- 17" Flat Panel Display (or 17" .26dpi CRT for labs)
- Minimum 3-year on-site parts and labor warranty

Macintosh Architecture

- G5 Dual 1.8 GHz
- 512mb PC 2300 RAM
- 80Gb Serial ATA 7200rpm HDD
- NVIDIA GeForce FX5200 video card
- CD-RW/DVD-ROM Combo drive
- Apple keyboard and mouse
- Mac OS X
- 17" Apple Studio Display (Flat Panel)
- 3yr AppleCare Warranty

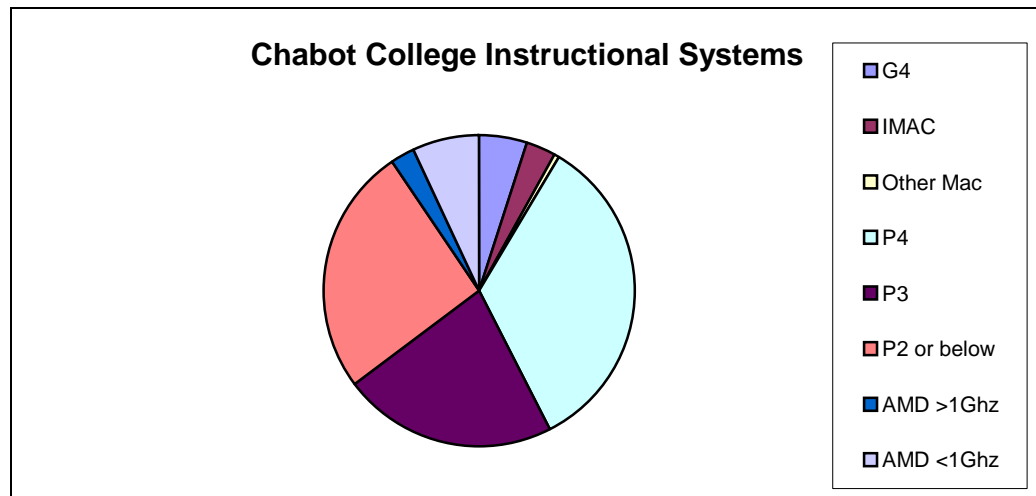
CCS has the desire to bring operations up to the standards of the *Technology Plan II TCO model (Appendix 3.4.L)*. According to this plan, one third of the oldest desktops will be replaced every year, effectively recycling through all systems every three years. See also *TCO Upgrade Model & Roll Out Plan (Appendix 3.4.Q.)* The CCS team has stated that the majority of their time is spent repairing "dying" hardware and adoption of this model would improve this. Recently, the industry is starting to migrate to a 4-year TCO model and CLPCCD is considering this new standard for their environment as well.

There are approximately 205 faculty systems located on the Chabot campus. Approximately forty-five of these systems are Macintosh platform and the majority (90%) is G4 systems. Only four PC systems are current P4 Architecture or about 3%. Another 41% (63) systems are based on the P3 architecture. This leaves the remaining 43% of Faculty PCs being P2 level or below.



There are approximately 1030 instructional systems located on the Chabot campus. Roughly 90 of these are Macintosh platform of which 60% are G4's. Another 33% are iMac's and these iMac systems are being eliminated and replaced with PC's. The remaining 7% are older obsolete Mac models.

Of the 907 instructional PCs 39% are current P4 systems. An additional 3% (25 systems) are AMD Athlon based that are P4 equivalent. 25% of the instructional systems are P3 processors. An additional 8% (69 systems) are AMD Athlon based that are P3 equivalent. Of the remaining 26% of systems, about half of them fall into the Pentium 2 category.



Data was extracted using values from the CCS Chabot Inventory database.



B. Laptops

Currently very few laptops are deployed. These laptops do not have docking stations, and are not offered as substitutions for administrative desktop workstations. The laptops are a loaner pool from Media Services, or classroom lab machines. The systems are specified at the time of purchase according to what is currently available on the market. It is required that these systems are purchased with standard three-year warranties on parts and labor but they include accidental damage as well.

The current Chabot inventory shows the following distribution of laptops: (5) P4 based laptops for the faculty and (27) P4 based laptops and (9) P2 based laptops for Instructional purposes. There is also an Apple PowerBook, and (1) P3 & (1) P4 laptop listed for "other" uses.

25 of the 27 P4's are used in the physics lab and are configured for wireless 802.11g connectivity.

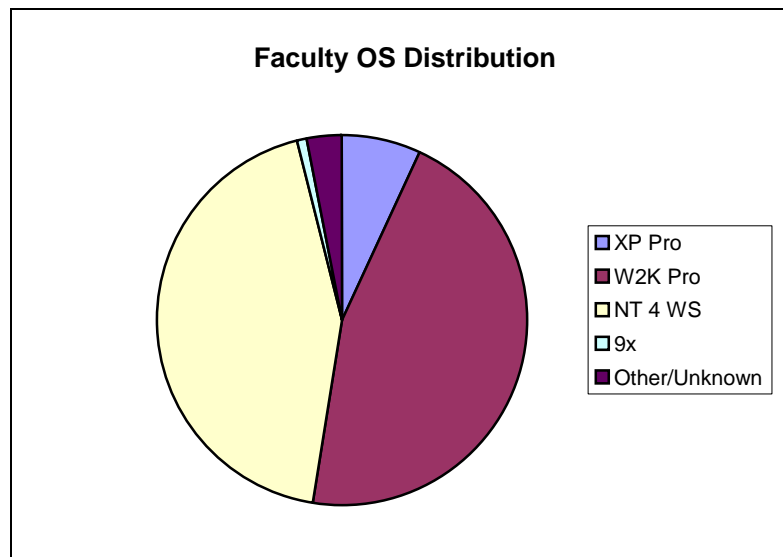
The majority of the laptops purchased have been HP/Compaq platforms

Operating Systems and Service Packs

Presently Windows2000 is the standard operating system for the instructional & faculty pc systems. SMS is problematic for automating service pack delivery until all systems are brought up to W2K and accounts are created in the domain so patches are installed on a case-by-case basis. This data is tracked manually.

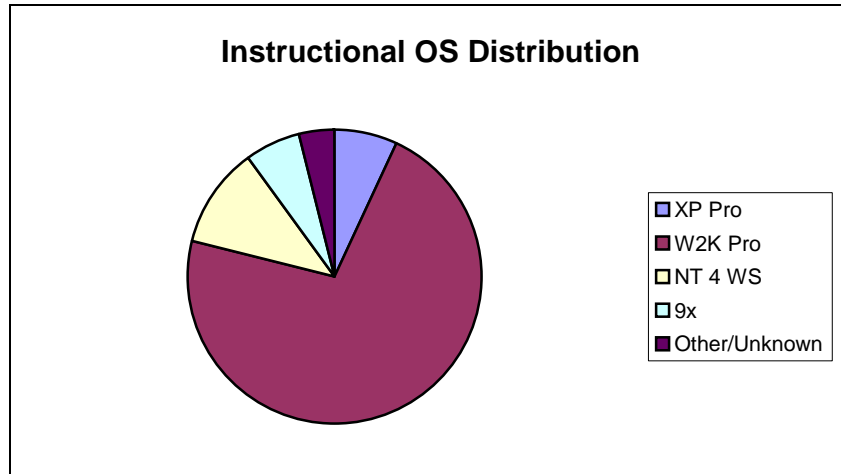
One of the primary objectives for CCS is to create a standardized OS environment to both increase efficiency in service, and to take better advantage of the management platform that they have already invested in.

Out of the 160 PC Faculty systems at Chabot College 73 (46%) meet this standard. Approximately 11 (7%) systems are already running WindowsXP, but 70 (44%) are still on WindowsNT. See *Chabot College PC Inventory* ([//intranet/MIS](#))





On the Instructional side approximately 907 systems are PC based. Seventy-two percent of these instructional systems meet the current Windows2000 OS standard. An additional 7% are already on WindowsXP. Of the 21% of the systems that aren't up to minimum standards, 11% are running WindowsNT and 6% are running Windows9x.



There are some systems that are still running DOS and Windows 3.x in both of these environments.

On the Macintosh side, most systems are running MacOs 9.x or higher. This includes 94% of the faculty Macs, and 61% of the instructional Macs.

Applications Supported

CCS has three current standard base installations for applications software on their systems. Other software can be added with proper authorization from departments. Standard system builds are rolled out with Symantec's Ghost Software. There is currently no method for auditing software licenses on the systems; CCS plans to use SMS to do this in the future as soon as it is possible for them to implement this. CCS currently maintains a software inventory spreadsheet.

Standard Intel Platform (Faculty)

- Microsoft Office 2000 Pro
- Frontpage 2002
- Acrobat Reader 6.0
- UltimateZip
- GroupWise 6.5.1 Client
- Norton Anti-Virus Corporate Edition
- Macromedia Flashplayer
- Macromedia Shockwave
- GradeQuick 8.1

Standard Intel Platform (Instructional/Labs)



- Microsoft Office 2000 Pro
- Frontpage 2002
- Acrobat Reader 6.0
- UltimateZip
- Norton Anti-Virus Corporate Edition
- Macromedia Flashplayer
- Macromedia Shockwave

Any additional needs will be determined by the needs of the lab/department and specific curriculum.

Standard Mac Platform (Faculty)

- Office X
- Explorer 5.1
- Gradequick 8.1
- Symantec Anti-Virus 9

See document CCS – Basic Software Installations (Appendix 3.4.R) & Chabot Software Licenses (Appendix 3.4.S)

Storage / Archival

CCS procedure for critical data storage is to have the user save this data to a network folder. Therefore, data storage on the desktop is trivial. It should be adequate to install the operating system, the required applications, and leave enough free space on the drive for swap space, and some file management. CCS does not back up these local drives/files.

Students are responsible for their own data, which can be backed up by floppy, burned to CDROM, or preferably copied to USB drives.

Workstation Locations

The physical security for the workstations is handled on a room-by-room basis. The locations of these systems are tracked for the Chabot campus in the Chabot College PC Inventory database (*//intranet/MIS*).

Asset management for items over \$1000 that are depreciable is tracked through the Purchasing department. IT assets that cost less than \$1000 are tracked by hand on inventory spreadsheets. District ITS and College CS track all PCs on spreadsheets for physical location and estimated replacement value for the *2004 Insurance Inventory ITS spreadsheet (Appendix 3.4.N)*.

3.0 Las Positas Campus

The Las Positas Campus is located at 3033 Collier Canyon Road in Livermore.

Servers

In addition to servers described previously, the Las Positas Computer Services department manages the LPC instructional servers. These servers provide; distributed file, print, curriculum support, World Wide Web, intranet and data archival services to the faculty and the student body.



Functionality & Purpose

The main goal of the servers and the applications that are deployed and managed by LPC CS are to provide the support and tools to the faculty and students that are necessary for instruction and the related administrative functions. Besides some minor interaction with the District servers for some core networking services, the LPC CS servers are autonomous from the District ITS servers. See document: *Las Positas College Computer Support Dept. Summary of Org & Functions (Appendix 3.4V)*.

Hardware Configuration

Different server vendors have been evaluated in the past. There is currently a mix of clone, Gateway, Dell, HP/Compaq & Linux servers in use at Las Positas. Some server configurations are evaluated for its intended purpose and its expected lifetime at the time of planning for its purchase. Others are deployed on available workstation hardware. See document: *LPC Instructional Servers spreadsheet (Appendix 3.4.U)*.

Operating System and Service Packs

Service Packs and patches are applied on a regular basis to ensure the systems maintain high security, integrity, and operability. The Windows 2000 servers have all been patched to Service Pack 4.

Software maintenance is included with all of the OS purchases to ensure the availability to upgrade to the latest release of OS when it is deemed necessary to increase server performance or provide other new added functionality. The LPC CS department makes upgrade decisions based upon business drivers, and to this point they have not determined the appropriate time to upgrade to Windows2003 server. See: *LPC Hardware & Software Inventory Database*.

Applications Supported

A. Directory Services

LPC CS has implemented Microsoft's Active Directory as their directory service. The Windows servers are all members of the LPC ADS domain. Daffy is the Primary ADS Domain Controller. Cooper, Marvin and SMS act as Secondary domain controllers.

B. Core Network Services

DDNS/DHCP - Alice, Marvin, Daffy, Cooper, Gandalf & Stars-Server servers all handle DNS requests for the instructional and faculty systems. Alice also handles DHCP for distributing network information to the instructional, faculty and admin desktops on the LPC network. Taz serves as the backup DHCP server. If Alice should fail, the service would have to be started manually on this server.

File Sharing - File sharing duties are provided for the full-time faculty and are shared among the network servers. VCOM holds files for sharing in the visual communications lab. Daffy is the primary file server for faculty. It is replicated to the Marvin server by NT File Replication Services (NTFRS). Cooper, Gandalf and the Science-Server also distribute the load of file sharing in the environment.



C. WWW/Intranet

The Las Positas College Internet site can be found at <http://www.laspositas.com>. This site is hosted on the District ITS's lserver/Porter server.

Library services via the Sirsi server are also available via the browser from both college sites. There are also three servers that deliver web based curriculum to students. Yje primary Sirsi server is based at Chabot, and managed by the Chabot College Computer Support team. The other two are offsite and managed by a third party. The following table illustrates the web based services that are currently running from Las Positas servers:

Server	Location	OS	WebServer	Web/Intranet Functionality

Las Positas Web Servers

D. Instructional Servers

There are a number of servers which host the applications or provide services for the curriculum in specific classes offered at Las Positas. The following table shows the server details:

Server	OS	Functionality	Support

Las Positas Instructional Servers



Storage/RAID

Currently just Marvin, Daffy & Image-server have RAID5; LPC1 has RAID1. This indicates that most of the faculty data stores are located on redundant disks, but not all of them.

Data backups of all of the domain controllers and the Science server are scheduled on the Cooper Server using Veritas BackUp Exec 9.1. This data backed up incrementally on a daily basis, which is followed by a full backup on Saturday. The data is saved to a USB2 Firewire hard drive that is switched weekly.

LPC1 is backed up with the Veritas software and saved to a local tape. This method of backup has not been deemed completely reliable.

The Image Server, SARS and ATI are backed up using an external USB hard drive. These incremental backups are also performed daily, with a full backup scheduled for Saturday. This drive is not rotated.

As stated in the District Office section, additional storage technology and operational processes need to be implemented so that a more robust storage/archival system is used. *See document: Las Positas College Computer Support Dept. Summary of Org & Functions (Appendix 3.4.V)*

Server Locations

Due to the lack of adequate space in the CS department, servers are currently distributed all over the campus. The critical admin servers are located in the shared MPOE and the remaining servers are in the classroom areas, but secured within locked computer cabinets. LPC CS would like to see all of the servers combined into a dedicated computer room in the proposed new data center.

Desktops

The desktop systems at Las Positas College are managed by the LPC CS team. They not only support any instructional or faculty desktop systems, but they support the administrative desktops that are on site as well. The LPC CS team provides second-level technical support to an in-house training program called Laptechs. If Laptechs cannot resolve the support call, it is then forwarded to LPC CS. District ITS and the college teams work together to resolve the more complex end user desktop issues, particularly where networking is concerned.

Functionality & Purpose

The basic functions of the desktop systems are to provide instructional aid and administrative support for the instructional efforts at the college. The desktops in this environment can basically be broken down into two categories, instructional & faculty.

The instructional systems are provided for students both in the classroom and around the campus for out of class computing needs. The in-classroom systems are often organized in labs and will have specific course related software in addition to the standard application load set.

Hardware Configuration

A. Desktop

At Las Positas College the current standard for Desktops for all faculty, staff & students are Intel based PC's. The current vendor of choice is Gateway and these systems are either



purchased, leased or purchased at the end of the lease. A decision is made at the time of purchase as to what the system requirements should be.

The equipment refresh procedure cycles through all of the systems every three years in accordance with the Technology Plan II TCO model. Recently, the industry is starting to migrate to a 4-year TCO model and CLPCCD is considering this new standard for their environment as well. Due to special arrangements with Gateway, LPC CS has been able to purchase systems at an extremely attractive price at the conclusion of their lease period. Gateway has offered this low buy-out as an incentive to continue with continuation leases. In the current cycle, LPC CS is in the process of phasing out their prior vendor, ACMA's P3 systems.

The OS Standard for instructional workstations is WindowsXP. This is based upon educational drivers and a need to have the latest operating system available for learning purposes. Macintosh systems are the exception in this environment. Each request for a Macintosh system is reviewed to verify that there is an academic driver for the request, and just not based on the personal preferences of the instructor. The following were the standards of the last systems that were specified:

Gateway E-4000

- Motherboards - Intel (Essex) Pentium 4 - 2.53 GHz
- Video Cards - NVIDIA GeForce4 Ti4200 128-MB AGP Graphics Card
- Monitors - VX730 17-inch Flat CRT Monitor with 16-inch Viewable Area
- Memory - MEM DDR 256-MB PC266B 32X8
- Hard Drives - Western Digital 80-GB 7200-RPM Hard Disk Drive
- CR-RW Drives - Lite-On 48x 24x 48x Recordable/Rewritable CDRW
- DVD Drives - HLDS 16X DVD Drive
- Zip and Jaz Drives - Iomega 750-MB Zip Drive
- Floppy Drives - Panasonic 1.44-MB Floppy Disk Drive Revision 7
- USB – 2.0 Four Ports
- Nic Card - Intel PRO/100+ Adapter
- Keyboards - Lite-on PS/2 104+ Keyboard 02 ID No Logo
- Mice - Logitech PS/2 Standard Mouse Revision 1
- Cases and Case Hardware - Pinta Desktop E-Series Mid-Tower Case

Apple Power Mac G4 (Gigabit Ethernet)

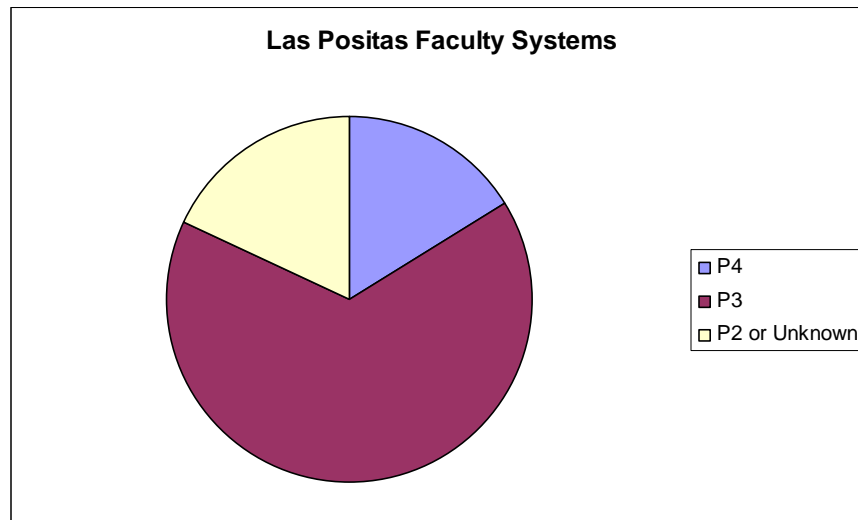
- Microprocessor - PowerPC G4 Dual 500 (MHz)
- L2 Cache - 1MB
- Bus speed - 100 (MHz)
- Memory – PC 100 SDRAM up to 2 GB
- Video - Rage 128 Pro AGPATI Radeon
- USB - Controller Dual independent (two controllers)
- FireWire - Controller Built into logic board
- PCI Slots - One AGP and three PCI slots
- Hard Drive – 40-GB Ultra ATA/66 Optional Ultra2 LVD SCSI
- CD/DVD Drive - DVD-ROM or DVD-RAM

Apple EMac

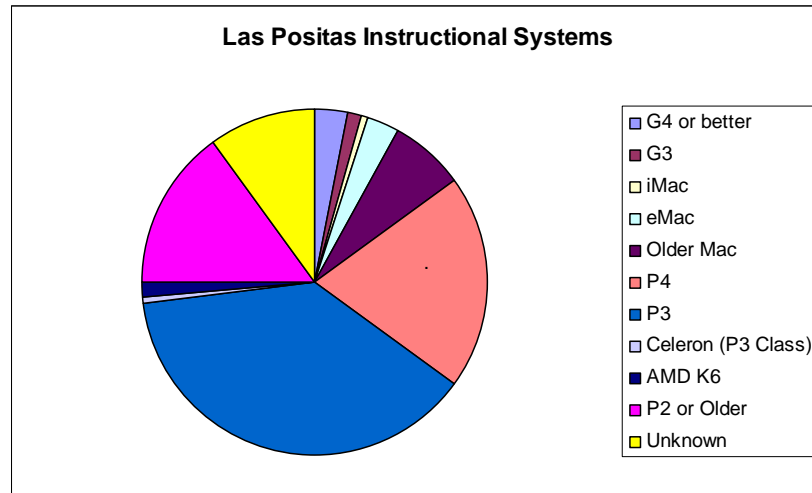


- Microprocessor – 700MHz PowerPC G4 processor with Velocity Engine
- Bus speed - 100MHz system bus
- Memory – 512MB of SDRAM - up to 1GB using 128MB, 256MB, or 512MB DIMMs
- L2 Cache - 256K on-chip level 2 cache at full processor speed
- Video - NVIDIA GeForce2 MX - AGP 2X support - 32MB of dedicated (DDR) SDRAM
- USB - Support for 5 Ports
- FireWire - Two 400-Mbps FireWire (IEEE 1394) ports
- Hard Drive - 40GB Ultra ATA hard disk drive
- CD/DVD Drive - 24x10x32x-speed (maximum) CD-RW drive
- Monitor - Built-in 17-inch flat CRT (16-inch diagonal viewable image size)
- NIC Card - Built-in 10/100BASE-T Ethernet (RJ-45 connector)

There are approximately 50 faculty systems located on the LPC campus. Only eight PC systems are current P4 Architecture or about 16%. Another 66% (33) systems are based on the P3 architecture. This leaves the remaining 9% of Faculty PCs being P2 level or below.



There are approximately 1117 instructional systems located on the LPC campus. Approximately 165 of these systems are Macintosh platform. 224 PC systems are current P4 Architecture or about 20%. Another 38% (422) systems are based on the P3 architecture. This leaves the remaining 27% of Instructional PCs being P2 level or below.



B. Laptops

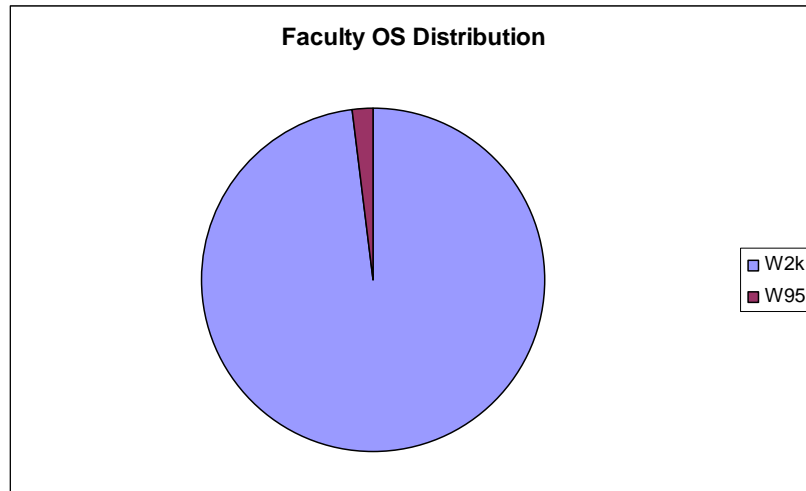
Currently very few laptops are deployed. These laptops do not have docking stations, and are not offered as alternatives to administrative desktop workstations. The systems are specified at the time of purchase according to what is currently available on the market. The preferred vendor is Gateway. These are P4 2.4 GHz laptops. LPC has some Sager P3 700Mhz laptops as well. LPC CS requires that these systems are purchased with standard three-year warranties on parts and labor.

Faculty are allowed to plug their own laptops onto the network in classrooms and faculty offices. This is for projecting PowerPoint materials in 95% of the cases. There are no requirements to make sure that faculty-owned laptops are patched to a certain level.

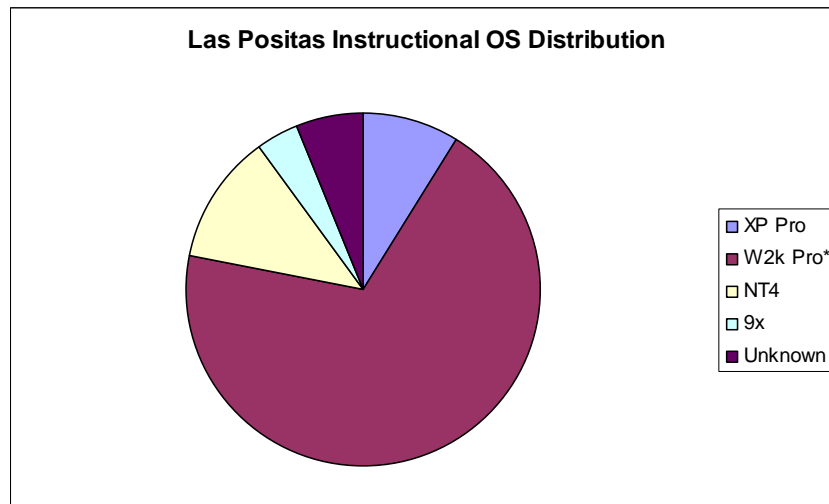
Operating System and Service Packs

WindowsXP Professional is the current standard OS for instructional systems. Windows2000 Professional is the current standard for administrative workstations on site. The new tentative District “unified” standard brings the existing two standards in line with one another by migrating administrative systems to WindowsXP. The majority of the Faculty systems meet the standard. The instructional environment still supports a mix of OS’s covering 95, 98, NT, Windows2000 Pro, and WindowsXP Pro.

Out of the 50 PC Faculty systems at Las Positas College, 98% (49 systems) are running Windows 2000. 2% of the systems are running Windows 95.



On the Instructional side approximately 1167 systems are PC based. 69% of these instructional systems meet the current Windows2000 OS standard. An additional 9% are already on WindowsXP. Of the 22% of the systems that aren't up to minimum standards, 12% are running WindowsNT and 10% are running Windows9x or other operating systems.



Applications Supported

A variety of Ghost images are deployed on the site as base images. The software inventory lists the standard applications such as Office2000, OfficeXP, Office2002 (Mac) and the rest of the applications are licensed as limited use per seat or on a stand-alone basis. See *LPC Software/Hardware Inventory Database* available from LPC staff.

Storage / Archival



The LPC CS procedure for critical data storage is to have the user save this data to a network folder. LPC CS does not back up local drives/files. Students are responsible for their own data, which can be backed up by floppy or zip drive, burned to CDROM, or copied to USB drive.

4.0 District Data Center

The physical location of the existing District Data Center is at Chabot College. The District Data Center provides the network connectivity, hardware, and software to support the instructional and administrative computer needs at both colleges. The existing District Data Center at Chabot College is deemed to be inadequate in terms of size, location and backup utilities to house the District Data Center as it expands to support the Bond Measure “B” initiatives. The District has determined that the Data Center should be relocated to a building built specifically for District ITS and LPC Computer Services.

The decision to relocate the District Data Center from Chabot campus where it has historically been was based on the following:

- The college has experienced increasing demands for classroom space that conflicts with the District ITS space occupation.
- The current ITS facilities at Chabot are inadequate in size and configuration to meet the current and anticipated staffing and technology infrastructure requirements of the colleges.
- There is no space available for generators to be located near the existing Data Center. Back up power to the servers in the Data Center is UPS only, and provides just enough time to shut down the servers in an orderly manner. There is a real need for a backup generator to ensure full operation during any major power outages. In the past, these unplanned power outages have interrupted the instructional services by as much as one full day, impacting instructors and students during registration, final tests, and on-line course work. Smaller generators will be acquired for the phone system for both colleges as well as the remote server room at Chabot College that does not house the primary data center.

In contrast, the Las Positas campus has adequate space available to build an Information Technology Services (ITS) Building, and the college is reasonably close proximity to the District where other District ITS resources reside.

This proposed Information Technology Services (ITS) building will be 8,500 square feet and will provide adequate expansion, added security and operational efficiencies. The new ITS building will consolidate administrative and instructional servers utilized by the District and LPC, and provide office space for the current and future staff for both the District ITS and Las Positas CS.

All primary data lines are planned to be upgraded from T1's to T3's for increased bandwidth and traffic throughput. These include port-to-port T1 lines as well as ISP lines for Internet services. All servers supporting the campus wide general services such as email and Web applications for Internet and Intranet will be upgraded and maintained under the Technology Plan II TCO model.

The new Data Center which will be housed within the new ITS building shall be designed in accordance with Industry standards for cabling, grounding, space allocation.



5.0 Network Infrastructure

CLPCCD District ITS is responsible for the design, configuration and management of the network infrastructure across all sites. This includes the cabling infrastructure, wireless networking, network routers/switches, VLANs, VPNs and network management tools/servers. Originally based on 10 Mbps hub infrastructure, the network has grown in a piecemeal fashion to provide 10/100 switching, VLANs and high performance routing. The current infrastructure is aging and will be soon considered unsupported by the manufacturer. Advanced network services that can support prioritization and sophisticated traffic control are needed for the current environment, but not available.

The CLPCCD ITS network has standardized on Cisco routing and switching products for the core and heavy duty WAN/LAN connectivity. This offers best-in-class capability and exceptional manufacturer's support. The standardization of command access for configuration and maintenance allows for consistency of operation. These factors are of critical importance to District ITS because the network support is performed by one District ITS network specialist, in conjunction with limited support assistance from the Computer Services staff at the Colleges. Network downtime for unscheduled outages averages at less than 1%.

DISTRICT OFFICE NETWORK

The District Office network is the smallest among all three sites. This network is managed by the ITS department. Two IP subnets are allocated to this site from a private class B address space (172.28.x.x).

Local Area Network

The District Office LAN consists of two Cisco 2950G-48 switches and one Catalyst 2924XL switch. This provides a total of 120 10/100 Ethernet ports for the District Office LAN. These switches are cascaded together with cross-over cables. More expansion may be needed and it is appropriate to consider replacing these switches with a higher-powered switching platform rather than add another cascaded switch.

LAN Protocols

TCP/IP and IPX/SPX protocols are in use at the district office. At some point in the future, the network can be migrated away from IPX to a homogenous TCP/IP network.

Bandwidth Capabilities

The District Office is capable of 100Mbps wire speed to the desktop as supported by desktop and printer LAN cards. Cisco Catalyst 2950 switches in use are suitable for a small branch office having a user count of 100 or less. While there are no immediate plans to expand the District Office at this time, the current switches offer little redundancy. In the event of a switch failure, large populations of users would be disconnected from the network. In discussing the replacement network equipment, it is worth investigating a replacement switch that would offer redundant power supplies, and other more sophisticated functionality.

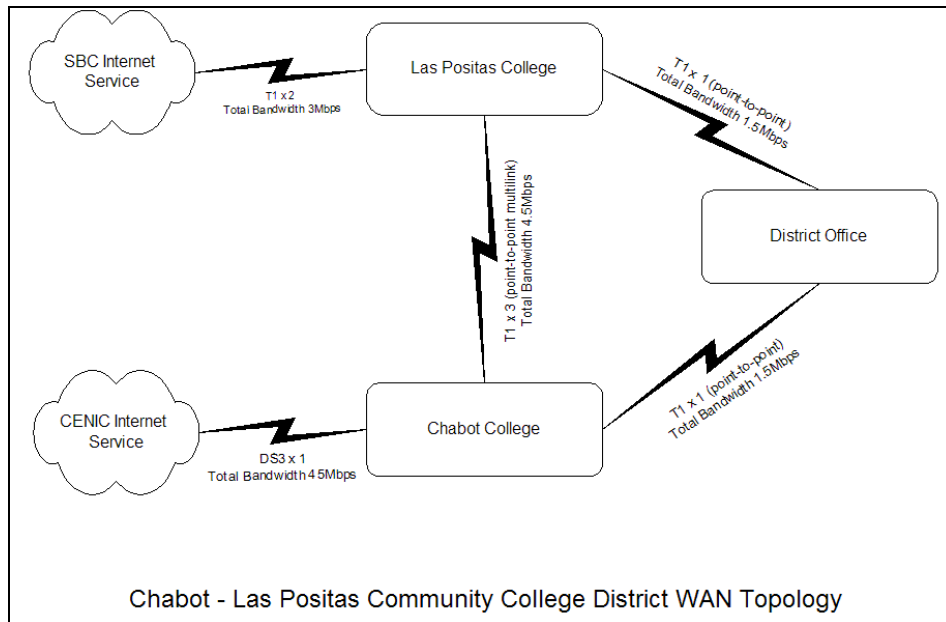
Wide Area Network



The District Office has 2 T1 (1.544 Mbps each) point-to-point connections, one terminating at Chabot and other at Las Positas campus. A Cisco 2610 router is used to connect to both locations. The router has 2 T1 WIC interfaces, one with an integrated DSU and one using an Adtran DSU/CSU.

Internet and Banner traffic is routed through Chabot’s WAN connection. Videoconferencing traffic is routed through the LPC T1 and back through to Chabot’s campus. This routing is forced using static routes, to prioritize the time-sensitive videoconferencing packets across unused WAN bandwidth. In this manner, there is no contention for T1 resources by Banner users who are accessing the Enterprise servers at Chabot. If the Chabot T1 link fails, the traffic is automatically re-routed through the Las Positas T1 connection.

Below is the CLPCCD WAN topology map:



WAN Devices

Cisco’s 2610 Access Router has reached its end-of-sale date on April 2003. The router is still supported by Cisco on a SmartNet contract. There are no plans to replace the router at this time.

WAN Router/Interface Specifications

Platform	Cisco 2610
Network Modules	1
WICs	1 WIC-1T, 1 WIC-1DSU
Fixed LAN Ports	1 Fast Ethernet (10/100Mbps)
Performance (up to kpps)	20
DRAM MB / maximum MB	96/256
Flash Memory MB / maximum MB	32/48

WAN Router / Interface Specifications



WAN Firewalls

There are no firewalls currently deployed at the District Office.

DMZ Information

There is no DMZ at the District Office.

Infrastructure

Voice and Data

The Main Point Of Entry (MPOE) is located at the lower southwest corner of the building. There are two (2) Main Distribution Frames (MDF) in the facility: one for data connectivity, the other for voice. The MDF's are located adjacent to each other with a gypsum board wall dividing the two. There is no direct access from one space to the other. There is a 100-pair copper tie cable installed between the MPOE and the voice MDF and a 12 strand 62.5/125 μ m multimode fiber optic cable (MMF) cable between the MPOE and the data MDF. The MMF is terminated on both ends using "ST" fiber optic connectors. There is MMF fiber on the premises which was left over from a previous tenant. It is assumed that this was used to support a previous infrastructure of network switches located throughout the building/campus, but CLPCCD does not have any documentation of this fiber plant and does not plan to use it.

A combination of Category 5 (CAT 5) and Category 5e (CAT 5E) Unshielded Twisted Pair (UTP) cable has been used as the horizontal distribution cabling for voice and data, respectively. Patch and workstation cabling is CAT 5e rated.

The standard data cable termination scheme is composed of either a 24 or 48 port CAT 5e 110/RJ-45 style patch panels. There were two outlet configurations observed as currently in use at the District Office: Configuration #1 has (2) data ports and (1) digital voice port on a four-position faceplate. Configuration #2 has (2) data ports, (1) digital voice port and (1) analog voice port for fax or modem connection on a four-position faceplate.

Currently, the PBX and CAT 5/CAT 5e telephone horizontal cross-connects and multi-pair cabling are maintained by an outside contractor.

CLPCCD District ITS is in the process of developing a set of Cabling Infrastructure standards that will encompass copper and fiber connectivity for voice and data systems inside and between all buildings at all campuses. These standards will include detailed documentation and diagrams discussing:

- Telecommunication Spaces
- Backbone Cabling
- Horizontal Station Cabling
- Standard Room Connectivity
- Construction Documents
- Testing, Inspection and Labeling

Refer to the appendices for more details.

Video Conferencing and CATV/Coaxial Cabling

There is no CATV/Coaxial cabling located at the District Office at this time. Video conferencing is routed over the existing LAN/WAN using IP technology.



Wireless LAN

There is no Wireless LAN located at the District Office at this time. District ITS has been looking into what would be needed to implement a secure wireless network at the District Office. All new laptops come with wireless connectivity and wireless may offer greater user convenience and network expansion.

Physical Infrastructure

The physical conveyance of horizontal and backbone cabling from the MPOE and MDF is performed via the use of J-Hooks over to conduit stubs that run down the walls to their respective outlets.

There is minimal grounding and surge suppression installed within the facility. What currently exists in the telecommunications infrastructure was done so by installation contractors at the direction of the manufacturer. Grounding of the telecommunications infrastructure (i.e., cabinets, relay racks, cable tray, etc...) within the building has not been performed. Adequate grounding is extremely important in ensuring that transient circuits do not disrupt data connectivity. This can exhibit itself as slow connectivity, drop offs and connection failures. During the renovations, it is important to scope the work needed to bring the grounding to within acceptable standards recommendations.

Cisco PIX Information

No firewalls exist at this site.

VPN Access

There are no VPN users configured at the District Office. VPN access to the District Office will be evaluated in context with a larger VPN strategy to be developed by CLPCCD ITS.

VLAN Configurations

Two VLANs are configured at the District Office. Only one is in use for desktop computers, laptops and printers. The second VLAN is dedicated for the videoconferencing IP connectivity.

Below is a table of VLANs currently configured at the District Office:

VLAN Number	IP Range	Purpose

District Office VLANS

For a district wide VLAN table, please refer to the document titled "VLANs Updated 102104.doc", (*Appendix 3.4.P*).

CHABOT COLLEGE NETWORK

The Chabot College network is managed by the District ITS department with the assistance of the Chabot College Computer Services staff. The backbone infrastructure is based on multi-mode fiber optic cable that connects the campus buildings using 10 Mbps (10BaseF) connectivity or



100Mbps using media converters. A private class B TCP/IP (172.28.x.x) address space is segmented on Class C boundaries to create subnets. The network is divided into two main functional categories; Administrative and Instructional. Specialized subnets for Faculty, Bookstore, wireless, and other entities are also in use. Multiple VLANs are configured based on these categories.

Local Area Network

The Chabot College network consists of 2 Cisco Catalyst 5500 series switches that are deployed at the distribution layer (core). 4 x 100Mbps Fast Ethernet ports are configured to create high-speed trunking between these two switches. VLANs are configured to isolate the user traffic. For detailed information on VLAN setup, please refer to section 3.6.3.6.

The following table details the edge switches and hubs in use mainly consist of Allied Telesyn (Centrecom) hubs and Cisco Catalyst 2900 series switches.

Switch/Hub Type	Function/Purpose	Location	Number of Devices



Switch/Hub Type	Function/Purpose	Location	Number of Devices

Edge Switches and Hubs

For a diagram showing switch interconnectivity, see Appendix 3.4 J

The overall network design goal is to replace the aging hubs and switches with state of the art 10/100 switching to the desktop, Gigabit (copper) connectivity to the servers and Gigabit (fiber) backbones to each building on campus. The Measure “B” Bond funding will allow the development of a new architecture and acquisition of equipment that can provide Chabot campus with a high-bandwidth, state-of-the-art network capable of supporting the current and future network connectivity needs.

LAN Protocols

TCP/IP is the primary protocol in use at Chabot College. IPX/SPX and AppleTalk are also in use. No timeline on IPX/SPX removal has yet been defined.

Bandwidth Capabilities

The Catalyst 5500 switch has a 3.6-Gbps media-independent switch fabric and a 5-Gbps cell-switch fabric. The backplane provides the connection between power supplies, supervisor engine, switching modules, and backbone module. The 3.6-Gbps media-independent fabric supports Ethernet, Fast Ethernet, Gigabit Ethernet, FDDI/CDDI, ATM LANE, ATM dual PHY DS3, RSM, and RSM/VIP2 modules. While considered high bandwidth when introduced in the late 1990s, the Catalyst 5500 backplane can easily be oversubscribed with the current connectivity requirements.

Chabot Anet Cisco Catalyst 5500 Switch Hardware and Software Configuration

Chabot Anet Catalyst 5000 series switch has a total of 5 add-on module slots and all are filled. This switch has reached Cisco’s end of sale in April 2000. Cisco has announced end of support date of May 31, 2005 for Catalyst 5000 series routing engine module. The District ITS department has already identified that this switch needs to be replaced under the Measure “B” Bond Quickstart initiative.

The following table details the modules installed in this switch:

Module	Port	Model	Serial #	Versions



Module	Port	Model	Serial #	Versions

Chabot Anet Switch Specifications

Chabot Inet Cisco Catalyst 5500 Switch Hardware and Software Configuration

Chabot Inet Catalyst 5000 series switch has a total of 5 add-on module slots and all ports are filled. This switch has reached Cisco's end of sale in April 2000. Cisco has announced end of support date of May 31, 2005 for Catalyst 5000 series routing engine module. The ITS department has already identified that this switch needs to be replaced under Quickstart initiative.

The following table details the modules installed in this switch:

Module	Port	Model	Serial #	Versions

Chabot Inet Switch Specifications

Wide Area Network

Chabot College has 3 T1s bundled together that provide a point-to-point connection to Las Positas campus. The District Office is connected via a single T1.

A DS3 circuit that connects to CENIC provides Internet connectivity for Chabot campus and the District and LPC administrative networks. A Cisco 7200 series router connects to the DS3 Internet link. This router is managed by CENIC.



Chabot uses a Cisco 7507 series router to connect to Las Positas campus and the District office. Cisco 7507 router is also used to route traffic between VLANs on the Chabot campus.

Router Type	Function/Purpose	Location	Number of devices

Wide Area Network Devices

WAN Devices – Cisco 7507 Router

The Cisco 7507 is Chabot College's core router. 7507 is an enterprise class router designed for intensive routing environments. Currently this router is configured with Cisco RSP4 (R5000) processor and 262144K/2072K bytes of memory. It has a total of seven add-on module slots out of which four are occupied. The router has three FastEthernet 10/100Mbps interfaces, four Ethernet 10Mbps interfaces and four Fast Serial Enhanced interfaces. The 7507 router is running Cisco IOS RSP Software (RSP-JSV-M) Version 12.0(8). The router is capable of routing IPX and AppleTalk protocols.

This router is also used for inter-VLAN traffic routing. FastEthernet 1/0 and FastEthernet 4/0 are used to create sub-interfaces for VLAN routing. The FastEthernet1/0 interface is used to route Administrative VLAN traffic. The FastEthernet4/0 interface is used to route instructional and faculty traffic. Routemaps are configured to force port 80 traffic from the instructional VLANs to a web caching device (CacheFlow at address 172.28.252.100). Prioritization of video conferencing packets is also configured.

Firewalls

At Chabot campus, the connection to CENIC is protected with a PIX 520 Firewall running PIX O/S 5.1(5). PIX 520 Firewall has reached end-of-life status according to Cisco's website. Cisco has stopped product support on this platform, although CLPCCD has maintains an active SMARTNET contract with Cisco until June of 2005. The ITS department has requested to replace this firewall under the Measure "B" Bond Quickstart initiative.

The PIX 520 Firewall has four Ethernet interfaces, which serve the following subnets:

Subnet	Description	IP Address

PIX Subnets



The configuration includes a number of static mappings to devices inside the CLPCCD network and conduits that allow access to many servers for services such as www, ftp, smtp, telnet, and specialized application ports. All open ports were configured in response to valid business purposes. As servers and remote access needs change, the PIX firewall configuration is adjusted.

For details on the servers and open ports, please refer to document titled "Chabot pix 092804.doc" (Appendix 3.4.T)

DMZ

There are 2 DMZ subnets at Chabot College campus. Both are protected by PIX firewall. These include Instructional and Adminhosts. The Instructional subnet contains servers that support the instructional needs of Chabot and LPC Colleges. These servers are maintained by staff from the respective Colleges. The Adminhosts subnet contains servers that are in support of the business purposes of the Colleges and District. These include Iserver/Porter (external DNS), Sirsi (Library Proxy) and external web sites. The Adminhosts DMZ network is more heavily protected than the Instructional DMZ.

Infrastructure

Voice and Data

Voice and data are currently separated and are located in different buildings, with the MPOE in Building #200 and the MDF in Building #300.

A combination of Category 3 (CAT 3), Category 5 (CAT 5) and Category 5e (CAT 5E) Unshielded Twisted Pair (UTP) cable has been used as the horizontal distribution cabling for voice and data, depending on the age of the cabling. Patch and workstation cabling is CAT 5e rated. Thin-Net cabling (10Base2) is still used to support the network in Building #200 and partially in building #300.

The standard data cable termination scheme is composed of either a 24 or 48 port CAT 5e 110/RJ-45 style patch panels. There is no standard for outlet configurations at Chabot and this needs to be set developed as part of a new wiring standard.

Patch and workstation cabling is either CAT 3, CAT 5 or CAT 5e rated and is purchased already assembled or provided to the college at the time of cable infrastructure installation by the installing contractor.

Current data backbone cabling practice is to use a multi-strand 62.5/125 μm multimode fiber optic cable, terminated using "ST" connectors. The fiber backbone was installed over many different construction projects, the earliest being 1992. In the summer of 2002 the fiber was tested, and many pairs were shown to fail transmission tests, particularly for Gigabit SX transmission. Use of the existing fiber for future backbone connectivity is questionable. No single mode fiber is currently installed.

Telecommunications rooms range in size from normally acceptable spaces such as the MPOE and MDF to a space where the equipment must be wall mounted or installed in free standing equipment cabinets. Spaces such as janitor closets and storage closets have been used to locate hubs and switches. For the majority of the telecommunications closets normal access is via classrooms, which makes it difficult to trouble-shoot when classes are in session. As part of the building renovations, it will be necessary to define standards for the new Telecom Rooms so that adequate, serviceable space can be allotted for voice/data infrastructure purposes.

Video Conferencing and CATV/Coaxial Cabling



Video conferencing is routed over the existing LAN/WAN using IP technology. As described earlier, the video conferencing packets are configured on a separate VLAN with prioritized routing to accommodate the time-sensitivity of the video transmissions.

Coaxial cable is used only for CATV distribution at Chabot.

Wireless LAN

The wireless LAN is used by students and faculty to gain access to server applications and the Internet. There is currently 5 wireless access points sanctioned and used on the Chabot instructional networks. These wireless access points are located in the (1) library, (2) physics labs, (1) on a mobile cart [NSF Project], and (1) for Chabot ITS testing located in room 310A, [normally off].

Physical Infrastructure

The physical conveyance of horizontal and backbone cabling from the MPOE and MDF is performed via the use of J-Hooks over to conduit stubs that run down the walls to their respective outlets. This has varied with building construction and the quality of the contractor. Some areas have cabling lying on dropped ceiling tile. Small add/move/change requests that require new or modified cabling are handled in-house by the CLPCCD M&O electrician. Those requests are handled in the most expedient manner, but not necessarily with particular attention to the TIA/EIA 569 standards for cable pathway.

There is minimal grounding and surge suppression installed within the facility. What currently exists in the telecommunications infrastructure was done so by installation contractors at the direction of the manufacturer. Grounding of the telecommunications infrastructure (i.e., cabinets, relay racks, cable tray, etc...) within the building has not been performed. The lack of grounding has serious implications for noise and electrical failures, particularly as copper transmission speeds increase with new generations of equipment.

The physical pathway between the MPOE, MDF and the other buildings on the campus is via buried conduit in a trench. This trench follows the student walkway as it wraps around the campus. The trench and conduit does not form a complete circle around the campus, but is separated between the Theater and Building 1500. This pathway not only has pedestrian traffic but occasionally vehicular traffic generated by security or vendors. Access to the manhole/handhole access points is under concrete covers or manhole covers.

The condition and the availability of space within the conduits must be verified, before plans are implemented reusing the existing conduits. This has been submitted as part of the Measure "B" Bond Quickstart project list for District ITS.

Cisco PIX Information

This section is covered earlier.

VPN Access

VPN access is configured on the Chabot PIX for remote operational support and access by CLPCCD ITS department employees. PPP with PAP, CHAP and MS-CHAP are used to authenticate users and to create VPN tunnels.

VLAN Configurations



VLANs are configured to isolate end-user traffic at Chabot campus. The District ITS department is responsible for managing VLAN assignment at the core; however, edge port assignments are delegated to the Chabot College Computer Service technicians. This division of responsibility allows the Chabot College Computer Services staff to quickly adjust configurations as end-user computers are moved around campus, while allowing District ITS to direct the overall architecture and security.

IEEE standards based 802.1q tagging is used to encapsulate VLAN traffic on most trunks however some trunks are configured with Cisco’s proprietary ISL tags because it connects with older Cisco equipment. Inter VLAN traffic is tagged with ISL on the router. The ANET Catalyst 5500 acts as the VTP Server on the Chabot network. All VLANs are configured on this switch and propagated to the edge switches. Campus-wide, any VLAN assignments on edge switches must be part of the core configuration of VLAN assignments.

Below is a table of VLANs currently deployed at the Chabot campus:

VLAN Number	IP Range	Purpose

Table 3.5.3.13-1 Chabot Campus VLANs



For a district wide VLAN table, please refer to the document titled “VLANs Updated 102104.doc” (*Appendix 3.4.P*)

LAS POSITAS NETWORK

The Las Positas network is managed by the District ITS department in conjunction with the Las Positas Computer Services staff. The backbone infrastructure is based on 62.5/125 micron multi-mode fiber optic cable that connects each building. 100Mbps connectivity is supported using media converters plugged into copper switch ports. Single mode fiber optic cable is installed but not in use. A private class B TCP/IP (172.28.x.x) address space is used to create subnets. The network is divided into two functional categories: Administrative, and Instructional. Specialized subnets for Faculty, Bookstore, wireless, and other entities are also in use. Multiple VLANs are configured based on these categories.

Local Area Network

The Las Positas College network consists of one Cisco Catalyst 3550 series layer 3 switch that is deployed at the distribution layer (core). This switch routes traffic from the buildings using 100FX media converters to the RJ-45 10/100 switch ports. VLANs are configured to isolate instructional, faculty and administrative traffic. The Layer 3 switch routes traffic between the VLANs.

There are a number of other edge switches in use, which mainly consist of Cisco Catalyst 2900, 3500 series switches and LinkSys switches.

Below is a list of all LAN devices installed at the Las Positas campus.

Switch/Hub Type	Function/Purpose	Location	Number of Devices



Switch/Hub Type	Function/Purpose	Location	Number of Devices

Las Positas LAN Devices

For a diagram showing switch interconnectivity, see Appendix 3.4 J

LAN Protocols

TCP/IP is the only protocol being used at Las Positas campus. RIP and static routes are used on the Layer 3 switch to route traffic among various LAN subnets.

Bandwidth Capabilities

Cisco Catalyst 3550-48 layer 3 switch has 6.8 Gbps maximum forwarding bandwidth at Layer 2 and Layer 3. This is a substantial improvement over the Cisco 5500 switch that was previously used as the LPC core switch, but Cisco targets this switch to be used as an “access layer switch for medium enterprise wiring closets”, rather than a core switch.

Las Positas 3550-48 Layer 3 Switch Hardware and Software Configuration

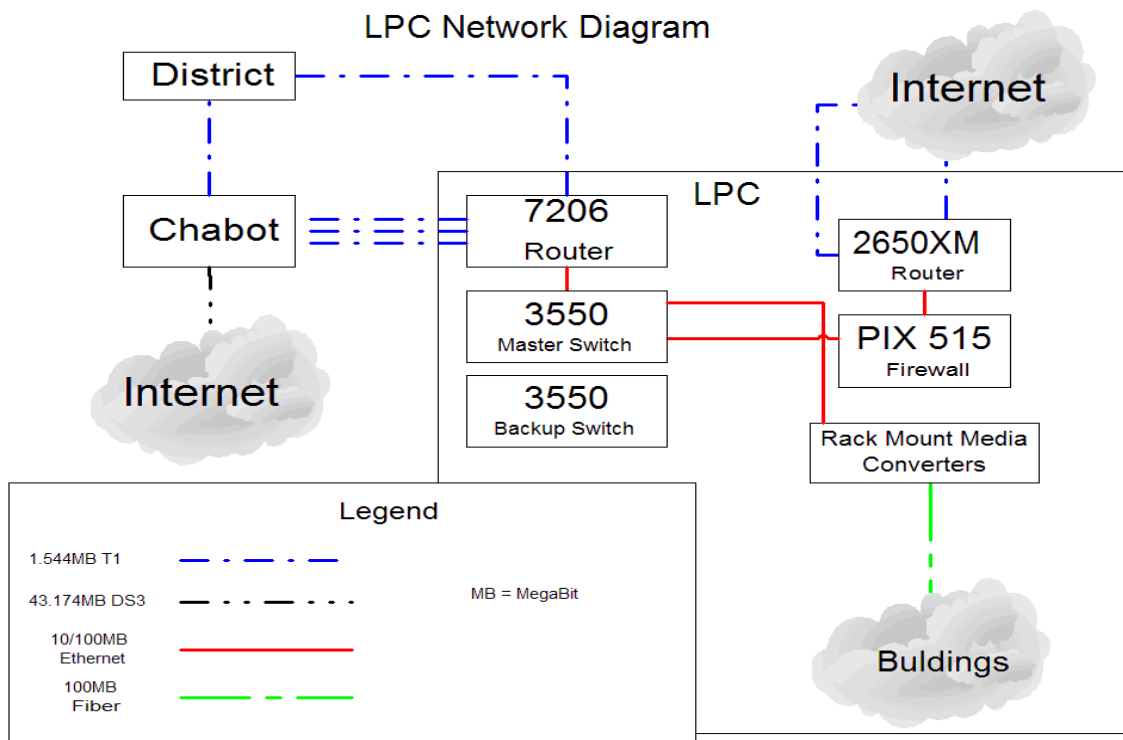
Las Positas 3550-48 Layer 3 switch is running Cisco Internetwork Operating System Software IOS (tm) C3550 Software (C3550-I5Q3L2-M), Version 12.1(13)EA1a.

The hardware consists of WS-C3550-48 (PowerPC) processor (revision D0) with 65526K/8192K bytes of memory. Interfaces include 48 x 10/100 ports and 2 x 1000BASE-X ports. This switch is used as the core routing switch for the Las Positas VLAN traffic.

Las Positas also has a spare 3550-48 Layer 3 switch. These switches were acquired recently and are fully supported by Cisco. Although these are not designed to be distribution layer switches, Las Positas may choose to use them as edge switches when they upgrade their infrastructure under bond measure B. Bond funding has been allocated for the purchase of new core switching hardware in the capacity range of a Cisco 65xx switch.

Wide Area Network

Las Positas has 3 T1s bundled together that provide a point-to-point connection to Chabot campus. The District office is connected via a single T1. Two T1 circuits that connect to SBC provide Internet connectivity for Las Positas campus. A Cisco 2650 router connects to SBC Internet link. This router is managed by SBC. Las Positas uses a Cisco 7206 series router to connect to Chabot campus and the District Office. RIP is used as a routing protocol with some static routes.



The following table details all WAN devices located at Las Positas campus:

Router Type	Function/Purpose	Location	Number of devices

Las Positas WAN Devices

Las Positas 7206 Router Hardware and Software Configuration

Cisco 7206 is Las Positas College’s core router. 7206 router has reached Cisco’s end-of-sale date in December 2002. Currently this router is configured with Cisco (NPE150) processor with 122880K/8192K bytes of memory. It has a total of seven add-on module slots, of which five are occupied. The router has three FastEthernet 10/100Mbps interfaces, four Ethernet 10Mbps interfaces and four Fast Serial Enhanced interfaces. The 7206 router is running Cisco IOS 7200 Software (C7200-JS-M), Version 12.0(8). The router is capable of routing AppleTalk protocol and has done so in the past. AppleTalk routing is no longer required.

Firewalls



At the LPC campus, a PIX 515 Firewall running PIX O/S 6.2(2) protects the LPC Instructional network from intrusion through its SBC Internet connection. A second, identical PIX was purchased to be configured as a failover device. The PIX is running with a restricted operating system license which prevents failover from being implemented. The operating system upgrade has been submitted as a Measure “B” Bond QuickStart project.

This PIX has three Ethernet interfaces which serve the following subnets:

Subnet	Description	IP Address

Las Positas Firewalls

The configuration includes a few static mappings to devices inside the LPC Instructional network but no conduits. ACLs are used to filter packets based on security policy.

DMZ Information

There is one DMZ subnet at Las Positas campus. It is protected by PIX firewall and configured with the name Instructional.

Infrastructure

Voice and Data

The MPOE and the MDF are co-located in building 1900. Currently, the voice system and PBX is maintained by staff personnel and outside contractors are only called when there is a large project or need for new hardware/software to be added and configured.

Current data cabling practice installs multi-strand multimode and single mode fiber optic cables in the backbone. The college utilizes only the 62.5/125 µm multimode; the 9.3/125 µm single mode was installed for future use. CAT 5/5e is used in the horizontal distribution for both voice and data.

Previous to the construction of Building 1900, multimode fiber backbones were run to a few buildings from a MDF in Building 100. When the current MDF was built, the old MDF located in Building 100 was downgraded to a standard communication closet. There have been brief discussions by LPC CS to maintaining the old fiber infrastructure as a redundant network. If this is done then additional fiber will have to be extended to the newer buildings, as well as certification of the old multimode fiber infrastructure radiating from Building 100.

There is no documentation showing the specific amount of fiber and the exact pathways used to get from the old MDF to the existing buildings, nor is there any documentation showing the same for the new fiber backbone. Fiber testing was performed in July of 2002 and revealed problems with the light loss levels in the new multimode and single mode fiber. These problems can be caused by improper termination of the connectors, fiber splices, fiber not pulled to the proper location requiring an intermediate fiber termination point and a tie cable be installed from termination point to where it is needed. In some cases the fiber between the MDF and instructional buildings failed every type of test completely. These test results



present strong indications that the LPC fiber is not ready to support new higher bandwidth connectivity, and that the fiber will need to be reterminated, retested or perhaps even replaced.

The standard telecommunication room termination uses a 24 or 48 ports CAT 5 or CAT 5e 110 punch-down patch panels. The Voice termination in the telecommunications room is on either 66 or 110 blocks. The outlet configuration at the workstation varies from installation to installation with type connectors and number of jack at each location.

Patch and workstation cabling is either CAT 5 or CAT 5e rated and are purchased assembled or are provided to the college at the time of cable infrastructure installation by the installing contractor.

Telecommunications rooms range in size from normally acceptable space such as the MDF to storage closets and wall-mounted or free standing equipment cabinets. The majority of the Intermediate Distribution Frames (IDF) are free standing or wall mounted cabinets, although there are a few ceiling mounted. Building #2100 and the Library utilize spaces that resemble coat closets for their IDFs. Most often times the closets or equipment cabinets are located in the classrooms or adjacent to the classroom with access only through the classrooms.

Video Conferencing and CATV/Coaxial Cabling

Video conferencing is routed over the existing LAN/WAN using IP technology.

The CATV system has been dismantled and no longer exists on the campus. The existing satellite dish located on top of the library was connected directly to a television system located within one of the library classrooms during the 9/11 events.

Wireless LAN

The wireless LAN is used by students and faculty to gain access to server applications and the Internet. There are currently 3 wireless access points sanctioned and used on the instructional networks. These wireless access points are located in the (1) library, (1) Science with directional antenna, and (1) in room 803. The access point in the Library is configured with SSID LPC-LRC and no WEP key. As such, open access from Library visitors is available, although the wireless network is secured to only grant Internet access and no access to any LPC networks. The Science wireless link is used to connect to a telescope on the hillside. Currently, the signal strength is too weak, because a directional antennae is used at only one side of the link. The other end use an omni-directional antennae, which needs to be replaced with a directional antennae for adequate signal strength.

LPC would like to add more wireless access points to expand coverage campus wide.

Physical Infrastructure:

The physical conveyance of horizontal and backbone cabling from the MPOE and MDF is performed via the use of J-Hooks over to conduit stubs that run down the walls to their respective outlets. This has varied with building construction and the quality of the contractor. Some areas have cable lying on ceiling tiles. In some buildings, the cabling has been modified/repulled by LPC CS staff. In certain areas, outlets are unlabeled and difficult to trace without toning.



There is minimal grounding and surge suppression installed within the facility. What currently exists in the telecommunications infrastructure was done so by installation contractors at the direction of the manufacturer. Grounding of the telecommunications infrastructure (i.e., cabinets, relay racks, cable tray, etc...) within the building has not been performed. Adequate grounding is extremely important in ensuring that transient circuits do not disrupt data connectivity. This can exhibit itself as slow connectivity, drop offs and connection failures. During the renovations, it is important to scope the work needed to bring the grounding to within acceptable standards recommendations.

The physical pathway between the MPOE & MDF, located in building 1900, and the other buildings on the campus is via buried conduit. The conduit is not encased in concrete, and because of the increased construction in the area, heavy duty equipment can be found crossing over the buried conduit. The condition and availability of space within the conduits needs to be verified, before any existing plans are implemented. This has been included as a Measure “B” Bond Quickstart project.

Cisco PIX Information

This section is covered earlier.

VPN Access

Limited VPN access is available through the PIX Firewall. This is used only for remote access by LPC CS staff.

VLAN Configurations

VLANs are configured to isolate instructional, faculty and administrative traffic at Las Positas campus. The District ITS department is responsible for managing VLAN assignment at the core. However, edge device port assignments are delegated to the LPCCS support team.

IEEE standards based 802.1q tagging is used to encapsulate VLAN traffic on most trunks. However, some trunks are configured with Cisco’s proprietary ISL tags.

The following table details the VLAN subnets currently deployed at Las Positas College

VLAN #	IP range	Purpose



VLAN #	IP range	Purpose

Las Positas VLANs



6.0 Security

The District ITS department is responsible for maintaining security and access to administrative servers at all sites, including the Banner application access. College Computer Services are responsible for security to servers they support. Security includes network accessibility and physical security. District ITS and College CS staff is well aware of security needs of today's networks and has taken a number of steps to improve the security of confidential information within the networks and servers.

Physical Security

At the District office, the servers are located in a locked room only accessible to District ITS staff. Further, the entire District Office is secured with keypad access to the office and meeting areas.

At Chabot campus, the Enterprise, network and Novell servers are located in locked areas. The operations staff monitors access to the computer room. The area is protected with a Sonitrol alarm system after hours. Servers maintained by Chabot CS reside in a server rack in room 310A. Room 310A is kept locked and only accessed by staff who have been issued keys.

Servers maintained by LPC CS are distributed across campus. Many of them are kept in locked cabinets where the network equipment resides. Security will be improved when the LPC CS move to the new District Data Center building and has a dedicated server room where they can consolidate servers in a secure environment.

Administrative Passwords

District ITS department maintains four separate user accounts – This includes Novell Directory Services (eDirectory) accounts, Groupwise e-mail, Banner System, and IBM AIX user accounts. IBM-AIX passwords are case sensitive and users are required to change them periodically. Users are not forced to change their Novell and email passwords on a regular basis.

For more details on password guidelines, please see document titled "Password Guidelines.doc", (*Appendix 3.4.0*).

Instructional/Faculty Passwords

At Chabot, Instructional Domain Authentication passwords are managed by the Chabot CS department, which includes faculty passwords in Microsoft Active Directory environment and Windows Local Accounts. There are no individual student user accounts currently in use at Chabot, instead generic student accounts, with limited access, are used by the students to access the Instructional Network resources.

Like Chabot, at LPC, Instructional Domain authentication passwords are managed by LPC CS department, which includes faculty passwords in Microsoft Active Directory environment and Windows Local Accounts. There are no individual student user accounts currently in use at Las Positas, instead generic student accounts, with limited access, are used by the students to access the Instructional Network resources.

Anti-Virus



Virus and worm attack is pervasive on the network, particularly on the Instructional network. CLPCCD uses anti-virus protection on each desktop to limit the possibility of virus attack.

Symantec's Norton Anti-Virus Corporate Edition version 7.6 is used on the Novell servers. The virus definitions are updated on the server side, and the administrative workstations automatically update from the current signature file on their local servers. The following table shows the primary anti-virus servers:

Server	Location	Updates from

Anti-Virus Servers

At Chabot College, Symantec's Norton Anti-Virus Corporate Edition is used on ChabotDC1 and ChabotDC2. The virus definitions are updated from the Symantec web site. At LPC, Symantec's Norton Anti-Virus Corporate Edition is used on Marvin and Cooper. The virus definitions are updated from the Symantec web site.

Network Device Security

Overall network security is the responsibility of the District ITS department. Like the servers the core network equipment is installed in locked areas with restricted access. Some of the edge equipment is more vulnerable because it is located in classrooms and more open areas. During renovations, it is imperative that separate lockable telecom rooms be designed into the remodels.

Network device passwords, such as Routers and Switches are also maintained by the District ITS department and changed as needed to secure access. Passwords are formatted with special characters to provide an additional level of security. Switches have a user level logon to allow Chabot and LPC CS technicians to modify VLAN assignments as needed at each campus. Telnet access is used for switch/router remote access, although the network staff has plans to switch to ssh access.

Access Control Lists

Access Control Lists or ACLs are used throughout CLPCCD and are managed by the ITS department. ACLs provide packet-filtering mechanism to prevent undesired layer 3 packets from entering secure areas of the network. ACLs are used behind the firewalls to prevent Instructional traffic from gaining unauthorized access to Administrative systems.

At Chabot College, ACLs are configured on the 7507 core router. Both standard and extended ACLs are in use. Much of the filtering is done to provide inter VLAN traffic security. For configured ACLs, please see document titled "chabot7507100704.doc" (*Appendix 3.4.X*)

At Las Positas College, ACLs are configured on the 3550-48 layer 3 switch as well as on the 515E PIX firewall. Both standard and extended ACLs are in use. Much of the filtering is done to



provide inter VLAN traffic security. For configured ACLs on 3550 switch, please see document titled "lpc3550.doc" (*Appendix 3.4.W*)

Although ACLs have worked well in the CLPCCD environment, they are cumbersome to administer and modify. As part of the Measure "B" Bond Quickstart upgrades for the firewalls, additional firewall LAN interfaces are being purchased. This will allow CLPCCD to split the Instructional and Administrative networks into two different firewall segments and use the more robust PIX firewall to regulate traffic.

Network Monitoring and Intrusion Detection

Firewall logs are stored on EnVision server. These logs are periodically monitored to assess and report any unauthorized activity and to provide historical analysis.

There is no Network or Host intrusion detection system in place at any campus. As part of the Bond purchases, enhanced network monitoring tools and intrusion detection tools are planned. In particular these will be needed as the distribution of wireless access grows.

In addition to operational tools, CLPCCD District ITS should schedule regular audits of the network environment to ensure that the firewalls are configured for secure connectivity.

7.0 Disaster Recovery/Business Continuity

CLPCCD District ITS disaster recovery methods are reliant on power continuity through UPS protection and data restoration from backup media. These provide a basic operating environment in the event of failures, but there is room for enhancement, particularly when the District Data Center is built.

Power Continuity

The IBM Enterprise servers and servers in the Chabot Room 312 computer room are connected to a large UPS system. The UPS will power the computer room for approximately one hour. The UPS is network attached and has the ability to send messages to the servers in the computer room that initiate shutdown scripts. This was implemented for the IBM and Novell servers, but does not function reliable for the Novell environment, and has been disabled.

In the Chabot Building 200 MPOE room, the SBC fiber terminal on which the CENIC DS3 is provisioned is powered by its own battery supply. The MUX components are plugged into the UPS for the Telephone system. The 7206 could be plugged into the UPS for the telephone, but is currently plugged into an unprotected outlet.

A UPS is installed at the District Office to power the telephone and data networks and the Novell server equipment. It is not clear what the maximum uptime is that the UPS will run to power the equipment. This equipment was left by the previous tenant and has been tested to power the equipment for at least 30 minutes.

The Bond projects include the replacement of UPSes and provision of generators at the key servers and data equipment locations.

Backup Processes



The Backup processes have been detailed in each individual server section above. Summarizing those descriptions, the following operating environment exists:

- a. Servers are backed up on individual schedules. The more critical the server, the more frequent the backup.
- b. A variety of backup software is used for the different servers. These include Arcserve 6.6, Backup Exec, IBM backup/tar utilities, Novastore and basic COPY utilities.
- c. Backup media include DAT tapes and Firewire drives. CLPCCD would like to move to more sophisticated and high-capacity storage technology such as DLT or LTO. Bond funding will enable the acquisition of this advanced backup equipment.
- d. For the PC Servers, tape/media exchanges are used, rather than a tape rotation scheme. The backups of the IBM Enterprise server use a more comprehensive rotation schedule.
- e. Off-site storage is not used. The IBM tapes are stored in the firesafe located at Chabot. .
- f. There are infrequent requests from the end-users for file restores.

These backup processes need to be enhanced and standardized so that a more robust recovery environment is in place. Short-term procedures for off-site storage include the provision to store backup tapes across the three CLPCCD locations, so the sites serve as backup for each other.