# Information Technology Master Plan


**Developed**

**by**

**Community Colleges Computer Services (CCCS)**

**2002 - 2006**

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## Introduction:

The Community Colleges of Colorado (hereto referred to as CCofC) Technology Plan is the base document by which all community colleges under CCofC can utilize as their template and serve as a resource to insure that their individual colleges' technology plans adhere to the standards established by CCofC. With the rapid changes in technology, this document should be viewed as a working document that will undergo constant changes, but never deviating from it mission.

## Executive Summary:

Due to the dynamic makeup of the Community College System and the charge put forth demanding current state-of-the-art training for the workforce, it is imperative that the CCofC have an established Technology Plan that is a living document. With the advances in technology occurring as you read this plan, it is incumbent that this document parallels what industry is demanding.

This Technology Plan will compliment the directives of the instructional and administrative aspects of each college. This plan will insure that the CCofC will be aligned with the demands of the work force as well as keep the colleges current with the transferability of course work to other institutions of higher education. In addition, this plan should be used in conjunction with other facets of master planning being done at each college as well as at the Board level of the system.

## CCCS Mission Statement:

Community College Computer Services under the direction of the Community Colleges of Colorado, will build and sustain a world class information technology and telecommunications environment to achieve the most efficient, reliable and accurate information technology system supporting all facets of the Community Colleges of Colorado in their endeavors to deliver quality, state-of-the-art administrative processes and educational instruction to their clients.

## Role:

CCCS provides full enterprise support to each college as it relates to wide-area networking, management information systems including SIS, FRS and HRS, system email connections on the WAN, video-conferencing, application development, security and backup of administrative systems, reporting tools, communication lines, software licensing coordination, help desk information, training and consultation.

This includes coordination with vendors on behalf of the entire system. Wherever possible, we will leverage the size of our System and centralized administrative technology function to the benefit of individual colleges. The above-mentioned items have established standards that can be found in detail later in this document.

In order to address the demands of the system colleges as it relates to system-wide initiatives, CCCS established the ITMPC (Information Technology Master Planning Council). This Council has been in existence since 1993. A budget is established each year and project requests are reviewed and prioritized by this committee. The base of each priority is "total cost of ownership" and therefore all future costs must also be projected and funded. **See Exhibit # 23** for an overview of the process.

CCCS serves as a resource to any CCofC college in the event that they need assistance in any of the areas mentioned in this document. It is not the responsibility of CCCS to manage or maintain the campus local area network hardware and software. Specifics can be found in CCCS/campus MOU's. Although primarily an administrative support department, CCCS offers help where needed in the academic arena, whether it be Internet access, software licensing, communication lines, networking issues, capacity planning and consulting services. For some colleges, CCCS has direct supervisory responsibility and budget management in support of the academic IT function.

## Design:

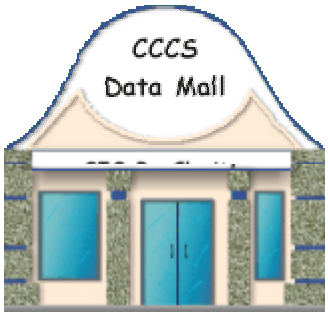
The design of this document allows modifications to be made to specific areas without impacting the document in whole. **Exhibit #1** summarizes the expenditures of this plan.

## Initiatives & Accomplishments:

Over the past two years, the CCofC (then CCCOES) was presented with many tasks to be accomplished, several of these by directive from the legislative branch of the government with the support of local government.

1. Northeastern Junior College (NJC) in Sterling, Colorado requested to become part of the community college system. The college had gone through two major conversions in the previous two years. CCCS started conducting meetings with the users and administration and within four months, the college was fully participating on the technology platform of CCofC. All administrative applications, data files and history files were converted to the common administrative Student and Financial Systems.

2. In 1999, Colorado Northwestern Community College (CNCC) requested to become part of the community college system. The same process that was so successful at NJC was implemented. Within three months, their systems and files were converted to our administrative system.




3. A Data Warehousing project was undertaken with the assistance of Microsoft and a pilot project was completed within 90 days. This project received international attention as CCCS was invited to kick-off the inaugural Business Apps Conference for Microsoft. CCCS also was requested to be the premier presenter at Microsoft's national launch of SQL 7.0 in Denver.
4. CCCS became the focal point of a statewide initiative for video-conferencing.
5. In order to maximize efficiencies and dollars, the operations components at Otero Junior College, Trinidad State Junior College, Pueblo Community College and Pikes Peak Community College were consolidated into the data center located in Denver.
6. A legislative directive (Connect Colorado) to install a fiber optic backbone in Southeastern Colorado was undertaken and successfully implemented. A major company in the area partnered with us to help underwrite this project. The project received national attention and received a regional award from the 'Docking Institute' for expanding network access in a rural area. The network included linking schools, colleges, libraries and hospitals along a 650-mile route of fiber.
7. Student Services on the Web emerged as a primary request by the institutions. Currently available are application, course look-up, registration, transcript request, schedule, credit card payment, grades and much more. Student self-advising tools and a Faculty/Advisor module are in development. These applications are all interactive with the existing legacy system and provide real-time access and update.

## Current Status:

### IT Overview:

CCCS supports a community of 5400 employees, 14 community colleges, 1 vocational school, AHEC, the State Board and 54 school districts.

All administrative computing is done at the main facility in Denver, linking to each campus via a multitude of T1 and DS3 circuits. See **exhibit # 5** for a detailed overview of the WAN. See **exhibit # 21** for a detailed layout of all agencies that are supported and link together by CCCS.

The administrative management system was originally purchased by CCCOES in 1986 for each of its colleges. The licenses included SIS (Student Information Systems), FRS (Financial Records System), HRS (Human Resource System), ZSS (Core system) and Zwriter (query facility). In 1993, it was decided to maintain the system with existing staff due to the number of changes that needed to be implemented.

Since that time, Voice Registration (via Edify), Web Registration and Electronic Student Record Access (via TouchNet), Document Imaging, Data Warehousing, Fixed Asset and Purchasing Card processing to mention a few, have been added to the core system.

In 2001, CCofC became the managing partner at the Lowry Campus. This facility has several partners occupying buildings. See **exhibits # 24 & 25** for an overview of this facility. In May 2002, CCCS will move to the Lowry Campus.

## IT Strategy:

- All strategies as it relates to Information Technology are driven by the benefits this technology will have on the students, faculty and staff across our system. A strong component of this will be present & future development of WEB enabled access for all students.

- Every effort will be made to maximize our resources such as partnering with major vendors, consolidate purchasing of software and hardware, standardization of systems, training methodologies, common platforms and many other efforts too numerous to mention here.

- CCofC has implemented the Cisco Academy at each of the colleges and CCCS is a Beta-site for Microsoft SQL.

- Due to industry placing heavy responsibilities on the community colleges to quickly train future employees in state-of-the-art tools, it is imperative for the CCofC to maintain a “Leading Edge” and “Early Adopter” philosophy. In order to supply the students with the skills necessary to compete in the global economy, they will be trained with the proper tools and skill sets.

<u>To meets these ends, the CCofC have standardized on:</u>

- Administrative Management System (SCT)
- Operations Platform (Open VMS)
- Electronic Imaging Systems (Liberty)
- Communications equipment (Cisco)
- Desktop application suite (Microsoft Office)
- Desktop operating systems (Microsoft)
- Email (Microsoft Exchange)
- Global Address Books (Microsoft Exchange)
- Video Conferencing (PicTel)
- Terminal Emulation (Reflections)
- Data Warehousing (Microsoft SQL)
- Web browser (Microsoft IE & Netscape Navigator)
- PDA's (Compaq IPaq)
- Network Operating Systems (Windows NT/2000)
- Wireless Standard (Cisco Aeronet)

## Vision:

- Full-networked connectivity to available electronic resources for all students, faculty & staff (Campus, local, Global).

- High speed connectivity between colleges and fully embrace converged network technologies (wired, wireless, voice, video and data).

- Highly personalized access to information and resources.

As part of this vision, over the next 2-7 years, the administrative management system will be migrating to a new client/server system from SCT. This package (RLS) will be implemented in stages. See **exhibit # 1** for summarized cost estimates. See **exhibit #2** for a product roadmap.

In order to further the mission of the Community College System, the network communications system will need to be upgraded to support voice, video and data, to allow implementation of H.323 standards insuring that each college can support the demands of Distance Education and enhanced electronic communications. See **exhibit #1** for summarized cost estimates.

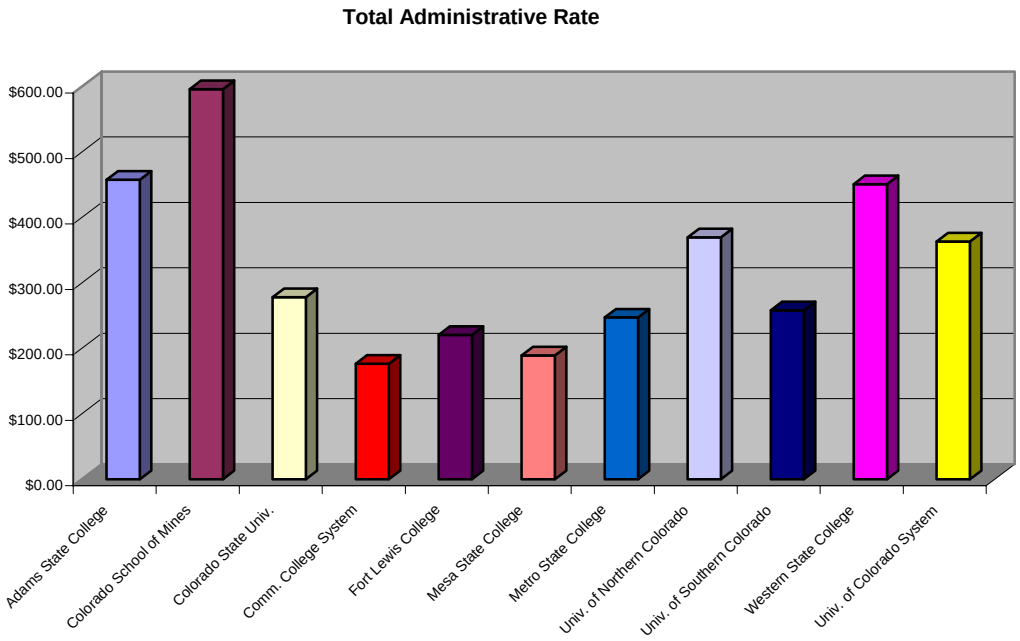
## Goals & Objectives:

**Goals:** The major goal over the next few years is to expand the use of technology in delivering increased access to information and services for students, faculty and staff. This will incorporate new directives as it relates to efficient administrative

systems, alternative learning styles, distance education, remediation and delivery systems.

As the technology changes, it is incumbent for CCCS to remain state-of-the-art in the following categories (but not limited to): communication techniques, upgraded administrative management tools, electronic forms management, delivery methods (whether it be in the classroom or remote), networking, bandwidth, converged technologies and video-conferencing capabilities.

Cost savings is always a concern and with that in mind, it is the desire to maximize our purchasing power for both hardware and software purchases. Our direction will be to utilizing state contracts, campus licensing agreements, bulk purchases and good fiscal management techniques to accomplish this goal. The ability to leverage our system and utilize common platforms has kept the cost per FTE lower than any other college or System in Colorado.




To provide a comprehensive IT plan to ensure the availability, support, effective management and deployment of these technologies to the campuses in support of their core missions.

Participate in a statewide and/or system-wide pricing agreement for technologies such as Blackboard and WebCT to be used by any college in their development of Web-based curriculum.

Enable the students to access their data from local workstations as well as remotely from their own personal access devices, such as PDA's.

To provide budgetary initiatives in support of this plan and position CCofC for future growth.

This plan should be used, as a guide for on-going meetings that address the technology needs of the system and its colleges.

It is the desire of the system to survey the colleges and be able to report on the status of each college and have the ability to review and offer assistance to those colleges to insure that they can meet the standards as established by this document.

A list of initiatives should be reviewed and prioritized, then presented to the IT Master Planning Council for consideration during its budget planning process.

The System office is requiring more system development utilizing Web technology. The main web site for the system is expanding to include interactive data from various 'communities' of interest. In order to improve communications and efficient workflow, CCCS will be moving to implement electronic forms and web access to employee related services.

Vocational student systems will be transferred from old batch file technology and move to web access for secondary and post-secondary programs. Plans are to implement a new system by late Spring 2002.

CCCS wishes to create and maintain a structure for the improvement of technology which represents the needs of all constituent groups for the purpose of developing technology policy, resolving common technology issues, recognizing new opportunities, selecting appropriate solutions, and proactively addressing external and internal constraints.

## Objectives:

### Replacement of Administrative Management System


**Description:** CCofC is in the first phase of converting our legacy system for administrative information management systems into a state-of-the-art management information system that will support the needs of the system as it relates to existing requirements, distance education, WEB based instruction, remote management and the multitude of reporting requirements for state and federal government.

**Rationale:** The current system would need extensive modifications to incorporate the needs of colleges as they move into the anytime/anywhere/any course delivery method. This would require the additional need to hire expertise in the areas of Database Administrators and architects. These positions are high cost and incremental. In addition, developing in-house would add an estimated 3 years for completion.

By purchasing RLS from SCT and renewing our maintenance contract, we have saved over $8 million with a 'system' implementation. Any new products would range from $ 20 - $40 million. The CCofC (by a prior agreement) will be participating in the design of the new product.

CCofC will have the ability to call upon hundreds of colleges and universities throughout the country to collaborate, request help, plan and recommend future design.

**Steps:** This project is expected to take 5 years to convert all colleges within the system. SCT (the software vendor) will be implementing a phased-in approach in the release of its software. The schedule can be seen in **exhibit # 2**. This schedule will change as CCCS gets closer to implementation and the conversion schedules are redefined between CCCS, SCT and the colleges.

During this time period, the legacy systems will continue to function as is, but parallel processes will be put into place to insure that the new RLS system functions properly. There will be a time when a legacy portion of Series Z will be terminated with crossover paths to the new system.

As each process is undertaken, a training schedule will be developed to educate the users in the methodologies used in the new system. Planning schedules and specific teams will be drawn from representatives of the core constituents of each branch of the colleges.

**Required Involvement:** Every department within CCCS will be involved in this implementation. In addition, departments at each college (such as Accounting, Financial Aid, Registrars, Counselors, etc.) will have representation through existing or newly created constituents committees. These committees will be provided with an overview of the conversion, be tasked with identifying training requirements, creation of transition teams, creating testing environments, etc.

**Strategic issues, barriers & obstacles:** During this period of conversion, it will be imperative that the CCofC agree to a mandatory freeze on any new development in the legacy systems, excluding those that are mandated by state or federal regulations.

Core teams will need to be developed to establish the existing standards and any new standards to be adopted by CCofC. Some of these decisions will need to be negotiated and agreed upon.

The colleges under CCofC have instructed CCCS to insure that the enhancements that have been implemented in the existing system would role forward into the RLS system.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.

**Funding source:** General Fund of CCofC.

## Expansion of Video-conferencing Systems

**Description:** This system is utilized by 4 year colleges, research institutions, community colleges, other state agencies and the legislative branch of the State of Colorado. This increased utilization has reduced the amount of travel needed within CCofC. These sessions are used to hold meetings at remote sites, instruction for distance learning within the community college system and post-graduate work with colleges and universities.

**Rationale:** The amount of video-conferencing taking place demands that the system be expanded to keep up with the quality and expectations of the faculty and staff.

The advancements in technology from the existing H.320 to the proposed H.323 are significant. The H.323 standard will make use of existing network infrastructure to provide video conferencing. Dedicated circuits that support video conferencing only are being eliminated in favor of circuits that can be better managed to make more efficient use of existing bandwidth.

The cost of equipment for H.323 Video Conferencing is less expensive that that for the H.320 standards. Therefore, maintenance of these units will be reduced considerably. Using H.323 standards also provides greater flexibility in locating equipment, scheduling conferences, and attaching to other video conferencing systems.

A Multipoint Conferencing Unit (MCU) will allow multipoint conferences to be scheduled throughout the system and provides the interface for other state video conferencing systems and connections via dialed lines to any compatible video conferencing system worldwide. The MCU will allow the system to take advantage of the extensive system currently in use statewide and provide opportunities to utilize these technologies for the community colleges of Colorado beyond the video conferencing capabilities.

By implementing distributed full motion video, the Community Colleges can digitize content and distribute to any campus at any time. Live video conferences can be stored real-time and then distributed out to any person on the IP network. This allows the users that were unable to attend a video conference to replay the content at their desktop anytime after the presentation. This content can be controlled like a VCR whereby the user can pause, rewind, fast-forward or stop the content while viewing. The potential to add Web-based content to this video experience with HTML based tests and interaction, will enhance the learning experience.

Video distribution can also extend to broadcasting a cable channel or a satellite feed onto the IP network. A properly designed IP Network will allow rich media to be delivered to any desktop in the network at any time.

**Steps:** A Multipoint Conferencing Unit to be located at CCCS-Denver will need to be purchased along with view stations at each conferencing location. The MCU will be installed and connected to the existing H.320 system. View stations at each end site will be purchased, configured and tested before installation at the remote sites.

The detailed schedule for this replacement is detailed in **exhibit # 10.**

**Required Involvement:** The primary department responsible for this objective is the Networking Team of CCCS. Coordination with the key

responsible personnel at each college will be established and managed by the Networking Manager of CCCS.

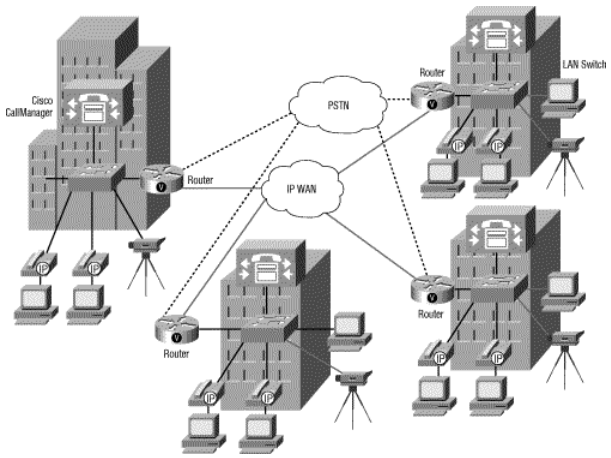
**Strategic Issues, barriers & obstacles:** Re-train existing personnel familiar with H.320. Establish quality of service levels on the network to provide high quality video capabilities. Scheduling. Interfacing with the existing H.320 equipment.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.

**Funding Source:** Capital Construction dollars.

## Voice over IP (VoIP)

**Description:** Install a VoIP solution for all colleges that will integrate voice with existing data & video to the desktop.




**Rationale:** Due to the magnitude of distance between colleges and the amount of monies being spent on long distance calls within the state of Colorado, the CCofC plans on reducing the amount of dollars being spent on local long distance and increase efficiencies by providing converged networks that support data, voice and video services. In order to accomplish this objective, the system will need to supplement and eventually replace our existing PBX systems with a VoIP solution.

VoIP makes use of existing network circuits and cabling. VoIP Call Managers, switches, routers, and telephone handsets will need to be purchased.

**Steps:** VoIP makes use of existing network circuits and cabling. VoIP Call Managers, switches, routers, and telephone handsets will need to be purchased. The schedule for this replacement will be detailed in **exhibit # 20** as soon as the objective is funded. This is due to the fact that not all colleges will be replacing or doing major upgrades to their PBX's at the same time. Personnel will need to be trained in this technology. A phased in approach will be implemented whereby a pilot project will be installed at each college. At the time that a colleges' PBX is scheduled to be replaced and/or upgraded, a VoIP solution will be installed that follow the standards and

guidelines established by this IT Master Plan. Each college will be responsible to include this into their IT Master Plan.

It must be noted that CCCS will be converting to VoIP second (as CNCC has fully replaced their PBX with a Cisco VoIP solution). Once CCCS is fully implemented, meetings will be scheduled with each of the colleges to identify implementation schedules for their pilot VoIP installation. The knowledge gained by CNCC and CCCS will be instrumental in the successful installation of the pilot projects at each of the colleges.

**Required Involvements:** The primary department responsible for this objective is the Networking Team of CCCS. Coordination with the key responsible personnel at each college will be established and managed by the Networking Manager of CCCS. In addition, training will be established between CCCS and those affected departments (both administrative and instructional) at each of the colleges as they implement this technology

**Strategic issues, barriers & obstacles:** Up-front funding must be received for this project. Training of personnel is another issue that will be addressed as we implement across the system.

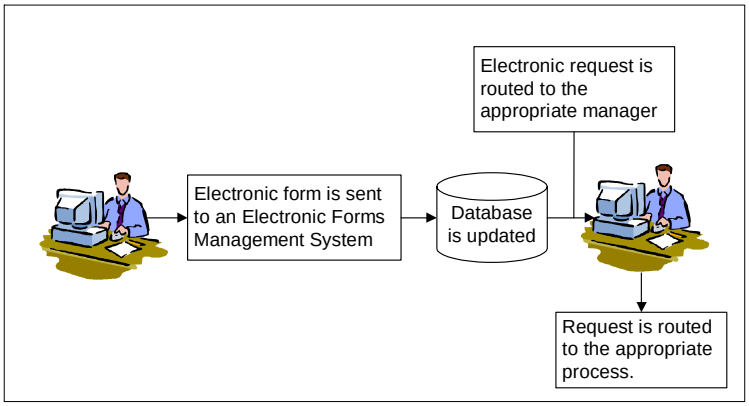
The electrical grid will need to be evaluated, and power must be available at all times to support the minimal voltage to each unit. The availability will be attained by the purchase of the proper Cisco switches and UPS's in the appropriate locations.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.

**Funding Source:** Capital Construction dollars.

## Electronic Forms Management

**Description:** Install an enterprise-wide workflow management system including forms routing and document management. This system will allow for system wide integration of standard forms libraries and will allow independent utilization



in decentralized CCofC college locations and the system office. This facility may be integrated with Microsoft Outlook and will help improve productivity in the areas of electronic forms, document preparation, document assembly and laser printer imaging.

**Rationale:** Individual Colleges as well as the system office are creating E-Forms with various software packages causing compatibility problems when they want to share these E-Forms. Second, colleges are forced to buy individual fill-in software for every user that wants to fill-in the form. In the Internet and Intranet environment existing solutions to these problems are cost prohibitive. The majority of forms are copies of paper forms and users across departments are continually using obsolete or variations of the official forms documents, which causes significant issues and ramifications. The manual routing of paper forms between departments and individuals is a time consuming process. Often paperwork is lost and continually requires administrative time to manually track down forms. The use of automated forms routing will eliminate these problems. Workflow processes will cause standardization of work and reduced overhead. Once processes are created events will be performed the same every time. This will reduce costs and eliminate frustration.

Scanning existing forms into a design application or creating them through an integrated package can create electronic forms. Once created, they can be published on designated Web sites, Intranets or in Database Applications. This will enable quick delivery of electronic forms to colleagues, colleges, system office or the entire CCofC through automated or manual workflow processes without redrawing or learning new applications. Anyone with a browser can instantly access, read and fill-in the forms on the Web and be provided the following:

* Immediate access, via the Internet or LAN/WAN, to electronic forms distribution, fill-in capabilities and local printing
* Assurances that forms accessed through the electronic repository are accurate and up-to-date
* Convenient, easy-to-use, form fill functionality
* User-ID login
* Access to standardized workflow processes defined by user-id.
* Individual tracking of forms as they proceed through defined processes

**Steps:** Evaluation of an enterprise-wide solution will need to be conducted. A pilot project would be implemented on a local level such as the system office and a single college, then an enterprise-wide (meaning CCofC) scheme. Individual workflow process will need to be detailed and cataloged according to entity. “Economies of scale” will be seen where colleges can capitalize off of standardized processes. Individual and shared forms will need to be identified and cataloged according to library.

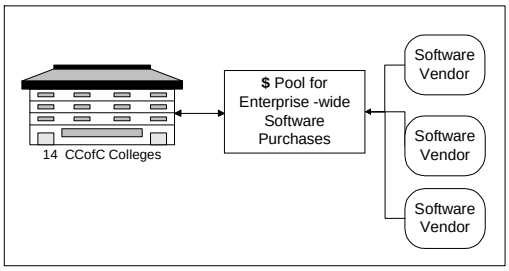
**Required Involvement:** The primary department responsible for implementation of this objective will be the Operations /Customer Coordinators and the Networking Team of CCCS. This will be coordinated with key members of the "system office" to identify those applications that will be created first. As each application becomes ready, the training efforts will be coordinated with each college's personnel that have been assigned the task of implementation.

**Strategic issues, barriers & obstacles:** Workflow documentation is a time consuming process and often is met with reluctance because it points out weaknesses in current processes. As with all new software, the adoption of this would require training, implementation schedules and integration into our systems platform. If any colleges have implemented some type of forms software, they will be reluctant to endorse an enterprise solution (not fully realizing the cost savings a fully integrated system would be to CCofC). Identification and policies surrounding the use of Electronic signatures will need to be addressed.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.

**Funding Source:** Capital Construction dollars.

## System-wide software purchases




**Description:** Establish a centralized pool for software purchases that can be utilized by each college.

**Rationale:** Due to the amount of software being purchased by each of the community colleges, a tremendous cost savings can be realized by combining this purchasing power through an Enterprise Account.

Major areas whereby the community colleges can realize cost savings are (but not limited to):

**Microsoft Campus Agreement -** Due to the CCofC standardizing on this platform for administrative servers and desktop. In addition, this agreement covers each and every computer lab within the system.

**Liberty –** Electronic Imaging is being utilized at each college in various departments.

**WebCt & Blackboard –** Web-based curriculum development tool. This software will be fully integrated into the RLS Administrative Management System by SCT.

**Academic Systems –** Web-based remedial Math and English. Due to the legislative mandate that all remedial classes must be administered by community colleges

**Steps:** Establish a one-time pool of money to be used by all colleges to purchase system-wide software. As each college purchases software from this pool, a budget transfer from the college to CCCS will be made, thus replenishing this pool.

**Required Involvement:** The VP Finance – CCofC and VP Information Technology – CCofC will coordinate with the business officers of all community colleges in the System to leverage the purchasing power and process of the System.

**Strategic Issues, barriers & obstacles:** Some colleges may need to be shown potential advantages by participating in system-wide purchases. This will be a mandated item. Keeping up with licensing changes from the vendors.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.
The budget pool makeup for this objective can be seen in **exhibit #6**.
See **exhibit # 19** for projected cost savings.

**Funding Source:** The General Fund of CCofC.

## Distance Learning over the Internet, CCCOnline

**Description:** Distance learning over the Internet is the fastest growing educational market. Distance learning over the Internet is being provided by many CC of C colleges in varying level of maturity from programs in the early planning stages to programs with over 100 courses online with complete campus-based servers, instructional designers, and help desk support. Primarily CC of C colleges use WebCT course management system (CMS) or Blackboard CMS, with the largest number of programs using WebCT.

CCCOnline provides consortial certificate and degree programs for college partners over the Internet and has grown in credit hours from 3,000 to 8,000 to 15,000 to 25,000 from 1998 to 2001; from one program in 1998 to over 17 programs online 2001 and many more in development for 2002. CCCOnline has leveraged Colorado's academic leadership to create programs that serve as national standards for quality, consortial partnerships and model of business.

**Rationale:**
CCCOnline has used the eCollege CMS, hosting and help desk products since 1998. Paying a per credit hour charge. CCCOnline has grown to a level of economy of scale that sustains the organization, academic development programs, IT operations, help desk and other student service functions, without general fund contributions.

As a result of the 2001 RFP process, CCCOnline will adopt WebCT CMS, develop on-site/off-site server operations, and move 200 courses into the new CMS over the period of AY02-AY03.

CCCOnline on-site/off-site systems will provide CC of C colleges a resource for development of their own online programs without costly reproduction of server operations, CMS licenses, instructional designers, trainers, help desks and other online student support services. CCCOnline on-site/off-site systems will provide new opportunities to link to academic programs of our colleges and allow for future backup between systems and creation of a common course catalog portal for all of the CC of C.

**Steps:**
Train and staff help desk operations. Design, acquire, assemble, test, and activate high speed, secure, reliable, redundant telecommunication server operations with RAID 5 database systems for delivery of academic programs. Document systems, backup and maintenance routines, and disaster recovery procedures. Design, acquire, assemble, and train an instructional

development team to move 200 courses into the new CMS over the period of AY02-AY03. Design a CCCOnline template and build 200 courses in the new CMS. Pilot operations and course delivery in the spring and summer 2002.

**Required Involvement:** The primary department responsible for implementation of this objective will be the employees that make up the eLearning initiative along with the primary vendor eCollege. In addition, those employees located at their respective college that have as a main task, to develop on-line web-based course curriculum.

**Strategic Issues, barriers & obstacles:**
Train existing personnel in the use of the new system. Hire and train new personnel to support instruction and build new courses in the new software. Train faculty to use the new system. Build CCCOnline infrastructure so that it can operate with 99.99% reliability. Completion of building renovation, installation of high-speed telecommunication lines and equipment, and scheduling move to the new Distance Learning Building. Interfacing with existing college systems.

**Expected Costs:** See **exhibit # 1** for summarized cost estimates.

**Funding Source:** The General Fund of CCofC.

## Training Services:

**Introduction**

This section will describe the training services and philosophy provided to all employees of the CCofC. These services are provided centrally at the main office or remotely at individual campuses.

**Background**

It became apparent that with the massive amounts of new technology (both hardware and software) being given to each employee, it was imperative that the training of these employees was essential to the success of the projects. New desktop office suites, email facilities, menuing systems, calendaring and various other applications were being replaced and/or upgraded. Each of these upgrades brought new functionality to the desktop.

**Benefit Analysis**

By establishing a training coordinator CCCS has created standard templates and various delivery methods to address the needs of the employee. Training centers have been established at several locations.

These training sessions are tailored to the working environment of the employee. This is beneficial to both the employee and the college. Colleges do not have to set aside training budgets for their employees to take generic training at a remote location.

As the CCofC starts the process to migrate from our current administrative management system to RLS, this training service will be a focal point to keep employees up-to-date on differences between the systems, understand the differences and create plans to migrate to the new management system.

**Guidelines**

Training is usually based on the needs of the employees. As the need is identified, the coordinator will send out emails to the entire global address list identifying when and where specific training will be taking place. Specific training sessions for the college community can be found on our Web site at:

http://www.cccs.cccoes.edu/cccs/oper/train/cccssched.htm

The planning and conversion to RLS will generate several levels of training and this will be planned and coordinated by the CCCS management team.

**Administrative User:**

Training classes are held for a variety of software packages. These training sessions are scheduled through the Training Coordinator for CCCS and dates are published system-wide as to locations, times and subject matter.

Specialized training sessions are created for those departments at the various colleges that have a specific need.

**Technical Staff:**

Each manager of CCCS will compile a list of needed training within their own departments. Each department within CCCS will prioritize their training needs. This analysis will be formulated into a master training schedule for CCCS. The needs will be based on keeping the skill levels up to the demands of their work load.

Every effort will be made to capitalize on:

- employee scholarships within the system

- bring qualified trainers to the CCCS training facility to maximize training dollars where applicable

- train the trainer

## Policies:

**Introduction** This section identifies the policies that are in place at CCofC regarding proper use of electronic media.

**Background** Criminal use and misuse associated with computer hardware and software has become an international epidemic. Huge fines have been levied against those found in violation of software copyright laws.

**Benefit/Analysis** These policies have been put into practice to protect both the organization and the employee. Each policy can be viewed via the WEB format or hardcopy. Employment papers make reference to these policies. If employees are unclear regarding these policies, a meeting will be scheduled through the Human Resource department.

**Guidelines** The following Policies have been put into place. As additional technology related policies are created, they will be represented in this Technology Plan.

### Request for Access

Every employee of the system office must formally request (via email from the department head or written format) for specific types of access. Once this request has been acted on, training is usually scheduled for that individual specific to the types of access requested.

Upon termination of employment, a request is sent to the security officer to insure that all access has been removed for that employee. It is the responsibility of the security officer to insure that operations, networking, etc. have taken the proper measures.

### Software Licensing

Each college adheres to all software licensing requirements and requires all employees to read and sign a Software Policy Statement, for an example see Exhibit #3. This document is then forwarded to the security officer to be filed for future reference or litigation.

## Audits

Due to the penalties involved in the use of illegal software, CCCS has the right to do unannounced random audits of employees desktops and servers. This is defined in the Policy Manual of CCofC.

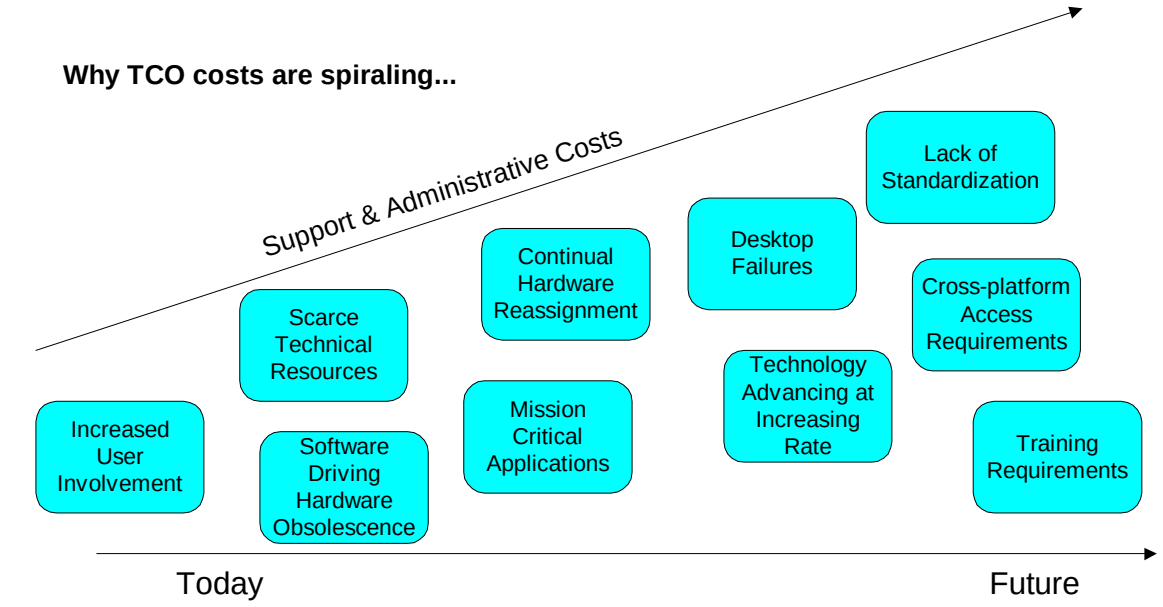
## Electronic Communications

See SB Policy # 3-125

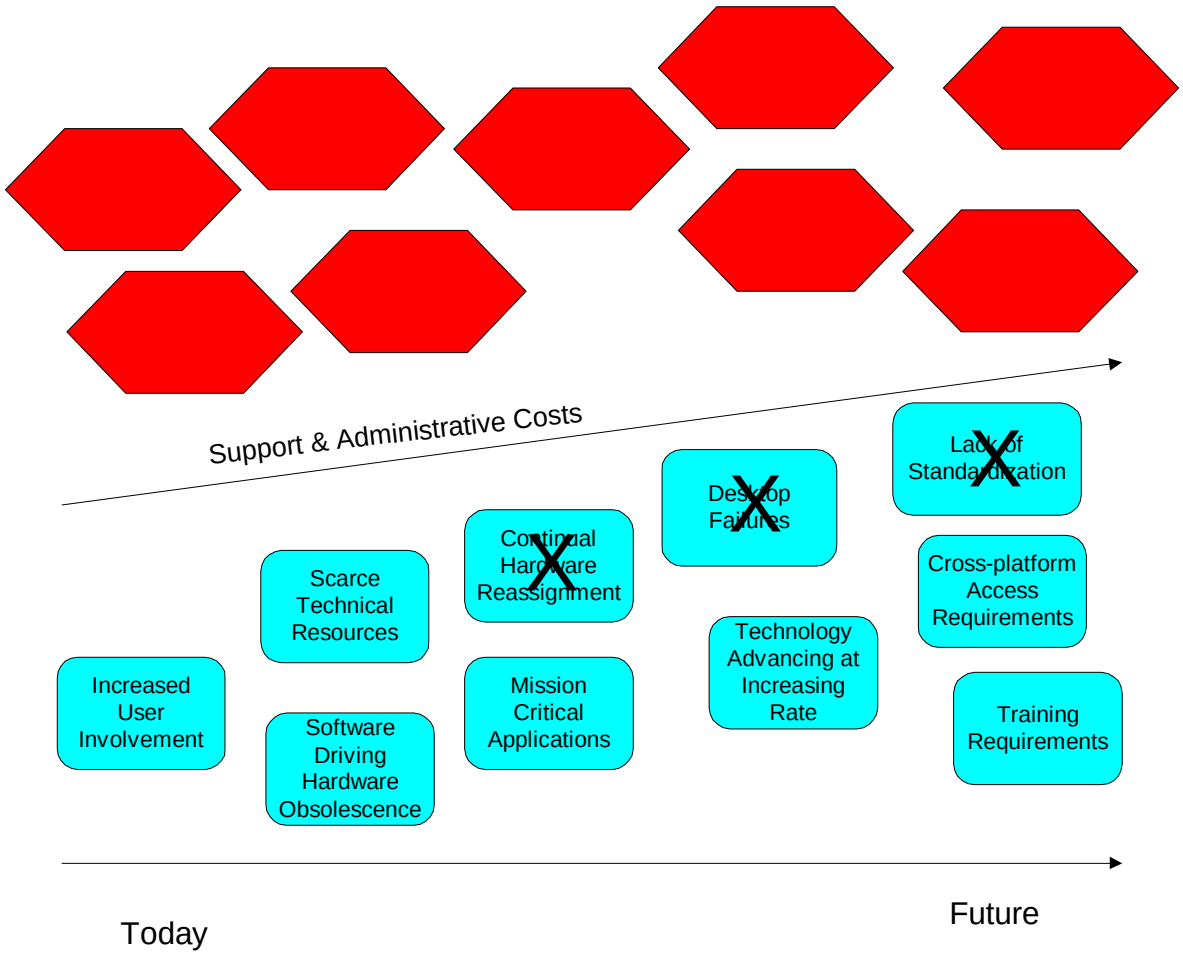
http://www.cccs.edu/Docs/SBCCOE/Policies/SP/Web/SP3-125a.htm

## Standards:

| | |
|---|---|
| **Introduction** | This category will define those standards that are to be used as minimum base configurations as each college plans to implement new technology. Many of the standards mentioned here were drawn from the **CIO Forum for the State of Colorado Desktop Standards Subcommittee**. |
| **Background** | Configurations in the past were primarily based on what budget was available and what could be purchased within that budget. |
| **Benefit Analysis** | By establishing base level standards, each college can insure they will be installing "tried and true" technology that is being used throughout the system. In addition, each college can rely on expertise system-wide. Spare parts and emergency situations become less of a problem for each college.<br><br>The system as a whole will realize cost savings, not only from a purchasing standpoint, but also a maintenance and expertise point of view. |
| **Guidelines** | Each section will have its own standards identified. Each section is designed in such a way that as standards change, usually only the exhibit needs to be update. The following page will graphically demonstrate why TCO is rising yearly, and the measures that colleges can take to help reduce those costs. |




**Adopting the methodologies in RED will help reduce the TCO (Total Cost of Ownership)**



## Desktop Hardware

| | |
|---|---|
| **Introduction** | This section will define those standards that are to be used as a minimum base configuration based on the level of the user. |
| **Background** | Base configurations in the past were primarily based on what budget was available and what could be purchased within that budget. |
| **Benefit Analysis** | By establishing base level standards, each department can be assured of the level of desktop that they can expect and that the level of user will dictate what type of PC will be placed on their desk. |
| **Guidelines** | Users are categorized into 1 of 3 classifications: Level I, Level II & Level III. These levels will dictate what type of PC will be needed to perform their daily tasks. |

**- Level III**:

Those falling in this category usually utilize the advanced features of a multitude of software and are multitasking, multi-thread individuals. Examples are creating multimedia presentations, multilevel databases, application development and testing, CAD design, system managers and analysts.

**- Level II**:

Those falling in this category regularly utilize standard application software features, plus some of the advanced features of several applications while multitasking between desktop applications and the networked administrative management applications. Examples of this are: financial analysts, application developers, system administrators and instructional design.

**- Level I**:

Those that are covered in this category are usually employees that use the basic functions of the desktop as it relates to word processing, spreadsheets, email, internet access and terminal emulation to the legacy systems. Clerical, data entry and workstudy desktops generally fall into this category.

| | |
|---|---|
| **Standards** | See Exhibit # 11 for desktop hardware specifications.<br><br>Each college should have in place a tracking facility that will identify when each piece of computer equipment is scheduled to be replaced. CCCS has a facility that can be implemented by each |

college. This can be downloaded by contacting Pueblo Community College – Computer Services.

At a minimum, the tracking facility should have the following information:

| | | | | CPU | | | | Purchase | | Replacement |
|---|---|---|---|---|---|---|---|---|---|---|
| **Bldg** | **Room** | **Person** | **Serial#** | **Type** | **Memory** | **HD** | **PO** | **Date** | **Level** | **Period** |
| | | | | | | | | | | |

## Laptop Hardware

**Introduction** This Section will define those standards that are to be used as minimum base configurations for laptop users based on their level of need.

**Background** As with the desktop requests for purchase, configurations in the past were primarily based on what budget was available and what could be purchased within that budget.

**Benefit Analysis** By establishing base level standards, each department can be assured of the level of laptop that they can expect and that the level of user will dictate what type of laptop will be purchased.

**Guidelines** Users are broken down into 3 classifications: Level III, Level II & Level I. These levels will dictate what type of laptop will be needed to perform their daily tasks.

**- Level III**:

Those falling in this category usually will be utilizing the laptop as their main desktop and will require a docking station plus a larger screen.

**- Level II**:

Those falling in this category are faculty and/or staff that regularly check-out laptops or need to do high level presentations that need the power of a level III desktop.

**- Level I**:

Those that are covered in this category are usually employees that travel consistently and need the flexibility of a laptop without the cumbersome weight and size of a standard laptop

**Standards** See Exhibit # 12 for laptop hardware specifications.

## Printers

**Introduction** This section will define those standards that are to be used as a minimal base configuration for printers based on the level of their need.

**Background** Many departments feel that it is necessary to have a printer on every desktop. What most departments don't realize is the cost of ownership for this privilege. The cost per unit delta between desktop printers and networked departmental printers is considerable.

**Benefit Analysis** By evaluating each request for printers, the system can reduce the cost-per-page and maintenance of printing within the respective areas.

**Guidelines** Users are broken down into 2 classifications: Level I and Level II. These levels will dictate what type of printing capabilities they will have.

- **Level I:**

  Any employee that prints documents that does not fall under the umbrella of security or privacy.

- **Level II:**

  Any employee that is in an area that involves security, privacy or the need to produce a document to be handed to a client immediately, or the cost-effectiveness of a networked printer is not justified.

**Standards** See Exhibit # 13 for printer specifications

## Application Software

**Introduction**

This section will define the standardized desktop software that will be deployed on each desktop. It is anticipated that additional software will be added to this group as the need arises.

**Background**

By not standardizing on integrated packages, the ability to share electronic information can be a nightmare. This non-integration would lead to more clerical manipulation as documents where trying to be shared across departments and/or platforms.

**Benefit Analysis**

Standardizing on a set of desktop software yields many benefits. These range from training costs to TCO. The ability to share documents across the entire system is of paramount concern.

Utilizing a fully integrated product reduces the TCO, allows for departmental cross-training and eliminates integration problems.

**Guidelines**

The base configurations are broken down into 2 categories:

1. Desktop
2. Server

Within each category, the software will be defined as:

1. Office productivity suites
2. Operating Systems
3. Virus Protection
4. Browser
5. Backup
6. Tools

**- Desktop** See exhibit # 16 for minimal desktop productivity tools.

**- Server** See exhibit # 17 for minimal server software

## IP Video

**Introduction**

This section will define those standards that are to be used as a minimal base configuration to support video over our IP network.

**Background**

The demand put upon the community college system to offer classes anywhere/antime requires that the current system be enhanced. The current H.320 standards used at each college is costly (to maintain), is limited from a technology standpoint and offers no growth path.

**Benefit Analysis**

By installing an H.323 IP Video network, the CCofC will have the ability to distribute video to the desktop throughout the system. In addition, the maintenance dollars will be reduced considerably. See Exhibit #1 for summarized cost estimates. The detailed schedules for this replacement is detailed in **exhibit #10**.

There are three different types of video solutions for the educational process.

a. Video conferencing
b. Streaming broadcast video – the ability to distribute live broadcasts across the IP network to all campuses.
c. Video on Demand – the ability to distribute and store digitized content at each campus that can be viewed at any time. Applications for video on demand are VHS tape libraries, HR video training, stored class training and satellite downlinks.

**Guidelines**

The base configurations for the deployment of IP Video are to be H.323 compliant.

**Standards**

Detailed minimal requirements can be seen in **exhibit #3**.

## Networking

**Introduction**

This section will define those standards that are to be used as a minimal base configuration to connect to the WAN and the components that will be used in the LAN of each college.

**Background**

The CCofC has evolved into what is the now the largest Higher Education WAN in Colorado supporting the largest group of students. See **exhibit # 21** for a graphical representation of those agencies affiliated with CCofC.

**Benefit Analysis**

The LAN and WAN of the CCofC are mission critical systems. It is imperative that standards are enforced to insure that support can be managed from multiple locations.

Having the ability to manage the routers and switches from a central location provides each college with redundant technical help and the ability to escalate problems for an immediate solution. The software/hardware solutions allow the technical staff to troubleshoot the network down to the port level of any switch on the network.

**Guidelines**

The base configurations for both the WAN and LAN are based on headcount of each campus within the CCofC. Level I are for locations with a headcount of 1-500. Level II are for locations with a headcount in excess of 500.

All switch technology will be:

- 10/100 switched to the desktop
- gigabit Ethernet backbone
- support building block design for future growth and flexibility
- designed to address voice and video services over the network
- have inline power capabilities for IP telephony

CCofC will utilize the communication lines as established by the MNT. As CCCS supports many agencies across the state, the conversion to the MNT backbone will be accomplished as the MNT makes each location available and its lines stable. Several sites are already on the MNT backbone. CCCS will work closely with the MNT to insure redundancy in the event that the primary communications lines are interrupted. As always, the CCofC will be looking at the most cost effective solution to reduce the costs of communications.

**Standards**

- **WAN** See Exhibit # 14 for Router Base Configurations
- **LAN** See Exhibit # 15 for Switch Base Configurations

## Cabling

| | |
|---|---|
| **Introduction** | This section will define those standards that are to be used as it relates to wiring buildings internally and between buildings. |
| **Background** | As new buildings are being constructed and older buildings remodeled, it is imperative to maximize the lifecycle of the voice, data and video infrastructure of each college. |
| **Benefit Analysis** | A core set of standards needs to be established that will provide each college a wiring infrastructure that should last at least 10 years or longer. |
| **Guidelines** | Cable should be rated to meet or exceed existing building codes. |
| **Standards** | **See exhibit # 17** for baseline configurations. |

## Wireless

| | |
|---|---|
| **Introduction** | This section will define those standards that are to be used for wireless connectivity to the college communications backbone. |
| **Background** | Some buildings are structured in such a way that it would be costly to install copper or fiber cabling. Yet these locations need to have access to the campus backbone. Although the main backbone will remain 'wired', the flexibility of relocating functions on a temporary basis or expanding where there is no network is invaluable.<br><br>Wireless connections provide convenient network access to personnel traveling to other system sites. It is the intent that staffs from across the system have access to information resources wherever they are and therefore a common standard will help insure that connectivity. |
| **Benefit Analysis** | A core set of standards needs to be established that will provide each college a wiring infrastructure that should last at least 5 years and possibly longer in most cases. |
| **Guidelines** | Wireless equipment conforms to 802.11B standards. Wireless equipment that serves both 802.11b and 802.11a is preferred. |
| **Standards** | **See exhibit # 18** for baseline configurations. |

## Security

**Introduction**

This Section will define those standards that are to be used as a minimum base configuration based on the needs of each individual college. It is the responsibility of each college to insure the integrity, confidentiality and availability of systems to its proper constituents. CCCS will be responsible for the centrally located administrative data systems and statewide network.

**Background**

CCCS's goal as it relates to security is to supply the proper levels of access as defined by the role of the user. There are sets of minimum standards that will be required of each college as they are part of the CCofC WAN. Administration of the WAN, including security, is the responsibility of CCCS.

CCCS will recommend security that needs to be implemented at each college. Although implementation will be the responsibility of each college, CCCS will serve as a resource to those colleges. Local security issues must be addressed to insure that the local area network is also seen as a mission critical component of the institution and we will assist in any way upon request.

**Benefit Analysis**

By establishing base level standards, each college can define the levels of security above the minimum standards established by CCCS. Because each college clearly understands their specific requirements as it relates to instruction, administration, access rights and budgets, the levels of security can be tailored to their specific needs.

**Guidelines**

Specific routers and switches must be in place in order to connect to the WAN of CCofC. These can be seen in **exhibit # 14 & 15.**

CCCS will assist any college as they plan to implement firewalls, proxy servers, and any new security technology that is available. Any issues that impact the WAN will require a review and approval by CCCS.

## Exhibits:

| | |
|---|---|
| **Introduction** | This section will contain all exhibits that are referenced in this document. |
| **Background** | Most documents or plans have numerous materials that are referenced. These are usually in the body of the document. |
| **Benefit Analysis** | Due to the nature of this documents, it is beneficial to have all reference materials and standards located here. This IT Plan is a living document due to the frequency of technological advances. Changes to the plan can be made without rewriting the entire plan. |
| **Guidelines** | As new exhibits are created, they will be placed in this section. |

## Exhibit # 1 Budget Request Summary

| Cost Estimates for Implementing Strategic IT Recommendations | | | | | | |
|---|---|---|---|---|---|---|
| | FY 02-03 | FY 03-04 | FY 04-05 | FY 05-06 | FY 06-07 | Total $ |
| **SCT Contract** | | | | | | |
| Buy-back into maintenance | $ 225,000.00 | $ 205,000.00 | $ 183,400.00 | $ 10,012.00 | $ 897.00 | $ 624,309.00 |
| New product maintenance | $ - | $ - | $ - | $ 150,060.00 | $ 162,065.00 | $ 312,125.00 |
| Current product maintenance | $ 250,000.00 | $ 270,000.00 | $ 291,600.00 | $ 314,928.00 | $ 340,122.00 | $ 1,466,650.00 |
| **Total SCT Contract ----------->** | **$ 475,000.00** | **$ 475,000.00** | **$ 475,000.00** | **$ 475,000.00** | **$ 503,084.00** | **$ 2,403,084.00** |
| **Funding Source - General fund** | **$ 475,000.00** | **$ 475,000.00** | **$ 475,000.00** | **$ 475,000.00** | **$ 503,084.00** | **$ 2,403,084.00** |
| **Funding Source - Capital Construction** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** |
| | | | | | | |
| **Upgrade Video to H.323** | | | | | | |
| (1) Bridge | $ 180,000.00 | | | | | $ 180,000.00 |
| Maintenance | $ - | $ 27,000.00 | $ 28,350.00 | $ 29,767.50 | $ 31,255.88 | $ 116,373.38 |
| Personnel | $ - | $ - | $ - | $ - | $ - | $ - |
| **Total H.323 --->** | **$ 180,000.00** | **$ 27,000.00** | **$ 28,350.00** | **$ 29,767.50** | **$ 31,255.88** | **$ 296,373.38** |
| **Funding Source - General fund** | **$ -** | **$ 27,000.00** | **$ 28,350.00** | **$ 29,767.50** | **$ 31,255.88** | **$ 116,373.38** |
| **Funding Source - Capital Construction** | **$ 180,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 180,000.00** |
| | | | | | | |
| **Upgrade Switches to support VoIP** | | | | | | |
| Equipment | $ 2,001,000.00 | | | | | $ 2,001,000.00 |
| Maintenance | | $ 300,150.00 | $ 315,157.50 | $ 330,915.38 | $ 347,461.14 | $ 1,293,684.02 |
| Personnel | $ 40,000.00 | $ 42,000.00 | $ 44,100.00 | $ 46,305.00 | $ 48,620.25 | $ 221,025.25 |
| **Total VoIP --->** | **$ 2,041,000.00** | **$ 342,150.00** | **$ 359,257.50** | **$ 377,220.38** | **$ 396,081.39** | **$ 3,515,709.27** |
| **Funding Source - General fund** | **$ 40,000.00** | **$ 342,150.00** | **$ 359,257.50** | **$ 377,220.38** | **$ 396,081.39** | **$ 1,514,709.27** |
| **Funding Source - Capital Construction** | **$ 2,001,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 2,001,000.00** |
| | | | | | | |
| **Electronic Forms Management** | | | | | | |
| Turn-key System | $ 375,000.00 | | | | | $ 375,000.00 |
| Maintenance | $ - | $ 37,500.00 | $ 39,375.00 | $ 41,343.75 | $ 43,410.94 | $ 161,629.69 |
| Personnel | $ 25,000.00 | $ 26,250.00 | $ 27,562.50 | $ 28,940.63 | $ 30,387.66 | $ 138,140.78 |
| **Total EFM ----->** | **$ 400,000.00** | **$ 63,750.00** | **$ 66,937.50** | **$ 70,284.38** | **$ 73,798.59** | **$ 7,706,189.01** |
| **Funding Source - General fund** | **$ 25,000.00** | **$ 63,750.00** | **$ 66,937.50** | **$ 70,284.38** | **$ 73,798.59** | **$ 299,770.47** |
| **Funding Source - Capital Construction** | **$ 375,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 375,000.00** |
| | | | | | | |
| **Software Purchases** | | | | | | |
| MS Campus License Agreement | $ 188,000.00 | | | | | $ 188,000.00 |
| Terminal Emulation | $ 45,000.00 | | | | | $ 45,000.00 |
| Liberty | $ 25,000.00 | | | | | $ 25,000.00 |
| WebCt | $ 33,600.00 | | | | | $ 33,600.00 |
| Blackboard | $ 21,000.00 | | | | | $ 21,000.00 |
| Academic Systems | $ 200,000.00 | | | | | $ 200,000.00 |
| **Total Software Purchases --->** | **$ 512,600.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 512,600.00** |
| **Funding Source - General fund** | **$ 512,600.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 512,600.00** |
| **Funding Source - Capital Construction** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** |
| | | | | | | |
| **Distance Learning over the Internet** | | | | | | |
| Equipment & Software | $ 233,000.00 | | | | | $ 233,000.00 |
| Maintenance | $ 420,000.00 | | | | | $ 420,000.00 |
| Personnel | $ 232,000.00 | | | | | $ 232,000.00 |
| **Total Software Purchases --->** | **$ 885,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 885,000.00** |
| **Funding Source - General fund** | **$ 885,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 885,000.00** |
| **Funding Source - Capital Construction** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** |

| IT Cost Summary | | | | | | |
|---|---|---|---|---|---|---|
| Equipment & Software | $ 3,301,600.00 | $ - | $ - | $ - | $ - | $ 3,301,600.00 |
| Maintenance | $ 895,000.00 | $ 839,650.00 | $ 857,882.50 | $ 877,026.63 | $ 925,211.96 | $ 4,394,771.08 |
| Personnel | $ 297,000.00 | $ 68,250.00 | $ 71,662.50 | $ 75,245.63 | $ 79,007.91 | $ 591,166.03 |
| **Total IT Request --->** | **$ 4,493,600.00** | **$ 907,900.00** | **$ 929,545.00** | **$ 952,272.25** | **$ 1,004,219.86** | **$ 8,287,537.11** |
| | | | | | | |
| **Funding Source - General fund** | **$ 1,937,600.00** | **$ 907,900.00** | **$ 929,545.00** | **$ 952,272.25** | **$ 1,004,219.86** | **$ 5,731,537.11** |
| **Funding Source - Capital Construction** | **$ 2,556,000.00** | **$ -** | **$ -** | **$ -** | **$ -** | **$ 2,556,000.00** |

## Exhibit # 2 RLS Implementation Schedule

| Components | FY-0102 | FY-0203 | FY-0304 | FY-0405 | FY0506 |
|---|---|---|---|---|---|
| Web Portal | Campus Pipeline | | | | |
| Relate | Prospecting- Employees, Students, Businesses & Donors | | | | |
| Relate & Achieve | | Human Resource System | | | |
| | | | Student – Admissions Records & Billings/Recivables. | | |
| | | | | Financial Aid | |
| Manage | | | | | Financials |

**Sample Configurations**

| Specifications | Level I | Level II | Level III |
|---|---|---|---|
| H.323 Conference equipment | | | |
| Multipoint Conference Units | Cisco IP/VC 3540 | Cisco IP/VC 3540 | Cisco IP/VC 3540 |
| Content Delivery Engines | Content Engine 507 | Content Engine 560 | Content Engine 590 |
| Content Distribution Manager (two required for total CCofC network) Cisco Content Distribution Manager 4630 | | | |
| Cisco VN 2900 if campus wants IP video broadcast capabilities | VN2900 | VN2900 | VN2900 |

**Definition**

Level I – campus locations with up to 2 T1s bandwidth
Level II – campus locations with up to DS3 bandwidth
Level III – campus locations with DS3+ bandwidth

**Terminology**

**Cisco IP/VC 3540 -** The Cisco IP/VC 3540 Videoconferencing System integrates multipoint conferencing, multimedia gateway, and data collaboration into a single platform for cost-effective deployment of IP-centric, converged networks. Built upon industry-standard H.323 technology, the Cisco IP/VC 3540 allows a wide range of customized, converged voice, video, and data solutions. It has the scalability, performance, and multivendor interoperability required by enterprises and service providers alike.

**Content Delivery Engines -** The Cisco Content Engines are content networking products that accelerate content delivery, ensuring maximum scalability and availability of content. By combining Cisco caching technologies with acquired technologies from Sightpath and Tasmania Network Systems, the new Cisco Content Engines offer a broad range of content services that significantly expand the value of your Cisco IOS infrastructure.

**Content Distribution Manager -** The Cisco Content Distribution Manager enables you to have complete control over an entire content distribution network, including all of the Cisco Content Engines located at your end-user sites, from one application.

**Cisco VN 2900 -** The Cisco VN 2900 Video Networking System is a high-density video encoder and decoder that receives audio and video streams, performs video processing, and adapts the streams to any standards-based digital broadband network. Ideal for high-density, low-cost video applications such as closed-circuit television, video courier, and TV content redistribution, the Cisco VN 2900 System enables customers to increase service offerings and revenue opportunities by deploying video services over existing network infrastructures.

**Sample Configurations**

| Specifications | Level I | Level II | Level III |
|---|---|---|---|
| IP Call Manager | No call manager required. Remote survivability software in router. | Two Call Managers (redundancy) with tape drive | Two Call Managers (redundancy) with tape drive |
| IP Phones<br>7960<br>7940 | Depends on number of users | Depends on number of users | Depends on number of users |
| Unity Voicemail and Unified Messaging | | 16 sessions unit minimum | 24 sessions unit minimum |
| Interactive Voice Response | None | Cisco IP IVR for advanced Interactive Voice Response | Cisco IP IVR for advanced Interactive Voice Response |
| Voice gateway to PSTN | Cisco 36xx router with T1 or analog connectivity to PSTN | 8 port T1 voice module for 6509 for PSTN PRI connectivity and DSP farm resources | 8 port T1 voice module for 6509 for PSTN PRI connectivity and DSP farm resources |
| E911 services | Additional interfaces in 36xx for CAMA trunks | Cisco 36xx router for CAMA trunks | Cisco 36xx router with CAMA trunks |
| Vendor of Choice | Cisco | Cisco | Cisco |

**Definition**

Level I – campus locations with phone users from 1- 100
Level II – campus locations with phone users from 101 to 500
Level III – campus locations with phone users of 501 to 1500

**Terminology**

**Cisco MCS-7835-1000 -** The Cisco Media Convergence Server 7835-1000 (MCS-7835-1000) is a high-availability server platform for Cisco AVVID. The MCS-7835-1000 delivers the high performance and availability demanded by today's enterprise

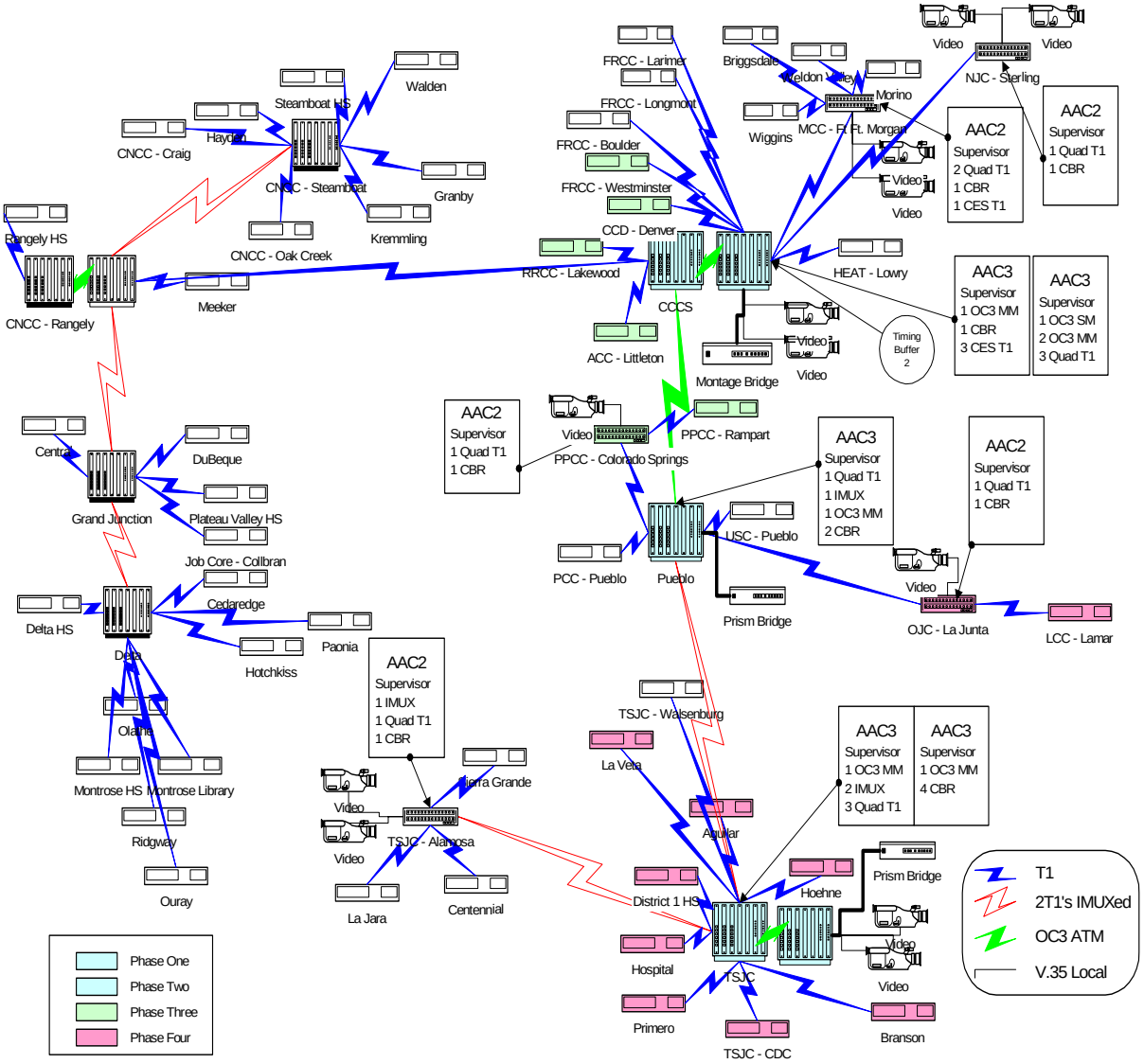
networks. At only 3U high, the MCS-7835-1000 packs tremendous power in a low-profile chassis that minimizes rack space.

**Call Manager –** The Cisco Call Manager is the intelligent call-processing software component of the Cisco AVVID (Architecture for Voice, Video and Integrated Data). Installed to highly reliable servers, Cisco Call Manager provides signaling and call control services to Cisco integrated multimedia applications as well as third-party applications. The benefit to the enterprise customer is industry-leading scalability and system availability. The architecture also sets the stage for next generation integrated web, voice, video applications - enhancing the ability of the enterprise to deliver customer care solutions through multiple media.

**Cisco Unity -** Cisco's Unity delivers all your messages into a single inbox, giving you the freedom to access and manage every voice, fax, and e-mail with the click of a mouse, or the push of a button. You can listen to your e-mail over the telephone, check voice messages from the Internet, and forward faxes to wherever you may be. Cisco Unity makes communication instant, convenient, and efficient. Cisco Unity also offers voice messaging with robust automated attendant functionality, intelligent routing, and easily customizable call screening and message notification options.

**Cisco IP IVR -** Cisco IP IVR is an IP-powered interactive voice response (IVR) solution that provides an open, extensible, and feature-rich foundation for the creation and delivery of IVR solutions via Internet Technology. Cisco IP IVR automates the handling of calls by autonomously interacting with users. The IP IVR processes user commands to facilitate command response features such as access to checking account information or user-directed call routing. The IP IVR also performs "prompt and collect" functions to obtain user data such as passwords or account identification. Additionally, the Cisco IP IVR can extract and parse Web-based content and present this data to customers via a telephony interface, thus facilitating the delivery of Web-maintained information to a voice media user. Designed to operate upon the Cisco AVVID (Architecture for Voice, Video and Integrated Data) architecture, the Cisco IP IVR product is constructed specifically to exploit the power of IP-based communications.

# Exhibit # 5 WAN



## Exhibit # 6 Software Pool

| Software Purchase Pool | Estimated Costs |
|---|---|
| MS Campus License Agreement | $188,000.00 |
| Terminal Emulation | $45,000.00 |
| Liberty | $25,000.00 |
| WebCt | $21,000.00 |
| Blackboard | $21,000.00 |
| Academic Systems | $200,000.00 |
| **Total Software Purchases --->** | **$500,000.00** |

## Exhibit # 7 Colorado's Community Colleges


COMMUNITY COLLEGES

1. Arapahoe Community College
2. CCCOnline
3. Colorado Northwestern Community College
4. Community College of Aurora
5. Community College of Denver
6. Front Range Community College
7. Lamar Community College
8. Morgan Community College
9. Northeastern Junior College
10. Otero Junior College
11. Pikes Peak Community College
12. Pueblo Community College
13. Red Rocks Community College
14. Trinidad State Junior College
15. Higher Education & Advanced Technologies (HEAT) Center at Lowry


LOCAL DISTRICT COMMUNITY COLLEGES

16. Aims Community College
17. Colorado Mountain College

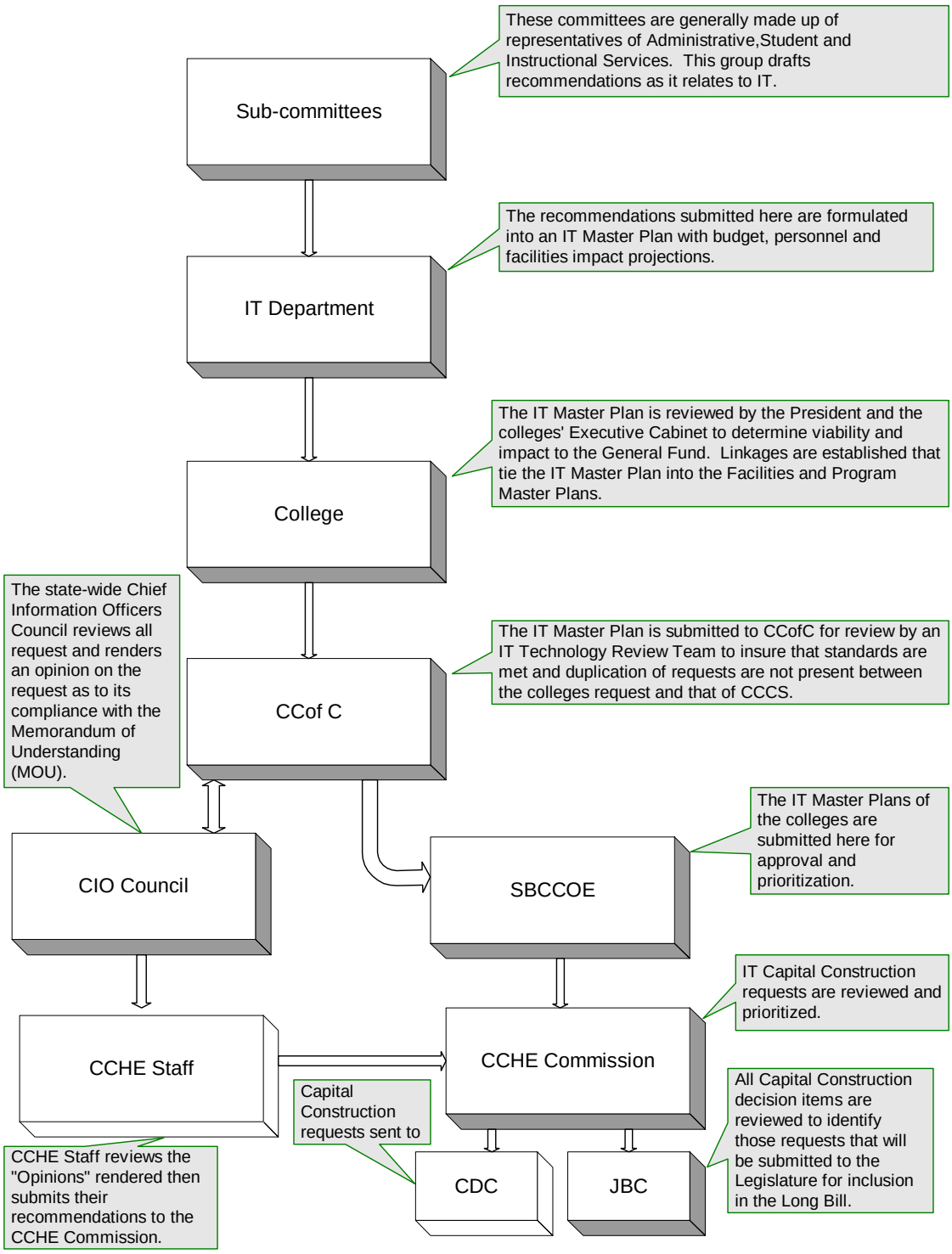
AREA VOCATIONAL SCHOOLS

18. Delta-Montrose
19. Emily Griffith Opportunity School
20. Pickens Tech Center
21. San Juan Basin Area Vocational-Technical School

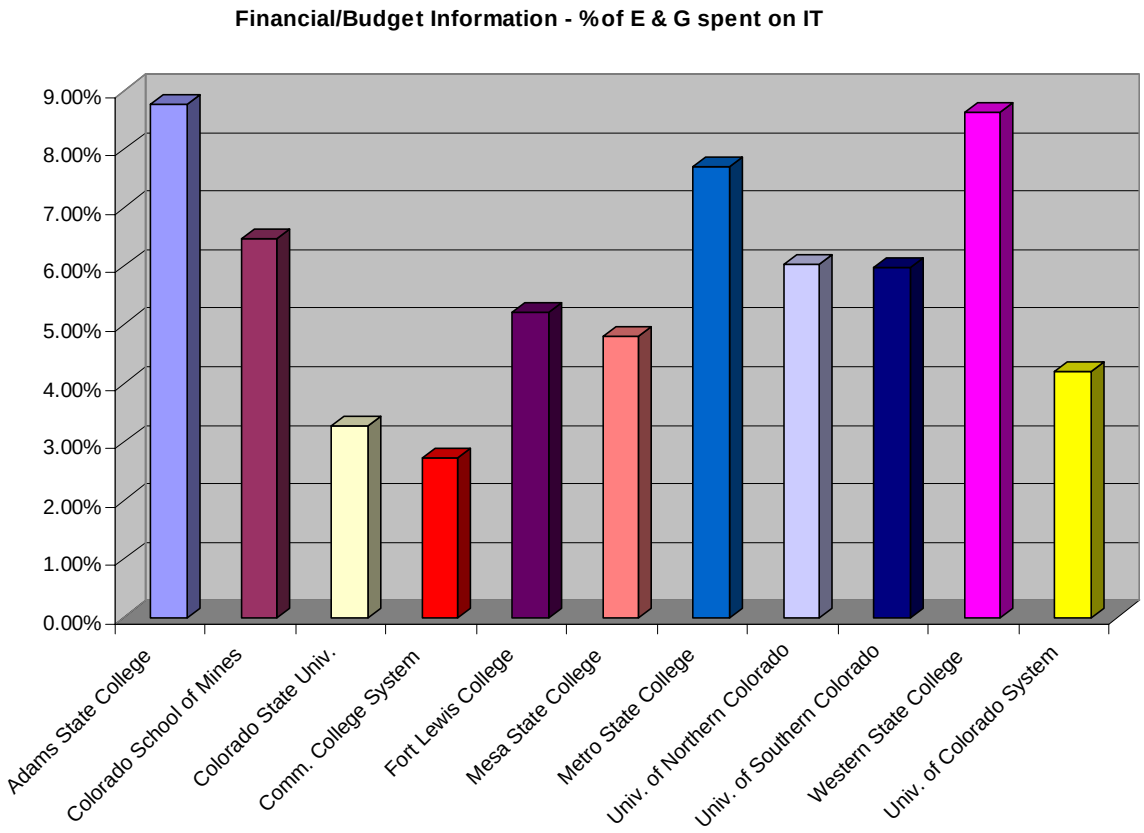


COMMUNITY COLLEGES OF COLORADO

# Exhibit # 8 IT Capital Construction Request Process



## Exhibit # 9 Comparative Budgets across Higher Education



## Exhibit # 10 H.323 Implementation Schedule

| College | Start Date |
|---|---|
| | |
| ACC | |
| CCA | |
| CCCS | July, 2002 |
| CCD | |
| CNCC | 6 mo. After start |
| FRCC | |
| LCC | |
| MCC | |
| NJC | |
| OJC | |
| PCC | 6 mo. After start |
| PPCC | |
| RRCC | |
| TSJC | 6 mo. After start |

## Exhibit # 11 Desktop Hardware Standards

### Recommended Configurations

| | **$ 950.00** | **$ 1,200.00** | **$ 1,750.00** |
|---|---|---|---|
| **Specifications** | **Level I** | **Level II** | **Level III** |
| Chipset: motherboards must be the same p/order | 810 | 815 | 820 |
| Processor | Pentium III | Pentium III | Pentium III |
| Speed | 800 Mhz | 1.0 Ghz | 1.5 Ghz |
| Power | 180 watt w/4 drive connection | 180 watt w/4 drive connection | 180 watt w/4 drive connection |
| RAM | 128 mb | 128 mb | 256 mb |
| Monitor Size | 17” | 17” | 17” |
| Monitor Resolution | 1024x768 26m | 1024x768 26m | 1024x768 26m |
| Energy | EPA Energy Star compliant and FCC class B approved | EPA Energy Star compliant and FCC class B approved | EPA Energy Star compliant and FCC class B approved |
| CD | 20/48x CD | 20/48x CD | 20/48x CD, DVD |
| Floppy | 3.5”, 1.44mb | 3.5”, 1.44mb | 3.5”, 1.44mb, ZIP |
| Hard Drive | 10gb | 20gb | 30gb |
| Network Adapter | 3COM 905B 10/100 | 3COM 905B 10/100 | 3COM 905B 10/100 |
| Video Card | Std. 4mb | Std. 4mb | Std. 4mb |
| Sound Card | Sound Blaster compatible | Sound Blaster compatible | Sound Blaster compatible |
| Operating System | 2000 | Windows 98 | Windows 98,2000 |
| Mouse | Standard PS/2 2-button | Intellimouse | Intellimouse |
| Keyboard | Standard 104+ | Standard 104+ | Standard 104+ |
| Ports | | | USB required |
| Expansion Slots | 2 | 2 | 3 |
| Bays available | 1 | 1 | 2 |
| Desktop Management | DMI Compliant | DMI Compliant | DMI Compliant |
| Shipping | Included | Included | Included |
| Tech Support | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. |

All systems must come with original hardware documentation and support software on CD and/or diskette.

All systems must be Plug-n-Play compliant.

All systems must be built with identical components

In some circumstances, there will be a need to support additional hardware and these should be considered for funding based on the justifications presented by the requesting department. These items are (but not limited to) the following:

- Flat Screen monitor
- Trackballs
- Other ADA peripherals
- Disk Imaging
- Installation Costs
- 19”/21” monitors
- Software add-ons
- Dual Processors
- Jazz Drives
- Tape Drives

## Exhibit # 12 Laptop Standards

**Recommended Configurations**

| | **$ 2,000.00** | **$ 2,500.00** | **$ 3,250.00** |
|---|---|---|---|
| **Specifications** | **Level I** | **Level II** | **Level III** |
| Chipset: | 440BX | 440BX | 440BX |
| Processor | Pentium III | Pentium III | Pentium III |
| Speed | 400 Mhz | 400 Mhz | 600 Mhz |
| RAM | 128 mb | 128 mb | 256 mb |
| Monitor Size | 10” | 12” | 15” |
| Monitor Resolution Active Matrix | 1024x768 26m | 1024x768 26m | 1024x768 26m |
| CD | 20/48x CD detachable | 20/48x CD integrated with floppy | 20/48x CD, DVD integrated with floppy |
| Floppy | 3.5”, 1.44mb detachable | 3.5”, 1.44mb | 3.5”, 1.44mb |
| Hard Drive | 6gb | 12gb | 20gb |
| PCMCIA slots | 1 | 2 | 2 |
| Ethernet PCMCIA | Zircom 10/100 | Zircom 10/100 | Zircom 10/100 |
| Operating System | Windows 98,2000 | Windows 98,2000 | Windows 98,2000 |
| Keyboard | Full Size | Full Size | Full Size |
| USB Ports | 1 | 1 | 1 |
| Fax/Modem | V.90 56K | V.90 56K | V.90 56K |
| Battery | Trickle Charge 2hrs | Trickle Charge 2hrs | Trickle Charge 2hrs |
| Carrying Case | Standard | Standard | Standard |
| Shipping | Included | Included | Included |
| Tech Support | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. | 3 yr parts to be consistent for all 3 yrs for CPU, monitor and all factory installed peripherals. |

All systems must come with original hardware documentation and support software on CD and/or diskette.

In some circumstances, there will be a need to support additional hardware and these should be considered for funding based on the justifications presented by the requesting department. These items are (but not limited to) the following:

- Docking Station
- Port Replicators

- Mouse
- Monitor
- Spare Battery

| | **$ 300.00** | **$ 1,500.00** |
|---|---|---|
| **Specifications** | **Level I** | **Level II** |
| | | |
| Pages per minute | 10 | 32 |
| RAM | | 128 |
| Network Ready | | Yes 10/100 |
| Printer Control Language | | PCL 5/6 |
| Standard Vendor | HPDJ970Cxi | HP 4050N |
| | | |

Although these two classes of printers should accommodate the needs of most end-users, there will be times when specialized printers/or additional add-ons will be needed. These requests should be considered for funding based on the justifications presented by the department.

These items are (but not limited to) the following:

- Postscript capabilities
- Multiple input trays
- Color Printers
- Impact printers
- Plotters
- Duplexing capabilities
- Combining functions such as :scanning, faxing & copying

**Minimum Configurations**

| Specifications | Level I | Level II |
|---|---|---|
| Protocol | EIGRP | EIGRP |
| Modular for future growth | 3640 | 7206VXR w/NSE-1 processor |
| Ethernet Interfaces | 2 | 2 |
| Dual power supplies | No | Yes |
| Memory | | 128 |
| Packets per second | 50-70kb/second | 400kb/second |
| Upgradeable to voice | Yes | |
| | | |
| Vendor of Choice | Cisco | Cisco |

**Definition**

Level I – campus locations with headcounts from 1- 500
Level II – campus locations with headcounts of 500+

**Terminology**

**EIGRP** - The Enhanced Interior Gateway Routing Protocol integrates the capabilities of link-state protocols into distance-vector protocols. It incorporates the *Diffusing-Update Algorithm* (DUAL) developed at SRI International by Dr. J.J. Garcia-Luna-Aceves.

## Exhibit # 15 Switch Standards

**Recommended Configurations**

| Specs | Level I | Level II | Level III | Level IV |
|---|---|---|---|---|
| MDF only | Catalyst 3524 Powered | Catalyst 3524s or Catalyst 4006 | Catalyst 65xx (one or two depending on redundancy requirements) | Catalyst 65xx (one or two depending on redundancy requirements). |
| VoIP | Powered Catalyst 3524s | Powered Ethernet line cards | Powered Ethernet line cards | |
| Layer Three | Not required | May be required Catalyst 3550/4908 L3 | 6509 MSFCs Primary and Redundant | 6509 MSFCs Primary and Redundant |
| MDF w/IDFs | Assume 24 ports all in MDF | Catalyst Powered 3524 and 3550. | Catalyst 65xx in MDF 65xx at distribution layer and Catalyst 400x or 35xx at access layer depending on port counts and growth | Catalyst 65xx in MDF 65xx and at distribution layer and Catalyst 400x or 35xx at access layer depending on port counts and growth |
| VoIP | Powered Ethernet line cards | Powered Ethernet line cards | Powered Ethernet line cards | Powered Ethernet line cards |
| Vendor of Choice | Cisco | Cisco | Cisco | Cisco |

**Definition**

Level I – campus locations with data drops from 1- 24
Level II – campus locations with data drops from 25-120 (single subnet)
Level III – campus locations with data drops of 120 – 500
Level IV - campus locations with data drops of 500+

**Baseline Configurations**

| Description | Desktop | Server |
|---|---|---|
| | | |
| Backups | | |
| Browsers | MS Internet Explorer or Netscape Communicator | |
| Electronic Imaging | Liberty | |
| Email | Outlook | |
| Graphic Arts | Corel Draw | |
| Integrated Office Suite | MS Office 2000 | |
| Operating Systems | Windows 98,NT,2000 | Windows 2000 |
| Relational Database | MS Access | MS SQL 7.0 |
| Terminal Emulation | Reflections | |
| Tools | MS Visio | |
| Viewer | Adobe Acrobat | |
| Virus Protection | Trend Micro | Trend Micro |

There will be situations where additional software will need to be loaded on individual desktops. Every effort should be made to standardize those needs. An evaluation should be conducted on these items to find the “Best Fit” as it relates to TCO.

## Exhibit # 17 Cabling

**Recommended Configurations**

| Description | Within Building | Between Buildings |
|---|---|---|
| | | |
| Copper cable | Category 5e/6 | |
| Fiber Optic cable | 4 strand per room | 24 strand |
| Patch panels | | |
| Office outlets | | |
| Labeling | Within 12” of both ends following documented college standards | Within 12” of both ends following documented college standards |
| | | |
| | | |

## Exhibit # 18 Wireless

**Recommended Configuration**

The Community Colleges of Colorado have adopted the CISCO Aironet Wireless solution for all wireless LAN access. This equipment is IEEE 802.11b compliant. The 802.llb standard is for networks that will be running at 11 meg per second. The latest level of standard that we are looking at is the IEEE 802.11a, which is rated at 56 meg per second. We are recommending that purchases of new wireless equipment have the dual ability to process under 802.11b and 802.11a. No other wireless devices should be attached to a LAN without the approval of CCofC.

It is recommended that there be one (1) access point for every 25 users.

The CCCS networking team will continually evaluate the latest technology and therefore any purchases of wireless equipment should be preceded by a call the networking team.

## Exhibit # 19 Projected Cost Savings - Software

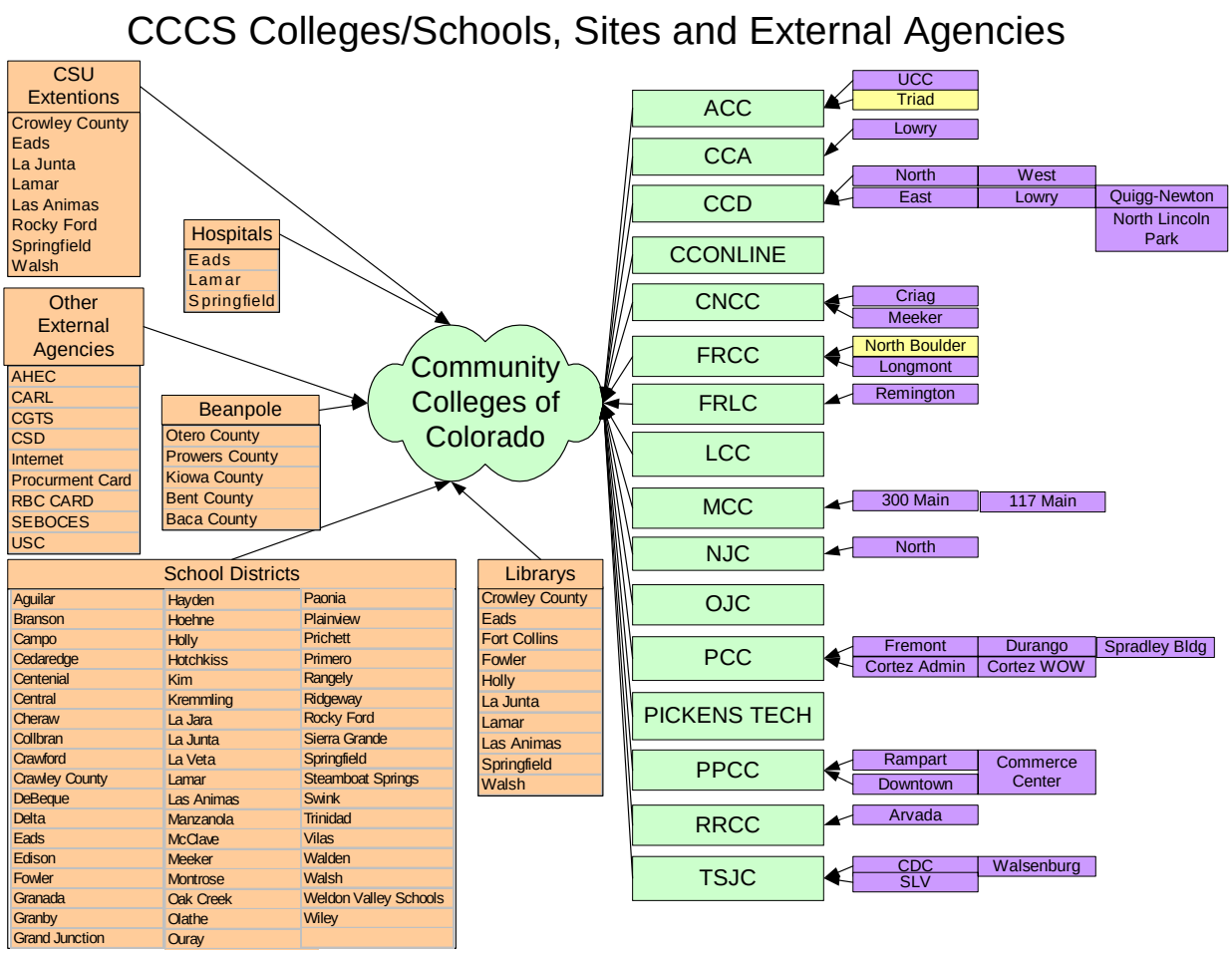
## Exhibit # 20 VoIP Implementation Schedule

*** Note ***

A detailed implementation schedule will be developed once the funding for this initiative has been funded. Meetings will need to be scheduled with each college to determine the lifecycle of their PBX and identify replacement dates.

| College | Date existing PBX was installed | Projected Start Date | Projected Completion |
|---|---|---|---|
| | | | |
| ACC | | | |
| CCA | | | |
| CCCS | | July, 2002 | |
| CCD | | | |
| CNCC | | Complete | |
| FRCC | | | |
| LCC | | | |
| MCC | | | |
| NJC | | | |
| OJC | | | |
| PCC | 1993 | July, 2003 | |
| PPCC | | | |
| RRCC | | | |
| TSJC | | | |

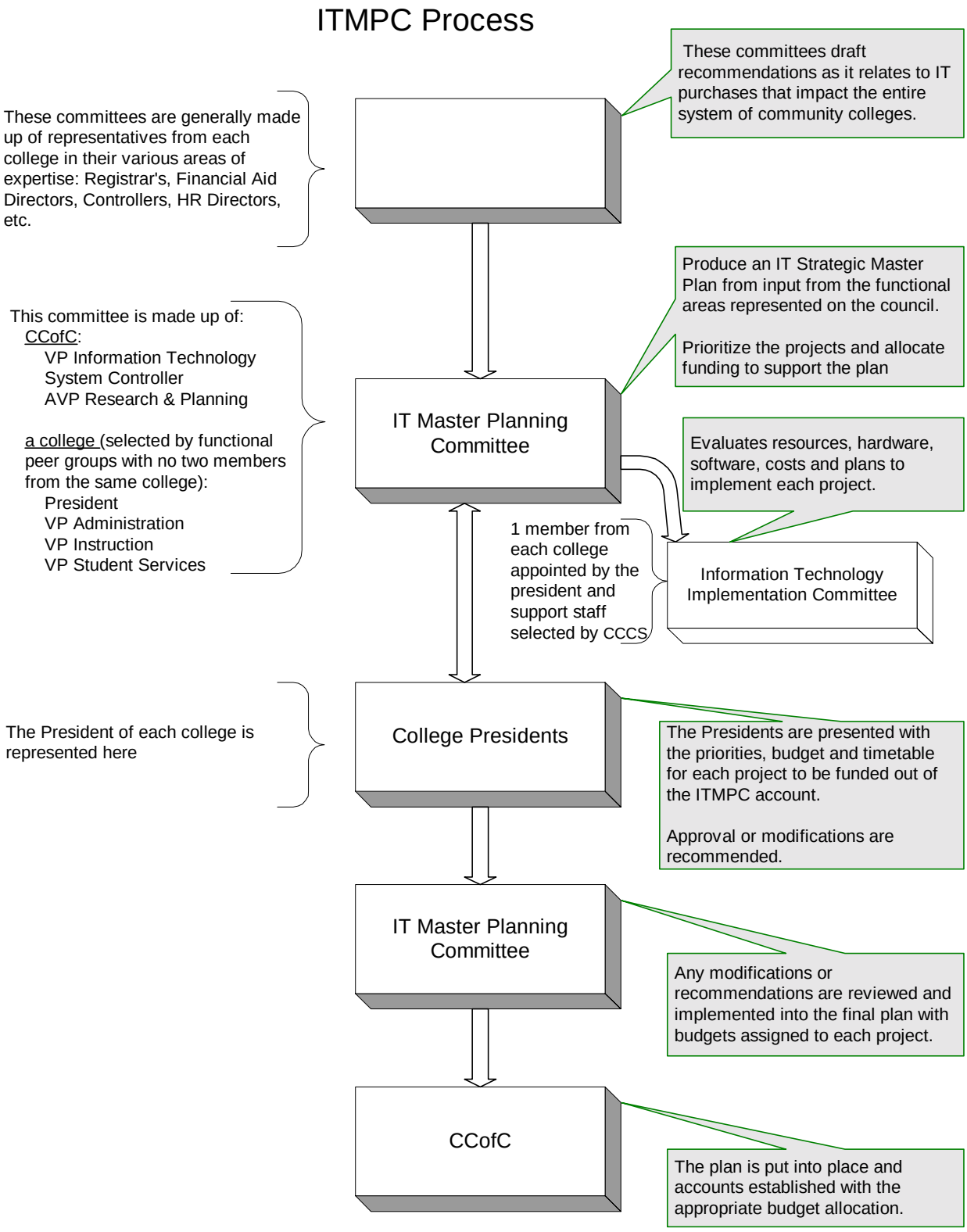
## Exhibit # 21 CCCS Affiliated Agencies



## Exhibit # 22 Timelines

| Project Description | July | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | June | Purpose |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Survey | | | | | | | | | | | | | Send out the annual Technology Survey to "inventory" what each college has in place. Formulate this into a "Data Analysis" report. |
| Define System-wide Objectives | | | | | | | | | | | | | Identify specific system-wide initiatives. These will be forwarded to the ITMPC. |
| Colleges Develeop and/or Modify IT Plan | | | | | | | | | | | | | Each college will be reviewing their IT Plans and making modifications for this next fiscal year. |
| Associate budgets with objectives | | | | | | | | | | | | | Identify the budget and source of funding that will be needed to implement each objective. |
| Review CCofC IT Objectives w/ITMPC | | | | | | | | | | | | | Review each objective and budget request with the ITMPC. This committee will identify which recommendations will go forward. |
| Review Colleges individual IT Plans/Requests | | | | | | | | | | | | | CCCS will review each IT Master Plan to insure completeness of the requests as it relates to: Infrastructure, Administrative & Instructional Computing and Training. |
| Submit IT Plans to SBCCOE for approval | | | | | | | | | | | | | The CCofC VP Finance will submit colleges IT Master Plan for board approval. |
| Submit IT Technology Requests to CIO Forum | | | | | | | | | | | | | The CIO Forum will review requests from all of Higher Education to insure the validity of the requests. |
| Modifications if need to College's IT Plan and Capital Request | | | | | | | | | | | | | Recommendations will be made to each college if modifications need to be made. |
| Submit CCofC IT Budget Request to SBCCOE | | | | | | | | | | | | | The individual college's requests will be presented to SBCCOE for approval and final prioritization. |
| Submit IT Requests to CCHE | | | | | | | | | | | | | All IT Plans will be submitted to CCHE for review, prioritization and formal request for funding from the state. (**see 4.30 of OIT Policy**) |

## Exhibit # 23 ITMPC Process



# Exhibit # 24 CCCS Affiliated Agencies @ Lowry

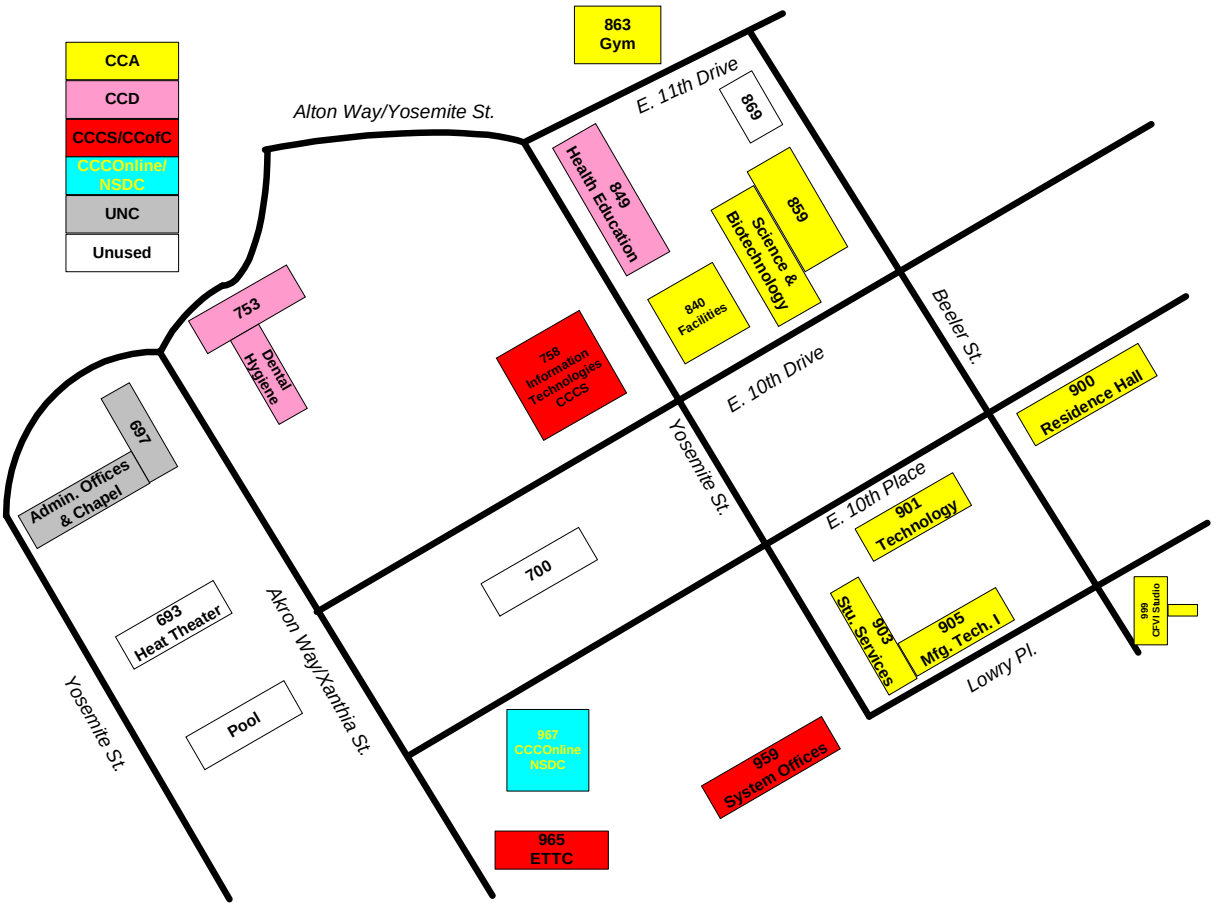
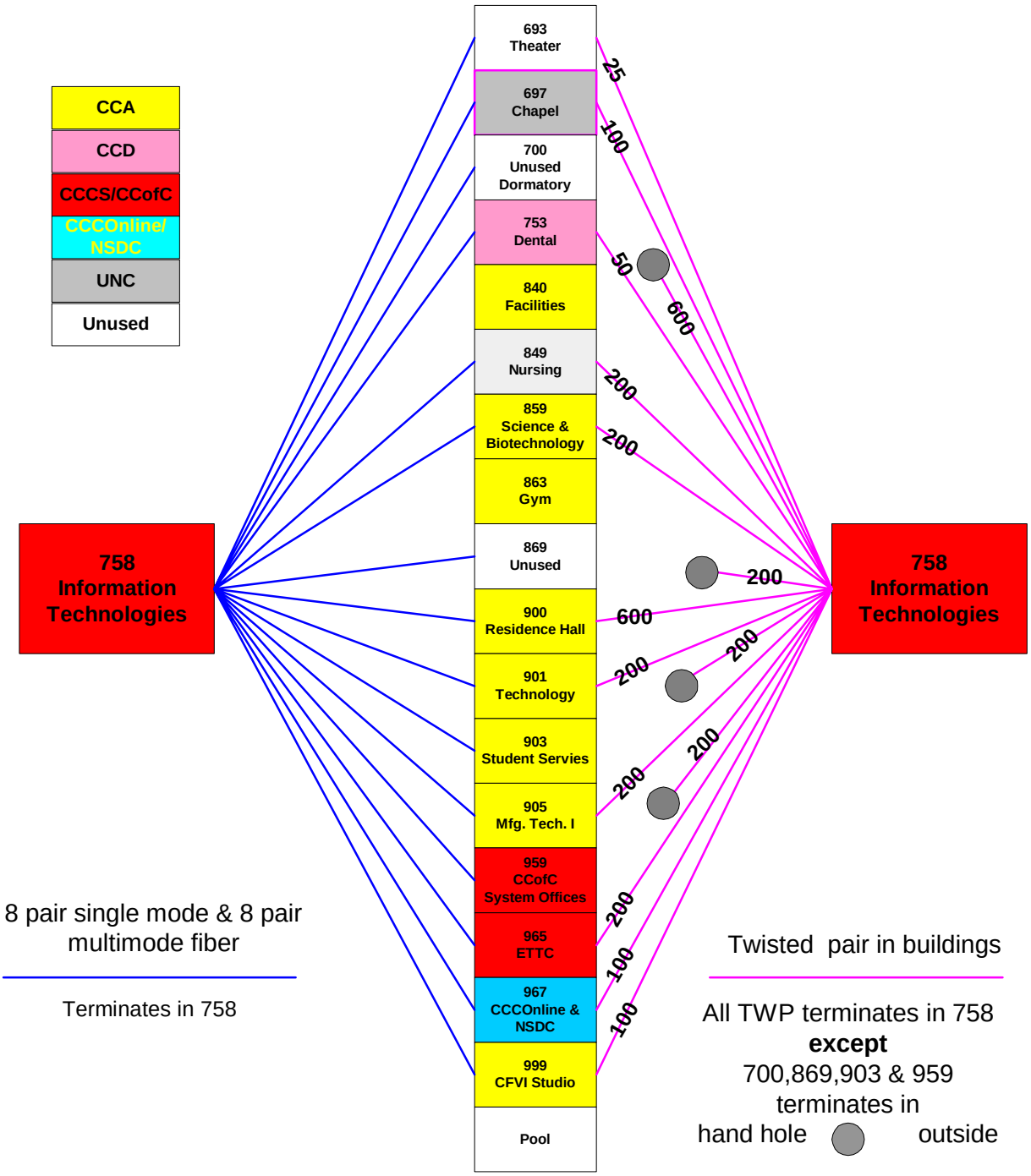


**Exhibit # 25 Wiring Infrastructure**

# Fiber & TWP overview of the Lowry Campus




8 pair single mode & 8 pair multimode fiber

Terminates in 758

Twisted pair in buildings

All TWP terminates in 758 **except** 700,869,903 & 959 terminates in hand hole outside

# Glossary of Terms

| | |
|---|---|
| ADA | American Disabilities Act |
| AHEC | Auraria Higher Education Center |
| CCCS | Community Colleges' Computer Services |
| CCCOES | Colorado Community College & Occupational Education System |
| CCofC | Community Colleges of Colorado |
| EIGRP | Enhanced Interior Gateway Routing Protocol |
| FAQ | Frequently Asked Questions |
| H.323 | A particular national standard for Video |
| IDF | Intermediate Distribution Frame |
| IP | Internet Protocol |
| ISP | Internet Service Provider |
| IT | Information Technology |
| JIT | Just in Time |
| LAN | Local Area Network |
| MCU | Multipoint Conferencing Unit |
| MDF | Main distribution Frame |
| PDQ | Position Description Questionnaire |
| RAS | Remote Access Server |
| UPS | Un-interruptible Power Supply |
| VoIP | Voice over IP |
| VPN | Virtual Private Network |
| WAN | Wide Area Network |

## Partners of the Community Colleges of Colorado








## Review & Acceptance of IT Master Plan

This Information Technology Master Plan has been reviewed and approved by the following for CCCS:

___/___/_____
Dr. Joe May Date
President

___/___/_____
George Delaney Date
VP Finance and Administration

___/___/_____
Don Williamson Date
VP Information Technologies

___/___/_____
Marybeth Susman Date
VP Educational Services

This Information Technology Master Plan for CCCS has been reviewed and approved by the following for SBCCOE:

___/___/_____
Greg Romberg Date
Chairperson