

Continental Cablevision, Inc. Enterprise-Wide Information Technology Group 1996 Business Plan

Table of Contents	Page
Section One Executive Summary	2
Section Two..... Customer Care Technologies	8
Section Three..... Data Warehouse Initiative	23
Section Four..... Legacy Subscriber Management Systems Support	28
Section Five..... Digital Research & Development	34
Section Six Network Services and Telecommunications Support	39
Section Seven..... Research & Development Technology Lab	45
Section Eight..... Enterprise-Wide Information Technology Initiatives	51
Section Nine Enterprise-Wide Technology Architecture	63
Index	73

Section One

Executive Summary

Executive Summary

The Continental Cablevision Enterprise-Wide Information Technology Group 1996 Business Plan presents the services and projects that the group will deliver in 1996. A brief summary of the highlights of this plan is outlined below.

Customer Care Technologies

The lines between cable, telephony and general information services are quickly merging. Customer care as a source of competitive differentiation has been embraced by Continental managers, and the relationship between customer satisfaction and loyalty is widely understood. However, fully exploring the customer care (i.e., customer intimacy) strategic dimension has required launching a major technology initiative that is aimed at reengineering CCI's customer service capabilities.

Continental Cablevision must replace today's subscriber management systems in order to offer new and competitive services in a timely and cost effective manner. The independent analysis prepared in 1995, now known as the SMS Gap Study, compared CCI's current legacy systems to all known, capable subscriber management systems. This extensive three month study included interviews with CCI senior managers, a site visit to England's Birmingham telephony/cable television system, reviews of CCI's current functional requirements and the functionality required to run the convergence-like environment of CCI's Australian venture, Optus Vision. This process ended with the selection of CSG Systems, Inc. for the core billing system. Since July 1995, CCI has been building a robust document detailing requirements for cable television billing, including options and infrastructure to support the business lines of telephony and high speed data.

The new initiative, called "CCES" - Continental Customer Expert System - will integrate a variety of technologies, tools and information into the work environments of CCI customer contact, and contact support personnel. The basic building block of CCES from a customer care perspective will be a state-of-the-art multi-media workstation that will be utilized by CSRs. At the workstation, a wide variety of powerful software tools will be integrated in a manner that will allow CSRs to provide competitive levels of customer care while improving individual performance levels.

This enterprise-wide solution to subscriber management includes desktop, network and infrastructure, encompassing the workstation through to the back-end servers that will hold CCI's databases. Through its project management office, CCI is acting as the general contractor to combine best-of-breed technologies into the new venture called CCES. By bringing together this group of vendors, CCI will have a system that can handle billing and customer management needs into the next century.

Data Warehouse Initiative

In order to offer new and competitive products and services to its customers, CCI must provide better access to current and historical information, including both transaction and customer profiles. The Data Warehouse Initiative is CCI's endeavor to meet the strategic and operational information needs of the business users in both the field and the corporate office.

CCI's data warehouse will be comprised of regional data warehouses and area-specific satellite databases called data marts, containing data that meet the individual needs of its intended business area users. The data warehouse will be designed to retain historical data and manage summary and aggregate values. In addition, the data warehouse development process will allow users to evaluate a suite of tools or interfaces that can be used to analyze, summarize, interrelate and correlate data in a variety of ways and forms.

Eventually, the data warehouse can be used to provide data for all levels of the organization. The data warehouse will be introduced in phases, by region throughout 1996. The Data Warehouse Project team has also embarked on the development of two additional data access and reporting systems called OLR (Off-Line Reporting) System and PAY80 (DDPF) Automated Reporting System. These systems will provide field users with added data retrieval and reporting capabilities without the development lead time of the warehouse. These systems will also be introduced by region in phases, with an expected completion of June 1996.

Legacy Subscriber Management Systems Support

Supporting and maintaining today's legacy subscriber management systems is critical to the continued success of CCI nationwide. Five data centers, strategically located across the country, provide help desk, account management, operational, and software development support to CCI systems 24 hours a day, seven days a week. The on-going challenge remains the allocation of necessary resources to these systems and users to ensure the continued protection of CCI data assets, generation of revenue, as well as to take advantage of new business opportunities as required by regional business strategies. This challenge, coupled with working in parallel to develop improved support strategies, implement new technologies and infrastructure in preparation for the deployment of CCES, defines the 1996 business plan for CCI's data centers.

Supporting and maintaining the legacy subscriber management systems developed by CableData, Inc. (DDP/SQL), Colony Communications, Inc. (EAZY) and CCI's in-house Subscriber Account Management (SAM) remains the cornerstone initiative of CCI data centers. Planned database consolidations and conversions will assist in laying the foundation for the eventual migration to CCES. Additional, essential projects are in scope for 1996 including the development and implementation of disaster recovery plans, expansion of local area networks, roll-out and support of new CSR workstations and administration of a new enterprise-wide hardware technical support agreement.

The research and testing of digital broadcast and interactive television will enable CCI to maintain its leadership in cable technology and to provide better support for implementations of these technologies as they mature. This project will research digital broadcast and interactive services and evaluate their potential for deployment in CCI service areas, particularly for revenue generating applications. To overcome the current inefficiencies in scheduling and billing for the Cable Ads business, CCI will research and develop solutions. These projects will be ongoing throughout 1996.

Network Services and Telecommunications Support

A robust but closely managed network is critical to support CCI's growth initiatives. To that end, CCI will implement a Network Business Support System (BSS) to manage and support the CCI enterprise-wide network, broadband services and telephony offerings, thus providing a stable infrastructure for CCI's business needs. The Network Operations Center (NOC) -- to be completed in the summer of 1996 -- is an integral component of the BSS. The NOC will allow proactive network management and control so that we can anticipate and correct problems before they affect the customer base.

The Network Services group is also charged with designing and implementing LAN/WAN network infrastructure using CCI network standards. Building the backbone for enterprise-wide e-mail is a key deliverable for this group. This enterprise-wide e-mail is the proof that data can flow seamlessly for other efforts such as call center consolidation. As CCI moves toward a more enterprise-wide network vision, the group will ensure that consistent technology standards are used and that its national presence is reflected in reduced pricing for telecommunications services.

Research & Development Technology Lab

Facilitating quality assurance and the development and roll-out of CCES, the Research & Development Technology Lab located in CCI's Richmond, Virginia Data Center is the first of its kind in the cable television industry. Designed to allow full configuration testing of all CCES components in a realistic cable television environment, the lab is a dynamic setup in which CCI and its business partners can freely evaluate and test new technologies.

Primary components of the lab include a real-world headend, CSR workstations, cable plant, plus monitoring equipment to display how the products and services are received in the customer's home.

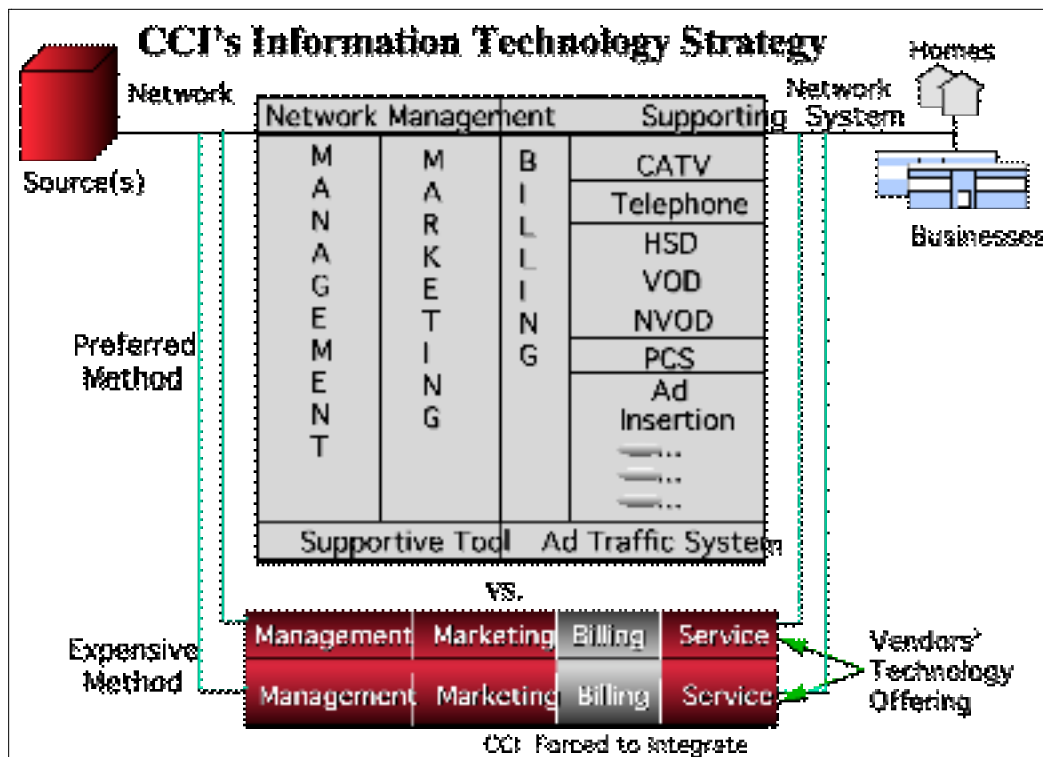
With all the components of a fully functional cable plant and call center office, the lab will allow staff to test new hardware and software, with actual data, and all the necessary equipment. Software developers will test interfaces for advanced services like credit card payment processing and wireless dispatching through in-vehicle terminals. Telephony researchers will be able to place customer calls into a call center environment to test the CSR workstations and telephony interfaces to the new subscriber management system. Addressability experts will have the ability to test and benchmark requirements using the latest technology. In all, vendors will test prototypes and evaluate the best fit for CCI's requirements.

Enterprise-Wide Information Technology Initiatives

CCI's enterprise-wide IT initiatives include Pilot House support, IBM Corporation Multiple Vendor Service (MVS) Help Desk Support, CCI staff assigned to strategic projects and enterprise-wide IT, regional IT liaisons, disaster recovery planning, facilities rentals, consultants for the key initiatives, and funding for IT's strategic plan. Capital is set aside for systems to support new Pilot House software systems such as human resources, inventory, project accounting and project costing.

Enterprise-Wide Technology Architecture

The Enterprise-Wide Technology Architecture provides the vision on which all IT projects are based. It defines the technological landscape, infrastructure, standards, systems development methodologies, and security measures reflecting the latest trends in information technology while providing the strategic environment to direct the overall IT business mission. The many benefits derived from this integrated technology architecture include simplifying the subscriber management system development process, reducing data administration costs, securing excellent price-performance from low-cost, distributed hardware platforms, increasing revenue from current sources, generating new sources of revenue and improving profit margins.



Section Two

Customer Care Technologies

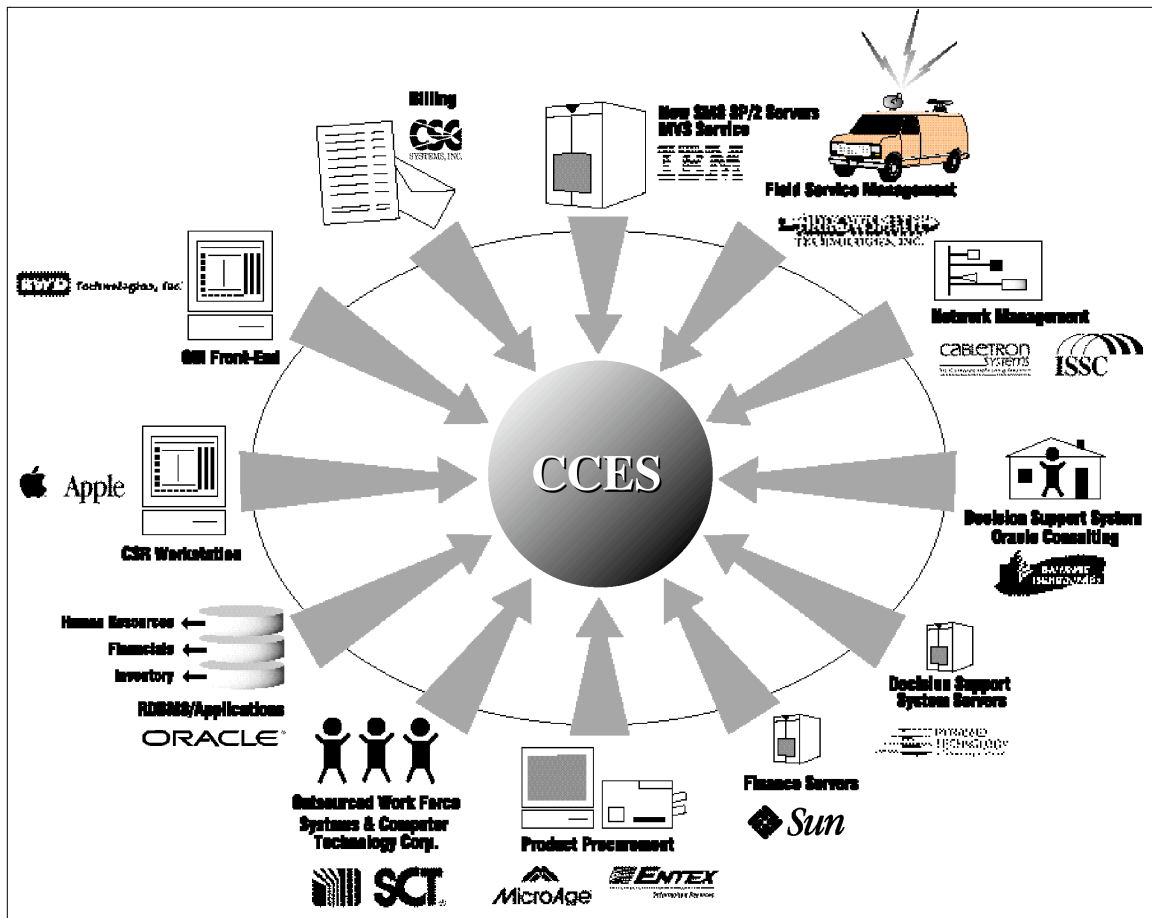
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This enterprise-wide solution to subscriber management includes desktop, network and infrastructure, encompassing the workstation through to the back-end servers that will hold CCI's databases. Through its project management office, CCI is acting as the general contractor to combine best-of-breed technologies into the new venture called CCES. By bringing together this group of vendors, CCI will have a system that can handle billing and customer management needs into the next century.



Call Center Strategic Support

Among the objectives of current CCI call center consolidation efforts are improved customer access, cost reduction and increased revenues from improved transactional marketing. Achieving these goals requires focus on many management areas including human performance, process redesign, performance metrics and technology-friendly systems. As we begin the delivery of these systems to CCI's contact environment through CCES, we will explore both what is technologically possible and best practices in the areas of efficient call handling, management tools, specialized call routing and automation of routine customer information requests.

Future Customer Care

There are many examples of companies creating windows of strategic advantage through the application of technology to anticipate and ultimately shape customer needs (i.e., rental car companies, banks, computer companies, etc.). We see trends in the customer care area toward mass customization and virtual service, where service is available anytime, anywhere, and any way the customer chooses. During 1996 we will combine CCI regional business strategies, competitive capability assessments, customer and technology scans to identify opportunities to enhance customer intimacy and connectivity. Of special interest will be technologies that improve the speed (access, delivery), customer knowledge and empowerment, and proactive delivery of products and services.

Pressure Points

Customer Contact

Professional Perspective

- High level of manual activities and paper processing
- Outdated and inflexible computer system
- Lack of information for customer response
- Poor training methodology

Call Center Manager

Perspective

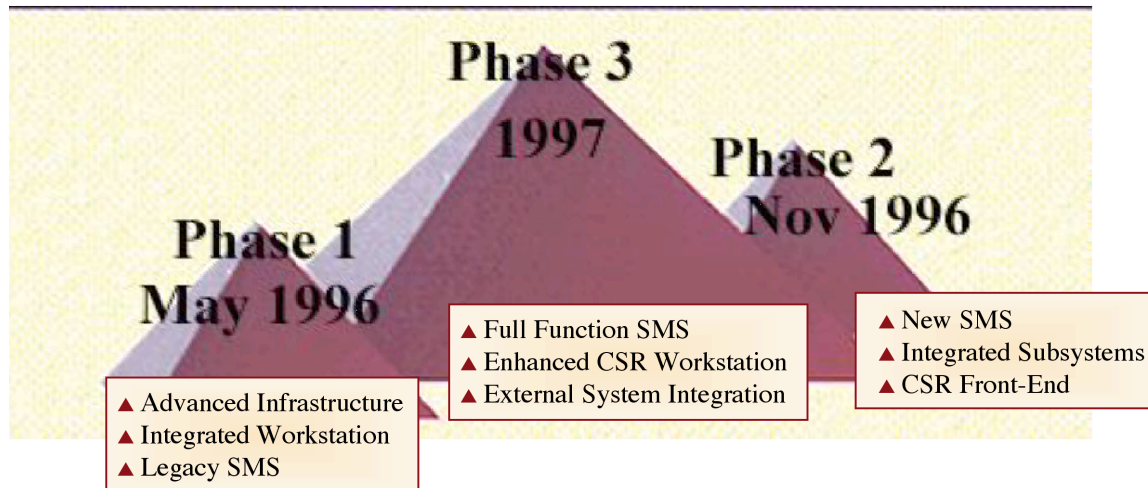
- Flat or declining productivity (cost per call)
- Sub-optimized customer service levels
- Limited focus on revenue opportunities
- Decreasing customer tolerance (i.e., busy signals, hold times, etc.)

Corporate Management

Perspective

- No enterprise level IT infrastructure
- No experience provisioning and billing for voice and data services
- Call Center development in early stages

CCES Project Overview



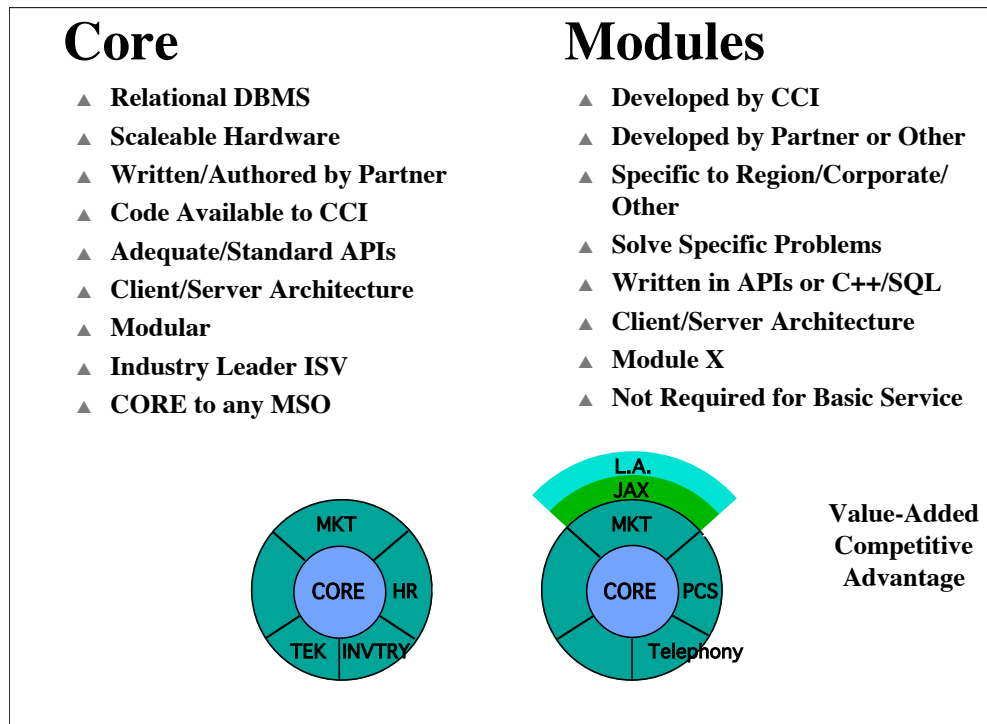
A phased roll-out of CCES is planned, beginning with installation of new integrated CSR workstations May through December. Introducing the system in three phases will help ease the transition to new technology. Via terminal emulation, the new PowerMac workstation provides a window to the legacy subscriber management systems (CableData, Inc., and SAM). This initial deployment, CCES Phase I, begins the transformation to new technology at the desktop.

The new desktop will incorporate multiple sessions of CableData and SAM, and will allow quick selection through scroll bars and pop-up menus. Easy access icons represent site-customized applications, and multi-tasking will be facilitated through new desktop tools such as word processing and spreadsheet applications, electronic mail, video, and an electronic notepad and calculator.

The early roll-out allows the CSR to become familiar with functionality of the PowerMac and the new desktop well before the Phoenix back-end system is deployed. This will minimize dips in productivity during the transition.

In the 4th quarter, Phase II of CCES will involve the database conversion of CCI's Pompano Beach systems from CableData to CSG Systems, Inc.'s new Phoenix back-end. Installation of CCI's newly developed graphical user interface front-end, which will contain 80% of a CSR's functionality, completes the transition from the legacy environment. Following this successful installation, CCES will be implemented throughout all of CCI's cable operations.

Beginning in late 1997, Phase III of CCES will include the more advanced features of interactive training and scripting, high-end interfaces and combined statement capabilities for telephone, data and video. Interactive training will include course work which users will complete at their desks between customer calls and an on-line help system to guide the novice user through to expert level. Also, an intelligent advisor will make recommendations on additional subscriber services and upgrades based on the customer profile.



Business Partners

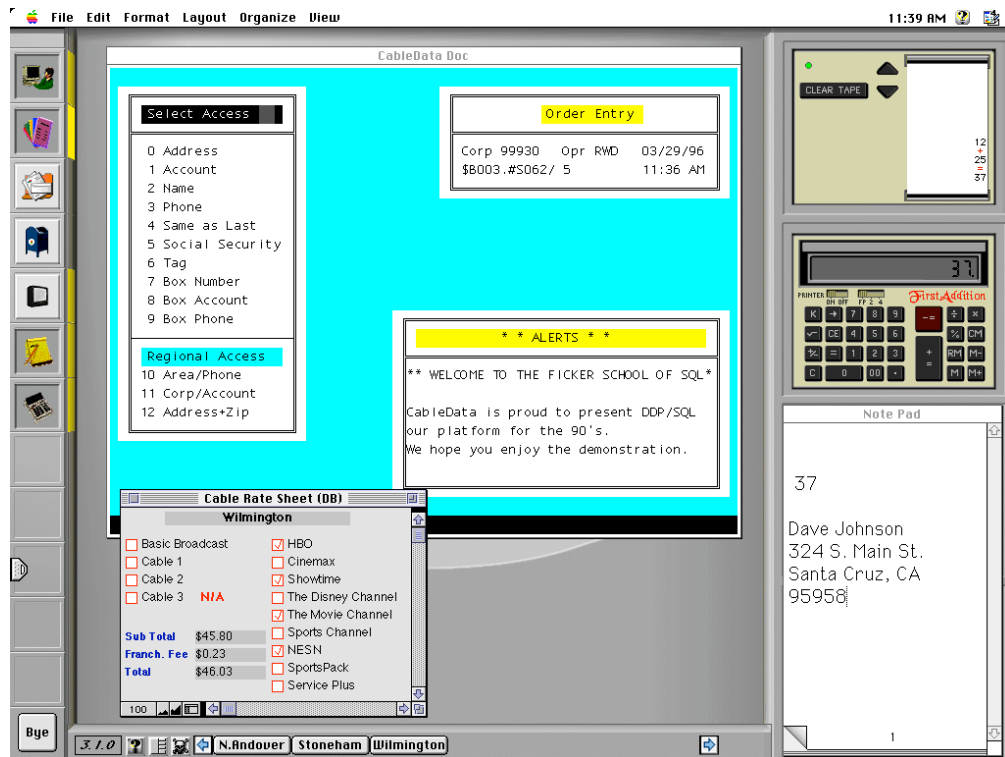
- Apple Computer Inc.
- Arrowsmith Technologies Inc.
- Cable Services Group (CSG Systems, Inc.)
- Cabletron Systems
- Entex Information Services, Inc.
- IBM Corporation
- MicroAge Computer Centers
- Oracle Corporation
- RWD Technologies, Inc.
- Sun Microsystems Computer Corporation
- Systems & Computing Technologies Corporation

Integrated Workstation

The CCES Integrated Workstation blends several key technologies into the Apple PowerMac platform with a CSR-centered graphical user interface developed by RWD Technologies, Inc. This workstation will deliver key technologies into the hands of users as quickly as possible, as CCES during Phase I.

CSRs can jump from one task to another by selecting open windows, or by clicking on one of the site-customized icons arranged on the left side of the screen. While viewing multiple sessions of CableData or SAM, they can use the site-customized function tool bar at the bottom of the screen to simplify tasks such as printing screens, viewing messages, and pasting subscriber information to a notepad or letter. In addition, they can use the video portion to check channel reception or program content, the note pad to jot down reminders, and a calculator to determine special rates.

During the first quarter of 1996 the initial workstation functional design was evaluated by CSRs in several CCI locations in Massachusetts and Virginia. Feedback collected on screen design, workstation issues, technical support requirements, and training requirements has been documented, distributed and used in workstation roll-out planning activities.



Technologies

- Subscriber Management System - The workstation will include terminal emulation to deliver SAM and CableData, Inc. to the workstation
- Automatic Number Identification (ANI) - The workstation will provide ANI to the workstation at sites where it is available and can be delivered via RS232 interface
- Cable Television - The workstation will deliver video to the workstation
- Electronic Mail Access - The workstation will provide access to electronic mail available on the local area network
- Office Automation - The workstation will include office automation tools such as word processing and spreadsheet applications
- CSR - Centered Shell Integration Program - A shell integration will be developed to provide easy access to the key technologies

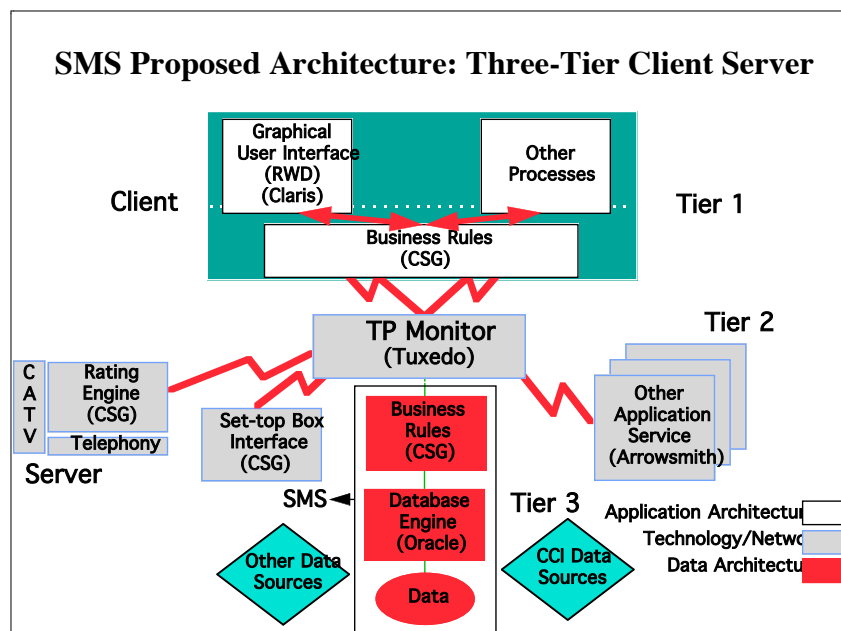
Graphical User Interface

RWD Technologies, Inc. and CSG Systems, Inc. jointly developed an applications programming interface that allows RWD Technologies, Inc. to begin developing the new CSR desktop graphical user interface. This GUI front-end greatly enhances the capacity of CSRs to assist customers in accessing a vast array of new products, services and information using “point-and-click” technology. This front-end will be delivered in the 4th quarter, as part of CCES Phase II. CCI will have access to early releases of CCES for integration, testing, and user evaluation as well as focus group interviews. This front-end is exclusive to CCI; whereas Phoenix is a product sold in the marketplace, the GUI front-end is CCI’s own.

Phoenix Subscriber Management System

CSG Systems, Inc.’s new Phoenix subscriber management system uses open, scaleable client/server technology, from both a software and hardware viewpoint. This allows Phoenix software to provide new solutions in a more timely manner than the current subscriber systems.

A critical element of CCES Phase II is the implementation of Phoenix. Currently under development, the first “beta” release is due July 1996. CCI is testing advance copies of Phoenix beginning with the December 1995 release. In addition, CCI is formulating business rules for Phoenix based on functional requirements compiled by the CCI group, CSG Systems, Inc., RWD Technologies, Inc., and interviews conducted with the CCI business community. Using a sample database, CCI will test each new release of Phoenix and the business rules, as they progress in development.



CCES Benefits

- On-line training, video and scripting capabilities to encompass troubleshooting techniques, product knowledge and sales/marketing promotions
- Anniversary billing for 31 billing cycles, multiple-page customer statements with selective tailorable messages and inserts to target customer interests with marketing offers
- Statement text itemization to ensure easy-to-read and understandable adjustments for monthly charges and pay-per-view purchases
- Support of new technology lines including telephony, Internet, paging services, and standard cablevision services to provide an integrated, full-service approach
- Effective packaging and pricing of customer purchases
- Contract billing of bulk or seasonal accounts including hotels, resorts and apartment complexes
- Screen pops which identify customer telephone numbers and route the customer's account to the CSR screen along with the incoming telephone call
- In-vehicle terminals with receipt printing, signature capture, credit card transactions and inventory management
- Real-time routing of scheduled work based on appointment times, technician availability and skill set, and response time standards.
- Outage detection and monitoring which compares trouble call data with existing plant components for timely dispatch and resolution, working with CCI's network operation facilities
- Support of plant design, engineering and construction initiatives allowing dwelling and plant component data to be input and tracked
- Customer-first focus
- Technology used for leveraging functionality of customer care systems
- Flexibility to quickly respond to market/industry changes and demands
- Lower costs and long term improvement for company-wide initiatives

Milestones

- | | |
|----------------|---|
| December 1995 | • RWD Technologies, Inc. published final Software Requirements Specification and project plan |
| January 1996 | • CSG Systems, Inc. provided first release of Phoenix software to the CCI R&D lab |
| May 1996 | • CCI begins deployment of workstations to CSRs and SP/2 machines to call centers |
| July 1996 | • CSG Systems, Inc. provides CCI with first “beta” Phoenix release |
| September 1996 | • CSG Systems, Inc. provides CCI with second “beta” Phoenix release |
| October 1996 | • RWD Technologies, Inc. provides GUI |
| | • Install first beta release at CCI site in Pompano Beach |
| December 1996 | • CSG Systems, Inc. provides CCI with third “beta” Phoenix release |

Mobile Workforce Management

In today's increasingly competitive cable environment, rising customer expectations and tighter FCC regulations are placing enormous pressure on cable operators to improve their customer service. Sophisticated mobile work force management systems are one answer to the customer service dilemma.

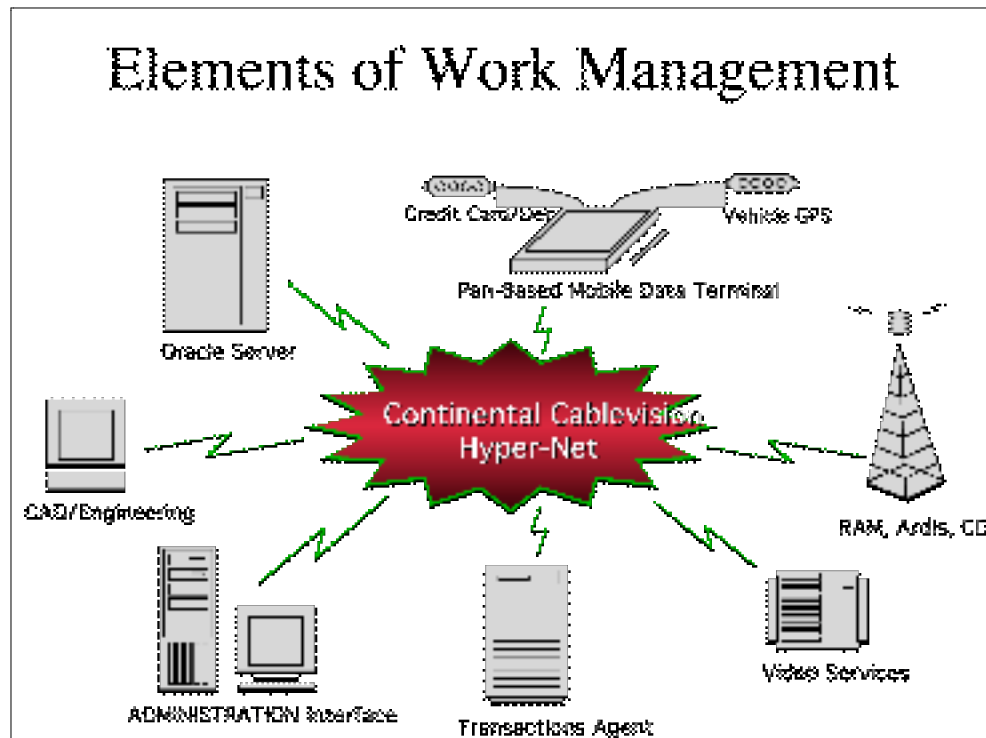
Arrowsmith Technologies Inc. was selected as a critical business partner for the new Subscriber Management System. Based in Austin, Texas, the company will furnish their Fleetcon field operations management system. Fleetcon provides computer-aided dispatch and routing of the service vehicles, a vehicle global positioning system, and mobile data terminals for the technicians. The system will be integrated with CSG Systems Inc.'s Phoenix System. It will also have the ability to interact with the legacy CableData, Inc. system. This will enable CCI to begin realizing the productivity improvements associated with Fleetcon before the CCES roll-out is complete.

Fleetcon uses a Global Positioning System (GPS), satellite signals, and digital map information to track vehicles and route technicians to customers. The dispatcher's screen displays icons that represent vehicle status and current position on a digital map. At a glance, dispatchers and managers can see the entire service fleet spread over the service area and are immediately alerted to problem areas.

Computer-aided dispatch (CAD) technology provides the most efficient schedule in the best sequence. This technology frees the dispatchers to attend to problems that need careful and immediate attention, such as outage declarations, alert situations, and impediments to a smooth workflow. Technicians receive assignments, record information, and communicate with dispatchers using hand-held computer terminals. These terminals reduce two barriers to productivity -- an overload of paperwork and the inability to contact the dispatcher due to crowded radio air waves. The graphical user interface (GUI), along with a two-way interface to the customer billing system, streamlines the work flow process. The resulting increased efficiencies mean lower vehicle operating costs, reduced labor expense, and improved customer satisfaction.

Benefits

- Standardized workforce management systems with aggressive enterprise pricing
- Reduced operating costs
- Increased mobile workforce productivity
- Enhanced customer service
- Improved the quality of management decision making
- Compliance with service time window



The Fleetcon Operations Management System software combines three distinct elements: Base Station Routing and Dispatch Software, the Mobile Data Communications Link, and the Billing System Software Interface.

The technician vehicle interface is composed of the Vehicle Information terminal (VIT), handheld and GPS receiver. The user handheld terminal comes equipped with internal and external bar code reader, printer, credit card scanning and wireless transmission options. The GPS antenna and receiver interface with the technician vehicle and Fleetcon base system to provide real-time position updates.

The standard Fleetcon system software applications include interactive routing and dispatch to allow employee interaction and overrule. The automatic routing and dispatch applications allow for the dispatch employee to engage a sophisticated computer program to dynamically assign existing and new work orders, allowing the dispatcher to evolve into a role of managing the operational exceptions.

Milestones

April 1996

- Validate proposed benefits and productivity improvements
- Sign enterprise-wide contract for base station software and maintenance

May - December 1996

- Develop implementation schedule based on regional budgets, needs, and CCES roll-out schedule

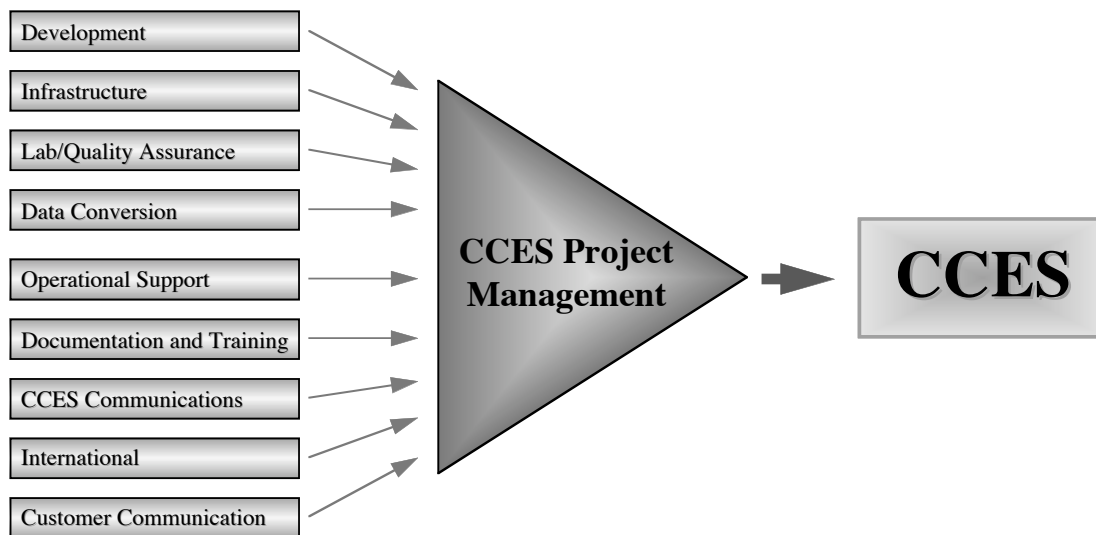
CCES Communications

Critical to the success of the CCES initiative is communication with various internal and external constituencies regarding key plans, developments and activities. In this process, the CCIIt managers and project partners will identify CCES communication opportunities, develop plans, and execute activities with the assistance of various resources. An important contribution will be to ensure alignment of CCES and other corporate and regional activities. Success will be measured by the rate and level of adoption of CCES technologies and related business practices.

Communication activities will be built around the requirements of the CCES development and implementation phases and the unique needs of the various target audiences. Video presentations, press releases, focus group interviews, advisory committees and special event presentations will be tailored for CCI field and corporate audiences as well as for the public.

CCES Project Management

In order to minimize risk, CCI created a full-time project management team with significant experience bringing all projects of this size to successful completion. The CCES project management office oversees every aspect of the CCES project and ensures the cohesive vision of the endeavor. Utilizing and adapting proven methods of management and planning, this office coordinates nine work groups which are responsible for the delivery of the CCES project.



Project management focus includes the creation of an integrated plan for CCES and early identification of obstacles and solutions. The project management office is responsible for maintaining GANT charts on each individual work group as well as the overall project, and weekly reports on project progress are prepared. Project management ensures that CCES is delivered as scheduled.

Section Three

Data Warehouse Initiative

Data Warehouse Initiative

To offer new and competitive services to its customers, CCI must provide better access to transactional and demographic information for senior management, operational management, and corporate and field marketing personnel. This data warehouse initiative is composed of an enterprise-wide data warehouse, satellite databases called data marts, and reporting tools, both access and ad-hoc that are specific to functional areas of the company.

The Data Warehouse Project team has also embarked on the development of two additional data access and reporting systems called OLR (Off-Line Reporting) System and PAY80 (DDPF) Automated Reporting System. These systems will provide field users with added data retrieval and reporting capabilities without the development lead time of the warehouse.

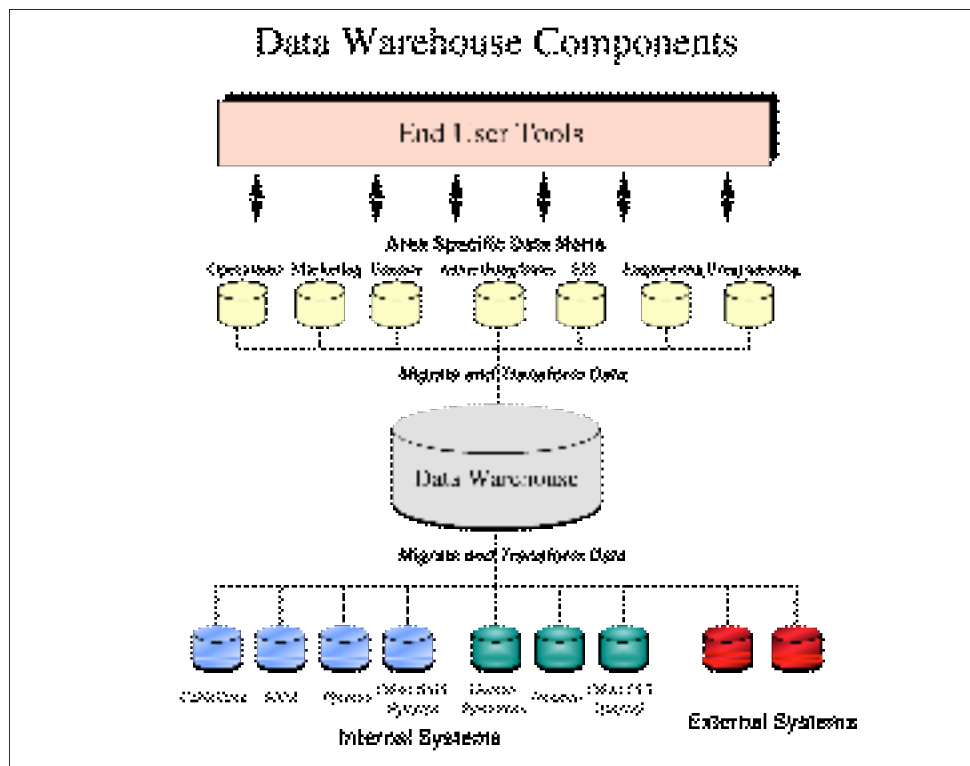
Benefits

- Data aggregation (weekly, monthly, yearly), allowing more customized views of data
- CCI-wide marketing analysis and segmentation to improve competitive advantage
- Data cleansing and validation ensuring more accurate reporting
- Staff time savings—eliminates staff manipulation of raw data
- Field and corporate access to information
- Fast turnaround for new reporting requirements
- Foundation for executive information system
- Open system access to data -- not dependent on any one vendor, application, or technology

Data Warehouse

A data warehouse is a collection point for all organizational data. The data resides in a database structure that is designed specifically to store historical data for analysis. CCI's data warehouse will bring together data from CCI systems such as CCI's in-house SAM system as well as external data sources that can be procured from outside vendors. Demographic data is an example of the type of data that may be purchased from an external vendor and integrated into the data warehouse. The data warehouse provides an opportunity to support users at all levels of the organization with timely and consistent data.

An Enterprise Data Model (EDM) is used to design the data warehouse. This is a description of all data and data relationships that form the business model for a company. Since great effort is needed to create the full EDM and data warehouse, CCI will implement the data warehouse in manageable phases. This approach focuses on delivering incremental solutions to real business needs on a regular basis. It provides an opportunity to refine the design based upon user feedback and to adjust the planned deliverables to meeting changing priorities. Subsets of the data warehouse are called data marts. A data mart is an area-specific database that contains specialized, focused subsets of data from the data warehouse database. The data mart is designed to support the decision-making and reporting needs of a specific business area or discipline. This database can be time-based, location-based or customized to specific target users. Data marts focus the right data to the right places for the right users.



Off-Line Reporting System

The OLR (Off-Line Reporting) System has been developed to provide regional MIS staff and the general CCI user community with more effective access to their region's CableData DDP/SQL data. The data is currently available on Tandem computers that are used for both On-Line Transaction Processing (OLTP) and report generation. A copy of each region's data and the parameters for their existing reports will be maintained on the OLR system. The OLR system will provide the following mechanisms to access the data:

- A collection of report generating programs to reproduce existing DDP/SQL reports
- A collection of programming tools to facilitate the development of new report generating programs by MIS staff, as needed
- A collection of tools to facilitate the investigation of the data by end-users with ad-hoc query and easy to use report formatting capabilities

PAY80 (DDPF) Automated Reporting System

The PAY80 (DDPF) Automated Reporting System will provide regional staff accountants access to their region's CableData PAY80 (DDPF) data via:

- A collection of pre-programmed reports, designed to streamline the functionality of existing DDPF reports
- Screens that have been designed to be used by the staff accountants to customize data from PAY80 (DDPF) and calculate bulk equivalents, subscriber accounts and revenue

In addition, a collection of processes exist that perform the following functions:

- Migrate data from CableData PAY80 (DDPF) product to PAY80 server
- Report scheduler/manager support processes
- Communications processes, used to inform the users about report activity

CCIt has created a team of Corporate Marketing, Oracle Corporation, CCIt, and Database Technologies Inc. personnel to work on the EDM and provide several data marts. Oracle Corporation has been selected as the database manager partner, and Pyramid Technology and Sun Microsystems Computer Corporation will provide the UNIX based hardware for the data warehouse. Database Technologies Inc. has extensive experience in building decision support systems with all three vendors' offerings.

Pressure Points

- Evolving rapidly from a more finite corporate marketing initiative originally designed simply to provide better access to customer information
- Integrating financial information with operational and billing data
- Tying various computer systems together like finance, human resources, payroll, inventory, and billing to provide an enterprise-wide view of CCI
- Providing reporting for the CCES system
- Providing easier and more timely data to external partners and regulatory agencies

Business Partners

- Database Technologies Inc.
- Oracle Corporation
- Pyramid Technology
- Sequent Computer Systems Inc.
- Sun Microsystems Computer Corporation

Milestones

- | | |
|----------------------------|---|
| November 1995 | • Core Enterprise Data Model |
| December 1995 - April 1996 | • UNIX/Oracle Corporation platform installed in Data Centers |
| | • PAY80 Revenue Reports -- phased by regions |
| February - April 1996 | • Off-Line Reporting System - version 1 |
| February 1996 | • Data Warehouse Proof-of-Concept, demonstration of query tools, and first users conference |
| April - June 1996 | • Off-Line Reporting System - version 2 |
| | • Data Warehouse Phase 1 |
| November 1996 | • Data Warehouse Phase 2 |

Section Four

Legacy Subscriber Management Systems Support

Legacy Subscriber Management Systems Support

Maintaining the legacy subscriber management systems implemented throughout the regions of CCI is critical to the company's continued success in the industry. With plans to migrate to the more technically-advanced environment created by the new subscriber management system - Continental Customer Expert System (CCES) - continued operational and user support of these legacy systems remains the cornerstone initiative of CCI's five data centers.

Utilizing a variety of hardware and software platforms, the three legacy systems supported by the data centers include: DDP/SQL (proprietary software developed by CableData, Inc.), EAZY (developed by Colony Communications, Inc.), and Subscriber Account Management or SAM (developed in-house by CCI). These three legacy systems are strategically supported in five CCI data centers across the country.



Historically, the data centers have played a major role in providing revenue support; including: accounting for pay-per-view services, subscriber billing, invoicing and revenue accounting, and other standardized financial functions. The focus during 1996 will involve making necessary improvements to our legacy systems, facilities, and operational procedures, as well as implementing new technologies and infrastructure in preparation for the deployment of CCES.

Essential projects in the scope for 1996 include expansion of local area networks, roll-out and support of new CSR workstations, and planned database consolidations and conversions. Another important project involves the administration of the IBM Multiple Vendor Service (MVS) agreement which provides enterprise-wide hardware and software technical support. Other key initiatives are development and implementation of disaster recovery capabilities to protect company assets and revenue, and standards and quality measures to monitor and assure the quality of support services round out the project plans.

Reading Data Center

The Reading Data Center, located in the suburbs of Boston, Massachusetts, supports CCI systems serving approximately 1.5 million subscribers in the Northeast and Southeast regions. This includes recently purchased cable systems in Massachusetts and Florida. System users access CableData, Inc. DDP/SQL software running on the Tandem Computers Incorporated hardware platform. Several other applications are developed and supported from this facility including off-line reporting for DDP/SQL users, data warehousing, inventory systems and CCI's Internet firewall. These applications are running on new technology platforms provided by Sun Microsystems Computer Corporation, Pyramid Technology, and IBM Corporation.

Stockton Data Center

The Stockton Data Center, located in Stockton, California, supports CCI systems serving approximately 950,000 subscribers in the Midwest and West regions. This includes recently acquired cable systems in California. The data center serves its constituency with the Tandem Computers Incorporated hardware platform consisting of three machines running CableData, Inc. DDP/SQL software.

Chicago Data Center

The Chicago Data Center, located in Rolling Meadows, Illinois, supports CCI systems serving approximately 500,000 subscribers exclusively within the Central region. This includes recently acquired Cablevision, Inc. systems in the metropolitan Chicago area. The data center supports its user base with Tandem Computers Incorporated hardware running CableData, Inc. DDP/SQL software.

East Providence Data Center

The East Providence Data Center, located in East Providence, Rhode Island, houses an IBM system running the EAZY legacy system. The data center serves a base of approximately 592,000 subscribers in newly acquired Colony Communications, Inc. cable systems nationwide. Due to planned call center consolidation activities, approximately 140,000 subscribers are scheduled to convert to DDP/SQL during 1996.

First quarter renovation plans for the facility provides additional office space and other associated amenities needed to support CCI projects such as CCES project management and enterprise-wide data warehouse initiatives. The renovation plan calls for almost 2,000 square feet for the data center and about 8,000 square feet for offices and storage space.

Richmond Data Center

The Richmond Data Center, located in Glen Allen, Virginia, supports CCI systems serving approximately 750,000 cable subscribers in CCI's Midwest, Central and Southeast regions. Additionally, this facility serves the entire CCI Primestar initiative of approximately 50,000 subscribers nationwide and Netlink, Inc., a TCI-owned C-Band company, representing some 450,000 C-Band satellite subscribers. The software developed and supported from this data center is CCI's in-house legacy Subscriber Management System (SAM), which utilizes DEC hardware distributed throughout 15 CCI locations. A help desk, launched in Q1, provides twelve-hour user support, five days per week.

Legacy Support Elements

Two software upgrades are scheduled in 1996 for CableData, Inc. DDP/SQL software. The first upgrade will provide enhanced network connectivity, improved reliability of user access to the Tandem Computers Incorporated hardware, and new automatic number identification (ANI) functionality for CSRs. The second upgrade will provide Near Video-on-Demand (NVOD) support, an interface to The Sega Channel, and seamless access to multiple Tandems for order processing.

Operating system upgrades have been implemented by Tandem Computers Incorporated in conjunction with the CableData, Inc. planned upgrades. During Q1, the remaining dumb terminals were replaced as CableData, Inc. has discontinued support of the equipment. Several database conversions and merges are planned for Q2 in recently acquired systems in the Northeast region. These activities, as well as on-going application and operating system tuning, will accommodate call center consolidation strategies.

Support and limited development of the EAZY system will continue from the East Providence Data Center. Former Colony Communications, Inc. offices which are sold or otherwise not scheduled for consolidation into existing CCI offices, will continue to utilize this legacy system. Seamless operations, personnel backup and contingency planning are all essential.

For the Richmond data center operations, extensive SAM database consolidations are planned the first and second quarters of 1996. Additionally, plans to de-convert Netlink are underway. Monthly SAM User Group meetings ensure that projects are well defined, properly scheduled and tracked. Development initiatives are planned in the areas of paging service support, a regional customer loyalty program, and enhanced service disconnections via addressable interfaces.

Disaster Recovery Plan

An essential element to any business operation, the disaster recovery plan is vital to the protection of CCI employees and the ability to conduct business in the event of a catastrophe. The probability of disaster has increased due to a growing dependence on information technologies that are very complex in nature. Thus, resulting losses can have a significant impact on the very survivability of the business itself.

Benefits

- Protect company against loss of revenue
- Minimize system and business downtime
- Protect company assets
- Timely response to disasters

The existing Disaster Recovery Plan, developed in conjunction with Comdisco for the EAZY legacy system, remains in place for the East Providence data center. Leveraging the available expertise through this partnership arrangement, CCI will develop a comprehensive plan for the Stockton, Reading, Chicago, and Richmond data centers. Initial development plans are slated for June; maintenance and testing will be on-going.

Pressure Points

- Complexity of exiting network infrastructure
- Development of testing plan
- Availability of legacy system resources
- Support of plan during migration to CCES



Section Five

Digital Research & Development

Digital Research & Development

To stay competitive in the face of ever changing technologies, CCI must have a baseline understanding of the evolving digital environment. Research and testing of digital and interactive television will enable CCI to maintain its leadership in cable technology and to provide better support for implementations of these technologies as they mature. This project will research digital broadcast and interactive services and evaluate their potential for deployment in CCI service areas, particularly for revenue generating applications.

To assist with research and testing, CCI will work with appropriate vendors to secure evaluation products for IT's Research and Development lab. This provides the opportunity to test how the various products work together and to test and create new products for CCI customers.

Digital & Interactive Television

Where possible, CCI will migrate digital technologies into areas that enhance current capabilities in the analog environment. Areas of focus include Near Video-on-Demand (NVOD), virtual channels, digital broadcast, and interactive setup boxes. Digital broadcasting creates the ability to provide more channels to the consumer with the existing cable plant by compressing the video data. It also provides better sound and picture quality.

The Near Video-on-Demand (NVOD) or enhanced pay-per-view will provide consumers more convenient and staggered start times for their video selections, with higher quality reception. In addition, consumers will be able to pause, rewind, and fast forward the video. NVOD utilizes computer servers instead of the tape drives used currently for pay-per-view. This translates into better reliability, less down-time, and a smaller data center footprint for the equipment.

As a product of this research, we will produce a white paper detailing ideas for the migration of digital set tops, including applications that will be used with the set top.

Benefits

- Reduced time to market in the future when CCI implements digital technologies
- Lab experience with new technologies, with the potential for new product development
- Ability to enhance analog products in a shorter time frame

Business Partners

- Digital Video
- IBM Corporation
- nCube
- Oracle Corporation

Milestones

March 1996

- Digital Server installed

April 1996

- Digital Near Video-on-Demand testing

June 1996

- Digital broadcast testing

August 1996

- Testing of digital set top box

Trafficking and Billing

The Cable Ads business is faced with a high volume of advertising spots managed by software written and developed in the mid-1980s. The current systems require manual matching of scheduled ads to those that were actually aired and a reconciliation to the ad contract. This sometimes results in lost billing revenue due to difficulty in proving the ad was aired and in processing such large volumes of data manually. In addition, basic business information regarding open advertising space, ad inventory, and sales are often kept and updated manually. This has led to inefficiencies for the ad sales force.

Also, scheduling of content on the cable plant will evolve to encompass an enterprise approach. The trafficking system will handle high transaction volumes, and be positioned for new business opportunities, including long form advertising, public access, Near Video-on-Demand, and interactive applications.

This enterprise-wide project encompasses:

- Researching existing and future traffic and billing software offerings
- Establishing user requirements for trafficking and billing system
- Evaluating software for use in large scale enterprise implementation
- Determining components and modules that are needed to deliver proposal generation, trafficking, inventory management, and reporting
- Evaluating feasibility of using this system for classified advertising, preview or barker channels, pay-per-view scheduling, and interactive advertising

Benefits

- Cable Ads will better manage the existing business and support additional revenue generating businesses. Manual reconciliation, and billing will be reduced
- Account Executives will be able to more effectively sell the available inventory
- Sales Managers will have a snapshot view of the current business, enabling them to increase sales force productivity
- New packages can be supported with a user-friendly interface
- A single trafficking solution will lower training costs across Ad Sales and core businesses

Business Partners

- VisionTel

Milestones

- | | |
|---------------|--|
| April 1996 | • White paper detailing the Trafficking and Billing model from CCI |
| May 1996 | • Roll-out Richmond Cable Ads trafficking and billing solution |
| | • Initial Proof of Concept and report for CCI Field |
| December 1996 | • Testing of Trafficking and Billing complete |

Section Six

Network Services and Telecommunications Support

Network Operations Center & Wide Area Network

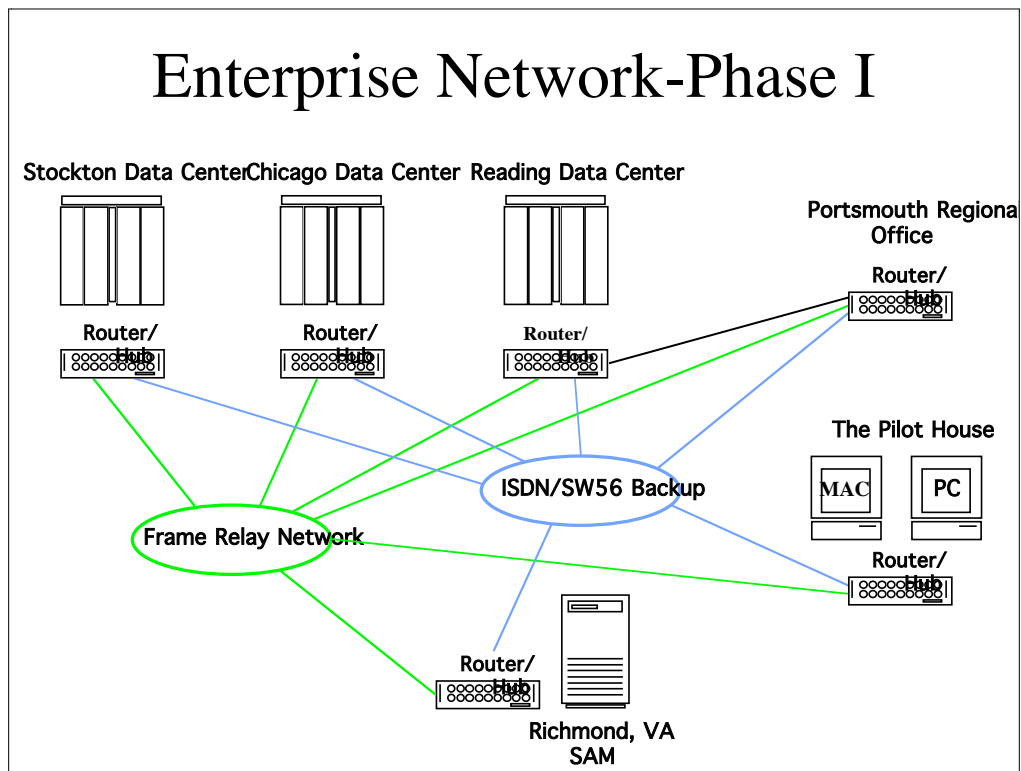
The Network Operations Center (NOC) and its Wide Area Network (WAN) component is a critical initiative to support stable CCI growth. The state-of-the-art NOC will enable a smooth and controlled migration of CCI's information technology infrastructure from its current legacy systems to distributed client/server technologies. While this distribution of computing functions is essential to support the planned growth of CCI, it also presents the very real problems of managing a highly diverse system and communications facility. The NOC will allow proactive network management and control so that we can anticipate and correct problems before they affect the customer base. A centralized NOC will eliminate the need for future investment in regional network control centers that would have been inevitable as we expand into new technologies and consolidate call centers. The economies of scale realized for hardware, software, and telephony purchases will further reduce overall investment.

The NOC/WAN development program will achieve the following goals:

- Create a Business Support System (BSS) to manage and support CCI's enterprise-wide network, broadband services, and telephony offerings. A BSS provides a stable infrastructure for business needs by monitoring the enterprise-wide IS and engineering infrastructure.
- Provide a distributed management platform, centrally managed, to monitor and manage CCI's enterprise-wide network. A distributed management system with a centralized view of the enterprise-wide network provides a foundation for improved customer service and increased competitive advantage. Real-time network monitoring allows for proactive network management with automated service of the network and its devices.
- Provide appropriate data to develop Advanced Business Systems management and develop specific programs and utilities that enhance business management in the areas of customer service, engineering, operations and service quality. Advanced Business Systems management is the foundation for business application growth and a foothold into new technologies of convergence.
- Design the LAN/WAN network infrastructure employing the CCI network standards. Building the backbone for enterprise-wide e-mail is a key deliverable. In addition to providing an effective communication tool, enterprise-wide e-mail is the proof that data can flow seamlessly for other efforts such as call center consolidation.

Once fully implemented, Network Operations Center will provide the following services:

- Fault/event performance management
- Help Desk and Trouble Tickets
- Asset and Resource Management
- Hardware and Hub/Router configuration
- Software distribution and version control
- Enterprise backup
- Telephone switch management and monitoring
- RF and analog device management and monitoring
- Electronic mail/messaging implementation and administration
- Video server management and monitoring
- Disaster Recovery plan and implementation



Implementation Plans

The design and implementation of the CCI enterprise-wide WAN and NOC network infrastructure and the creation of regional Local Area Networks (LAN) will be accomplished through three phases of effort:

Phase 1- NOC/WAN and Standards

A Business Support System (BSS) must first interface with existing network devices, including servers, hubs, routers, legacy equipment, and RF devices. This phase will establish the linkage between a broad spectrum of network and supporting infrastructure devices. It also establishes a platform for future growth, regardless of direction or time frame requirements. The BSS must have an infrastructure on which to run, connecting discrete regions' local area networks.

The Network group will establish standards for network wiring, hubs and routers, and hardware/software for workstations, servers, and printers. The standards will be used as this and other network projects are rolled out.

Phase 2 - Network Management System

Phase 2 identifies and implements a full-feature Network Management System (NMS). Cabletron Systems' Spectrum Network Management System has been selected as the system of choice. The system will provide network infrastructure planning, visibility and mapping. Specific device management will be determined by business. In addition, network intelligence for correlating alarms for the different areas of the CCI network infrastructure will be implemented.

Phase 3 - Advanced Business Management Applications

In Phase 3, advanced business management applications on the selected network management system will be developed and implemented. These applications will include:

- Network Resource Management
- Fault Management
- Event Monitoring
- Security
- Work Order Management
- Trouble Ticket Management
- Asset Management
- Enterprise Backup and Disaster Recovery

Milestones

- | | |
|-------------|--|
| April 1996 | <ul style="list-style-type: none">• Publish and distribute CCI standards and procedures for LAN/WAN connectivity, server and printer standards and naming convention, workstation standards, and software standards |
| May 1996 | <ul style="list-style-type: none">• Move to appropriate site and build enterprise NOC |
| Q3 1996 | <ul style="list-style-type: none">• Develop and implement CCI messaging system including the WAN/LAN design |
| July 1996 | <ul style="list-style-type: none">• Work with Cabletron Systems/Spectrum to develop device management for legacy and RF equipment• Manage and monitor devices and connections for Northeast Region Broadband initiative |
| August 1996 | <ul style="list-style-type: none">• Plan and implement enterprise backup and disaster recovery for CCI infrastructure |
| Ongoing | <ul style="list-style-type: none">• Design the LAN/WAN network infrastructure and implement the design employing the CCI standards• Develop plan to interface telephone switch standards with LAN/WAN strategy |

Business Partners

- Cabletron Systems
- Entex Information Services, Inc.
- IBM Corporation
- MCI Telecommunications Corporation

Telecommunications Support

System and call center consolidation has created the need to purchase sophisticated telecommunications services and equipment in all regions. The enterprise-wide telecommunications group will support each region in the selection, purchasing, and installation of new telephone systems -- i.e. PBX's or key systems, Automated Call Distribution (ACD), Voice Mail, Interactive Voice Response (IVR), Computer Integrated Telephony (CIT), Predictive Dialers and other Call Center Management solutions. They will also provide support and assist in the system design of each application.

Benefits

- Provide networking expertise, private or leased facility
- Engineer and support regional and private voice/data networks
- Implement the interconnection of regional networks to other regions
- Liaison with all Regional Call Centers
- Support all regional ACD, IVR, and CIT applications
- Develop and implement standards in telecommunication applications throughout the region, (ACD, IVR, CIT and predictive dialing applications)
- Liaison with all other regional managers to help set national telecommunication standards for Call Center environment
- Monitor and analyze all regional long distance activity to prevent abuse
- Coordinate and manage all telecommunication equipment installations in the region
- Approve all software and equipment purchases in each region
- Develop a regional "HELP" line service to provide 24-hour service to all CCI offices
- Review and test disaster recovery schemes for each site
- Assist in developing the national technology, equipment, and software standards
- Improve relationships with local and national vendors through consistency of direction and communications
- Negotiate and achieve aggressive pricing based on national commitments and volume purchasing

Section Seven

Research & Development Technology Lab

Research & Development Technology Lab

Building and maintaining a quality subscriber management system requires a better way to thoroughly test new software, hardware, products and services. Methods used for CCI's legacy subscriber management systems involve trials with a small population of customers, or limited testing in an isolated environment. Drawbacks to this isolated testing are revealed when components fail or react unpredictably when the software is delivered to customer sites. To ensure consistent quality standards during the development and implementation of CCI's new subscriber management system - Continental Customer Expert System (CCES) the Research & Development Technology Lab was created in the Fall of 1995. Located in Richmond, Virginia the lab provides the facilities within which the various configurations of CCES are tested, validated and managed.

By simulating users, database loading, and network traffic, the lab will measure system performance and test designs. It will also provide the total cable/customer environment needed for thorough testing of future products such as Near Video-on-Demand, Internet Access, Telephony, and Digital Data Services. The lab will test CCI's ability to deliver a product, along with the ability to meter and bill for that product. The lab will test software interfaces, to verify that components flawlessly talk to each other.

Pressure Points

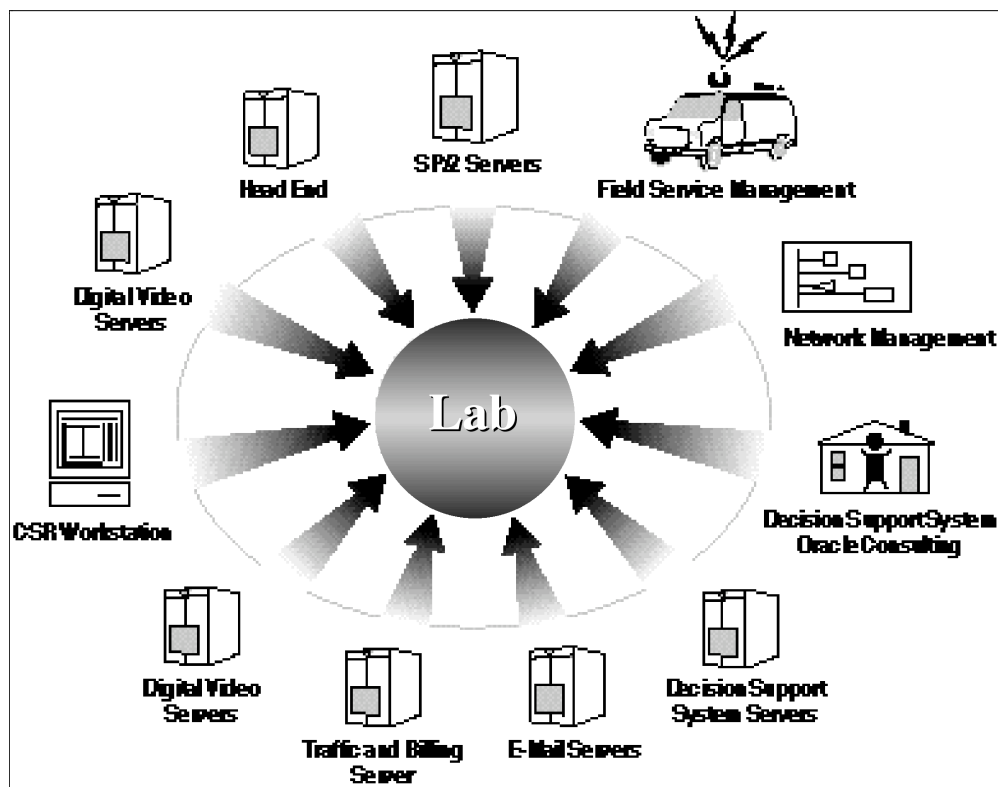
- Inadequate software and hardware testing facility for subscriber management systems
- Current methodology requires testing on production databases
- Need environment to test innovative technologies
- Need environment for vendors to resolve compatibility and interface issues
- Need environment to benchmark the entire CCES configuration to determine future hardware, software, networking, and support requirements

Configuration Testing

As software and hardware components are identified as configurable items, any changes to them as individual components or to their integration will be tested, verified and validated. At any one point of time, versions and releases of specific configurations of CCES-related hardware and software can be reconstructed, distributed, inventoried and, therefore, managed.

Testing of configurations will include analyzing the integration of hardware and software components. The hardware components are depicted below. Major software components consist of the graphical user interface developed by RWD Technologies, Inc., the Phoenix subscriber management system developed by CSG Systems, Inc., and Fleetcon field management system developed by Arrowsmith Technologies, Inc. These software components must interface and interact with each other at the command of a CSR or other user. Software testing ensures that these interactions work and that the CSR can perform all business functions required to service the customer and support the company's business objectives.

Testing, configuration management and system roll-out are interdependent, and therefore they will be carefully planned and developed for the initial pilot roll-out of CCES in the Pompano Beach systems later this year.

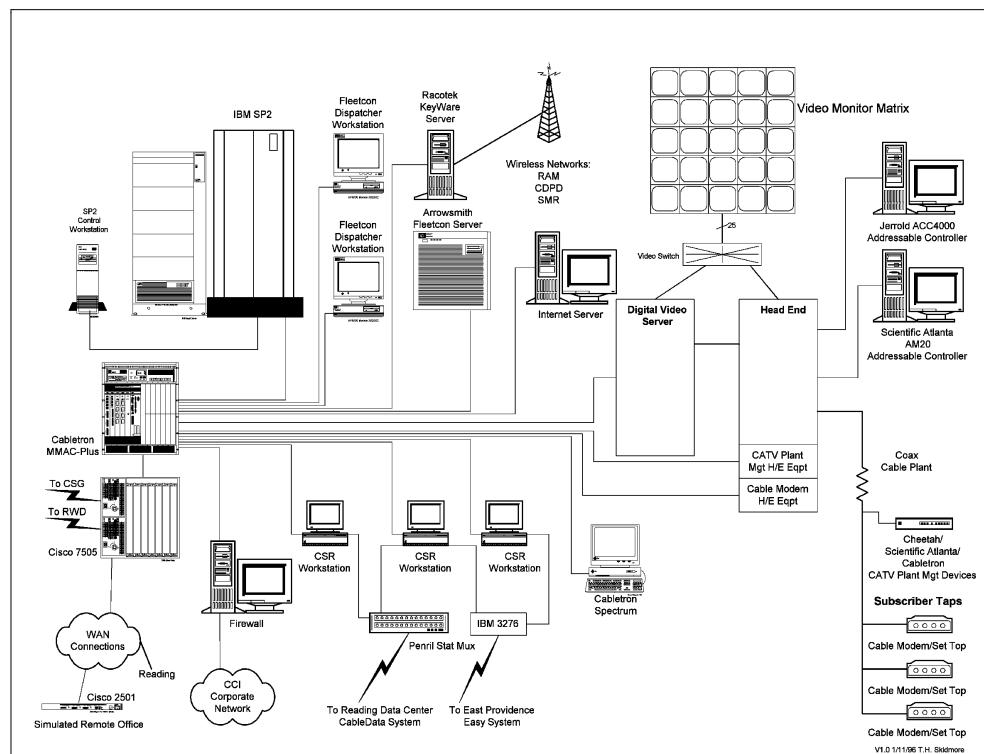


Lab Components

The lab testing environment is designed to provide a full compliment of cable television coaxial and fiber optic subscriber services and subscriber management system evaluation capabilities. The test environment platform will provide analog services to subscriber terminals with the modularity to easily install various cable service platforms. This modularity will allow ease of configuration and installation for the evaluation and viability testing for Addressable, Near Video-On-Demand (NVOD), Primestar, Direct TV, High Speed Data, Network, and other services. Components for the lab include a real-world cable headend, CSR workstations, cable plant, plus monitoring equipment to display how the product is received in a customer's home.

Telecommunications interfaces will be available in a CSR inbound pool. The availability to test customer calls into an Automatic Call Distribution (ACD) environment will permit testing the CSR workstations and the telephony interface to the billing system. The addition of an Automatic Number Identification/Voice Response Unit (ANI/VRU) engine to the Computer Telephony system will provide the platform to test as well as benchmark the traffic and capacity models for stand-alone addressability.

Addressable controllers for pay-per-view testing will be installed and the downstream data will be available to the subscriber terminal. Controllers such as Scientific-Atlanta and Jerrold are in the lab. With the installation of bi-directional equipment, Impulse pay-per-view and network connectivity services can be fully implemented. As other digital strategies are developed, the modularity of the lab will easily permit configuration and testing of these new systems and their interaction with CCES.



Benefits

- Complete testing of subscriber management system software, new services and hardware platforms
- Eliminate impact on customer or cable plant operations during testing and benchmarking
- Improved accuracy of the planning and implementation
- Prototyped delivery of new services
- Ability to experiment with new technologies

Business Partners

- Apple Computer, Inc.
- Arrowsmith Technologies, Inc.
- Cabletron Systems
- Cisco Systems Inc.
- CSG Systems, Inc.
- Digital Video
- Entex Information Systems, Inc.
- General Instruments
- GTE Mobilnet
- IBM Corporation
- Jerrold Corporation
- LANcity Corporation
- MCI Telecommunications Corporation
- MicroAge Computer Centers
- nCube
- Oracle Corporation
- Racotek
- RAM Mobile Data
- RWD Technologies, Inc.
- Scientific-Atlanta, Inc.
- Silicon Graphics Inc.
- Sony
- Sun Microsystems Computer Corporation
- Superior Electronics Group Inc.
- VisionTel

Milestones

November 1995	<ul style="list-style-type: none">• Complete lab construction
December 1995	<ul style="list-style-type: none">• Install IBM SP/2 in lab
January 1996	<ul style="list-style-type: none">• Install first pre-release of Phoenix software
January - April 1996	<ul style="list-style-type: none">• Install communications lines for CSG Systems, Inc., RWD, CableData and EAZY
March 1996	<ul style="list-style-type: none">• Install second pre-release of Phoenix software• Hire Quality Assurance Manager
May 1996	<ul style="list-style-type: none">• Complete test headend installation• Install third pre-release of Phoenix software
June 1996	<ul style="list-style-type: none">• Install and integrate Fleetcon software
July 1996	<ul style="list-style-type: none">• Install fourth pre-release of Phoenix software
September 1996	<ul style="list-style-type: none">• Install and integrate graphical user interface
October 1996	<ul style="list-style-type: none">• Perform acceptance and regression testing

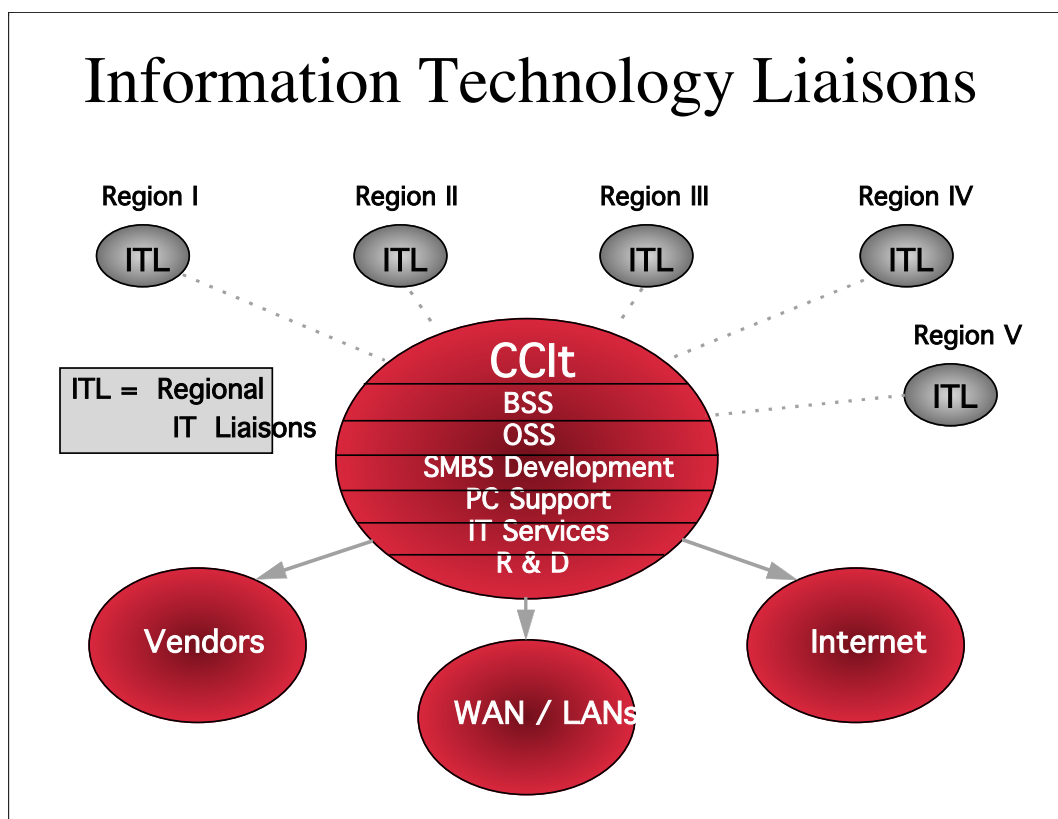
Section Eight

Enterprise-Wide Information Technology Initiatives

Enterprise-Wide Information Technology

The IT organization is an enterprise-wide group which supports both corporate and regional functions. To strengthen this matrixed view, Regional IT Directors, acting as CIO's for their regions, are part of the enterprise-wide IT organization.

Enterprise-wide Information Technology includes the staff who support the services described in this section as well as the individuals who head up each of the projects described in the entire IT Business Plan.



In addition to the initiatives described in the entire IT Business Plan, and in this section, the Enterprise-wide Information Technology Group:

- Produces *Across Technology*, a quarterly publication which highlights CCI's activities in the areas of Information Technology, Engineering and Marketing.
- Manages IBM MVS (Multiple Vendor Service), an enterprise-wide contract for desktop hardware and software support.

Negotiate Service Maintenance Agreements

- ▲ Leverage Service Dollars to Reduce Overall Costs
- ▲ High Level of Support
- ▲ Fast Turnaround Time for Problems
- ▲ 1-800 Phone Number
- ▲ One Phone Call
- ▲ Single Point of Contact

- Supports initiatives such as CCI's Executive Information System and high-speed data (HSD) support.

Pilot House IT Support

The plan for 1996 is to offer a new and focused approach to Pilot House IT support and services. With an emphasis on training and streamlined help services, the Pilot House IT group will strive to maximize use of information technology within the Pilot House and surrounding offices.

Benefits

- Increased utilization of Pilot House IT assets
- Improved:
 - ◆ Hardware/software procurement
 - ◆ Problem determination and resolution
 - ◆ Accountability for enterprise and Pilot House IT assets

Deliverables

- Establish dispatch procedures which facilitate the timely and effective resolution of desktop and network problems
- Ensure that policies, procedures and guidelines relating to the use of IT assets and networks are well documented and maintained
- Develop and implement a plan which ensures that Pilot House employees are properly trained in the use of information systems and technology
- Ensure that IT assets in place are inventoried and protected

Corporate Systems Development

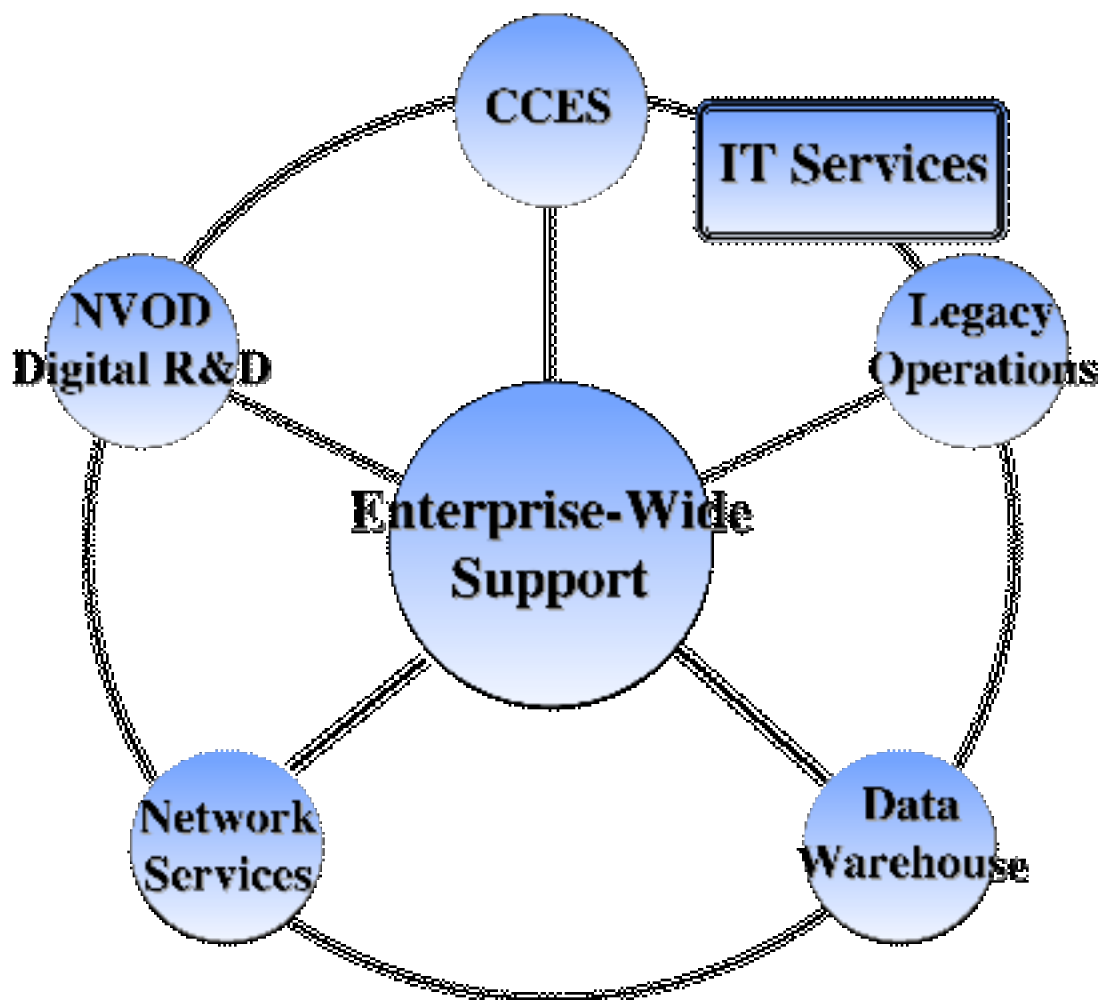
The plan for 1996 is to work with their management to implement new Corporate Information systems. These systems will help satisfy the Pilot House executives' information technology requirements and will result in improvements in our administrative processes.

Benefits

- Improve access to enterprise information
- Improve velocity of information between and within business units
- Improve control of enterprise assets

IT Services

The primary mission of the IT Services Department is to manage the CCI investment in information technologies through supporting services. The group identifies, initiates, and supports necessary changes vital to the overall business strategy of the IT organization encompassing the complete technology landscape. Additionally, the group plays a key role in carrying out several major initiatives of the IT organization. These initiatives require services to manage projects, finances, contracts and human resources.



Financial Reporting and Controls

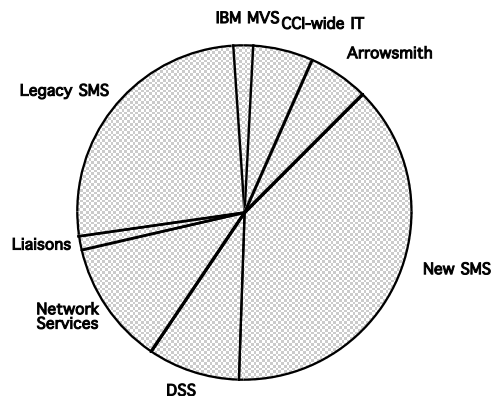
The IT services group is responsible for controllership functions related to IT's 50+ million dollar budget. Functions included are:

- Reviewing capital purchases
- Producing month-end financial reports on IT's operating and capital performance
- Managing all expenditures related to the IT budget including payables, purchases, payroll and contract obligations.
- Producing monthly reports on contract negotiations and obligations
- Communicating IT financial information to both IT management and CCI Pilot House and field management

In 1996, CCI moved to an organized and structured financial approach. This order will provide better information to key department managers. Controls will also improve our stewardship of CCI's IT financial and human resources.

Information Technology Investment

- ▲ New SMS 38%
- ▲ Decision support system 9%
- ▲ Legacy SMS support 26%
- ▲ IT Liaisons 1.3%
- ▲ Network services (network operation center, wide area network) 12%
- ▲ IBM MVS 2%
- ▲ Arrowsmith 6%
- ▲ Other enterprise-wide information technology services 5.7%



Milestones

February 15, 1996

- Monthly financial reports are designed and distributed

June 15, 1996

- Reforecasts are complete

Purchasing

This effort will result in a single purchasing procedure, to include both operating and capital purchases, followed by all CCI staff. Setting one set of approved CCI-wide IT purchasing standards is important in order to control the 1996 budget. Additional policy changes will be reviewed including creating a central IT purchasing group, ensuring that all regional purchasing is performed under the guidance of the IT Directors, and that all data center purchasing is reflective of data center budgets.

Milestones

March 1996	• IT purchasing and purchase authorization procedures
April 1996	• IT purchase order distributed and in use
	• IT signature verification form and procedures
Ongoing	• Summaries of purchases with vendors prepared regularly and sent to SVP and designated operating managers

Payables

This effort will result in a single accounts payable procedure followed at each CCI office. Elements of this process include an IT payment authorization form, documented payables procedures, on-site field training in payables procedure, and auditing of significant operating expenses.

1997 Budget Creation

1996 is the first year of an aggregate CCI-wide budget, and budget creation for 1997 is a critical component of the work of the IT Services Group.

Elements

- Apply the principles of project management to the 1997 budget cycle
- Prepare spreadsheets for each of the 1997 cost centers
- Organize budget education and planning meetings
- Prepare 1997 aggregate budget

Pressure Points

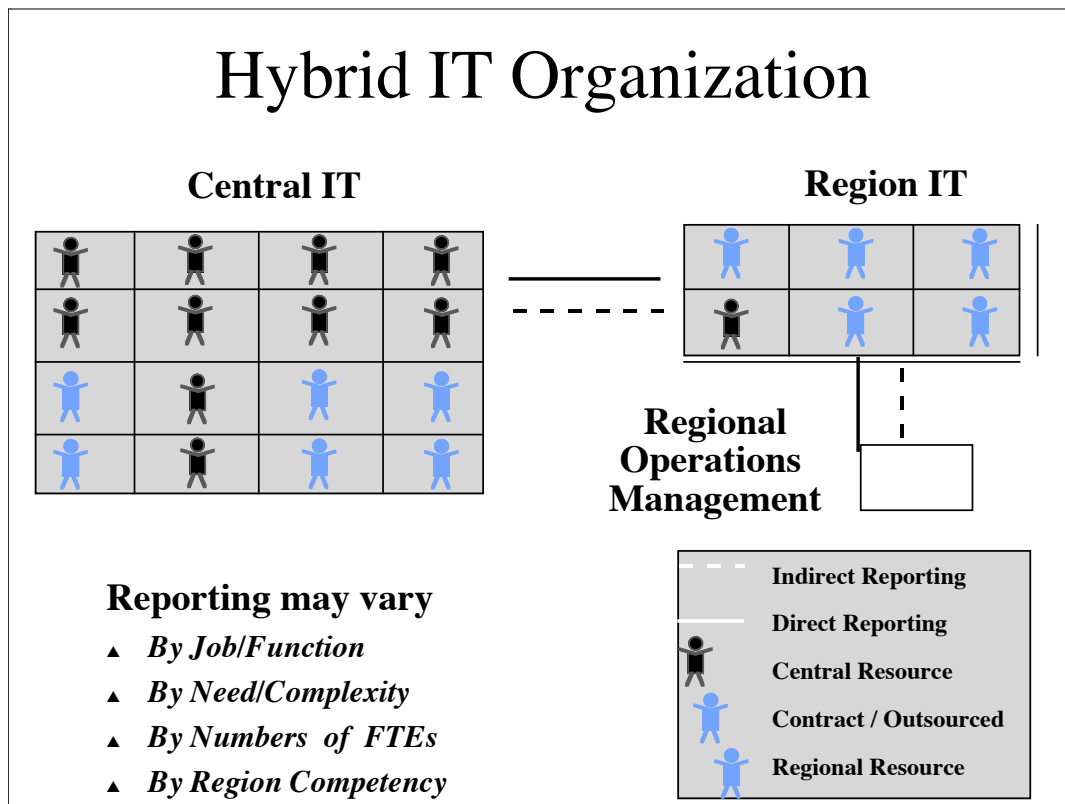
- Ensure that the budget offers the flexibility needed as we redefine the IT workforce at CCI. As CCES is deployed, we will move from the data center paradigm to a new way of managing CCI's IT resources

SCT Contract Management

Outsourcing is a strategy used by CCI for approximately 75 positions. Systems and Computer Technology, Inc. (SCT) - the selected outsourcing partner - allows CCI to quickly tap in to an enormous pool of trained resources. Cost control and service delivery components of the SCT contract must be carefully managed. In addition, it is imperative that the contract protect the flexibility CCI requires during the migration to CCES.

Milestones

- Contracts accurately reflect our SCT workforce
- We maneuver to a new way of handling data centers and work force changes, within existing financial commitments
- Procedures between CCI and SCT for salary review, use of discretionary fund and hiring are documented



Contract Services

The IT services group manages all contracts, licensing agreements and contract labor agreements for the CCI's enterprise-wide IT group. This ensures that volume purchase discounts and consistent terms and conditions are realized throughout CCI. The group manages the contract initiation, business and legal review, negotiation, signing, and verification to billings. In addition, the group serves as a focal point for existing contract issues as they arise.

Education

Education and accountability will be key components to the success of the IT Services Group. This training applies to both clerical level and management level staff. On a quarterly basis, each site will be visited to provide training and monitor procedures. The initial example of training efforts in coding of payables, has already been performed at each data center.

Experience from creating the 1996 budget indicates that higher level training will be organized as the 1997 budget season approaches. Possible topics include reading CCI's accounting reports, methods of budgeting, and IT financial controls.

Human Resources

During the first half of 1996, the IT Services Group will define what support is best offered by the human resources areas at the Pilot House, regional offices, and within the IT organization itself. In addition, the IT Services group will assist with migration and transformation of workforce from current functions to new functions, review human resources procedures and assist in issue resolution, maintain wage budgets and hiring requests, and develop flow and hiring processes and associated documents.

Milestones

- IT policies and procedures manual complete
- Each data center has had an "HR" audit that includes employee files, work records, signing in and out, postings, etc.
- Monthly labor force analysis complete by 5th of each month
- Organization Charts updated as changes occur

Planning

Project planning will grow throughout 1996 focusing in the areas of CCES project planning assistance, SAM software project planning, CCI's business planning process. Planning will be expanded to include enterprise-wide project plans and CCI's strategic plans.

Milestones

- Project plans available in both operating and executive form
- The interrelationships of IT projects illustrated
- Due dates and business deliverables clearly illustrated
- The strategic plan delivered

In examining the CCI-wide planning needs during the first half of 1996, recommendations may include project planners that do not necessarily report to the IT Services Group. Additional projects and resources to be examined include an IT-wide Project Planner and strategic planning from Deloitte & Touche.

IT Communications

Communicating IT plans and issues to the business community is a critical mission of the IT Services Group. This task is to maintain the following information:

CCI-Wide Intranet

The IT Communications group is charged with developing a CCI-Wide Intranet. This Intranet will be a forum for *Across Technology*, *Plugged In*, and information defined by Pilot House human resources. The research and development for the project will be supplied by the Richmond-based R&D Lab. The actual creation of the website will be managed by the IT Services Group.

Business Planning

Editing, planning, production, and integration of the CCI's Enterprise-Wide business plan is the responsibility of the IT services group. This includes coaching IT managers on business plan preparation.

Project Presentations

Each of the key initiatives of the IT group requires both traditional business communication and a “slide” presentation. This information must be packaged so that it can easily be rolled out to the regions at any time.

Business Communication

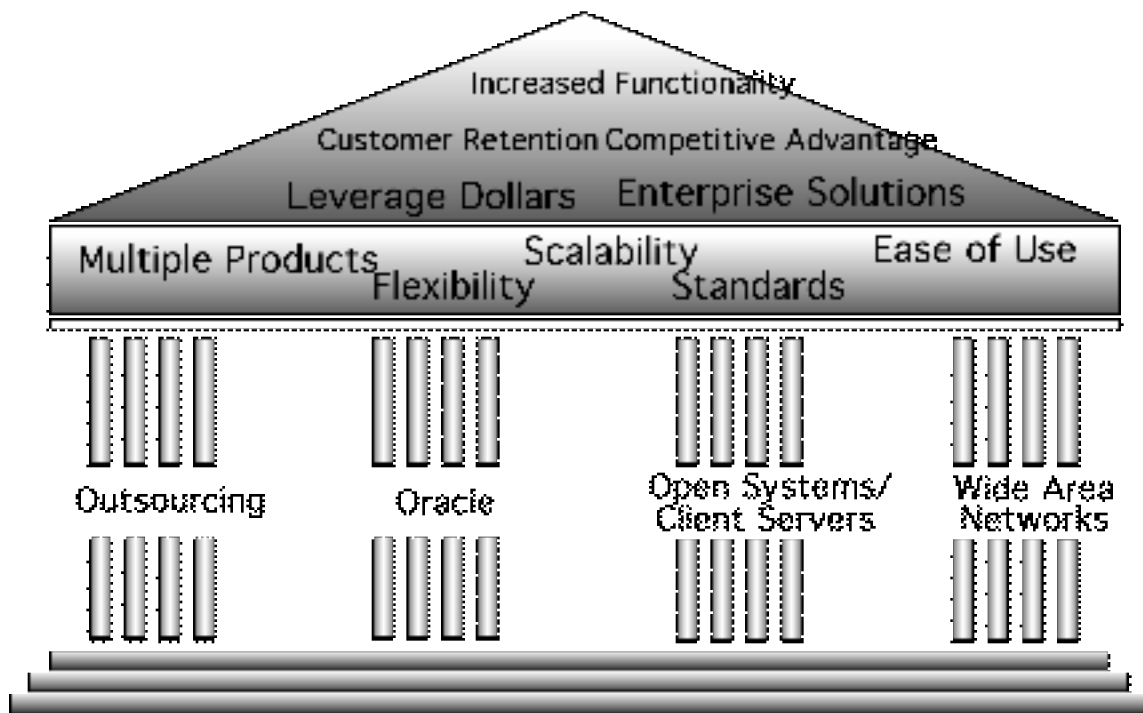
Communicating in business terms the purpose, benefits and deliverables of the various projects of the IT group is an ongoing responsibility of the IT Services Group. Specific assistance is being provided on an ongoing basis to the CCES project.

Section Nine

Enterprise-Wide Technology Architecture

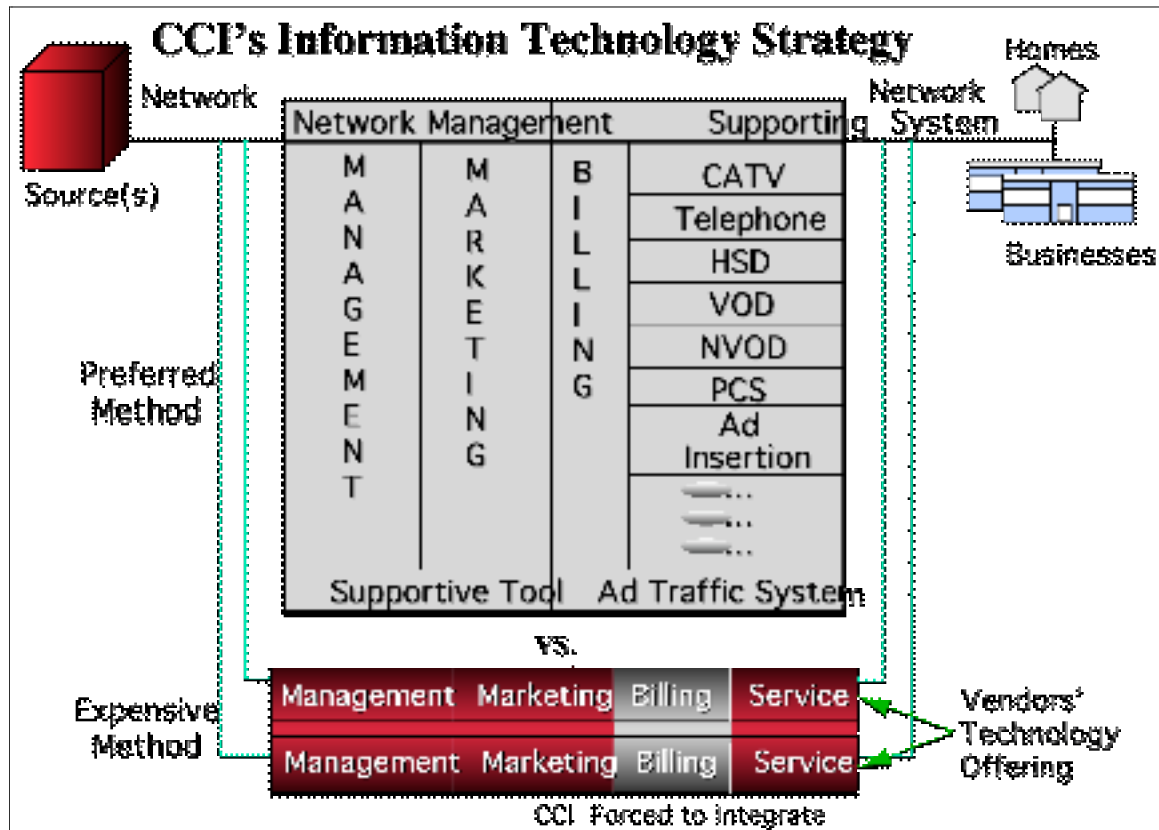
Enterprise-Wide Technology Architecture

The Enterprise-Wide Technology Architecture provides the vision on which all IT projects are based. CCI's enterprise-wide technology architecture comprises seven different components; each serving as strategic pillar and laying the foundation to support the overall business mission. These components are: Technology Landscape, Data and Information Organization, Technical Environment, Application Standards, Network Infrastructure, Security Provisions, and Development/Support Methodology.



Convergence

Flexible, cost-efficient, and high-function business support systems will offer CCI a competitive advantage. The IT focus is to provide for administrative and customer support for future and current convergence products.



Convergence Issues

- ▲ Separate IT versus Engineering
 - NOCs (Network Operations Centers)
 - Video Servers
 - Internet
- ▲ Build WAN for CCI Company
 - Company Data, Voice, Video
- ▲ Wire Local LANs
 - Standards
 - Data Experience
- ▲ Forge Vendor Collaboration
 - Data Versus Radio Frequency Vendors

We Must Manage In Front of This Curve.

CCIt, Role of Technology

Near-Term

- ▲ Near-Video-on-Demand
- ▲ Data/Voice/Video Products
- ▲ Internet Access
- ▲ Ad Insertion
- ▲ Game-Per-View

Maybe

- ▲ Home Shopping
- ▲ Distance Learning
- ▲ International Operations
- ▲ Telephony
- ▲ Video-on-Demand
- ▲ Personal Communication Service

CCIt Must Provide Real-Time, Reliable, Responsive, Enterprise-Wide Information Systems to Enable CCI to Seize New Product Opportunities.

Technology Landscape

The technology landscape coordinates all development efforts. It includes the specifications of all computer hardware, operating software, utility software, programming languages, and tools projected for or in use by CCI.

Major components

- Computers (maxi, mini, PC server/client)
- Networks (local area networks, wide area networks, bridges)
- Operating software (UNIX, VMS, OS, OS2, DOS)
- Application software (SMS, accounts payable/receivable, general ledger, inventory, maintenance, payroll, mail, calendaring, project management), and end-user environments

CCI has established a technology landscape that demands and supports enterprise architecture standards. These standards support CCI's entrance into video, voice, and data markets of convergence.

CCI supports IBM, DEC, and SUN Pyramid platforms for back-end and server use as well as IBM, Compaq, and Apple equipment for desktop use. UNIX is the major operating software for the back-end system. Mac-OS and Windows 95 are the operating software for the desktop environment. CCI supports Novell as well as Banyan LANs, various VANS (Value Added Networks) and WAN (Wide Area Networks), and Internet connections. The boundary defined by this technology landscape results in economies of scale, data access, and manpower efficiencies.

Create and Support Standards

Economies of Scale, Data Access and Manpower Efficiencies are Benefits of Creating and Supporting CCI Technology Standards.

<p>▲ Desktop</p> <ul style="list-style-type: none">➤ IBM (PowerPC & Intel)➤ Compaq (Intel)➤ Apple (PowerPC)➤ No Clones!	<p>▲ Software</p> <ul style="list-style-type: none">➤ Microsoft Suite<ul style="list-style-type: none">• Applications• Windows95➤ Lotus➤ Cross-Platform a Must (DOS, UNIX, MAC, Windows)
<p>▲ Back-Ends & Servers</p> <ul style="list-style-type: none">➤ DEC➤ SUN➤ IBM➤ Tandem (?)➤ Core Operating System = UNIX	<p>▲ Database</p> <ul style="list-style-type: none">➤ Oracle

Use the Right Tool for the Job.

Data and Information Organization

The data and information organization allows definition of data models, identification of appropriate database management software, and development of a proper data dictionary. These three components, together, manage information as a valuable asset. Information, like people and equipment, is a valuable resource that must be managed effectively. CASE (Computer Assisted Software Engineering) technology is a common thread across these three components. CCI will employ this CASE technology in developing the new subscriber management system. The data and information organization enforces the discipline needed to structure business requirements with consistency and standards. CCI has selected Oracle, a market-dominated product, as its RDBMS enterprise standard. CCES will be based on this data management system.

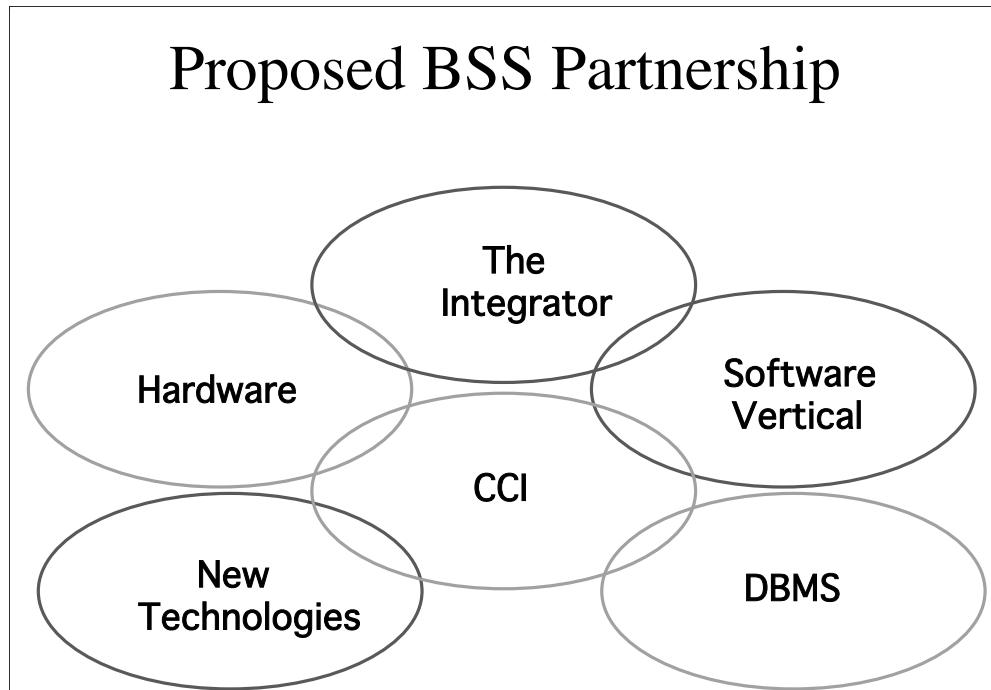
Technical Environment

The technical environment defines tools and materials used to construct new systems. Because technology evolves rapidly, CCI has evaluated emerging technologies and chose four technologies that offer greatest potential for productivity and flexibility within reasonable risk. These are:

- **Open System Architecture** allowing the support of hardware and software based on industry standards. Open systems technology defines software and hardware products based upon industry, not proprietary, standards. These products are based on standards whose definitions are known and accessible and which are widely distributed and easily transported as commodities from one environment to another. Since open systems are based on “open” industry standards rather than “closed” proprietary standards, companies embracing them are less vulnerable to the success or failure of specific vendors.
- **Graphical User Interface (GUI)** to develop easy and user-friendly interactions with the system. The movement toward graphical user interface represents a clear, dominant trend for interactive applications and describes communicating with a computer by manipulating icons (pictures) and windows with a mouse. A well-designed GUI provides ease of use, fast input, flexible screen navigation, eye-catching displays, and an “intuitive” operational environment for users. Properly implemented, GUIs reduce learning curves and increase productivity.
- **Client/Server Architecture** for distributing functionalities and cost efficiently. The forces which promote GUI usage also shape the environment for client/server technology. Client/server architecture describes the structure of application software, data software, and user presentation software so that these components can distribute among central, mid-range, and PC hardware for cost and processing efficiency.

- **Scaleable RISC (Reduced Instructions Set Computing) Technology** for stepwise incremental growth. Scaleable technology provides the ability to grow computing power in small, cost-efficient increments. Scaleable hardware allows systems to scale-up their processing power by adding inexpensive CPUs to existing computers or by adding computers to a network.

The technical environment together with the technology landscape become the cornerstone when negotiating existing or new partnerships.



Application Standards

The application standards provide a flexible and modular design approach for minimizing disruption due to changes. This flexibility is important and has several implications. A flexible focus causes application logic to be table-driven and allows programs to support management decisions changes with less maintenance. This focus also causes applications to be modular and seamless. Modularity allows for changes to be made in discrete segments of the applications, minimizing disruption to other modules, and reducing maintenance efforts. Seamless construction produces interfaces, which integrate applications processes with business cycle efficiency requirements, and provide end-to-end, streamlined effectiveness. Application architecture flexibility allows SMS to facilitate the introduction, administration and coordination of new products and services, positioning CCI to respond quickly to convergence marketplace opportunities.

CCI business support system is modularized along the major business functions such as Billing, Marketing, Inventory, Accounting, and Human Resource Management.

Business Support System Modular Design

- | | |
|----------------------------|--------------------------------------|
| ▲ Management | ▲ Ad Insertion |
| ▲ Billing-All Services | ▲ General Ledger, Accounting |
| ▲ Marketing | ▲ Human Resource Management |
| ▲ Field Service Management | ▲ Telephone, PCS, Network Management |
| ▲ Inventory | ▲ New Business |
| ▲ Office Automation | |

Think of the Whole Picture

- ✓ **Back-Office, Business Support System**
- ✓ **Middleware, Network**
- ✓ **Desktop, Interactive**

Network Infrastructure

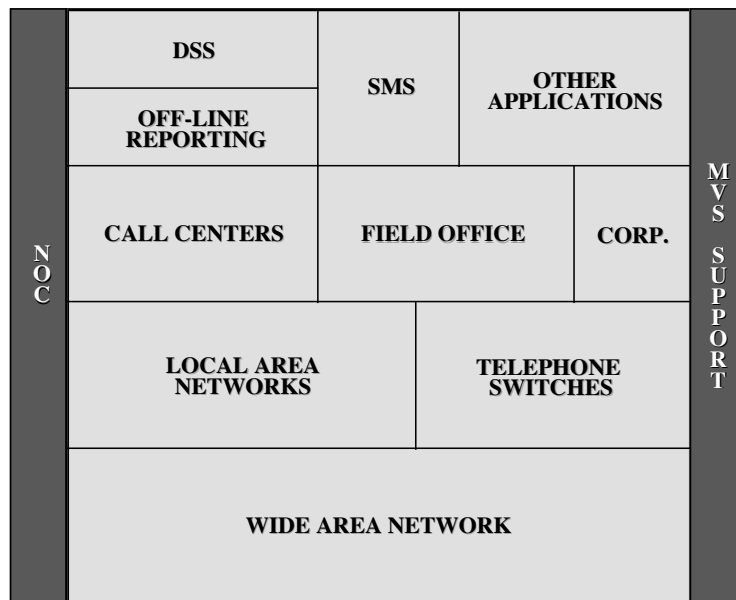
The network infrastructure includes all hardware, software, wiring, bridges, switches, and communications equipment to access remote information. Like a spinal cord, network infrastructure represents the enterprise backbone, enabling it to operate as a coordinated whole. CCI's network architecture includes local area networks, wide area networks, protocols, and network monitors. The network supporting the subscriber management system will connect all five data centers using ISDN (Integrated Service Digital Network) and frame-relay technology to provide high speed data transfer capability.

Security Provisions

The security provisions are a must to prevent unauthorized access to CCI information. A robust architecture defines independent security measures for the network, for each computer, for the applications, and for the data. This becomes especially important as CCI begins to use and offer Internet services. Sophisticated and exceptional security provisions will be critical for transactional and billing data integrity, Electronic Funds Transfers and credit card authorization, personal identification number (PIN) processing and usage, and third party remote access (i.e. Internet, telephony, network interconnections with vendors). Security provisions will be key to customer and vendor confidence, fundamentally contributing to business success.

Development/Support Methodologies

Project Interrelationships



The development/support architecture defines the methodology used to develop and maintain application software. Organizations are increasingly aware of the system maintenance cost which rapidly dwarfs the cost of system development. These costs include both measurable programming costs and immeasurable lost opportunity costs when new features cannot be rapidly added. To avoid these costs, high performance organizations have successfully deployed industry's best practices - including CASE, and fourth generation programming languages.

Computer Assisted System Engineering (CASE) tools enforce software design/development disciplines and reduce design and implementation oversight errors. They speed the generation of new applications, assist with impact analysis, and assist with error version control as the applications change. Third-generation languages are needed for specific performance requirements, but most development should be done in higher level CASE-based languages.

By using CASE appropriately, CCI speeds the development process of SMS, improves system quality, reduces maintenance costs, and extends the SMS's life. CCI's use of proven project management disciplines - project planning, tracking, estimating, reporting, and change management - also positively affects the quality and integrity of the final SMS product.

Index

Index

—A—

Across Technology, 53, 61
Addressability, 6, 48
Advanced Business Systems, 40
Apple Computer, Inc., 49

—B—

BSS, 5, 40, 42
Budgets, 20, 57, 60

—C—

Cable Ads, 5, 37, 38
CableData, Inc., 4, 12, 19, 29, 30, 32
CableData, Inc. (DDP/SQL), 4
Cabletron Systems, 13, 43, 49
CAD, 19
Call Center, 5, 6, 10, 11, 18, 31, 32, 40, 44
CASE, 68, 72
CCES, 3, 4, 6, 9, 10, 12, 13, 14, 16, 17, 19, 20,
21, 22, 27, 29, 30, 31, 33, 46, 47, 48, 58, 59,
61, 62
Chicago Data Center, 31
Cisco Systems, 49
CIT, 44
Client/Server, 68
Colony Communications, Inc. (EAZY), 4
Communications, 4, 20, 21, 26, 29, 32, 40, 44, 50,
61, 71
Compaq, 67
Computer Integrated Telephony (CIT), 44
Continental Customer Expert System (CCES), 29
Convergence, 3, 9, 40, 65, 67, 70
CSG Systems, Inc., 3, 9, 12, 13, 16, 18, 47, 49, 50
Customer Care, 3, 8, 9, 11, 17
Customer Care Technologies, 3, 8, 9

—D—

Data Centers, 4, 27, 29, 30, 33, 59, 71
Data Mart, 4, 24, 25, 26
Data Warehouse, 4, 23, 24, 25, 26, 27, 31
Database Technologies Inc., 26, 27
DDP/SQL, 4, 26, 29, 30, 31, 32
DEC, 31, 67
Desktop, 3, 9, 12, 16, 53, 54, 67
Digital Research & Development, 5, 34, 35
Digital Video, 36, 49
Direct TV, 48
Disaster Recovery, 4, 6, 30, 33, 41, 42, 43, 44

—E—

East Providence Data Center, 31
EAZY, 4, 29, 31, 32, 33, 50
Education, 58, 60
E-Mail, 15
Enterprise Data Model (EDM), 25, 26
Entex Information Systems, Inc., 49
Executive Information System, 53

—F—

Firewall, 30
Fleetcon, 19, 20, 47, 50

—G—

General Instruments, 49
Global Positioning System (GPS), 19, 20
Graphical User Interface (GUI), 16, 18, 19, 68
GTE Mobilnet, 49

—H—

Help Desk, 4, 6, 31, 41
High Speed Data (HSD), 48, 53
Human Resources, 6, 55, 56, 60, 61

—I—

IBM Corporation, 6, 13, 36, 43, 49
Infrastructure, 3, 4, 5, 7, 9, 11, 30, 33, 40, 42, 43,
64, 71
Integrated Workstation, 14
Interactive Television, 5, 35
Interactive Voice Response (IVR), 44
Interfaces, 4, 6, 12, 13, 14, 15, 16, 19, 20, 32, 37,
42, 43, 46, 47, 48, 50, 68, 70
Internet, 17, 30, 46, 67, 71
Intranet, 61
ISDN, 71

—J—

Jerrold Corporation, 49

—L—

Lab, 6, 18, 35, 45, 46, 48, 50, 61
LAN/WAN, 5, 40, 43
LANcity Corporation, 49
Legacy Subscriber Management Systems, 4, 28, 29

—M—

MCI, 43, 49
MCI Telecommunications Corporation, 43, 49
MicroAge Computer Centers, 13, 49
Multiple Vendor Service (MVS), 6, 30
MVS, 6, 30, 53

—N—

nCube, 36, 49
Near Video-on-Demand (NVOD), 32, 35, 48
Netlink, Inc., 31
Network Business Support System (BSS), 5
Network Infrastructure, 64, 71
Network Management System (NMS), 42
Network Operations Center (NOC), 5, 40
Network Services, 5, 39
NOC, 5, 40, 42, 43
Novell, 67
NVOD, 32, 35, 48

—O—

OLR, 4, 24, 26
OLTP, 26
Optus Vision, 3, 9
Oracle Corporation, 13, 26, 27, 36, 49

—P—

Paging Service, 17, 32
PAY80 (DDPF) Automated Reporting System, 4, 24, 26
Payables, 56, 57
Phoenix, 12, 16, 18, 19, 47, 50
Pilot House, 6, 54, 56, 60, 61
Plugged In, 61
Predictive Dialer, 44
Primestar, 31, 48
Purchasing, 44, 57
Pyramid Technology, 26

—Q—

Quality Assurance, 6, 50

—R—

Racotek, 49
RAM Mobile Data, 49
Reading Data Center, 30
Research & Development, 5, 6, 34, 35, 45, 46, 61
Research & Development Technology Lab, 6, 45, 46
Richmond Data Center, 31
RWD Technologies, Inc., 13, 14, 16, 18, 47, 49

—S—

SAM, 4, 12, 14, 29, 31, 32, 61
SCT, 59
Sequent Computer Systems Inc., 27
SMS Gap Study, 3, 9
Spectrum, 42, 43
Statements, 17
Stockton Data Center, 30
Systems and Computer Technology, Inc. (SCT), 59

—T—

Tandem Computers Incorporated, 26, 30, 31, 32
Telecommunications Support, 5, 39, 44
Telephony, 3, 5, 6, 9, 17, 40, 44, 46, 48, 71
Trafficking, 37, 38
Training, 11, 13, 14, 17, 37, 54, 57, 60

—U—

UNIX, 26, 27, 67

—V—

Video, 12, 13, 14, 15, 17, 21, 32, 35, 36, 37, 41, 46, 48, 49, 67
VisionTel, 37
VIT, 20

—W—

WAN, 5, 40, 42, 43, 67
Wide Area Network (WAN), 40
Workstation, 3, 9, 12, 14, 15, 43