Case Study Series

A REPORT OF THE NATIONAL TASK FORCE ON COURT AUTOMATION AND INTEGRATION

Colorado Integrated Criminal Justice Information System
Project Overview and Recommendations

By Amir Holmes and
David Usery, SEARCH
Dr. Robert Roper, Colorado Judicial
Branch

The Colorado Integrated Criminal Justice Information System (CICJIS) began operations in March 1998 and continues to evolve. The system currently processes felony case matters only; system enhancements to process misdemeanor, traffic, and domestic cases and to provide public access to the system are under development. CICJIS utilizes middleware[1] technology to integrate the information systems of five participating State justice entities.[2]

The National Task Force on Court Automation and Integration consists of 13 State court system representatives, including judges, State-level and trial court administrators, and consultants; and 9 government and justice system officials representing prosecution, defense, and law enforcement agencies, as well as a State legislator and a State chief information officer. For more information, visit www.search.org.

This case study is intended to provide a high-level overview of CICJIS. In addition to providing an overview of the statewide system, including the entities, technology, and information exchanges involved, this case study also: documents the scope of the system; lists the benefits of integration; describes the system's governance structure, planning and implementation process, cost and funding sources, network security issues, and ongoing developments; explains the lessons learned by the agencies involved in the CICJIS effort; and presents their recommended strategies for jurisdictions seeking to integrate information systems. Information contained in this case study was compiled through interviews and personal observations,[3] from the CICJIS Website (**www.state.co.us/gov_dir/cicjis/**), and from reviews of system documentation.[4]

System Overview

The mission of CICJIS is to "establish a seamless integrated system that maximizes standardization of data and communications technology among the primary Community of Interest Groups (CIGs): law enforcement, district attorneys, state-funded courts, and state-funded adult and youth corrections."[5]

CICJIS went live statewide with event-driven data transfers among the five participating CIGs on May 4, 1998.

Approximately 15,000 business transfer transactions occur every day. Person matches are made through the State Identification Number (SID), based on a digitized fingerprint. Incident matches are accomplished through matches of the court case number in summons cases, and through a combination of arrest number, date of arrest, and arresting agency when the docket number is not available in arrest cases.

CICJIS was developed by mutual agreement of the State Court Administrator and executive directors of the Colorado District Attorneys Council and state Departments of Public Safety, Corrections, and Human Services, and was formally established by the Colorado Legislature in 1996.[6] The statute also established the CICJIS Task Force — a working group currently comprised of the information technology (IT) directors from the five CIGs — to design, develop, and implement the system.[7] System staff and hardware are located in the Department of Public Safety.

CICJIS was established to meet the following objectives:[8]

1) To improve public safety by making more timely, accurate, and complete information available statewide to all CICJIS users, including individual decisionmakers in the system (for example, police, judges, corrections staff).

2) To improve the productivity of existing staff by reducing and/or eliminating redundant data collection efforts among the agencies/departments, and by reducing and/or eliminating "paper-based" processing.

3) To enhance access to timely, accurate, and complete information for both criminal justice agency staff and the public.

4) To provide statistically reliable information for the evaluation of public policy alternatives to the General Assembly, local and State agency administrators, and others through establishment of data standards.

In order to better understand CICJIS, it is important to look at the five CIGs involved, and the technology and information exchanges that support the integrated system.

Agencies Involved in CICJIS

Colorado Judicial Branch. The Judicial Branch component of CICJIS

includes all State-funded courts in Colorado.[9] Colorado's State-funded trial courts consist of District and County Courts. The District Courts have general jurisdiction over juvenile, civil, felony, and domestic relations cases. The County Courts have limited jurisdiction in civil, misdemeanor, and traffic cases. Pursuant to statute, trial courts are divided into 22 judicial districts and seven special water divisions. Each of the 22 judicial districts also has a probation department. The State-funded judicial system includes some 3,200 employees in 107 locations.

Colorado Bureau of Investigation. The Colorado Bureau of Investigation (CBI) is a division of the Colorado Department of Public Safety. It is a support service agency for law enforcement and other Colorado criminal justice agencies. At the Governor's direction, CBI investigative agents assist local agencies when requested to do so. The CBI laboratory staff analyzes and reports upon evidence submitted by local agencies. The CBI's Colorado Crime Information Center (CCIC) operates a telecommunications network and a file/records system that enables all State and local law enforcement agencies to communicate with one another within and outside of Colorado.

Colorado Department of Human Services, Division of Youth Corrections. In 1994, legislation called for consolidating the functions of the former Departments of Institutions and Social Services (except Medical Assistance) and the Division of Alcohol and Drug Abuse to create the Colorado Department of Human Services. Within this new department is the Division of Youth Corrections (DYC), which provides statewide services and programs to reduce delinquent behavior and protect public safety by controlling, assessing, and treating youths in the system. DYC directly administers these programs and contracts with facilities and programs to provide statewide services for juvenile offenders between the ages of 10 and 21.

Colorado District Attorneys Council. The Colorado District Attorneys Council (CDAC), which was established in 1972 to enhance intercity and interagency communications, is a governmental entity with statutory authority. It is a unique organization within the criminal justice community. Although recognized as a governmental unit, CDAC does not receive direct State funding: it is funded largely through county funding provided by the District Attorney Offices for the State's 22 judicial districts. Numerous Federal grants provide alternate funding to the CDAC.

Department of Corrections. The Colorado Department of Corrections (DOC) operates 22 major prison facilities in the State, housing approximately 12,000 inmates, and oversees approximately 3,000 offenders in various levels of community placement. The DOC's annual operating budget is $420 million. The DOC assesses offenders' needs and risks and regularly provides information to law enforcement and the courts regarding its current and past populations.

Technical Overview

CICJIS operates through a middleware solution whereby each participating CIG maintains its own legacy system[10] linked by a central index.[11] (See Figure 1: The CICJIS Architecture.) Information collected by any agency that is needed by any other agency is automatically routed to the requesting agency according to "business rules" that define the circumstances whereby information may be accessed or provided, to whom, and for what purposes. This solution enables the State to leverage its investment in the existing legacy systems used by local jurisdictions without requiring development of a completely new sixth system, even though the five CIG computer systems were not initially designed to communicate with one another.

CICJIS thus created a new criminal justice systemwide information system

from the five separate systems. According to the CICJIS *Strategic Plan,* "CICJIS creates a virtual database of all five agencies, with each agency having the ability to call stored procedures, which move data through the system."[12] While moving these data, CICJIS keeps track of the transactions and translates data between systems so users of the receiving agency see information as if they had entered it. A central index stores basic offender and case information as the information moves through the system.

CICJIS is designed to handle event-driven transfers, queries between systems, and data extracts for decision support and public access. The system is based on real-time data exchange, which takes data entered by the originating agency and automatically updates the other relevant systems. Common data definitions were established by the entities for data items shared among the entities or queried by local law enforcement. These data items meet National Crime Information Center (NCIC) standards, where applicable.[13] The data integrity is based on the real-time updating of various systems when an event occurs. CICJIS updates the data automatically so that user intervention is not necessary.

The CICJIS network uses a private TCP/IP[14] network among the five CIGs, which is used to transfer data back and forth and handle standard queries. The applications outlined in this report are designed to share files over a network with different computers and operating systems.

Figure 1: The CICJIS Architecture

Colorado Integrated Criminal Justice Information System Architecture
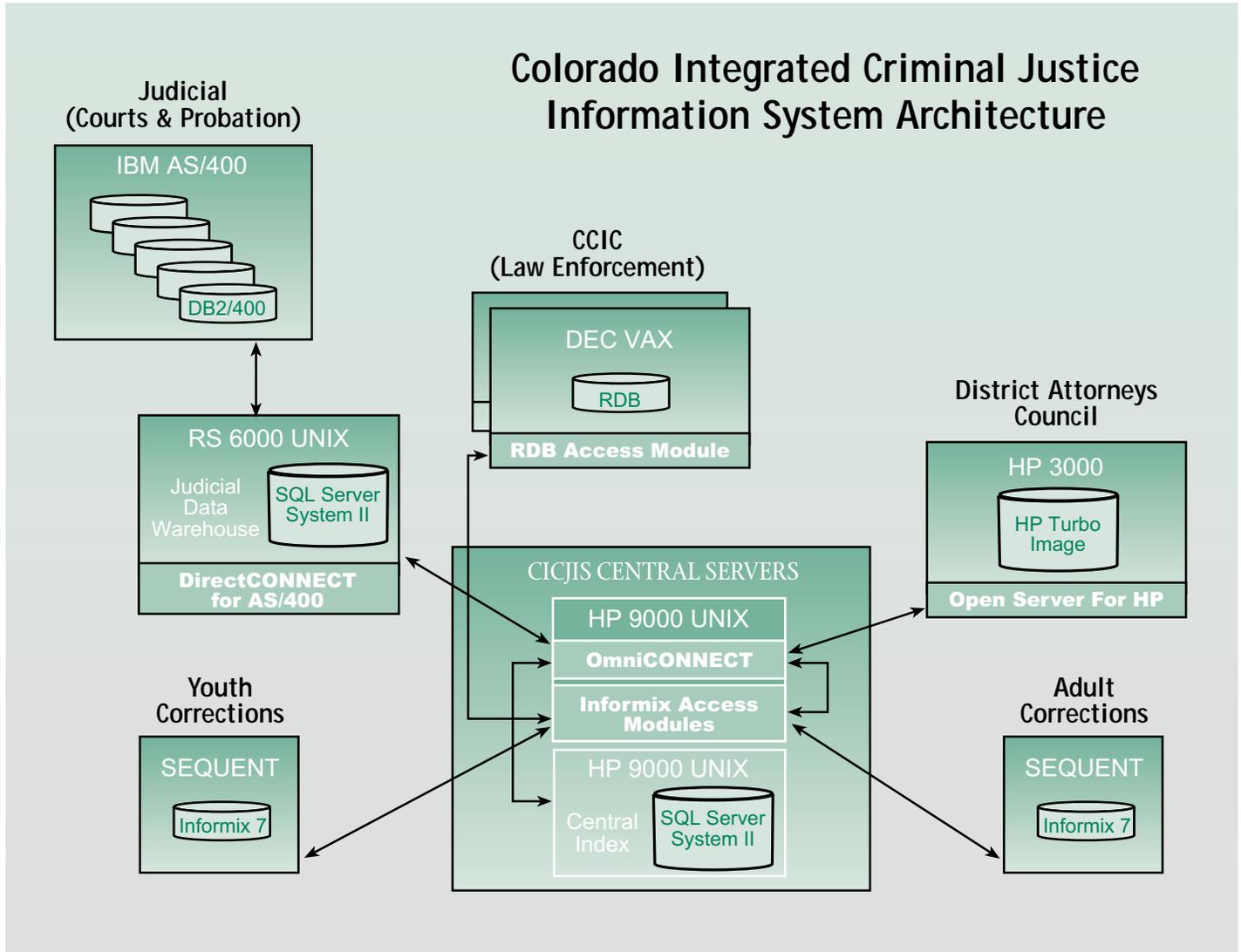
Information Exchanges

After three-and-one-half years of planning, analyzing, programming, testing, and organizing staff from the five participating CIGs, Colorado implemented data transfers between these CIGs on May 4, 1998. The CICJIS system is a "day-one forward system,"[15] meaning that it will take years for system users to link all of their cases and offenders with SIDs and other identifiers.

Tables 1 and 2 represent the data transfers and queries currently operational in CICJIS.[16] These lists include a brief description of each application, the primary agencies/departments involved in the data transfer or query, and related comments. Tables 3 and 4 represent additional transfers and queries that are planned for implementation beginning in calendar year 2001.

Table 1: Existing CICJIS Data Transfers

Application Description	Primary Agencies and Departments Involved in Data Transfer	Comments
Court-scheduled Events	Data transfers *from* Judicial *to* CDAC	
Restraining Orders: Initial Orders, Changes, and Vacates	From Judicial to CBI	
Mitts,[17] Assessments	From Judicial to DOC, DYC	
Initial Case Filing	From Judicial to CDAC; *or* From CDAC to Judicial	
Initial Arrest Filing	From CBI to Judicial, CDAC	
Witness Information	From CDAC to DOC	
Amended Charges	From Judicial to CDAC	
"No File" Decision	From CDAC to Judicial	
Victim Information	From CDAC to Judicial	
Warrants involve three major functions: 1) Transferring court warrants and cancellations to CCIC 2) Notifying the Sheriff's Office of a warrant and their ability to modify the warrant 3) Locating or canceling a warrant back to the court through messaging	Data transfers for each: 1) From Judicial to CBI 2) From CBI to Law Enforcement Agencies 3) From CBI to Judicial	Warrant transfers are now operational in Boulder, Jefferson, and Arapahoe counties. The transfers should be operational in the remainder of the State by December 2001.
Sentencing and Dispositions	From Judicial to CDAC, CBI	

Table 2: Existing CICJIS Queries

Application Description	Primary Agencies and Departments Involved in Query	Comments
Driver's History	CBI queried by Judicial, DAs, DOC	Division of Motor Vehicles Driver's History (CCIC collects DMV data via batch transfers — no direct, real-time queries of DMV are done at present)
LSI	DOC queried by Judicial, DAs	Level of Supervision Inventory (standardized measure of offender criminology)
YLSI	DYC queried by DOC, Judicial, DAs	Youth Level of Supervision Inventory (standardized measure of youth offender criminology)
Minute Orders	Courts queried by DAs	Court Minute Orders
SID	CBI queried by Judicial	This query allows court users to obtain an SID by entering the defendant's name, date of birth, sex, and race
Rap Sheets	CBI queried by DOC, DYC, Judicial, DAs	Fingerprint-based Record of Arrest and Prosecution (this also queries the NCIC)
Restraining Orders	CBI queried by DOC, Judicial, DAs	CCIC Registry of Restraining Orders — includes Municipal Court Restraining Orders, as well as State Court Restraining Orders
Warrants	CBI queried by DOC, Judicial, DAs, DYC	CCIC Registry of Warrants — includes Municipal Court Warrants, as well as State Court Warrants
Financial Summaries	Judicial queried by DAs	Financial Summaries include balances of fees, fines, and restitution charges and payments recorded on the court case management system

Table 3: Data Transfers to be Implemented in CICJIS

Application Description	Primary Agencies and Departments Involved in Data Transfer	Comments
Sex Offender Registry/ Other Status Tracking Codes	Data transfers *from* all agencies *to* the CICJIS Central Index	The primary transfer is to update the Central Index from the CCIC Sex Offender Registry, along with conviction and arrest counts (within Colorado)
Bond Information	From Judicial to CDAC	The computer entry of all judicial bond information will transfer to the CDAC database and the Central Index
Messaging after Contact by Law Enforcement	From CCIC to Judicial, DOC, DYC	Messages will be sent to the appropriate place if law enforcement has contact with an offender under the custody of any of the three agencies; messages will be handled through each agency's native mail/messaging system
General Messaging (between users at CICJIS agencies)	From all agencies to all agencies	Messages will be handled through each agency's native mail/messaging system
Detention Holds for Juveniles	From DYC to Judicial, CDAC (CCIC is now updated)	This will transfer detention information similar to other "initial contact with the system" transfers, such as Arrest, Initial Court Filing, or DA Case Filing
Escape Information	From DYC, DOC to CCIC	This will transfer the escape information to CCIC with the Fugitive Warrant Information

Table 4: Queries to be Implemented in CICJIS

Application Description	Primary Agencies and Departments Involved in Query	Comments
Central Index Query	Central Index queried by all agencies	Will allow agencies to query offender general information and current status in the system
Probation Case History	Judicial queried by CBI	CBI users can query probation case information in detail
Defendant Information	DAs queried by CBI, DOC, DYC	Agencies can query DA defendant information
Detainers	DOC queried by CBI	
Article Pawning	CBI queried by DAs	CCIC Registry of Pawned Articles
Wanted Vehicles	CBI queried by DOC, Judicial, DAs	CCIC Registry of Persons and Vehicles of Interest
DOC Information	DOC queried by CCIC, CDAC, Judicial	Crimes, Moves, Parole Conditions, Disciplinary Infractions, Parole Technical Violations, Restitution
DYC Information	DYC queried by CCIC, CDAC, Judicial, DOC	Crimes, Moves, Parole Conditions, Disciplinary Infractions, Parole Technical Violations, Restitution

Scope of Integration

The legislation that defined CICJIS created an integrated *criminal* justice system. The stakeholders in CICJIS, as it operates now, are the members of the criminal justice community. System expansion to facilitate integration with *all* justice system-related agencies and systems (including court, law enforcement, and prosecution agencies not currently participants in CICJIS), as well as other "noncriminal justice" entities (such as the Division of Motor Vehicles, schools, social service agencies, etc.), would likely require a substantial increase in system capacity. Major design and development resources and new hardware acquisition would be required to accommodate the increase in workload volume that such expansion would involve.[18]

To prepare for the possibility of expansion, CICJIS is beginning to estimate future IT objectives and resource requirements. CICJIS's present operational scope is limited to the electronic exchange of information related solely to felony cases in State-funded courts (although CICJIS does handle *all* warrants and *all* restraining orders regardless of the case type issued by the State-funded courts). Misdemeanors and lesser offenses are more

complicated to automate because of the multitude of case types and processes involved. Expanding the case types covered by CICJIS beyond the felony cases to include misdemeanors, domestic, and traffic cases would greatly enhance the utility of the CICJIS database, as well as offer CICJIS enhanced data quality benefits. ICON,[19] the information system used by the State Judicial Branch, covers all the State's District Courts (general jurisdiction courts) and all of the County Courts (limited jurisdiction courts), with the exception of the Denver County Court.[20] The Denver County Court and some municipal courts are currently exploring the feasibility of participating in ICON.

Future expansion of the system to incorporate linkages between CBI and local law enforcement information systems may also be considered. Integration of the state's District Attorney Offices into CICJIS is already underway. In June 2000, CDAC connected all of its smaller rural offices to Blackstone, its statewide system, and planned to have all field staff trained on the system by the end of calendar year 2000.

CICJIS is also exploring how to best provide public access to the system. One of the objectives of CICJIS is "to enhance

access to timely, accurate and complete information for both criminal justice agency staff and the public." Although public access involves very sensitive policy issues, the Legislature and the five CIGs are committed to finding a way to provide certain information to the public. For example, CICJIS submitted a plan to the State Legislature in October 2000 that outlined ways to provide public access to CICJIS information.

Benefits of Integration

A number of benefits are generally attributable to CICJIS. The Colorado statewide justice integration initiative:

Improves Public Safety. The first and foremost benefit is increased public safety through improved disposition reporting. A high rate of disposition reporting enables officials to make better decisions regarding such events as investigations, bonds, sentencing, and firearms purchase approvals, among others. Historically, however, criminal histories on offenders in Colorado have been incomplete; matches between court dispositions and arrests averaged around 10 percent.[21] Significant improvements have been made in this area over the past few years. This improvement results from the electronic

transfer of "matching information" from the District Attorney Offices throughout the State to the courts. According to the *Strategic Plan*, "As soon as the full electronic transfer of fingerprints is operational, these match rates for arrests should improve toward 100 percent."[22]

Eliminates Redundant Data Entry. CICJIS handles almost 15,000 transfers of information a day among participating agencies, many of which are sent to more than one agency. In the past, these data had to be re-entered at each of the receiving agencies. This reduction in redundant data entry results in more complete, accurate, and timely data transfers.

Provides Complete and Current Data. Availability of more complete and current information allows participating agencies to perform their duties more efficiently and effectively. For example, CICJIS allows for a single point of inquiry to obtain the current status of any individual with a record in the system; this results in improved tracking of individuals through the criminal justice system. In addition, the electronic transfer of critical information provides agencies with more complete data about a defendant and corresponding criminal justice events. CICJIS also ensures that participating agencies have more timely access to necessary information. Rather than waiting for paper transfers of information, CICJIS provides almost instantaneous access to criminal history, court case, and other criminal justice information that might have taken days or weeks to access in the past.

Improves Ability to Evaluate the Impact of Policy Changes. CICJIS has enhanced the ability of the State Legislature and all participating agencies and departments to measure the impact of justice system policy changes through the development and adoption of standard definitions of shared terms and fields. This practice has resulted in more uniform analysis and comparable data among the agencies and departments. Research using these interagency data is

more reliable and valid than research based on information that is not standardized. CICJIS is also seeking to improve activity reporting[23] and decision support. Once all queries defined in Table 4 are fully operational, researchers will no longer have to poll individual agencies for such information, and will have access to the data in a standard, comparable database.

Documented Benefits

The legislation that gave rise to CICJIS addresses the need to document cost benefits of system implementation. The statute[24] states that the project timeframe "shall include specific benchmark dates for the demonstration of cost and personnel savings and demonstration of results of the improvements described in section 16-20.5-101.5(2) [the four project objectives]."[25] As reflected in the legislation, CICJIS participants expect that documented benefits will more than pay for the implementation of CICJIS.

Quantifiable benefits of CICJIS implementation identified by the CICJIS Task Force include:

- **Using single-point statewide inquiries** has reduced the staff time spent researching criminal histories and compiling other related information on defendants and suspects throughout the juvenile and adult criminal justice system.

- **Minimizing redundant data collection efforts** has resulted in less staff time spent on re-entering data or tracking down correct information.

- **Reducing resources required for queries** has resulted because much of the information is populating researcher databases, thereby minimizing the amount of time that researchers spend accessing other agency resources.

- **Reducing paper-handling costs** has resulted due to the fact that much of the information that was transferred

by paper is now being electronically exchanged. Personnel, photocopying, and paper costs associated with paper-based information exchange are being saved.

- **Improved response times** have resulted through using a new telecommunications network that was installed among the five participating CICJIS agencies.

Organizational Structure/ Governance

The 1996 legislation that established the CICJIS organizational structure designated the directors of the five participating CIGs or their designees as the "CICJIS Task Force" and established the position of CICJIS Chief Information Officer (CIO), to be appointed by the Governor and the Chief Justice.[26] The executive directors and the State Court Administrator appointed their organizations' IT Directors to serve as the members of the CICJIS Task Force and designated themselves as the Executive Policy Board with responsibility for maintaining overall business authority over the system (see Figure 2). The Task Force subsequently established a Technical Work Group and a Tactical Business Group. The following is a summary of the roles and responsibilities of each component of the governance structure:

CICJIS Executive Policy Board. As indicated above, the board has business authority over the overall system. The Board members are:

- Executive Director, Department of Public Safety
- Executive Director, Department of Corrections
- Executive Director, Department of Human Services
- State Court Administrator, Judicial Branch
- Executive Director, Colorado District Attorneys Council

CICJIS CIO. Colorado's Chief Information Officer is appointed by the Governor and the Chief Justice to staff the Executive Policy Board, and fully participates in CICJIS Task Force discussions and activities.

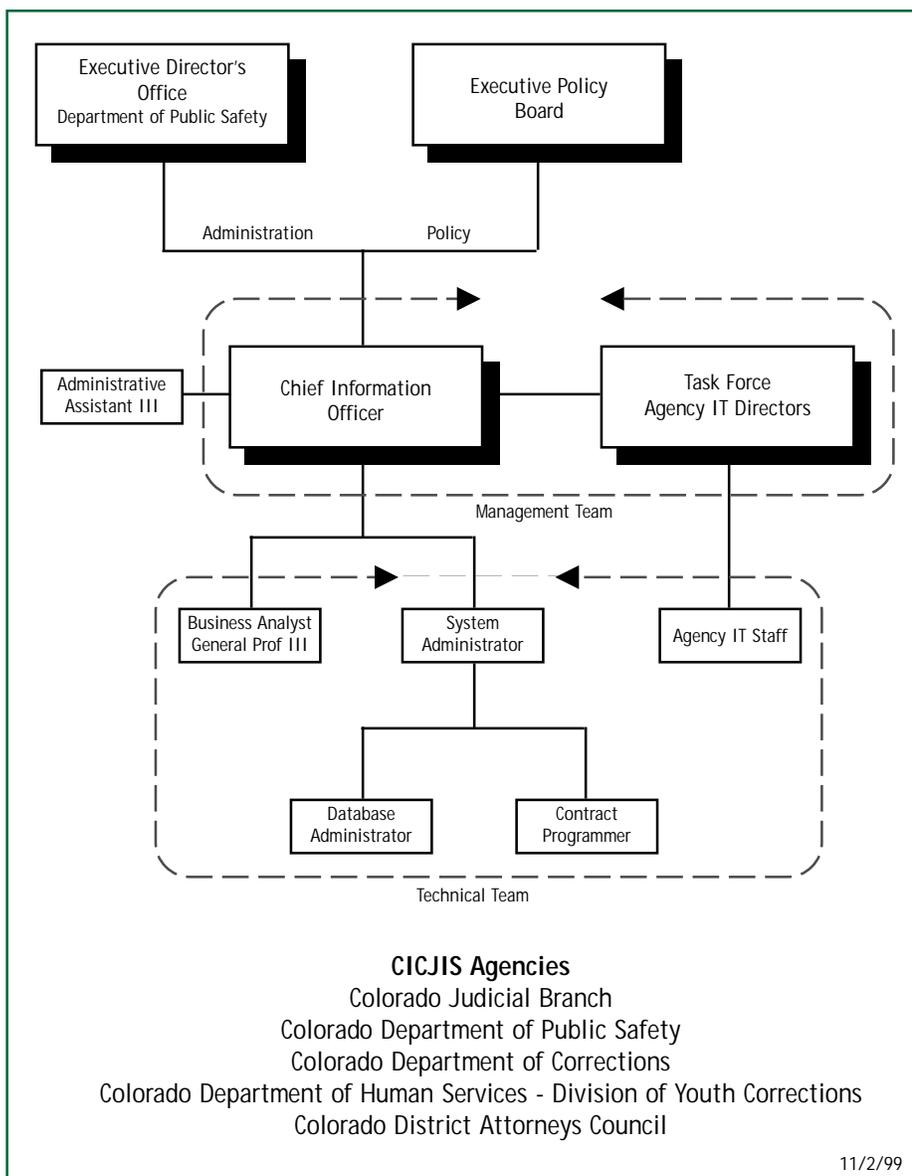**CICJIS Task Force**. Task Force Members are:

- CIO, Judicial Branch
- Information Systems Director, Colorado District Attorneys Council
- Information Systems Director, Department of Corrections
- Information Technology Services Manager, Division of Youth Corrections
- Systems Manager, Colorado Bureau of Investigation

CICJIS Technical Work Group and Tactical Business Group. The Task Force created the following groups to provide the Task Force with the end-user perspective on local business issues, and some technical perspectives that might have otherwise gone unnoticed in the development and implementation efforts:

- **Technical Work Group (Data Dictionary Team)**. This group is comprised of technical analyst/ programming staff from each of the five agencies and Sybase (the vendor for CICJIS's middleware), and the technical analyst staff member from the CICJIS project. This group is responsible for designing and implementing the CICJIS data dictionary, programming all transfers and applications, and building the central index.
- **Tactical Business Group.** This group is comprised of working staff (on-line users) from each of the five State agencies involved in the project, local law enforcement, other involved agencies, and the business analyst staff member from the CICJIS project. This group is responsible for determining the processes, screens, and programs that are viable solutions for online users. This group also tests applications upon completion and educates the CICJIS project staff on current procedures within their respective agencies and departments.

Figure 2: CICJIS Organization Chart

Executive Director's Office
Department of Public Safety

Executive Policy Board

Administration   Policy

Administrative Assistant III

Chief Information Officer

Task Force Agency IT Directors

Management Team

Business Analyst General Prof III

System Administrator

Agency IT Staff

Database Administrator

Contract Programmer

Technical Team

CICJIS Agencies
Colorado Judicial Branch
Colorado Department of Public Safety
Colorado Department of Corrections
Colorado Department of Human Services - Division of Youth Corrections
Colorado District Attorneys Council

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Planning and Implementing CICJIS

The CICJIS Project Plan was allocated an 18-month time span with a project start date of April 1, 1996, and project completion date of October 28, 1997. (CICJIS did not go live until May 4, 1998.) The project time frames can be separated into five phases:

1) **Preliminary Phase.** This phase consisted of the development of a data dictionary, application identification, vendor selection, contract negotiation, hardware purchase, and database development. It ran from July 1996 to October 1996.

2) **First Pilot Phase.** This phase included implementation of a pilot between CBI and CDAC to demonstrate feasibility of the middleware solution. This stage also allowed Colorado to prepare for the second pilot phase by having the necessary hardware and the network in place. It ran from October 1996 to December 1996.

3) **Second Pilot Phase.** This phase consisted of implementation of the second pilot phase, which involved *all* participating State agencies. This phase demonstrated the feasibility of the middleware solution throughout all five agencies. It ran from January 1997 to May 1997.

4) **Full Development Phase.** This phase entailed development of the remaining applications identified in the first phase of the project. It ran from June 1997 to December 1997.

5) **Implementation Phase.** This phase included testing of the entire system, training users, and moving into full production mode. It ran from January 1998 to May 1998.

Funding CICJIS

The CICJIS Project had a one-time total cost of $2.71 million in new State funds with some additional expenditures from Federal grant money (approximately $1 million).[27] The State funds, appropriated by the Legislature, include $1.11 million for hardware and software, $1.54 million for contract services, $55,000 for training and networking costs, and $5,000 for telecommunication services. Personnel costs for the CICJIS project amounted to $300,000, which came out of the CIGs' existing budgets.[28] The total implementation budget was $4,011,323.

The initial legislation did not provide funding for system lifecycle replacement expenses or system expansion. In future years, supplemental funding will be requested to upgrade the central computer to keep performance at an acceptable level as misdemeanors and traffic cases are incorporated into the system. In addition, each of the participating CIGs may need to request to supplement their staffs in order to respond to the new demands that CICJIS has created.

Network Security

The CICJIS network is closed, meaning nothing is directly tied into the network but the five host systems. Users on the various systems are able to access the other agencies' databases through their own host database. Firewalls are in place at each site between the users and the CICJIS network. These firewalls prevent any unauthorized access to the CICJIS network from a user on one of the other host machines. Security is not compromised, as each host is still responsible for the information it releases and updates, and with whom it chooses to share the information.

Upcoming Developments

Under the present system, users are constrained by the applications and presentations available to them through their respective agencies. The future direction is to move into a true client/server environment in which the user is the client and the various host machines are the servers, depending on the transaction. This future direction of migration toward true open systems — client/server computing — will entail substantial additional costs. Nevertheless, there is a clear migration path to the new environment that offers training in relatively low-risk steps into UNIX and the related communication software, as well as structured query language (SQL) between systems. The UNIX environment offers several advantages as platforms for future development. As a CICJIS document stated, "UNIX makes up 95 percent of the server market in client/server applications, and most of the available software and databases are written for this environment."[29]

The CICJIS Task Force is considering a variety of technical alternatives, including utilizing "applets" — Java-based Web applications — to support a common user interface into shared CICJIS applications.

The Task Force is also considering design of a dedicated criminal justice decision support database. Database development would require the development of a design tool that allows non-programming users to manage parts of the database structure and a replicator tool that allows for latent extractions from CICJIS into a decision support system.

Preliminary Phase (4 Months)	First Pilot Phase (3 Months)	Second Pilot Phase (5 Months)	Full Development Phase (7 Months)	Implementation Phase (5 Months)

Lessons Learned and Recommended Strategies

The CIGs have learned a great deal from their CICJIS project efforts to date. Based on their experiences, they offer the following recommendations:

1) The senior leadership of all agencies to be affected by proposed changes must be consulted throughout the process — from problem analysis to solution development to system design and implementation — in order to arrive at the solution that is best for all involved, as well as to ensure that all players are invested in the achievement of the same result. Organizations and individuals are always resistant to change. Conflicting personalities, egos, and distrust among system users are some of the greatest obstacles to integration efforts. Changing age-old processes may be a difficult task regardless of the potential benefits of the new system. For example, when warrant data transfers were attempted in a pilot site, there was strong resistance to changing current business processes. The resistance was the result of natural ambivalence to change, the lack of testing, and CICJIS design flaws. The problems encountered with warrants demonstrated that transfers could not be entrusted to one agency to implement when such major changes are involved. Old fears and mistrust make it extremely difficult for users in one agency to give up control of information to another agency. Resting the responsibility of data transfers with a single agency was nearly fatal to the system's development. Therefore, data transfers are handled by CICJIS, not the independent CIGs.

2) The most effective governance structure includes all constituent organizations and provides a neutral forum for consideration of issues. CICJIS' success reflects in part the equal standing of all organizations involved. The CIO can play a critical role in resolving differences of opinion among participant organizations.

3) Problem resolution should be handled at the operational level. In any system that has tens of thousands of users, it is inevitable that many unanticipated problems will arise. These problems may be central to the business process, or they may be pertinent to specific jurisdictions or issues, but there must be a way to handle these problems. According to the *Strategic Plan,* "CICJIS has stressed and supported the need for local CICJIS groups, which focus on the business practices within a jurisdiction. Many practices fit into CICJIS applications, but if the sending and receiving local agencies are not coordinating their activities, timing problems and other issues will arise. These issues need to be addressed as soon as they arise and must not be allowed to fester."[30] In Colorado, some jurisdictions have been more successful in resolving problems than others. The successful jurisdictions meet frequently — as often as weekly. Those local jurisdictions that appear to be experiencing the greatest difficulties either have no local CICJIS committees or rarely bring these committees together to resolve their problems.

4) Document the business and technical aspects of the project. Documenting the system from a business and technical perspective is essential for successful maintenance and future development.

5) Analyze business rules carefully before implementing an integrated system. The greatest challenges of CICJIS implementation have not involved technological issues; rather, they have involved *business rules*. These are protocols agreed to by the agencies sharing information regarding what action needs to occur or what document needs to be issued as a result of a particular action being taken, or as the result of the arrival or dissemination of a particular data element or data set or form, etc. Court scheduling, warrant issuances, charge filings, and other business procedures have to be analyzed to determine the most efficient way to automate these processes. CICJIS transfers and queries have been written and re-written to conform to the numerous business rules that guide information sharing among the five State agencies. In addition, the ability to share information electronically has required that CICJIS agencies reassess their business processes in order to create an efficient integrated system. Participants must study, define, and evaluate business rules before implementing an integrated justice system. The system must be developed with a clear understanding of business rules so major problems are not continuously arising after system implementation. In addition, business rules should be modified to take advantage of new system features. If the new system allows for more efficient processing of information, outdated business rules should not be allowed to hamper system efficiency.

6) Develop an integrated system incrementally and build upon early success. System implementers should set a manageable scope to initial integration efforts. If the initial scope of the system is too large, it may be fatal to further development. In Colorado, CICJIS began by addressing the information-sharing needs of five CIGs. It focused initially on felony cases. When CICJIS went live in May 1998, it handled only information transfers; however, in fall 1999 it began offering queries to its users. The CICJIS Task Force then began to consider if and how to expand the system to include the processing of traffic and all misdemeanor cases and to provide connectivity and services to additional agencies. The Task Force recommends constantly building upon successes and thereby creating momentum for future efforts.

7) Establish buy-in from system stakeholders. The lack of support from any one of the participating CIGs in an integrated system can be fatal to success of the project. Information sharing depends on the involvement of all participating CIGs. If one CIG fails to update its records, then the rest of the participating agencies are working with inaccurate and incomplete information. Staff from each CIG must be educated as to the benefits of integrating information systems. In addition, their fears regarding data contamination, loss of control, and hampered security must be alleviated. This is done through frequent meetings and open discourse about every aspect of system implementation. Moreover, all stakeholders must be involved from the outset of the project so that a common vision and similar objectives are developed.

8) IT acquisition must be viewed as a continuing investment; funding must be allocated accordingly. The old concept of converting to a new technology every 10 years, with little change in the interim, is no longer viable. Information systems need to be upgraded continuously throughout the system lifecycle to enable system owners to adapt quickly to the changing needs of the criminal justice community. Integrated justice system funding is not a one-time effort. Funding must account for costs of system maintenance and upgrades.

9) Ensure adequate resources after initial development during the implementation phase. Although the various CIGs provided adequate resources during the development phases of the project, they delayed other projects in order to complete CICJIS. Therefore, it should not have been surprising to learn that when CICJIS entered its implementation phase, the resources scattered and were redirected to the projects that had been put on hold. This made it difficult to refine and correct some of the initial problems.

10) Make sure the primary planners and implementers have good people skills, are committed to CICJIS, and have a capacity to reprioritize projects and resources. The successful implementation of CICJIS, more than any other type of automation effort, requires people who can get along with people — this is especially important in overcoming the historical problems and finger-pointing that has occurred in the criminal justice arena. At the same time, the point people need to be committed to CICJIS so that resources are not redirected elsewhere, and must also have the authority to redirect to CICJIS during the difficult times that will occur. Without these characteristics, CICJIS will suffer from other internal priorities that agencies and departments will experience.

11) Do not forget training. All of the best development and implementation will not be successful if users are not adequately trained in the technology and business impacts of CICJIS. An important part of this training is an effort to develop empathy among the users of the agencies and departments for each other's business practices. This is critical to breaking down the political and organizational barriers to a successful CICJIS.

12) Minimize technical change. One of the major reasons CICJIS was successful in Colorado was because CICJIS built on existing legacy systems — it did not force agencies and departments to migrate to other platforms. This allowed Colorado to keep project costs and development time to a minimum, maximize the technical expertise of the existing staff, and focus on the more important business issues.

13) Benchmarking against the goals and objectives of CICJIS is critical to continued marketing of the project. It is important to remember that CICJIS is not a one-time project — it is ongoing and will require maintenance and continuous development. The ability to document progress toward goals and objectives will be valuable in developing a business case justification for additional resources.

Conclusion

The Colorado integrated justice information system combines the systems of five separate entities into a single virtual database using data transfers and queries, creating a central statewide index. Information exchanges are based on business rules that the CIGs participating in the system have agreed to support and continue to refine. The system's success is a function of the participant organizations' ability to address issues on a justice systemwide basis, rather than an agency-specific basis.

ENDNOTES

[1] "Middleware" consists of a central database that translates messages sent by each State agency so that every computer in every agency is able to read those messages. The vendor that developed this middleware solution for CICJIS is Sybase.

[2] The five CICJIS participants are: Department of Corrections; Department of Human Services, Division of Youth Corrections; Department of Public Safety, Colorado Bureau of Investigation; Colorado Judicial Branch; and the Colorado District Attorneys Council.

[3] SEARCH Program Coordinator Amir Holmes conducted onsite interviews in March 1998 with CICJIS Chief Information Officer (CIO) David Usery, State Court Information System Director Dr. Robert Roper, and representatives of each participating entity. Mr. Holmes conducted additional interviews by telephone following initial rollout of the system in May 1998. On January 1, 1999, Mr. Usery became an employee of SEARCH. He subsequently updated the initial interview materials based on his familiarity with system developments through March 2000. The revised text was subsequently reviewed by Dr. Roper and by Mr. Marx Perbix, current CICJIS CIO, for accuracy.

ENDNOTES, CONTINUED

[4] The CICJIS documentation includes the *CICJIS Strategic Plan – 1998*; *CICJIS Response to HB95-1101, 11/9/98*; and *1998 Information Management Annual Plan, Parts I & II – Visioning and Planning and Baseline and Project*.

[5] State of Colorado, *CICJIS Strategic Plan – 1998*, page 3. Hereafter, *Strategic Plan*.

[6] As set out in Colorado Revised Statutes §§ 16-20.5-101 through 16-20.5-108.

[7] CRS § 16-20.5-103.

[8] CRS § 16-20.5-101.5(2).

[9] Locally funded courts — including the Denver County Court and local municipal courts, which have jurisdiction over local ordinance violations — do not currently participate in CICJIS.

[10] Each State agency maintains a legacy system — a computer system that pre-dates CICJIS development. For a detailed look at these legacy systems, select the "Agency Systems" link on the CICJIS Website at **http://www.state.co.us/ gov_dir/cicjis/**, which provides a full description of the hardware and software used in the five State agencies. In addition, an "Architectural Overview" section of the site provides further detail about the technology that operates the CICJIS network at **http://www.state.co.us/ gov_dir/cicjis/!CICJIS%20Systems/arch-over.html**.

[11] The CICJIS central servers are HP 9000 UNIX servers.

[12] *Strategic Plan,* page 9.

[13] NCIC is an automated database of criminal justice and justice-related records maintained by the FBI. The database includes the "hot files" of wanted and missing persons, stolen vehicles, and identifiable stolen property (including firearms). Access to NCIC files is through central control terminal operators in each State that are connected to NCIC via dedicated telecommunications lines maintained by the FBI.

[14] Transmission Control Protocol/Internet Protocol.

[15] Although some historical data among the five agencies have been linked, CICJIS is primarily intended to provide transfer and query capability in cases that are initiated *after* system implementation.

[16] Tables 1 and 2 are taken from the *Strategic Plan*, pages 16-18; however, the tables shown here do not reproduce training comments and hints shown in the original document.

[17] "Mitts" refer to *Mittimus* or Commitment Orders.

[18] Current legislation prohibits CICJIS from expanding beyond the original five CIGs until all of the original transfers and queries have been stabilized (through June 2001).

[19] Integrated Colorado Online Network.

[20] The Denver County Court is a separate Constitutional Court that falls outside the original scope of CICJIS.

[21] A separate file of court dispositions that lack arrest information is maintained by CBI. *Survey of State Criminal History Information Systems, 1995* (U.S. Department of Justice, Bureau of Justice Statistics: May 1997) p. 44.

[22] *Strategic Plan*, page 27.

[23] "Activity reporting" refers to collecting such data as number of arrests, prosecutions, sentencings, etc., and following cases through the system on an aggregate basis (as opposed to each agency reporting independent statistics).

[24] CRS §16-20.5-105(1)(e)(II).

[25] In addition, §16-20.5-108(3) states, "On or before January 1 of the year following the implementation of the local pilot program and each year thereafter, the counties participating in the local pilot program shall submit a report to the task force on the effectiveness and cost-savings realized by the integration of the local criminal justice agencies' information systems into the Colorado integrated criminal justice information system developed under this article."

[26] CRS § 16-20.5-103(1).

[27] The $1 million in Federal grants came in over the first 18 months of the project.

[28] Figures are taken from Executive Summary of *CICJIS Response to HB95-1101*, page 31.

[29] *Ibid.,* page 25.

[30] *Strategic Plan*, page 6.